The effect of Chinese economic growth on South Africa's exports to China

by

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DECLARATION

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I, Bella Benjamin Angomoko, student number 49133764, declare that the current study is my own work. However, I referred to other people's work in some sections of this study and acknowledged this in reference format, both in the text and the reference list. This study has never been submitted to any other university and I guarantee that this dissertation is my own legitimate work.

Signature……. Date…….

Bella Benjamin Angomoko

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Abstract

China’s economy has been experiencing high growth since 1979. The growth of China’s economy is attributed to the growth in its international trade. China’s economic growth affects trade growth of other nations because of the combination of its huge size, rapid growth and openness. This study investigates the direct effect of China’s growth on its imports from South Africa.

Keywords: China’s growth, effect of China’s growth, South Africa, international trade.

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Abbreviations

ADF	Augmented Dicker Fuller
BRIC	Brazil, Russia, India and China
BRICS	Brazil, Russia, India, China and South Africa
CES	Constant Elasticity of Substitution
EU	European Union
FDI	Foreign Direct Investment
GAO	Government Accountability Office
GATT	General Agreement on Tariffs and Trade
GDP	Gross Domestic Product
H-O	Hecksher-Ohlin
IMF	International Monetary Fund
OECD	Organisation for Economic Co-operation and Development
P-P	Phillips-Perron
R&D	Research and Development
SADC	Southern African Development Community
TFP	Total Factor Productivity
UN	United Nations
USA	United States of America
WITS	World Integrated Trade Solutions
WTO	World Trade Organisation

Chapter one

Introduction

1.0. Introduction

The aim of this study is to explore the effect of China's economic growth on its imports from South Africa. The first chapter of the study discusses the background and motivation of the study, as well as the problem statement, objectives and limitations of the study. Chapter two analyses trade relationships and benefits among nations, identifying factors that bring about an unequal share of trade benefits among nations. Chapter three discusses the history of China's growth and compares South African and Chinese trade components. Chapter four explains the research methodology and chapter five presents the analysis of results. The study ends with concluding remarks in chapter six.

1.1. Background and motivation

The rapid growth of China's economy is one of the major factors affecting the current global trade structure (Eichengreen, Rhee and Tong 2004:1). For the last thirty years, China's economy has been growing at annual rate of over 8 per cent (Zafar 2007:104). China's high growth rate is attributed to the growth of its import and export industries, which contribute about 70 per cent of its gross domestic product (GDP) (Humphrey and Schmitz 2006: i). The increased world demand for cheap quality Chinese goods has resulted in China's increased demand for raw materials from other countries to sustain its industries (Zafar 2007:104). Other countries' huge demand for Chinese exports, coupled with the high Chinese demand for raw materials from foreign countries, has influenced the world trade structure. In addition to that, China could be affecting the international trade growth of other nations because of the combination of it huge size, rapid growth and openness.

Dussel (2005) argues that China has become the most attractive trade destination in the current off-shoring process. He also believes that China's entry into the World Trade organisation (WTO) on 1 January 2001 changed the world trade structure like no other country before in terms of expectations, opportunities and threats (Dussel 2005:24).

As Eichengreen et al (2004:1) point out; the growth of China's economy is not a one-time shock, but an on-going process of growth that is expected to continue for many years. This is supported by the fact that the International Monetary Fund (IMF) predicts China's real GDP

growth to average 8.5 per cent between 2013 and 2017 (Morrison 2013: 3). In addition, as revealed by Henderson (2008:380), China's share in the growth of world exports is projected to be 15.4 per cent by 2020, compared with the United States of America's (USA) 9.9 per cent, Japan's 6.3 per cent and Germany's 3.8 per cent.

The rapid expansion in China's economic growth has made the country target the world as its market (Sun and Heshmati 2010: 2). China's export industry might be fighting to maintain its already established markets and acquire more markets for its goods and services. To some countries, China's growth might open opportunities as new markets for their goods and services. On the other hand, it might also limit the trade growth and development of other countries.

China's goods have been found to drive away goods from other countries in third markets because of their relatively low prices. According to Morrison (2013: i), China's goods are cheap because China has abundant cheap labour and its government provides subsidies to export industries.[1] The sales of low-end Chinese consumer goods in Africa may destroy local economies in Africa, where manufacturing industries are still underdeveloped. Very cheap Chinese goods penetrating African economies may create resentment and backlash in these countries (Pannell 2008:11). A study on the crowding out effect of China's exports shows the links between China's rising textile exports and declining African exports (Renard 2011:24).

Empirical studies have shown that China's economic growth has had a positive effect on employment, real GDP and productivity in some major countries such as the USA, Japan and European Union (EU) countries (Gallegos and Brando 2012:199). In contrast, in Mexico, China was found to have a negative effect on employment and GDP growth (Gallegos and Brando 2012: 199). It has further been shown that China's exports crowd out exports from other Asian countries in third markets, with the main effect on consumer goods and less effect on capital goods (Eichengreen et al 2004:22). This may be because China exports mainly consumer goods. The story is not different in Sub-Saharan Africa, where China's exports are taking over Sub-Saharan export markets because of strong competition resulting from its low production cost and also because of its ability to integrate into international production networks (Montinari and Prodi 2011: 76).

[1] Rodrik (2006) suggests that the current industrial structure and export activity in China are a result of its industrial policies of "promotion and protection" initiated since 1978 (Girma, Gong, Görg and Yu 2008:1).

Another concern about China's growth is that Chinese exports displace domestic production in importing countries and reduce domestic production and overall economic growth (Rangasamy and Swanepoel 2011:141). African producers are unable to compete with China even in their own home markets because they are not able to cut their production costs and prices to match the low-priced Chinese goods. Tull (2006:472) has indicated that local retailers in Africa are also faced with rapidly increasing business competition from expatriate Chinese traders. The tendency of Chinese firms opening branches in other countries through expatriate traders could be killing African small and medium businesses. In addition, China's foreign direct investment (FDI) does not support diversification into manufacturing and service activities. Thus, the rise of China may push Africa further towards "raw material corner" (Goldstein, Pinauld, Reisen and McCormick 2007:1). This is not good for the growth of African economies. Africa needs manufacturing industries to process its vast minerals into finished goods and compete with developed economies in the world market.

In spite of all this, there are many who would disagree with the assessment of the negative effects of China's growth, including most of the African leaders who welcome Chinese trade with open arms. African scholars, policy analysts and entrepreneurs are all impressed with the economic growth in the continent since the Chinese aggressively began to extract and import raw materials from Africa and invest in all sectors of the economy (Lee: 2007:26). African elites consider China's growth as a model worth emulating and as a potential catalyst for socio-economic development in Africa. They look at China's trade interest in Africa as an opportunity for Africa to cut neo-colonial ties to the West. However, there is no clear evidence that Chinese-African trade is different from Western-African trade, nor is it obvious that Chinese-African trade will improve African development prospects (Tull 2006:471). Therefore, Chinese-African trade should be analysed critically to avoid wrong conclusions about the relationship.

The effect of China's growth can be transmitted to other countries through a number of channels. These include trade flows, technological transfer, FDI, integration into global value chains and aid flows. Other effects may also be transmitted through the environment, financial flows or participation in institutions of regional and global governance (Kaplinsky, McCormick and Morris 2010:1). The focus of the current study is on the effects that can be transmitted through trade flows. The effects of trade flows come about in two different ways,

namely direct effects and indirect effects. This study considers mostly the direct effects of China's growth on its trade with South Africa.

Against the above background, this study seeks to determine the effect of the growth of China's economy on the growth of South Africa's international trade. The question that this paper seeks to answer is, "Does China's economic growth increase trade flow between South Africa and China?"

1.2. Problem statement

Rangasamy and Swanepoel (2011), in their study on China's impact on South Africa's trade and inflation, found that there was a limited short-term cost originating from trade competition with China. They found that increased Chinese demand for raw materials around the world benefits South African exports, because it has kept commodity prices at a high level. Moreover, technological transfer from China was found to have a significant impact on South Africa's overall economic growth in the medium term, but they did not point out the direction of the effect.

Another study by Sandrey and Jensen (2007) indicates that the free trade project between China and South Africa will benefit the South African economy from the welfare perspective. The economy will benefit from varieties of imported goods at lower prices. Low prices increase individuals' purchasing power; they can afford more goods. The study also shows that owing to the low prices of Chinese goods, trade between the two countries will put downward pressure on South African inflation.

The two studies did not mention whether China's growth had led to increased trade between China and South Africa. Thus, the current study investigates the effect of China's economic growth on South Africa's international trade during the period 1988 to 2013, using annual trade data from both China and South Africa for the period. It seeks to determine whether China's economic growth presents export and import opportunities for South Africa.

1.3. Objectives of the study

The major objective of the study is to determine the effect of China's economic growth on South Africa's export to China.

1.3.1. Specific objectives of the study

1. To examine the patterns of South Africa's trade with its major trading partners. In pursuing this objective, the researcher will try to determine changing trends in South Africa's exports to its major trading partners.
2. To determine the determinants of trade relationship between South Africa and China. These objectives will help us find out what are the factors behind the rapid trade growth between South Africa and China.
3. To determine the relationship between China's growth and its imports from South Africa. Examining the relationship between China's growth and its imports from South Africa will reveal whether South Africa is benefiting from China's booming growth.

1.4. Limitations of the study

There are quite possibly more delineations and limitations in this study than those mentioned here. The first limitation is that the study only focuses on traded goods, leaving out FDI or any other kind of transactions and services provided between China and South Africa. The second limitation is that of limited trade data between the two countries.

Chapter two

Literature review

2.0. Introduction

This chapter comprises both a theoretical and an empirical literature review. The theoretical review includes an analysis of trade relationships and benefits between nations, a review of sharing benefits that arise from international trade and a discussion on the effects of international trade. The empirical review includes discussions on empirical studies on the effects of China's growth and studies on factors affecting South Africa's international trade**.**

2.1. Theoretical review

The study begins the literature review with a theoretical review of the trade relationships and benefits among nations. It is important to review trade relationships and benefits among nations because they form the basis of international trade. Section 2.1.2 of this chapter discusses factors that determine sharing of trade benefits among nations, pointing out which countries benefit more. This is followed by a discussion on the effects of international trade on all countries across the world.

2.1.1. Analysing trade relationship and benefits among nations

Major world financial institutions[2] advocate trade liberalisation through reduction of trade barriers to promote international trade. As Matto, Stern and Zanini (2008:11) indicate, reducing trade barriers is likely to lead to improved quality, increased variety and lower prices of goods and services; increased variety of goods and services increases consumers' welfare and standard of living. On the other hand, trade restrictions on goods and services reduce consumers' welfare, since they create a wedge between domestic and foreign prices, which reduces consumer surplus more than increases in producer surplus and government revenue do (Matto et al 2008:11).

The study of trade relationships and benefits among nations date far back; it is believed that the first study of the subject was carried out by Adam Smith (1723-90). In his book, "An inquiry into the Nature and Causes of the Wealth of Nations (1776)", Smith pointed out the importance of trade among nations, as this increased productivity. According to Smith, trade between nations widens markets and motivates firms to increase production in order to satisfy

[2] These financial institutions are the IMF, World Bank, European Development Bank and others.

the increasing market. He found that benefits of trade between nations came about in two distinct ways: Firstly, if there is no demand for items, surplus production can be taken to another place (country) where there is a demand and in return something else for which there is a demand at home can be brought back. Secondly, when a commodity is exchanged for something else, that "something" else may satisfy part of the community's wants that cannot be satisfied by its own production. As argued by Thirlwall (2000:6), increased markets for home produce above home consumption encourage home labour to improve its productive powers and overall annual production, thus increasing the real revenue and overall wealth of a society.

Smith analysed the dynamic force of international trade. The dynamic force of international trade constitutes an extension of the market for home goods. International trade makes it possible to overcome the reduced dimension of the internal market. By extending the market, international trade enhances division of labour and increased production. Therefore, international trade introduces a dynamic force capable of intensifying the ability and skills of workers, improving technical innovation and accumulating wealth, thus giving participating countries the capacity of enjoying economic growth by overcoming technical limitations (Afonso 2001:4).

Smith summarised the benefits of international trade in what he called an absolute advantage theory. In his absolute advantage theory, Smith assumed every country could produce one or more commodities at a lower real cost than others. As Dunn and Mutti (2000:20) point out, a country can benefit from trade by specialising in commodities in which it has an absolute advantage and importing commodities that it produces at a higher real cost than other countries. This means that for a country to benefit from trade, it has to import commodities in respect of which it has an absolute disadvantage in production and concentrate on producing and exporting commodities in which it has absolute advantage.

Following Smith, David Ricardo (1772-1823) developed the theory of comparative advantage. In his book, "Principles of political economy and taxation" (1817), Ricardo claimed that absolute advantage is not a sufficient condition for a country to benefit from trade with a trading partner. Both nations can benefit from trade although one country has an absolute advantage in the production of all commodities, as long as each has a comparative advantage (i.e. a lower ratio of real cost in terms of labour inputs) in the production of at least one commodity (Dunn and Mutti 2000:20). Comparative advantage states that country A

should import a commodity it produces using a higher amount of labour than country B. According to Negishi (2001:34), country A should therefore export commodities it produces with less labour than country B. In that way both countries will benefit from trade by exchanging commodities following the comparative advantage rule. Ricardo (1817) also presented the static forces of international trade on economic growth. According to him, without international trade the remaining two forces of economic growth (savings and the institutional element) will soon reach a "stationary state". As Afonso (2001:4) argues, international trade could delay a fall in the profit rate and subsequent time to reach the "stationary state".

However, trade that is based on the comparative advantage theory may have a negative effect on home industries because importing cheap commodities kills the demand for home goods in the same industry. According to Elwell (2006:2), trade based on comparative advantage may lead to the collapse of companies and many workers being displaced in the short run, causing unemployment. In the long run, the overall effect of trade based on comparative advantage results in elevation of economic well-being; it provides citizens with varieties of commodities at a cheaper price.

Another study to determine trade relationships and benefits was carried out by two scholars, Eli Heckscher and Bertil Ohlin. The Heckscher-Ohlin (H-O) model rejects the classical approach of Smith and Ricardo that considers only a single input, labour, in production. According to the H-O model, more than one factor go into the production of a commodity in different proportions. Dunn and Mutti (2000:20) have pointed out that the H-O model identifies two factors of production, namely land and labour.

The H-O model assumes international trade will lead to equalisation of individual factor prices. It says that in a country with high factor prices (rent and wages) before trade begins, there will be a tendency for the factor prices to fall with an increase in trade and vice versa. Learner (1995:2) indicates that in the H-O model, trade will benefit the abundant factor by raising the amount it is paid and harm the scarce factor by causing its payment to decline. The model also claims that potential decline in the marginal productivity of capital in an open economy will be completely offset by a shift in the product mix towards capital-intensive products. However, in a closed economy the shifts in product mix will be more limited, since everything has to be sold internally.

All the models point at the benefits of international trade and agree that a country should specialise in the production of particular commodities in order to realise benefits. It is from these theories that different countries tend to determine which commodities they should produce for the international market so as to obtain the much needed foreign reserves to help them acquire foreign goods and increase their economic growth. Based on the theories, every country can gain from trade, depending on the choice of trading commodities and trading partners.

2.1.2. Sharing benefits arising from international trade

The theories discussed above point out the benefits of international trade to trading partners. It should be noted that these theories only show how the benefits may arise, but do not show how the benefits are shared between trading nations. There is no doubt that all trading nations benefit from trade, but it should also be noted that one country might benefit more and to some extent take what could have been beneficial to its trading partners' development.

International trade theories proclaim the benefits of international trade, thus many countries advocate free trade in the expectation of gaining. Historically, international trade contributed greatly to the growth of developed nations at different stages, not only by contributing to more sufficient resources within the nation, but also by transmitting growth from one part of the world to another. As Thirlwall (2000:6) argues, although it is agreed that international trade contributes to a country's growth, the benefits are both dynamic and static, and there is no theory of a customs union that says the benefits from trade are equitably distributed among nations.

In this section, the current study looks at what brings about an unequal share of international trade benefits. Indeed, not all countries gain from trade at the same level and this is because of different factors involved. Firstly, the current measure of benefits from trade is economic growth and development of nations. Benefits from trade with a rapidly growing emerging economy are not static, as claimed by Ricardo. Economic growth changes the relative economic circumstances of trading partners; it alters the relative abundance of economic resources, sources of comparative advantage and relative trade gains. Elwell (2006:2) has shown that trade can still leave a country better off than it would be without trade, but the size of the country's gains from trade could rise or fall, depending on the situation and magnitude of changes in the economic growth of its trading partners.

Secondly, it is also believed that a country's choice of trading partners affects its benefits from trade. Developing countries may benefit more from trading with developed countries and this could be more technically innovative than trading with their fellow developing countries. Technically innovative countries open access to new goods and technologies necessary for economic development. Yanikkaya (2002:72) found that a developing country that trades with developed countries benefits from trade not only because of technological transfer, but also because it gains access to a larger market.

Thirdly, while Gomory and Baumol's discussion on global trade argues that the 21st century national policies, based on investment, education, and research and development (R&D), bring about changes in the comparative advantage of nations, Sha and Hugues (2009:2) show that in some cases specific industries lost in one country could be gained by another industry in a different country. Sha and Hugues' arguments are supported by Kowalski (2011), who claims that the classical comparative advantage theory advocated by David Ricardo has become unreliable owing to increases in the mobility of factors of production, technology, ideas, goods and services across borders and it has resulted in significant changes in trade shares (Kowalski 2011:4).

Recently, the development of new technology has changed the way trade is conducted. Development of new technology has made it easy to order, pay and transport goods among nations and that has altered the benefits of trade to the extent that nations with high technological development are benefiting more than those with low technological development. The idea that a country should invest in a way that would shape and change its comparative advantage to achieve higher trade growth and gain from trade worked only in the 19th century world, where factors of production, land and labour were relatively fixed and did not flow easily among nations. Sha and Hugues (2009:2) indicate that in the 21st century national policies could guide the development of new trade strengths based on investment, R&D and education.

Fourthly, the major focus of benefits from trade has shifted to the measure of terms of trade. The division of benefits from trade between two countries now depends on terms of trade. Terms of trade measure the international exchange ratio that causes the equality of what one country wants to export to the quantity that it imports (Dunn and Mutti 2000:41). Elwell (2006:3) argues that terms of trade are a measure of the average export cost of acquiring desired imports. It depends on the prices of the exchanged commodities; the country that

trades in higher-valued commodities gains more than others. The problem with terms of trade measurement is that it does not reflect the gains from trade that comes from other bases of trade, for example, from the realisation of economies of scale. Economies of scale are an important element in economic growth; they have greater significance for trade between mature economies that have factors of similar proportions. Nevertheless, movement in terms of trade would remain indicative of changes in the benefits from trade coming from rising trade with low-wage economies that would still have more resource endowments (Elwell 2006:3).

Fifthly, instead of using comparative trade theory, studies now focus on sources of comparative advantage as the measure of trade benefits. Ricardo's famous example of England and Portugal, and cloth and wine in determining comparative advantage does not explain the sources of comparative advantage. The H-O Samuelson model gives the determinants of comparative advantage as relative factor endowment (land, labour and capital) and processes of using these factors to produce goods. Recent studies on sources of comparative advantage focus on the interaction of government policy and a regulatory framework, with the particular needs of individual sectors of the economy. For example, countries with better financial policy development export more in sectors that rely on external financing; countries with a better rule of law export more in sectors that have lower levels of input concentration and lower shares of customised inputs; countries with flexible labour policies have higher exports in industries with volatility of demand (Kowalski 2011:8). In general, countries with a good trade policy that brings in comparative advantage tend to benefit more from international trade than others.

Sixthly, Porter (1990) introduced management theory and the international competiveness of countries as measures of benefits of trade. He identified four attributes (which he called National Diamonds) that determine the competitive advantage of a nation. These are factor conditions, demand conditions, national competitive advantage and support industries. It has been shown that the existence of external economies as a result of clustering enables domestic firms to be much more competitive internationally (Smit 2010:115).

Lastly, another measure of benefits from trade among nations is the disadvantages of increased specialisation. Some countries fail to gain from trade because of the disadvantages of increased specialisation. Countries that specialise in sectors with less productivity growth and lower income elasticity of demand, such as the agricultural sector, will always be behind

in income growth. Redding (1999) calls this the "specialisation trap". Productivity growth in those countries will permanently be lower. The specialisation trap is compared to the so-called "learning-by-doing" approach. This approach explains how in the course of production workers learn to become more efficient. The implication of international trade for the "learning-by-doing" approach is twofold, namely that different sectors have different learning speeds and that countries that specialise in sectors with a faster learning speed will grow continuously. On the other hand, international trade intensifies comparative advantage through the learning-by-doing approach, leaving countries with poor learning rates growing slowly. Bidlingmaier (2007:2) argues that if trade opening leads a country to import high-quality goods instead of producing them locally, learning rates in that country, as well as subsequent economic growth, will be suppressed.

With regard to the current study, the determinants of a country's benefits from trade pointed out above, economic growth and development, R&D, choice of trading partners, investment, research and education, measures of terms of trade, sources of comparative advantage, management theory and international competiveness and the disadvantage of increased competiveness, work in favour of China. These could be the reasons why China's exports continue to grow and are threats to other nations' exports in third markets.

2.1.3. Effects of international trade

The effects of international trade on a nation are twofold, direct and indirect. The direct effects relate to bilateral trade between countries, whereas the indirect effect involves competing with other countries in a third market. The effects of international trade are both positive and negative. In the discussion below, the researcher presents some of the effects of international trade on participating countries.

Firstly, international trade affects employment opportunities in both importing and exporting countries. According to Isgut (2006: 2), international trade theories suggest exporting commodities requiring low skills have a positive effect on the wages of low-skilled labourers in the exporting country, but may lead to a decrease in the demand for low-skilled workers in the importing countries. Jenkins and Sen (2006:1) indicate that recently, developing countries have been experiencing loss of "good" manufacturing jobs as a result of import competition; conversely there is an increase in "bad" jobs in sweatshop industries producing for exports in developing countries. Job losses in the importing countries bring about both political and economic instabilities, which retard economic growth.

Secondly, international trade affects commodity prices, but mostly in importing countries. Import competition drives prices down. According to the "new" theories of trade, the effect of the response to imports flow competition on prices depends on the elasticity of demand. The impact of the import flow from low-income countries on developed countries' prices is more pronounced in sectors with an elastic demand. This might be due to the fact that it is easier for foreign firms to penetrate a market with elastic demand. The response of prices to a percentage increase in import competition is higher in sectors with inelastic demand. As highlighted by Auer and Fischer (2008:3), the import effect on sectors with different elasticity of demand is larger in the short run than in the long run. Auer and Fischer (2008:24) found that for every 1 per cent increase in imported goods from low-income countries to the USA, producer prices in the similar sector declined by 3 per cent. The effect also depressed the overall producer price across the US economy by about 2 per cent each year. It has been revealed that the combined effect of higher prices of commodity exports and lower prices of exports of labour-intensive manufacturers is more pronounced in countries exporting primary commodities and this has been noted in Latin American countries (e.g. Brazil, Columbia and Mexico), as well as in South Africa (United Nations 2012:9).

Thirdly, international trade affects industrial productivity. Amiti and Khandelwal (2009:2) argue that it is generally accepted that trade competition enhances innovation, which is a vital tool in fostering productivity. Trade competition stimulates technical progress, which in turn increases the demand for skilled labour, innovation and technological development (Bloom et al 2010:2). The effect of trade competition on productivity is explained by two broad theories, "compositional" theory and "innovation". Compositional theory suggests lower trade cost induces firms to change their product mix so that it can fit in the existing menu of products. This is mostly a result of importing from low-cost countries that reduces a firm's production costs. Firms will tend to move to producing high-tech commodities if the fall in trade cost occurs with low-wage countries.

Composition and innovation theories measure the effect of trade competition on total factor productivity (TFP) and cannot evaluate the effect at plant level. According to Teshima (2010: 1), TFP measurement suffers many biases and might reflect several differences across plants, apart from technical efficiency. Some firms implement new technologies better than others or sometimes other firms fail to implement new technologies, thus their productivity level will not be the same. The effect of trade competition on productivity also depends on the type of goods. Amiti and Khandelwal (2009: 15) argue that foreign trade competition upgrades

productivity in goods that are close to the world quality frontier and discourages productivity and quality upgrades of goods that are distant from the world quality frontier.

On the other hand, an exporting country becomes more innovative when gaining more exposure to a foreign market because of tariff reduction. When firms export, productivity gain from investment raises their profits both in the domestic and foreign market. Therefore, exporting raises returns that can be invested, leading to more productivity. It is also argued that firms that enjoy a large domestic market may not experience productivity gain from exporting, since they are already used to the large market situation (Lileeva and Trefler 2007:1). In general, complementarity between exporting and investing differs among firms. It may be because different firms have different post-exporting investment strategies. Nevertheless, several studies have found a positive relationship among trade liberation, technology adoption and productivity.

From the above examples of the effects of international trade, a need arises for countries to participate and increase their international trade growth. This is because of the possibility that international trade could increase employment opportunities by increasing firms' productivity and profits. International trade could also improve the standard of living of importing countries, since it provides citizens with a variety of goods at lower prices and increases government revenue through import and export tariffs.

2.1. Empirical review

In the previous section, the study looked at the effects of international trade and showed that they may be either direct or indirect. It can be suggested that any country can be affected and that any country can cause changes in the international trade structure. In the next two sub-sections the study will discuss the empirical effects of China's growth on major economic variables of other countries and the empirical factors affecting South African international trade.

2.1.1. Empirical studies on effects of China's economic growth

Various studies have been done on the effects of China's economic growth on different countries. This section discusses the effects of China's economic growth. China's economic growth has affected many countries. In some countries it has led to economic growth while in others it has affected economic growth negatively. Against this background, it will be better

to determine the direction of the effects of China's economic growth and to find out which countries are more vulnerable.

To start with, it has been revealed that China's economic growth has changed trade structures in both developing and developed countries. The effects of China's economic growth on trade in other countries have been both direct and indirect. The direct effects are mainly due to China's increased demand for foreign goods, mainly raw materials and machinery. According to Geda and Meskel (2008:248), some countries have been experiencing increased demand for commodities from China, causing an increase in their exports to China. In particular, Sudan's exports to China increased to 70 per cent in 2005 from 10 per cent in 1995, while Burkina Faso and Ethiopia observed increases in their exports to China of 33 per cent and 13 per cent respectively (Geda and Meskel 2008:248). On the other hand, Mauritian exports to China declined by accumulatively 55 per cent from 2002 to 2007 (Ancharaz 2009:626). The indirect effects of China's economic growth are mostly due to the country's exportation of goods. For instance, when China's competition in the global market intensified, Morocco saw its share of the global market decline, while Egypt increased its share of a growing export market (Brenton and Walkenhorst 2010:578).

Lall and Albaladejo (2004) point out that China is a potential threat to the growth of market shares of other countries, mostly its Asian neighbours. As highlighted by Lall and Albaladejo (2004:1444), the threat comes in different forms. Firstly, a partial threat develops when the world market share of both China and the other country rises in a particular market, but China's market share grows at a faster rate than the market share of the other country. Secondly, no threat is posed when China and the other country gain market share, but China's market share grows more slowly than the other's. Thirdly, a direct threat is posed when China gains and the other country loses. Fourthly, China might be placed under threat, when China loses and another country gains. Lastly, mutual withdrawal could occur, which is when both countries lose their market share.

Some studies have found that the trade relationship between China and Africa has a negative trade effect on Africa. Tull (2006:472) argues that if it had not been for China's importation of oil and other valuable minerals such as gold, platinum and copper from the continent, overall African trade with China would show a huge deficit for Africa. Using a gravity model, Geda and Meskel (2008:257) found that China's exports of clothing and accessories drove out African exports in third markets at a significant elasticity coefficient of minus 2.25,

while Indian manufacturing exports were found to complement Africa's manufacturing exports in third markets at a significant elasticity coefficient of positive 2.1. It can be argued that China's economic growth has intensified competition for African countries in the world market; nevertheless, it also provides additional sources of demand for African commodities. Brenton and Walkenhorst (2010:577) have found that the increase in demand provides opportunities for developing African exports and reduces reliance on traditional, but slow-growing markets in Europe and the USA.

As discussed above, some countries are gaining while others are losing in trade in response to China's economic growth. Renard (2011:23) revealed that countries that are producing capital-intensive and technologically advanced goods are gaining, while those producing labour-intensive commodities have reason to fear competition from China. According to Freund and Ozden (2006:3) the US Government Accountability Office (US GAO) report (2003) found that out of 152 main export industries in Mexico, 47 lost their market share to other countries. Of the 47 industries, China gained market share in three quarters or about 35 of them.

In general, China's growth affects countries differently, according to what type of commodities they are specialising in for export. For instance, as pointed out by Hanson and Robertson (2008:2), countries where manufacturing goods account for less than 25 per cent of merchandise exports are expected to benefit from China's growth, with the commodity boom lifting their terms of trade. Secondly, countries with diversified export production, spanning agriculture, manufacturing and mining, or where manufacturing accounts for between 30 per cent and 55 per cent of merchandise exports, experience mixed results in increases and decreases in the prices of commodities they produce. Thirdly, for countries that are highly specialised and where manufacturing accounts for more than 80 per cent of merchandised exports, China's growth is most likely to have an adverse effect, as China has become a rival source of supply in their third export markets.

It has also been shown that China has taken the competition into domestic markets of other nations, flooding their markets with cheap goods. Lee (2007:26) reveals that Ugandan traders have been travelling to China for years to buy goods and sell these in their local markets, but are now experiencing stiff competition from Chinese traders who bring the same products into the country at a much cheaper price. China's products have been able to dominate

domestic markets in Uganda because the domestic consumers are illiterate and only care about price, not quality (Lee 2007:26).

Another aspect is that the economic growth of China has affected both developing and developed countries' employment growth, mainly through increased exportation. A study on the impact of China's exports on Canada's labour market showed a negative correlation between China's imports and employment growth. Isgut (2006: 3) argues that whereas both low and high skilled workers are affected, the impact is greater on the low skilled labour. On the contrary, China's exports to the USA were found to have both negative and positive impacts on employment. In fact, according to Trade Partnership Worldwide (2005:9), the USA experienced net job gains (job gains minus job losses) of over 800 000 jobs because of importing from China. Jenkins and Sen (2006:301) show that technological differences between nations explain the effects of trade on employment. The cheap low skilled goods the USA imports from China do not affect the USA's highly skilled demand industries. Hence, the cheap labour-intensive Chinese products may only cause job losses in countries with high labour-intensive industries.

The growth of China's economy has caused commodity price changes all over the world. According to Rangasamy and Swanepoel (2011:142), China's economic growth has two opposing effects on price changes. Firstly, China's growth has led to a sharp rise in demand for commodities, which has in turn kept commodity prices high, consequently adding inflationary pressure. On the other hand, China's growth has a dampening effect on global prices. As pointed out by Feyzioğlu and Willard (2006:3), before 2003 Chinese exports exerted downward pressure on prices in other countries through exportation of low-priced commodities and also because China's manufacturing industries experienced excess capacity and the excess capacity drove manufactured goods' prices to decline. This deflation was propagated to the rest of the world because of the high growth in China's export share in world markets. Another reason could have been the low value of the Chinese Yuan to the dollar that put significant downward pressure on prices. After 2003, it became known that China exports inflation to other countries through sucking in goods at higher rates for which consumers in other countries have to pay higher prices.

A very notable effect of Chinese growth on world prices has been on mineral prices. China has become a key driver of price dynamics in metals. Zafar (2007:109) indicates that China is the world's largest consumer of steel, copper, coal, platinum and cement, and it is responsible

for much of the rise in the commodity-price index in recent years. According to the United Nations (2012:12), these effects are expected to fade; the slowdown in China's infrastructure and real estate sector will mark the end of the price super cycle effect.

Another effect of China's economic growth is that increased Chinese economic growth has encouraged trade growth and that has resulted in rapid technical change and the adoption and development of new technologies, contributing to productivity growth (Bloom et al 2010:1). It was found that a 10 per cent increase in Chinese imports in some selected countries is associated with a 3.2 per cent increase in patenting, a 3.6 per cent increase in information technology, a 12 per cent increase in R&D and a 2.6 per cent increase in total factor productivity (Bloom et al 2010:13). China's economic growth also affects the productivity of other nations by attracting many foreign investors from other countries. Schindler (2003:2) has found that many manufacturing companies have moved from other Asian countries into China, in large part to take advantage of the low labour cost and the growing domestic market in China. This could have had a negative impact on the productivity growth of other countries because of their capital flight into China.

Lastly, China's growth has helped maintain low interest rates and bound yields through its financing of the US deficit. There is some empirical evidence that high commodity prices are influenced by low real interest rates. According to Zafar (2007:109), by contrast, supply side factors in China are creating downward price pressures in a number of industrial sectors globally, including light manufacturers of textiles and clothing and high-technology products.

2.1.2. Empirical studies on factors affecting South Africa's international trade

South Africa's international trade is affected by a number of factors. These are foreign competition, trade policy, transport and customs infrastructure, telecommunication cost and real exchange rate volatility.

According to the United States International Trade Commission (2008:65), South African exporters are experiencing strong foreign competition, mostly from newly industrialised countries. There is stiff competition between Chinese and South African exports in the USA and EU. From 2002 to 2006, intensified competition with exports from China decreased the export of wood furniture from South Africa to the US and EU market (United States International Trade Commission 2008: 3-65). Rankin (2013:18) suggests that the only solution for South Africa to increase the competiveness of its local firms in foreign markets is keeping the costs of production low and improving the domestic business environment.

As highlighted by Edwards and Lawrence (2006:42), the South African government trade policy of tariffs and trade protectionism raises export costs by increasing the prices of intermediate inputs. They therefore reduce the profitability of export production. In another case, nominal tariffs tend to raise the relative return to production for the domestic market, thus shifting production out of the export market and towards the domestic market. Flatters and Sterns (2007: 7) found that although the sharp drop in South African tariff protection after 1994 increased South African non-commodity exports, it still appears that South Africa's government trade policy hinders its overall export performance.

As noted by Flatters and Stern (2007:10), the government of South Africa has made a substantial investment in its export infrastructure by constructing two state of the art car transport terminals to ease transportation of exports. Flatters and Stern (2007:10) have found that, nevertheless, there is still a variety of complaints, including congestion and high turnaround time, inadequate equipment and low skill levels. Flatters and Stern (2007:10) point out that in addition, South Africa faces natural disadvantages due to its geographic isolation. These disadvantages require South Africa to strive harder than other countries to avoid policy-sensitive impediments to trade. Matthee and Krugell (2012:4) argue that the high transport cost in South Africa is a constraint to export growth. Removing this constraint will improve the business environment in which firms operate and subsequent export growth.

According to Fourie (2007:4), telecommunication is a critical service activity in a country's participation in the international trade environment. Fourie (2007:4) shows that the development of telecommunication infrastructure helps reduce the cost of trade and increases trade. Fourie (2007:4) points out that including the cost of telephone calls in a gravity model has a negative and significant impact on bilateral trade flows. Edwards and Alves (2005:37) argue that despite the rapid growth in South Africa's telecommunication infrastructure, the country's telecommunication prices are considered the most expensive compared to other developing countries. Fixed-line costs have also remained high and are expected to continue rising until effective competition becomes a reality. Ortmann (2005:296) indicates that the high costs of telecommunication affects the competiveness of the affected business through increased business costs. Based on the level of South African development, it was expected that South Africa should by now be exporting telecommunication services. On the contrary, Sterns (2002:10) reports a negative relationship between South Africa's telecommunication exports and per capita growth.

As noted by Ekanayake, Thaver and Plante (2012:13), exchange rate volatility directly affects exports because it brings about uncertainty and adjustment in export costs. It also has an indirect effect, since it affects the structure of output, investment and government policy. According to Flatters and Stern (2007: 13), rising exports of resources in South Africa have led to appreciation of the rand. A stronger rand against major currencies could contribute to the declining competiveness of South Africa's exports. The United States International Trade Commission (2008: 66) reported that in 2005 the Alexander Rose Company stopped importing furniture from South Africa because the value of the rand rose by 40 per cent against the US dollar.

Chapter three

Country-based literature review

3.0. Introduction

This chapter comprises a country-based review of China and South Africa. The chapter discusses the various trade components of both China and South Africa. The review of China entails a description of China's economic and export growth, while that of South Africa discusses the growth of South Africa's international trade. The last section of the chapter compares the trade components of South Africa and China.

3.1. China review

This section will discuss the history of China's growth and the influence of its exports on economic growth.

3.1.1. History of China's economic growth

According to Powell (2012:1), China's economic growth now stands close to 10 per cent from only 4 per cent in 1979. Considering this figure, it means that on average China has managed to double the size of its economy in real terms every eight years (Morrison 2013: 3). This is a very rare occurrence in the history of any country's growth. Table 1 below shows the milestones of China's rise in the world economic ranking.

Table 1: Milestones of China's rise in total economic size

YEAR	RANK IN WORLD	AS PERCENTAGE OF THE USA	OVERTAKEN COUNTRY
1978	11th	< 8 per cent	
2000	6th	12.04 per cent	Italy
2005	4th	17.53 per cent	Britain, France
2008	3rd	26.68 per cent	Germany
2010	2nd	31.35 per cent	Japan

Source: Lu (2011:536).

Table 1 shows that China's growth as a percentage of the USA's worth increased from less than 8 per cent in 1978 to 31.35 per cent in 2010. China's considerable growth started in 1978. Over a period of only 32 years (from 1978-2010), China rose to second position in the world ranking and soon will be the number one economy in the world.

According to Chow (2004:128), the current high Chinese economic growth is attributed to the 1978 economic reform. In I978 China started market-oriented economic planning with the emphasis on agriculture, industry, science and technology, and defence. Lu (2011: 537) states that the 1978 economic reforms have been praised for installing institutional elements of a modern market economy, including protection of property rights, commercial banking and the capital market, the legal status of private business, a modern taxation system and mechanisms to enforce contracts. These elements have encouraged private investments in the country and brought about rapid economic growth.

As reported by Woo (1999:1), in 1997 the Chinese communist party decided to privatise most of the state-owned enterprises and also advocated economic reforms that would encourage foreign investors and consequently the growth of China's export sector. Henderson (2008:378) argues that the growth of China and the extension of the neoliberal economic project during the same period was a matter of coincidence. He indicates that the inflow of FDI was quite significant but not sufficient to affect the high Chinese growth; instead, the most important factor might have been the freeing of trade in manufactured commodities under the World Trade Organisation.

As Powell (2012:1) indicates, like any other fast growth in East and South East Asian economies, China's good economic performance since 1978 has been due to the increasing liberalisation, internalisation and privatisation of economic activities. International trade accounted for only 11 per cent of economic activity in 1987, as the government's economic policies emphasised "self-sufficiency", but at present international trade contributes about 70 per cent of its GDP growth (Powell 2012:1). Gallegos and Brando (2012:200) argue that China's liberalisation and privatisation were carried out under strict government leadership and supervision. These strategies are the cornerstone of the successful Chinese creation of a free market and economic growth.

Kaplinsky, McCormick and Morris (2010:1) point out that it is also believed that the Chinese strategy became more successful when foreign companies began to take advantage of their comparative lead in China. About 450 of the 500 biggest companies from 202 different countries have already invested in China and the number is increasing. These companies might have come with a lot of capital that they invested in the major export industries, thus boosting the Chinese export sector and consequently its growth.

Therefore, it could be agreed that the growth of China is attributed to its trade liberalisation and openness. This argument is supported by Humphrey and Schmitz's (2006) study, which shows that international trade (import and export) accounts for over 70 per cent of China's GDP, compared with only about 25-30 per cent in the USA, Japan and major EU countries (Humphrey and Schmitz 2006: i).

In summary, the growth of China's economy came from three distinct sources: the accumulation of capital, productivity and global integration. As highlighted by Gallegos and Brando (2012:201), accumulation of capital is assumed to be the first phase between 1952 and 1978, followed by productivity with expansion in the private sector and lastly, global integration through opening policies responsible for the current high levels of external trade and the growth in foreign reserves.

3.1.2. China's exports and their influence on Chinese economic growth

According to Naudé and Rossouw (2010: 100), the growth of China's economy is mainly attributed to its export growth. China has now overtaken Japan as the world's second-largest economy. Lu (2011: 536) indicates that China has become a global hub for manufacturing industries, the largest exporter and the largest energy consumer in the world.

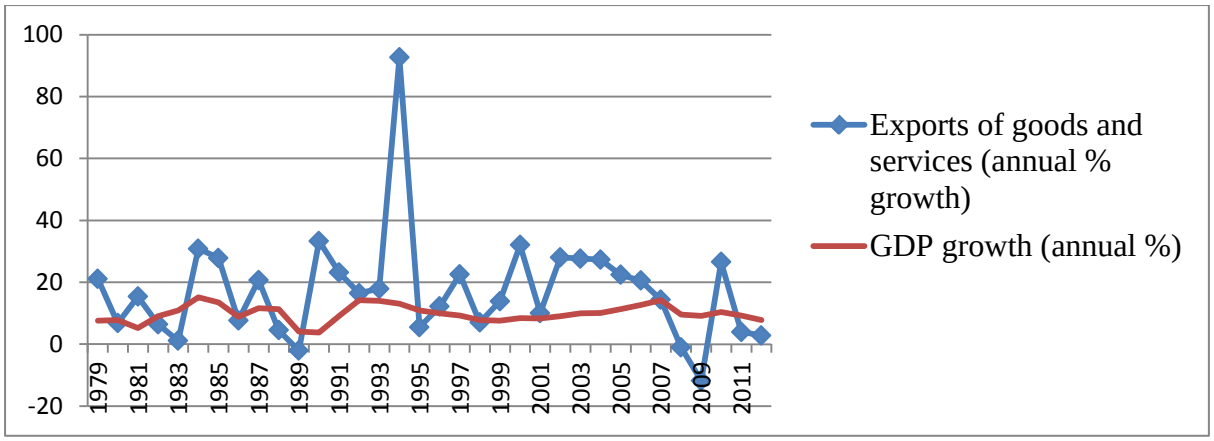
China's export growth has been higher than its economic growth, at an estimated rate of over 20 per cent per annum. Bijian (2005: 5) has found that the high export growth has raised the share of China's exports all over the world from less than 1 per cent in 1978 to 4 per cent in 2005. As revealed by Eichengreen et al (2004: 2), these figure tripled for the same period in some selected major world economies such as Japan and the USA, from 5.1 per cent to 18.3 per cent and 3.2 per cent to 11.1 per cent from 1990 to 2002. The same result can be seen when one compares China's export and import data with the rest of the countries.

Morrison (2013: 20) found that in 2009 China became the world's largest merchandise exporter, overtaking Germany. It also became the second largest merchandise importer in 2012. China's share of global exports almost tripled from 2000 to 2012, rising from 3.9 per cent to 11.5 per cent. The large volume of China's exports, foreign investment and purchases of foreign currencies have helped the country to become the world's largest holder of foreign reserves, in excess of 3 trillion US dollars at the end of 2012 (Morrison 2013: 20).

A study by Naudé and Rossouw (2010) found a very strong relationship between export diversification and GDP per capita growth in China. The increased export diversification has

helped China maintain high positive GDP growth. Figure 1 below shows the relationship between China's export and GDP growth.

Figure 1: China's annual exports of goods and services and GDP growth



Source: World Bank (2011)

It can be deduced from figure 1 above that positive export growth has helped China to maintain positive economic growth. Since the 1978 economic reforms, China's exports have experienced negative export growth in 1989 and 2009 only. The negative export growth could be the reason for the slowed economic growth in the same years. Figure 1 shows that there was a decline in China's export growth around 2007. The slowdown in China's exports from 2007 is attributed to the global economic crisis and the financial crisis. This resulted in average GDP growth of 9 per cent in 2008, 2009 and 2010, a fraction below the previously high GDP growth, as shown in figure 1. As the Organisation for Economic Co-operation and Development (OECD) indicates (2013:5), GDP growth slowed further in 2011 despite corrective action taken in the face of overheating symptoms and sectoral imbalances.

According to the South African Department of Research and Information (2013:1), in 2012 the Chinese economy grew by only 7.8 per cent, the lowest GDP growth rate it recorded since 1999. The reasons for this slow growth were slow investment spending, which has historically been the driver of growth, weak economic conditions in its export destinations and weak domestic consumer spending.

Sun and Heshmati (2010:2) argue that a country that focuses on production for international markets tends to be more productive than one that focuses on satisfying its domestic market. This is because globalisation encourages competition and innovation. Export-oriented countries tend to develop new technology to increase both the quality and quantity of their

products to allow them to compete in international markets. China's export industry encourages foreign companies to invest in China. Foreign companies bring in new technology and this has helped China expand its exports and become more competitive in international markets.

3.2. South Africa's country review

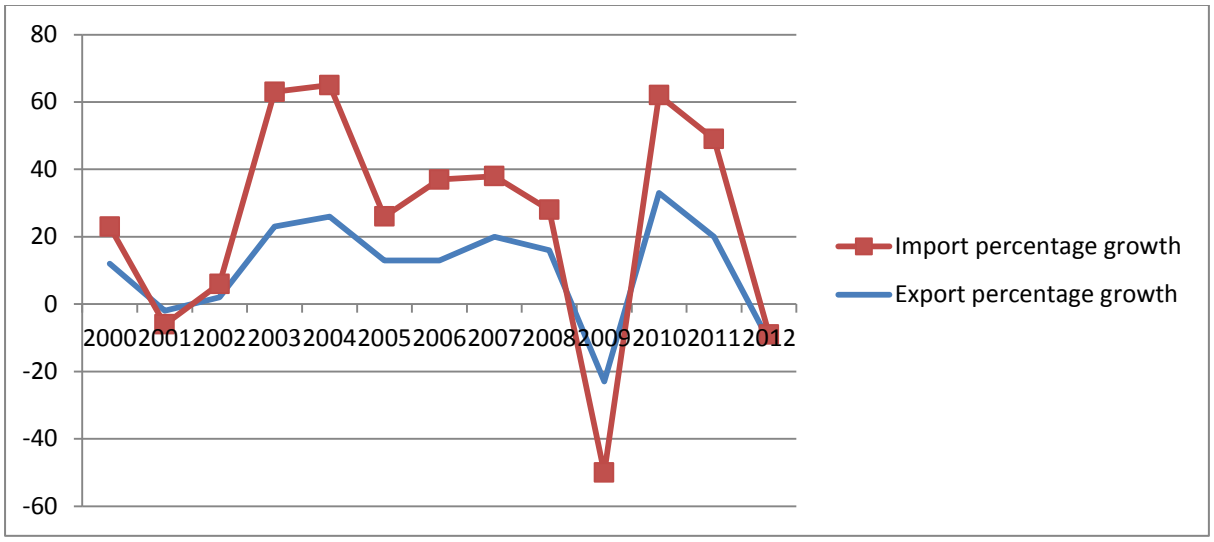
Like the growth of any other country, the growth of South Africa's economy depends on its trade with other countries. In this section, the study focuses on South Africa's international trade growth and the patterns of South Africa's trade with its major trading partners.

3.2.1. South Africa's international trade growth

After 1994, South Africa became a democratic country run by a new government. According to Weiner, Roxo and Kellman (2008:86), the newly elected government committed itself to outward-oriented policy. The new policy rapidly opened the country's market to foreign goods by eliminating tariff barriers and lowering nominal tariffs. Kucera and Roncolato (2011:2) indicate that the government commitment to trade liberalisation manifested in the country's signing of the Marrakesh Protocol to the General Agreement on Tariffs and Trade (GATT) in 1994 and it became a founding member of the WTO in 1995.

Though South Africa's trade was expected to increase rapidly after its trade liberalisation, on the contrary, the country has experienced slow export growth over the past years. As Mosikari and Sikwila (2013:669) point out, despite substantial reforms, South Africa's average export growth has fallen from 6.2 per cent to 5.6 per cent since 1994. Imports have also remained low and this indicates that trade openness has remained resilient in the face of domestic trade. Figure 2 below shows the growth of South African exports and imports from 2000 to 2012.

Figure 2: The growth of South Africa's international trade 2000-2012



Source: Word Trade Organisation (International Trade Statistics) (various issues)

Figure 2 above shows that South Africa registered negative growth in both exports and imports in 2001 and 2009. In 2012, the country registered negative growth in exports only, while imports increased by 2 per cent.

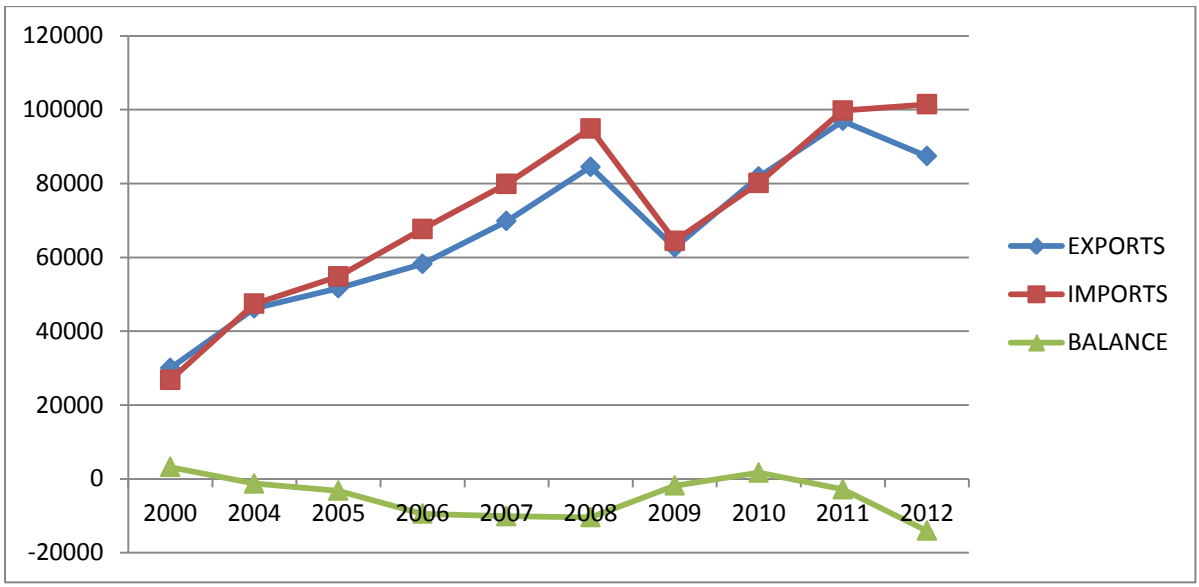
According to the South African Revenue Service (2002:15-16), South Africa's merchandise import volumes declined in 2001 despite higher domestic spending. Imports were expected to accelerate as domestic activities gained momentum during the year, while expenditure switching effects due to the depreciation of the rand were expected to keep import growth moderate. The South African Revenue Service (2002:15-16) indicated that the export growth in 2002 confirmed the expectation of higher export growth during the year because of the anticipated recovery in the global economy.

According to the South African Reserve Bank (2009:56), the merchandise export volume was gradually suppressed in the course of 2008 up to June 2009 because of the deceleration in international demand in response to the recession in many advanced economies. The effect of the recession became more pronounced in the first half of 2009, when the volume of South African exports shrank by close to 24 per cent. The volume of manufacturing exports deteriorated because of the lower investment spending in Europe, while mining exports contracted because of weaker demand. The South African Reserve Bank (2009:56) indicated that relatively tight and scarce credit finance for the exporters had contracted exports further.

Figure 2 shows a decline in South Africa's export growth in 2012. The 2012 export decline was due to both external and domestic factors. According to the Department of Research and Information of South Africa (2013:1), the decline in foreign demand was due to the economic turmoil in the Western world and production stoppages, particularly in the mining sector, which had a detrimental effect on the country's exports. The mining strike led to an estimated 2 points drop in exports (IMF 2013:6). Since the mining sector is the major component of South Africa's export sector, any negative growth in that sector affects the overall growth of the country's export sector.

The deterioration of both South Africa's imports and exports has resulted in an unstable balance of trade. South Africa has been experiencing a negative balance of trade because of a reduction in export growth and increased in demand for imported goods. Figure 3 below shows South Africa's export, import and trade balance from 2000 to 2012.

Figure 3: South Africa's exports, imports and trade balance (2000-2012) in millions of US dollars



Source: UN Com Trade (2012).

Although both exports and imports have been rising, as shown in figure 3 above, the figure also shows a negative trade balance for most of the years under review, with positive growth only in the 2000-2011 and 2009-2010 periods. The positive trade balance growth in 2001 corresponded with the increase in total real exports; exports rose by 4.7 per cent. As indicated by the South African Revenue Service (2002: 16), both exports and imports rose because of weaker domestic economic conditions, coupled with a depreciating rand. According to the

South African Reserve Bank (2009:56), the significant reduction in the deficit in 2009 was mainly due to the country's reduced domestic demand for foreign consumer goods and the slower growth in capital expenditure plus lower net service, income and current transfer payments to the rest of the world.

After picking up in 2010, the trade balance was expected to remain positive, but it deteriorated back to negative in 2011 and deteriorated more in 2012. As reported by the South African Department of Research and Information (2013:2), in 2012 the deficit was approximately R118 billion. Falling mineral exports were partly to blame, but weak external demand also limited the export performance.

Figure 3 shows deterioration in the trade balance between 2010 and 2011. According to the South African Reserve Bank (2012:35), the deteriorating trade balance in 2010 and 2011 was also due to the stronger growth in domestic expenditure compared to domestic production. Trade surplus narrowed during the period because of the faster pace of increase in merchandise imports value compared to exports. According to the South African Reserve Bank (2012:35), the trade surplus switched from a surplus of 1.1 per cent to virtually zero in the second half. It deteriorated further into deficit in 2012 in response to a surge in imports. As the IMF (2013:8) points out, although the current account improved to 5.8 per cent of GDP in the first quarter of 2013 owing to the depreciation of the rand, it was expected to deteriorate because of structural factors such as low household savings and weak external demand.

Gonzalez-Nuñez (2008:4) argues that increasing export growth is seen as an important tool to help South Africa achieve robust economic growth and development. According to Brenton and Walkenhorst (2010:580), this is because export industries tend to be more productive than non-export industries. To increase export, South Africa needs to develop a strong export industry based on processing and value addition of its minerals, but this requires importation of machinery. If the country is to continue importation of machinery for the present, its trade balance is still expected to continue deteriorating, but at least it will be good because researchers expect that in the future it will lead to increase exports and more foreign earnings.

To expand its economic power and international trade growth, South Africa has been aligning itself with the emerging economies, particularly Brazil, Russia, India and China (the BRIC countries). South Africa can try to learn from these emerging countries that undertook successful economic reforms. However, Sandrey and Edinger (2009:10) have found that the

sheer size of these countries and their strong desire to gain a place in the "top tier" of the global market make them potential markets and "dangerous" competitors in third markets and they may crowd out South African goods, both at home and abroad.

The growth and development of South Africa rely on its trade with the outside world in both raw materials (mostly minerals) and manufactured goods. South Africa continues searching for markets for it goods, while maintaining its current markets. With the economic rise of China, both the already occupied markets and new markets for South African goods may be under threat of being overtaken by cheap Chinese goods. Tull (2006:472) discovered that this is because both Chinese and South African businesses are economic contenders for investments and markets, especially in the field of labour-intensive and export-oriented manufacturing companies such as textiles and clothing.

South African exports have continued to grow, but not at a rate to match or be above imports. Its trade balance has continued to deteriorate and this is not good for the country's growth, although this depends on the type of commodities it imports. If the major valued exports are machinery or any other production equipment, then one would say that in the near future the country may experience high exports due to increased production. Otherwise, one should expect a reduction in exports, as was seen in 2012, to continue because of a reduction in production and the current high competition in world markets.

3.2.2. The patterns of South Africa's trade with its major trading partners

Since 1992, South Africa has been changing its export destinations. According to Gonzalez-Nuñez (2008:16), the EU has been the major export destination for South Africa, but also Eastern Asia and the North American Free Trade Area. Trade between South Africa and its neighbours (the Southern African Development Community [SADC] countries) increased to 12 per cent in 2008 from 8 per cent in 1992. The trade deficit between South Africa and the EU has reduced significantly because of a reduction in South Africa's imports from the EU, from 44 per cent in 1992 to 32 per cent in 2008. Table 2 below shows the pattern of South Africa's trade with its top major trading partners from 1992 to 2012.

Table 2: Changes in South Africa's trade with major exporters (1992-2012) in percentage

Partners	1992	1995	2000	2005	2010	2012
China	0.82	4.57	1.27	2.91	11.38	11.69
Unspecified	0.01	0.01	13.58	0.27	0	10.4
United States	7.45	7.6	9.16	10.41	9.88	8.75
Japan	5.29	6.38	5.15	10.96	8.99	6.24
Germany	4.89	4.97	7.22	7.09	7.74	4.81
India	0.03	0.67	1.41	2.49	4.17	4.24
UK	7.36	8.32	8.7	10.64	5.18	3.87
Netherlands	2.89	3.03	3.84	4.98	3.2	3.51
Zimbabwe	2.57	4.44	2.6	2.47	3.02	2.81
Mozambique	1.13	2.19	2.69	2.11	2.65	2.77

Source: World Integrated Trade Solutions (WITS) (various issues)

Table 2 above shows that South Africa's exports to China grew more than 10 per cent from 1992 to 2012. Export growth to Japan has gone up and down but Japan is still the fourth largest export destination for the country. The appearance of Zimbabwe and Mozambique among South Africa's top export partners in 2012 supports the finding by Gonzalez-Nuñez (2008:16) that trade between South Africa and its neighbours increased. South African exports to the USA and UK have continued to reduce since 2005. Increased exports to India are an assurance that South Africa is shifting its exports to its BRIC partners, especially Asian countries (China and India).

Table 2 further shows that South Africa's export destinations changed over the period 1992 to 2012, new markets emerged and the dominance of traditional markets has been reduced considerably. This was the case particularly with respect to the UK and Japan, whereas the relative shares of the USA and Germany reduced, but to a more limited extent. On the other hand, China has emerged as South Africa's number one export destination since 2009; the share of its non-gold merchandise exports increased from 0.8 per cent in 1994 to 12.9 per cent in 2012. India is now the fifth largest export destination for South African exports, having overtaken the UK. According to the South African Department of Research and Information (2013:19), Africa in general and SADC countries in particular have become South Africa's most important export destination. Africa's share increased from 10 per cent to 17.6 per cent from 1994 to 2012, while that of the SADC increased from 8.3 per cent to 12.9 per cent during the same period. Exports to Africa are diversified and dominated by manufactured goods (93.2 per cent of total), comprising mainly non-electrical goods,

machinery, motor vehicles, parts and accessories, food products and basic iron and steel products.

As indicated by the South African Reserve Bank (2012:39), the value of South African exports destined for the USA increased in 2011, mainly because of higher exports of vehicles, transport equipment and chemical products. The overall value of South African exports rose in Europe in 2011 in spite of a decline in Germany because of an increased in the value of precious and semi-precious metal exports to the UK and Switzerland.

Although South Africa has managed to diversify its export markets to China and Sub-Saharan Africa, Europe remains its major regional trading partner. Any economic disruption in either Europe or the Chinese economy will spill over to the rest of the world. The IMF (2012:9) reported that whereas the effect exerted by European economies is greater than that of China, China could have a strong indirect effect on South Africa through its impact on commodity prices in the country and other Sub-Saharan African countries.

Like exports, South Africa's import destinations have also been changing, with Asian countries, China in particular, being the top import destinations. Table 3 below illustrates South African import destinations from 1992-2012.

Table 3: Changes in South Africa's trade with its major importers (1992-2012) in percentage

Partners	1992	1995	2000	2005	2010	2012
China	1.24	1.9	3.72	8.99	14.35	14.41
Germany	16.36	16.49	13.16	14.02	11.29	10.08
Saudi Arabia	0.03	0.78	7.55	5.54	4.05	7.75
United States	13.67	11.81	11.9	7.9	7.28	7.38
Japan	10.6	10.17	7.96	6.75	5.3	4.55
India	0.21	0.73	0.95	2	3.54	4.52
Nigeria	0.01	0.03	0.68	1.19	2.75	3.67
United Kingdom	10.21	10.97	8.41	5.52	3.77	3.46
Angola	0	0	0.04	0.54	2.49	2.76
Thailand	0.74	0.71	0.99	1.6	2.28	2.66

Source: WITS (various issues)

Table 3 above shows that whereas South Africa's imports from China have grown significantly from only 1.42 per cent in 1992 to 14.41 per cent in 2012, its imports from the major world traders Germany, the USA, Japan and the UK have reduced significantly. China has overtaken Germany as South Africa's number one import partner. Nigeria and Angola are

the only African countries featuring among the top ten South African import partners. Imports from India have also increased.

From the above observation, it can be deduced that South Africa has increased its trade with Asian and African countries. It is moving away from Western markets in both exports and import trade. Although South Africa's exports to its SADC neighbours have increased, it imports less from the SADC; instead it imports more from Nigeria and Angola.

As indicated by the Department of Trade and Industry (2010:76), whereas around 1994 Zimbabwe used to be South Africa's number one import destination in Africa, Nigeria has taken over that position. By 2006, Nigeria and Angola had become South Africa's most important import destination, mainly because of South Africa's oil imports from them. South Africa has increased imports from African countries because of their close geographical proximity. South Africa's imports from Nigeria, Angola, Mozambique and Egypt consist mainly of fuels, oil, precious stones, metals, etc. (Department of Trade and Industry, South Africa 2010:76).

3.3. Comparison of trade components of South Africa and China

Both South Africa and China are in the BRICS block. Therefore, this section will try to establish the similarity between China's and South Africa's international trade components. Thereafter, the study will discuss the trade relationship between the two countries. The section starts with a discussion of the export commodities of both countries. The table below illustrates the growth of selected export commodities of South Africa and China.

3.3.1. Growth of selected export commodities in South Africa and China

Table 4 below presents the growth rates of selected export commodities in South Africa and China. China's export structure has changed drastically since 1992, from consumer goods to capital goods, specifically from textiles and clothing to mechanical and electrical goods. On the contrary, South Africa has been exporting mostly intermediate goods since 1992, mainly metals and fuel. Raw materials are the second most exported items by South Africa, but exported least often by China.

Table 4: Growth of selected export commodities in South Africa and China (1992-2012)

	1992		1995		2000		2005		2010		2012	
	SA	CH	SA	CH	SA	CH	SA	CH	SA	CH	SA	CH
Capital goods	6.58	9.86	8.02	38.75	12.81	27.35	14.2	42	13.12	46.68	14.46	45
Consumers goods	8.15	55.61	11.48	10.54	19.75	48.21	18.55	36.84	16	33.71	14.26	35.76
Intermediate goods	25.01	19.75	29.31	38.64	32.15	17.14	43.82	16.07	39.77	15.56	39.7	15.88
Raw materials	17.88	12.74	23.71	10.21	21.63	5.38	23.21	3.06	30.88	1.98	31.24	1.76
Chemicals	5.34	4.85	6.12	7.89	6.96	4.67	7.25	4.18	5.88	4.75	5.8	4.61
Food products	3.09	3.88	3.61	1.46	4.24	2.07	3.92	1.47	3.77	1.23	3.09	1.34
Foot wear	0.09	6.06	0.12	0.34	0.12	4.8	0.07	2.99	0.07	2.78	0.07	2.87
Fuels	6.95	5.52	8.92	3.89	10.17	3.15	10.41	2.31	10.1	1.69	11.31	1.51
Mechanical and electrical	3.58	13.59	4.9	35.58	8.94	29.25	9.75	42.26	9.15	44.26	9.03	42.09
Metals	12.49	5.36	14.67	9.21	17.11	6.66	19.3	7.49	17.67	7.02	12.76	7.28
Minerals	4.82	1.09	4.17	1.59	4.7	0.54	5.39	0.43	14.17	0.23	14.98	0.19
Textiles and clothing	3.01	28.98	2.37	11.98	2.41	19.81	1.47	14.13	0.86	12.65	0.85	12.01
Transport	3.87	2.47	3.88	4.06	8.44	3.72	10.63	3.73	9.68	5.63	9.46	5.29
Wood	3.78	2	4.76	3.72	4.83	1.82	3.41	1.66	2.61	1.5	1.96	1.58

Source: WITS (various issues)

As revealed in Table 4, China's exports of both footwear and textiles are higher than South Africa's. This implies South Africa's exports of footwear and textiles do not supplement China's but competes with China in third markets. The reduction of South Africa's exports of both commodities signal that South Africa is either losing its markets for footwear, textiles and clothing, or reducing production of these commodities.

The largest category of South Africa's exports comprises precious metals, although the composition has changed from gold to platinum. The second largest category consists of base metals, including ferroalloys, iron, steel and stainless steel products. The two categories, together with mineral products such as coal, briquettes, oil from petroleum and iron ores and concentrates, represent about half of total exports, reflecting the dominance of basic processing and mining in South Africa's export profile. As reported by the Department of Trade and Industry (2010:14), machinery and vehicle exports account for the growth in manufactured exports.

According to the Department of Research and Information (2013: 2), South Africa's major export sector, mining, has been facing serious challenges. Mining outputs reduced by 3.1 per cent in 2012, mainly because of production stoppages largely linked to industrial action in the major mining firms, including platinum, gold, iron ore and coal mining. Since the beginning of the mining strikes early in 2012, mining sector output has been compromised and the

overall South African export volume tumbled. The World Bank (2012a:7) reported that the growth in manufacturing exports increased in 2012 owing to the strong demand from South Africa's developing country trading partners. The successful growth of mineral and manufacturing exports was not caused by the reduction in tariffs, but by good policy implementation, notably in the automotive sector (Department of Trade and Industry, South Africa 2010:13).

China's imports and exports include re-imports. As reported by the World Trade Organisation (2012:196), re-imports consisting of products which have been produced in China but temporarily exported before being imported back into China constituted 7.0 per cent of China's total merchandise imports in 2011. The structure of re-imported Chinese commodities indicates office and telecommunication equipment is the largest section in category absolute terms, about 868.3 billion US dollar in 2011. The share of re-imported products continues to increase, mainly in telecommunication equipment (36.5 per cent), electrical machinery (28.0 per cent) and textiles (15.8 per cent).

Although the composition of South Africa's export and import commodities is different, the composition is almost similar in China. The table below shows the growth in percentage of some selected imported commodities in South Africa and China.

3.3.2. Growth of selected import commodities in South Africa and China

Table 5 below shows the growth of selected commodities in South Africa and China between 1992 and 2012. Table 5 shows that capital goods have been the major imported commodities in both countries since 1995. Specifically, South Africa's imports comprised mostly mechanical and electrical goods, whereas minerals and footwear were the items imported least often in South Africa during the relevant period.

Table 5: Growth of selected import commodities in South Africa and China (1992-2012)

	1992		1995		2000		2005		2010		2012	
	SA	CH	SA	CH	SA	CH	SA	CH	SA	CH	SA	CH
Capital goods	38.44	34.89	41.13	41.13	33.5	40.62	32.38	48.32	30.07	41.49	29.23	37.25
Consumers goods	19.49	11.34	19.78	19.78	20.8	9.19	25.92	8.75	28.51	9.97	29.29	11.31
Intermediate goods	22.29	42.44	22.43	22.43	18.75	34.45	15.82	24.67	17.01	20.87	15.82	18.75
Raw materials	6.86	9.87	13.51	13.51	17.58	14.41	16.45	17.62	17.07	25.97	18.87	28.61
Chemicals	11.03	8.9	6.96	10.66	10.97	7.96	8.99	7.66	9.49	6.63	8.89	6.43
Food products	2.17	1.36	4.24	2.08	1.7	0.8	1.76	0.52	2.55	0.69	2.54	0.79
Footwear	0.59	0.63	0.12	0.75	0.84	0.18	0.97	0.1	1.02	0.1	1.09	0.12

Fuels	0.51	4.43	10.17	8.32	14.29	9.19	14.26	9.71	19.62	13.54	22.47	17.22
Mechanical and electrical goods	28.46	30.36	8.94	31.04	28.44	37.84	26.17	41.08	25.47	34.84	23.92	30.76
Metals	4.76	9.73	17.11	5.02	4.05	9.16	4.2	8.58	4.7	7.38	4.67	6.12
Minerals	0.59	1.5	4.7	0.62	0.45	1.71	0.85	4.27	0.38	8.16	0.57	7.7
Textiles and clothing	4.64	12.55	2.41	3.9	3.22	7.36	3.2	3.55	3.14	2.12	2.88	2.25
Transport	12.61	7.65	8.44	13.72	8.32	2.83	13.2	3.01	10.33	4.7	10.61	5.01
Wood	3.57	4.47	4.83	3.64	2.64	4.75	2.26	2.54	2	2.25	1.83	2.13

Source: WITS (various issues)

It is interesting to find that China also imports mostly capital goods, particularly mechanical and electrical items. Looking at China's exports and imports, one would wonder why they are so closely related. According to Morrison (2013: 24), this is because a substantial amount of China's imports comprises parts and components that are assembled into finished consumer electrical products and computers and then exported. China gains from this arrangement because the value added to the imported products by Chinese workers is relatively low compared to the value of the product when they export it.

The South African Department of Research and Information (2013:20) reported that although the share of intermediate goods imports continued to decline in South Africa, intermediate goods still dominate the import basket, while consumer goods have registered increased shares since 1994 and have overtaken capital as the second most imported goods category despite the large demand for capital goods for the public sector infrastructure development.

China's export earnings have continued to increase while South Africa's export earnings are deteriorating. The table below compares South Africa and China's exports earnings in selected commodities from the major world's importers.

3.3.3. South Africa and China's exports earnings

Table 6 below presents South Africa and China's earnings from selected commodities. These exports earnings are from major importers during the period 2000 to 2012.

Table 6: South Africa and China's export earnings from the major importers (2000-2012) in millions of US Dollars

SOUTH AFRICA										
COMMODITY	WORLD		JAPAN		GERMANY		USA		EU	
	2000	2012	2000	2012	2000	2012	2000	2012	2000	2012
FOOD AND BEVERAGES	2168	6245	144	169	69	216	110	214	7	176
CEREALS	92	438	25	0	0	0	0		0	0
TEXTILES, FIBRES	190	405	10	4	13	14	4	2	0	0
CRUDE FERTILIZERS AND MINERALS	208	897	12	36	1	11	28	249	0	1

CHEMICALS	2055	6196	79	152	57	76	324	782	0	5
MACHINERY AND TRANSPORT EQUIPMENT	4570	15993	143	396	950	2184	577	2796	14	160
IRON AND STEEL	2758	6270	245	361	81	379	486	726	1	15
CLOTHING	218	125	1	0	2	1	117	8	0	0
CHINA										
	WORLD		**JAPAN**		**GERMANY**		**USA**		**EU**	
	2000	**2012**	**2000**	**2012**	**2000**	**2012**	**2000**	**2012**	**2000**	**2012**
FOOD AND BEVERAGES	13027	54667	4877	10847	296	1416	910	6357	162	2011
CEREALS	1643	443	55	77	0	1	1	1	59	3
TEXTILE FIBRES	1085	3220	158	126	27	158	16	300	1	71
CRUDE FERTILIZERS AND MINERALS	1103	2942	275	592	11	31	180	455	27	63
CHEMICALS	12098	113522	1493	8894	645	3251	1661	13432	93	2942
MACHINERY AND TRANSPORT EQUIPMENT	82600	965288	9716	62662	3921	32007	18323	176118	217	20981
IRON AND STEEL	4391	53833	597	2272	12	439	566	2964	3	1188
CLOTHING	36071	159614	11513	22262	923	7996	4780	29029	1087	7368

Source: UN Com Trade (2013).

Table 6 above shows that South Africa's world clothing export earnings reduced from 218 million dollars to 125 million dollars, while China's clothing export earnings more than quintupled from 36 071 to 159 614 million dollars from 2000 to 2012. Although South Africa's textile fibres export increased from 190 to 405 million dollars, it has failed to capture the EU market. The textile fibres export to the EU remains at zero. China has managed to capture the markets, whereas South Africa has failed to do it. The increased Chinese market has increased its earnings.

The earnings on crude oil remained stable in spite of the US-led sanctions against Iran; weak demand for crude oil, attributed to the economic crisis, reduced the effect of the sanctions on oil prices. Global food supplies were disrupted by extreme weather conditions, causing sharp price fluctuations of food supplies. The overall price increase eased in 2011 (Bank of the Republic of China 2012:18).

3.3.4. Trend in world exports share of China and South Africa

Table 7 below shows the trend in world export share of China and South Africa. Table 7 below shows that in 1948 South Africa was exporting and importing more than China. It had 2 per cent and 2.5 per cent world export and import shares respectively against 0.9 and 0.6 per cent for China. Whereas China managed to increase its international trade share by more than 10 per cent, South Africa's international trade share now stands below 1 per cent in both exports and imports. South Africa needs to increase its international trade share, more especially its

export shares, by increasing the standard and variety of its goods and should look for markets for its export commodities.

Table 7: World export share of China and South Africa (1948-2012) in Percentage

	PE CENTAGE WORLD EXPORT SHARE OF CHINA AND SOUTH AFRICA							
YEAR	1948	1953	1963	1973	1983	1993	2003	2012
CHINA	0.9	1.2	1.3	1	1.2	2.5	5.9	11.4
SOUTH AFRICA	2	1.6	1.5	1	1	0.7	0.5	0.5
	PE CENTAGE WORLD IMPORT SHARE OF CHINA AND SOUTH AFRICA							
YEAR	1948	1953	1963	1973	1983	1993	2003	2012
CHINA	0.6	1.6	0.9	0.9	1.1	2.7	5.4	10
SOUTH AFRICA	2.5	1.5	1.1	0.9	0.8	0.5	0.5	0.7

Source: World Trade Organisation (International Trade Statistics 2012)

South Africa's exports constitute about 0.5 per cent of the world merchandise exports. South African export growth has not been able to compete with that of developing countries such as China, India and Brazil. As reported by the Department of Trade and Industry, South Africa (2010:13), South Africa's export growth has been at least 11 per cent slower than that of these developing countries.

On the other hand, since China joined the WTO in 2001 up to 2008, it managed to grow its export shares in the world market by almost 1 per cent per year. The OECD (2013:13) indicated that after 2008, its export share declined. Although export growth rebounded after the financial crisis, the pace of the growth of market share gains fell remarkably.

World trade competition has intensified in recent years; many countries have seen their position challenged. Whereas China's international trade has improved in ranking, South Africa has been experiencing a deteriorating trend in its export ranking. Table 8 below shows the world export and import ranking of South Africa and China.

3.3.5. World rankings of South African and Chinese exports and imports

In Table 8 below shows world rankings of South Africa and Chinese exports and imports. As shown in Table 8 below, South African exports have lost ground in the international market, from 38th position in 2000 to 44th position 2012, whereas China's export industry is gaining ground in the international market, rising from 7th to 1st position. This makes China the most influential country in the world's export market. Although South Africa is losing in the export ranking, its import ranking has improved from 40th to 32nd position. This implies that South Africa has increased imports, but is exporting less.

Table 8: World rankings of South African and Chinese exports and imports (2000-2012)

			EXPORT										
YEAR	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
SOUTH AFRICA	38	38	38	38	37	39	39	38	40	38	38	41	44
CHINA	7	6	5	4	3	3	3	2	2	1	1	1	1
			IMPORT										
YEAR	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**
SOUTH AFRICA	40	40	41	35	32	34	32	33	34	34	32	32	32
CHINA	8	6	6	3	3	3	3	3	3	2	2	2	2

Source: World Trade Organisation (International Trade Statistics 2012)

Although it can be seen that South Africa's international trade growth has been declining over the years, the South African Department of Trade and Industry r(2010:13) reported that the country's growth in the export of dynamic products is ranked 24th among developing countries.

Table 8 also shows that in 2008 China overtook Germany to become the largest exporter of manufactured goods, although not so far of total merchandise exports. Between 2000 and 2008, China's manufactured goods exports grew at an annual average of 25.2 per cent, twice the growth rate in Germany. While EU exports outside EU markets still surpass China's, the gap has reduced (from 67 per cent to 15 per cent in 2008). As highlighted by the WTO (2009:35), on the imports side, the hierarchy of the three major manufacturer importers - the USA, Germany and China - has not changed.

The high ranking of China in the first and second position in export and import respectively shows that China really determines the current direction of trade in the world. For exporting countries, this is the time they should be looking towards China to market their commodities. Exporting countries might be threatened by the increasing cheap exports from China to the world market.

3.4. Trade relationship between China and South Africa

Trade and investment relationships between South Africa and China have developed rapidly since the beginning of the diplomatic relationship between the two countries in 1998. In 2008 China overtook Germany as the largest import market for South Africa. Villoria (2009:532) states that in the same year, South Africa's exports, most of which were diamonds, accounted for 18 per cent of African exports to China. According to Kaplinsky et al (2010:3), South

Africa is also the major Sub-Saharan African exporter of manufactured goods to China. There has been growing economic engagement between China and South Africa. Alden (2010:41) has reported that the two-way trade between the two countries rose from 800 million dollars in 1998 to 14.1 billion in 2009, turning China into South Africa's largest trading partner.

According to Carmody (2012:235), South Africa exchanges it exports, which are mainly metals and mineral products, for machinery, textiles, clothing and footwear from China. He also argues that South Africa is now exporting fewer advanced goods to China than it did in 1993. Carmody (2012:235) notes that on the contrary, China is now exporting greater and greater quantities of advanced goods to South Africa.

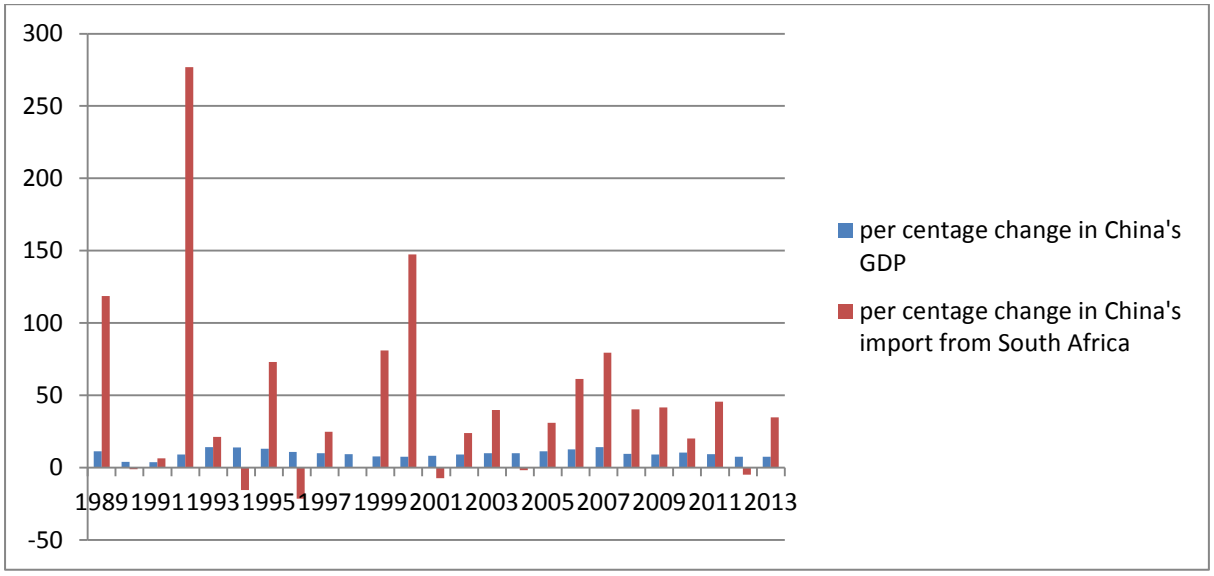
China has a high interest in South Africa because it considers South Africa as Africa's mineralogical treasure house. China imports a lot of minerals from South Africa and that has helped boost its industries. In 2006 South Africa exported 92 910 tons of ferrochrome to China and because of that, China was the biggest stainless steel producer of the year in Asia. Aprill (2009: 465) reports that China also considers South Africa a gateway to other African markets because of the economic strength of South Africa on the African continent.

Though South Africa is reluctant to involve China in its mineral resources exploration, China has managed to obtain shares in a South African oil refinery. According to Pannell (2008:715), the turnover from the Chinese-South African oil refinery was over 14 billion dollars in 2007 and it was predicted to rise. As indicated by Alden (2010:43), China has the upper hand to increase its access to South African resources exploration because to win access for South African resources in China, the South African government is offering more room for Chinese investment, technological transfer and human capital development.
China is also getting involved in other South African businesses. In 2007, a Chinese commercial bank acquired 20 per cent of South Africa's Standard Bank for 5.5 billion dollars. Carmody (2012:235) highlights that this transaction boosted South Africa's FDI that year to hundreds of per cent and it was recorded as the largest FDI in South Africa's history

3.4.1. Relationship between China's growth and its imports from South Africa

The growth of China has been a blessing to some countries; it has led to an increase in China's total import value. In view of the improved relationship between China and South Africa, one can expect increased Chinese imports from South Africa, similar to Chinese exports to South Africa. The figure below shows the relationship between China's growth and its imports from South Africa.

Figure 4: Relationship between China's GDP growth and its imports from South Africa (1989-2013)



Source: **Department of Trade, South Africa and World Development Indicators, World**

The percentage change in China's imports from South Africa has shown a positive relationship between China's GDP growth and its imports from South Africa. Although there were negative changes in 1995, 2001, 2004 and 2011, most of the years registered positive changes.

3.4.2. Effects of China's growth on South Africa's international trade

Relating to the effect of China's growth on South Africa, China has intensified its interest in Africa in almost all areas, for example in the fields of mining, manufacturing, agriculture and finance. This might not be good for South African businesses, since South Africa also has a high interest in energy (including water and electricity from the Congo basin) and minerals on the continent. Shaw, Cooper and Antklewkz (2007: 1259) note that South African franchises, such as ABSA Bank, DSTV, MTN, Nandos, Protea, Shoprite and Standard Bank, are spreading throughout Africa. This concern was echoed by Alden, who found that South African firms have railed against Chinese competition, especially in African countries (Alden 2010:42).

Examples of empirical results of the effect of China's economic growth on South African international trade can be seen in a study by Tull (2006) that shows that in 2004, South Africa incurred a huge trade deficit with China of 1.9 billion USA dollars (Tull 2006:472). Another study by Ancharat (2009:627) showed that China accounted for over 11 per cent of total

imports to Mauritius in 2009, placing China ahead of South Africa and because of that, South Africa became the third ranked exporting country in Mauritius, from being its traditional source of imports at regional level. Renard (2011:23) has shown that by 2011 South Africa had lost between 23 000 and 85 000 jobs in the textile industry, apparently because of imports from China.

Using the bilateral trade intensity method to measure trade relations between South Africa and China, Rangasamy and Swanepoel (2011) found limited short-term costs from competition with China. Turning to the longer-term cost, by 2006 China had surpassed Germany as the largest South African deficit country (Rangasamy and Swanepoel 2011:144). They discovered that aggregate statistic such as deficit are not accurate measures of international trade relations because they do not fully capture dynamic impacts; for example, they do not reflect the linkage effect across different sectors and do not consider the positive effect of international technology transfer.

The demand effect of China's growth helps South Africa gain from exportation of ore and metals, cotton and log timbers. South Africa also benefits from the supply of transport vehicles, motor vehicles, textile and apparel and rice. According to Renard (2011:23), the purchase of capital goods and transport equipment at lower prices from China than from Europe has significantly lowered investment cost.

It can be argued that South Africa has the upper hand in competing with China in Africa because China lacks knowledge of African markets and has a different trading culture. According to Bodomo (2009:174), Chinese firms are failing to establish themselves because of the difference in business culture and inexperienced management. Despite the fact that South Africa is only around a tenth the size of China, South African trade with the rest of Africa was a third that of China with the rest of Africa in 2006. Carmody (2012:223) indicates that, in the same year, South Africa was the largest single foreign investor in the rest of Africa.

South Africa can also compete with China head to head in third markets because of similarities in stages of economic development, factor abundance, comparative advantage and production cost. According to Eichengreen, Rheen and Tong (2004:3), in some cases differences in resource endowment between China and South Africa mean they can complement one another in trade. Moreover, because China's manufacturing sector relies on imported raw materials, the growth of China's industries might be stimulating rather than

slowing the growth of South Africa's exports. Adding to that, Renard (2011:22) points out that because South Africa is a much diversified economy, it might not be vulnerable to the effects of China's exports. At this stage the current study cannot predict the effects of the growth of China's economy on South Africa's trade.

Chapter four

Methodology

4.1. Introduction

This chapter presents the methodology that was used to analyse the data obtained during the study. The study used a gravity model to estimate the effect of Chinese growth on its trade with South Africa. The gravity model was first introduced in international trade by Tinbergen in 1962 and since then it has been used in many empirical studies to analyse trade between countries. The gravity model has been defined as a workhorse of international trade because of its ability to approximate trade correctly and is also regarded as one of the most stable empirical relationships in economics (Salvatici 2013:3).

The gravity model was originally founded by Newton. Newton's physics theory states that two bodies are attracted to each other in proportion to their masses and the distance between them. It is in a similar context that the gravity model is applied in international trade studies. As explained by Chan-Hyun (2001:3), the application of the gravity model in international trade helps to explain bilateral trade flows between two economies by regarding them as an organic body that are attracted to each other by their economic size (GDP), growth and the distance between them.

Although the gravity model is praised for its empirical success, the theoretical justification of the model has been a matter of dispute among scholars. Most scholars believe that a law used in physics has no validity in applied economics. Gu (2005:7) argues that the model has a strong relationship with the geographical view of trade and ignores other important factors that influence trade flows. To respond to economic doubts about the model, the economists who believe in the model have actively looked for a theoretical foundation to support it. Anderson (1979) made the firsts attempt to support the model; he used property expenditure systems where the structure of preferences is similar and assumed homothetic preferences across regions to derive the model. On the other hand, Bergstrand (1985) derived the model by using a general equilibrium world trade model and illustrated that "the gravity model is a reduced form of partial equilibrium subsystem of a general equilibrium model with nationally differentiated products". Another economist, Deardoff (1995), showed that the gravity model can be derived from the H-O model with the Cobb Douglas preferences and with constant elasticity of substitution preferences (Gu 2005:8).

Despite the fact that the gravity model is now widely used because it fits well in international trade study, it is also argued that it needs to be handled with care in several dimensions. Firstly, it requires variables with positive support only and cannot be implemented with a dependent variable missing figures or having zero values. Secondly, the method can lead to a biased and inconsistent ordinary least square estimator because of a high possibility of endogeneity. To solve these two problems, statistical literature suggests two possible solutions: exponential multiplicative model estimation (Poisson pseudo-maximum likelihood) or the two-stage least square method (Giovanneti, Sanfilipo and Veluchi 2010:8).

The advantage of using gravity models in international trade study is that the data required is often easily accessible and reliable. According to Paas (2000:633), the second advantage of using the gravity model is that the theoretical considerations of using the model to measure the patterns of trade flows have been well discussed and developed.

4.2. Formulation of the model

There are two forms of gravity model, namely basic (simple) and augmented (extended) gravity models. According to Prasai (2014:5), the basic model is standardised and uses trade volume as dependent variable, and only two independent variables, GDP and distance. Anderson and Ferrantino (2004:3) noted that double-log gravity models that require only three variables to explain trade flows. The variables were further simplified into only two repressors multiplying together exporter's GDP and importer's GDP to derive a simple activity variable (Anderson and Ferrantino 2004:3).

Chan-Hyun (2001) derived what he called the simple version of the gravity model as follows:

$T_{ij} = A \cdot (Yi\ Yj\ /D_{ij})$ …….....……. (1)

T_{ij} = bilateral trade flows (exports + imports)

Y_i = GDP of country i

Y_j = GDP of country j

D_{ij}= Distance between country i and j

A = Constant of proportionality.

In contrast, the augmented gravity model includes other dependent variables (Prasai 2014:5). The theory behind the gravity model relates the flow of trade between two countries to supply and demand systems, leading to the trade volume between them being directly proportional to their economic mass. The model also states that trade between two countries is inversely related to other characteristics, such as distance, that hamper trade (Ruiz and Vilarrubia

2007:1). Resistance variables such as dummy variables for neighbouring countries (with a common physical border) and preferential trade agreement can be included in the analysis. Variables such as tariffs and cultural differences are included in the model because they tend to reduce the trade flow between countries (de Miranda, Ozaki, Fonseca and Mortatti 2007:7). The common language dummy variable is also added to the analysis on the basis of transaction costs (Bussière and Schnatz 2006:1). There is also a tradition of adding population to the GDP dependent variable to relate trade flow to both GDP and GDP per capita (Hogan and Neary 1999: 388). Furthermore, monetary variables are added to determine the role of exchange rate variability in trade (Kandogan 2007:338).

Many studies have modelled the gravity model to measure international trade flow[3]. In this study, the researcher will model the augmented gravity model as well to measure the effect of China's growth on its trade with South Africa. As mentioned above, several factors are considered to determine international trade volume between nations, but this study will attempt to insert those factors that are believed could be influencing South Africa's international trade volume with China. Other variables, such as a common border, common language and distance, will not be included in the model because the researcher deemed them irrelevant to determine trade between South Africa and China. For example, a study by Croce, Juan-Ramón and Zhu (2004:3) showed that distance and shared language have become less relevant over time in explaining trade flow among countries.

The equations to be estimated in this study are specified as:

$SA_{xcht} = C + \beta_1 \log GDP_{cht} + \beta_3 \log ER_{saUS} + \beta_4 \log Tariffs_{sat} + u_i$ .....(2)

$SA_{xcht} = C + \beta_2 \log GDPpercapita_{cht} + \beta_3 \log ER_{saUS} + \beta_4 \log Tariffs_{sat} + u_i$ .....(3)

C= A constant

SA_{xcht} = South Africa's international trade volume with China at a given time

GDP_{cht} = Gross domestic product growth of China at a given time

$GDPpercapita_{cht}$ = Per capital income growth of China at a given time

ER_{saUs} = Exchange rate between South African rand and US dollar

$Tariffs_{sat}$ = South Africa's tariff charge on international trade goods

u_i = The stochastic error term

[3] Check Kepaptsoglou, Karlaftis and Tsamboulas (2010).

4.3. Model descriptions

Equation 2 above is interpreted as follows: South Africa's total trade volume with China (SA_{xcht}) is determined by the constant (C) plus China's GDP (GDP_{cht}), plus the exchange rate between South African rand and US dollar (ER_{saUs}), plus South African tariffs on trade flow ($Tariffs_{sat}$) plus the stochastic error term $u_{i.}$ (The study compares South African rand to dollar because the dollar is the most popular currency in the international trade market.)

GDP represents economic size in terms of production and market size. According to Prasai (2014:6), when a country's economy expands, it increases its domestic market and that also creates a market for foreign goods. That means an increase in China's GDP is expected to increase trade flow between that country and South Africa. GPD per capita income of a trading partner is used in the model to capture the effect of income levels (Kandogan 2007:344). In addition, GDP per capita evaluates the purchasing power of trading partners. Tariff rate is included to measure the effect of trade restrictions; the coefficient of the tariff variable is expected to be negative because higher trade restrictions decrease trade (Amin, Hamid and Saad 2009:30). It has been important to include the exchange rate in the model, since the exchange rate is one of the major macroeconomics variables that affect trade flow (Karemera, Smith, Ojah and Cole 1997: 353). Furthermore, the model includes the exchange rate and tariffs because a study by Edwards and Alvess (2005: 8) found that the reduction of tariffs and the real depreciation of the exchange rate have raised South African exports and imports as a share of GDP. u_i is a non-stochastic error term that determines the effects of other variables that affect South African international trade, but are not included in the model.

4.4. Data type and sources

The study used annual time series data from 1988 to 2013. The source of data on China's GDP, China's GDP per capita and the exchange rate between the South African rand and US dollar is the World Integrated Trade Solutions (WITS) World Bank. The data on GDP and GDP per capita is in percentage form. The data on trade between South Africa and China was obtained from Quantec Easydata and is specified in rand value. Tariffs data is from WITS and Edwards (2005). The import weighted average tariff rates from 1988-2008 were obtained from Edwards and from 2009 to 2013 from WITS.

4.5. Interpretation of the coefficients

The equation is in national logarithm form. The advantage of using a logarithm is that the coefficients will be interpreted in percentages, which makes it easy to interpret the results. A positive coefficient of logGDPcht (β_1) indicates that Chinese economic growth is correlated with positive growth in South Africa's international trade. That could mean South Africa is benefiting from the high growth of China's economy through trade expansion. A positive coefficient of $\log ER_{saUS}$ (β_3) implies that depreciation of the rand value against the US dollar leads to an increase in trade between South Africa and China. On the other hand, a positive coefficient of $\log Tariffs_{sat}$ (β_4) shows that an increase in South African tariff rates leads to increased trade between South Africa and China.

After obtaining the coefficients from the equation, the results will be analysed by taking into account the R^2, t-ratios and different diagnostic tests. The diagnostic tests will be done in order to check for serial correlation and stationarity. Breusch-Godfrey Serial Correlation LM tests and Correlogram and Q-statistics Park tests will be applied to test for serial correlation. The Augmented Dickey Fuller (ADF) test and the Phillip-Perron test will be used to test for stationarity.

4.6. Conclusion

The gravity model has been used in many studies and has been proven to be a stable estimator of international trade flow over time. Using the gravity model in this study will yield the required results and the coefficient will be easy to interpret.

Chapter five

Diagnostic tests and estimation of results

3.1. Empirical analysis

In the empirical exercise, the researcher conducted the estimation of the gravity model to determine the coefficients of the variables. Firstly, all the variables were tested for stationarity using the ADF and Phillips-Perron tests. Afterwards, the equation was estimated using Eviews 7 software. After obtaining the results, the Durbin-Watson statistic was used to detect serial correlation.

5.1.1 Stationarity tests

Both the ADF and Phillips-Perron tests were used to test for stationarity of the variables. The tests were conducted in levels before differencing the variables. The reported results for stationarity tests were conducted at 5 percent level of significance. The results from ADF and Phillips-Perron (P-P) tests are shown in table 9. Full results of the ADF and Phillips-Perron tests are given in appendix tables A2 to A9.

Table 9: Stationarity tests in levels before differencing

Variables	ADF test statistic	ADF critical value	P-P test statistic	P-P critical value	Stationarity status
GDPPERCENT	-2.495981	-2.986225	-2.749922	-2.986225	Non-stationary
PERCAPITAPERCENT	-2.414204	-2.986225	-2.67172	-2.986225	Non-stationary
LOGEXCHANGE	-1.419118	-2.986225	-1.415198	-2.986225	Non-stationary
TARIFFS	-0.615604	-2.991878	-0.73104	-2.986225	Non-stationary

In Table 9 above, both the ADF and Phillips-Perron tests show that the variables are non-stationary in levels at 5 per cent critical value. Table 10 below shows the ADF and Phillips-Perron tests for the variables in first difference.

Table 10: Stationarity tests in first difference after differencing

Variables	ADF test statistic	ADF critical value	P-P test statistic	P-P critical value	Stationarity status
DGDPPERCENT	-5.883838	-2.998064	-6.042494	-2.998064	Stationary
DPERCAPITAPERCENT	-5.871254	-2.998064	-6.035915	-2.998064	Stationary
DLOGEXCHANGE	-5.792306	-2.998064	-8.8455482	-2.998064	Stationary
DTARIFFS	-8.429070	-2.998064	-12.86913	-2.998064	Stationary

After differencing, all the variables became stationary at 5 per cent level of significance, as shown in table 10.

5.1.2. Serial correlation tests

The results of correlogram and Q-statistics and Breusch-Godfrey serial correlation LM tests for serial correlation indicate that serial correlation is present in the data in levels. The results for serial correlation tests are given in appendix tables A20, A21, A22 and A23.

5.2. Findings of the study

The study used both China's GDP growth and GDP per capita growth to capture the effect of China's growth on its trade with South Africa. GDP per capita growth was included to cater for population changes. The coefficients of the results from both GDP growth (GDPPERCENT) and GDP per capita (PERCAPITAPERCENT) growth are almost the same as shown in the tables below. Table 11 shows the estimation result for South Africa's trade with China (LOGTRADE) when regressed on China's GDP growth (GDPPERCENT), South Africa's exchange rate (LOGEXCHANGE), South Africa's tariffs (TARIFFS) and lagged residuals (RES02).

Table 11: First equation

Dependent variable: DLOGTRADE
Method: Least squares
Date: 11/12/14 Time: 17:33
Sample (adjusted): 1989 2012
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.274023	0.027013	10.14414	0.0000
DGDPPERCENT	0.020891	0.009871	2.116489	0.0477
DLOGEXCHANGE(1)	0.254129	0.199176	1.275897	0.2174
DTARIFFS(1)	0.062620	0.028320	2.211146	0.0395

RES02(1)	-0.048170	0.035595	-1.353275	0.1919

R-squared	0.412316	Mean dependent var	0.271270
Adjusted R-squared	0.288593	S.D. dependent var	0.139994
S.E. of regression	0.118078	Akaike info criterion	-1.251897
Sum squared resid	0.264904	Schwarz criterion	-1.006469
Log likelihood	20.02276	Hannan-Quinn criter.	-1.186785
F-statistic	3.332579	Durbin-Watson stat	2.770422
Prob(F-statistic)	0.031518		

Table 11 shows the estimation result for South Africa's trade with China (LOGTRADE) when regressed on China's GDP per capita growth (PERCAPITAPERCENT), South Africa's exchange rate (LOGEXCHANGE), South Africa's tariffs (TARIFFS) and lagged residuals (RES04).

Table 12: Second equation

Dependent variable: DLOGTRADE
Method: Least squares
Date: 11/12/14 Time: 17:41
Sample (adjusted): 1989 2012
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.273095	0.026876	10.16136	0.0000
DPERCAPITAPERCENT	0.020656	0.009937	2.078699	0.0514
DLOGEXCHANGE(1)	0.256303	0.197873	1.295290	0.2107
DTARIFFS(1)	0.063116	0.028374	2.224413	0.0384
RES04(1)	-0.050720	0.036346	-1.395451	0.1790

R-squared	0.417555	Mean dependent var	0.271270
Adjusted R-squared	0.294935	S.D. dependent var	0.139994
S.E. of regression	0.117550	Akaike info criterion	-1.260852
Sum squared resid	0.262543	Schwarz criterion	-1.015424
Log likelihood	20.13022	Hannan-Quinn criter.	-1.195740
F-statistic	3.405282	Durbin-Watson stat	2.784477
Prob(F-statistic)	0.029241		

The results from Tables 11 and 12 can be interpreted as follows:

The intercept shows that in the absence of all the variables included in the model, there would be 0.27 per cent change in trade between China and South Africa resulting from other factors not included in the model.

The coefficient of China's GDP is positive and significant, which implies that a 1 per cent change in China's GDP growth would cause 0.02 per cent change in trade between China and South Africa. That is, a 1 per cent increase in China's GDP will lead to 0.02 per cent increase

in bilateral trade between China and South Africa. The increase can either originate from the increases in South Africa's exports to China due to increased demand for commodities or from increased South African imports of cheap manufactured goods from China. An increase in China's GDP is associated with its increased trade with the rest of the world. As indicated by Venables and Yueh (2006:12), since 1979 China's GDP has increased twelvefold and its trade with the rest of the world has increased 30 times.

South Africa's exchange rate coefficient, although not statistically significant, provides a meaningful explanation of trade between the two countries. The 0.025 per cent exchange rate coefficient with the lag one implies that a 1 per cent change in South Africa's exchange rate in one year will lead to a 0.025 per cent change in trade between China and South Africa the next year, other factors being constant. Specifically, it means that a 1 per cent depreciation of the rand against the US dollar in one year will lead to a 0.025 increase in trade between South Africa and China in the following year. According to Edwards and Alves (2005:8), a real depreciation of the rand has raised both South Africa's exports and imports as a share of GDP.

South Africa's tariffs coefficient is positive, not as expected. It was expected that the coefficient would be negative, implying that an increase in South Africa's tariff will reduce its trade with China. On the contrary, the coefficient is positive; this may be because the equation combines both imports and exports. Since tariffs do not affect exports, the result may be meaningful, indicating that a 1 per cent increase in South Africa's tariff rate increases its trade with China by 0.06 per cent, other factors remaining constant.

The lagged residual, although not significant, has a negative sign, as expected. This shows that there is convergence. The variables would adjust by 0.025 towards equilibrium.

The coefficient of determinations R^2 shows that about 41 per cent variation in South Africa's trade with China is explained by the regressors.

Chapter six

Conclusion

6.0. Conclusion

The main aim of this study has been to determine the effect of China's economic growth on its trade with South Africa. Earlier studies showed that China's economic growth affects the economic components of its trading partners. Moreover, China's entry into the WTO has changed world trade like never before; in some countries it has led to trade growth, while in others it has reduced their trade by crowding out their exports in foreign markets. The econometric model used in the current study has enabled the researcher to determine the effect of China's economic growth on its trade with South Africa.

The empirical results have shown that China's economic growth increases its trade with South Africa. This finding suggests that China's economic growth expands markets for South Africa's current exports, especially raw materials, mainly metals and diamonds. Another finding by the study is that South Africa accounts for over 18 per cent of Africa's diamond exports to China. Another reason why China's economic growth increases its trade with South Africa could be increased demand for relatively cheaper Chinese goods in South Africa. It has also been shown that China produces cheaper products because of the abundant labour and the fact that the government subsidises export firms.

The implications of the findings of the study are that improvements in China's economic growth lead to increased exports from South Africa to China. On the other hand, improvements in China's economic growth lead to increased imports from South Africa. This means that South Africa exchanges it exports, which are mainly metals and mineral products, for manufactured imports such as machinery, textiles, clothing and footwear from China. Although this result could be good for South Africa, since it reveals an increased market for its exports, it could also lead to increased balance of trade with China because the manufactured imports from China could be more valuable than the exported minerals from South Africa.

In conclusion, trade between South Africa and China has been increasing and is expected to continue growing, since they are both in the BRICS trading block. Whether the increase in trade is beneficial to South Africa depends on the type and value of commodities that South Africa exports to China. China's economic growth may be expanding markets for South

Africa’s raw materials, but has also led to increased Chinese exports to South Africa that could be competing against South Africa’s local producers, especially in the manufacturing industries.

Furthermore, China’s economic growth could lead to crowding out South Africa’s exports in foreign markets, mostly in Africa. China has intensified its interest in Africa in almost all areas, for example in the fields of mining, manufacturing, agriculture and finance. China’s entrance into the Mauritian market has reduced South Africa’s trade in the country.

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APPENDIX

Table1 A1: Data

Years	SA's Exports to China (Rand)	S A's Imports from China (Rand)	Total Trade between SA and China (Rand)	China's GDP in Volume ($)	China's GDP Per Capita (Volume)	China's GDP (%)	China's Per Capita income (%)	SA's Exchange rate (R/$)	SA's Tariffs (%)
1988	60,479,823	238,861,139	299,340,962	310000000000.00	281	11.583	9.80108	2.27	12
1989	132,291,574	265,407,959	397,699,533	344000000000.00	307.5	11.281	9.587476	2.62	9.9
1990	130,918,836	340,367,665	471,286,501	357000000000.00	314.4	4.0632	2.547428	2.59	12
1991	139,374,187	478,802,972	618,177,159	379000000000.00	329.8	3.839	2.431832	2.76	12
1992	525,193,983	655,745,964	1,180,939,947	423000000000.00	362.8	9.1789	7.849075	2.85	13
1993	637,405,638	1,009,070,163	1,646,475,801	441000000000.00	373.8	14.241	12.93489	3.27	16
1994	538,208,881	1,302,870,973	1,841,079,854	559000000000.00	469.2	13.964	12.68347	3.55	15
1995	931,176,290	1,852,321,595	2,783,497,885	728000000000.00	604.2	13.081	11.8587	3.63	14
1996	729,200,834	2,450,174,604	3,179,375,438	856000000000.00	703.1	10.925	9.768401	4.3	13
1997	909,700,686	3,259,347,981	4,169,048,667	953000000000.00	774.5	10.009	8.888383	4.61	12
1998	912,754,731	4,345,732,989	5,258,487,720	1020000000000.00	820.9	9.297	8.25329	5.53	10
1999	1,651,541,341	5,010,605,591	6,662,146,932	1080000000000.00	864.7	7.8333	6.903701	6.11	10
2000	4,086,723,558	6,935,117,156	11,021,840,714	1200000000000.00	949.2	7.6198	6.775171	6.94	9.6
2001	3,785,931,853	9,087,058,577	12,872,990,430	1320000000000.00	1042	8.3003	7.516496	8.61	8.9
2002	4,694,374,978	14,240,372,289	18,934,747,267	1450000000000.00	1135	9.0821	8.353662	10.5	8.4
2003	6,570,008,237	16,581,867,589	23,151,875,826	1640000000000.00	1274	10.025	9.342204	7.56	8.6
2004	6,458,942,742	23,010,974,189	29,469,916,931	1930000000000.00	1490	10.085	9.433147	6.46	7.9
2005	8,458,896,364	31,467,506,180	39,926,402,544	2260000000000.00	1731	11.31	10.65731	6.36	8.2
2006	13,647,738,263	46,712,001,491	60,359,739,754	2710000000000.00	2069	12.677	12.04913	6.77	8.2
2007	24,501,423,312	60,280,871,421	84,782,294,733	3494060000000.00	2651	14.162	13.56771	7.05	7.5
2008	34,389,865,647	82,418,447,301	116,808,312,948	4520000000000.00	3414	9.6347	9.074351	8.26	7.1
2009	48,685,724,582	70,800,305,593	119,486,030,175	4990000000000.00	3749	9.2142	8.672337	8.47	7.3
2010	58,550,859,921	84,090,237,366	142,641,097,287	5930000000000.00	4433	10.447	9.914861	7.32	7.4
2011	85,297,382,982	103,130,074,805	188,427,457,787	7320000000000.00	5447	9.2999	8.777427	7.26	7.2
2012	81,141,523,076	120,058,729,350	201,200,252,426	8230000000000.00	6091	7.6526	7.129312	8.21	7
2013	109,359,578,643	154,529,952,063	263,889,530,706	9240270452100.00	6807	7.6712	7.140918	9.66	6.6

Sources: China's GDP, China's GDP per capita and exchange rate between South African Rand and US dollar data are from World Integrated Trade Solutions (WITS) World Bank. The data on trade between South Africa and China is from Quantec Easydata and it is in rand value. Tariffs data is from World Integrated Trade Solutions and Edwards (2005). The Import weighted average tariff rates from 1988-2008 was from Edwards and from 2009 to 2013 was from WITS.

STATIONARITY TESTS OF VARIABLES IN LEVELS

(a) ADF TESTS IN LEVELS

Table A2: GDPPERCENT

Null Hypothesis: GDP_PERCENT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.495981	0.1283
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP_PERCENT)
Method: Least Squares
Date: 11/22/14 Time: 06:39
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_PERCENT(-1)	-0.431881	0.173031	-2.495981	0.0202
C	4.141679	1.780085	2.326674	0.0291

R-squared	0.213135	Mean dependent var	-0.156483
Adjusted R-squared	0.178923	S.D. dependent var	2.488012
S.E. of regression	2.254469	Akaike info criterion	4.540324
Sum squared resid	116.9005	Schwarz criterion	4.637834
Log likelihood	-54.75405	Hannan-Quinn criter.	4.567369
F-statistic	6.229919	Durbin-Watson stat	1.352572
Prob(F-statistic)	0.020172		

Table A3: PERCAPITAPERCENT

Null Hypothesis: PER_CAPITA_PERCENT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.414204	0.1481
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PER_CAPITA_PERCENT)
Method: Least Squares
Date: 11/27/14 Time: 06:33
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PER_CAPITA_PERCENT(-1)	-0.411318	0.170374	-2.414204	0.0241
C	3.591681	1.596804	2.249294	0.0344

R-squared	0.202175	Mean dependent var	-0.106406
Adjusted R-squared	0.167487	S.D. dependent var	2.471188
S.E. of regression	2.254765	Akaike info criterion	4.540587
Sum squared resid	116.9312	Schwarz criterion	4.638097
Log likelihood	-54.75733	Hannan-Quinn criter.	4.567632
F-statistic	5.828381	Durbin-Watson stat	1.352113
Prob(F-statistic)	0.024129		

Table A4: LOGEXCHANGE

Null Hypothesis: LOGEXCHANGE has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.419118	0.5567
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(LOGEXCHANGE)
Method: Least Squares
Date: 11/22/14 Time: 06:45
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGEXCHANGE(-1)	-0.077358	0.054511	-1.419118	0.1693
C	0.186020	0.093607	1.987247	0.0589

R-squared	0.080511	Mean dependent var	0.057847
Adjusted R-squared	0.040533	S.D. dependent var	0.125531
S.E. of regression	0.122961	Akaike info criterion	-1.277286
Sum squared resid	0.347745	Schwarz criterion	-1.179776
Log likelihood	17.96607	Hannan-Quinn criter.	-1.250241
F-statistic	2.013896	Durbin-Watson stat	1.471899
Prob(F-statistic)	0.169275		

Table A5: TARIFFS

Null Hypothesis: TARIFFS has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.615604	0.8494
Test critical values:	1% level	-3.737853	
	5% level	-2.991878	
	10% level	-2.635542	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(TARIFFS)
Method: Least Squares
Date: 11/22/14 Time: 06:47
Sample (adjusted): 1990 2013
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TARIFFS(-1)	-0.045768	0.074347	-0.615604	0.5448
D(TARIFFS(-1))	0.234123	0.206194	1.135450	0.2690
C	0.366770	0.781040	0.469592	0.6435

R-squared	0.063025	Mean dependent var	-0.137500
Adjusted R-squared	-0.026210	S.D. dependent var	0.933815
S.E. of regression	0.945974	Akaike info criterion	2.843265
Sum squared resid	18.79220	Schwarz criterion	2.990522
Log likelihood	-31.11918	Hannan-Quinn criter.	2.882332
F-statistic	0.706278	Durbin-Watson stat	1.322798
Prob(F-statistic)	0.504827		

(b) PHILLIPS-PERRON TESTS IN LEVELS

Table A6: GDPPERCENT

Null Hypothesis: GDP_PERCENT has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.749922	0.0800
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	4.676019

HAC corrected variance (Bartlett kernel)	6.170097

Phillips-Perron Test Equation
Dependent Variable: D(GDP_PERCENT)
Method: Least Squares
Date: 11/22/14 Time: 06:51
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_PERCENT(-1)	-0.431881	0.173031	-2.495981	0.0202
C	4.141679	1.780085	2.326674	0.0291

R-squared	0.213135	Mean dependent var	-0.156483
Adjusted R-squared	0.178923	S.D. dependent var	2.488012
S.E. of regression	2.254469	Akaike info criterion	4.540324
Sum squared resid	116.9005	Schwarz criterion	4.637834
Log likelihood	-54.75405	Hannan-Quinn criter.	4.567369
F-statistic	6.229919	Durbin-Watson stat	1.352572
Prob(F-statistic)	0.020172		

Table A7: PERCAPITAPERCENT

Null Hypothesis: PER_CAPITA_PERCENT has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.671720	0.0929
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	4.677246
HAC corrected variance (Bartlett kernel)	6.182997

Phillips-Perron Test Equation
Dependent Variable: D(PER_CAPITA_PERCENT)
Method: Least Squares
Date: 11/27/14 Time: 06:35
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PER_CAPITA_PERCENT(-1)	-0.411318	0.170374	-2.414204	0.0241
C	3.591681	1.596804	2.249294	0.0344

R-squared	0.202175	Mean dependent var	-0.106406
Adjusted R-squared	0.167487	S.D. dependent var	2.471188
S.E. of regression	2.254765	Akaike info criterion	4.540587
Sum squared resid	116.9312	Schwarz criterion	4.638097
Log likelihood	-54.75733	Hannan-Quinn criter.	4.567632
F-statistic	5.828381	Durbin-Watson stat	1.352113
Prob(F-statistic)	0.024129		

Table A8: LOGEXCHANGERATE

Null Hypothesis: LOGEXCHANGE has a unit root
Exogenous: Constant
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.415198	0.5586
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.013910
HAC corrected variance (Bartlett kernel)	0.017188

Phillips-Perron Test Equation
Dependent Variable: D(LOGEXCHANGE)
Method: Least Squares
Date: 11/22/14 Time: 06:53
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGEXCHANGE(-1)	-0.077358	0.054511	-1.419118	0.1693
C	0.186020	0.093607	1.987247	0.0589

R-squared	0.080511	Mean dependent var	0.057847
Adjusted R-squared	0.040533	S.D. dependent var	0.125531
S.E. of regression	0.122961	Akaike info criterion	-1.277286
Sum squared resid	0.347745	Schwarz criterion	-1.179776
Log likelihood	17.96607	Hannan-Quinn criter.	-1.250241
F-statistic	2.013896	Durbin-Watson stat	1.471899
Prob(F-statistic)	0.169275		

Table A9: TARIFFS

Null Hypothesis: TARIFFS has a unit root
Exogenous: Constant
Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.731040	0.8210
Test critical values:	1% level	-3.724070	
	5% level	-2.986225	
	10% level	-2.632604	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.885699
HAC corrected variance (Bartlett kernel)	1.226852

Phillips-Perron Test Equation
Dependent Variable: D(TARIFFS)
Method: Least Squares
Date: 11/22/14 Time: 06:55
Sample (adjusted): 1989 2013
Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
TARIFFS(-1)	-0.038435	0.074315	-0.517192	0.6100
C	0.188194	0.775809	0.242578	0.8105

R-squared	0.011496	Mean dependent var	-0.200000
Adjusted R-squared	-0.031482	S.D. dependent var	0.966092
S.E. of regression	0.981181	Akaike info criterion	2.876499
Sum squared resid	22.14249	Schwarz criterion	2.974009
Log likelihood	-33.95624	Hannan-Quinn criter.	2.903545
F-statistic	0.267488	Durbin-Watson stat	1.446814
Prob(F-statistic)	0.609960		

STATIONARITY TESTS OF VARIABLES IN FIRST DIFFERENCE

(a) ADF TESTS IN FIRST DIFFERENCE

Table A10: DGDPPERCENT

Null Hypothesis: D(DGDPPERCENT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.883838	0.0001
Test critical values:	1% level	-3.752946	

	5% level	-2.998064
	10% level	-2.638752

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DGDPPERCENT,2)
Method: Least Squares
Date: 11/22/14 Time: 07:04
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DGDPPERCENT(-1))	-1.130028	0.192056	-5.883838	0.0000
C	0.307008	0.602873	0.509241	0.6159

R-squared	0.622435	Mean dependent var	0.373073
Adjusted R-squared	0.604456	S.D. dependent var	4.596387
S.E. of regression	2.890775	Akaike info criterion	5.043867
Sum squared resid	175.4881	Schwarz criterion	5.142606
Log likelihood	-56.00447	Hannan-Quinn criter.	5.068700
F-statistic	34.61955	Durbin-Watson stat	1.461912
Prob(F-statistic)	0.000008		

Table A11: DPERCAPITAPERCENT

Null Hypothesis: D(DPERCAPITAPERCENT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.871254	0.0001
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DPERCAPITAPERCENT,2)
Method: Least Squares
Date: 11/27/14 Time: 06:40
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DPERCAPITAPERCENT(-1))	-1.129890	0.192444	-5.871254	0.0000
C	0.298492	0.600100	0.497404	0.6241

R-squared	0.621428	Mean dependent var	0.368964
Adjusted R-squared	0.603401	S.D. dependent var	4.569041
S.E. of regression	2.877405	Akaike info criterion	5.034596
Sum squared resid	173.8686	Schwarz criterion	5.133334
Log likelihood	-55.89785	Hannan-Quinn criter.	5.059428
F-statistic	34.47162	Durbin-Watson stat	1.469274
Prob(F-statistic)	0.000008		

Table A12: DLOGEXCHANGE

Null Hypothesis: D(DLOGEXCHANGE) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.792306	0.0001
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DLOGEXCHANGE,2)
Method: Least Squares
Date: 11/22/14 Time: 07:06
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DLOGEXCHANGE(-1))	-1.207607	0.208485	-5.792306	0.0000
C	0.007458	0.032237	0.231356	0.8193

R-squared	0.615038	Mean dependent var	0.008512
Adjusted R-squared	0.596706	S.D. dependent var	0.243443
S.E. of regression	0.154599	Akaike info criterion	-0.813019
Sum squared resid	0.501920	Schwarz criterion	-0.714281
Log likelihood	11.34972	Hannan-Quinn criter.	-0.788187
F-statistic	33.55081	Durbin-Watson stat	2.092771
Prob(F-statistic)	0.000009		

Table A13: DTARIFFS

Null Hypothesis: D(DTARIFFS) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.429070	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DTARIFFS,2)
Method: Least Squares
Date: 11/22/14 Time: 07:07
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DTARIFFS(-1))	-1.296627	0.153828	-8.429070	0.0000
C	-0.085003	0.185233	-0.458895	0.6510

R-squared	0.771861	Mean dependent var	-0.169565
Adjusted R-squared	0.760997	S.D. dependent var	1.814446
S.E. of regression	0.887044	Akaike info criterion	2.681097
Sum squared resid	16.52380	Schwarz criterion	2.779836
Log likelihood	-28.83262	Hannan-Quinn criter.	2.705930
F-statistic	71.04923	Durbin-Watson stat	2.096992
Prob(F-statistic)	0.000000		

(b) PHILLIPS-PERRON TESTS IN FIRST DIFFERENCE

Table A14: DGDPERCENT

Null Hypothesis: D(DGDPPERCENT) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.042494	0.0001
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	7.629918
HAC corrected variance (Bartlett kernel)	6.461745

Phillips-Perron Test Equation
Dependent Variable: D(DGDPPERCENT,2)
Method: Least Squares
Date: 11/22/14 Time: 06:57
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DGDPPERCENT(-1))	-1.130028	0.192056	-5.883838	0.0000
C	0.307008	0.602873	0.509241	0.6159

R-squared	0.622435	Mean dependent var	0.373073
Adjusted R-squared	0.604456	S.D. dependent var	4.596387
S.E. of regression	2.890775	Akaike info criterion	5.043867
Sum squared resid	175.4881	Schwarz criterion	5.142606
Log likelihood	-56.00447	Hannan-Quinn criter.	5.068700
F-statistic	34.61955	Durbin-Watson stat	1.461912
Prob(F-statistic)	0.000008		

Table 15: DPERCAPITAPERCENT

Null Hypothesis: D(DPERCAPITAPERCENT) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.035915	0.0001
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	7.559505
HAC corrected variance (Bartlett kernel)	6.355730

Phillips-Perron Test Equation
Dependent Variable: D(DPERCAPITAPERCENT,2)
Method: Least Squares
Date: 11/27/14 Time: 06:42
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DPERCAPITAPERCENT(-1))	-1.129890	0.192444	-5.871254	0.0000
C	0.298492	0.600100	0.497404	0.6241

R-squared	0.621428	Mean dependent var	0.368964
Adjusted R-squared	0.603401	S.D. dependent var	4.569041
S.E. of regression	2.877405	Akaike info criterion	5.034596
Sum squared resid	173.8686	Schwarz criterion	5.133334
Log likelihood	-55.89785	Hannan-Quinn criter.	5.059428
F-statistic	34.47162	Durbin-Watson stat	1.469274
Prob(F-statistic)	0.000008		

Table A16: DLOGEXCHANGE

Null Hypothesis: D(DLOGEXCHANGE) has a unit root
Exogenous: Constant
Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-8.845482	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.021823
HAC corrected variance (Bartlett kernel)	0.004375

Phillips-Perron Test Equation
Dependent Variable: D(DLOGEXCHANGE,2)
Method: Least Squares
Date: 11/22/14 Time: 07:01
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DLOGEXCHANGE(-1))	-1.207607	0.208485	-5.792306	0.0000
C	0.007458	0.032237	0.231356	0.8193

R-squared	0.615038	Mean dependent var	0.008512
Adjusted R-squared	0.596706	S.D. dependent var	0.243443
S.E. of regression	0.154599	Akaike info criterion	-0.813019
Sum squared resid	0.501920	Schwarz criterion	-0.714281
Log likelihood	11.34972	Hannan-Quinn criter.	-0.788187
F-statistic	33.55081	Durbin-Watson stat	2.092771
Prob(F-statistic)	0.000009		

Table A17: DTARIFFS

Null Hypothesis: D(DTARIFFS) has a unit root
Exogenous: Constant
Bandwidth: 14 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-12.86913	0.0000
Test critical values:	1% level	-3.752946	
	5% level	-2.998064	
	10% level	-2.638752	

*MacKinnon (1996) one-sided p-values.

Residual variance (no correction)	0.718426
HAC corrected variance (Bartlett kernel)	0.229878

Phillips-Perron Test Equation
Dependent Variable: D(DTARIFFS,2)
Method: Least Squares
Date: 11/22/14 Time: 07:02
Sample (adjusted): 1991 2013
Included observations: 23 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(DTARIFFS(-1))	-1.296627	0.153828	-8.429070	0.0000
C	-0.085003	0.185233	-0.458895	0.6510

R-squared	0.771861	Mean dependent var	-0.169565
Adjusted R-squared	0.760997	S.D. dependent var	1.814446
S.E. of regression	0.887044	Akaike info criterion	2.681097
Sum squared resid	16.52380	Schwarz criterion	2.779836
Log likelihood	-28.83262	Hannan-Quinn criter.	2.705930
F-statistic	71.04923	Durbin-Watson stat	2.096992
Prob(F-statistic)	0.000000		

EQUATIONS

Table A18: DGDPPERCENT

Dependent Variable: DLOGTRADE
Method: Least Squares
Date: 11/12/14 Time: 17:33
Sample (adjusted): 1989 2012
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.274023	0.027013	10.14414	0.0000
DGDPPERCENT	0.020891	0.009871	2.116489	0.0477
DLOGEXCHANGE(1)	0.254129	0.199176	1.275897	0.2174
DTARIFFS(1)	0.062620	0.028320	2.211146	0.0395
RES02(1)	-0.048170	0.035595	-1.353275	0.1919

R-squared	0.412316	Mean dependent var	0.271270
Adjusted R-squared	0.288593	S.D. dependent var	0.139994
S.E. of regression	0.118078	Akaike info criterion	-1.251897
Sum squared resid	0.264904	Schwarz criterion	-1.006469
Log likelihood	20.02276	Hannan-Quinn criter.	-1.186785
F-statistic	3.332579	Durbin-Watson stat	2.770422
Prob(F-statistic)	0.031518		

Table A19: DPECAPITA PERCENT

Dependent Variable: DLOGTRADE
Method: Least Squares
Date: 11/12/14 Time: 17:41
Sample (adjusted): 1989 2012
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.273095	0.026876	10.16136	0.0000
DPERCAPITAPERCENT	0.020656	0.009937	2.078699	0.0514
DLOGEXCHANGE(1)	0.256303	0.197873	1.295290	0.2107
DTARIFFS(1)	0.063116	0.028374	2.224413	0.0384
RES04(1)	-0.050720	0.036346	-1.395451	0.1790

R-squared	0.417555	Mean dependent var	0.271270
Adjusted R-squared	0.294935	S.D. dependent var	0.139994
S.E. of regression	0.117550	Akaike info criterion	-1.260852
Sum squared resid	0.262543	Schwarz criterion	-1.015424
Log likelihood	20.13022	Hannan-Quinn criter.	-1.195740
F-statistic	3.405282	Durbin-Watson stat	2.784477
Prob(F-statistic)	0.029241		

SERIAL CORRELATION TESTS

(a) CORRELOGRAM AND Q-STATISTICS

Table A20: DGDPPERCENT

Date: 11/22/14 Time: 07:18
Sample: 1989 2012
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.445	-0.445	5.3705	0.020
. |* . |	. *| . |	2	0.074	-0.155	5.5259	0.063
. |* . |	. |* . |	3	0.091	0.078	5.7742	0.123
. *| . |	. *| . |	4	-0.181	-0.118	6.7934	0.147
. |* . |	. | . |	5	0.123	-0.011	7.2900	0.200
.**| . |	.**| . |	6	-0.217	-0.231	8.9291	0.178
. *| . |	***| . |	7	-0.088	-0.347	9.2134	0.238
. |**. |	. | . |	8	0.230	0.009	11.283	0.186
. *| . |	. | . |	9	-0.170	-0.017	12.489	0.187
. | . |	.**| . |	10	-0.057	-0.266	12.635	0.245
. |**. |	. | . |	11	0.220	-0.001	14.958	0.184
. | . |	. |* . |	12	-0.034	0.118	15.019	0.240

Table A21: DPERCAPITAPERCENT

Date: 11/22/14 Time: 07:21
Sample: 1989 2012
Included observations: 24

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
***| . |	***| . |	1	-0.450	-0.450	5.4859	0.019
. | . |	. *| . |	2	0.070	-0.166	5.6251	0.060
. |* . |	. | . |	3	0.094	0.072	5.8858	0.117
. *| . |	. *| . |	4	-0.180	-0.118	6.8972	0.141
. |* . |	. | . |	5	0.125	-0.008	7.4102	0.192
.**| . |	.**| . |	6	-0.219	-0.233	9.0724	0.170
. *| . |	***| . |	7	-0.089	-0.358	9.3636	0.228
. |**. |	. | . |	8	0.232	-0.007	11.454	0.177
. *| . |	. | . |	9	-0.172	-0.028	12.682	0.178
. | . |	.**| . |	10	-0.057	-0.276	12.829	0.233
. |**. |	. | . |	11	0.221	-0.016	15.178	0.174
. | . |	. |* . |	12	-0.032	0.111	15.233	0.229

(b) BREUSCH-GODFREY SERIAL CORRELATION LM TEST

Table A22: DGDPPERCENT

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.042995	Prob. F(2,17)	0.0742
Obs*R-squared	6.326944	Prob. Chi-Square(2)	0.0423

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/22/14 Time: 07:23
Sample: 1989 2012
Included observations: 24
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001033	0.024663	-0.041881	0.9671
DGDPPERCENT	0.002621	0.009052	0.289505	0.7757
DLOGEXCHANGE(1)	0.074733	0.185591	0.402674	0.6922
DTARIFFS(1)	-0.013782	0.026294	-0.524140	0.6069
RES02(1)	0.000313	0.032318	0.009696	0.9924
RESID(-1)	-0.621150	0.254899	-2.436844	0.0261
RESID(-2)	-0.172097	0.248745	-0.691860	0.4984

R-squared	0.263623	Mean dependent var	6.94E-18
Adjusted R-squared	0.003725	S.D. dependent var	0.107320
S.E. of regression	0.107120	Akaike info criterion	-1.391243
Sum squared resid	0.195069	Schwarz criterion	-1.047644
Log likelihood	23.69492	Hannan-Quinn criter.	-1.300086
F-statistic	1.014332	Durbin-Watson stat	1.912596
Prob(F-statistic)	0.448615		

Table A23: DPERCAPITA PERCENT

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	3.145448	Prob. F(2,17)	0.0688
Obs*R-squared	6.482425	Prob. Chi-Square(2)	0.0391

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/22/14 Time: 07:25
Sample: 1989 2012
Included observations: 24
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.001505	0.024425	-0.061603	0.9516
DPERCAPITAPERCENT	0.002401	0.009069	0.264778	0.7944

DLOGEXCHANGE(1)	0.076950	0.183589	0.419142	0.6804
DTARIFFS(1)	-0.014005	0.026232	-0.533868	0.6003
RES04(1)	0.001197	0.032857	0.036445	0.9714
RESID(-1)	-0.628954	0.253461	-2.481456	0.0238
RESID(-2)	-0.181597	0.247631	-0.733337	0.4733

R-squared	0.270101	Mean dependent var	-3.59E-17
Adjusted R-squared	0.012490	S.D. dependent var	0.106841
S.E. of regression	0.106171	Akaike info criterion	-1.409034
Sum squared resid	0.191630	Schwarz criterion	-1.065435
Log likelihood	23.90841	Hannan-Quinn criter.	-1.317877
F-statistic	1.048483	Durbin-Watson stat	1.919730
Prob(F-statistic)	0.429552		