UNIVERSITY OF THE WESTERN CAPE

DEPARTMENT OF ECONOMICS

AN ASSESSMENT OF THE BENEFITS OF OFFSHORE SERVICES TO SOUTH AFRICA'S ECONOMIC GROWTH

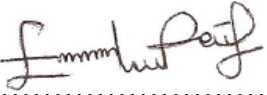**By**

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A mini-thesis submitted in partial fulfilment of the requirement for the degree of Master of Economics in the Department of Economics, University of the Western Cape.

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DECLARATION

I, the undersigned, hereby declare that "An assessment of the benefits of offshore services to South Africa's economic growth" is my own work, that it has not been previously submitted in its entirety or in part for any degree in any university, and that all the sources I have used or quoted have been indicated and acknowledged by means of complete references.

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ABSTRACT

Throughout its development, trade has been regarded as a vital component of economic growth and development. Both theoretical and empirical studies consider international trade to be a major determinant of the growth of any economy. International trade in services has been rising ever since trade in services was incorporated into international trade agreements after the Uruguay Round of trade negotiations in 1994. This, coupled with the ever-improving state of technological innovation, has made services trade an important aspect of the development agenda of most countries. However, just like any other endeavour, offshoring of services has both opportunities as well as threats.

The study examines two research questions relating to the growth-enhancing impact of South Africa's exports and imports of services. Firstly, the study examines the contribution of services exports to economic growth in South Africa. Secondly, the study determines the impact that imported services has had on South Africa's economic growth.

In spite of the global rise of trade in services, South Africa's export of services accounts for only 14 percent of total exports, while the import of services constitutes 20 percent of total imports. Using quarterly time series data for the period 1980 to 2012, the study adopts the ordinary least squares method to estimate the contribution of both exports and imports to output expansion within an aggregation production function setup. The empirical results show that the export of services influences influence South Africa's economic growth significantly in both the long-run and the short-run. While the relationship is positive in the long-run, it is negative in the short-run. The results also indicate that the import of services significantly and positively affects real output growth in both the long-run and the short-run.

KEYWORDS: International trade in services, Offshoring, Inshoring, Export, Import, Economic growth, South Africa.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
BOP	Balance of Payments
CES	Constant Elasticity of Substitution
ECM	Error-Correction Model
EG	Engle Granger
GATS	General Agreements on Trade in Services
GDP	Gross Domestic Product
ICT	Information and Communication Technology
IMF	International Monetary Fund
IT	Information Technology
MSTIS	Manual Statistic on Trade in Services
NEDLAC	National Economic Development and Labour Council
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
SARB	South African Reserve Bank
TFP	Total Factor Productivity
UNCTAD	United Nations Conference on Trade and Development
VAR	Vector Autoregression
VECM	Vector Error-Correction Model
WTO	World Trade Organisation

CHAPTER ONE: INTRODUCTION

1.1 Introduction

There has been a remarkable expansion of the share of services in the world economy, making the services sector the engine of growth in many economies. By facilitating transactions, services play an important role as determinants of productivity of the factors of production. Apart from serving as vital input in the production process, services also provide the bulk of income and employment opportunities in a number of countries. A more efficient service sector can therefore be instrumental to the achievement of economic growth.

The economic significance of services has been growing constantly in several middle- and low-income countries. Therefore the perception that the developing world may not be able to maximise the gains from services trade because their services industries are mostly inefficient and non-competitive is unreliable (OECD, 2005: 2). According to both the theoretical and empirical literature, opening up the services sector to international trade leads to considerable gains for all economies, developed and developing. For example, health services now constitute an important export avenue and source of foreign exchange for a number of developing nations, including South Africa. A sizable number of patients from abroad seek medical services (such plastic surgery) from South Africa. Several companies also relocate some aspects of their operations, such as call centres, to regions other than their home countries. The practice of relocating business processes to a foreign destination is described as offshoring.

Offshoring of services to and from abroad, although not a recent phenomenon, has been developing at a remarkable pace in recent times. This rising trend of services offshoring has made services a vital component of global trade. The growing importance of services in international trade has made them a prominent feature on the agenda of the Doha Round of trade negotiations (Cooper, 2009: 1). Although trade negotiations during the Uruguay Round contributed to the rise in services trade, technological development has also played a key role in making services more tradable. The rise in the tradability of services has necessitated the need to critically analyse the opportunities and threats that can be encountered as a country embarks on the import and export of services.

The study poses two research questions as it attempts to ascertain the growth-inducing effect of services trade. These research questions are stated in section 1.2. The empirical

investigation of the research questions will assist in achieving the objectives of this study which are outlined in section 1.3. It is envisaged that this study can help deepen the understanding of the role that services trade plays in South Africa. Section 1.4 outlines the significance of the study. Finally, section 1.5 elaborates on how the thesis is organised.

1.2 Research Questions

Even though the services sector is considered as a key sector, its role in economic development has not been well conceptualised and thus has not been extensively analysed, especially in developing countries. The reason for this is that, in spite of the importance of the services sector to economic development, most developing nations have not been able to fully utilise the opportunities that services trade offers. In an attempt to empirically test the effect that services trade has on South Africa's economic growth, the study focuses on two major questions. These are:

1. What effect does the export of services have on South Africa's economic?
2. How does the import of services influence the growth of real output within the South Africa's economy?

1.3 Aims and Objectives of the Study

As the two research questions indicate, this study investigates the growth-enhancing effect of international trade in services with an emphasis on the South African economy. The rationale of this study is to analyse the export and import of services in the South African economy to ascertain whether these two variables have either a positive or negative impact on the growth of GDP. The result of the investigation will help to make inferences about the benefits of the offshoring of services to and from South Africa. The specific hypotheses tested are embedded in the two key research questions. The study will test the hypotheses that both export and import of services can influence output expansion positively.

By reviewing relevant related literature as well as using data from the South African Reserve Bank (SARB) Quarterly Bulletin, International Monetary Fund (IMF) Balance of Payments Statistics and United Nations Conference on Trade and Development Statistics (UNCTADSTAT), the study aims to:

- Analyse the key theoretical and empirical literature that pertains to the impact of international trade in services on economic growth;

- Empirically estimate models that will help to determine the growth-enhancing impact of offshoring of services to and from South Africa.

1.4 Significance of the Study

By adopting appropriate econometric methodology and data, this study explores the potential gains from international trade in services, an area which has witnessed less empirical attention relative to trade in goods. In the past the focus of government policies and strategies on trade has mainly centred on the manufacturing sector. The conclusion of the Uruguay Round of trade negotiations and the eventual recognition of services in multilateral trade present the developing world with numerous opportunities regarding both the export and import of services.

This study provides empirical evidence on how the export of services affects South Africa's economic growth. The outcome of the study can give an indication of the role services can play in export-promotion policies. The study also helps to identify the key sub-categories of South Africa's total exported services.

On the import side, the study empirically tests the importance of the import of services in relation to output expansion in South African. The findings of this study can provide direction on the possible benefits that South Africa can gain from opening up its services sector to foreign competition. For example, the movement of natural persons (mode 4)[1] into South Africa can be expanded to enhance competitiveness and provide short-term relief for the shortages of skilled labour.

1.5 Structure of the Thesis

The thesis is structured into six chapters. Chapter One is the introduction; Chapter Two describes the background on services and services trade; Chapter Three is the literature review; Chapter Four outlines the methodology; Chapter Five presents the empirical results; and Chapter Six draws the conclusion.

Chapter Two of the thesis gives a detailed background on services in general and identifies the key characteristics that make services distinct from goods. These distinctive features of services are intangibility, heterogeneity, inseparability and perishability. The chapter also explains what international trade in services entails and how it has expanded over the years.

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[1] See section 2.3 for detailed explanation.

The chapter then explores the factors that have contributed to the observed growth in services trade. As the chapter demonstrates, the growth in services trade is attributed to the vital roles played by information technology and trade liberalisation.

Chapter Three explores the literature on trade in two parts. The first part reviews the theoretical rationale for trade in general and how trade theory applies to services trade. The different perspectives of trade theories, from classical to the new trade theory, are reviewed to demonstrate how the theoretical underpinnings of trade have evolved. Both the traditional trade theory of comparative advantage and the new trade theory which hinges on increasing returns emphasise the economic gains from trade. In order to back this assertion, the second part of Chapter Three reviews past studies to ascertain how trade impacts on growth and development. The literature confirms that international trade in general, and services trade in particular, is vital to the economic growth and development.

Chapter Four discusses the models, data and econometric procedures that the study employs to meet its objectives. The strength of any empirical study lies in the accuracy of the data and appropriateness of the econometric tools adopted. The chapter first discusses the approaches that have been used by previous studies, such as the ones reviewed in the third chapter, before identifying the analytical framework and model that this study adopts. The chapter identifies the aggregate production function approach as the method that can be used to assess how trade affects economic growth. Different models, based on the aggregate production function framework, are specified for the export and import of services in line with the objectives of the study.

Chapter Five uses the production function approach to empirically investigate how the export and import of services affect South Africa's economic growth. After subjecting all the variables to unit root testing and checking if they are cointegrated, the coefficients of exports and imports together with the coefficients of capital and labour are estimated. The outcome shows that in the long-run, both the export and import of services have a positive relationship with real GDP growth. While the import of services affects the growth of real GDP positively in the short-run, the export of services has a negative impact the GDP growth.

Chapter Six concludes the study, focusing on the main empirical findings and how these findings help to solve the research problem. The chapter also provides suggestions on related research areas that could be the focus of future investigations.

CHAPTER TWO: BACKGROUND ON SERVICES AND TRADE IN SERVICES

2.1 Introduction

To supplement the introduction to this study in the previous chapter, the current chapter discusses the concepts of services and trade in services which are fundamental and central to the topic under consideration. Unlike goods which are physical in nature and appropriable, services are not physical objects but activities that can change the condition of a person or a good, as emphasised by Hill (1977: 317). This means that the services sector is distinct from the goods or manufacturing sector. Globally, the services sector has grown in size and importance, and is considered as key to economic growth (OECD, 2005: 1) because of the effects the sector has on production efficiency (Safdari and Elahi, 2012: 48). In section 2.2 of this chapter the conceptual definition and distinguishing characteristics of services are discussed in detail.

Due to the increasing importance of the services sector, trade within the sector, according to Safdari and Elahi (2012: 48), has become an essential aspect of economic and technical integration among nations. As alluded to by the World Bank (2008: 3), the scope of tradable services has been significantly improved by advances in information and communication technologies (ICT). Likewise, Chanda (2008: 1) also posits that the rise of worldwide trade and investment flows in services has been aided by liberalisation and deregulation of economies. Consequently, several services which were considered as non-tradable in the past have become tradable in recent times, as postulated by Amiti and Wei (2009: 203). The factors that have accounted for the expansion of trade in services are discussed in detail in section 2.3 of this chapter.

2.2 The Concept of Services

The term service covers a wide range of heterogeneous and intangible activities (WTO, 2010: 7). Hill (1977: 318) defines a service as an activity that changes the condition of an economic agent, or of a good belonging to an economic agent, and this change occurs through an activity that is provided by another economic agent. Similarly, Regan (1963: 57) regards services as activities, satisfactions, or benefits which are either offered for sale, or are provided in conjunction with the sale of goods. Services can be classified as either consumer services or producer services.

Consumer services are final-demand services that are provided to fulfil the needs of the ultimate consumer. A consumer service is therefore said to have been provided when the activity of the producer of the service has a direct impact on the consumer (Hill, 1977: 318). Apart from being able to change the condition of consumers, services can also influence the production process.

Services that are used as intermediate inputs in production are known as producer services. The World trade Organisation (2010: 7) states that certain services, known as transformation services, play key roles in productive activities. Services that play the role of intermediate inputs in production include communication, financial and business services (Hodge, 1997: 4). The literature identifies four main distinct characteristics which help to distinguish services from goods. These distinct features of services are discussed in the next section.

2.2.1 Characteristics of Services

According to Wolak, Kalafati and Haris (1998: 23), there are four major distinct features of services, namely that they are intangible, heterogeneous, inseparable and perishable (IHIP). These so-called IHIP characteristics have been widely debated in the literature (Moeller, 2010: 359). Although these characteristics are widely recognised, some authors, including Lovelock and Gummesson (2004) and Vargo and Lusch (2004), have criticised them. Moeller (2010: 359) explains that the core reason for the criticism is linked to the dramatic advancement and improvement in ICT.

Intangibility: The intangibility of services means that services are immaterial (Moeller, 2010: 361). Services are deemed to be immaterial because they cannot be seen, felt or touched by the consumer, unlike in the case of goods (Zeithaml, 1981: 186). Zeithaml (1981: 186) further explains that it is difficult to display or physically demonstrate services.

Heterogeneity: In the delivery of services, performance and quality are inconsistent (Zeithaml, 1981: 186). While quality may differ from day to day, the level of performance also depends to a large extent on demand. Zeithaml (1981: 186) therefore concludes that the service provider may exert minimal effort during periods of high demand and vice versa. Wolak et al. (1998: 26) also argue that there is a vast variability in service delivery, especially for services that have a high labour content. This is because a particular service can be delivered by different people with distinct capabilities and experience.

Inseparability: Gereffi and Fernandez-Stark (2010: 6) assert that prior to the beginning of the 21st century, the provision of services required close contact between the producer of the service and the consumer or the productive activity that makes use of such services. The notion of inseparability of services means that delivery and utilisation of services, either through consumption or production, take place simultaneously. The World Bank (2008: 5) stipulates that, unlike trade in goods, some form of interaction is usually required between the provider and the consumer or the productive activity for a service transaction to materialise. The service provider and the consumer/productive activity can be in contact either physically or via a telecommunications network (Hoekman and Stern, 1988: 40; Snape, 1988: 81).

Perishability: Services are considered to be perishable because when produced they cannot be stored and carried forward to a future time period (Wolak et al., 1998: 27). Thus services are time-dependent, which means that time assumes an important role in service delivery and the use of such service. However, as Moeller (2010: 359) explains, improvements in ICT have gradually de-emphasised this feature of services. Likewise, Hijzen, Pisu and Upward (2006: 4) emphasise that the non-storability characteristic of services, which requires the service provider and the recipient of the service to be in close proximity, has gradually faded and is of less relevance in recent times.

2.3 The Definition of International Trade in Services

The conventional notion of international trade, which is considered to entail the transportation of physical products from one geographical location to another, is not applicable in the analysis of services trade (Hodge, 1997: 5). Breinlick and Criscuolo (2011: 190) regard all service transactions between residents of a country and foreign parties as international trade in services. According to the World Trade Organisation (1988: 2), international trade in services involves all service or labour activities intended to provide satisfaction to the needs of consumers across national borders.

The General Agreement on Trade in Services (GATS) defines international trade in services as the supply of services through any of the four modes of service delivery. These modes of supply are based on the origin of the supplier and the recipient of the service as well as their territorial presence at the time of trade (Naudè, 1999: 7). The definition of services trade on the basis of the modes through which they are supplied is significantly broader than the standard balance of payments concept of services trade. Countries that belong to the WTO

have to schedule their commitments[2] in specific services sectors in line with the four modes of service delivery. The four modes of supply are discussed in the sub-sections below.

2.3.1 Cross-border supply (mode 1)

This entails interactions between suppliers and consumers across the borders of their respective countries, where services are supplied from the territory of one geographical location to another (World Bank, 2008: 49). With respect to mode 1, it is the service that moves across national borders, while both the consumer and the supplier remain in their respective countries (United Nations, 2002: 11). Freight transport services and correspondence courses are examples of cross-border supply of services (United Nations, 2002: 11).

2.3.2 Consumption abroad (mode 2)

Consumption of services abroad involves the movement of consumers from one country into the territory of another country where the services are being supplied (World Bank, 2008: 49). Naudé (1999: 7) explains that in mode 2, the consumer moves outside his/her country of residence to utilise the service, as in the case of tourism. According to Hodge (1998: 39), tourism as well as the consumption of medical and education services outside one's home country are examples of mode 2 supply.

2.3.3 Commercial presence (mode 3)

This is where the service is offered by a foreign supplier which is commercially located in the territory of another member country (World Bank, 2008: 49). The establishment of commercial presence, which can be in the form of a representative office or a branch, ensures close contact with the consumers in their home country (United Nations, 2002: 11). The provision of medical services by the representative office of a foreign health facility is an example of services supplied through commercial presence (United Nations, 2002: 11).

2.3.4 Presence of natural persons (mode 4)

This can be classified as labour migration, where foreign nationals, either employed or self-employed, supply their services in the territory of another country where they currently reside (World Bank, 2008: 50). Mode 4 mainly covers non-permanent employment of the service provider in the country of the consumer (United Nations, 2002: 12). Hodge (1998: 39) postulates that the income of temporary resident foreigners in a given domestic economy is

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[2] See section 2.4.1.2 for the description of schedule of commitments.

measured as imports, while the income of domestic residents temporarily located overseas will be counted as exports. Examples of mode 4 include the short-term engagement of foreign doctors and teachers in a particular country (United Nations, 2002: 12).

The 2010 Manual on Statistics of International Trade in Services (MSITS) emphasises that a particular service can be delivered through any of the four modes or through any combination of them. For example, a doctor can attend to a foreign client through online medical advice (mode 1), or alternatively request his patient to travel for an appointment with him (mode 2). The doctor may also decide to open a practice in a foreign country (mode 3). On the other hand, an architect working for a foreign client may initially send the project design to his client electronically (mode 1) and later visit the client's home country at the implementation stage (mode 4).

Figures 2.1 and 2.2 further illustrate how services trade occurs through the four identified modes. While the supplier of the service does not move to the consumer in modes 1 and 2, the service supplier must be present in the country where the consumer is based in the case of modes 3 and 4. However, the basic difference between mode 3 and mode 4 is that, while the supplier in mode 4 is a natural person, the supplier in 3 is an artificial person (company). Categorising services trade on the basis of the modes through which services are supplied gives an indication of the possible sources of data on services trade. It is also worth noting that although most services trade is captured in the balance of payments (BOP) accounts, the BOP does not give a comprehensive account of international trade in services. Given the sources of data as indicated in Figure 2.2, the BOP does not adequately capture services trade in all the four modes.[3]

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[3] The comprehensiveness of services trade data is discussed further in section 4.4.

Figure 2.1: Synthetic View of the Modes of Supply
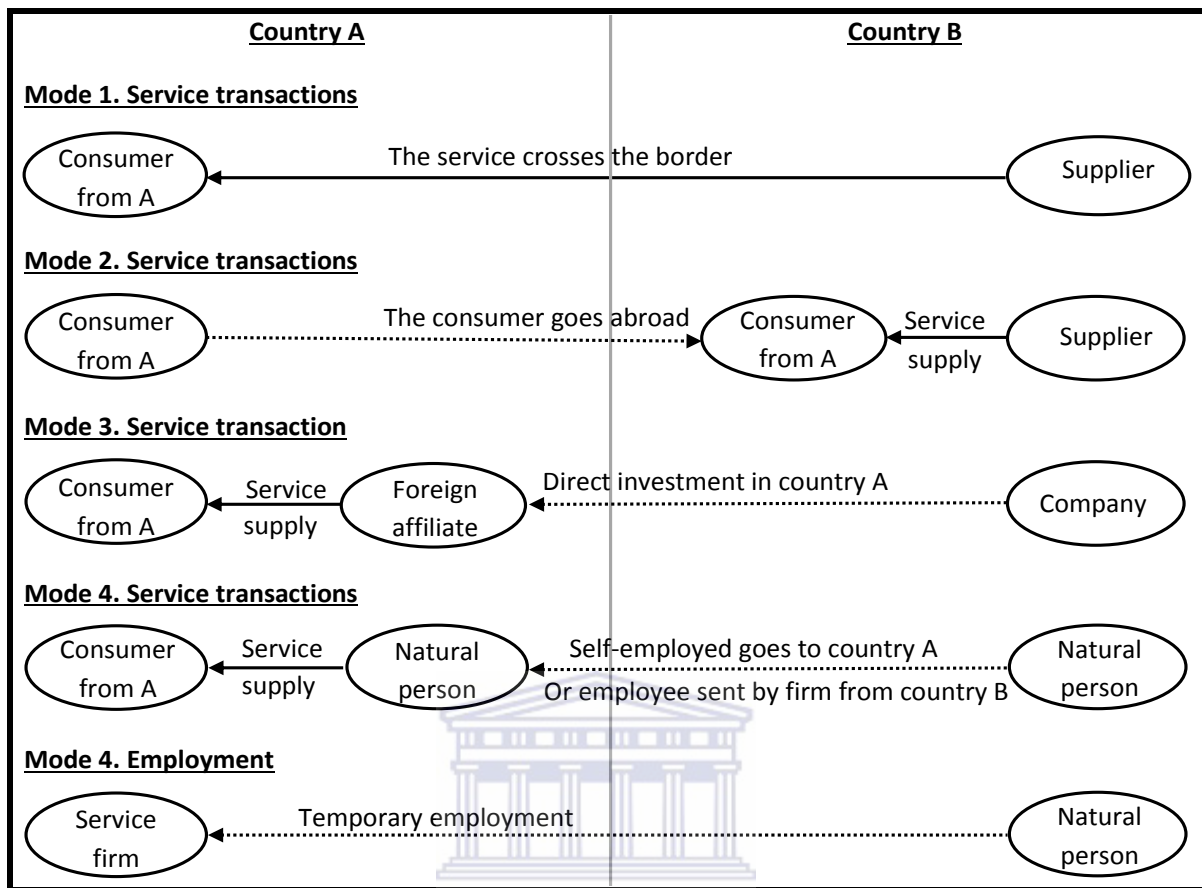
Source: United Nations (2002: 23)

Figure 2.2: The Four Modes of Supply
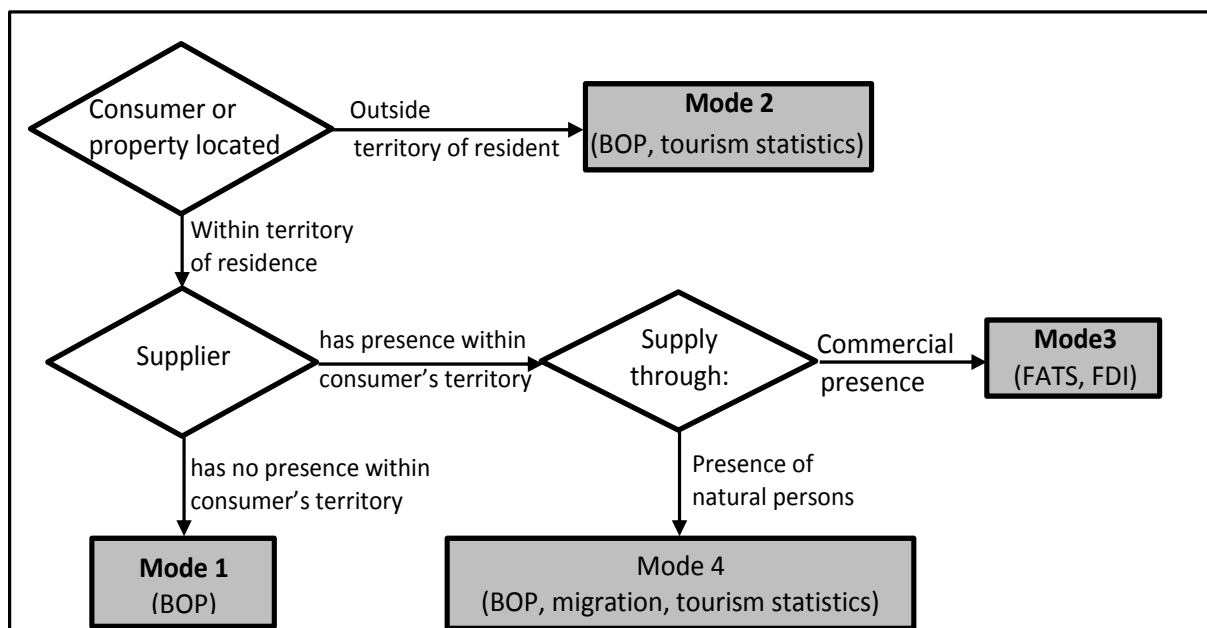
Source: United Nations (2002: 22)

2.4 Growth in Services Trade

International trade in services is becoming an increasingly important component of world trade (World Bank, 2008: 3). Services trade was the speciality of industrial economies during the 20th century (Gereffi and Fernandez-Stark, 2010: 6). Therefore Hodge (1997: 3) argues that the inclusion of services on the agenda of trade negotiations was mainly promoted by developed nations, specifically the United States, as their service sectors became increasingly dominant, giving rise to comparative advantage. However, Gereffi and Fernandez-Stark (2010: 6) show that in recent times the developing world has been a major provider of business services to industrial economies. This means that developing countries can now take advantage of the paradigm shift to promote their development agenda.

The strategic role of services trade in economic development has contributed to the significant growth in the services component of global trade (Trefler, 2005: 36). Figure 2.3 indicates that trade in services has been rising steadily since the late 1980s, except for the period after the 2007 – 2008 financial crisis. Due to this significant rise, the share of services trade in world trade has increased in recent times. Nonetheless, trade in goods still dominates international trade, since services accounted for approximately only 21 percent of global trade in 2009, as shown by Karam and Zaki (2012: 1). However, it is anticipated that total services trade could be underestimated as a result of measurement issues as well as the intangible nature of some services. Services trade data are discussed in depth in section 4.4.

Figure 2.3: Total Import and Export of Services as Percentage of GDP
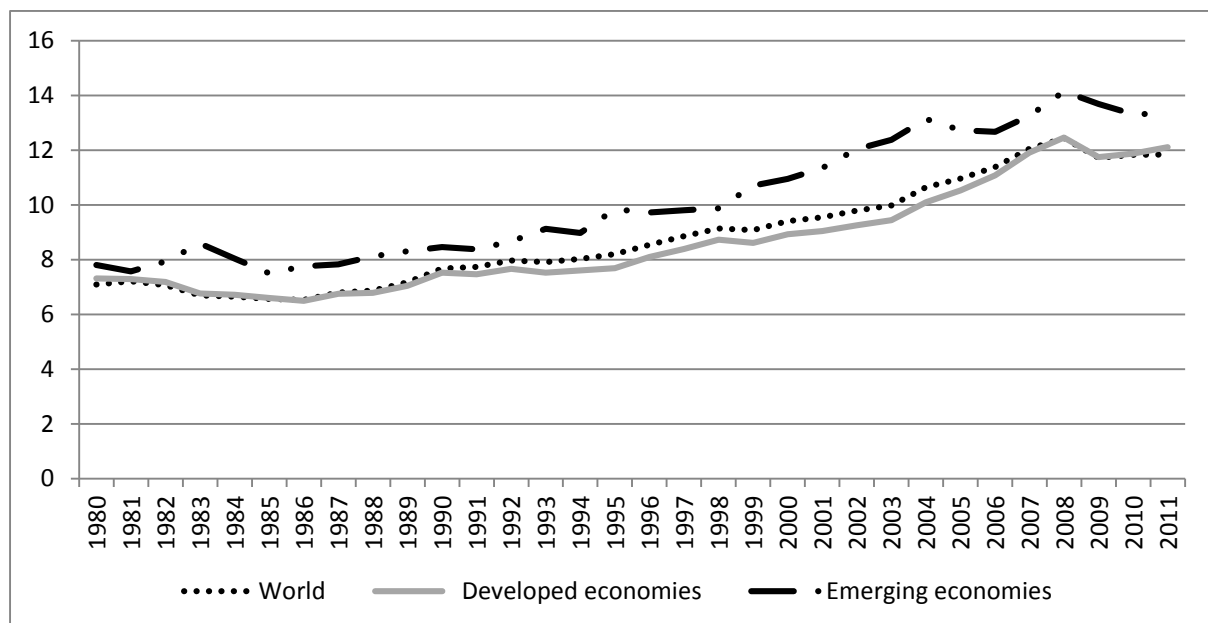
Source: Data extracted from UNCTADSTAT (online database)

Figure 2.4 shows the growth in services trade as measured by the IMF Balance of Payments Statistics. As shown in the graph, the rise in services trade has been particularly impressive since the 1990s for all reporting countries. Although transport and travel services have traditionally been major components of services trade, the rapid improvement in technology has significantly increased other services.

Figure 2.4: The Rise of Services Trade (1980 – 2012)
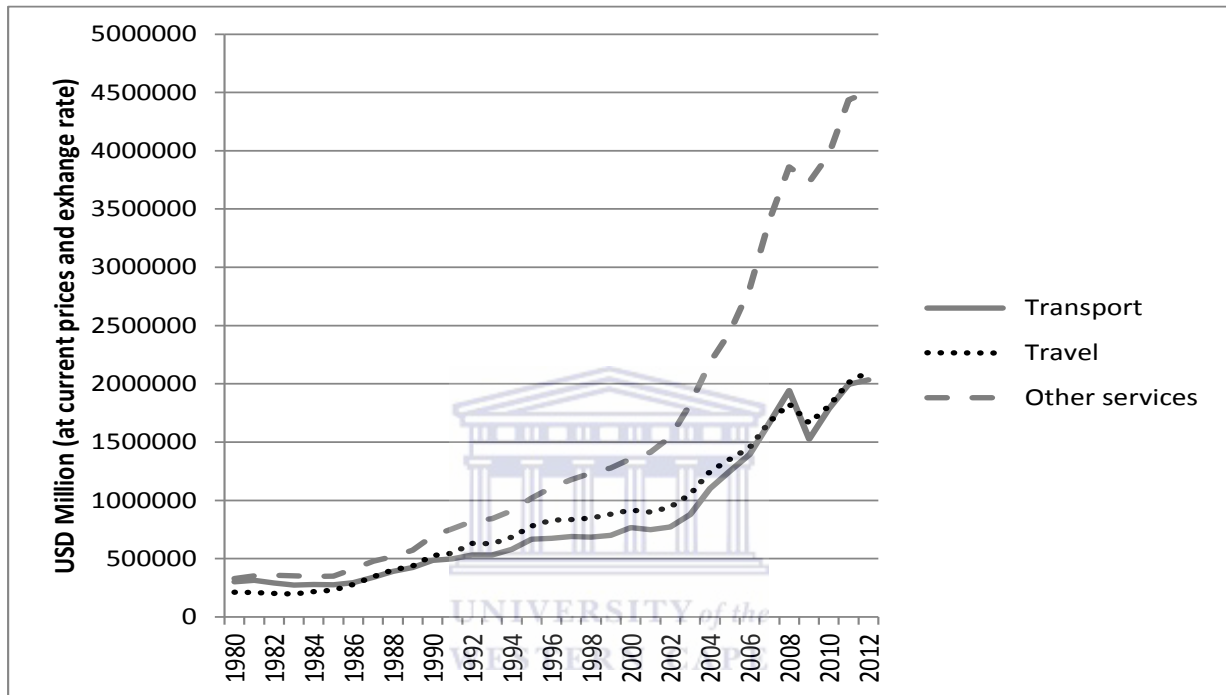
Source: Data extracted from UNCTADSTAT (online database)

2.4.1 Reasons for the Growth in Tradable Services

As emphasised in section 2.2.1, before the noticeable rise in services trade, the degree of proximity between suppliers and demanders of services used to be an important aspect of trading. However, Boyer (2007: 5) argues that economic integration and trade liberalisation coupled with massive development in ICT have de-emphasised the need for proximity. Likewise, Hodge (1997: 7) argues that apart from technological changes and trade liberalisation, the internationalisation of production and structural changes are also responsible for the increase in the tradability of services. The various factors that have accounted for the rise in tradable services are discussed in the sub-sections below.

2.4.1.1 Improvement in Information and Telecommunication Technology

Information and communications technology (ICT) has helped to form new links between globalisation, services and economic growth. According to Mann (2007: 3), three forms of

technological innovation are noticeable. Firstly, the rise of internet connectivity together with global telecommunications networks and personal computers assisted in creating linkages that hitherto did not exist between nations and businesses. Such linkages have made services more accessible across national borders and have contributed immensely to the growth in services trade.

Secondly, certain service functions became digitised over time and this greatly reduced transaction costs involved in international trade. For example, as time progressed, it became possible to provide certain services via video conversations or through the use of software. This trend has made services more tradable by reducing the relevance of the inseparability and perishability characteristics of services.

The third form of technological change that has been important in making services more tradable is the codification of information. The codification of information reduces the need to possess some specific knowledge to be able to perform certain tasks, because information is put into ordered formats. For example, the installation of on-screen menu systems in customer service centres makes it relatively easy for individuals with less expertise to perform skill-intensive as well as knowledge-intensive tasks.

Mann (2007: 2) also stipulates that ICT implementation facilitates international trade in services and enhances productivity growth within the services sector. Even though trade in transport and travel services existed a long time ago, certain services have in the past been considered as non-tradable because of their high transactional costs (Mann, 2007: 3). Technological advancement has, however, helped to make this factor less relevant. According to Rudriguez-Clare (2009: 1) advancement in technology has also brought about a significant decline in communication cost as well as the cost of coordinating activities based in diverse locations.

A number of authors (Bunyaratavej, Doh, Haln, Lewin and Massini, 2011: 77; Amiti and Wei, 2009: 203; Liu and Trefler, 2008: 1; Bryson, 2007: 31) have argued that the adoption of ICT has significantly improved services trade by removing all locational barriers. For instance, Liu and Trefler (2008: 1) stress that the cumulative improvements in ICT during the mid-1990s facilitated a noticeable expansion of international trade in services. Thus, as expounded by the World Bank (2008: 86), the scope of trade in services such as finance and education has been greatly enhanced by technological progress, especially in telecommunications and information technology. Such technological progress has also

generated a host of other tradable services, including software development and internet solutions. Apart from the role of ICT, trade in services has also been improved by trade liberalisation, as discussed in the next section.

2.4.1.2 Liberalisation of Services Trade

Openness and trade liberalisation improves economic efficiency and welfare by increasing the markets for local producers as well as the varieties available to consumers (Mehrara and Firouzjaee, 2011: 224). Stern (2002: 2) explains that several studies based on computed general equilibrium modelling have demonstrated that services trade liberalisation is accompanied by welfare gains and these gains have been deemed to exceed the gains associated with the liberalisation of trade in goods. It is estimated that a 50 percent reduction in trade barriers pertaining to the services sector is capable of generating global gains in economic welfare over a period of 5 to 10 years (Cali, Ellis and Te Velde, 2008b: 2). Pacheco-López (2003: 2) argues that trade liberalisation is strongly advocated as a mechanism to expand trade in order to accelerate economic development. However, services trade liberalisation can be complex, especially for developing countries, as a result of administrative and negotiating capacity constraints (OECD, 2005: 7).

The liberalisation of international trade in services can be attributed to the trade negotiations during the Uruguay Round which took place between 1986 and 1994. Nordås (2010: 497) states that the incorporation of services in multilateral trade agreements was made possible during trade negotiations in the Uruguay Round, which eventually led to the establishment of the GATS. The GATS requires every member to maintain a national 'schedule of commitments', but each member state has the freedom to decide which services to include in its schedule as clarified in Article XIX of the GATS.

A 'schedule of commitments' provides a list of the specific service sectors each World Trade Organisation (WTO) signatory government has undertaken to liberalise under the GATS (Public Citizen, 2006: 1). Each WTO member country is allowed to choose the specific service sector it wants to open up to international trade and global competition. Policymakers and governments need to identify the modes of supply in which they want to negotiate their specific commitments (United Nations, 2010: 95). According to Steuart (2005: 15), South Africa scheduled its commitments under GATS within the first year of the political transition in 1994. By virtue of being a member of the WTO and in view of its commitments under the

GATS, South Africa can engage in the export and import of services to and from the rest of the world.

South Africa has made commitments in 9 out of the 12 main groupings under the Services Sectoral Classification List (W/120)[4] of the Uruguay Round (Steuart, 2005: 5). The three services categories in which South Africa has not made any commitments are educational services; health-related and social services; and recreational, cultural and sporting services. Although South Africa chose not to liberalise its health-related and social services, Steuart (2005: 5) explains that there are no limitations to professional services such as medical, dental and veterinary services as well as the services of nurses, midwives, paramedics and physiotherapists.

By liberalising a significant part of its services sector, South African can take advantage of the global rise in tradable services to promote its economic growth. However, a policy brief written by the OECD (2005: 5) stipulates that liberalisation has to be accompanied by effective regulation and domestic policies in order to make a meaningful contribution to development. For instance, the gains from trade liberalisation can be reduced or may not be realised at all if countries do not institute reforms to tackle unproductive competition (OECD, 2005: 5). Therefore, as much as South Africa can take advantage of the opportunities presented by services trade liberalisation, the country must also have adequate measures in place to mitigate the possible threats to be able to realise the benefits of services trade openness.

It is essential for a country to critically assess both the opportunities and challenges of opening up its services sector before making commitments. This is because liberalisation of services trade under the GATS can be a complex endeavour, particularly given the limited negotiating and administrative capacity of several developing nations (OECD, 2005: 7). Chand (2008: 1) also claims that liberalisation and its incipient rise in trade raises various regulatory concerns. Openness stretches the regulatory capacity of economies, because the regulatory authorities have to deal with both domestic and foreign entities. The importance of regulation in services trade is discussed in the next section.

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[4] See Appendix 1 for the list.

2.5 Regulations and Institutions

The services sector is one that needs an extensive use of regulations (Cali, Ellis and Te Velde, 2008a: x), because the liberalisation of services trade can make a country vulnerable when its regulations and institutions are not strong enough. According to Steuart (2005: 13), the regulatory framework within the services sector must ensure that trade liberalisation measures are credible and non-discriminatory, on the one hand, while also ensuring that pro-competitive reforms are instituted to promote social objectives, on the other hand. Although regulation is necessary to effectively steer trade in services to a country's advantage, Cali et al. (2008a: 4) point out that the capacity requirements for the establishment of strong regulatory frameworks as well as the institutions to enforce such regulations are often too demanding for some developing economies.

Khemani and Shapiro (1993: 73) define regulation as the imposition of state rules, backed by the use of penalties that are intended to modify the economic behaviour of agents within the private sector. The role of regulation entails putting measures in place to ensure that efficient markets operate in an undistorted policy environment (Jalilian, Kirkpatrick and Parker, 2007: 87). According to Parker (1999: 224), a well-functioning regulatory system ensures accountability, transparency and consistency. As pointed out by Cali et al. (2008a: 5), regulation is usually required in the services sector to ensure that service markets work properly, since such markets are commonly characterised by elements of natural monopoly and information asymmetries. The procedure for handling domestic regulation relating to services trade is spelt out in Article VI of the GATS.

There are a number of objectives, both economic and non-economic, that regulation in service markets seeks to achieve. Snape (2003: 83) explains that the economic objective for regulating services is to tackle problems associated with externalities, the protection of intellectual property rights, consumer protection, and improvements regarding the terms of foreign trade. On the other hand, some of the non-economic goals for implementing regulation in service markets are related to issues of distribution, national ownership, as well as cultural and social objectives (Snape, 2003: 83). Regulation and policies pertaining to services trade can either be generic or specific to particular sectors. For example, most countries implement regulation that is specific to the financial services sector. According to Key (1999: 62), reforms and prudential regulation in financial services are usually aimed at creating a more resilient domestic financial system.

In spite of the importance of regulations, they may have certain unforeseen consequences on trade. These include the tendency to create barriers and defeat the purpose of trade liberalisation. Mattoo and Sauvé (2003: 2) stress that regulations such as licensing and qualification requirements can unduly restrict trade in services. Boyfield (2009: 3) also cites the high compliance cost of financial services regulation and reforms as an impediment to industries within the financial services sector. In view of such potentially undesirable effects of regulation, the implementation of regulation must be carefully done.

The building of adequate and effective regulatory structures involves more than just the technical design of regulatory instruments (World Bank, 2002: 152). The quality of regulatory institutions is also important. Jalilian et al. (2007: 90) postulate that an economy with sufficient institutional capacity has the ability to design and implement effective regulations. Institutions are able to affect economic growth by setting the "rules of the game", which helps to reduce information imperfections, maximise economic incentives and decrease transaction costs (Jalilian et al., 2007: 89). Djankov, McLiesh and Ramalho (2006: 395) posit that institutions are major determinants of long-term growth. They argue that countries that are currently rich are those that had better political and economic institutions in the past.
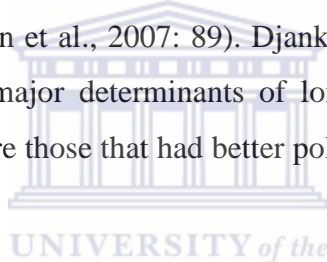
Clark, Duchesne and Meunier (2000: 69) posit that strong institutional capacity also grants countries the bargaining power to be effective in trade negotiations. It is envisaged that effective trade negotiating machinery is paramount and is capable of influencing a country's ability to exploit all possible advantages of services trade, while protecting itself from exploitation by trading partners (Steuart, 2005: 12). Meunier (2000: 104) concludes that the institutional design of the European Union is able to influence the region's success and effectiveness in international trade negotiations.

2.6 Summary and Conclusion

The chapter provided a comprehensive overview of the concept of services and the definition of international trade in services. In particular, the chapter focused on the distinctive features of services and the factors that have contributed to the growth in services trade. Services were previously regarded as less tradable mainly because of their non-storability and intangibility properties, but in the last two decades services trade has been a major component of international trade. The rise in services trade coincided with massive improvements in ICT

and was further accelerated after the guidelines for services trade were spelt out during trade discussions under the Uruguay Round and the eventual formulation of GATS. It must be emphasised that for countries to fully benefit from trade in services, effective and efficient regulations and institutions are relevant, because they help strengthen the negotiating abilities of trading nations. Institutions are also relevant, because good policies may fail to achieve the desired outcomes as a result of poor institutional conditions. Using the background provided in this chapter as a foundation, the next chapter reviews the theoretical as well as the empirical literature pertaining to the impact of international trade on economic growth.

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CHAPTER THREE: LITERATURE REVIEW

3.1 Introduction

Having defined international trade in services, its relationship to economic growth will now be investigated by reviewing both the theoretical and the empirical literature. Krugman and Obstfeld (2003: 10) emphasise that there are two major reasons why countries engage in international trade. In their view, countries trade with one another either because of the differences between them or because they want to achieve economies of scale. In other words, while countries can benefit from their resource diversities if they produce in accordance with their resource capabilities, they can also produce more efficiently and at a larger scale if they concentrate on the production of a limited range of goods and services. The various theories of trade, which are discussed in detail in section 3.2 of this chapter, give credence to the two reasons highlighted above.

Moreover, through the efficient use of resources and economies of scale, trade can have a positive impact on economic growth. There is much empirical evidence to support the assertion that international trade has a positive impact on growth through channels such as capacity utilization, industrial upgrading and institutional advancement (Sun and Heshmati, 2010: 3). An in-depth discussion of the contribution of trade to economic growth is covered in section 3.3.

3.2 The Theoretical Rationale for Trade

The doctrine of free trade was developed in reaction to the mercantilist view which is in favour of state regulation and protection of domestic industries from foreign competition (Van Marrewijk, 2007: 49). The mercantilists, according to Salvatore (2011: 30), call for strict government controls against imports and the promotion of exports in order to have a favourable trade balance. On the other hand, the notion of free trade favours the removal of trade restrictions on the basis that trade enhances production efficiency at the global level, as Sen (2010: 2) postulates. Therefore, while the proponents of free trade regard trade as a positive-sum game, the mercantilists consider trade as a zero-sum game. Anderson (2008: 3) posits that the theory of trade has evolved from traditional trade theory, which is mainly based on the exogenous differences in national characteristics, to the new trade theory which relies on endogenous factors. While the underlying theme of traditional trade theory is

comparative advantage, the new trade theory emphasises the importance of economies of scale.

Kowalski (2011: 7) points out that the comparative advantage hypothesis has been relied on as a principal explanation of international trade for close to two centuries. Krugman (1985: 1) emphasises that since the inception of the concept of comparative advantage, it has been a key part of virtually all theoretical discussions of international trade due to its theoretical appeal. The concept of comparative advantage suggests that the relative differences between countries are the most important reason why countries trade with each other (Kowalski, 2011: 7). As pointed out by Kowalski (2011: 8), the classical theory of comparative advantage, as formulated by David Ricardo in 1817, stipulates that comparative advantage emanates from the differences in relative labour productivity. Neoclassical economists such as Hecksher, Ohlin and Samuelson, on the other hand, suggest that comparative advantage depends on differences in relative factor endowments (Kowalski, 2011: 8). Krugman (1985: 1) elaborates that comparative advantage, in spite of being the central theme of trade theory, is not the only possible explanation of international trade. This is because countries also trade based on the existence of economies of scale and increasing returns to scale (Krugman, 1985: 1).

The literature on the new trade theory dwells on the impact of increasing returns to scale (Sen, 2010: 6). Krugman (1979: 469) postulates that increasing returns to scale provide an alternative view to the concept of comparative advantage as an explanation of international specialisation and trade. Increasing returns to scale occur when output increases proportionally more than the corresponding changes in all inputs, resulting in a decline in average costs (Hartigh, 2005: 2). At both the logical and practical level, Krugman (1985: 1) emphasises that the theory of trade based on the notion of increasing returns is as fundamental and important as the one based on comparative advantage. However, until recently, increasing returns to scale as an explanation of international trade received less theoretical attention, unlike comparative advantage (Krugman, 1979: 469; Krugman, 1985: 2). The various theories of trade are discussed in detail in the next four sections.

3.2.1 The Foundational Theory of Trade

Sen (2010: 2) states that the standard theory of international trade evolved between 1776 and 1826 through the contributions of Adam Smith (1776) and David Ricardo (1817). These two authors paved the way for the formulation of the theory of free trade among nations.

Smith advocates free trade on the basis of the concept of absolute advantage. According to the theory of absolute advantage, nations can efficiently utilise available resources and expand the level of output by specialising in the production of the commodities they are more competent at producing (Salvadore, 2011: 20). Sen (2010: 2) explains that Smith's idea is based on the division of labour and specialisation, which gives rise to reduced labour costs and ensures effective competition among nations. Van Marrewijk (2007: 51) concludes that in line with the theory of absolute advantage, international trade should be encouraged if a country can import from abroad at a lower cost than it can produce at home.

A possible dilemma in relation to the theory of absolute advantage arises where a particular country has absolute advantage in all traded goods. In that case trade would not be mutually beneficial, because one country would have a continuous trade surplus while the other experiences a continuous trade deficit (Sen, 2010: 2). Likewise, Van Marrewijk (2007: 49) posits that based on the theory of absolute cost advantage, it would be difficult for a less developed country, which cannot produce more efficiently than advanced nations, to participate in global trade.

In order to strengthen the foundational theory of free trade, David Ricardo proposed a move away from the theory of absolute advantage towards the theory of comparative advantage. Sen (2010: 2) emphasises that for mutually gainful trade among nations, comparative advantage rather than absolute advantage is both necessary and sufficient for trade. This is because, on the basis of relative cost advantage, it is still beneficial to trade even if a particular country has an absolute advantage in all traded goods.

Krugman and Obstfeld (2003: 12) postulate that in the Ricardian model a nation is considered to have a comparative advantage in the production of a particular good if the opportunity cost of producing that good relative to others is lower in that country compared to other countries. On the basis of the classical comparative advantage theory, trade among countries is deemed to be beneficial if participating countries export the products they are able to produce at a lower opportunity cost relative to other countries (Anderson, 2008: 4; Kowalski, 2011: 8). It must be emphasised that in the Ricardian model, difference in labour productivity, measured in terms of per unit labour hours, is the determining factor that defines comparative advantage (Sen, 2010: 2). A major shortcoming of the Ricardian model, according to Sen (2010: 2), is its failure to incorporate the role of demand to explain the terms of trade.

3.2.2 The Role of Demand in Trade Theory

J. S. Mill introduced the concept of 'reciprocal demand' as a way of incorporating demand into the theory of trade (Sen, 2010: 2). Based on 'reciprocal demand', a country's demand for a particular good in terms of the quantities of other goods it is willing to sacrifice in exchange determines the equilibrium terms of trade (Maneschi, 2001: 613). Sen (2010: 3) emphasised that the role of demand in the explanation of the terms of trade was also underscored by Alfred Marshal through the use of the 'offer curve' construct. The equilibrium terms of trade as well as the volume of trade based on the concept of the 'offer curve' is determined by the point of intersection of a country's import demand and another country's export supply (Humphrey, 1995: 40). In other words, the supply of a commodity by a particular country equals the demand by its trading partner.

According to Sen (2010: 3), the role of both supply and demand forces in determining trade across nations was further highlighted by the Austrian school, which introduced the concept of opportunity cost pertaining to consumption. Based on this premise, free trade is deemed as Pareto optimal, since it ensures the optimisation of production, consumption and exchange for the participating countries at equilibrium (Sen, 2010: 3). The Austrian school regards consumer preference to be as important as the supply cost. Moreover, although demand is also emphasised in the factor endowment theory, it is assumed to be identical between nations, which makes the supply side of the economy its main focus. The factor endowment theory by Heckscher and Ohlin is discussed in detail in the next section.

3.2.3 Factor Endowment Theory

As emphasised in section 3.2.1, labour productivity is the underlying factor in the classical theory of comparative advantage. However, labour productivity is not the only supply side factor that determines comparative advantage because trade also reflects differences in resources among countries. According to the factor endowment theory, also known as the Heckscher-Ohlin model or factor proportions theory, countries engage in trade based on the relative abundance of the factors of production (Krugman and Obstfeld, 2003: 67). Sen (2010: 4) explains that the most important factor for mutually gainful trade based on the Heskscher-Ohlin model is resource endowment. The Heshscher-Ohlin model was developed within a neoclassical framework on the basis of the following assumptions (Van Marrewijk, 2007: 74):

- There are two countries (with identical technology and similar demand structure) that make use of two factors of production (labour and capital) to produce to two final goods;

- Production is characterised by constant returns to scale;

- The factors of production, which may differ in quantity among the two countries, are mobile between sectors within a country, but immobile across countries; and

- Markets are characterised by perfect competition with no transport costs and no impediments to trade.

Based on these assumptions, the Heckscher-Ohlin model emphasises that countries have comparative advantages in producing goods that make relatively intensive use of the countries' comparatively abundant factors of production (Anderson, 2008: 5). If a country has relatively abundant labour, it would most likely have comparative advantage in goods that make use of labour relatively intensively. In this regard, a nation will export the goods which intensively depend on the factor of production that is relatively abundant in that nation and import the good that make less use of such factor of production (Van Marrewijk, 2007: 131). Anderson (2008: 5) asserts that trade helps to smoothen out the differences in national endowments and permits each country to equally consume factor services as if the world were completely integrated. Furthermore, the factor endowment theory requires that countries that are highly endowed with an abundance of skilled labour and have relatively few natural resources should be major exporters of services (Tregenna, 2006: 7). On the basis of this requirement, South Africa may naturally not be considered as a net exporter of services because of the abundance of natural resources and inadequate skilled labour. However, Tregenna (2006: 7) states that comparative advantages in service trade are not static or solely predetermined.

The Heckscher-Ohlin model is illustrated in Figure 3.1, which depicts the production possibility frontiers (PPF) of two nations (Nation 1 and Nation 2). The commodity on the horizontal axis is labour intensive, while the commodity on the vertical axis is capital intensive. It can be observed that Nation 1 has labour as its abundant factor of production, because its PPF is skewed along the horizontal axis. Technology is the same in both countries and because of the assumption of homogeneous demand, the indifference curves are common to both nations. Autarky equilibrium (as indicated in the left panel) can be identified at point A for Nation 1 and point A' for Nation 2, while the no-trade equilibrium-relative commodity

prices are P_A in Nation 1 and $P_{A'}$ in Nation 2. It can be deduced that Nation 1 has a relative advantage in producing commodity X, while Nation 2 is able to produce commodity Y at a lesser opportunity cost since P_A is greater than $P_{A'}$. Through international trade (as indicated in the left panel) both nations can specialise in producing the commodity in which they have relative advantage. Nation 1 will end up producing at point B and Nation 2 at B', where the transformation curves of the two countries are tangent to the common relative price line P_B. Trade will make it possible for Nation 1 to export product X, while importing product Y from Nation 2 at point E. Likewise, Nation 2 can export product Y in exchange for product X at point E' (which coincides with point E). Thus, trade is beneficial to both countries because they move from a lower indifference curve I to a higher indifference curve II.

Figure 3.1: An Illustration of the Heckscher-Ohlin Theory
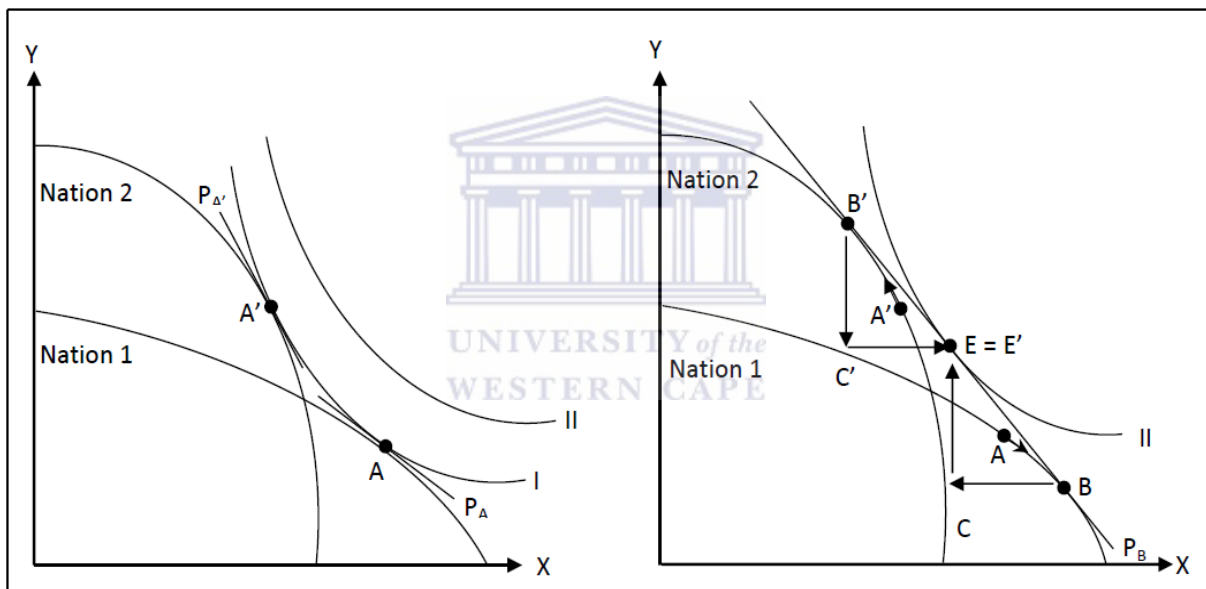
Salvatore (2011: 114)

Empirically, the Heckscher-Ohlin model failed to conform to reality when it was observed that the United States (USA) had a tendency to export more labour-intensive products than importing them, even though capital is relatively abundant in the USA (Sen, 2010: 5). This empirical inconsistency with the Heckscher-Ohlin model compelled Leontief (1956) to formulate a paradox. According to Sen (2010: 5), the Leontief paradox explains that the United States' exports are more labour-intensive rather than capital-intensive because a unit of labour in the USA is equivalent to more than one unit of labour in other nations.

In spite of this empirical inconsistency, the Heckscher-Ohlin model is still highly regarded in the international trade literature. It must be emphasised that in both the Heckscher-Ohlin

model and the Ricardian model, the determining factor of comparative advantage is exogenous differences in national characteristics (Anderson, 2008: 3). According to Anderson (2008: 3), the exogenous explanation of comparative advantage relies on the difference in labour productivity and relative factor endowments to analyse the patterns of trade. Nonetheless, trade patterns can also be explained by the endogenous differences between nations. The new trade theory, which is discussed in the next section, concentrates on the endogenous factors that give rise to trade.

3.2.4 The New Trade Theory

The new trade theory attempts to redefine the free trade doctrine by getting rid of the restrictive assumptions of traditional trade theory (Sen, 2010: 6). As pointed out by Deraniyagala and Fine (2001: 812), models of the new theory of trade seek to rectify the limitations of traditional theory by integrating a more comprehensive range of factors, such as imperfect competition, strategic behaviour of firms and new growth theory. Sen (2010: 6) therefore concludes that unlike traditional trade theory, which assumes that there are constant returns to scale and markets are perfectly competitive, the new trade theory recognises the possibility of market imperfections and the role of economies of scale. The underlying principle, however, is that there are gains from trade. Therefore even under imperfect competition and increasing returns to scale, if countries specialise to produce different goods and services in line with their respective resource, factor and technology endowments, the scale and diversity of production would increase (Krugman, 1987: 134).

The new trade theory focuses on the advantages that emanate from the economic interactions within a given economy (Anderson, 2008: 7). One of the avenues for such endogenous advantages is increasing returns to scale, which also gives rise to economies of scale. Anderson (2008: 8) postulates that a nation can benefit from engaging in international trade if it expands its production in goods that have scale economies. As explained by Van Marrewijk (2007: 211), economies of scale arise when the average costs per unit of output decreases as the level of output increases. Such decline in the costs per unit of output can be attributed to both internal and external economies of scale. Internal economies of scale, as Anderson (2008: 8) explains, are linked to imperfect competition, particularly monopolistic competition, where firms gain advantage through market power. While internal economies of scale arise from increases in production at the firm level, external economies of scale originate from an industry-wide increase in output (Van Marrewijk, 2007: 211).

Moreover, Deraniyagala and Fine (2001: 812) argue that the conventional increasing returns to scale argument has been complemented by other forms of market imperfections, including information asymmetry.[5] Models that consider optimal technology choice over time address the issue of information asymmetry. Apart from market imperfections, the new trade theory is also integrated with the endogenous growth theory.

According to Deraniyagala and Fine (2001: 814), the new trade theory is linked to the endogenous growth theory through technology and knowledge spillovers. The notion of endogenous growth became prominent from the 1990s and has since then been an important part of the literature on the impact of trade on growth. Authors such as Romer (1990) as well as Ben-David and Loewy (1998) are among the major proponents of this school of thought. According to these authors, the enhancement of a nation's human capital or the accumulation of knowledge to boost economic growth captures the central theme of the new growth theory. It is anticipated that an improvement in human capital can propel economic growth through the development of new forms of technology as well as ensuring effective and efficient means of production (Qasenivalu, 2008: 10). Models of endogenous growth theory therefore stipulate that technology can be codified and transferred easily (Deraniyagala and Fine, 2001: 815). However, Deraniyagala and Fine (2001: 815) argue that the effectiveness of technological transfer or 'learning by doing' depends on the absorptive capacity of the importing country.

3.3 The Applicability of Trade Theories to Services Trade

It must be emphasised that until services became fully and formally recognised in international trade, international trade theories such as the ones discussed in the preceding sections were mainly developed to explain trade in goods (Qasenivalu, 2008: 9). However, Stern (2002: 1) postulates that the unique characteristics of services identified in Chapter Two do not nullify the applicability of the fundamental trade theories to services trade. Various authors (including, Hindley and Smith, 1984; Oulton, 1984; Herman and van Hoist, 1981; Deardorff, 1985; Sampson and Snape, 1985; Richardson, 1987) are of the view that the application of traditional trade theories to services can provide valuable insights regarding services trade.

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[5] Asymmetric information occurs when one party is unable to make accurate decisions because of having inadequate knowledge about the other party (Mishkin, 2004: 32).

Hodge (1997: 9) states that traditional trade theories such as Ricardian and Heckscher-Ohlin models of comparative advantage as well as the new trade theory, which revolves around increasing returns to scale, are applicable to trade in services. Authors such as Hindley and Smith (1984) as well as Deardorff (1985) have demonstrated that the theory of comparative advantage by Ricardo is also relevant to the trade in services. Likewise, the factor endowment theory of comparative advantage by Heckscher and Ohlin is deemed to be compatible with trade in services, according to Bhagwati (1984) and Melvin (1989). Moreover, a few theories have been developed specifically for services trade, as emphasised by Lennon, Mirza and Nicoletti (2009: 183). These include the use of a production function framework based on consumer services by Ethier and Horn (1991: 224).

Despite the differences in approach, the various schools of thought are based on the fundamental principle that trade is beneficial to all participating parties. This means that both the exporting country and the importing country stand to gain from international trade. One of the sources of such gains, as the theory reveals, is output expansion or economic growth. This study is therefore designed to investigate whether South Africa's export and import of services contribute to growth as trade theory speculates. But before that, the literature on the nature of the relationship between trade and growth is discussed in the next section.

3.4 Trade and Economic Growth

The theories reviewed in section 3.2 lay emphasis on the importance of trade to growth and development. The linkage between international trade policies and economic growth can be analysed from three perspectives, namely the neoclassical approach, the endogenous growth model and the institutional approach (Mehrara and Firouzjaee, 2011: 224). The neoclassical approach highlights the relevance of comparative advantage in international trade. According to the neoclassical approach, the benefits of trade are static, which means that trade and its related policies can only influence the level of output but not the long-run rate of economic growth (Mehrara and Firouzjaee, 2011: 224). Similarly, Sun and Heshmati (2010: 4) argue that the static gains from trade centres on the enhancement of output and national welfare. From the welfare point of view, openness provides an opportunity for exchanges to be made at international prices that can be advantageous to both consumers and producers. While consumers can benefit from cheaper imported substitutes, producers can also sell at higher international prices (Sun and Heshmati, 2010: 4).

Unlike the neoclassical approach, the endogenous growth model, which was extensively discussed in section 3.2.4, hinges on dynamic gains. The endogenous growth theory emphasises that trade policies could have an influence on both the level of output and growth rate in the long run (Mehrara and Firouzjaee, 2011: 224). As pointed out by Sun and Heshmati (2010: 4), the dynamic gains from trade are based on the changes in the structure of production. Such changes arise as a country adopts new technologies from abroad and also as a result of the impact of economies of scale. In other words, as international trade promotes technological spillover among countries, endogenous growth is achieved via 'learning by doing'. Moreover, participation in the global market ensures economies of scale through output expansion and cost reduction.

The institutional approach, on the other hand, puts the emphasis on the role and the influence of institutions on economic growth. Institutions are regarded as vital to the economic performance of market-based economies. According to the institutionalists, trade policies influence growth within the right institutional framework (Mehrara and Firouzjaee, 2011: 224). This means that without adequate institutions, the effects of trade reforms and policies on a country's economic expansion would be minimal. Mehrara and Firouzjaee (2011: 224) therefore conclude that effective institutions enhance trade through the fair implementation of contracts and property rights. In other words, effective institutions help to enhance the growth-inducing effect of trade.

The discussion on the way that trade influences economic growth can be viewed from two perspectives. One side of the discussion focuses on a bidirectional link between economic growth and international trade, while the other deals with a unidirectional causality from trade to economic growth. The former dwells on the direction of the causal link between international trade and economic growth to ascertain whether trade propels growth or vice versa. The focus is on the possible reciprocal interactions between economic growth and international trade (Gabriele, 2003: 15). Hence, the discussion is concentrated on two causal linkages (from international trade to economic growth and reverse causality). The latter, according to Sun and Heshmati (2010: 3), focuses mainly on the contribution of trade to economic growth. The emphasis is on only one causal relationship (from international trade to economic growth). This study adopts the latter approach.

The debate on how international trade contributes to output expansion and economic development has been on-going for several decades. Sun and Heshmati (2010: 2) assert that

countries which engage in international trade tend to be more productive than those that produce only for their domestic markets. Various studies have attempted to evaluate the contribution that international trade makes to economic growth and development. For example, both Balassa (1986) and Dollar (1992) argue that developing nations that are more open achieve higher growth rates than their counterparts that are inwardly oriented. Likewise, after investigating the relationship between openness, economic growth and poverty in Taiwan from 1964 to 2003, Tsai and Huang (2007: 1869) concluded that openness to international trade can influence economic growth positively. Authors such as Bolaky and Freund (2004), Dollar and Kraay (2002) and Wacziarg and Welch (2003) agree with Balassa (1986), Dollar (1992) and Tsai and Huang (2007) in considering international trade to be a catalyst for economic growth. However, others such as Harrison (1996), O'Rourke (2000) and Yannikayya (2003) indicate that the effect of international trade on growth is not clear and may even be negative in some cases. The nature of the contribution of trade to long-term growth is therefore not conclusive, since the evidence available is contradictory.

The overall growth-inducing impact of international trade is also dependent on the linkages between the major sectors involved in international trade and the rest of the economy. This is because the interdependence of key sectors with the rest of the economy is crucial to economic growth and development. Cai, Leung and Mak (2006: 37) define key sectors as those that have both strong forward and backward linkages with other sectors in the economy. The interdependence between a key sector and the rest of the economy can also be captured through the employment effect (Tregenna, 2006: 12).

Forward Linkages: According to Humavindu and Stage (2013: 1), forward linkages pertain to the role a sector plays in supplying inputs to other sectors. A sector's ability to induce growth through this channel depends on the degree of its downstream vertical integration (Tregenna, 2006: 12). If the impressive growth performance of trade within certain sectors of the economy results in a reduction in the cost of its outputs which are used as inputs for downstream sectors, then such cost effectiveness can have economy-wide growth-inducing effects.

Backward Linkages: As explained by Humavindu and Stage (2013: 1), backward linkages relate to the dependency of a sector on the inputs from other sectors. The backward linkages of a sector to the rest of the economy are capable of creating further demand for the outputs of upstream sectors, and this can enhance investment and capacity utilisation (Tregenna,

2006: 12). It must be emphasised that the degree of a particular sector's vertical integration in the economy would determine the strength of the sector's contribution to economic growth.

Employment Effect: The growth-complementing externality effects of employment can also propel economic growth. As the growth in the services sector increases employment and/or workers' remuneration, the incipient higher wage bill, according to the Keynesian school of thought, would improve demand (Tregenna 2006: 13).Tregenna (2006: 13) explains that the increase in demand would contribute to a rise in the level of resource utilisation as well as the level of investment.

As the discussion above indicates, the nature of the relationship between economic growth and international trade is not a straightforward one. While one side of the debate considers international trade to be a contributor to economic growth and development, the other side holds the opposite view. Nevertheless, it is anticipated that trade within a specific sector of the economy can be beneficial to the entire economy because of the sector's integration and feedback effect to the rest of the economy. In the next section the discussion focuses only on trade within the services sector.

3.4.1 International Trade in Services and Economic Growth

Having discussed how international trade can affect economic growth in the previous section, the discussion is now specifically narrowed down to international trade in services. The sectoral composition of an economy changes during the process of economic development as conceptualised in the Fisher-Clark three-stage growth theory (Tregenna, 2006: 2). The services sector becomes more important as a country moves up the development path. Cali et al. (2008b: 1) attest to the fact that the process of development usually coincides with a growing role of the services sector in an economy.

Tregenna (2006: 6) explains, however, that the role of services trade in economic growth has received less empirical attention than the role the manufacturing sector plays in trade. This is mainly because services were previously seen as non-tradable. In spite of the seemingly inadequate empirical attention, Cali et al. (2008a: 1) argue that for most developing countries the services sector makes significant contributions to GDP. The services sector is also important for employment generation as well as the provision of important inputs for other sectors of the economy. Steuart (2005: 1) postulates that in South Africa the service industry

is seen as a significant component of overall economic development because of the sector's contribution to growth as well as its export prospects.

Since the services sector now constitutes a fast and growing component of the national output of developing countries, Chand (2008: 1) posits that the sector presents the developing world with opportunities to steer their economies along the growth path. This is because growth in a key sector of the economy, according to Tregenna (2006: 11), can lead to overall economic growth, over and above the sector's growth. Arising from the previous section, key sectors can make significant contributions to growth as a result of their forward and backward linkages as well as employment effects.

Tregenna (2006: 12) argues that through forward linkages, the service sector can influence economic growth based on its impact on downstream sectors. For example, Mattoo, Rathindran and Subramanian (2001: 4) argue that an improvement in telecommunication services can generate economy-wide benefits. This is because telecommunication is regarded as an important intermediate input which is also essential to the diffusion of knowledge. Similarly, transport services can facilitate the efficient distribution of goods within a nation and can also enhance the ability of that nation to participate in global trade (Mattoo et al., 2001:4). Steuart (2005: 2) therefore concludes that an active and effective services sector could have multiple positive effects in the entire economy.

On employment effect, Tregenna (2006: 13) argues that higher employment associated with the growth within the services sector can contribute to skills development, which can in turn have a positive effect on current and future productivity levels. Islam (2004: 4) proposes that there is a virtuous cycle between economic growth and employment. He suggests that economic growth can lead to growth of employment with rising productivity. The growth of employment can then lead to higher income and the incipient rise in aggregate expenditure will result in increased productive capacity.

In addition to the growth prospect of the services sector's interdependence with the rest of the economy, mainstream new growth theory[6] also emphasises that the supply of two types of services, namely services regarded as complementary capital and services that relate to property rights, are deemed crucial to economic growth (Tregenna, 2006: 6). Therefore without the efficient supply of these two types of services, developing countries would

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[6] See section 3.2.4 for detailed discussion.

experience capital flights which could undermine their productive capacities. Services that have strong complementarities in the production process include IT and financial services. For example, a well-regulated and efficient financial sector can enhance productivity and ultimately growth by effectively transforming savings to investments (Mattoo, Rathindran and Subramanian, 2001: 4).

Mattoo et al. (2001: 6) further argue that services trade can have a generalised favourable impact on economic growth, since it can enable a country to employ a wide variety of intermediate goods and capital equipment to help improve the productivity of resources. It must be emphasised, however, that active policy is considered to be instrumental for enhancing the competitiveness of sub-sectors that engage in services trade in order to fully realise the growth potential of the services sector (Majluf 2006: 22). Thus the extent to which an economy can harness the potential benefits of trade in services would depend on a conducive and supportive policy environment. According to Majluf (2006: 22), such supportive policies would help to strengthen the capacity of the domestic service industry for higher growth.

It is anticipated that both developed and developing economies stand to gain from opening up their services sector to trade (OECD, 2005: 2). In spite of the growth-inducing effects of services trade, the literature on the contribution of international trade to economic growth accords a minimal role to services, except in the case of financial services. Goldsmith (1969) provided the seminal work on the role of financial services in economic growth and development by stressing that financial services promote growth through the channelling of investment funds towards productive ventures.

After the contribution of Goldsmith, other authors have furthered research in this area. For example, Francois and Schuknecht (1999) attempted to examine the link between trade in financial services and economic growth. They discovered that there is a robust positive relationship between competition in the financial sector and long-term growth. Mattoo et al. (2001) conducted a cross-country study focusing mainly on financial services and telecommunication services. They also concluded that opening up the services sector to trade does influence growth performance in the long run. A number of other studies have adopted computable general equilibrium (CGE) model simulations to determine how international trade in services affects economic growth. These include Kiyota and Stern (2008), Jensen, Rutherford and Tarr (2008) and Balistreri, Rutherford and Tarr (2009). All of these studies

point to the direction that opening up the services sector to trade could be a significant source of economic gain.

Just as services trade in general is vital to economic growth and development, the two major components of services trade, namely export and import of services, are equally important. Awokuse (2007: 389) reiterates the importance of both exports and imports to economic growth and explains that the focus on only exports as the engine of growth in many past studies may make them misleading and incomplete.

The export of services can form an essential part of a developing country's growth strategy, an example being the ability of India to capitalise on the export of IT-related services to boost its growth (Cali et al., 2008a: ix). The import of services, on the other hand, promotes greater competition, makes available international best practice, augments the skill composition of a country, improves technology and provides investment capital (Cali et al., 2008a: ix). Therefore, although both the export and import of services are considered critical to economic growth and development, the two may influence growth through different routes. As a result, Hsueh, Lin and Wang (2003: 143) stipulate that it is appropriate to divide the analysis of trade in services into its two major constituents, namely the export of services and the import of services. The next two sections discuss the separate contributions of export and import of services to economic growth.

3.4.1.1 Export of Services and Economic Growth

The relationship between exports in general and economic growth is not straightforward, as alluded to by Mehrara and Firouzjaee (2011: 223). Some analysts (such as Helpman and Krugman, 1985; Khalifa Al-Youssif, 1997; Ekanayake, 1999) are of the view that exports can propel economic growth based on the export-led growth hypothesis. This claim is supported by the fact that exports can contribute towards an efficient allocation of resources and an improvement in creativity as well as innovation through effective competition (Mehrara and Firouzjaee, 2011: 223).

A significant part of the literature on trade and economic development emphasises that exports accelerate growth. After studying the data for 73 developing countries, both low-income and middle-income countries, Kavoussi (1984: 248) came to the conclusion that the economic growth rate is strongly correlated with the growth rate of exports. Khan, Azra, Umar, Zaman, Ahmad and Shoukat (2012: 539) also assert that export expansion contributes

to growth through economies of scale, enhanced capacity utilisation, efficient allocation of resources and increased factor productivity. Abou-Stait (2005: 2) agrees with Khan et al. (2012) and emphasises that the literature on export-led growth attributes the positive effects of exports on economic growth to key factors such as increased capacity utilisation and productivity gains. However, there are also some studies, for example Khan et al. (2012), that emphasise growth-led exports, where causality runs from economic growth to exports. This means that as much as exports contribute to growth, there can be feedback effects in the opposite direction. It must be noted that the export-led growth hypothesis does not only hold for goods but also for services (Gabriele, 2003: 14).

Export of services is synonymous with inshoring, which entails the sale and supply of domestically produced services to foreign parties (Liu and Trefler, 2008: 5). Regarding the growth effects of exported services, Abou-Stait (2005: 1) argues that the export of services is an important source of foreign exchange reserves, which can help a country to ease the pressure on its balance of payments account. Tregenna (2006: 12) also agrees with Abou-Stait (2005) in highlighting that the generation of foreign exchange through the export of services can help mitigate the balance of payments constraints of an economy in a manner that supports higher growth.

In recent times a number of cross-country studies have attempted to explore the relationship between export of services and economic growth at an aggregate level. These include Langhammer (2002), Ito and Krueger (2003), Gabriele (2003) and Gabriele (2006). These studies have made significant contributions to the relevance of services in relation to the expansion of output. Just as the export of services can be used as a growth strategy, the import of services also possesses some benefits in the form of improvement in performance as a result of greater competition as well as the availability of, and access to, advanced technology. The relationship between import of services and economic growth is discussed in more depth in the next section.

3.4.1.2 Import of Services and Economic Growth

Offshoring, which captures all international transactions that involve the sale and supply of foreign-provided services to a domestic party (Liu and Trefler, 2008: 5), is synonymous with the import of services. The offshoring phenomenon, according to Boyer (2007: 2), pertains mainly to the services sector whose products were initially classified as quasi non-tradable.

Although offshoring is not a recent phenomenon, the rate of its development has been very significant in recent periods (Boyer, 2007: 5).

As a result of this rising trend of offshoring, professionals such as doctors, teachers, engineers, etc. now face strict competition from abroad (Boyer, 2007: 2). Domestic consumers are also able to experience improvement in welfare because of the availability of a wide variety of services (Cali et al., 2008b: 2).

The extent to which services are sourced internationally depends on the characteristics of the domestic services market (Nordås, 2011: 308). As Bunyaratavej et al. (2011: 75) explain, firms acquire services offshore for cost-saving reasons not only by offshoring to lower wage destinations, but also in order to have access to qualified labour that may be lacking in the domestic economy, and as part of a much broader strategy of improving efficiency.

The literature which analyses the contribution of imports to economic growth is limited because the relationship between imports and economic growth appears complicated compared to the relationship between exports and growth. Nevertheless, the importance of imports as an essential channel for the flow of foreign technology into the domestic economy has been emphasised by recent studies using endogenous growth models. These include Grossman and Helpman (1991), Lee (1995) and Mazumdar (2001). Uğur (2008: 55) argues that with sufficient foreign exchange reserves, the importation of high-quality goods and services expands production possibilities and promotes growth.

With regards to services, Mattoo et al. (2001: 6) explain that the import of services can increase the scale of activity through the participation of foreign entities, as well as improve competition, and hence provide greater scope for generating growth. Even without the scale effect, the import of services could still contribute to growth, since the foreign parties are more likely to come along with a source of endogenous growth in the form of technology, and such diffusion of technology can enhance productivity and growth (Mattoo et al., 2001: 7).

Amiti and Wei (2009: 206-207) also highlight that the import of services can influence the level of productivity through learning externalities, where domestic firms can study the foreign firms and learn from their experience to become efficient. However, Mattoo et al. (2001: 6) argue that there would be no positive impact on growth if imported services merely substitute for domestic ones and limit the expansion of the domestic services sector. Mattoo

et al. (2001: 6) further explain that for a greater impact on growth, the imported services must also be locally produced, so that trade would improve efficiency through competition.

3.5 Summary and Conclusion

This chapter reviewed the literature on the theories of trade as well as the literature on the contribution of trade to economic growth. Based on the discussion in this chapter, it seems that the major difference between traditional theory and the new theory is that the new theory attempts to move away from the restrictive assumptions of both the classical and neoclassical trade theory. Both the traditional comparative advantage theory and the new trade theory based on increasing returns emphasise the economic gains from trade. The literature also confirms that the general trade theories also apply to trade in services.

International trade in general, and in particular services trade, is vital to the economic growth and development of any economy. The growth-enhancing effect of services trade can arise from both the export of services and the import of services. While being a net exporter of services can generate foreign reserves to boost investment, the import of services can also ensure effective competition and improved efficiency as well as an increase the scale of activities. The next chapter addresses the methodological approach that is employed by the study to analyse the impact that trade in services has on economic growth. Also, drawing on the literature noted in this chapter, the effect of services trade on South Africa's economic growth will be examined in Chapters Five and Six.

CHAPTER FOUR: METHODOLOGY

4.1 Introduction

This chapter outlines the methodology used to investigate the impact of trade in services on South Africa's economic growth. In particular, the models that will be used to test the hypotheses that both export and import of services are vital to South Africa's economic growth are discussed in this chapter. As noted in Chapter Three, both the theoretical and the empirical literature assign a significant role to trade in economic growth and development. Unlike trade in goods, the role that services trade plays in economic growth and development has not been extensively studied (Hoekman and Mattoo, 2008: 2).

However, following the seminal work by Goldsmith (1969) on financial services and economic growth, a number of empirical analyses concerning the growth potential of services in general and in particular services trade have been undertaken. These empirical works include Li, Greenaway and Hine (2003), Hsueh, Lin and Wang (2003), Gabriele (2003), Musonda (2007), Hoekman and Mattoo (2008), and Amiti and Wei (2009). The methodology that this study adopts is discussed in section 4.2 and, on the basis of the methodology reviewed, the model for this study is then specified in section 4.3.

Moreover, the study uses quarterly time series data from 1980 to 2012 and the core source of data is the South African Reserve Bank (SARB) Quarterly Bulletin and the IMF Balance of Payments Statistics. The various time series variables as well as the sources of data used in the study are discussed in detail in section 4.4. Furthermore, since time series data can easily generate misleading conclusions because of issue of non-stationarity, it is necessary to analyse the various variables under consideration using the relevant econometric tools. Therefore, time series econometric techniques that are applied in order to avoid spurious[7] results are discussed in section 4.5.

4.2 Aggregate Production Function Approach

Miller (2008: 1) defines a production function as a mathematical expression that illustrates a systematic relationship between inputs and output within an economy. Although the production function was originally designed to explain the production process of individual firms, the approach has been adopted by macroeconomists, mainly neoclassical economists,

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[7] A situation whereby regression results appear significant even though the variables are unrelated (Hill, Griffiths and Lim, 2012: 482).

for the estimation of certain parameters that cannot be measured directly from the national accounts (Miller, 2008:3). One of these parameters is the elasticity of substitution between the factors of production, specifically capital and labour. Antràs (2004: 1) posits that the elasticity of substitution between capital and labour is important in growth theory. Elasticity of substitution is a measure of how easily firms can shift from one factor input to another when factor prices change (Raval, 2011: 2).

Felipe and Fisher (2003: 209) postulate that the aggregate production function, which depicts the relationship between inputs and output at the aggregate level, constitutes the core of neoclassical growth models. The two basic underlying assumptions of the neoclassical production function are constant returns to scale[8] and diminishing marginal product.[9] Fisher (1969: 553) explains that the estimation and application of the aggregate production function in economic analysis has become an important practice. This is because within the production function framework, it is possible to estimate the individual contribution of each factor to GDP growth (Epstein and Macchiarelli, 2010: 4).

The general aggregate production function used in growth theories can be expressed as:

$$Y = f(T, K, L) \qquad 4.1$$

Where Y represents the level of output,

      K is the stock of capital,

      L is the quantity of labour,

      T is the total factor productivity in output.

According to the endogenous growth model discussed in Chapter Three, the variable T is endogenously determined and captures the driving forces of growth and productivity that are not associated with capital and labour (Parjiono, 2009: 168). Parjiono (2009: 169) explains that T entails all economic factors that can be influenced by policy, including openness, macroeconomic stability, governance and institutional development, government expenditure and external factors. The openness factor, which is the major factor of interest of this study, involves exports, imports and foreign direct investment.

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[8] With constant returns to scale, output changes by the same proportion as the change in inputs (Josheski, Lazarov and Koteski, 2011: 2).

[9] Diminishing marginal product means that the additional deployment of factors of production increases the level of output, but at a decreasing rate (Josheski et al., 2011: 2).

The aggregate production function framework has been extensively utilised in the international trade literature to examine the impact of trade on economic growth. In examining the relationship between exports and economic growth, Khalifa Al-Youssif (1997) and Dritsakis (2006) adopted a production function approach in which the level of exports was considered as one of the factors that propel output growth. Banga and Goldar (2007) also used the aggregate production function approach to evaluate the contribution of services to output growth and productivity in India. Likewise, Vohra (2001) investigated the relationship between exports expansion and economic growth in India, Malaysia, the Philippines, Thailand and Pakistan using the production function approach. Moreover, Olsen (2006) as well as Amiti and Wei (2009) used the production function approach to determine the effects of offshoring on productivity and growth.

In spite of the extensive use of the aggregate production function in the literature, the approach has also received some criticisms. Felipe and Fisher (2003: 210) question the legitimacy of aggregate output, capital and labour primarily because of measurement issues. Moreover, Fisher (1969: 554) explains that the aggregation of capital, labour and output require stringent conditions that are not realistic at the economy-wide level. Similar to the concerns of Felipe and Fisher (2003) as well as Fisher (1969), Miller (2008: 12) argues that there is some degree of uncertainty with respect to aggregation, because it is not clear whether the aggregation of the output of firms can give a coherent output for the overall economy.

Regardless of the concerns raised above, the aggregate production function approach is considered as a good analytical tool, because of its ability to illustrate how the combination of inputs at a given level of technology produces total output (Miller, 2008: 2). Temple (2006: 303-305) attempts to justify the use of the aggregate production function by regarding it as a way of learning about the world. Temple (ibid.) is of the opinion that the likelihood of shortcomings is not enough to invalidate a research strategy, but researchers just have to be keenly aware of the limits such a strategy imposes on the interpretations of their results. This gives an indication that the aggregate production function can still be employed in empirical analysis. There are two types of aggregate production functions that are widely used.

The two types of neoclassical aggregate production functions used in the literature are Cobb-Douglas and constant elasticity of substitution (CES). While the Cobb-Douglas production function assumes a unitary elasticity of substitution, the CES function is more general and

allows the elasticity of substitution to be determined by the data. These two functional forms of the aggregate production function are discussed in detail in the next two sections.

4.2.1 Cobb-Douglas Production Function

Duffy and Papageorgious (2000: 87) explain that the Cobb-Douglas production function is a linear homogenous production function which has a unitary elasticity of substitution. Elasticity of substitution is a measure of how easy it is to shift between the factors of production (Raval, 2011: 2). A unitary elasticity of substitution is an indication that the production function is homogenous to the degree of one and as such exhibits constant returns to scale. Miller (2008: 18) explains that the Cobb-Douglas production function assumes a unitary elasticity of substitution, even though there is no theoretical justification for such an assumption. This type of production function was designed by Charles W. Cobb and Paul H. Douglas in 1928 (Miller, 2008: 7). Since it was first used in 1928, the Cobb-Douglas production function has become the standard approach used in the growth literature as postulated by Epstein and Macchiarelli (2010: 4) as well as Duffy and Papageorgious (2000: 87). The Cobb-Douglas production function can be expressed as:

$$Y = AK^{\alpha}L^{1-\alpha} \underline{\hspace{2cm}} 4.2$$

Where Y represents output,

K is the stock of capital,

L is the quantity of labour,

A is the level of technology which is assumed to be Hicks neutral[10], and

α represents production factor elasticity. α is a constant that ranges from zero to one.

The advantages of the Cobb-Douglas production function revolve around its simplicity and excellent fit for most data. Willman (2002: 8) explains that the Cobb-Douglas production function is popular in both theoretical and empirical analyses, because it is easy to estimate and often provides a good fit for data. Similarly, Miller (2008: 1) emphasises that the Cobb-Douglas production function is popularly used in empirical analysis because it is simple and explains stylised facts better. Apart from its analytical simplicity, the Cobb-Douglas function has other attractive properties such as homogeneity and aggregation (Willman, 2002: 8).

Moreover, Miller (2008: 7) as well as Josheski, Lazarov and Koteski (2011: 3) emphasise that the Cobb-Douglas production function is used in numerous empirical analyses, because it is

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[10] When a production function is regarded as Hicks neutral, improvement in productivity or technical progress does not influence the relative marginal productivity of factor inputs (Raval, 2011: 2).

considered to provide a reasonable description of actual economies. For this reason the Cobb-Douglas production function has been relied on to produce long-term economic forecasts that are reasonably accurate (Miller, 2008: 23). Furthermore, since firms take productivity or technical progress into consideration when making inputs decisions, it is highly likely that inputs may be correlated with productivity. Raval (2011: 6) therefore concludes that economists prefer the Cobb-Douglas functional form because it addresses endogeneity of productivity by assuming a Hicks neutral productivity.

Despite its theoretical and empirical appeal, Willman (2002: 8) and Raval (2011: 5) state that the Cobb-Douglas production function relies on a restrictive assumption that the elasticity of substitution between the factors of production is unitary. This means that the Cobb-Douglas production function does not allow the parameters of the inputs to sum to a number other than one. In other words, the Cobb-Douglas production function does not take into account the possibility of either increasing returns to scale or decreasing returns to scale. However, Debertin (2002: 173 - 174) emphasises that certain modifications have been made to the original Cobb-Douglas function. These include recognising the possibility that returns to scale cannot always be constant as well as incorporating additional inputs other than labour and capital into the function.

Apart from the concerns raised about its assumption, some modern economists have also asked questions about the methodological soundness of the studies that have provided support for the Cobb-Douglas production function (Miller, 2008: 18). For example, Fraser (2002), after re-examining five of the original time series studies that have provided empirical support for the Cobb-Douglas production function, discovered that the data used in these studies were highly collinear and partly non-stationary. This means that the results of these studies may have been imprecise and spurious.

On the basis of these concerns, some analysts and economists have questioned the application of the Cobb-Douglas production function and have argued that the more general CES would be more appropriate to use (Miller, 2008: 1). The CES production function is discussed in detail in the next section.

4.2.2 The Constant Elasticity of Substitution (CES) Production Function
According to Willman (2002: 8), the constant elasticity of substitution (CES) production function is more general and less restrictive compared to the Cobb-Douglas production function, because it allows the elasticity of substitution to be estimated from the data. The

CES production function has a non-unitary elasticity of substitution (Klump, McAdam and Willman, 2011: 8). Klump et al. (2011: 12) explain that the elasticity of substitution between two factors of production (capital and labour) measures the percent response of the relative marginal products of the two factor inputs to a percentage change in the marginal rate of technical substitution.

The CES production function was explicitly derived by Arrow, Chenery, Minhas and Solow (1961: 225), who argued that unitary substitutability between capital and labour is highly unlikely. Some recent empirical analyses have also demonstrated that the aggregate production function is better characterised by non-unitary substitution elasticity (Klump et al., 2011: 8). The CES production function has three parameters, namely substitution parameter, efficiency parameter and distribution parameter. The standard CES production function can be expressed as:

$$Y = C[\alpha K^\rho + (1-\alpha)L^\rho]^{1/\rho} \underline{\hspace{3cm}} 4.3$$

Where Y is the level of output,

K is the stock of capital,

L is the quantity of labour,

C is the efficiency parameter which is helps to measure technical progress,

α is the distribution parameter. The distribution parameter is used to determine the factor share for the inputs, and

ρ is the substitution parameter and hence determines the degree of substitutability between the factors of production.

Even though the CES production function has the advantage of being more general than the Cobb-Douglas function, the estimation of the CES production function, according to Willman (2002: 8), is complicated by the non-linearity and the greater number of parameters. The difficulty of estimation may therefore offset the advantage of theoretical generality (Willman, 2002: 8). Similar to the concerns raised by Willman (2002), Antràs (2004: 233) highlights that the CES production function is difficult to fit directly to observations on output and inputs because of the non-linear nature of the substitution parameter.

Moreover, for forecasting purposes, the generality of the CES production function is problematic, because it is difficult to get an estimate of the value of elasticity of substitution that is consistent across studies (Miller, 2008: 23). Miller (2008: 23) therefore concludes that

although the Cobb-Douglas production function is regarded as restrictive, the alternative (the CES production function) cannot significantly improve forecasting.

As already emphasised, this study adopts the aggregate production function approach because it is useful for modelling growth. The aggregate production function is appropriate for modelling growth, because it takes output as the dependent variable. With output as the dependent variable, the aggregate production function framework makes it possible to estimate the coefficients, which in turn helps to determine the individual contribution of the inputs to growth. The aggregate production function approach is also appropriate for estimating the growth impact of international trade, because it allows both exports and imports to be included as TFP variables. Therefore, by using the aggregate production function method, one will be able to analyse how the export and import of services impact on economic growth. The next section specifies the models for this study based on the production function framework.

4.3 Model Specification

Having discussed the research methodology to be adopted in this study in the previous section, this section specifies the empirical models to be used in the rest of the study. Arising from the discussion in Chapter Three, it is considered appropriate to divide the analysis of trade in services into its two major constituents, namely the export of services and the import of services. In following the approach of dividing services trade into export and import of services, the study examines two major models in relation to the two research questions. The first model seeks to examine the impact of export of services on economic growth, while the second seeks to determine the effect import of services has on economic growth.

Both models are based on the aggregate production function approach as described in the previous section. It is also worth emphasising that the functional form of the two aggregate production functions is assumed to be Cobb-Douglas. This is because, as emphasised in section 4.2.1, the Cobb-Douglas production function is simple to estimate. Moreover, when empirical estimates are restricted to the Cobb-Douglas functional form, the data fit is deemed to be excellent (Miller, 2008: 23; Josheski et al., 2011: 3). In the ensuing sections, two models have been specified to help determine the individual impact of export and import of services on South Africa's economic growth.

4.3.1 Export of Services and Economic Growth

It was established in Chapter Three that the export of services can be instrumental to the achievement of the overall economic growth and development objectives of any economy. As already emphasised, this study uses the aggregate production function framework. Therefore the model that would be used to estimate the impact of export of services on growth is derived from the general aggregate production function, which was expressed in section 4.2 as:

$$Y = f(T, K, L)$$

Where Y represents the level of output (GDP),

      K is gross fixed capital formation (GFK) used as a proxy for capital stock,

      L is the quantity of labour (LBR),

      T is the total factor productivity in output.

Openness (OPNS) is considered as one of the factors which contribute to the growth of total factor productivity in output. Therefore, since total export (X) is a component of openness, it can be stated that:

$$T = f(X)$$

Moreover, total exports can be divided into the export of services (EXPS) and the export of goods (EXPG). Thus, the model can now be expressed as:

$$GDP = f(GFK, LBR, EXPS, EXPG) \underline{\hspace{2cm}} 4.4$$

As depicted in equation 4.4, gross domestic product is set as a function of capital, labour and exports. This type of model formulation has been used in studies such as Dritsakis (2006) and Vohra (2001). We take the natural logarithm of the variables (GDP, GFK and LBR) and express the export of both goods and services as a ratio of GDP. Expressing the variables in a log-log[11] form ensures the interpretation of the estimated coefficients as elasticities. The transformed model can be estimated as:

$$\ln GDP_t = \beta_0 + \beta_1 \ln GFK_t + \beta_2 \ln LBR_t + \beta_3 EXPS/GDP_t + \beta_4 EXPG/GDP_t + \varepsilon_t \underline{\hspace{1.5cm}} 4.5$$

Where InGDP is the log of real GDP,

      InGFK is the log of gross fixed capital formation,

      InLBR is the log of labour,

      EXPS/GDP represents the export of services to GDP ratio,

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[11] A log-log model is regarded as a model in which both the dependent variable and the explanatory variables are transformed to logarithms (Benoit, 2011: 4).

EXPG/GDP is the ratio of exported goods to GDP

β_0 represents the intercept, β_1 to β_4 are the parameters, the subscript t denotes time period and ε_t is the error term. The relationship between output and all four explanatory variables is expected to be positive. Thus, $\beta_1, \beta_2, \beta_3, \beta_4$, are expected to be greater than one.

4.3.2 Import of Services and Economic Growth

The discussion in section 3.4.1.2 suggested that import of services can influence the level of productivity and hence economic growth through efficiency gains, technology spillover and learning externalities. Just as in the case of export of services, the impact of import of services on economic growth would be modelled using the aggregate production function approach. The basic difference is that imports (M) become a function of total factor productivity. That is:

$$Y = f(T, K, L)$$

Where Y represents the level of output (GDP),

K is gross fixed capital formation (GFK) used as a proxy for capital stock,

L is the quantity of labour (LBR),

T is the total factor productivity in output which can be influenced by openness (OPNS). Thus T can also be a function of imports as shown in the expression below.

$$T = f(M)$$

Total imports can further be grouped into import of services (IMPS) and imports of goods (IMPG). After grouping imports into goods and services, the production function can be rewritten as:

$$GDP = f(GFK, LBR, IMPS, IMPG) \qquad _____4.6$$

Equation 4.6 portrays that output is a function of capital, labour and the import of both goods and services. Amiti and Wei (2009) used this type of model to estimate the effects of offshoring of goods and services on productivity in the United States.

In order to be able to interpret the estimated explanatory variables' coefficients as elasticities, GDP, GFK and LBR are transformed into their natural log. After the log transformation, the estimated coefficients will reflect the percentage changes in the dependent variable as a result

of a 1 percent change in the regressors. The functional form of the production function above can be estimated as:

$$\ln GDP_t = \gamma_0 + \gamma_1 \ln GFK_t + \gamma_2 \ln LBR_t + \gamma_3 IMPS/GDP_t + \gamma_4 IMPG/GDP + \mu_t \ _____4.7$$

Where QIMPS/QGDP represents the ratio of the import of services to GDP,

QIMPG/QGDP is the ratio of imported goods to GDP

γ_0 represents the intercept, γ_1 to γ_4 are the parameters, the subscript t denotes time period, and μ_t is the error term. γ_1 and γ_2 are expected to be greater than one, because there is a positive relationship between output and capital as well as output and labour. Even though the values of γ_3 and γ_4 are also expected to be positive, γ_3 can have a negative value for developing countries, as shown by Li et al. (2003).

4.4 Data and Variables

The variables as well as the sources of data that would be used to estimate the models which were outlined in the previous section are discussed in this section. Although there is no consensus on what should be the ideal empirical model concerning the relationship between services and economic growth, Li et al. (2003:7) emphasise that there has been some convergence regarding the core variables to be included in the model. These variables include GDP, the share of investment and human capital. This study uses quarterly South African data for the period 1980 to 2012 to estimate the model specified in the previous section. Key sources of data include the South African Reserve Bank (SARB) Quarterly Bulletin, IMF Balance of Payments Statistics and the United Nations Conference on Trade and Development Statistics (UNCTADSTAT). The list of variables used in this study and the respective sources of data are provided in Table 4.1. Furthermore, the definitions and details regarding the various variables are discussed below.

Table 4.1: List of Variables

CODE	VARIABLE	SOURCE
GDP	Gross Domestic Product (Quarterly)	SARB Quarterly Bulletin
GFK	Gross fixed capital formation (Quarterly)	
LBR	Labour (Quarterly)	
EXPS	Export of services (Quarterly)	IMF Balance of Payments Statistics (BOPS)
EXPG	Export of goods (Quarterly)	
IMPS	Import of services (Quarterly)	
IMPG	Import of goods (Quarterly)	

Gross Domestic Product (GDP): GDP in real terms is the dependent variable for the two models estimated in section 4.3. Real GDP, which is a measure of the monetary value of all final goods and services produced within the boundaries of a country over a specific period, is the most widely used measure of economic growth and development. Data on real GDP (in 2010 constant prices) were obtained from the SARB.

Gross fixed capital formation (GFK): Gross fixed capital formation is adopted in this study as a representation of capital, which is one of the primary inputs in the neoclassical production function framework. The approach of using gross fixed capital formation to represent capital was also adopted by Musonda (2007). The gross fixed capital formation data used in this study were calculated at 2010 constant prices.

Labour (LBR): Just like capital, labour is also an essential factor in the transformation of inputs into output. This study uses the seasonally adjusted index of total employment in the non-agricultural sectors as a measure of aggregate labour supply. Although the most reliable data on total employment would have been the October Household Survey (OHS) and its successor surveys, the Labour Force Survey (LFS) and the Quarterly Labour Force Survey (QLFS). The coverage for these survey data is only available for the period 1995 and onwards. Thus, the coverage is not adequate to cover the intended period of this study (1980 to 2012). The total employment in the non-agricultural sectors series is therefore the only option that provides employment data before 1995. It must be emphasised, however, that the series may not provide an accurate measure of total formal sector employment because of its inconsistent and changing sectoral coverage over time.

Export of Services (EXPS): These are services that are produced by residents of a country and sold to consumers of other nations or the rest of the world. The export of services data used in the regression were extracted from the IMF Balance of Payments Statistics (BM5 and BM6).

Import of Services (IMPS): Imported services are services that are produced by residents of other countries and sold in the domestic economy. Just as in the case of the export of services, the import of services data used to estimate the proposed model extracted from the IMF Balance of Payments Statistics (BM5 and BM6).

Most services trade data, including those used in this study, can be obtained from the balance of payments (BOP). It is worth noting that the classification of services according to the four modes of supply helps to highlight the fact that available official statistics on international trade in services based on the BOP are not exhaustive. Even the IMF Balance of Payments (BOP) statistics, which is the most comprehensive statistical source of data on services trade, do not adequately capture services trade in all four modes of supply.

The BOP does not adequately capture trade that takes place through mode 3 (Gabriele, 2003: 4) nor to some extent mode 4 (Hodge, 1998: 39). Hodge (1998: 38-39) explains that while the BOP can be relied on to measure international trade in services originating from mode 1 and mode 2, it inadequately captures services trade emanating from modes 3 and 4. Hodge (1998: 39) emphasises that foreign direct investment (FDI) data, statistics on foreign affiliate trade (FAT) and migration statistics can provide complementary data for modes 3 and 4 respectively. However, such data are not always readily available (Hodge, 1998: 39). Lennon, Mirza and Nicoletti (2009: 184) point out that BOP data can be relied upon for empirical analysis because most services trade is observable from the BOP data.

Export of goods (EXPG) and import of goods (IMPG): Although the study is about services trade, export and import of goods are also considered, because total exports as well as total imports are made up of goods and services. Moreover, there is a strong complementarity between goods and services. According to Hsueh, Lin and Wang (2003: 149), an increase in the export of goods increases the demand for certain services such as communication, financial, transport and travelling services. Likewise, as more goods are imported, the demand for services such as insurance also increases (Hsueh et al., 2003: 144).

4.5 Econometric Technique

Across the literature, there are a number of estimation techniques used to ascertain the relationship between trade and economic growth. These include vector error-correction models (VECM), Granger causality tests and the ordinary least squares method. The approaches are explained in detail the next three sub-sections.

4.5.1 Vector Error-Correction Model

According to Dash and Parida (2013: 229), the vector error-correction model (VECM) procedure was suggested by Granger (1986) and Engle and Granger (1987). Hill, Griffiths and Lim (2012: 503) define a VECM as a multivariate dynamic model which incorporates a cointegrating relationship. The VECM is principally regarded as a special form of vector autoregression (VAR)[12] for non-stationary variables that are cointegrated (Zeugner, 2002: 8). It takes account of the dynamic properties and interrelationships between a set of time series variables. The VECM is therefore used to analyse the direction of causality between variables (Dash and Parida, 2013: 229) and is considered as a useful forecasting tool (Lastrapes, 2001: 5). Apart from helping to indicate the direction of causality amongst variables, the VECM assists in distinguishing between the long-run and short-run Granger causality (Tahir and Sarwat, 2010: 49).

Ekanayake (1999: 45) emphasises that VECM has gained popularity in recent empirical analyses, firstly, because it is simple and relevant in dealing with time series data, and secondly, because of its ability to ensure stationarity[13] and provide an additional channel for detecting causality. Moreover, Asari, Baharuddin, Jusoh, Mohammad, Shamsudin, and Jusoff (2011: 51) state that the VECM can only be applied after the long-run equilibrium relationship between the variables in the series has been detected. Asari et al. (2011: 52) as well as Khan et al. (2012: 540) therefore conclude that VECM is not useful if there is no cointegration among the variables.

Jochmann, Koop, Leon-Gonzalez and Strachan (2009: 5) postulate that the VECM for an n-dimensional[14] vector (y_t) can be expressed as:

$$\Delta y_t = \Pi y_{t-1} + \sum_{j=1}^{\rho-1} \Gamma_j \Delta y_{t-j} + \mu d_t + \varepsilon_t \underline{\hspace{2cm}} 4.8$$

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[12] A VAR is defined as a system in which each variable is a function of its own lag and the lag of other variables in the system (Hill et al., 2012: 499).

[13] See section 4.5.1 for the definition of stationarity.

[14] The number of rows and columns (the size of the matrix) defines the dimension of a matrix.

Where Δ denotes first difference, such that $\Delta y_t = y_t - y_{t-1}$,

Π is the n x n matrix of rank $r \geq n$. An n x n matrix indicates that the matrix has n number of rows and n number of columns. The rank measures the long-run cointegrating relations in the system,

d_t represents deterministic terms,

ε_t is the error-correction term. The error-correction parameter measures how the system reacts to deviations from long-run equilibrium, and

ρ is the order of the VAR, which translates into a lag of ρ -1 in the VECM .

Various authors have used the vector error-correction model in the international trade literature. For example, Khan et al. (2012) used VECM to examine the relationship between exports, imports and economic growth in Pakistan. Likewise, Mehrara and Firouzjae (2011) and Anoruo and Ramchander (2000) examined the relationship between exports and economic growth in developing countries and five emerging economies of Asia using VECM. These studies were able to adopt the VECM because the variables they used were cointegrated. However, in instances where the variables do not cointegrate, the basic Granger causality test can be used to determine the causal relationships between the variables under consideration (Asari et al., 2011: 51). This study will not adopt the VECM because the main aim of the study, as discussed in section 3.4, is not to determine the direction of causality. The Granger causality test is discussed in the next section.

4.5.2 The Granger Causality Test

The Granger causality test is used to verify the cause-and-effect relationship between variables (Cui and Shen, 2011: 222). In a bivariate (X, Y) context, the Granger Causality test can be specified as:

$$Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \ldots \alpha_i Y_{t-i} + \ldots \beta_i X_{t-i} + \mu \underline{\qquad} 4.9$$

$$X_t = \alpha_0 + \alpha_1 X_{t-1} + \ldots \alpha_i X_{t-i} + \ldots \beta_i Y_{t-i} + \mu \underline{\qquad} 4.10$$

Where the constant parameter α_0 represents the constant growth rate of the respective variables, the subscripts signify time period, and μ refers to the error terms. The purpose of the two equations above is to assist in determining the causal relationship between variables X and Y. In order to achieve this purpose, variable X together with the lagged values of Y are expressed as a function of variable Y in equation 4.2, while Y and the lagged values of X are also expressed as a function of X in equation 4.3.

Asari et al. (2011: 52) posit that two types of tests can be obtained from the two equations. The first test, which relates to equation 4.1, assesses the null hypothesis that variable X does not Granger-cause[15] variable Y. The second test, on the other hand, investigates the null hypothesis that the Y variable does not Granger-cause the X variable in relation to equation 4.3. It can be deduced that changes in X are Granger-caused by a change in Y, if we fail to reject the first null hypothesis but reject the second. Moreover, if either the first or second null hypothesis is rejected, then it means that there is a unidirectional causality between variable Y and variable X. On the other hand, if both null hypotheses are rejected, then there is bidirectional causality between the variables.

Granger causality tests have been adopted in numerous studies to investigate the relationship between trade and economic growth. Ramos (2001) and Amiri and Gerdtham (2011) employed Granger causality tests to determine the relationship between exports, imports and economic growth for Portugal and France respectively. Cui and Shen (2011) also investigated the relationship between China's international trade in services and economic growth using Granger causality tests. Moreover, About-Stait (2005), in examining the effect of exports on Egypt's economic growth, used Granger causality tests.

It must be emphasised that both the VECM and Granger causality tests are useful tools that are used in the empirical literature to determine the direction of the causal relationship between international trade and economic growth in order to ascertain whether trade propels growth or vice versa (Sun and Heshmati, 2010: 3). However, arising from the discussion in section 3.4, this study does not attempt to ascertain whether a bidirectional relationship (from international trade to economic growth and vice versa) exists between international trade and economic growth. Since the study only focuses on a unidirectional causality from trade to economic growth, the aggregate production function, which is discussed in the next section, would be the most appropriate method to use.

4.5.3 Ordinary Least Squares

This study uses the ordinary least squares (OLS) method of estimation. Hill et al. (2012: 51) define OLS as a statistical method which helps to estimate the parameters of interest in a linear regression model. Maddala (1977: 83) explains that the least squares method is used in statistical analysis to choose the best fit curve that has the minimal sum of squared residuals

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[15] A variable is said to Granger-cause another if the former helps to explain the future values of the latter (Liu and Bahadori, 2012: 2).

from a set of observable data. In other words, the summation of the squares of the vertical distances (residuals) from each point to the curve must be as small as possible to be able to fit the curve to the data values. The intuition behind the squaring of the residuals is to prevent a situation whereby large negative residuals will be cancelled by large positive residuals (Hill et al, 2012: 51).

According to Andren (2007: 37), the OLS method is the most popular method used in the literature to estimate the parameters of the population regression function. The OLS point estimators are expressed in terms of the observable sample population (Gujarati, 2004: 78). Thus, OLS uses sample data to estimate the true population relationship between the regressand and the regressor(s). Gujarati (2004: 79) explains that on the basis of the well-known Gauss-Markov Theorem, OLS estimators are regarded as the best linear unbiased estimators (BLUE). Hill et al. (2012: 63) explain that the BLUE principle entails a minimisation of the variance[16] of the chosen linear combination of the data subject to the constraint that the estimator is unbiased. In other words, the estimator must have the minimum variance compared to similar estimators. In order to be regarded as an unbiased estimator, the expected value of the estimator must be the true value of the parameter. It is worth emphasising that the Gauss-Markov theorem does not depend on the normality assumption (Hill el al., 2012: 63).

However, since the residuals in OLS regression are assumed to be normally distributed, it implies that the probability distributions of the OLS estimators are also normal (Gujarati, 2004: 109; Hill et al., 2012: 63). Gujurati (2004: 109) states that the normality assumption makes it easier for the probability distribution of the OLS estimators to be derived. Andren (2007: 22) explains that normal distribution functions are symmetric and bell-shaped. The range of the normal random variable is continuous from negative infinity to positive infinity (Hill el al., 2012: 33). Statistically, variables that are normally distributed have a skewness value of zero and a kurtosis value of three (Andren, 2007: 22).

OLS regression can be successfully applied to time series data under certain conditions. Asari et al. (2011: 51) posit that a simple OLS modelling will cause a spurious regression in the event that the time series under consideration are integrated or are non-stationary random

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[16] "The variance of a random variable is the average of the squared distances between the possible values of the variable and its mean" (Hill et al., 2002: 60).

processes. Therefore, the series must be tested to be stationary before using the OLS method. The next section discusses the concept of stationarity in detail.

4.5.3.1 Stationary and Non-stationary Series

The key assumption made when using time series data under the OLS regression model is that the data are stationary. Khan et al. (2012: 539) posit that a series is regarded as stationary, if the variance, covariance and mean of such a series remain constant over time. Similarly, Asari et al. (2011: 51) emphasise that if both the mean and variance of a time series variable are constant over a certain period, then the series is regarded as a stationary process.

On the other hand, a series can be described as being non-stationary, provided it does not have a constant mean and covariance across the time period under consideration. Furthermore, Asari et al. (2011: 51) explain that the stationarity or non-stationarity of time series data is an important phenomenon, because of the effect it has on the behaviour of the series. For instance, if a time series is non-stationary, predicting future behaviour is difficult because the probability distribution of the series is unstable over time (Gujarati, 2004: 798). It is possible to transform a non-stationary series to become stationary.

Difference operations can be used to make a non-stationary series become stationary (Asari et al., 2011: 51). Murray (1994: 37) explains that a non-stationary time series that becomes stationary when differenced n times is deemed to be integrated of order n. Moreover, a series is said to be integrated of order 0, that is, I(0) if it is stationary without being differenced, while a series that only becomes stationary in its first difference state is considered to be integrated of order one or I(1) (Asari et al., 2011: 51).

Since the use of non-stationary variables in time series OLS regression results in misleading inferences, it is important to verify whether the variables are stationary. Johnston and DiNardo (1997: 215) state that there are two principal methods that can used to detect non-stationarity. These are unit roots tests and graphical inspection through the use of correlogram. While graphical inspection is based on subjective judgment, a unit root test is a formal statistical test (Johnston and DiNardo, 1997: 215). Thus the next section discusses unit root testing in detail.

4.5.3.1.1 Unit root testing

According to Dritsakis (2006: 184), many macroeconomics time series data exhibit unit roots dominated by stochastic trends. Cui and Shen (2011: 222) emphasise that times series data can easily generate a unit root, because the dynamic path does not only contain predictable elements but also random elements. In other words, a unit root is used to describe a statistical model of a time series whose autoregressive parameter is equal to one.

Unit root testing entails evaluating the existence of any stochastic trend in a time series model. The test is required in order to determine whether a series requires differencing to render it stationary. Cui and Shen (2011: 222) explain that unit root testing helps to deal with the problem of spurious regression which is associated with time series data. The Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test are important econometrics tools that can be used in unit root testing.

This study uses the ADF test to check for the existence of a unit root in each variable. The ADF test provides an essential modification to the original Dickey-Fuller test. It incorporates the possibility of autocorrelation in the residuals (Hill et al., 2012: 485). There are three variations of the ADF test. The ADF test equation can be estimated with no constant and no trend, with a constant term but no trend, and with both constant and trend. These variations help to take account of the role of the constant term as well as the trend (Hill et al., 2012: 484). The ADF unit root test is chosen for this study because it is the most widely used approach in the literature. Elder and Kennedy (2001: 138) assert that the ADF test is the most popularly used approach in the literature compared to other competing tests. The model for the ADF test can be expressed as:

$$\Delta X_t = \alpha_0 + \lambda T + \emptyset X_{t-1} + \sum_{i=1}^{k-1} \gamma_i \Delta X_{t-i} + e_t \underline{\hspace{4cm}} 4.11$$

Where X_t represents the time series being tested for unit root, Δ denotes first difference, α_0 represents the constant term, λ is the time trend parameter, e_t is the error terms, and k represents the number of lags which is selected based on the Schwarz Information Criterion (SIC). The addition of the lagged first differenced term (ΔX_{t-i}) helps to ensure that the residuals are not autocorrelated. $\emptyset$ is the coefficient of interest in the ADF test model above. The null hypothesis under scrutiny is that $\emptyset = 0$, which signifies that the series is non-stationary, while the alternative hypothesis states that $\emptyset < 1$, meaning the variable is stationary. The more negative the ADF statistic is compared to the critical values, the greater

the possibility of rejecting the null hypothesis. By rejecting the null hypothesis, the variable is said to have no unit root, which means it is stationary.

Apart from the issue of unit root and non-stationarity, time series are usually cointegrated. Cui and Shen (2011:222) explain that while unit root testing is conducted to determine the stability of the data, a test of cointegration assists in determining the long-run equilibrium link between variables that are non-stationary. The next section therefore discusses cointegration in detail.

4.5.3.2 Testing for cointegration

Engle and Granger (1987: 251) postulate that some linear combinations may exist among economic time series that converge to a long-run equilibrium over time, even though the individual series may wander through time. Time series variables are therefore deemed to cointegrate if the individual variables become stationary only after differencing but their linear combination is stationary (Anoruo and Ramchander, 2000: 7). Hendry and Nielson (2007: 254) explain that the concept of cointegration is used to signify the co-movement among trending variables. In other words, cointegrated variables share a similar stochastic trend and they do not diverge too far from each other.

Testing for cointegration entails investigating the long-run relation between variables. Testing for cointegration is also effectively a test of the stationarity of the residuals (Hill et al., 2012: 489). Time series variables are thus considered to be cointegrated once the test result shows that the residuals are stationary. Cointegration tests evaluate the null hypothesis that the variables are not cointegrated (non-stationary residuals) against the alternative hypothesis that the variables are cointegrated (stationary residuals). There are a number of tests available for checking cointegration amongst variables. These include the Johansen approach (1988, 1991) and the Engle and Granger (EG) method (1987). This study uses the Engle and Granger method even though the Johansen method is preferred when there are more than two non-stationary variables.

Engle Granger Method: The EG method, also known as the two-step estimation procedure, investigates the presence of a cointegrating relationship between a set of variables using the linear combination of the variables (Ogaki, 1993: 138). As stated by Ssekuma (2011: 9), the EG method estimates an OLS regression and then subjects the residuals of the regression to unit root testing using the ADF test. Once it is established that in the long-run the variables converge (that is, the residuals are stationary), an error-correction model is then estimated.

The approach first tests each variable to check the order of integration before estimating the error-correction model (ECM).

An ECM is a dynamic model which offers a coherent way of combining the long-run and the short-run effects by analysing the relationship between stationary or I(0) variables together with an embedded cointegrating relation (Hill et al., 2012: 490). The EMC has both the dependent variables and independent variables differenced. It also includes the lag of the residuals from the long-run regression as one of the regressors. The EG method has been used in number of studies, including Lee (1993) and Maslyuk and Smyth (2009). This thesis also adopts the EG method because it uses OLS regression, which is the same econometric technique the thesis employs in estimating the coefficients of interest. There is therefore no need to estimate a VAR for the purpose of testing for cointegration as done in the Johansen approach.

4.6 Summary and Conclusion

This chapter highlighted the methodology that would be applied to estimate the parameters of interest for this study. The chapter also discussed the variables, data issues and the econometric tools needed to ensure the accuracy of results when dealing with time series data. In Chapter Five the study will statistically test for the stationarity of all the variables as well as any cointegration relationship among them for the purpose of avoiding spurious regression. Moreover, the OLS method of estimation is adopted to evaluate the two research questions. The empirical results from the estimated equations are presented in the next chapter. These results would help to examine how the export and import of services affect South Africa's economic growth.

CHAPTER FIVE: DESCRIPTIVE STATISTICS AND EMPIRICAL RESULTS

5.1 Introduction

Using the models and econometric techniques specified in the previous chapter, the current chapter presents an empirical analysis of the impact that export and import of services have on South Africa's economic growth. The review of existing literature on trade, which was the focus of Chapter Three, highlighted that trade in general and services trade in particular can significantly influence economic growth in a positive manner. The empirical analysis in this chapter will help to determine both the long-run as well as the short-run relationship between services trade and economic growth in South Africa.

As was expounded in section 3.4.1, both exports and imports can propel growth but through different channels. While exports can directly contribute to output expansion, imports can impact on growth indirectly through the diffusion of technology and the subsequent improvement in productivity. This chapter provides an empirical analysis of how international trade in services impacts on South Africa's economic growth.

The chapter starts in section 5.2 with a qualitative description of South Africa's services trade and the sub-categories of services that make up total trade in services. The descriptive summary lays the foundation for a more extensive inferential statistical analysis in section 5.3. As in any time series econometric modelling, this study tests for both unit root and cointegration before investigating the two models specified in Chapter Four.

5.2 Trend and Structure of South Africa's Services Trade

This section provides a graphic analysis of South Africa's services trade using data from SARB and UNCTAD. The section first explores the size and growth of total trade in services before looking at the services sub-sectors that make up total exports and total imports.

5.2.1 Size and Growth of South Africa's Services Trade

Services trade makes up a small portion of South Africa's total trade, in real terms, as shown in Figure 5.1. A possible explanation for this is the fact that South Africa is a commodity-based economy and as such it is expected that the country's trade will be dominated by goods rather than services. As indicated in Figure 5.1, South Africa's total trade, in real terms, started rising from 1983 but stagnated during the mid-1980s as a result of the economic sanctions imposed on South Africa. Total real trade started rising again from the early 1990s

and only witnessed a significant fall after 2007 as a result of the global financial crisis. The changes in total real trade are mainly driven by changes in real goods trade.

As a result of the dominance of real trade in goods, real services trade accounts for less than 20 percent of South Africa's total real trade as shown in Figure 5.2. Also, real trade in services as a percentage of total real trade has not seen any significant change since 1980. The percentage of real services trade ranges between 15 and 19 from 1980 to 2012.

Figure 5.1: Share of Services Trade in Total Trade of South Africa (in real terms)
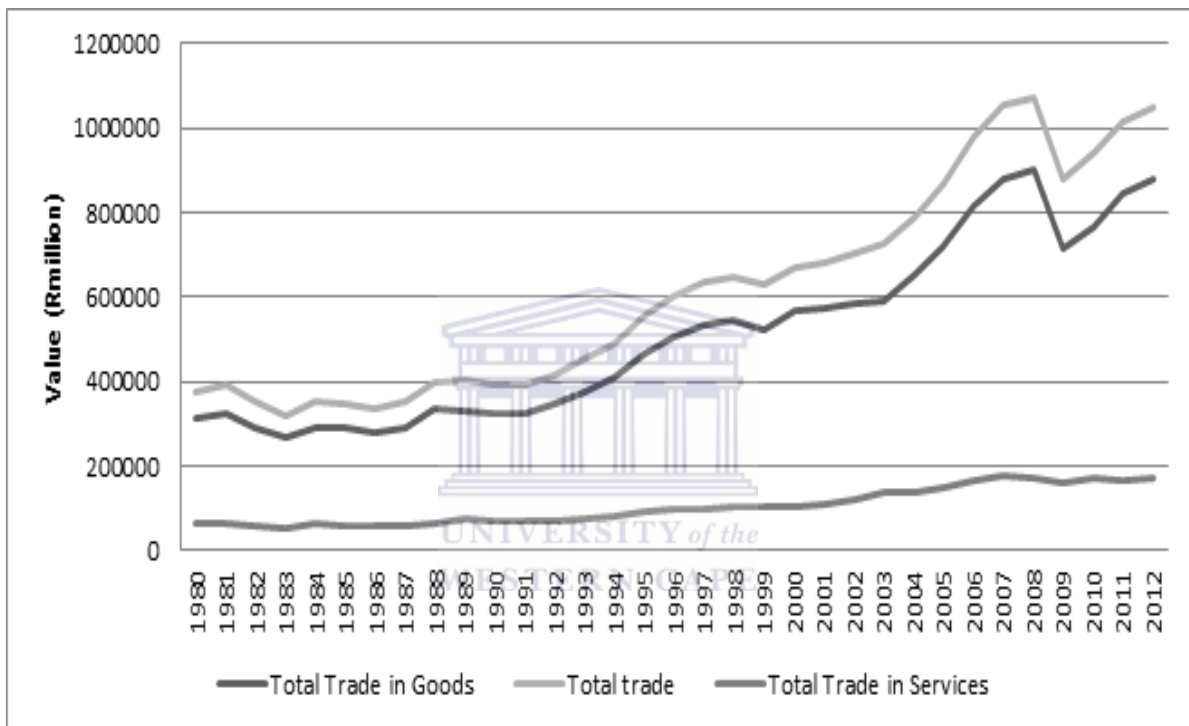
Source: SARB Quarterly Bulletin

Figure 5.2: South Africa's Services Trade as a Percentage of Total Trade (in real terms)
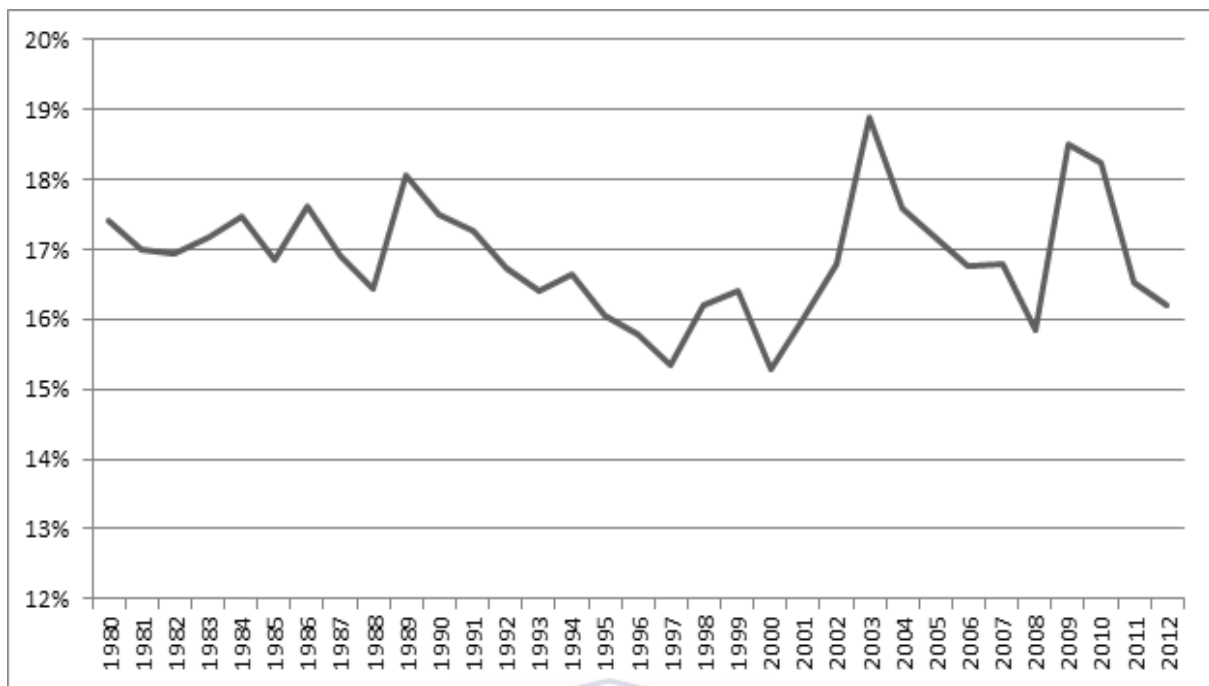
Source: SARB Quarterly Bulletin

South Africa's real trade in services has experienced fluctuating fortunes over the past three decades. As Figure 5.3 depicts, real trade in services experienced negative growth in 1982 and 1983, saw rapid positive growth in 1984, and swung again to negative growth in 1985. During the late 1980s real services trade growth improved, being driven in part by the export expansion initiative which was aimed at mitigating the capital account deficit at the time.

As uncertainties concerning negotiations for the first democratic elections escalated in 1990, economic activities were hampered. As a result real services trade growth shrank around that period. Once calm was achieved in the political environment from 1992 onwards, trade in services started growing again at a positive rate. In the mid-1990s and early 2000s, the growth rate of real trade in services fluctuated until it peaked in 2003. The growth rate remained positive for the rest of the period except in 2008 – 2009 and 2011 because of the effects of the global financial crisis and the Eurozone crisis respectively. The next section deals with South Africa's real export and real import of services, focusing on net exports as well as the categories of services that make up total exports and total imports.

Figure 5.3: Growth of South Africa's Services Trade (in real terms)
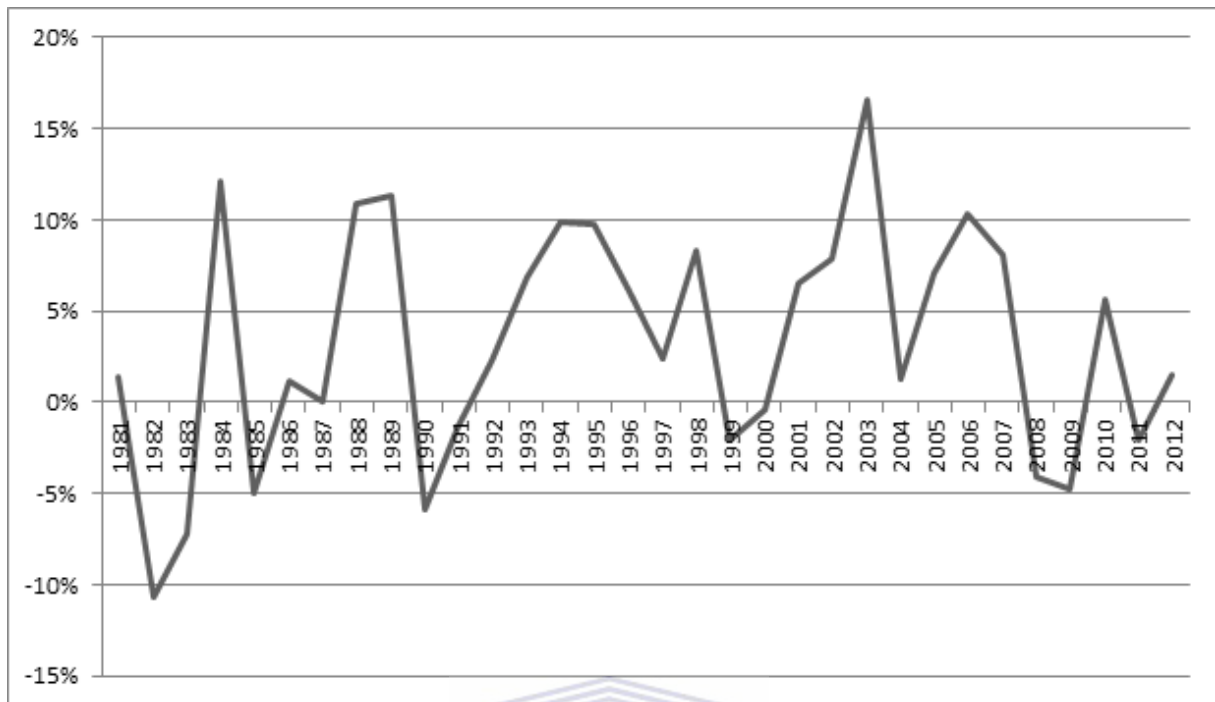
Source: SARB Quarterly Bulletin

5.2.2 South Africa's Export and Import of Services

The majority of South Africa's total exported services are made of goods. As a result the export of services accounts for an average of only 14 percent of total exports as depicted in Figure 5.4. Just as in the case of exports, total South African imports are dominated by goods. The imports of services accounts for an average of 20 percent of total South African imports of goods and services, as indicated in Figure 5.5.

Figure 5.4: Percentage of Export of Goods and Services in Total Export (in real terms)
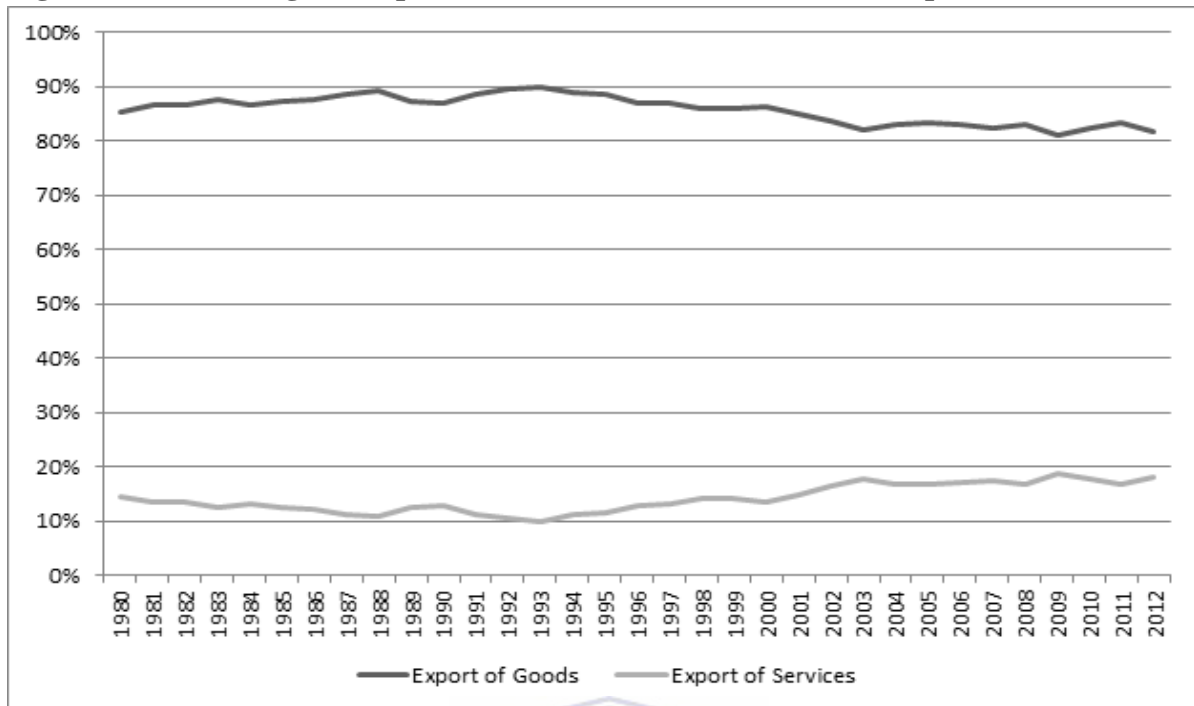
Source: SARB Quarterly Bulletin

Figure 5.5: Percentage of Import of Goods and Services in Total Export (in real terms)
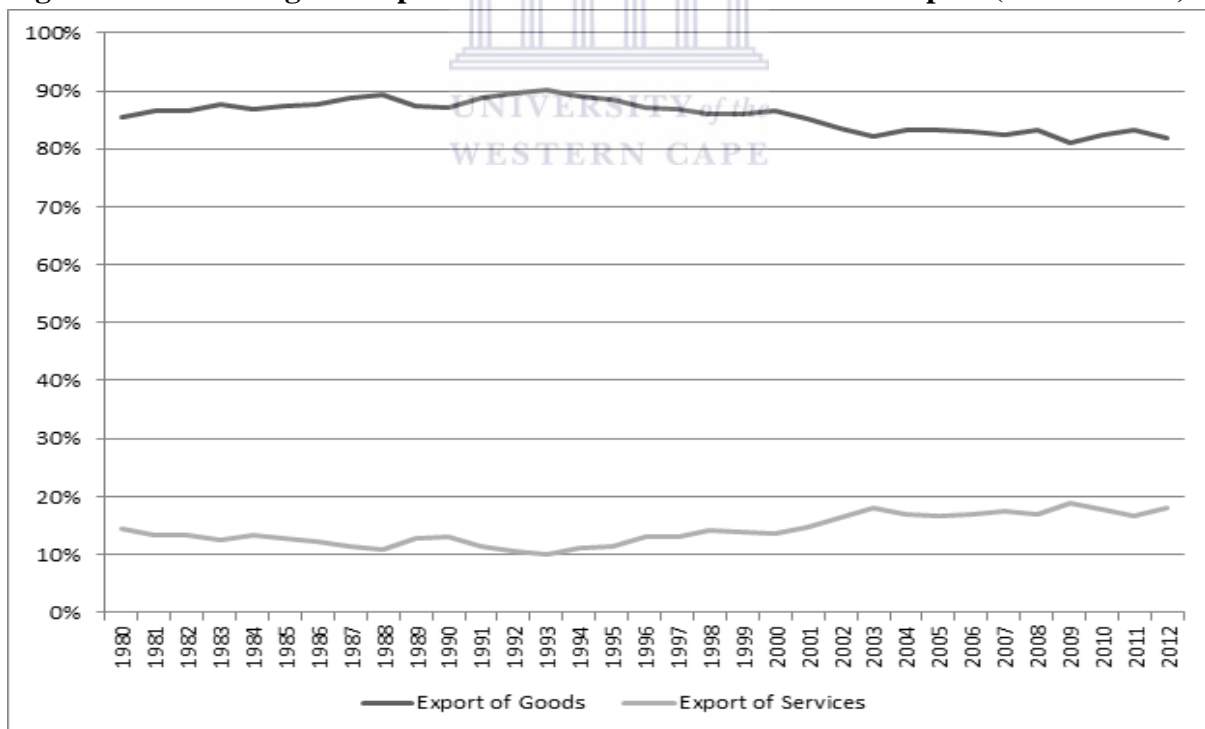
Source: SARB Quarterly Bulletin

South Africa can be regarded as a net importer of services. As indicated in Figure 5.6, real import of services exceeded real export of services for almost the entire period under consideration, except from 2001 to 2003. This trend can be explained in part by the fact that

the South African labour market is characterised by a shortage of skilled labour. Therefore the economy relies on external sources for certain services that require highly skilled labour.

Figure 5.6: South Africa's Net Export of Services (in real terms)
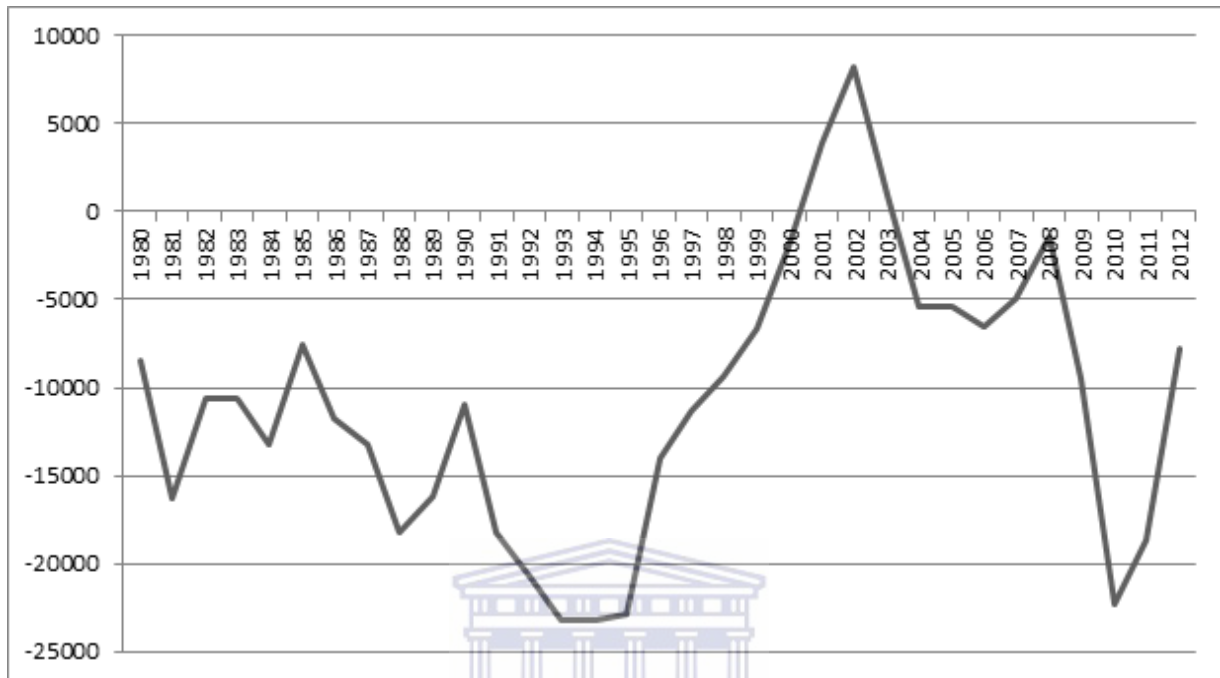
Source: SARB Quarterly Bulletin

The sub-categories of services that make up the total of the two components of net export of services, exports and imports, are presented in Figures 5.7 and 5.8 respectively. With regards to the export of services, travel services constitute over 60 percent of all the services that South Africa exports. The second largest category of South Africa's total export of services is transport services, constituting over 10 percent. While the share of travel services has been increasing since 2000, the share of transport services has been on the decline, as shown in Figure 5.7. Apart from travel services and transport services, other business services and financial services are the next major components of South Africa's total export of services. These are followed by insurance; computer and information; royalties and licence fees; communication; personal, cultural and recreation; and construction services.

Figure 5.7: South Africa's Export of Commercial Services
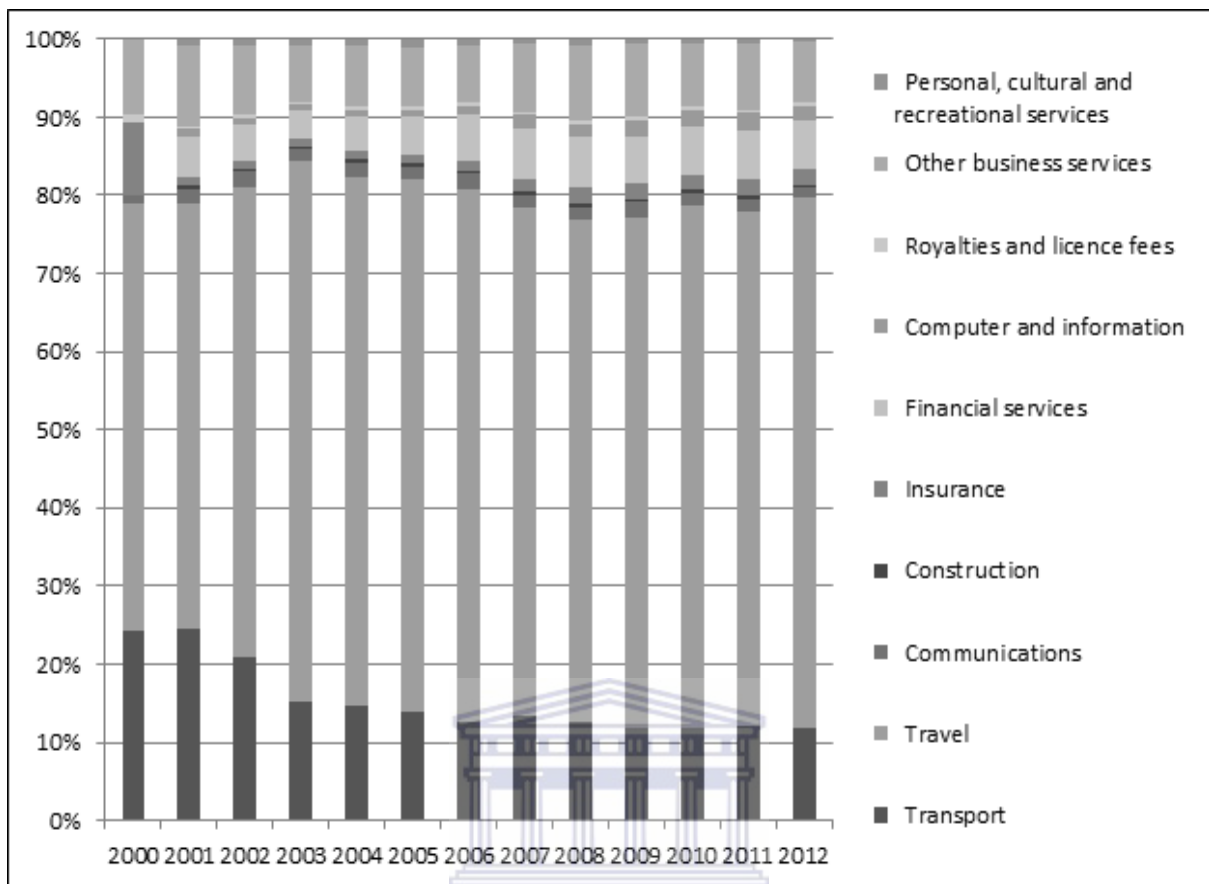
Source: UNCTADSTAT

With respect to the import of services, South Africa imports more transport services than any other services. Transport services make up over 50 percent of total imported services, followed by travel services, which represent over 20 percent total import of services. Royalties and licence fees, and other business services constitute the second and third largest components respectively of South Africa's total import of services. The other sub-categories of South Africa's total imported services, in order of magnitude, are insurance; communication; financial; computer and information; personal, cultural and recreational; and construction services.

Figure 5.8: South Africa's Import of Commercial Services
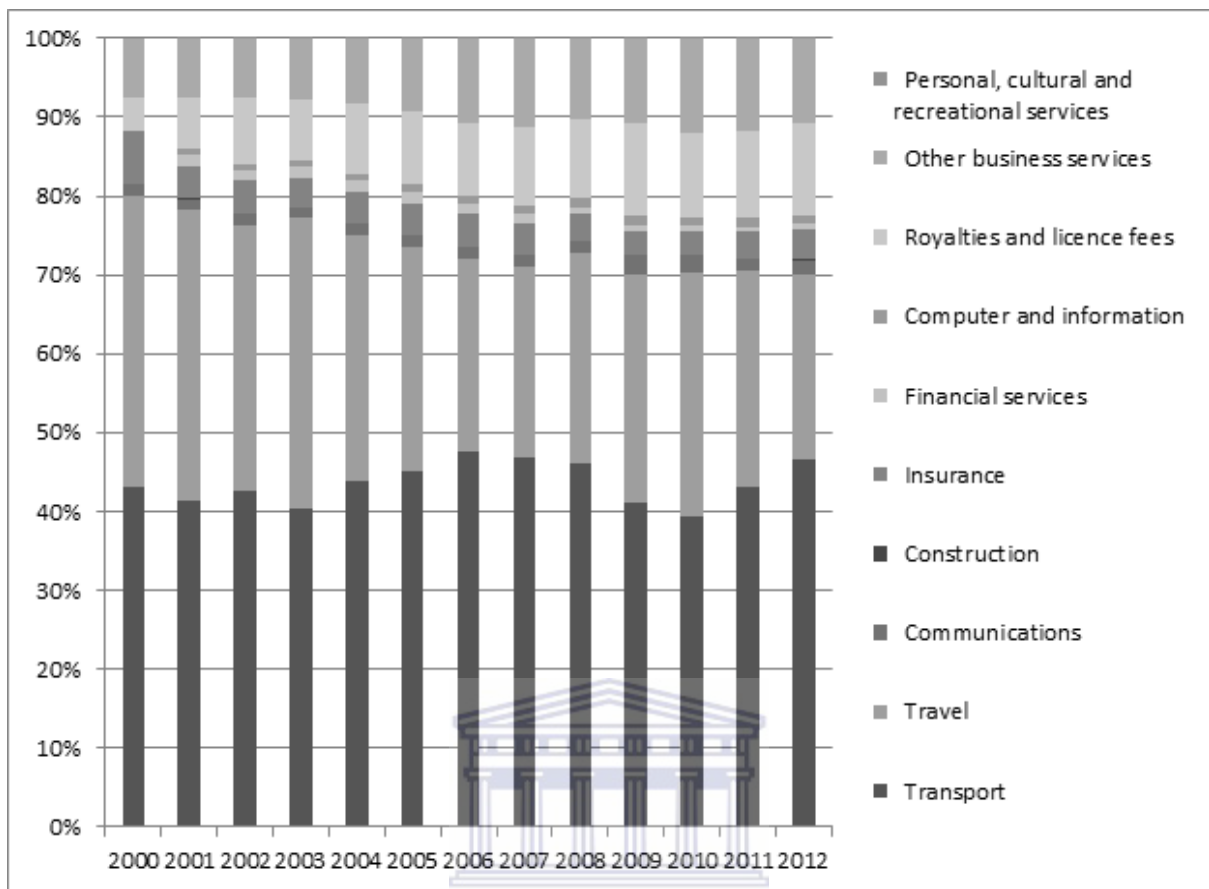
Source: UNCTADSTAT

5.3 Empirical Results

This section reports the outcome of the econometric approach to determining the impact of services trade on South Africa's economic growth over the period of 1980 to 2012. The empirical results for the two models specified in Chapter Four are presented after testing for cointegration. Before presenting the results of the models, all variables are initially tested to determine whether they are stationary or non-stationary using the ADF unit root test. The aim of unit root testing is to avoid spurious regression.

5.3.1 Results of Unit Root Test

Testing for the presence of a unit root is necessary, because it assists in determining the order of integration of all the variables this study uses. As emphasised in section 4.5.3.1.1, this study adopts the ADF test to check whether or not each variable has a constant mean and variance over time. The ADF unit root test analyses whether the variables are stationary either in their levels or first difference forms. The stationarity of all the variables of the study

are first tested at no intercept and trend, then at intercept only, and finally at intercept and trend. The optimal lag length is chosen based on the Schwarz Information Criterion.

In the ADF test, the null hypothesis that the variables have unit roots is tested against the alternative hypothesis that they do not have unit roots. The ADF test statistic value for each variable is computed using EViews. The computed ADF test statistic values for the variables are then analysed in relation to the critical values. Both the ADF test values and the critical values must be negative. If the computed ADF test value in absolute terms for any particular variable exceeds the absolute critical value, the null hypothesis that the variable has a unit root is rejected. The rejection of the null hypothesis implies that the variable is stationary. Alternatively, if the ADF test value is less than the critical value in absolute terms, we fail to reject the null hypothesis. Failing to reject the null hypothesis implies that the variable has a unit root and is therefore considered to be non-stationary.

As shown in Table 5.1, none of the variables is stationary in their level form, as the estimated ADF test values do not exceed the critical value at the 5 percent level of significance. However, in their first difference forms, the absolute ADF test values for all the variables are greater than the absolute critical value at the 1% level of significance. Hence, one can reject the null hypothesis of the presence of unit roots after first differencing the non-stationary variables. On basis of these results, all the variables are deemed satisfactory to be used to determine the impact that the export and import of services have on South Africa's economic growth. The next section discusses the regression results of the two specified models of this study.

Table 5.1: Augmented Dickey-Fuller Test Results

Variables in levels				
Variable	**ADF Test value**			**Conclusion**
	No Intercept and Trend	**Intercept**	**Intercept and Trend**	
InGDP	2.632564(0.9999)	1.438517(0.9991)	-1.980417(0.6059)	Non-stationary
InGFK	0.816870(0.8870)	-0.330942(0.9159)	-1.066169(0.9299)	Non-stationary
InLBR	1.394004(0.9588)	-0.312134(0.9188)	-1.210776(0.9037)	Non-stationary
EXPS/GDP	3.039555(0.9994)	1.308918(0.9986)	-1.957848(0.6182)	Non-stationary
EXPG/GDP	2.812968(0.9988)	1.144813(0.9977)	-2.425502(0.3648)	Non-stationary
IMPS/GDP	3.035148(0.9994)	0.824810(0.9942)	-1.894574(0.6517)	Non-stationary
QMPG/GDP	2.662206(0.9981)	1.162310(0.9978)	-1.933835(0.6311)	Non-stationary
Variables in first difference				
	No Intercept and Trend	**Intercept**	**Intercept and Trend**	
ΔInGDP	-2.283780(0.0222)	-3.496085(0.0097)	-4.122491(0.0077)	Stationary
ΔInGFK	-3.335839(0.0010)	-3.431824(0.0116)	-3.753834(0.0223)	Stationary
ΔInLBR	-11.05237(0.0000)	-11.16905(0.0000)	-11.18857(0.0000)	Stationary
ΔEXPS/GDP	-4.255804(0.0000)	-5.421001(0.0000)	-5.815585(0.0000)	Stationary
ΔEXPG/GDP	-8.449751(0.0000)	-8.251024(0.0000)	-8.512383(0.0000)	Stationary
ΔIMPS/GDP	-3.922443(0.0001)	-9.479767(0.0000)	-9.745025(0.0000)	Stationary
ΔIMPG/GDP	-9.036041(0.0000)	-9.368215(0.0000)	-5.624975(0.0000)	Stationary

Values in parenthesis indicate p-values while those without parenthesis show t-statistics.
Δ denotes first difference.

5.3.2 Results for Service Trade-Growth Nexus

This section discusses the empirical results for the two equations specified in sections 4.3.1 and 4.3.2. The estimated regression output presented in this section will help to determine how services trade impact on the growth of total factor productivity. The first step in estimating the results involves the determination of any possible equilibrium relationship among the variables in the long run using the Engle Granger method. After an equilibrium relationship has been established, the next step is to estimate an ECM to determine the short-run relationship among the variables. As has already been emphasised in Chapter Four, the analysis will be broken down into export of services and import of services to determine their

separate impact on economic growth. The regression results regarding the assessment of how the export and import of services affect South Africa's economic growth are discussed in subsections 5.3.2.1 and 5.3.2.2 respectively.

5.3.2.1 Export of Services and Economic Growth

Since the EG method has been chosen for this study, we proceed with the estimation of an OLS regression of equation 4.5 and then subject the residuals of the regression to unit root testing using the ADF test. The aim of the unit root test is to check the stationary property of the residuals. The statistical value of the ADF test of the residuals is computed and compared with the estimated Mackinnon[17] critical values. If the absolute ADF test value of the residuals exceeds the absolute Mackinnon critical value, the residuals are said to be stationary and the null hypothesis of no cointegration is rejected. When the null hypothesis is rejected, it implies that the residuals are stationary and as such the endogenous variable and the exogenous variables cointegrate. On the other hand, if the absolute value of the ADF test is less than the absolute Mackinnon critical value, we can then fail to reject the null hypothesis and conclude that there is no cointegrating relationship.

The nature of the results in Table 5.2 is an indication that the variables in the model are cointegrated. This is because the ADF test value of the residuals (ECT1) is greater than the Mackinnon critical value in absolute terms at the 1 percent level of significance. We therefore reject the null hypothesis of no cointegrating relationship and conclude that the variables converge in the long run.

Table 5.2: Cointegration Test Results

Residual	ADF Test Statistics Value	Mackinnon Critical Value			Conclusion
		1%	5%	10%	
ECT1	-5.068939 (0.0000)	-4.782910	-4.182639	-3.874304	Cointegrated

Even though the individual variables are non-stationary, as explained in section 5.3.1, the fact that they converge towards a long-run equilibrium implies that a meaningful conclusion can be made about their long-run relationship. The long-run estimates for equation 4.5 are presented in Table 5.3.

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[17] See appendix for the calculation of the Mackinnon critical values.

Table 5.3: Estimates of the Long-run Effect on Economic Growth

Dependent variable: InGDP

Variable	Coefficient
InGFK	0.02 (0.6120)
InLBR	0.07 (2.2882)***
EXPS/GDP	8.04 (8.6352) ***
EXPG/GDP	1.19 (7.6056)***
CONSTANT	12.31 (53.9354)***

Values in parenthesis indicate t-statistics. *** implies a level of significance at 1% while ** and * indicate significance levels of 5% and 10% respectively.

The long-run coefficients of all the variables have the expected signs. The results presented in table 5.3 suggest that gross fixed capital formation does not have a significant long-run relationship with the real GDP growth. Labour on the other hand has a significant positive relationship with the growth of real GDP. The labour parameter is significant at the 1 percent statistical level. Assuming all other variable are held constant, a 0.07 percent increase in real GDP growth can be achieved by increasing labour by 1 percent. The export of both goods and services also affects economic growth positively in the long run. A significant part of the literature reviewed in section 3.4.1.1 emphasised that exports and economic growth have a positive relationship.

When we disaggregate South Africa's export of services into some of its major categories, we find that the export of financial and insurance services have a significant long-run relationship with economic growth. These two categories of services are deemed as knowledge-intensive and have a higher level of interdependence with the rest of the economy (Gabriele, 2003: 21). The export of transport and other business services, on the other, have a negative relationship with the growth of real output while the export of travel services does not significantly affect real GDP growth in the long-run.

Table 5.4: Estimates of the Long-run Effect on GDP Using Services Categories

Dependent variable: InGDP

Variable	Coefficient
InGFK	0.16**
InLBR	0.05
EXPG/GDP	0.64***
TRAVEL_EX/GDP	1.33
TRANSP_EX/GDP	-31.14***
OTHERBUS_EX/GDP	-27.37***
FIN_EX/GDP	43.18**
INSUR_EX/GDP	104.29**
CONSTANT	11.11***

*** *implies a level of significance at 1% while ** and * indicate significance levels of 5% and 10% respectively.*

The next step after confirming the presence of a long-run relationship amongst the variables is to analyse the short-run relationship by estimating an ECM as discussed in section 4.5.3.2. In order to estimate the ECM, the variables in equation 4.5 are transformed into their first difference forms. The lag of the residuals from the long-run equation is also included as one of the regressors. The ECM can be expressed as:

$$\Delta InGDP = \beta_0 + \beta_1 \Delta InGFK + \beta_2 \Delta \text{In}LBR + \beta_3 \Delta EXPS/GDP + \beta_4 \Delta EXPG/GDP + \beta_5 ECT3_{t-1} + \varepsilon \underline{\hspace{2cm}} 5.4$$

Where Δ denotes first difference,

ECT1$_{t-1}$ is the lag of the error term from equation 4.5,

All the other variables are as defined in section 4.3.1.

The estimated ECM results regarding the impact that the export of services has on South Africa's economic growth are reported in Table 5.5. The adjusted R-squared value of 0.40 shows that the independent variables explain about 40 percent of the variability in South Africa's short-run economic growth. Adjusted R-square is defined as the coefficient of determination which has been adjusted to reflect the degrees of freedom (Gujarati, 2004: 217). It measures the percentage of the variations in the endogenous variable which can be attributed to the independent variables. An adjusted R-squared value close to 1 implies that

the regressors together explain a greater percentage of the variations in the dependent variable.

The model's diagnostic tests to check serial correlation and heteroscedasticity do not indicate any cause for concern. With regards to the Breuch-Godfrey serial correlation test, the null hypothesis to be tested is that the residuals are not serially correlated. The null hypothesis is rejected if the estimated chi-square value is greater than the critical chi-square value at the appropriate significance level. The computed Breuch-Godfrey test chi-square value is less than the critical chi-square values at either the 5 percent or 10 percent level of significance. We therefore fail to reject the null hypothesis and conclude that the residuals are not serially serial correlated.

White's general heteroscedasticity test is used to check if the residuals are homoscedastic or heteroscedastic. Homoscedastic or constant variance of the residuals is one of the assumptions of the classical linear regression model (Gujrati, 2004: 387). In testing for heteroscedasticity (non-constant variance), the null hypothesis of no heteroscedasticity is evaluated. If the chi-square value that is derived from the White test exceeds the critical chi-square value at the appropriate statistically significant level, it can be concluded that heteroscedasticity is present. On the other hand, there is no heteroscedasticity present if the computed chi-square value is less than the critical chi-square value. The White test therefore indicates that the residuals are not heteroscedastic, since the computed chi-square value of 17.7824 does not exceed the critical chi-square value at either the 5 percent or 10 percent level of significance.

The error-correction term (ECT) determines how far away the system is from its long-run equilibrium. The coefficient of the error-correction term is therefore a measure of the speed of adjustment. It must have a negative sign to indicate that the system can return to equilibrium. From the regression results, the coefficient has a negative sign and it is statistically significance at the 1 percent level which implies that the system is quick to return to long-run equilibrium. The estimated equilibrium correction coefficient is -0.31. After the shock of the previous quarter, there is only about a 31 percent convergence in the current quarter back to the long-run equilibrium.

The estimated coefficients of gross fixed capital formation indicate that the variable influence economic growth positively in the short run. The coefficient of gross fixed capital formation statistically significant at the 1 percent. Labour, however, does not have a statistically

significant impact on the growth of GDP in the short-run. The export of goods has a positive short-run impact on economic growth and the impact is statistically significant at the 1 percent level. Unlike in the case of goods, the export of services negatively affects South Africa's economic growth at the 10 percent level of significance.

This result indicates that in spite of the global rise of services trade, service exports tend have an adverse impact on South Africa's economic growth. A contrary conclusion was documented in a study conducted by Gabriele (2003). In an attempt to analyse the relationship economic growth and the export of services in developing countries, the study by Gabriele (2003: 20) revealed that the export of services does not significantly affect developing countries' economic growth. The adverse impact of the export of services parameter on economic growth can be explained by the following factors.

South Africa's trade policy has in the past accorded priority to the expansion of manufacturing exports at the neglect of export of services. Grater (2011: 3) emphasises that there is no services export promotion strategy in the South African export promotion framework. The omission of services in the formulation of export strategies means that South Africa's trade policy is not able to stimulate the growth of services exports. This partly explains the adverse contribution that services exports make to the growth of the South African economy relative to the contribution from the export of goods.

Another possible reason why the export of services adversely affect the growth of the South African economy in the short-run could be because South Africa does not have a comparative advantage in services. Labour plays a key role in services trade. However, the South Africa labour market is generally characterised by the shortage of skilled labour which could be detrimental to competitiveness in the global market.

Table 5.5: Error-Correction Model Estimates

Dependent variable: ΔlnGDP

Variable	Coefficient	t-Statistic	P-Value
ΔlnGFK	0.32	6.6667	0.0000
ΔlnLBR	0.02	0.3589	0.7203
ΔEXPS/GDP	-1.67	-1.6791	0.0956
ΔEXPG/GDP	0.70	3.0291	0.0030
ECT3(-1)	-0.31	-4.5400	0.0000
CONSTANT	0.003	1.5051	0.1348

Adjusted R-squared	0.400834
White test - χ^2 (20)	17.7824
Breuch-Godfrey test - χ^2 (1)	1.586940

The critical values of the chi-square distribution for the White test are 31.41 and 28.41, representing 5% and 10% level of significance respectively. The critical chi-square values for the Breuch-Godfrey test are 3.84 and 2.71 at 5% and 10% level of significance respectively.

5.3.2.2 Import of Services and Economic Growth

Just as was done for the first model, the unit root property of the residuals is analysed to determine whether the residuals are stationary or non-stationary. The results presented in Table 5.6 points to the direction that the variables in equation 4.7 are cointegrated. This is because the ADF test value of the residuals (ECT2) exceeds the Mackinnon critical in absolute terms value at the 5 percent level of significance. We therefore reject the null hypothesis of no cointegrating relationship and conclude that the variables converge in the long-run relationship. The nature of the long-run relationship amongst the variables in equation 4.7 is presented in Table 5.7.

Table 5.6: Cointegration Test Results

Residual	ADF Test Statistics Value	Mackinnon Critical Value			Conclusion
		1%	5%	10%	
ECT2	-4.308562 (0.0000)	-4.782910	-4.182639	-3.874304	Cointegrated

Table 5.7: Estimates of the Long-run Effect on Economic Growth
Dependent variable: InGDP

Variable	Coefficient
InGFK	-0.01 (-0.4974)
InLBR	-0.01 (-0.4168)
IMPS/GDP	12.85 (10.9180) ***
IMPG/GDP	0.17 (0.7321)
CONSTANT	12.99 (52.3701)***

Values in parenthesis indicate t-statistics. *** implies a level of significance at 1% while ** and * indicate significance levels of 5% and 10% respectively

Unlike in the first model, the long-run relationship between real GDP growth and gross fixed capital formation becomes insignificant in the current model. Labour and the export of goods also have an insignificant long-run relationship with the growth of real output. In the long-run the import of services and economic growth are significantly related. The import of services is therefore the only variable which has a significant long-run relationship with real GDP growth in this model.

At the disaggregated level, using the major categories of services that South Africa imports, we find that transport, travel and insurance services affect real GDP growth positively in the long-run. Royalties and licence fees as well as other business services, on the other hand, do not have a significant relationship with real output growth.

Table 5.8: Estimates of the Long-run Effect on GDP Using Services Categories
Dependent variable: InGDP

Variable	Coefficient
InGFK	0.02
InLBR	0.09[*]
IMPG/GDP	0.25
TRAVEL_IM/GDP	17.06[***]
TRANSP_IM/GDP	14.80[***]
OTHERBUS_IM/GDP	-1.52
ROYALTIES_IM/GDP	-3.41
INSUR_IM/GDP	21.33[*]
CONSTANT	12.14[***]

*** ** and * implies a level of significance at 1%, 5% and 10% respectively.

Having identified that the variables have a long-run relationship, the next step is to estimate an ECM to analyse the short-run relationship. As defined in section 4.5.3.2, estimating the ECM involves differencing all the variables in the long-run equation (equation 4.7) as well as including the lag of the residuals from the regression of equation 4.7. The ECM can be expressed as:

$$\Delta InGDP = \beta_0 + \beta_1 \Delta InGFK + \beta_2 \Delta \text{In}LBR + \beta_3 \Delta IMPS/GDP + \beta_4 \Delta IMPS/GDP_{t-1}$$
$$+ \beta_5 \Delta IMPG/GDP + \beta_6 \Delta IMPG/GDP_{t-1} + \beta_7 ECT2_{t-1} + \varepsilon _____ 5.2$$

Where Δ denotes first difference,

$ECT2_{t-1}$ is the lag of the error correction term,

All the other variables are as defined in section 4.3.2

The estimated ECM results, which show the effect that imported services have on South Africa's economic growth, are reported in Table 5.9. The lagged values of the import of services and the import of goods are included in the regression, since the diffusion of technology through imports may take more than just one period to materialise. It is possible that imports in a particular period may have an impact on growth in a subsequent period.

The adjusted R-squared value of 0.34 signifies that the regressors together explain approximately 34 percent of the variability in South Africa's economic growth. The model's diagnostic tests for serial correlation and heteroscedasticity do not indicate any cause for concern.

With regards to the Breuch-Godfrey serial correlation test, the computed chi-square value is less than the critical chi-square value at either 5% or 10% level of significance. We therefore fail to reject the null hypothesis and conclude that the residuals are not serially correlated.

The White heteroscedasticity test indicates that the error term is not heteroscedastic, since the estimated chi-square value of 3.7910 does not exceed the critical chi-square value at either the 5% or 10% level of significance.

Also, the significant negative coefficient of the error-correction term, which measures the speed of adjustment, is an indication that the system is quick to return to its equilibrium position. The estimated equilibrium correction coefficient is -0.28, which indicates that 28 percent of the disequilibrium in the previous period converges back to the long-run equilibrium in the current period.

The short-run regression estimates indicate that gross fixed capital formation has a positive influence on South Africa's real GDP growth and the relationship is statistically significant at the 1% level. Labour, on the other hand, does not have a significant short-run impact on the growth of real output. The import of goods together with it lagged values do not significantly affects South Africa's real GDP growth in the short run. On the contrary, both the current and previous period's import of services affect the growth of real output positively and in a statistically significant manner in the short-run. This result gives credence to the importance of imported services in relation to the international diffusion of technology. However, the result differs from that of the study by Li et al. (2003), who found that the impact of imported services on growth is significantly negative in developing countries.

The significant positive impact of the import of services can partly be explained by the fact that imported services create an essential channel for the flow of foreign technology into the South African economy. Such technology transfer enhances productivity and thus enhances the real output growth. Moreover, some of the imported services also constitute important inputs in the production process. Services such as financial, communication and IT services act as intermediate inputs and thereby facilitate other economic activities (Li et al., 2003: 6).

Table 5.9: Error-Correction Model Estimates

Dependent variable: ΔInGDP

Variable	Coefficient	t-Statistic	P-Value
ΔInGFK	0.29	5.4068	0.0000
ΔInLBR	-0.01	-0.2074	0.8361
ΔIMPS/GDP	5.33	2.8667	0.0049
ΔIMPS/GDP$_{t-1}$	3.97	2.1018	0.0376
ΔIMPG/GDP	0.06	0.2202	0.8261
ΔIMPG/GDP$_{t-1}$	-0.30	-1.2743	0.2050
ECT4(-1)	-0.28	-4.3882	0.0000
CONSTANT	0.001	0.5658	0.5726
Adjusted R-squared	0.340385		
White test - χ^2 (7)	3.790958		
Breuch-Godfrey test - χ^2 (1)	3.256590		

The critical values of the chi-square distribution for the White test are 11.07 and 9.24, representing 5% and 10% level of significance respectively. The critical chi-square values for the Breuch-Godfrey test are 3.84 and 2.71 at 5% and 10% level of significance respectively.

5.4 Summary and Conclusion

This chapter presented the empirical findings regarding the growth-inducing impact of services trade on South Africa's economy. Both the export and the import of services have a significantly positive long-run relationship with real GDP growth. In the short-run, the export of services has a significant negative impact on South Africa's real output growth. This is because South Africa's services sector has been neglected in export promotion strategies. Also, it is likely that South Africa does not have a comparative advantage in services trade. The import of services contributes positively to the growth of real output in the short-run. This is an indication that the transfer of technology and the provision of intermediate inputs into the domestic economy, usually associated with the import of services, hold for South Africa.

CHAPTER SIX: CONCLUSION

6.1 Introduction

The study set out to evaluate the impact of services trade on South Africa's economic growth. In doing so, both the empirical and the theoretical literature on the subject were reviewed. The services sector in general plays a key role and makes an important contribution to gross domestic product (GDP) for most countries. Just as services such as financial and IT services are crucial for economic development, so health, education and sanitation services are major components of social development. As emphasised in Chapter Two, services were previously regarded as non-tradable mainly because of their non-storability and intangibility properties, but in the last two decades the services trade has been a growing component of international trade. The rise in services trade coincided with massive improvements in ICT and was further accelerated after the guidelines for services trade were formulated during trade discussions in the Uruguay Round.

In spite of the global surge in services trade, South Africa's trade in services has not seen any significant change since the early 1980s. From 1980 to 2012 the share of services trade in total trade ranged between 15 percent and 19 percent. A possible explanation for this is the fact that South Africa is a commodity-based economy and as such it is expected that the country's trade will be dominated by goods rather than services. Regardless of the relatively small share of services in South Africa's total trade, trade in service can still have an impact on growth.

The contribution of services trade to economic growth can stem from both the export and the import of services. While being a net exporter can generate foreign reserves to boost investment, the import of services can also ensure effective competition and improved efficiency as well as an increase the scale of activities. Moreover, growth within the service sector can ensure economy-wide growth through the sector's backward and forward interdependence with other sectors of the economy.

This study was designed to answer two fundamental questions, namely
(1) What effect does the export of services have on South Africa's economic growth?
(2) How does the import of services influence the growth of real output within the South Africa's economy?

In undertaking the empirical analysis, two models were estimated using data from the first quarter of 1980 to the fourth quarter of 2012. The estimation of the models was based on the aggregate production function framework. The OLS approach was used to estimate the coefficients of the variables of interest, while the Engle Granger method was adopted to determine the nature of the long-run relationship between the variables. The result of the study proved to be robust after subjecting the models to various residual diagnostic tests, namely serial correlation and heteroscedasticity.

The remainder of the chapter is set out as follows. Section 6.2 provides a synthesis of the main empirical findings of the study in relation to the research questions. The findings of this study also suggest other related areas for future research. Section 6.3 highlights some of the other areas of South Africa's international trade in services that can be the focus of future research.

6.2 Summary of the Main Empirical Findings

The major findings of the study are outlined in Chapter Five. The aim of this section is to synthesise the study's main empirical findings in relation to the two research questions. The next two sub-sections will deal with export of services and import of services respectively.

6.2.1 Export of Services and its Impact on Economic Growth

South Africa's exported services accounts for about 14 percent of the total export of goods and services. This is an indication that the country's exports are dominated by goods. South Africa's services trade data also show that the country is a net importer of services. The abundance of natural resources and the scarcity of skilled labour can be regarded as possible explanations for the relatively lower share of services in South Africa's total exports.

The empirical results of the study demonstrate that there is a positive long-run relationship between South Africa's export of services and the growth of real GDP. However, South Africa's export of services has a negative impact on real GDP growth in the short run which suggests that in spite of the potential for growth that international trade in services offers, South Africa is yet to make any significant short-run gains from services trade. The result defers from the findings of Gabriele (2003), who found that the growth-enhancing impact of services exports is weaker or statistically insignificant in developing countries.

Several explanations can be offered for the negative growth-enhancing impact of exported services on South Africa's economic growth. South Africa's export of services is poorly integrated with the country's overall trade promotion framework. Grater (2011: 3) points to the absence of an export promotion strategy for services in South Africa's overall export promotion framework. Moreover, South Africa relies mainly on commodity and manufacturing exports to put its economy on the path of growth. This means that the export of services is accorded less relevance in the country's framework of overall growth-maximising strategy and policy. Also, South Africa may not have the comparative advantage to export services.

6.2.2 Import of Services and its Effect on Economic Growth

The import of services accounts for about 20 percent of the total imports of South Africa. Transport services and travel services respectively constitute the first and second highest categories of imported services.

The regression results indicate that the import of services and economic growth have a significant long-run relationship. Also, in the short run, the import of services has a significant positive effect on South Africa's real GDP growth. This result differs from the conclusion reached by Li et al. (2003). The previous quarter's imported services is also significantly able to influence the level of output in the current quarter. It can be inferred from the regression results that the diffusion of technology, which is usually associated with imports, is effective with regards to South Africa's import of services.

The import of services has a significant effect on economic growth partly because the import of services can influence the level of productivity and hence output expansion through efficiency gains, technology spillover and learning externalities. The importation of certain complimentary capital services and those services that are vital inputs in production can also propel an increase in the volume of real output.

6.3 Suggestions for Future Research

This study can provide the basis for further research to deepen the understanding of the reasons for the lack of a significant contribution of services trade on South Africa's economic growth. Future research can explore the factors that are responsible for the lack of a significant impact of both the export of services and the import of services on South Africa's economic growth.

Another possible area for future research is to investigate the growth-enhancing contribution of each specific services sector. It is possible that the various categories of services may affect economic growth differently. Therefore, by looking at services trade at the disaggregated level, the findings will show whether all or just some of the categories of services have an insignificant impact on South Africa's economic growth.

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APPENDICES

Appendix 1: Services Sectoral Classification List
1. Business services
      Professional Services
      Computer and Related Services
      Research and Development Services
      Real Estate Services
      Rental/Leasing Services without Operators
      Other Business Services

2. Communication services
      Postal services
      Courier services
      Telecommunication services
      Audio-visual services
      Other

3. Construction and related engineering services
      General construction work for building
      General construction work for civil engineering
      Installation and assembly work
      Building completion and finishing work
      Other

4. Distribution services
      Commission agents' services
      Wholesale trade services
      Retailing service
      Franchising
      Other

5. Educational services
      Primary education services
      Secondary education services
      Higher education services
      Adult education
      Other education services

6. Environmental services
      Sewage services
      Refuse disposal services
      Sanitation and similar services
      Other

7. Financial services

    All insurance and insurance-related services

    Banking and other financial services (Excluding insurance)

    Other

8. Health-related and social services

    Hospital services

    Other Human Health Services

    Social Services

    Other

9. Tourism and travel-related services

    Hotels and restaurants (incl. catering)

    Travel agencies and tour operators' services

    Tourist guides services

    Other

10. Recreational, cultural, and sporting services

    Entertainment services (including theatre, live bands and circus services)

    News agency services

    Libraries, archives, museums and other cultural services

    Sporting and other recreational services

    Other

11. Transport services

    Maritime Transport Services

    Internal Waterways Transport

    Air Transport Services

    Space Transport

    Rail Transport Services

    Road Transport Services

    Pipeline Transport

    Services auxiliary to all modes of transport

    Other Transport Services

12. Other services not included elsewhere
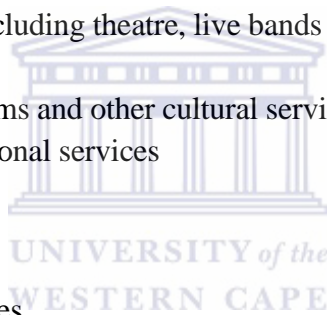
Appendix 2: Calculation of Mackinnon critical value

The Mackinnon critical value formula is given as:

$$C(p) = \emptyset_\infty + \emptyset_1 T^{-1} + \emptyset_2 T^{-2}$$

Where T is the number of observations.

There are four variables in each of the model models specified in chapter 4

Using a constant and trend model, the values of $\emptyset_\infty$, $\emptyset_1$, and $\emptyset_2$ from the Mackinnon table are as follows:

	1% level	5% level	10% level
$\emptyset_\infty$	-4.6493	-4.1000	-3.8110
$\emptyset_1$	-17.188	-10.745	-8.317
$\emptyset_2$	-59.20	-21.57	-5.19

Using the formula above, the Mackinnon critical values given four variables and 132 observations are:

Level of significance	Value
1%	-4.782910
5%	-4.182639
10%	-3.874304