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Malefa Rose Malefane  
Nicholas M. Odhiambo

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Malefa Rose Malefane  
Department of Economics  
University of South Africa  
P. O. Box 392, UNISA  
0003, Pretoria  
South Africa  
Email: [malefmr@unisa.ac.za](mailto:malefmr@unisa.ac.za)

Nicholas M. Odhiambo  
Department of Economics  
University of South Africa  
P. O. Box 392, UNISA  
0003, Pretoria  
South Africa  
Email: [odhianm@unisa.ac.za](mailto:odhianm@unisa.ac.za) /  
[nmbaya99@yahoo.com](mailto:nmbaya99@yahoo.com)

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# Impact Of Trade Openness On Economic Growth: Empirical Evidence From South Africa

Malefa Rose Malefane<sup>1</sup> and Nicholas M. Odhiambo

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## Abstract

*This paper examines the impact of trade openness on economic growth in South Africa. The study employs the autoregressive distributed lag (ARDL) bound testing approach to investigate the dynamic impact of trade openness on economic growth. Unlike some previous studies, the current study uses four proxies of trade openness, with each proxy addressing a different aspect of trade openness. The first proxy of trade openness is derived from the ratio of exports plus imports to gross domestic product (GDP). The second proxy is the ratio of exports to GDP, while the third proxy is the ratio of imports to GDP. The last proxy is an index of trade openness, which accounts for the country size and geography. Based on the long run empirical results, this study finds that trade openness has a positive and significant impact on economic growth when the ratio of total trade to GDP is used as a proxy, but not when the three other proxies are employed. However, in the short run, when the first three proxies of openness are used, the study finds trade openness to have a positive impact on economic growth, but not so when the trade openness index is employed. These results, therefore, suggest that the promotion of policies that support international trade is relevant in the South African economy.*

**Keywords:** ARDL; economic growth; exports; imports; South Africa; trade openness

**JEL Classification Code:** C13; F43 ; O40

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<sup>1</sup> Corresponding author: Malefa Rose Malefane, Doctoral Student, Department of Economics, University of South Africa (UNISA). Email address: [malefmr@unisa.ac.za](mailto:malefmr@unisa.ac.za).

## 1. INTRODUCTION

In the advent of growing international relations and economic integration, the relationship between trade openness and economic growth has become a topical debate. Over the past decades, different studies have sought to investigate the relevance and significance of trade openness on economic growth. Some of the existing studies on trade and growth find a very strong support for the proposition that trade openness has a positive impact on economic growth (Karras, 2003; Rao and Rao, 2009; Chang and Mendy, 2012). There are other studies, however, that argue that trade openness has little or no impact on growth (Eris and Ulasan, 2013; Babatunde, 2011). Then again, some studies investigating the link between trade openness and economic growth propose that trade openness has a negative impact on economic growth (Zanohogo, 2017; Adhikary, 2011; Krugman, 1994). Based on existing literature, therefore, there is no clear consensus regarding the impact of trade openness on economic growth. Moreover, previous studies also measure trade openness in several different ways based on their choice of proxies.

Against this background, the purpose of the current study is to examine the dynamic relationship between trade openness and economic growth in South Africa over the period 1975 to 2014. Following Yanikkaya (2003), this study employs trade-based measures of trade openness, which are the ratio of exports plus imports (trade) to gross domestic product (GDP), the ratio of exports to GDP, and the ratio of imports to GDP. In addition to the trade-based measures of trade openness, this study employs an index of trade openness, which sets this study apart from other previous studies on trade openness and economic growth. This trade openness index takes the country size and geography into account. The current study also takes into account the short-run and long-run

impact of trade openness on economic growth using the autoregressive distributed lag (ARDL) bounds testing approach.

The rationale behind the current study focusing on South Africa is that the country has gone through different episodes of economic reforms over the past years. Among other things, these reforms have shaped the landscape of South Africa's trade policy. As pointed out by Rangasamy (2009), South Africa's new trade policy is geared towards the implementation of outward oriented measures, which are essential in assisting the country to liberalise its trade. Therefore, given that South Africa has attempted to open up its economy to trade, the current study aims to establish whether increased trade openness has any significant impact on economic growth in the country. The empirical findings of this study also add to the existing body of literature on openness and economic growth in sub-Saharan Africa.

This paper is organised into five sections. After the introduction, Section 2 provides an overview of trade openness and economic growth in South Africa, while Section 2 reviews literature on trade openness and economic growth. Section 4 discusses the methodology used and the empirical results for the study. Section 5 concludes the paper.

## **2. TRADE OPENNESS AND ECONOMIC GROWTH IN SOUTH AFRICA: HISTORICAL OVERVIEW**

Like other economies in sub-Saharan Africa, the Republic of South Africa (RSA) has experienced transformations in its trade and growth policies over the past decades. During the early years of the past century, South Africa's trade sector was characterised by some conditions that made it difficult for local industries to find sufficient markets in the country. In particular, the local

industries experienced high costs of raw materials and skilled labour, which hindered the growth of these industries (RSA, 1912). Realising these adverse conditions, the government of South Africa, through the recommendations of the Sir Thomas Cullinan Commission, took steps to provide further protection to local industries against competition from their foreign counterparts. At that time, South Africa adopted the import-substitution industrialisation as a strategy for economic growth and development. During the early years of import substitution industrialisation, South Africa applied prohibitive rates of customs duty based on the rates set in the maximum duty column of the First Schedule to the 1925 Customs and Duty Act of South Africa (RSA, 1925). The First Schedule of the Act presented duty rates for fifteen different classes of imports consisting of goods from agriculture, manufacturing and mining sectors. The Act also made provision for some goods to be admitted free of customs duty on condition that such goods are imported for use in manufacturing industry only.

Following the implementation of the 1925 Customs and Duty Act of South Africa, the country continued with the inward-oriented strategy. This inward-oriented strategy controlled the imports mainly through the use of protectionist tariffs (Matthews, 1983). However, the use of the protectionist tariffs as the main instrument of industrial protection in South Africa lasted only until 1948. This was because in 1948, quantitative restrictions were introduced as the main instrument of industrial protection (Jenkins *et al.*, 1995). The system of quantitative restrictions involved the use of import permits as well as annual quotas for selected products. In 1949, South Africa introduced some trade reforms, following the country's new membership to the General Agreement on Tariffs and Trade (GATT). The GATT's mandate is that member countries should enter into arrangements directed to the substantial reduction of tariffs and other barriers to trade

(World Trade Organisation, WTO, 1986, p. 1). Subsequently, South Africa moved to the use of import licensing as the main instrument of industrial policy in place of tariff protection. The import licensing system seemed fit during the 1940s when South Africa was experiencing a continuing deterioration in its balance of payments. With the new system of import licensing, about three-quarters of imports to South Africa were subjected to licensing with occasional imposition of a few import quotas (Fine and Rustomjee, 1996). This system of import licensing lasted until the early 1980s.

In 1972, driven by the desire to shift away from import substitution industrialisation and towards export-oriented industrialisation, South Africa established the Commission of Inquiry into Export Trade of the Republic of South Africa – the Reynders Commission. One of the highlights of the Reynders Commission was the need for the South African economy to diversify the exports from manufactured exports into non-gold exports in general (Bell, 1992). The objective of moving the economy away from import substitution required the country to implement some new measures in its trade policy. The new measures that South Africa adopted as part of the policy shift away from the import substitution industrialisation included the relaxation of quantitative restrictions, reduction of tariffs, devaluation, and direct export promotion measures (Bell, 1997).

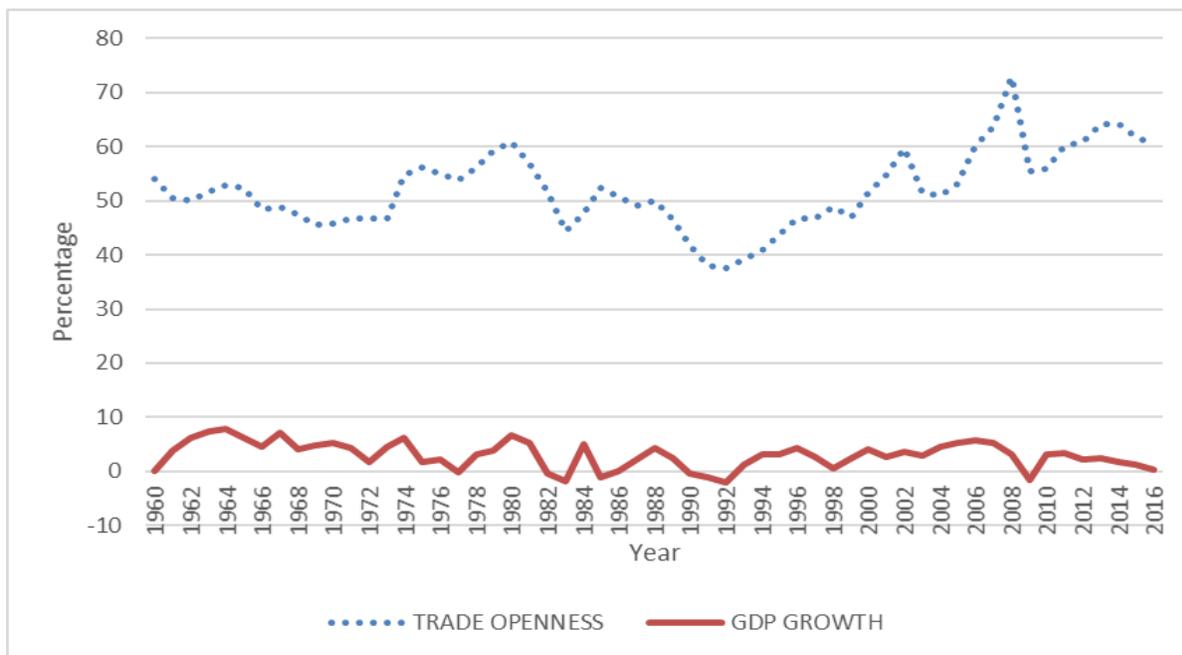
As part of the intermediate remedies to economic crises of the time, the dual exchange rate system was later introduced in South Africa in 1985. The main aim for imposing the dual exchange rate system in South Africa at that time was to separate the foreign exchange transactions of non-resident portfolio investors from all other foreign exchange transactions (Farrel, 2001). In light of deteriorating international competitiveness experienced during the 1980s together with the need to establish an employment-creating international competitiveness, South Africa recognised the need

to restructure its trade and industrial policies further, particularly with more inclination on tariff reforms and supply-side measures. Thus, with the new political dispensation commencing from 1990, the new government of South Africa aimed at economic restructuring with the emphasis on job creation and economic growth as some of the key issues (Department of Trade and Industry, DTI, 1990). Consequently, the government introduced a package of supply-side measures in view of stimulating industrial investment, job opportunities and exports.

In 1996, the Growth, Employment and Redistribution (GEAR) strategy was introduced in South Africa, with the aim to create a competitive fast-growing economy. In the medium term, some of the trade and industrial policies had to go through reforms. In the GEAR strategy, the South African government emphasised on the need for a policy shift away from the demand-side interventions such as tariffs and subsidies as these interventions were detrimental to international trade through their effect on prices received by producers (RSA, 1996, p.12). Thus, driven by the desire to achieve a stronger competitiveness of domestic industries, as well as to achieve greater export promotion, the reforms in South Africa's trade policy that took place during the 1990s can be seen as favouring export promotion. Among others, these reforms include a variety of incentives, tariff concessions, credit facilities, financial assistance, and guarantee facilities (WTO, 1998).

Figure 1 shows the trends in trade openness and economic growth in South Africa between 1960 and 2016. Trade openness is expressed as the ratio of exports plus imports to gross domestic product (GDP), while economic growth is measured by the rate of growth on the real GDP.

**Figure 1: Trends in Trade Openness and Economic Growth in South Africa, 1960-2016**



*Source: World Bank (2016)*

The trends depicted in Figure 1 show that South Africa's economic growth was exceptionally high during the 1960s, relative to where it is in the current decade. Between 1960 and 1969, economic growth reached its peak in 1964 where 7.9% growth rate was recorded (World Bank, 2016). However, South Africa's economic growth deteriorated from 5.2% in 1970 to 3.8% in 1979. By 1985, economic growth had worsened to -1.2%. Although there were some recoveries in economic growth between 1986 and 1988, a further decline in South Africa's economic growth occurred from 1989 until 1992, after which economic growth averaged 2.8% per annum (p.a.) between 1993 and 2003. Between 2004 and 2008, South Africa's economic growth improved quite significantly until a slump occurred in 2009, following the global economic recession (World Bank, 2016). In recent years, particularly during the last five years from 2012 - 2016, South Africa's economic growth has remained below 3%, with 2016 experiencing only 0.27% economic growth rate (World Bank, 2016).

Concerning trade openness, Figure 1 shows a downward trend in trade openness during the 1960s, followed by an upward trend during the 1970s. This upward trend in trade openness coincides with the period after the implementation of export promotion industrialisation in South Africa, which was incepted in 1972. South Africa's trade openness, however, declined considerably during the early 1980s and again during the early 1990s, particularly between 1990 and 1992. However, from 1993 onwards, trade openness showed a steady upward trend, reaching a peak of 72.9% in 2008. Following the decline in the world trade as a result of the 2008 global recession, South Africa's trade openness dropped sharply to 55.4% in 2009, before rising again in 2010. During the period between 2011 and 2016, South Africa's trade openness has remained slightly above 60% (World Bank, 2016).

### **3. LITERATURE REVIEW**

Before the advent of the new trade theories, some of the postulates in international trade theories were as a result of, among others, the contributions made by Ricardo, Heckscher, Ohlin and Samuelson. To start with, the Ricardian model of trade considers technological differences as the main factor causing international trade (Krugman, 1987, p. 132). In contrast, the Heckscher-Ohlin-Samuelson model attributes international trade to differences in factors endowments. Hence, the expansion of international trade opportunities is likely to support growth in labour-intensive export industries (Ahmed and Sattar, 2004, p. 1).

Even though the classical theories of international trade brought into being the models of international trade, these theories were developed under the assumption of perfect competition and constant returns to scale. By allowing for perfect competition, the gains from trade would then

result in the form of increased efficiency (Havrylyshyn, 1990). However, the validity of perfect competition of international trade models was later challenged by new theories of international trade including Krugman (1979, 1981). There are reasons why the new theories of international trade refute the idea of perfectly competitive markets. With the new theories, markets are assumed to operate under the condition of imperfect competition. This imperfect competition comes as a result of economies of scale (Krugman, 1981, p. 971). The existence of economies of scale makes it possible for countries to realise some gains from trade. These gains from trade arising from economies of scale could be in the form of increased welfare in the countries involved in trade (Krugman, 1979, p. 476).

The new theories, including the endogenous growth theory, support the view that trade openness has a positive influence on economic growth. For instance, Romer (1990) argues that free international trade tends to speed up economic growth. Within the endogenous growth framework, one of the ways through which trade openness is believed to affect economic growth is the transmission of technology (Karras, 2003). Thus, technology transfers and other factor movements are more possible in an open compared to a closed economy. Drawing on an argument from the endogenous growth theory, Adhikary (2011, p. 17) posits that trade openness may affect economic growth by facilitating flows of international capital as well as by redirecting factor endowments to more productive sectors.

Apart from facilitating factor movements and capital flows, trade openness can also affect economic growth through its effect on labour productivity and export capability. In this view, an economy that is more open to trade is inclined to have increased specialisation and division of labour, thus improving productivity and export capability (Constant and Yaoxing, 2010, p. 99). In

some cases, the connection between trade openness and economic growth has been associated with the effect of trade openness on foreign investment. In this view, it is believed that a higher degree of trade openness allows more foreign investment inflows (Osabuohien, 2007).

Because of the developments in trade and growth literature, different channels that link trade openness with economic growth have been identified. For instance, in some situations, particularly in developing countries, the act of opening up to trade through the reduction in the restrictiveness of trade regimes has resulted in rapid economic growth. This is so because the growth of developing countries in part relies on their ability to import, especially the capital goods, investment and other intermediate goods and services (Krueger, 1998). This situation offers a possible explanation to why some developing countries have, over the past decades, introduced measures that aimed at relaxing the restrictiveness of their trade regimes towards more open trade regimes. One of the arguments in favour of trade openness is that when an economy is more open to trade, the more likely it is for the national per capita income to increase. This is because increased trade openness encourages investment, which in turn leads to increased economic growth in the long run (Klasra, 2011).

In support of the evidence that trade openness plays an important role in economic growth, Wacziarg and Welch (2008, p. 1) showed that by the year 2000, 73% of world economies had opened up to international trade compared to 22% in 1960. Empirical evidence also shows trade openness does not only increase per capita income, but also assists in the attainment of steady-state convergence in income. Sachs and Warner (1997, p. 187) argued that economies that are more open to trade experience faster income convergence compared to closed economies. This difference in income convergence between open economies and closed economies arises because

of the role played by trade openness in the movement of factor endowments, particularly capital and technology. Most importantly, trade openness facilitates a faster movement of capital and technological transfers (Adhikary, 2011). Thus, the more open the economy is, the greater the ability to implement technological innovations from more productive trading partners, and hence the higher is economic growth (Karras, 2003). Eventually, the capital inflows and technological transfers become a vital channel through which trade openness impacts on economic growth.

In some cases, trade openness has been found to affect economic growth through its effect on specialisation of labour and labour productivity. For instance, Hassan (2005) argued that trade openness accelerates economic growth by increasing specialisation and productivity level. Moreover, in more open economies, labour productivity has been proven to have more impact on economic growth (Dar and Amirkhalkhali, 2010). Lastly, the other way through which trade openness affects economic growth is by allowing countries to be more internationally competitive in governance. In this regard, efforts by countries to remove barriers to international trade make it imperative for governments to also adjust services from their institutions of governance in order to enhance long-run economic growth (Skipton, 2007). Thus, as countries gain some international competition in governance, there is likelihood for increased capital inflows to occur that would drive up economic growth in the long run.

## **4. MODEL SPECIFICATION AND ESTIMATION TECHNIQUES**

### **4.1 Model Specification and Variable Description**

To estimate the impact of trade openness on economic growth in South Africa, we follow Jin (2000) for the general model specification and Yanikkaya (2003) to introduce the three trade-based

proxies for trade openness. We also incorporate the fourth proxy, which is an index of trade openness, which accounts for the effects of country size and geography.

The general empirical model that is used to test the impact of trade openness on economic growth is specified as follows:

$$GROWTH = \alpha_0 + \beta_1 OPEN + \beta_2 \frac{INV}{GDP} + \beta_3 \frac{GOV}{GDP} + \beta_4 INFL + \beta_5 \frac{M2}{GDP} + \varepsilon_t \dots \dots \dots (1)$$

where,

In equation (1), *GROWTH* is the growth rate of real GDP per capita; *OPEN* is a measure of trade openness with *GROWTH* as the dependent variable. Apart from the trade openness variable, the control variables are investment as a share of GDP (*INV/GDP*); government consumption expenditure as a share of GDP (*GOV/GDP*); inflation rate (*INF*), and the level of financial development (*M2/GDP*). The term  $\varepsilon_t$  is the error term while  $\alpha_0$  is the constant term.  $\beta_1 \dots \beta_5$  are the regression coefficients.

To arrive at the general specification of the empirical model for the current study, the following modifications were made to the Jin (2000) model: First, investment variable (*INV/GDP*) was introduced to the model. The inclusion of investment variable in the empirical model was driven by the trade-induced investment-led growth hypothesis, according to which trade may affect growth through investment channel. According to Baldwin and Seghezza (1996), increased trade openness could reduce the cost of capital thereby resulting in an increase in the demand for capital and as well as the return on investment. Subsequently, the return on investment would increase, leading to trade-induced investment-led growth. The other reason for inclusion of investment in

the current specification is that investment is considered to be one of the factors that affect economic growth in Sub-Saharan Africa (Hadjimichael and Ghura, 1995).

Apart from introducing investment variable to the model, the other modification to the original model by Jin (2000) is the inclusion of a different indicator of financial development, ( $M2/GDP$ ), in place of  $M1$ . The third modification made to the original model involves the inclusion of inflation rate ( $INFL$ ) in place of foreign shock. The inclusion of  $M2/GDP$  and  $INFL$  in the current investigation follows Bittencourt *et al.* (2015), who identified  $M2/GDP$  ratio and inflation rate as being significant factors in influencing economic growth in a group of 15 Sub-Saharan African countries that also included South Africa.

In line with Pesaran *et al.* (2001), the ARDL specification of this study is specified as follows:

$$\begin{aligned}
 \Delta GROWTH = & \alpha_0 + \sum_{i=1}^n \beta_{1i} \Delta GROWTH_{t-i} + \sum_{i=0}^n \beta_{2i} \Delta OPEN_{t-i} + \sum_{i=0}^n \beta_{3i} \Delta \frac{INV}{GDP}_{t-i} \\
 & + \sum_{i=0}^n \beta_{4i} \Delta \frac{GOV}{GDP}_{t-i} + \sum_{i=0}^n \beta_{5i} \Delta INF_{t-i} + \sum_{i=0}^n \beta_{6i} \Delta \frac{M2}{GDP}_{t-i} + \lambda_1 GROWTH_{t-1} \\
 & + \lambda_2 OPEN_{t-1} + \lambda_3 \frac{INV}{GDP}_{t-1} + \lambda_4 \frac{GOV}{GDP}_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 \frac{M2}{GDP}_{t-1} \\
 & + u_t \dots \dots \dots (2)
 \end{aligned}$$

In equation 2,  $\Delta$  is the difference operator;  $n$  is the lag length;  $GROWTH$  is the is the real GDP per capita growth rate;  $INV/GDP$  is the ratio of investment to GDP;  $OPEN$  is a measure of trade

openness;  $GOV/GDP$  is the ratio of government consumption expenditure to GDP;  $INF$  is the inflation rate;  $M2/GDP$  is a measure of financial development; and  $u_t$  is the error term.

In order to carry out the ARDL bounds testing procedure, there are two stages involved. The first stage involves the testing of cointegration relationship. The rationale behind the cointegration test at this stage is to establish whether there exists a linear combination for the nonstationary processes.

Using the parameters expressed in equation (2), it follows that the null hypothesis testing for no cointegration is given by:

$$H_0: \lambda_1 = \lambda_2 = \lambda_3 = \lambda_4 = \lambda_5 = \lambda_6 = 0$$

This is tested against the alternative hypothesis:

$$H_1: \lambda_1 \neq \lambda_2 \neq \lambda_3 \neq \lambda_4 \neq \lambda_5 \neq \lambda_6 \neq 0$$

The outcome of the cointegration test is determined by the computed F-statistic, which is compared to the critical values tabulated in Pesaran and Pesaran (2001). This F-statistic has a non-standard distribution, irrespective of whether the regressors are integrated of order zero  $I(0)$ ; or integrated of order one,  $I(1)$  (Pesaran and Pesaran 2009, p. 308). There are two sets of critical value bounds for the F-test: the first one assumes that all the variables in the ARDL model are  $I(0)$ , while the other set assumes that all the variables are  $I(1)$ . The decision to reject the null hypothesis of no cointegration is made on the basis of whether the computed F-statistic falls outside or within the critical value bounds. The second stage of the ARDL modelling involves the estimation of the coefficients of the long-run relationships as well as drawing inference on the values of the



of adjustment. This coefficient of the error correction term ( $\varphi$ ) is expected to have a statistically significant and negative value, and to be less than 1.

### ***Data Type and Sources***

In this study, economic growth is treated as the dependent variable in the growth equation, which is measured by the growth rate in real GDP per capita. In addition to the dependent variable, five independent variables are included in the growth equation for this study. These variables include trade openness, investment, government consumption expenditure, inflation rate, and financial development. Four different indicators of trade openness are used in this study, which are OPEN1, OPEN 2, OPEN 3, and OPEN 4. OPEN 1 is the ratio of exports plus imports to GDP; OPEN 2 is the ratio of exports to GDP, while OPEN 3 is the ratio of imports to GDP. OPEN 4 is the trade openness index derived from a regression equation involving per capita GDP, country size and population size following Frankel and Romer (1999) and UNCTAD (2012). In addition to the trade openness variable, there are four other explanatory variables in the empirical model. These are investment as a share of GDP (INV/GDP), government consumption expenditure as a share of GDP (GOV/GDP), inflation rate (INFL), and financial development variable (M2/GDP). The World Bank World Development Indicators (World Bank, 2016) was used as the source of data. This study uses annual time series data covering the period 1975 to 2014.

### **Estimation Techniques**

The variables were first tested for the presence of unit roots. Unit root tests allow for determining whether times series is stationary or not. If a particular series is stationary, then the mean, variance and autocorrelations can be well approximated using long-time averages based on a single set of

realisations (Enders, 2004). However, if a series is nonstationary, it will tend to drift away from its long-run mean, which could lead to inference being based on spurious results. This study employs the Dickey Fuller test with Generalised Least Squares (GLS) de-trending, Phillip-Perron test, and the Perron (1997) test. The results of these unit root tests are reported in Table 1.

**Table 1: Stationarity tests for all variables**

Variable	Dickey Fuller GLS				Phillip-Perron				Perron (1997)			
	Stationarity of all Variables in Levels		Stationarity of all Variables in First Difference		Stationarity of all Variables in Levels		Stationarity of all Variables in First Difference		Stationarity of all Variables in Levels		Stationarity of all Variables in First Difference	
	No trend	Trend	No trend	Trend	No Trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend
GROWTH	-3.870***	-4.166***	–	–	-3.873***	-3.997***	–	–	-4.664***	-4.059***	–	–
OPEN1	-1.692*	-1.910	–	-6.319***	-1.532	-1.750*	-6.469***	–	-2.687	-2.927	-6.476***	-6.321***
OPEN2	-2.228**	-2.247	–	-5.635***	-2.342	-2.304	-5.842***	-5.914***	-2.496	-3.391	-5.763***	-5.482***
OPEN3	-1.518	-1.961	-6.367***	-6.899***	-1.475	-2.108*	-6.717***	–	-3.142	-2.951	-6.872***	-7.157***
OPEN4	-2.298**	-2.642	–	-6.267***	-2.659*	-2.506*	–	–	-3.327	-3.909	-6.175***	-6.151***
INV/GDP	-1.470	-1.964	-3.803***	-4.161***	-2.058	-1.096	-3.712***	-4.258***	-3.023	-3.586	-5.290***	-5.290***
GOV/GDP	-0.758	-1.923	-4.686***	-5.548***	-1.859	-2.190	-5.903***	-5.809***	-2.415	-2.835	-6.399***	-6.295***
INFL	-1.445	-2.730	-5.650***	-5.154***	-1.486	-2.576	-8.423***	-8.887***	-4.765**	-4.719*	–	–
M2/GDP	-1.137	-1.668	-3.802***	-4.218***	-0.877	-1.899	-4.123***	-4.141***	-3.875	-3.782	-4.824**	-5.467***
INFL	-1.486	-2.576	-8.423***	-8.887***	-4.415***	-6.835***	–	–	-1.415	-2.645	-6.259***	-6.167***
M2/GDP	-0.877	-1.899	-4.123***	-4.141***	-2.298	-2.208	-4.292***	-4.439***	-2.510	-2.979	-6.378***	-6.306***

Note: \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% levels respectively

Based on the stationarity test results reported in Table 1, it can be concluded that economic growth is integrated of order zero, whereas trade openness, investment, government consumption, inflation rate, and financial development are integrated of order one. The unit root tests results further indicate that after first differencing, all the variables that were non-stationary in levels became stationary. The results, therefore, show that the variables used in the study are integrated of order zero or order one. Having confirmed the order of integration of the variables, the ARDL bounds test for cointegration was performed in order to establish if there is any long-run relationship among the variables. The results of the ARDL bounds test are reported in Table 2.

**Table 2: ARDL Bounds Test Results**

Model	Dependent Variable		Function		F-Statistic	
Model 1	GROWTH		F(GROWTH   OPEN1, INV/GDP, GOV/GDP, INFL, M2/GDP)		4.543 ***	
Model 2	GROWTH		F(GROWTH   OPEN2, INV/GDP, GOV/GDP, INFL, M2/GDP)		5.419***	
Model 3	GROWTH		F(GROWTH   OPEN3, INV/GDP, GOV/GDP, INFL, M2/GDP)		5.534***	
Model 4	GROWTH		F(GROWTH   OPEN4, INV/GDP, GOV/GDP, INFL, M2/GDP)		3.384*	
<b>Asymptotic Critical Values</b>						
Pesaran <i>et al.</i> (2001), p.300, Table CI(iii) Case III	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3.41	4.68	2.62	3.79	2.26	3.35

Note: \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% levels respectively. The reported asymptotic critical values are based on Pesaran *et al.* (2001), Table CI(iii), Case III.

The results of the ARDL bounds test for cointegration reported in Table 2 show that in all the four models of this study, the calculated F-statistics are higher than the critical value bounds at 1% level of statistical significance for Model 1, Model 2 and Model 3, and at 10% level of statistical significance for Model 4. These results lead to the rejection of the null hypothesis of

no cointegration, resulting in the conclusion that there is cointegration among the variables used in the four models. Following the cointegration test, the estimation of the long-run and the short-run coefficients for the model was carried out. The optimal lag length was determined using the Schwartz Information Criterion (SIC). The SIC selected ARDL(2, 0, 1, 2, 2, 0) for Model 1; ARDL(2, 0, 1, 2, 2, 0) for Model 2; ARDL(1, 1, 0, 0, 0, 0) for Model 3; and ARDL(1, 0, 0, 2, 0, 0) for Model 4. Table 3 reports the empirical results for the four models of this study.

**Table 3: Results of the Long-Run and Short-Run Estimations of the ARDL (All Models)**

<b>Panel 1: Long-run coefficients, Dependent variable is GROWTH</b>								
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>	
<b>Regressor</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>
OPEN	0.188* (2.037)	0.052	0.241 (1.697)	0.101	-0.006 (-0.040)	0.969	-0.034 (-0.457)	0.651
INV/GDP	-0.449** (-2.084)	0.047	-0.344 (-1.692)	0.102	-0.246* (-1.717)	0.096	-0.236 (-1.168)	0.252
GOV/GDP	-0.941** (-2.240)	0.033	-0.844* (-1.960)	0.060	-0.882*** (-2.907)	0.007	-0.986* (-1.994)	0.055
INFL	0.033 (0.262)	0.795	0.066 (-0.548)	0.588	-0.174* (-1.834)	0.076	-0.176* (-1.719)	0.096
M2/GDP	0.032 (0.498)	0.622	0.055 (0.886)	0.383	0.074 (1.209)	0.236	0.090 (1.621)	0.115
C	14.615 (1.666)	0.107	13.640 (1.482)	0.150	18.840*** (2.778)	0.009	19.929* (1.913)	0.065
<b>Panel 2: Short-run coefficients, Dependent variable is ΔGROWTH</b>								
	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>	
<b>Regressor</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>	<b>Coefficient</b>	<b>Probability</b>
ΔGROWTH(1)	-0.090 (-0.629)	0.534	-0.110 (-0.712)	0.482	...	...	...	...
ΔOPEN	0.182** (2.626)	0.013	0.236** (2.088)	0.750	0.419*** (3.660)	0.001	-0.033 (-0.463)	0.646
ΔINV/GDP	-0.121 (-0.431)	0.669	0.123 (0.425)	0.143	-0.233 (-1.641)	0.110	-0.225 (-1.162)	0.254
ΔGOV/GDP	-0.961** (-2.397)	0.023	-0.831* (-1.878)	0.145	-0.834*** (-2.818)	...	1.155** (-2.537)	0.016
ΔGOV/GDP(1)	-0.710* (-1.809)	0.080	-0.802* (-1.979)	0.057	-0.834*** (-2.818)	0.008	-1.094** (-2.518)	0.017
ΔINFL	-0.171 (-1.293)	0.206	-0.182 (-1.272)	0.401	0.507* (1.826)	0.060	-0.168* (-1.742)	0.091
ΔINFL(1)	-0.427*** (-2.73)	0.010	-0.369** (-2.340)	0.136	....	...	...	...

$\Delta M2/GDP$	0.031 (0.486)	0.631	0.054 (0.851)	0.401	0.070 (1.233)	0.226	0.085 (1.544)	0.132
ECM(-1)	-0.969*** (-4.372)	0.000	-0.982*** (-4.231)	0.000	-0.946*** (-7.387)	0.000	-0.952*** (-6.524)	0.000
<b>Test Statistic</b>	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>		<b>Model 4</b>	
	0.789		0.772		0.760		0.672	
R-Squared	0.695		0.670		0.708		0.587	
R-Bar Squared								
S.E. of Regression	1.439		1.496		1.409		1.674	
F. Statistic	11.226[0.000]		11.2261[0.000]		16.9029[0.000]		9.067[0.000]	
RSS	93.124		60.390		63.548		86.942	
DW	2.109		2.234		1.742		2.120	
AIC	-76.442		-77.997		-74.016		-81.285	
SBC	-87.419		-88.974		-80.771		-88.885	

Note: \*, \*\* and \*\*\* denote statistical significance at 10%, 5% and 1% levels respectively. T-ratios are in parentheses ( ).

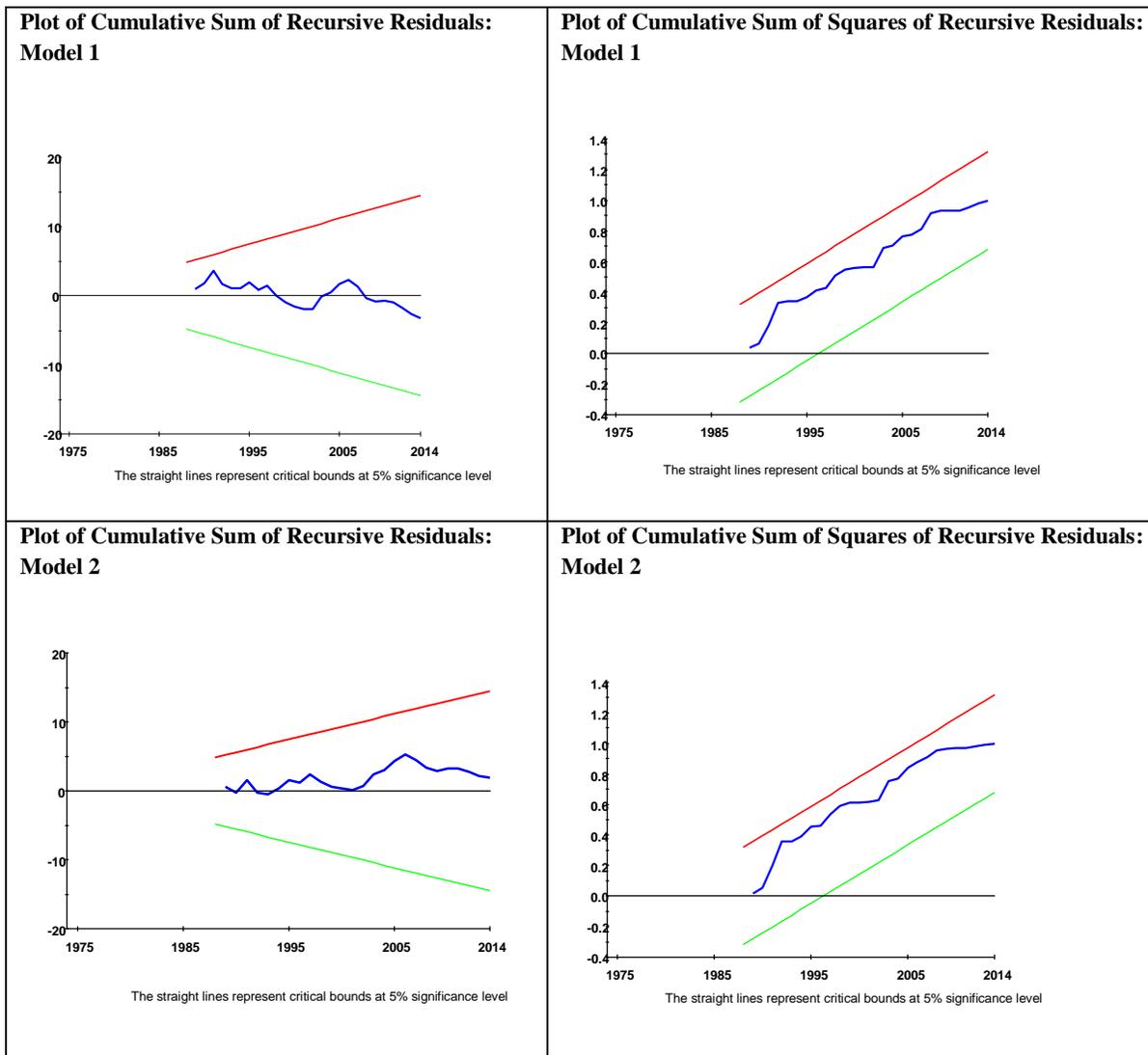
The results for the long-run coefficients show that trade openness has a significant positive impact on economic growth only in the case of Model 1. This shows that an increase in the ratio of total trade to GDP in South Africa has a positive impact on economic growth in the country. The long-run results also reveal that the coefficient of investment variable is negative and statistically significant in the cases of Model 1 and Model 3. The negative coefficient of the investment variable contradicts the expectations of the current study. However, these results are consistent with the findings of Nyasha and Odhiambo (2015) and Chang and Mendy (2012), who found a negative relationship between investment and economic growth in South Africa and in sub-Saharan Africa, respectively. The long-run results further show that the coefficient of government consumption expenditure is negative and statistically significant. This implies that government consumption expenditure has a negative impact on economic growth in South Africa. The results indicating a negative effect of government consumption expenditure on economic growth are consistent with Landau (1983). Based on Model 3 and Model 4, the long-run results reveal that the coefficient of inflation rate is negative and statistically significant. This indicates that inflation rate has a negative impact on long-run economic growth in South Africa. This finding is consistent with Hodge (2006), who indicated that inflation hinders economic growth in South Africa. The long-run results also show that the coefficient of the proxy for financial development, (M2/GDP), is insignificant in all the models. This is an indication that the bank-based financial development has no significant impact on economic growth in South Africa.

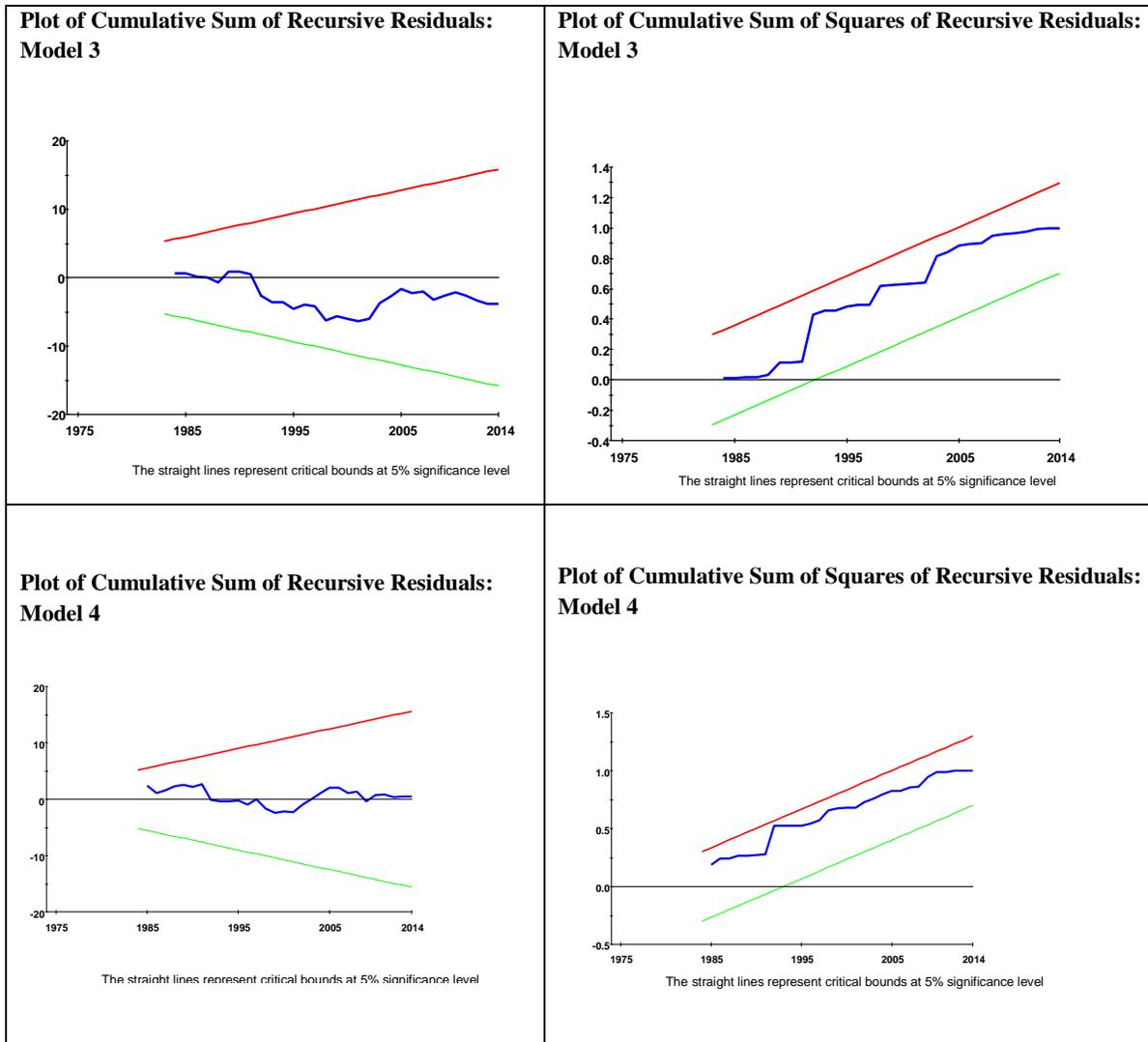
The results for the short-run coefficients show that the coefficient of trade openness is positive and statistically significant in the cases of Model 1, Model 2 and Model 3. These results suggest that an increase in the ratio of total trade, exports or imports to GDP results in an increase in economic growth in South Africa. These results show the importance of international trade activities in South Africa's economic growth. The short-run results further show depending on the model used in the analysis, the coefficients of government expenditure and inflation rate are negative and statistically significant.

The negative signs of these short-run coefficients are consistent with the expectations of this study. Other short-run results reveal that in all the four models, the lagged coefficient of the error correction term is negative and is statistically significant. This is an indication that in all the models used in this study, there exists a long-run relationship among the variables.

Following the long-run and short-run estimations, the plots for cumulative sum of recursive residuals (CUSUM) and the plots for the cumulative sum of squared residuals (CUSUMQ) are examined. Figure 2 shows these residual plots, which provide further insights on the stability of the model.

**Figure 2: Plot of CUSUM and CUSUMQ**





The plots for the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squared residuals (CUSUMQ) indicate that there is stability in the parameters of all the four models used in the empirical analysis for South Africa. As displayed in Figure 2, the residual plots do not cross the boundaries.

## 5. CONCLUDING REMARKS

This paper examined the impact of trade openness on economic growth in South Africa, using the sample period 1975 - 2014. The main aim of this paper was twofold: firstly, to find out whether trade openness affects economic growth in South Africa; and secondly, to examine whether the impact of trade openness on economic growth depends on the proxy used. Specifically, the paper used four indicators of trade openness. These include three trade-based indicators of trade openness, and an index of trade openness, reflecting the residual openness after purging country's size and geography. The empirical results show that, depending on the proxy used to measure trade openness, the impact of trade openness on economic growth varies between the short run and the long run. Based on the first ratio of exports to GDP, the ratio of exports to GDP, and the ratio of imports to GDP, the results show that trade openness has a positive and significant impact on economic growth in South Africa. However, when the trade-openness index was used as a proxy for openness, the study failed to find any support for the positive relationship between trade openness and economic growth. This implies that after purging the effects of country size and geography, the residual trade openness has no impact on economic growth. These results, therefore, suggest that country size and geography have a complementary effect on the extent to which trade openness affects economic growth in South Africa. Based on the overall results of this study, it is evident that international trade plays a significant role in South Africa's economic growth. The implication is that, in order for South Africa to benefit more from international trade, it must continue with the policies that enhance increased trade openness in the country. In addition, since exports were found to have a positive impact on economic growth in

the short-run, the export-promotion policies should be pursued further in South Africa, in order to reinforce the export-led growth in the country.

## References

- Adhikary, B.K. (2011) 'FDI, trade openness, capital formation, and economic growth in Bangladesh: a linkage analysis.' *International Journal of Business and Management*, 6(1): pp. 16 – 28.
- Ahmed, S., and Sattar, Z. (2004) 'Trade liberalisation, growth and poverty reduction: the case of Bangladesh.' *World Bank Working Paper No. 34204*, pp. 1 – 46. Available at <http://documents.worldbank.org/curated/en/598241468205488437/pdf/342040BD0rev.pdf>  
Accessed: 12 May 2015.
- Babatunde, A. (2011) 'Trade openness, infrastructure, FDI and growth in Sub-Saharan African countries.' *Journal of Management Policy and Practice*, 12(7): pp. 27– 36.
- Baldwin, R. and Seghezza, E. (1996) 'Testing for trade-induced investment-led growth'. NBER Working Paper 5416. Massachusetts: National Bureau of Economic Research.
- Banerjee, A., Dolado, J. J., and Mestre, R. (1998) 'Error-correction Mechanism Tests for Cointegration in a Single-Equation Framework.' *Journal of Time Series Analysis*, 19(3): pp. 263 – 283.

- Bell, T. (1992) 'Should South Africa further liberalise its foreign trade?' *Economic Trends Research Group Working Paper No. 16*.
- Bell, T. (1997) 'Trade Policy'. In: Michie, J. and Padayachee, V. (Eds). *The Political Economy of South Africa's Transition*. Dryden Press: London.
- Bittencourt, M., Van Eyden, R. and Seleteng, M. (2015) 'Inflation and economic growth: evidence from the Southern African Development Community', *South African Journal of Economics*, 83, (3): 411 – 424.
- Chang, C. and Mendy, M. (2012) 'Economic growth and openness in Africa: what is the empirical relationship?' *Applied Economics Letters*, 19(18): pp. 1903 – 1907.
- Constant, N. B. Z. S., and Yaoxing, Y. (2010) 'The relationship between foreign direct investment, trade openness and growth in Cote d'Ivoire.' *International Journal of Business and Management*, 5(7): pp. 99 – 107.
- Dar, A., and Amirkhalkhali, S. (2010) 'On the impact of trade openness on growth: further evidence from OECD countries.' *Applied Economics*, 35(16): pp. 1761–1766.
- Enders, W (2004) *Applied Econometric Time Series*. 2<sup>nd</sup> Ed. United States of America: John Wiley and Sons.
- Engle, R.F., and Granger C. W. J. (1987) 'Cointegration and error correction: representation, estimation, and testing,' *Econometrica*, 55: pp. 251 – 276.

- Eris, M. N., and Ulasan, B. (2013) 'Trade openness and economic growth: Bayesian model averaging estimate of cross country growth regressions.' *Economic Modelling*, 33: pp. 867 – 883.
- Farrel, G. N. (2001) 'Capital Controls and the Volatility of South African Exchange Rates.' *South African Reserve Bank Occasional Paper No. 15*, pp. 1-30. Available at <https://pdfs.semanticscholar.org/ff6b/cc110b1bfe996cb344e9f72161eb01b919ea.pdf> Accessed 5 May 2015.
- Fine, B., and Rustomjee, Z. (1996) *The political economy of south africa, from minerals-energy complex to industrialisation*. London: C. Hurst & Co. Publishers Ltd.
- Frankel, J. A., and Romer, D. (1999) 'Does trade cause growth?' *The American Economic Review*, 89(3): pp. 379 – 399.
- Hadjimichael, M. T., and Ghura, D. (1995) 'Public Policies and Private Savings and Investment in Sub-Saharan Africa: An Empirical Investigation.' *IMF Working Paper No. 95/19*, pp. 1 – 46. Available at <https://ssrn.com/abstract=883169> Accessed 6 May 2015.
- Hansen, B. (1990) A powerful, simple test for cointegration using Cochrane\_Orcutt. University of Rochester Working Paper No, 230, pp. 1 – 30. Available at <https://www.ssc.wisc.edu/~bhansen/papers/CochraneOrcutt.pdf> Accessed 5 May 2015.
- Hassan, A. F. M. (2005) 'Trade openness and economic growth: search for causal relationship.' *South Asian Journal of Management*, 12(4): pp. 38 – 51.

- Havrylyshyn, O. (1990) 'Trade policy and productivity gains in developing countries: a survey of literature.' *The World Bank Research Observer*, 5(1): pp. 1 – 24.
- Hodge, D. (2006) 'Inflation and growth in South Africa.' *Cambridge Journal of Economics*, 30(2): pp. 163 – 180.
- Jenkins, C., Bleaney M., and Holden, M. (1995) 'Trade liberalisation in Sub-Saharan Africa: case study of South Africa.' Centre for the Study of African Economies, University of Oxford *Working Paper No. WPS/96-6*, pp. 1– 50.
- Jin, J.C. (2000) 'Openness and growth: an interpretation of empirical evidence from East Asian countries.' *The Journal of International Trade and Economic Development*, 9(9): pp. 5 – 17.
- Karras, G. (2003) 'Trade openness and economic growth: can we estimate the precise effect?' *Applied Econometrics and International Development*, 3(1): pp. 7 – 25.
- Klasra, M. A. (2011) 'Foreign direct investment, trade openness and economic growth in Pakistan and turkey: an investigation using bounds test.' *Quality & Quantity*, 45: pp. 223 – 231.
- Krueger, A. O. (1998) 'Why trade liberalisation is good for growth.' *The Economic Journal*, 108: pp. 1513 – 1522.
- Krugman, P. R. (1979) 'Increasing returns, monopolistic competition, and international trade.' *Journal of International Economics*, 9(4): pp. 469 – 479.

- Krugman, P. R. (1981) 'Intra-industry specialization and the gains from trade.' *Journal of Political Economy*, 89: pp. 959 – 963.
- Krugman, P. R. (1987) 'Is free trade passé?' *Journal of Economic Perspectives*, 1(2): pp. 131– 144.
- Krugman, P. R. (1994) 'Introduction to Empirical Studies of Strategic Trade Policy'. In: Krugman, P., and Smith, A. (Eds) *Empirical Studies of Trade Policy*. Chicago: University of Chicago Press, pp. 1– 10.
- Landau, D. (1983) 'Government expenditure and economic growth: a cross-country study.' *Southern Economic Journal*, 49(3): pp. 783 – 792.
- Matthews, J. (1983) *South Africa in the world economy*. Johannesburg: McGraw-Hill Book Company.
- Nyasha, S., and Odhiambo, N. M. (2015) 'The impact of banks and stock market development on economic growth in South Africa: an ARDL bounds testing approach.' *Contemporary Economics*, 9(1): pp. 93 – 108.
- Osabuohien, E.S.C. (2007) 'Trade openness and economic performance of ECOWAS members – reflections from Ghana and Nigeria.' *African Journal of Business and Economic Research*, 2&3: pp. 57 – 73.
- Perron, P. (1997) 'Further evidence on breaking trend functions in macroeconomic variables. *Journal of Econometrics*, 80: pp. 355 – 385.

Pesaran, B., and Pesaran, M. H. (2009) *Time Series Econometrics Using Microfit 5.0*. Oxford: Oxford University Press.

Pesaran, M. H., Shin Y., and Smith, R. J. (2001) 'Bounds testing approaches to the analysis of level relationships.' *Journal of Applied Economics*, 16: pp. 289 – 326.

Rangasamy, L. (2009) 'Exports and economic growth: the case for South Africa.' *Journal of International Development*, 21: pp. 603 – 617.

Rao, B. B. and Rao, M. (2009) 'Openness and growth in Fiji: some time series evidence.' *Applied Economics*, 41: pp. 1653 – 1662.

RSA (1996) *Growth, employment and redistribution: a macroeconomic strategy (GEAR)*. Pretoria: Republic of South Africa.

DTI (1990) *Annual Report*. Pretoria: Department of Trade and Industry.

RSA (1912) *Report of the commission appointed to inquire into the conditions of trade and industries*. Pretoria: Republic of South Africa.

RSA (1925) *Customs tariff and excise duties amendment act No. 36 of 1925, in statutes of the union of South Africa 1925*. Cape Town: Republic of South Africa.

Sachs, J. D., and Warner, A. M. (1997) 'Fundamental sources of long-run growth.' *The American Economic Review*, 87): pp. 84 – 188.

- Skipton, C. (2007) 'Trade openness, investment, and long-run economic growth'. *Paper Presented at the 2007 – 2008 Southern Economic Association (SEA) Meetings*, New Orleans, November 18 – 21, pp..
- Romer, P. (1990) 'Endogenous technological change.' *The Journal of Political Economy*, 98(5), Part 2: pp. S71– S102.
- Tang, T. C. (2004) 'A reassessment of aggregate import demand function in the ASEAN-5: a cointegration analysis.' *The International Trade Journal*, 18(3): pp. 239 – 268.
- UNCTAD. (2012) A Practical Guide to Trade Policy Analysis. Available at [https://www.wto.org/english/res\\_e/publications\\_e/wto\\_unctad12\\_e.pdf](https://www.wto.org/english/res_e/publications_e/wto_unctad12_e.pdf) Accessed 5 May 2015.
- Wacziarg, R. and Welch, K. H. (2008) 'Trade liberalization and growth: new evidence.' *The World Bank Review*, 22(1): pp. 1– 45.
- World Bank (2016) *World Development Indicators*. Available at: [www.worldbank.org](http://www.worldbank.org). Accessed: 1 March 2017.
- WTO (1986) *The Text of the General Agreement on Tariffs and Trade*. Geneva: World Trade Organisation.
- WTO (1998) *Trade Policy Review: Republic of South Africa - Report by the Secretariat*, WT/TPR/S/34. Geneva: World Trade Organisation.

Yanikkaya, H. (2003) 'Trade openness and economic growth: a cross-country empirical investigation.' *Journal of Development Economics*, 72: pp. 57– 89.

Zahonogo, P. (2017) 'Trade and economic growth in developing countries: evidence from Sub-Saharan Africa.' *Journal of African Trade*, 3(1-2): pp. 41– 56.