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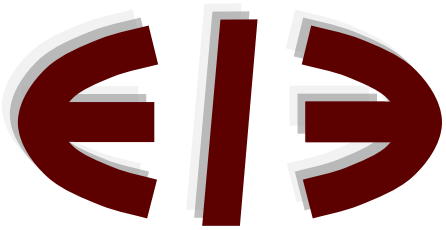

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Abstract

The article addressed the central issue on whether South Africa's joining of the BRICS has led to a sustainable growth as was envisaged. An econometric assessment was done using the Autoregressive Redistributive modelling on quarterly data from 1990 to 2014. Empirical results were insignificant to explain the long-run relationship between South Africa's trade, direct foreign investment and growth with the BRIC countries. The short-run trade effect was little to instil any significant effect on South Africa's growth. BRICS trade does not Granger Cause growth in South Africa. Trade and investment policy should be reviewed to correct the negative trade effect.

Key Words: BRICS; Trade; Economic Growth; South Africa

1. Introduction

The rapid growth of the Brazil-Russia-India-China-South Africa (BRICS) initiative over the past years has spearheaded a new paradigm for world economic growth (Bell, 2011). BRICS economies share common characteristics in their countries' size, human capital potential, macro-economic stability, institutions and openness to trade (Da Silva, Drumond, and De Almeida, 2013). Statistically, BRICS accounts for over 30 percent of the earth's land and 45 percent of its population. In 2010, BRICS economies recorded spectacular growth rates with a contribution of 50 per cent to global economic growth (SAGI, 2013). This was as a result of low labour costs and export-oriented direct foreign investments and trade (Da Silva et al. 2013). Presently the BRIC account for over 16 percent of global trade and combined foreign exchange reserves of over US$4 trillion, raising projections of surpassing the G8 economies in trade prospects by 2025 (WTO, 2015).

South Africa joined the BRIC with three main objectives, namely: advancement of economic growth, increasing competitiveness and creation of jobs. South Africa's membership into BRICS facilitates growth through trade. In this regard international trade through export-led growth strategies is one of the fundamental reasons for South Africa

joining BRICS (Oxford, 2012). Economic growth theories by Romer (1986) and Lucas (1988) amongst others support this stance taken by South Africa in becoming a member of BRICS (Polodoo, Seetanah, Sannasee & Padachi, 2012). Increased international trade through the BRICS would allow the nation to gain access to sophisticated technologies, improved efficiencies and economies of scope in production, investment in infrastructure and foreign markets (SAGI, 2013).

With South Africa membership in BRICS, most trade barriers were dealt away with resulting in narrowing of South Africa's trade balances with the BRIC. These changes alongside motives for membership raised growth prospects in the economy. The problem is that the growth prospects has not been realised to date. Real GDP figures fluctuated below 3 percent since the BRICS inception in 2010 to 2014 (StatsSA, 2015). The Confederation of South African Industries (COSATU) (Business Day, March, 2013) raised eyebrows that the grouping is a membership of convenience. The organisation cited several disadvantages of South Africa in the member body, among them incidences of dumping and influx of cheap imports from China, all with negative bearing on local production and employment. This study therefore seeks to address the question on whether joining the BRICS impacts South Africa's growth as was envisaged.

2. Literature Review

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

The Hecksher-Ohlin theory was postulated in an attempt to address the failure of Ricardian theory in explaining the causes of different labour productivities among trading nations. In the Hecksher-Ohlin model, the country exports the good which makes more abundant use of its factor intensity. Trade allows resources to move towards the sector that draws upon the abundant factor, and the value of total output increases. The H-O theory is not always ideal in in real world economies, as sources of comparative advantage may emanate from continuous research and development, not only from differentials in relative factor endowments.

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

markets, the factor-price equalisation theorem seems to be realistic in the real world.

Finally, Federer (1982) led efforts to initiate that foreign trade in particular exports has growth implications. This he termed the 'export led growth model'. The assumptions of the model includes, first, that the export sector yield positive externalities on the other economic sectors through advanced managerial techniques and technological spill-overs. Second, any trade policy that focuses on reallocation of factors of production into exports from other economic sectors will affect growth positively (Federer, 1982). Criticism of the Export-Led growth hypothesis lies in failure to explain exports-growth relationship in the long-run. Most BRICS countries are still developing as such they follow the behavioural patterns as specified in the traditional theories of trade.

With the advent of globalization and international trading blocs, a new wave of theorist proposed a new set of theories that mostly opposed the founding principles of traditional trade theorists. These theorists reviewed beyond the two sector country model to a perfect market and monopolistic market systems. The new monopolistic trade theorists of Krugman (1979), Brander Krugman (1982), Dix-Stiglitz (1977), Dix-Stiglitz-Krugman (1980) and Rodrik-Rodriguez (2001) provides a distinct pattern of gains in trade even with similar country characteristics and resource endowments.

Krugman shows that trade can also arise in mutually beneficial ways even if countries are similar. This trade he termed 'intra-industry trade', and shows a two way exchange of goods with standard industrial classifications. The model focused on the effect of trade on autarkic equilibrium of the monopolistic competitive industry. The model, though applicable to modern day theory, fails to address the reaction of firms due to short term changes in demand, the reason for failure of the firm and the role of this failure towards final free trade equilibrium adjustment. Brander & Krugman (1982) developed the reciprocal dumbing model to show incidences of the negative consequences of trade. The theorists argue that the oligopolistic rivalry between firms leads to 'reciprocal dumping', a condition whereby each firm dumps their goods in another firm's home markets. The reciprocal dumping model has been criticised for being pareto-inefficient.

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

the Dixit-Stiglitz-Krugman (1980) is an extension to the Dixit-Stiglitz (1977) model. Both models have wide applications in many other economics topics such as growth theory, environmental economics, macroeconomics and microeconomics.

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

Empirical literature from South Africa and BRICS is scant. Previous studies focused on export diversification and the trade openness effect on growth. This was far less than required to correctly evaluate how trade impacts growth. Studies on developed and developing countries complemented the BRICS and South African literature. In developed countries discourse, Jenish (2013) examined on economic trade and development in 11 countries of the Commonwealth of Independent States (CIS). A Generalised Method of Moments (GMM) panel data estimation methodology was employed over the period 2000-2010. Results of the study showed that trade with the Russian

Federation (RF) had a positive effect, although only moderate on economic growth. Neither intra-regional trade without RF nor extra-regional trade had any significant effect on growth. Investment, oil exports and economic freedom had where positively related with growth. In another study, Ledyava & Linden (2008) investigated the factors influencing growth in 74 Russian states for the period 1996-2005 using both panel and cross-sectional data analysis. The results of the study reported that, apart from investments, exports are highly significant in explaining growth in Russia.

In addition, Eaton & Kortum (1996) developed a model known as the Ricardian model to explore the effect of technological innovation on foreign trade among OECD countries. Results from the study found trade as an important component for gains from improved technology. The magnitude of the gains differs with proximity to the technological source. This means foreigners benefit by only a tenth as much as the innovating country. Finally, Yanikkaya (2003) undertook a cross-country empirical investigation on international trade openness and economic growth in 100 emerging and emerged economies in a panel data setup from 1990-1997. Oil exporting countries were excluded due to data considerations. A significant relationship between trade and growth was reported from the findings. The implication was more pronounced in developing countries.

In the BRICS economies context, Didier & Hoarau (2014) utilised on gravity models from 2000-2010 to investigate on the determinants of bilateral exports and imports between the BRIC and Sub-Saharan African countries. Results to the study conferred the negative effect of distance and geography together with the positive effects of BRIC's and Africa-Sub-Sahara's growth as determinants. The augmented variables of natural resources, terms of trade, and democracy highlighted the outstanding role of China in comparison to other BRIC economies. Recently He, Hao & Zhang (2015) investigated the effects of foreign trade and FDI on income distribution in the BRICS. Annual data from 1960-2012 was utilised over static and dynamic panel data analysis techniques. The findings reported on the positive effect of both imports and exports on BRICS economies growth. The effects of imports, exports were different amongst the BRICS countries. Save for India, all the BRICS members' income gap widened with ascension to World Trade Organisation (WTO). Bhatia & Kishor (2015) utilised on Vector Autoregressive modelling to analyse the linkages of foreign portfolio investments and stock market indices in BRICS nations. Results of the study showed that it is difficult for the BRICS to sustain growth without steady inflow of foreign capital, foreign portfolio investment or foreign institutional investors. In another analysis, Polodoo et al. (2012) examined the degree to which international trade

impacts the BRICS economies growth. The study used data from 1990-2010 over econometric methodologies of panel unit root and random coefficient estimates. The empirical results reveal that international trade has contributed a lot to high economic growth rates in the BRICS economies. Of significance also was human capital, Gross Domestic Fixed Capital Formation (GDFCF) and exchange rate appreciation. A convergence effect in dynamic setting was also revealed. Using OLS regression for the period 1995-2010, Kuboniwa (2011) studied on the impact of trading gains on the BRIC economies growth. The studies were done at the helm of the global financial shock, termed the 'Dutch disease' in 2000. Results of the study suggest that Russia was unscathed by the Dutch disease. All the BRIC nations were affected by trading gains. 50 percent and 20 percent were explained for Russian and Brazilian growth. Impacts on India and China were almost negligible, implying immunity to recurrent global financial crises should correlations persist.

Finally from South Africa in brief, Mogoe & Mongale (2014) utilised the VECM technique and Johansen cointegration tests on quarterly data from 1990 to 2013 to investigate on the impact of international trade on economic growth in South. Empirical findings showed a positive relationship between inflation rate, exports and real exchange rate, at the same time, the relationship between imports and growth was negative.

Jordaan & Kanda (2011) investigated the trade effects of the European Union - South Africa (EU-SA) and Southern African Development Committee (SADC) preferential trade agreements. Panel data from 1994-2008 was used in estimation of the gravity model. Results of the study showed significant trade expansion effect between the EU and SA preferential trade agreement. The SADC agreement was considered not fully operational hence the trade effects of SADC preferential trade agreement on South Africa were inconclusive. Recommendations were made for South Africa's trade policy to be geared toward multilateral trade liberalisation as such South Africa was entitled to push towards regional economic development and stability through supporting regional trade initiatives.

The studies mentioned above uses different econometric techniques, but related variables. This is necessary for the choice of the model regressors.

3. The Data, Model and Methodology of the Study

3.1 Description of Variables and Data Sources

Growth in BRICS economies is underpinned by trade and FDIs. Prior studies have either used total trade or exports and imports entered separately in their regression analysis (Polodoo, 2012 and Lo & Hiscook, 2014). A narrowing trade deficit with the BRICS formalisation gives another dimension on utilising

average trade balances (ϑTB) to measure the contribution of BRICS trade towards South Africa's growth. ϑFDI is used to measure average foreign direct investments balances between South Africa and the BRICS and REXCH is the real effective exchange rate of the BRICS currencies in relation to the dollar. The independent variables are expected to be positively related to growth and are obtained from UNComtrade, KPMG and the South African Reserve Bank. All data is entered as quarterly from 1990 quarter 1 to 2014 quarter 4.

3.2 The Model

The theoretical model on the research methodology is founded on the new endogenous growth model by Romer (1993). The model is distinguished by the presence of technological spill-overs due to industrialization. This will further translate into economy-wide increasing returns to scale (Todaro & Smith, 2013). The model is presented as follows;

$$Yi = AKi^{\alpha}Li^{1-\alpha}\check{K}^{\beta} \qquad (1)$$

Where: *Yi* = Aggregate output; *L* = Labour; *K* = Capital; A = Aggregate factor productivity (aggregate); αand β are output elasticity coefficients of labour and capital and are determined by technology respectively (Todaro & Smith, 2013). Output elasticity is defined as the responsiveness of output to a change in levels of labour and capital, termed input factors. For example, if α = 0.35, it means a 1 percent increase in labour

results in a 0.35 percentage increase in output. If $\alpha + \beta = 1$, the production function has constant returns to scale. If L and K increase by 20 per cent, Y increases by the same magnitude. Thus $\alpha + \beta < 1$ confers decreasing returns to scale and $\alpha + \beta > 1$ implies increasing returns to scale (Todaro & Smith, 2013).

Assuming symmetry across industry such that each industry utilises an equivalent amount of capital and labour, an aggregate production function is derived, and is presented as follows:

$$Yi = AK^{\alpha+\beta} L^{1-\alpha} \qquad (2)$$

From the model above, all growth is due to technological progress. At the same time, there is a constant growth in the stock of knowledge and output. That is to say, the *K/L* ratio, the stock of knowledge and aggregate output, grow at a constant rate (Romer, 1993).

The new endogenous growth model is redefined by employing RGDP growth as the dependent variable, Average Trade balances of BRIC member countries (ϑTB) and Average Foreign Direct Investment (ϑFDI) of BRIC member countries in South Africa and of South Africa in BRIC member countries and the Real Effective Exchange Rate (REXCH) of the rand to the US dollar all entered as independent variables.

A functional model is expressed as follows:

$$RGDP_t = \beta_0 + \beta_1 \vartheta TB_t + \beta_2 \vartheta FDI_t + \beta_3 REXCH_t + \beta_4 DUM + \mu t \quad (3)$$

Where; $\beta_1, \beta_2 \ldots\ldots \beta_7$ are coefficients to be estimated; $RGDP_t$ = Real Gross Domestic Product in year t; ϑTB_t = Average Trade Balance in year t, Brazil, Russia, India, China; ϑFDI_t = Average Foreign Direct Investments in year t, Brazil, Russia, India, China; $REXCH_t$ = Real Effective Exchange Rate in year t and DUM= Dummy variable takes 1 (after South Africa officially joined BRIC) otherwise 0 (before South Africa officially joined BRIC).

3.3 ARDL Cointegration and the Bounds Testing Approach

Cointegration tests are done using several techniques. The prominent techniques include the Engle-Granger (1987) and Johansen- Juselius (1990; 1995) tests. These techniques suffered major criticisms advocating for the usage of recent sophisticated test methods such as the OLS based ARDL approach commendable for its cointegrating power amongst other attributes (Pesaran & Shin, 1999). The ARDL approach is adopted in our study to perform simulations on both short and long-run dynamics in BRICS trade and FDIs with South Africa (Pesaran, Shin & Smith 2001).

The model is presented as follows;

$$Y_t = \alpha_0 + \alpha_1 Y_t + \alpha_2 X_{t-1} + v_t \quad (4)$$

Where, Y_t is entered as the dependent variable, $\alpha_1 Y_t$ is entered as the explanatory variable and X_{t-1} is entered as the stochastic explanatory variable distributed independently of the disturbance term v_t.

The dependent variable Yt represent SA growth and is regressed against ϑTB_t (Average trade balances of SA with BRIC), ϑFDI_t (Average Foreign Investments of SA with BRIC) and $REXCH_t$ (Real Effective Exchange Rate) are time variant and will include an innovative outlier to demarcate periods after BRICS membership.

The ARDL modelling technique is renowned for its flexibility in inclusion of variables integrated in different orders (Pesaran & Pesaran 1997).This is contrasting to the Johansen-Juselius (1991) and Johansen (1991; 1995) cointegration methods which require all variables to be integrated in the same order for cointegration analysis. Secondly; a dynamic error correction model can be derived from the ARDL through a simple linear transformation and the error correction model integrates the short-run dynamics with the long-run equilibrium without losing information (Bannerjee, Dolado & Mestre, 1998). Finally, the ARDL approach avoids problems resulting from non-stationary time series data and has exquisite abilities to utilise sufficient number of lags in the derivation of a general-to specific modelling framework (Laurenceson & Chai, 2003).

To investigate the presence of the long-run relationship, a bounds test based on the Wald or F statistic, as proposed by Pesaran (2001) was used.

The bounds test is performed in three levels. In the first level, the test is computed based on the Unrestricted Error Correction Model (UECM) using the Ordinary Least Squares (OLS) technique.

The UECM is presented as follows:

$$\Delta \ln RGDP_t = \beta_0 + \sum_{i=0}^{p} \beta_1 \Delta \ln \vartheta TB_{t-i} + \sum_{i=0}^{p} \beta_2 \Delta \ln \vartheta FDI_{t-i}$$

$$+ \sum_{i=0}^{p} \beta_3 \Delta \ln REXCH_{t-i} + \beta_4 \ln \vartheta TB_{t-1} + \beta_5 \ln \vartheta FDI_{t-1} +$$

$$\beta_6 \ln \vartheta REXCH_{t-1} + \beta_7 DUM_{t-1} + \mu t \qquad (5)$$

Where, $\Delta \ln$ is the first difference of logarithms for the respective variables.

In the second level, the null hypothesis of non-cointegrating relationship (H0: $\delta_1 = \delta_2 = \delta_{3.....} = \delta_8 = 0$) is estimated based on the joint significance test of lagged level variables. The F statistic is standard under asymptotic distribution of the alternative hypothesis irrespective of whether the variables are 1(0) or 1(1). Tabulation is based on two sets of critical values, upper bound 1 (1) and lower bound (1(0) developed by Narayan (2004). Under the conventional used significance level, if the F-statistic is higher than the critical bound, the null

hypothesis of no-cointegration is rejected (Hamuda et al. 2013). If the F-statistic falls outside the critical bound, a conclusive inference can be made without considering the order of integration of the explanatory variables.

The third level is on estimating the coefficients of the long-run cointegrating equilibrium relationship and the corresponding Error Correction Model. The produces a long-term ARDL equilibrium relation given as;

$$LnRGDPt = a_0 + \sum_{i=1}^{q1} a_1 lnRGDP_{t-i} + \sum_{i=0}^{q2} a_2 ln\theta TB_{t-i} + \sum_{i=0}^{q3} a_3 ln\theta FDI_{t-I} + \sum_{i=0}^{q4} a_4 lnREXCH_{t-i} + dDUM + €_t \quad (6)$$

Where, $€_t$ is the gap error term used most often between ln ($RGDP_t$) and its equilibrium to be filled in the next period (Hamuda et al. 2013).

The resulting model is presented as;

$$LnRGDPt = c_0 + \sum_{i=1}^{q} c_1 lnRGDP_{t-i} + \sum_{i=0}^{q} c_2 ln\vartheta TB_{t-i} + \sum_{i=0}^{q} c_3 ln\vartheta FDI_{t-I} + c_4 lnREXCH_{t-i} + €_{t-1} + \mu t \quad (7)$$

The estimated coefficient is expected to be negative, and is defined as the speed of adjustment for the explained variable towards equilibrium. Three model selection criteria are used to determine the lag structure of the ECM, namely; Schwarz Bayesian Criteria, the Adjusted LR Test and the Akaike Information Criteria

4. Estimation and Analysis of Results

4.1 ARDL Unit Root Test

A necessary preliminary step before conducting ARDL cointegration analysis is pre-testing of the integration order of variables. This is so as to avoid inclusion of 1(2) variables.

Graphical presentations of the data showed clear structural breaks in the series after South Africa was admitted into BRICS in 2010. A dummy variable, BREAK, with the value one for these observations and zero everywhere else, was added to carter for such changes. ADF-MAX Breakpoint unit root test developed by Leybourne (1995) was utilised to provide robust statistics towards structural breaks in the series. An additive outlier break type over the SC criterion in trend and intercept was considered for blue estimates.

The ADF-MAX Breakpoint unit root tests results are shown in table 1.

[Insert table 1. here]

The null hypothesis confer non- stationarity, which is the presence of a unit root against the alternative of stationarity, which is the absence of unit root. The critical values are based on MacKinnon (1996).

RGDP and REXCH containts a unit root at level1(0), and become stationary in first differences 1(1). ∂TB and ∂FDI are

stationary at both levels and first differences 1(1). The inclusion of both 1(0) and 1(1) variables is necessary for application of the bounds test.

4.2 ARDL Model Specification

The Schwarz criterion (SC) was used as the basis for determining the lag orders for the regressors. A consideration of 425128 models was made for our model choice at 8 lags. The BREAK dummy variable, an intercept and linear trend were entered as fixed regressors as such lagging is not possible. Results of the model test using Akaike info Criterion (AIC) chose ARDL model (3; 6; 3; 6; 0; 2; 0) as the most appropriate for our regression analysis.

[Insert figure 1. here]

4.3 Residual Diagnostic Tests

4.3.1 Breusch-Godfrey Test

One of the assumptions of the ARDL model is for the serial independents of the parameter estimates. Serial dependence or correlation causes inconsistent parameter estimates. The Breusch-Godfrey test validates some of the modelling assumptions inherent in regression analysis and follows to identify instances where lagged values of the regressor were used as regressors. The null hypothesis for serial independence

is accepted with a chi-square probability value of 0.2848 at 5 percent significant level.

4.4 Stability Diagnostic Tests

4.4.1Cusum & CusumsQ Tests

The cumulative sum of recursive residuals (Cusum) and the cumulative sum of squares of recursive residuals (CusumsQ) tests intent to empirically analyse the stability of the short- and long run dynamic model's coefficients (Pesaran & Pesaran, 2001)

The model is said to be stable if the Cusum and CusumsQ lines are within two red lines drawn at 5 percent level of significance. Cusum and CusumsQ test results are reported from figure 2.

[Insert figure 2. here]

Plots of CUSUM and CUSUMSQ results are within the recommended limit. This therefore means the short-run and long-run coefficients of the model are stable.

4.5 Coefficient Diagnostics

4.5.1The Bounds Test

The Bounds test is derived from the *F* and t-statistics in estimation of the relationship between the dependent and the independent variable in a univariate equilibrium correction set-up.

[Insert table 2 here]

Using the two sets of asymptotic critical values proposed by Pesaran et al, 2001 and Narayan, 2004 reported from table 2, the intercept and trend F statistic of 3.986530 is greater than the upper bound value of 3.28 at 5 percent significant level confirming the presence of a long-run cointegration relationship amongst our regressors.

4.5.2 ARDL Cointegrating and Long-Run Form

Cointegration is defined as the level relationship between the regressor and the regress-ants. The bounds test was performed to determine the presence of long run equilibrium relationship between our test variables. The bounds test results were positive and significant, which is an indication of a stable long run relationship between the dependent variable RGDP and independent variables (ϑTB, ϑFDI and REXCH).

4.5.2.1 Short-Run Cointegration Form

The ECM coefficient shows the speed of adjustment of a variable towards equilibrium.

The short-run coefficient estimates of the ARDL ECM are shown in table 3.

[Insert table 3.here]

If BRIC Average trade balances with South Africa (ϑTB) narrows by 1 percent South Africa's growth increase by 0.02

percent. The relationship is positive, explaining the positive outcome from trade in BRICS.

Average Foreign Direct Investment Balances with BRICS (ϑFDI have done little to offset the little growth effect inflicted by ϑTB. A 1 percentage increase in ϑFDI reduces growth by 0.01 percent, which is almost insignificant. This supports literature on the low levels of FDIs SA received from BRICS and resounding less beneficial impact it could impose on growth.

An appreciation in the exchange rate (REXCH) has positive implications on growth with an insignificant coefficient. The appreciation in exchange rate as a result of improved competitiveness is sustainable and cannot lower growth.

4.5.2.2 Long-Run Cointegration Form

Bannerjee, Dolado & Mestre (1998) provided guidelines to follow in interpreting long run coefficients. If the error correction term coefficient (ECT) is positive, there is absence of stable long- term relationship between the variables. The ECT in our model was positive and statistically significant giving us the decision to accept Bannerjee, et al.'s (1998) hypothesis and as such attest the absence of stable long-run relationship amongst the test variables. Validation to this conclusion was made by looking at the p values of the regressors' coefficients. The p values were insignificant at all levels.

These results entail that the structure and dynamics of trade and FDIs in BRICS is not pronounced to inflict any significant growth in the long term for South Africa. The situation could further deteriorate with less input from Russia due to political sanctions and the recent upheavals in the Brazilian economic and political structure amongst other factors.

4.6 Granger Causality Tests

Gujarati (2004) defines Granger causality as the statistical concept of causation that is based on prediction. According to the theory, if a signal C_1 "Granger-causes" a signal C_2, then past values of C_1 should constitute of information that predict C_2 above and beyond the information contained in prior values of C_2 alone.

The Pairwise Granger causality tests results are reported from table 4

[Insert table 4.here]

Results from the Granger Causality tests show that SA-RGDP Granger Causes ϑFDI with a coefficient of 0.0010 percent at 5 percent significant level. On the other hand SA-RGDP does not Granger Cause BRIC's ϑTB and REXCH as the coefficients were insignificant. Finally no Granger Causality exists between the BRIC ϑTB, ϑFDI and REXCH on SA-RGDP accepted the null hypothesis of non-Causality. Results of the findings imply that trade and direct foreign investments

between South Africa and the BRICS do not lead to South Africa's growth. The results are in line with the ARDL results and confirm similar test results by Sridharan et al (2009) who find that growth leads to FDI bi-directionally on SA growth. Trade and FDI with other BRIC un-directionally caused growth.

5. Conclusions and Recommendations

The study analysed on how South Africa-BRICS trade relations impacts South Africa's growth. Literature on BRICS trade with South Africa is scant and inconclusive in retrospect. The most advanced econometric methodologies are therefore applied in order for the study to add to existing literature. Initially preliminary checks were done to determine the stationarity of variables. The ADF-MAX breakpoint unit root test was conducted on the ARDL model to eliminate structural bias from the series.

In the ARDL framework, the bounds test provided positive results towards cointegration. However, after considering the ECT sign and insignificance of regressing coefficients, no long run relationship exists between RGDP and the growth regressors. Save for ϑTFDI all short-run coefficients of the regressants were positive. The contribution of ϑTB was minimal to instil significant growth linkages. Results from the ARDL framework were similar to those of Bhatia & Kishor

(2015) who utilised on Vector Autoregressive modelling to analyse the linkages of foreign portfolio investments and stock market indices in BRICS nations. Results of the study showed that it is difficult for the BRICS to sustain growth without steady inflow of foreign capital, foreign portfolio investment or foreign institutional investors. China and Russia are controlled economies as such foreign investment is retarded. South Africa, India and Brazil are democracies which have been gradually adopting policies of structural and financial reforms as such their foreign investments are increasing. Negative trade balance from a strong rand, non-conducive FDI enabling environment, economic woes of Russia and the political connotations of Brazil were to blame for such anomalies. Diagnostic test results were significant to support the results obtained from the model. Results from the Granger Causality tests showed that BRIC ∂TB, ∂FDI and REXCH do not Granger Cause SA RGDP as the probability values were greater than 5 percent.

On the other hand the null hypothesis that SA RGDP Granger Cause BRIC ∂FDI and cannot Granger Cause BRIC ∂TB, and REXCH was rejected.

These results are congruent with the ARDL estimates and imply that Average trade balances of BRIC trade with South Africa and Average foreign direct investment balances of South

Africa and the BRIC does not affect South Africa's economic growth and BRIC economies growth respectively.

In line with recommendations from Edwards & Lawrence, 2012, research and development towards innovative capacities and value addition to SA products could go a long way in improving SA trade balances with the BRICS.

SA trade policy has been too relaxed to allow imports and subsequently dumping from BRICS member countries. Policy should be revisited towards protecting the local industry as the repercussions have been felt in industry unemployment. Specific tariffs and duty might be necessary to control influx of competing foreign products. At the same time controls should be relaxed on scarce commodities and all areas where research and development, global value addition and innovation capacities are undertaken *ceteris paribus*.

Internalization of the rand could go a long way in alleviating trade balance problems brought about by differences in exchange rates.

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List of Tables

Table 1: ADF Breakpoint Unit root Test Results

	ADF Test Levels		**ADF Test First Differences**
Variable	T- statistic	Variable	T-Statistic
RGDP	-3.73605	RGDP	-5.728376***
∂TB	-14.06801*	∂TB	-11.55290*
∂FDI	-6.480697*	∂FDI	-3.82428*
REXCH	-4.056315	REXCH	-10.4482***

***,**, * *denotes significance at 1%, 5% and 10% levels*.

Source: Own Table drawn from Eviews 9 iterations

Table 2: ARDL Bounds Test Results

Test Statistic	**Value**	**k**
F-statistic	3.986530**	6

Critical Value	**I0 Bound**	**I1 Bound**

Bounds		
10%	1.99	2.94
5%	2.27	3.28
1%	2.88	3.99

Source: Own Table Drawn from Eviews 9 iterations

Table 3: Estimated Short-run Error Correction Model

ECM-ARDL: Dependent Variable ΔRGDP			
Regressor	Coefficient	T-Statistic	P- Value
ΔϑTB	0.020770	-4.266675	0.0006
Δϑ FDI	-0.015608	-2.747027	0.0470
ΔREXCH	647.7466	2.493255	0.0152
BREAK	-2.254464	-1.859323	0.0074
ECM_{t-1}	0.01134	6.364226	0.0000

Source: Own Table Drawn from E views 9 Iterations

Table 4.Pairwise Granger Causality Tests

Null Hypothesis:	Obs	F-Statistic	Prob.
TFDI does not Granger Cause TTB	23	0.57565	0.5724
TTB does not Granger Cause TFDI		0.97281	0.3970
RGDP does not Granger Cause TTB	23	1.13085	0.3446

TTB does not Granger Cause RGDP		1.15639	0.3369
REXCH does not Granger Cause TTB	23	0.05654	0.9452
TTB does not Granger Cause REXCH		0.98507	0.3927
RGDP does not Granger Cause TFDI	23	10.2979	0.0010
TFDI does not Granger Cause RGDP		0.25131	0.7805
REXCH does not Granger Cause TFDI	23	0.64048	0.5386
TFDI does not Granger Cause REXCH		1.01221	0.3832
REXCH does not Granger Cause RGDP	23	0.65791	0.5299
RGDP does not Granger Cause REXCH		1.39126	0.2743

Source: Eview9 Iterations

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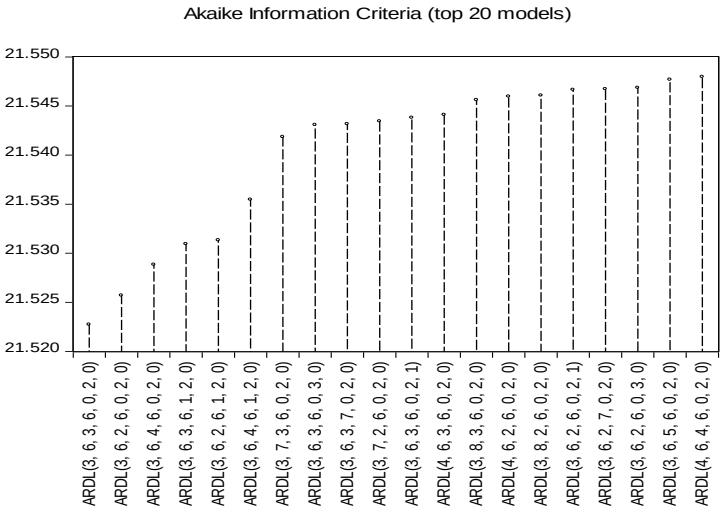

Figure 1: Model Test Results

Source: E views 9 Iterations

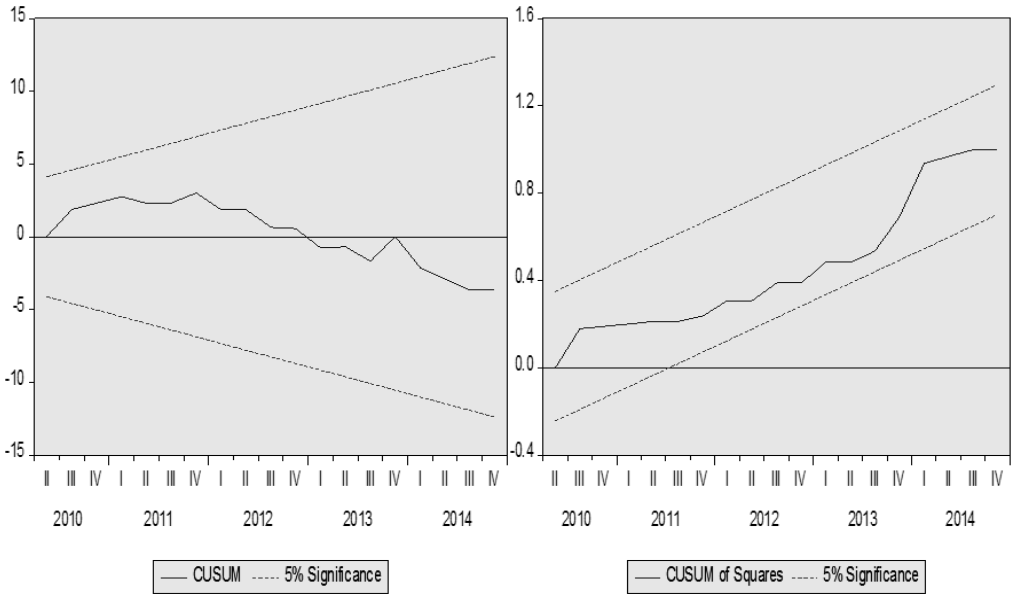

Figure: 2 Cusum & CusumsQ Test Results

Source Eviews9 Iterations