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THE IMPACT OF TRADE OPENNESS ON ECONOMIC GROWTH: THE CASE OF BRICS

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Abstract

This paper revisits the empirical evidence on the relationship between trade openness and long-run economic growth through heterogeneous panel of 5 countries over the sample period 2004-2012. By using panel data the hypothesis that trade openness through its special mechanisms positively affects the economic growth of these countries is investigated. It can be inferred from the study that, trade openness must be promoted in BRICS nations to enhance economic growth.

Keywords: *Trade openness, Economic Growth, Panel Data.*

JEL Classification: *F43, C23.*

1. Introduction

With the belief that trade openness promotes economic growth, trade has been acknowledged as an engine of growth (Nurkse, 1961). Historically, trade has acted as an important engine of growth and at the junction where most of the developing countries growth rate is constrained due to shortage of modern technology and foreign exchange; liberalisation of trade can help them to grow faster(Thirwall; 2000). Trade brings both static and dynamic gains to a nation but not necessarily the gains will be equally distributed among the nations. General consensus among majority of the nation was that industrialisation is the optimal strategy for providing a pace to economic growth. The Classical and Neoclassical era advocated the benefits of international trade as it helps in extending the market which will increase division of labour, thereby increasing productivity and also provide comparative cost advantage. Trade openness provides a channel for extending the domestic market and might also help to disseminate technological know- how, leads to competition, innovates new products and transfer of new technology (Krugman, 1979 and Grossman and Helpman, 1991). Liberalization promotes trade, which in turn fuels the engine of growth. Empirical studies have indicated that trade openness leads to efficient investment, which extends the market size so trade liberalization process has a positive impact on growth. Globalization process brought many fundamental

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changes in the regional and international level and a significant feature is trade liberalization, leading to drastic increase in the volume of trade. Integration of the economies by forming free trade areas and with preferential trade agreements among nations has provided a platform to accelerate growth through trade. Openness of the countries helps them to catch up to leading technologies of the rest of the world (Romer, 1993 and Grossman and Helpman,1991) and promotes the efficient allocation of resources through comparative advantage. The role of multilateral international institutions, such as, WTO, IMF and World Bank in promoting trade openness and growth has been immense. But the theoretical evidence of positive relation between trade openness and economic growth has been questioned by Krugman (1994) and Rodrik and Rodríguez (2001) as they are of the opinion that the effect of openness on growth is doubtful and has also been overstated.

In the 1980's due to the failure of import substitution policies, nations started to adopt outward oriented policies as it is likely to enhance economic growth (Grossman and Helpman, 1991),but the macroeconomic crisis such as unmanageable government deficit, import deficit and so on led to the turning away of the nations from it(Baldwin;2004).Liberalisation of trade was first brought under notion with the formation of General Agreement on Tariff and Trade (GATT) in 1947, which was later replaced by World Trade Organisation (WTO)in 1995, they tried to increase the openness of the economies by reducing tariffs and quotas. Trade promotes growth through number of channels such as technology transfer, scale economies and comparative advantage (Yannikaya, 2003).

The quest for growth in developing and emerging economies has encouraged them to reduce trade barriers in order to allow for comparative advantages to develop. The world has become increasingly interdependent with passage of time; this trend has been carried forward with regional integration among different nations. The regional economic groupings are playing an important role in shaping the future of the countries, especially in the field of trade (Sawhney, 2010). Brazil, Russia, India, China and South Africa are together known as BRICS, have opened up their economy and adopted export led growth which have contributed to their significant growth rates. The BRICS economies differ greatly in terms of their growth, but as an economic block their importance is expected to continue to rise in future and may outperform G6 nations.Significant trade liberalisation within the last one and half decade has been adopted by these nations so that the progress in both intra-regional and international trade has been experienced at the desired paces across the member nations by dismantling all tariff and non-tariff barriers to trade in the region, so in our paper an attempt has been made to study the effect of openness on economic growth for the BRICS.

2. Literature Review

Consensus on whether trade openness promotes economic growth is difficult to arrive. The endogenous growth theory (Romer, 1986 and Lucas 1988), highlights the importance of trade for economic growth. Several studies have established a positive linkage between trade

openness and economic growth. Dash and Sharma (2008), applied Engle and Granger two-step co integration analysis for the time period 1950-2007 and recognized that trade has a positive impact on economic growth. The findings of Busse and Koniger (2012), Marelli and Signorelli (2011), Anderson and Babula (2008) affirmed a bond between trade openness and economic growth. Yeboah ,Naanwaab, Saleem, Akuffo (2012) used C-D production function for 38 African countries(1980-2008) which indicated that trade openness have a positive relation with GDP. Yanikaya (2003) reported that restriction on trade can benefit a country depending on whether it is a developed or developing country. The studies regarding the relationship between openness and economic growth are presented in Table 1.

Table 1: Recent empirical studies on openess-growth relationship

Authors	Period	Data	Econometric Method	Findings
Sahoo and Mathiyazhagan (2003)	1979-2000.	Time Series	Johansen co-integration test	Positive relationship between export and GDP growth
Sarkar (2007)	1981- 2002 And 1961-2002	Panel Data Time Series Analysis for 51 LDCs	Random effect model and ARDL model	For 11 rich and highly trade dependent countries, economic growth is associated with higher trade.
Gorgi and alipourian (2008)	1960-2002 to 1988-2001	Panel Data for Iran and some OPEC nations	Panel Data Regression and fixed effect method	Trade openness through its mechanisms positively affects the economic growth of these countries.
Dufrénot,Mignon and Tsangarides (2009)	1980- 2006	Time Series	GMM and Two-Stage Quantile Regressions	Both for short- run and long run the effect of openness on growth is higher for countries with slow growth rate
Marelli and Signorelli (2011)	1980-2007 China and India	Panel Data Analysis	Fixed effect model with 2SLS	Trade openness promotes economic growth for India and China
Gries and Redlin(2012)	1970- 2009	Panel Data Analysis	Panel cointeregration test and Panel ECM with GMM	In long run there exist a positive relation while in short run relation becomes positive with increasing income
Ulasan (2012)	1960- 2000	Time Series	OLS	Openness variables are positively related to long run economic growth
Kahnamoui (2013)	1970-1999. 90 Non-OCED countries	Panel Data Analysis	OLS	There is a significant and positive impact of trade openness on economic growth in presence export credits.

Authors	Period	Data	Econometric Method	Findings
Shaheen, Muhammad Ali, Kauser and Bashir Ahmed(2013)	1975-2010. Pakistan	Time Series	Johansen Co-integration approach	Trade liberalization and Gross Fixed Capital Formation have positive and significant impact on economic growth.
Chatterji, Mohan and Dastidar(2013)	India 1970-2010	Time Series Analysis	Vector Autoregressive method	They found that trade openness is good for India's growth

Source : Compiled by the authors

3. Objectives of the study

The study has been taken up in the view to determine the presence of any relation between trade openness and economic growth of BRICS.

4. Hypothesis of the study

There exists a significant relation between trade openness and economic growth of BRICS.

5.1 Data and Variables

The analysis is based on panel data for BRICS nation (N= 1... 5), namely Brazil, Russia, India, China and South Africa for the time period 2004 to 2012 (T = 1... 9) to analyze the effect of trade openness on economic growth.

The study used Gross domestic product (Constant 2005 US $) as dependent variable, hereafter it will be referred as GDP and trade openness as the independent variable (export + import/ GDP). The data is taken from the World Development Indicators, 2013. For carrying out the estimations in the study, the GDP data-set and trade openness data- set are converted into their log forms.

5.2 Model Specification:

To investigate the impact of trade openness on economic growth in terms of GDP we used panel data analysis. The use of panel data has an advantage that it can exploit both the time series and cross sectional dimensions of data and provide more efficient estimations of the relationship between the dependent and independent variables by considering wider sources of variation. For analyzing the effect of trade openness on economic growth, we follow the literature on panel data analysis and consider this empirical model for simple regression with error components disturbances (Baltagi, 2005):

$$Y_{it} = \alpha + \beta X_{it} + u_{it} \quad \ldots\ldots\ldots\ldots (1)$$

where Y_{it} is GDP of country i in year t; X_{it} denotes trade openness of country i in the year t, α is a constant, u_{it} is the error term; and β the country parameters related to trade openness.

The panel data model utilize a one-way error component model for the disturbances, with

$$u_{it} = \mu_i + \nu_{it} \quad \ldots\ldots\ldots\ldots\ldots(2)$$

where μ_i denotes the unobservable individual-specific effect and ν_{it} denotes the remainder disturbance. The panel data model is then estimated using a fixed effects and random effects model. In fixed effects model the μ_i are assumed to be fixed parameters to be estimated and the remainder disturbances stochastic $\nu_{it} \sim$ IID $(0, \sigma^2_{\nu})$. The X_{it} are assumed independent of the ν_{it} for all i and t. FE estimator cannot estimate the effect of any time invariant variable as these variables are wiped out by the within transformation. FE has less degree of freedom and takes into calculation only the variation 'within' units, not between units. An advantage of random effects is that we can estimate individual and time invariant variables. RE model is suitable as differences across economic groups (entities) have some influence on our dependent variable. The random effects model is obtained by assuming that μi are random. And

$\mu_i, \nu_{it} \sim$IID$(0, \sigma^2)$ and the μ_i are independent of the ν_{it}. In addition, the X_{it} are independent of the μ_i and ν_{it}, for all i and t. The use of panel data allows us not only to investigate dynamic relations but also to control for unobserved cross-section heterogeneity. With panel data, the issue is whether to use a random effects or a fixed effects estimation approach.

5.3 Breush-Pagan Lagrange Multiplier (LM) Test

The LM test was performed in order to determine the type of effects (random or fixed). Because the selected countries are not in a certain economic group, it was expected that individual effects would be random. Whether the effects are really random or not can be determined by LM test (Baltagi. 2001:15). The null hypothesis in the LM test is that variances across entities are zero i.e., no significant difference across units (i.e. no panel effect). When the probability value obtained from the test results is smaller than 0.05, H_0 is rejected and it is decided that the effects are random. In this case, estimation is made through the one-way random effect model. If H_0 is accepted, model estimation is made through the one-way fixed effect model**.** Test hypothesis is as follows:

$H_0 = \sigma^2_{\mu} = 0$ (no random effect)

$H_1 = \sigma^2_{\mu} \neq 0$ (random effect)

5.4 Hausman Specification Test

Hausman test is not an alternative for LM test, but it functions to check the decision by LM test. Hausman test, tests whether the unique errors (μ_i) are correlated with the regressor.

Test hypothesis:

$H_0 : Cov(\mu_i, X_{it}) = 0$

$H_1 : Cov(\mu_i, X_{it}) \neq 0$

Here μ_i indicates the individual effects in the equation (2), but X_{it} indicates the explanatory variables in the equation (1). When the probability value of χ^2 obtained from the analysis is smaller than 0.01, H_0 is rejected and in this case fixed effects model is used. However, when H_0 is accepted, random effects model is used. Hausman test is a function to check the decision by LM test.

6. Results and Discussions

The panel unit root test considers both time and cross section dimension of the data. The study deploys Levin-Lin-Chu (LLC) (Levin et al., 2002) for testing the stationarity of the variables. The LLC model allows for the heterogeneity only in the intercept and imposes homogeneity on the autoregressive coefficient. The test is based on the model below:

$$\Delta Y_{it} = \alpha_i Y_{it-1} + \sum_{j=1}^{\mu_j} \beta_{ij} \Delta Y_{it-j} + X_{it}\delta + \varepsilon_{it}$$

Where α_i is the error correction term and when $|\alpha_i| < 1$, the series is trend stationary, on the other hand if $|\alpha_i| \geq 1$, the series is non-stationary.

$H_0 : \alpha_i = 1$, the series is non-stationary.

$H_1 : \alpha_i < 1$, the series is stationary

When the probability value of the stationary test is less than 0.05, H_0 is rejected and it is decided that the series are stationary. LLC test results are on Table 3, which shows, that both the variables are stationary in the level value.

Table 3

LLC Panel Unit Root Test		
Variables	Statistic value	p- value
GDP	-4.28	0.00*
Open	-4.35	0.00*

Source : Calculated by the authors

Panel data analysis is estimated by the one-way fixed effect model and one- way random effect model; the result are on the Table 4.The test statistics in Table 4, represents that model is reliable statistically.

Table 4: Regression Results

Variable	FE(within regression)				RE(GLS regression)			
	Co-efficient	Standard Error	t-statistics	p-value	coefficient	Standard Error	z-statistics	p-value
Constant	28.09465	.11434	245.71	0.000	28.00868	.10868	257.70	0.000
Open	-65.601	.37923	-172.98	0.000	-65.31591	.36057	-181.14	0.000
	Overall R^2 =0.9994		WithinR^2= 0.9997		Overall R^2 =0.9994		WithinR^2= 0.9997	
	F(1,39)= 60373.21 Prob>F = 0.0000				Wald chi2 = 66406.74 Prob> chi2 = 0.0000			

Source : Calculated by the authors

Table 5: FE versus RE estimator: Diagnostic test

Dependent variable (model)	Breusch–Pagan LM test	Hausman specification test
GDP	χ2=129.32(0.0000)*	χ2=5.86(0.0155)

Source : Calculated by the authors

*Null hypothesis rejected

The results of the Hausman Specification and Breusch–Pagan LM tests are summarized in Table 4.LM test was conducted and χ^2 = 129.32, χ^2 p-value =0.0000 is obtained which is smaller than 0.01, Ho was rejected and hence it was decided that the effects are random. In this case estimation is made through the one -way random effect model. Hausman test was conducted and χ^2 = 5.86, χ^2 p- value =0.0155 was obtained and since this value is not smaller than 0.01, H0 hypothesis is accepted and it is decided that random effect model is suitable. In this case, it is necessary to do the analysis with the random effects model and this result supports the LM test results. As it can been seen from the table, the Hausman Specification test cannot reject the null hypothesis whereas Breusch–Pagan LM tests reject the null hypothesis. These findings suggest that the RE estimator can be used without fear of producing biased estimates and the results are shown in Table 4.

From Table 4, it is seen that trade openness has a positive influence on GDP which is in line with the literature. Coefficient of openness indicates that 1% increase in openness in the BRICS nation will lead to 28% increase in GDP.

Conclusion

This study tried to investigate the effect of trade openness on economic growth via panel data method analysis for BRICS nations (viz, Brazil, Russia, India, China and South Africa) for the period 2004 – 2012. One- way random effect model was used in the analysis as LM tests and Hausman test results favored existence of random effect.

The analysis results support the hypothesis that openness will increase the economic growth. It was determined that 1% increase in openness level increased the growth at the rate of 28%. In recent days, these fast developing economies of the world having larger market potentials are expected to gain benefits from opening their economy. Therefore, policies should to be implemented in the way, such that the increase in openness especially in exports will support economic growth by increasing the economic performance of the countries.

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