Studying trade potential among the Group of Eight Developing Countries (D8) and Industrialized Nations (G8) (1990-2012)

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Abstract: Those countries that have lesser economic power could gather together as a framework of economic zones and create a larger union. To become successful, such unions require a leader from advanced industrial countries that are in better circumstances with respect to extent of domestic market, financial strength and technology level. Since one of the objectives of creating the group of eight developing countries (D8) is improving its economic cooperation with the group of eight industrialized nations (G8), the present research thru panel data studies factors that affect trade flows between the G8 and the D8 from 1990 to 2012. Therefore, a model based on trade flows of the countries that are members of the D8 and the G8 has been designed in order to study effect of related variables on their trade potential. Results indicate variables such as total gross domestic product of parties involved in trade, difference in per capita income of the countries and geographical distance have a significant impact on the trade potential of the G8 and the D8, but variable of similarity in economic size does not have a significant effect on their trade potential.

Key words: The D8; The G8; Trade potential

1. Introduction

The world is experiencing a phenomenon called globalization and this process requires a greater presence of countries in the field of international economy. Creating regional blocs and economies will be possible through removing tariff barriers in the region and making larger markets available for production units; therefore, barriers to capital and technology transfer in the region will be removed and there will be wider horizons for production units. Nowadays, economic integration is an important element of economic decisions in most countries. In fact, countries are trying to be economically integrated with each other to benefit from such integration. Economic integration indicates theory of creation of a larger economic unit through some smaller national economies. Therefore, trade obstacles in the way of trade among members of the integration scheme will be removed and their cooperation and coordination in trade, financial and economic activities will develop (Gurler 2000).

Economic integration, especially, in developing and least developed countries creates industries and provides wide markets for those industries that have advantage of economies resulting from mass production. Hence, we can consider integration as a mechanism that rationally divides labor between countries; they cannot benefit from division of labor solely.

In this paper, trade potential within the Developing-8 and the group of eight industrialized nations (G8) from 1990 to 2012 was studied.

2. Trade potential

Trade potential is trading volume of countries that could potentially trade with each other in regard to determining factors of trade flows. There are different methods to determine trade potential within countries. Estimating methods for trade potential can be divided into three groups: 1. Trade potential simple estimating method 2. Estimating trade potential through similarity-based method 3. Estimating trade potential using the gravity model (Arnon et al 1996).

Yang and Zarzoso (2014) used panel data and the gravity model to study impacts of trade and trade diversion creation resulting from free trade agreement among countries that are members of China and ASEAN bloc. Their research period was from 1995 to 2010. Their results show establishment of free trade agreement and trade relations between China and ASEAN members, increases trade potential between them Chakravartya, & Chakrabartyb (2013) in their paper named "A gravity model approach to terms-of-trade fluctuations between India and ASEAN" from 1971 to 2010 and thru the gravity model realized due to fluctuation in India GDP growth, trade between India and ASEAN countries has fluctuation and geographical distance has greater impact than economic size on trading volume of these countries. Nazia and Hafiz (2011) estimated Pakistan's trade

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potential in an article. Their research period was from 1981 to 2005 and they used the gravity model for 42 countries. Given their findings, Pakistan has a high trade potential with Asia-Pacific region countries. Rahman (2010) used the gravity model and ordinary least squares method to study Australia's trade potential with 50 countries from 2001 to 2005. Results indicate variables such as economic size, GDP per capita, existence of a common language in Australia's bilateral trade have positive relations with each of the studied countries and geographical distance between trade partners has a negative effect on Australia's trade potential.

3. The gravity model specification to evaluate the D8 and G8 trade potential

The model population includes countries of the Developing-8 and the group of eight industrialized nations.

Trade flow is an important, yet complex phenomenon and depends on different economic

$LnEXPORT_{ijt} = \alpha_i + \beta_1 LnTGDP_{ij,t} + \beta_2 LnSGDP_{ijt} + \beta_3 LnDGDPPC_{ijt} + \beta_4 LnDIST_{ij} + \varepsilon_{ijt}$

In which:

$TGDP_{ijt} = Ln(GDP_i + GDP_j)$

$$SGDP_{ijt} = Ln\left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}}\right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}}\right)^2\right]$$

$GDPPC_{ijt} = \left| LnGDPPC_i - LnGDPPC_j \right|$

4. Model variables

$EXPORT_{ijt}$ is export volume of the D8 to G8; $TGDP_{ijt}$ is total gross domestic product of parties; $SGDP_{ijt}$ is similar size of countries; $DGDPPC_{ijt}$ is difference in gross domestic product per capita of trade parties and $DIST_{ij}$ is geographical distance between capital of j and i countries. ($TGDP_{ijt}$, $SFDP_{ijt}$ and $DGDPPC_{ijt}$ variables are related to the key principle of new trade theory and $DIST_{ij}$ is considered as a trade barrier). ε_{ijt} is the model total error with zero mean and variance identified in both periods. $TGDP_{ijt}$ indicates total gross domestic product of the D8 countries (i) and the G8 members (j) and it is added as an index for their economic size to the model. $SGDP_{ijt}$ variable indicates similarity in the size of countries. According to new trade theory, whenever similarity in the size of countries is greater, trading volume between them will increase, hence, $SGDP_{ijt}$ has a positive impact on trade potential. $DGDPPC_{ijt}$ is difference in gross domestic product per capita of the countries. Positive sign of its β3 is based on Heckscher–Ohlin theorem and its negative sign supports Linder hypothesis. (Roberts 2004) Given Linder hypothesis, economic dissimilarity reduces trade potential. Due to structural differences in the economies of the D8 and G8, it is expected that β3 will be negative and follow Linder hypothesis. $DIST_{ij}$ indicates geographical distance between capitals of the two trading partners. Whenever geographical distance between involved parties in trade is greater, transport costs

and noneconomic variables. In order to estimate the gravity model, we can use several variables. One of the specific characteristics of this model is usage of economic and non-economic explanatory variables derived from a combination of several trade models in gravity equation. In international economy, gravity models provide an opportunity to estimate trade potential at a given time and at the same time from a perspective of exporting and importing countries. In fact, estimating trade potential between two countries in the gravity model will be possible thru its determining factors. We could add available barriers and incentives as either qualitative or quantitative variables that have been quantitative in acceptable markets to the model and survey their impact on trade potential.

Augmented gravity model used in this section following Helpman (1987), and Stack and Pentecost (2011) is based on a combination of new trade theory and trade barriers.

increases; hence it is expected that effect of this variable on the countries trade flows will be negative. ($\beta_4 \langle 0$)

5. Data analysis

5.1. Unit root test

Before estimating the model, it is necessary to test stationary state of all variables. Because their non-stationary state both in a time series and panel data causes spurious regression. In contrast with what is common about a time series data, we cannot use Dicky-Fuller and augmented Dicky-Fuller (ADF) tests to test stationary, we should somehow test variables' total stationary. Therefore, we used LCC (Levin, Lin and Chu) test and its results are in Table 1.

Table 1: results of unit root test on the model variables

Variable name	Statistic	Probability
EXPORT	-4.0421	.001
TGDP	-5.2098	.001
SGDP	-2.2494	.001
DGDPPC	-3.8251	.001

According to Table 1, results of total unit root test on the model variables show null hypothesis about non-stationary state of variables at 99-percent-confidence level is rejected; it means all the model variables are stationary. When we are sure about the

stationary state of the variables, there is no need to do co-integration test and be concern about spurious regression, we can estimate the model.

5.2. Estimating the gravity model

Results of model 1 estimate regarding F-Limer statistic are in Table 2 and zero probability of null hypothesis that says the data should be examined in combination, is rejected in favor of the other hypothesis that is about the existence of capability in panel data.

Hausman (H) test makes selecting among fixed-effects and random-effect method possible, statistic and probability of it shows null hypothesis on selecting random-effects test is accepted. To verify random-effects method, we use Breusch–Pagan test

in order to choose either ordinary least squares or random-effects test. Due to zero possibility of Breusch-Pagan test in table below, null hypothesis on homogeneity of variance is confirmed. Therefore, given these results, we should estimate the specified model thru random-effects method. Results of the model estimate based on random-effects methods are in Table 3.

Table 2: F-Limer statistic, Hausman and Breusch-Pagan

	F test	Hausman test	Breusch-Pagan test
Statistic	3.12	5.35	798.16
Probability	.001	.148	.001

Table 3: results of the model estimate based on random-effects test

Independent variables	Variables coefficients	Coefficients estimate	Standard deviation	Z statistic	Probability
$LnTGDP_{ij,t}$	$\beta 1$	.8738866	.009	26.45	.001
$LnSGDP_{ij,t}$	$\beta 2$	.0262474	.022	1.21	.225
$LnDGDPPC_{ij,t}$	$\beta 3$	-.0412409	.012	-3.37	.001
$LnDIST_{ij}$	$\beta 4$	-.1051729	.028	-3.73	.001
$Cons$	α	.9928137	.442	2.25	.025
R^2 = 0.86		F-Limer statistic: 3.12		Probability: 0.001	

6. Conclusion

According to the results in table 3, coefficient of variable of total gross domestic product of involved parties in trading, as the most appropriate variable for determining economic sizes of countries, is positive in accordance with theoretical expectations and statistically, at 95 percent confidence level is significant and 0.87%. Obviously, economic strength of a country is in its gross domestic product. Hence, GDP indicates market size of any country. Therefore, when GDP of host country is higher, its domestic market size will be wider; as a result, consequences resulting from investment will be more effective. In fact, with an increase in gross domestic product, country's ability in attracting and producing will increase and there will be more supply and demand for trade between two trade partners. Positive impact of gross domestic product on trading volume is compatible with main hypothesis of the gravity model, when economic size increases, countries' trade potential will increase as well. SGDP variable, similarity in gross domestic product, has little effect but it is meaningless statistically. Therefore, SGDP of trade partners does not have any impact on the D8 trading volume to the G8. Since the D8 includes developing countries and the G8 includes advanced industrial economies, there is a heterogeneity in the structure of these economies. $DGDPPC_{ij}$ variable, difference in gross domestic product per capita, has a negative, significant impact on the studied countries trade flows. Its negative sign is in compatible with Linder hypothesis about a reduction in trade flows due to economic dissimilarity; so that

if the difference in the two countries as much as ten percent increases, reduction of trade relations between them will be 0.4%. Geographical distance is an important factor for determining trade size between two trade partners. Whenever distance between two trade partners is greater, transport costs increases. Results of the estimate indicate 1% increase in countries geographical distance, decreases 0.1% of their bilateral trade volume. Statistically, distance variable is negative and significant.

Results of the evaluation show variables such as total gross domestic product of involved parties in trade, difference in per capita income of countries and geographical distance have significant impact on trading volumes among members of the D8 and countries of the G8, however, similarity in economic size does not have any significant effect on trade potential. Contrary to D8, the G8 countries have greater economic growth, hence, the D8 can identify needs of parties thru recognizing potentials, and relative ability and advantages of the G8 countries and trade goods and services using a proper planning and vision to meet their needs. Moreover, formulating policies for the proper use of the advantages, developing economic cooperation, facilitating laws relating to tariff and goods and services customs and setting joint ventures up in those industries and sectors of these countries that are proper for developing production, could in a long run contribute to trading volume among them.

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