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Intraindustry Trade between Malaysia and Other Association of South East Asian Nations Countries: A Panel Data Approach

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ABSTRACT

This study aims to determine the determinants of intraindustry trade (IIT) between Malaysia and their Association of South East Asian Nations (ASEAN) trade partners by using the panel data approach. Eight ASEAN countries are selected while nine variables are used in this study with the duration of data start from 2000 to 2014. The result shows that fixed effect model is the best model and only three variables are significant at the 5% level of significance. Thus, differences in gross domestic products, foreign direct investment and gross fixed capital are the determinant of IIT between Malaysia and their ASEAN trade partner.

Keywords: Intraindustry Trade, Pool OLS, Fixed Effects Model, Random Effects Model, Least Square Dummy Variables
JEL Classifications: C01, C23, F12

1. INTRODUCTION

The intraindustry trade (IIT) was first introduced in the 1960s by Verdoorn (1960). Then, Balassa (1966) realized that IIT between different countries are more important than the interindustry trade. IIT is the simultaneous export and import of products in the same product categories. Meanwhile, the interindustry trade is the exchange of product in the different product categories. The trade patterns have traditionally explained by the Heckscher-Ohlin (HO) model, which predicts that a particular country will export the products that use its relatively abundant factor intensively and imports the products that use its relatively less abundant factor intensively. According to the HO model, similar countries have little reason to trade, particularly if the trade is in similar products.

While, Davis (1995) introduces Ricardian comparative advantage theory within the HO model. He stated that if another country can supply us with low cost item compared to the item which is we produced, it is better we buy the item from them. Thus, we can get some advantage from it. This idea was simple and logic. Then, if our country can produce some item with low cost compare to other country and if other country can produce low cost item compared to our country, so it was attracted us to exchange our low cost item to the other country item. Both countries will get an advantage from this trade agreement.

Grubel and Lloyd (1975) developed the most popular index for measurement of IIT. Later, Helpman and Krugman (1985) synthesized the various attempts to model IIT (Leitao and Shahbaz, 2012). Leitao and Shahbaz (2012) argue that the theory to test for intraindustry model was emerged by Helpman (1987). Helpman (1987) analyzed organization for economic cooperation and development (OECD) countries and test some hypothesis for Helpman and Krugman (1985) model where he found the results confirmed the theory of IIT. Next, Hummels and Levinsohn (1995) continued the work of Helpman (1987) and analyzed the results for all OECD countries and extending to test non-OECD countries with panel data. They used the ordinary least squares (OLS), fixed effects and random effects models (REM). The results answered at least partially the findings obtained by Helpman (1987).

For the past 15 years, some of the empirical research on IIT are by Ekanayake (2001), Clark (2006), Chang (2009), Leitao and Faustino (2009) and Shahbaz et al. (2012). The study of Ekanayake

(2001) examines the determinants of Mexican intra-industry trade. This study concludes that IIT is positively correlated with economic dimension (average of gross domestic product [GDP] per capita), trade intensity (openness trade), and border. He also shows that IIT is negatively correlated with relative factor endowments and geographical distance. which focus on IIT for developed countries.

Chang (2009) examines the main factors of horizontal IIT and vertical IIT including investment approaches of a firm in the industry of information technology for Asian, European and U.S. markets. The study uses time series data over the period of 1996-2005. Chang (2009) demonstrates that vertical intra-industry trade is significant between Asia and EU countries. According to Chang (2009) the regional agreements between EU and Association of South East Asian Nations (ASEAN) conduces the vertical specialization.

The study of Leitao and Faustino (2009) examines the determinants of IIT in the automobile component sector in Portugal. This manuscript considers Portuguese trade in automobile sector between European Union (EU-27), the BRIC (Brazil, India and China), and United States between 1995 and 2006. They used a panel data (static and dynamic panel data: GMM-system). This study concludes that IIT occurs more frequently among countries that are similar endowments. Later, Shahbaz et al. (2012) did similar empirical study but focus on Pakistan. They found that difference in GDP per capita between Pakistan and her trading partners have negative impact to IIT. They conclude that Pakistan should reduce the trade barrier for industry that have potential in IIT in order to increase trade agreement from different industries.

The ASEAN established in 1967 with the objective of cooperation in terms of economic, social, cultural, technical, education among the Southeast Asian countries. Among the nations in ASEAN group are Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand and Viet Nam. Moreover, according to World Bank, there are is a higher IIT among the ASEAN group of countries. Therefore, this research was conducted to determine which variables give the effects to the IIT between Malaysia and their neighbour ASEAN countries.

The remainder of the paper is organized as follows: In section two, we describe the materials and methods used in this study. In section three, we present the data analysis and discussion. Finally, section four presents the main conclusions of the study.

2. MATERIAL AND METHODS

2.1. Data

The level of IIT (dependent variables) is generally measured by the Grubel and Lloyd (1975) index. They defined IIT as the difference between the trade balance of the industry *i* and the total trade of this same industry. In order to make the comparison easier between industries or countries, the index is presented as a ratio in which the denominator is total trade.

$$\mathrm{IIT} = 1 - \frac{|x_i - m_i|}{(x_i + m_i)} \quad (1)$$

Where x_i are export to partner country *i* at time *t* and m_i are import from partner country *i* at time *t*. While the other eight explanatory variables based on the previous literatures are:

- Economic differences between countries (DGDP): This is difference in GDP (purchasing power parity [PPP], incurrent international dollars) between Malaysia and the partner country.
- Min-GDP: This is the lowest value of GDP per capita (PPP, in current international dollars) between Malaysia and the partner country. This variable is included to control for relative size effects.
- Max-GDP: This is the higher/highest value of GDP per capita (PPP, in current international dollars) between Malaysia and the partner country.
- DIM: This is the average of GDP per capita between Malaysia and the partner country. Usually the studies utilized this proxy to evaluate the potential economies of scales and the variety of differentiated product.
- DIST: This is the geographical distance between the Malaysia and the partner country.
- Foreign direct investment (FDI) inflows: The relationship between IIT and the level of FDI in a particular industry is somewhat ambiguous since FDI may be a substitute for the trade.
- Trade imbalance (TIMB): This is considered as control variable. This variable represents the net trade as a share of trade and takes a value of zero at the lower extreme if there is no TIMB and a value of one if there are neither exports nor imports.
- Gross fixed capital (GFC): This is called as gross fixed investment. The value used in percentage form.

The data for the dependent variables and explanatory variables is sourced from the World Bank, world development indicators. The empirical model is given below:

IIT=f (DGDP, log MinGDP, log MaxGDP, log DIM, FDI, TIMB, log DIST, log GFC) (2)

2.2. Panel Data Model

Panel data analysis is a means of analysing subjects within multiple sites over a defined period of study. Panel analysis allows study of the dynamics of change of short time series with repeated observations of enough cross-sections. The combination of time series and cross-section can increase the quantity and quality of data in means that would be impossible using only one of these two dimensions (Gujarati, 2003). There are three panel data analytic models commonly used in analysis, namely pooled OLS model, fixed effects models, and REM.

In the situation when there is neither significant individual nor significant temporal effects, all the data can be pooled and an OLS regression model can be estimated. This model is sometimes called the pooled regression model or pooled OLS model (POLS). The fixed effect model (FEM) (also called least square dummy variable model), has constant slopes, but intercepts that differ according to the cross-sectional (group) unit, for example in this paper is the country or the time. Meanwhile, the thought behind the formation of REM as compared to fixed effects model is that, the variation across individual is assumed to be random and uncorrelated with the predictor or independent variables included in the model. An advantage of random effects is that time invariant variables can be included in the model where in the fixed effects model these variables are absorbed by the intercept.

3. RESULTS AND DISCUSSION

Table 1 present the model estimation for POLS, FEM and REM. A few diagnostic tests need to be employed before the best model can be selected among the three models. The first test is the redundant test with examines the existence of fixed effect. The Chi-square statistic of 139.06 and P value of 0.000 indicate significant result where FEM is better than POLS. The second test is the Breusch-Pagan Lagrange multiplier test. This test investigates if there any random effect exists. If the test is insignificant then the prefer model is the pooled OLS. Otherwise, the random effect model is selected. With the chi-squared statistic of 84.69 and P value of 0.000, we have enough evidence to reject the null hypothesis. Therefore, we can conclude that the random effect model is more appropriate. Finally, Hausman test is applied in order to choose either fixed or random effect models. The null hypothesis of random effect model against FEM are used. Results show the Chi-square statistic of 212.56 with P value of 0.00. Thus the null hypothesis is rejected with imply a FEM is the preferred model.

From Table 1, there are three explanatory variables which are significant at the 5% level for the FEM. There are the differences in GDP (DGDP), FDI and GFC in logarithmic form (Log GFC). Furthermore, the analysis continues with finding the country effect by using the FEM with dummy variables. This model is called least square dummy variables (LSDV). Table 2 only shows the coefficient of the country. It appears that all ASEAN countries have a significant IIT with Malaysia.

Table 1: Analysis result of POLS, FEM and REM

Coefficient	POLS	FEM	REM
Intercept	1.205905**	1.005087**	1.205905**
DGDP	0.000028**	0.000055**	0.000028**
log MinGDP	0.466269**	0.060346	0.466269**
log MaxGDP	1.630405**	−0.195337	1.630405**
log DIM	−2.099429**	0.091472	−2.099429**
FDI	0.000038**	0.000023**	0.000038**
TIMB	−0.005179**	0.000275	−0.005179**
log DIST	−0.137188**	−0.029202	−0.137188**
log GFC	0.012281	0.144769**	0.012281
F test	59.99**	91.98**	59.99**
R^2	0.792	0.925	0.792

**Significance at 0.05 levels of significance DGDP: Diffrences in gross domestic product, REM: Random effects model, FEM: Fixed effect model, POLS: Pooled ordinary least square model, FDI: Foreign direct investment, GDP: Gross domestic product

Table 2: Country effect on fixed effect model

Country	LSDV
Thailand	0.106809**
Cambodia	0.168749**
Singapore	0.256166**
Indonesia	0.087011**
Laos	0.088275**
Vietnam	0.126794**
Philippines	0.145278**
Brunei	0.900087**

**Significance at 0.05 levels of significance. LSDV: Least square dummy variables

4. CONCLUSION

The objective of this study was to determine the determinants of IIT between Malaysia and ASEAN countries using panel data approach. The results found that the best model for this study is FEM and out of the eight variables only three determinants are significant. These determinants are DGDP, foreign direct investment (FDI) and GFC (log GFC). The findings indicate that the increase of intraindustry will be associated to product differentiation, quality, brand and design. This initiative will promote FDI from neighbor countries and capital from local industry. While the LSDV model uncover that all the ASEAN nations are closely related in term of trading either IIT or interindustry trade.

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REFERENCES

Balassa, B. (1966), Tariff reductions and trade in manufactures among the industrial countries. American Economic Review, 56(3), 466-473.

Chang, S.C. (2009), Horizontal and vertical intra-industry trade and firm's investment strategies: Evidence from the IT industry in the Asian, EU and US. Markets, Global Economic Review, 38, 63-76.

Clark, D. (2006), Country and industry-level determinants of vertical specialization based trade. International Economic Journal, 20(2), 211-225.

Davis, D.R. (1995), Intra-industry trade: A Heckscher-Ohlin-Ricardo approach. Journal of International Economics, 39, 201-226.

Ekanayake, E.M. (2001), Determinants of intra-industry trade: The case of Mexico. The International Trade Journal, 15(1), 89-112.

Grubel, H., Lloyd, P. (1975), Intra-Industry Trade: The Theory and Measurement of International Trade in Different Products. London: Palgrave Macmillan.

Gujarati, D. (2003), Basic Econometrics. 4th ed. New York: McGraw Hill.

Helpman, E. (1987), Imperfect competition and international trade: Evidence from 14 industrial countries. Journal of Japanese and International Economics, 1(1), 62-81.

Helpman, E., Krugman, P. (1985), Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy. London: MIT Press.

Hummels, D., Levinsohn, J. (1995), Monopolistic competition and international trade: Reconsidering the evidence. Quarterly Journal of Economics, 110(3), 799-836.

Leitao, N.C., Faustino, H.C. (2009), Intra-industry trade in the automobile components industry: An empirical analysis. Journal of Global Business and Technology, 5(1), 32-41.

Leitao, N.C., Shahbaz, M. (2012), Liberalization and United States' intra-industry trade. International Journal of Economics and Financial Issues, 2(4), 505-512.

Shahbaz, M., Leitao, N.C., Butt, M.S. (2012), Pakistan intra-industry trade: A panel data approach. International Journal of Economics and Financial Issues, 2(2), 225-232.

Verdoorn, P.J. (1960), The intra block trade of Benelux. In: Robinson, E.A.G., editor. Economic Consequences of the Size of Nations. London: Palgrave Macmillan. p291-321.