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THE GLOBAL FINANCIAL CRISIS AND ECONOMIC INTEGRATION: EVIDENCE ON ASEAN-5 COUNTRIES[1]

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Abstract

The ASEAN Charter has been ratified by the ten member countries of ASEAN in 2008. This is to reaffirm the commitment of the member countries to the establishment of the ASEAN free trade area by 2015. The ASEAN members must prepare themselves with the economic and non economics aspects to be ready facing this era. Nevertheless, the global financial crisis could be a major hindrance to the implementation of the ASEAN free trade area. In this study, we attempt to determine how the global financial crisis could possibly affect the creation of the regional economic integration among ASEAN countries.

The study based on Newtonian paradigm on economic regional or namely the gravity model. Gravity model explored the economic relation of the many regions or countries. The core properties of gravity model are export, GDP, population and distance inters countries. This followed by the analysis of the possibility of the economics integration using the core gravity model. Next, we will incorporate the Exchange Market Pressure (EMP) as the financial crisis index to the core gravity model, to determine the influence of financial crisis in ASEAN-5's economic integration. We will use the panel data method to execute the model. The result indicates EMP giving negative effect on ASEAN-5's economic integration. In overall result reported here indicate that economic integration is possible to implement on ASEAN-5 countries. But, the global financial crisis will be threat implementation of the economic integration.

Keywords*: economic integration, gravity model, global financial crisis.*

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INTRODUCTION

One prominent topic to making sustainability macro economics on ASEAN countries is building of economic integration. Many schemes of economic integration had been discoursed consist of Asian Monetary Fund (AMF), ASEAN Economic Arrangement (AEA), and ASEAN free trade area. To make strong basic of economic integration on free trade area framework, the leader of the ASEAN's countries has ratified The ASEAN Charter on 2008. This is to reaffirm the commitment of the member countries to the establishment of the ASEAN free trade area by 2015.

Nevertheless, the global financial crisis could be a major hindrance to the implementation of the ASEAN free trade area. In this study, we attempt to determine how the global financial crisis could possibly affect the creation of the regional economic integration among ASEAN countries. The study based on Newtonian paradigm on economic regional or namely the gravity model. Gravity model explored the economic relation of the many regions or countries.

Meanwhile, to explore the index economic crisis, we use the exchange market pressure (EMP). Girton & Roper (1977) firstly developed the EMP in Canada. Many economist used EMP to estimate in many countries like Connolly & Silveira (1979) take the Brazil economy case and Burderkin & Burkett (1990) on Canada case. In the context of economic crisis on 1990s and the last 2000s, Tanner (2001) and Pontines & Siregar (2007) explore the impact of global economic crisis on Asia Countries.

We will use the panel data method to execute the gravity model. This followed by the analysis of the possibility of the economics integration using the core gravity model. The core properties of gravity model are export, GDP, population and distance inters countries. Next, we will incorporate the Exchange Market Pressure (EMP) as the financial crisis index to the core gravity model, to determine the influence of financial crisis in ASEAN-5's economic integration.

LITERATURE REVIEW

Prior research of economic integration usually used to optimum currency area (OCA) theory. OCA based on the seminal contributions of Mundell (1961), McKinnon (1963) and Kenen (1969). Mundell (1961) viewed factor mobility as the key criterion on the choice a currency union. McKinnon (1961) argued that openness to external trade should be another important criterion. Kenen (1969) added that product diversification as criterion of currency union. These three papers represent the core theory of optimum currency areas and have been the basis for much of the recent empirical work.

According Tavlas (1993) and Mongelli (2002), characteristics of currency optimum divide of non economic and economic criteria. The non economic criteria consist of politics, history and language aspects, meanwhile economic criterion are business cycle, trade linkages and financial integration. Business cycle aspects are similarity of shock and inflation; the degree of factor mobility; the openness and size the economy; price and wage flexibility and fiscal integration. Trade linkages aspect are the degree of commodity diversification, and the degree of goods market integration. Financial market aspect is financial market integration consist of stock and money market.

Some researchers focused to develop model to test trade linkages criterions. Frenkel and Rose (1998) developed a new framework namely the endogeneity OCA. They focused on trade linkages among countries and used the gravity model of international trade. The large literature that employ the gravity model of international trade point to distance, income level, population proxy of country size. Rose (2000) and Rose & Engel (2002) developed

the gravity model with extend economic variable like regional trade arrangement and non economic variable like common language, common land border, common nation, common colonizer and its relationship. These extra effects are usually statistically significantly and economically sensible, though they add little to the overall explanatory power of the model.

The gravity model used to explore the impact of currency union on international trade. They have been discussed at length by Rose (2000) and Frankel & Rose (2002). Rose (2000) augmented gravity model to estimate the effects of currency unions and exchange rate volatility on trade. He used the standard gravity equation consist of bilateral trade as dependent variable and GDP, GDP per capita, distance, volatility of bilateral exchange and extended with many dummies variables as independent variables. The dummies variables consist of contiguity, common language, regional trade agreement, common nation, colonies, colonized, and common currency. The model is estimated using 33.903 bilateral trade observations spanning five different year (1970, 1975, 1980, 1985, & 1990) executed by OLS and pooled method. The study indicated that effect of exchange rate volatility on trade is strong negative, the effect of common currency on trade is the larger positive, and the effect of common currency is much larger than the hypothetical effect of reducing exchange rate volatility to zero.

Frankel and Rose (2002) observed the implication of common currency for trade and income by augmented gravity model. They used the standard gravity equation consist of log bilateral trade as dependent variable and log GDP, log GDP per capita, log distance, number landlocked, log of product of land area, and extended with many dummies variables as independent variables. The dummies variables consist of common land border, common language, colonizer, ex-colony/ colonizer, political union, common FTA, currency union, and currency board. The panel data set includes observations from almost 8000 country-pair observation from over 180 countries and territories at five year intervals from 1970 through 1995 estimated by OLS. The result of study indicated that currency union seems to have a large effect in creating trade.

Rose & van Wincoop (2001) researched the relationship of a national currency and the currency union. The thrust of this paper has been to estimate the real benefits of currency union. Currency union reduces trade barriers associated with national borders, leading to substantial increases in both trade and welfare. That is, a national currency seems to be a significant barrier to trade. Reducing these barriers through currency unions like EMU or dollarization in the Americas will thus result in increased international trade. Our empirical work indicates that this effect may be large, in excess of 50 percent for EMU. It will be unexpected. And it will be beneficial. Eliminating the monetary bar- rier to trade brings benefits for consumers- possibly in the form of more currency unions.

Rose (2004) explored many researches of effect of currency union on trade with the gravity model by meta-analysis method. Meta-analysis is a set of quantitative techniques for evaluating and combining empirical results from different studies. He used thirty-four recent studies have investigated the effect of currency union on trade, resulting in 754 point estimates of the effect. The main findings of researches that the hypothesis that there is no effect of currency union on trade can be rejected at standard significance levels and the combined estimate implies that a bilateral currency union increase trade by between 30% and 90%.

Summary (1989) and Oh & Selmier (2008) enhanced the gravity model with international political factors. Summary (1989) stated that international political as well as economic variables have been used to

explain US bilateral trade. She used the standard model of gravity consist of export and import as dependent variables and GDP, distance, population and enhanced four international political variables. as independent variables. The international political variables were arms transfer, political rights, civilian employees, and foreign agents. Data included for sixty-six US trading partners on 1978 and 1982. The result of this study indicated that arms transfer, civilian employees and foreign agents were to be found positive and significant, but political rights were insignificant.

Meanwhile, Oh & Selmier (2008) developed the gravity model with international diplomacy aspect in ASEAN countries. They used uni-directional import as dependent variable and real GDP, real per capita GDP, distance all variables in logarithm, dummy variables, and diplomacy variables as independent variables. Dummy variables consist of common border, language, colonizer, and colonial relationship. Diplomacy variables were amount of meeting consist of summit, ministerial, forum, and committee. This study indicated that only forum meeting of the diplomatic relationship was be found positive, but on estimating with first different panel equation refer summit and forum meeting were be found positive and significant. In general this study stated that diplomatic relations consistently increase directional trade flow.

We follow Rose and Engel (2002) in using the gravity model of international trade as our framework. In particular, we ask whether bilateral trade between two countries is higher if they both use the same currency, holding constant a variety of other determinants of international trade. The large literature that employs the gravity model of international trade points to distance, income levels, and country size as being the most critical drivers of bilateral trade flows, a result which we corroborate here. The precise model we employ is completely standard and can be written thus:

$$\ln (xij) = \partial CU_{ij} + \beta_0 + \beta_1 \ln (D_{ij}) + \beta_2 \ln (y_i y_{j/} pop_i pop_y) + \rho^* z_{ij} + e_{ij} \quad (1)$$

where Xij denotes the value of bilateral trade between countries i and j, CU is a binary dummy variable which is unity if i and j use the same currency and zero otherwise, Dij denotes the distance between countries i and j, Y denotes real GDP, pop denotes population, Z denotes a vector of other controls, the P denotes 8 coefficients from dummy variable, and e denotes the residual impact of all other factors driving trade. The coefficient of interest to us is y, which measures the impact of a common currency on international trade. A positive coefficient indicates that two countries that use a common currency also tend to trade more. Z are dummy variables of regional trade agreement; common language; common land border; common colonizer; same nation; colonial relationship; number of landlocked countries; log of sum of land area; log of product of land area and number of island countries.

Meanwhile, another approach the gravity model developed by Cheng and Wall (2005), the precise model can be written thus:

$$\ln x_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_1 \ln Y_{jt} + \beta_3 \ln N_{it} + \beta_4 \ln N_{jt} + \delta_1 \ln D_{ji} + \delta_2 C_{ij} + \lambda_5 L_{ij} + \varepsilon_{ij} \quad (2)$$

where X_{ij} is the value of bilateral export between countries i and j, Y_{it} is real GDP_i origin and Y_{jt} is GDP_j destination countries, N_{it} is population origin countries and N_{jt} is population destination countries, Dij is the distance between countries i and j, C_{ij} is a contiguity dummy, and L_{ij} is a common-language dummy.

MODEL AND RESEARCH METHODOLOGY

We consider the ASEAN-5 economic integration in panel data model to evaluate of the possibility of implement the project. Base on the core gravity model of Rose & Engel (2003) and Cheng & Wall (2005), we will make a modification and add EMP variable. The EMP index was the simple sum of the rate of change in international reserves and the rate of change in the exchange rate (REER). The precise model can be written thus:

$$\ln x_{ijt} = \beta_0 + \beta_1 \ln Y_{it} + \beta_2 \ln Y_{jt} + \beta_3 \ln N_{it} + \beta_4 \ln N_{jt} + \beta_5 \ln D_{ji} + \delta_1 B_{ij} + \delta_2 L_{ij} + \delta_3 RTA_{ij} + \lambda_1 EMPI_{it} + \lambda_2 EMP_{jt} + \varepsilon_{ij} \quad (3).$$

where X_{ij} is the value of bilateral log export between countries i and j, Y_{it} is log real GDP_i origin and Y_{jt} is log GDP_j destination countries, N_{it} is log population origin countries and N_{jt} is log population destination countries, D_{ij} is the distance between countries i and j, B_{ij} is a dummy of land border, L_{ij} is a dummy of common-language, RTA_{ij} is a dummy of Regional Trade Arrangement, EMP_{it} is EMP origin countries, EMP_{jt} is EMP destination countries.

According Cheng & Wall (2005), export are expected to be positively related to national incomes, and negatively relate to distance or β_1, β_2 are expected to be positive and β_5 is expected negative. The sign expected for population coefficient is ambiguous, and the literature has not tended to find a consistent sign for β_3 or β_4. Many variable dummies as Land Border (B), Common Language (L), Regional Trade Arrangement (RTA) are expected positive. Finally, variable of economic crisis (EMP) is expected negative.

We utilized panel data analysis to execute the gravity model of economic integration. We compare three method of panel data consist of pooled least square (PLS), generalized least square (GLS), and seemingly unrelated regression (SUR) to execute the model.

RESULTS

The Core Gravity model

The regression result of the core gravity model is presented in table 1. We divide three (3) model consist of used pooled least square (PLS), generalize least square (GLS), and seemingly unrelated regression (SUR). Base on goodness of fit test, GLS is the best with R-square 0,943 than model PLS (0,575) and SUR (0,575). All model is robust indicate F-statistic which PLS (249,445) and GLS (3090). T-statistic test of all model passed on α = 5%, only one relationship on GLS model is land border to export.

The PLS model found that relationship national income origin countries to export find to be positively appropriate with theory, but for destination countries are negative. Relationship distance to export is negative which appropriate with theory. The sign population is negative appropriate with theory. The sign all variable dummies as Land Border (B), Common Language (L), Regional Trade Arrangement (RTA) are positive and appropriate with theory.

The GLS model found that relationship national income origin countries to export find to be positively appropriate with theory, but for destination countries are negative. Relationship distance to export is negative which appropriate with theory. The sign population is negative appropriate with theory. The sign variable dummies consist of Land Border (B), Common Language (L) are negative, but Regional Trade Arrangement (RTA) are positive.

The SUR indicate relationship among variables similar with model PLS. The model found that relationship national income origin countries to export find to be positively appropriate with theory, but for destination

Tabel 1. Result of Core Gravity Model

Dependent Variable: Log of Export

	PLS	GLS	SUR
(Log) Origin GDP	0.384280	0.404178	0.384512
	0.029284	0.026744	0.008103
(Log) Destination GDP	-0.125357	-0.050300	-0.112230
	0.029501	0.023233	0.009153
(Log) Origin Population	-0.191888	-0.200840	-0.194536
	0.014660	0.010911	0.003977
(Log) Destination Population	-0.130550	-0.105628	-0.133232
	0.015474	0.013159	0.003435
(Log) Distance	-0.284189	-0.446763	-0.289591
	0.046411	0.038530	0.009199
(Dummy) Land Border	0.098687	-0.002990*	0.093710
	0.039094	0.032170	0.007235
(Dummy) Common Language	0.234216	-0.074347	0.217067
	0.046619	0.041982	0.011466
(Dummy) Regional Trade Arrangement	4.059867	4.984283	4.067068
	0.365910	0.304543	0.081180
R-squared	0.575494	0.943800	0.575284
F-statistic	249.4450	3090.008	-

Sample: 1990:4 2006:4, Included observations: 65
Number of cross-sections used: 20
Total panel (unbalanced) observations: 1296

Note: standard errors are in the parentheses, and t-statistics significant is at 5 percent level (t-table=1,645), except * denotes not significant.

Source: Author's Own Calculation

countries are negative. Relationship distance to export is negative which appropriate with theory. The sign population is negative appropriate with theory. The sign variable dummies consist of Land Border (B), Common Language (L) are negative, but Regional Trade Arrangement (RTA) is positive.

The comparative result of PLS, GLS and SUR method indicate PLS and SUR get similar result. In general, model PLS and SUR are robust and appropriate with theory, but we are more prefer PLS model as main analysis of result. Base on PLS model indicate that the standard gravity model will explain possibility of ASEAN-5 economic integration.

The Augmented Gravity Model

The regression result of the augmented gravity model is presented in table 2. We divide three (3) model consist of used pooled least square (PLS), generalize least square (GLS), and seemingly unrelated regression (SUR). Base on goodness of fit test, GLS is the best with R-square 0,955 than model PLS (0,558) and SUR (0,534). All model is robust indicate F-statistic which PLS (44,126) and GLS (756.48).

Table 2. Result of Augmented Gravity Model

Dependent Variable: Log of Export

	PLS	GLS	SUR
(Log) Origin GDP	0.332150	0.099818	0.327221
	0.065506	0.033488	0.029145
(Log) Destination GDP	0.024880*	0.047217*	0.110016
	0.077084	0.032767	0.026473
(Log) Origin Population	0.769385	1.408021	0.820215
	0.171842	0.080573	0.067791
(Log) Destination Population	0.467778	0.978430	0.395708
	0.176737	0.079326	0.064320
(Log) Distance	-2.058915	-3.471423	-1.907846
	0.485559	0.220201	0.173654
(Dummy) Land Border	-0.023868*	-0.054814*	-0.142576*
	0.469733	0.144235	0.128739
(Dummy) Common Language	0.147857*	-0.298872*	0.553264
	0.493804	0.187758	0.196411
(Dummy) Regional Trade Arrangement	12.21473	20.21288	10.67342
	2.526670	1.176879	0.955794
Origin EMP	-0.015782*	0.033185*	-0.042151*
	0.204750	0.102699	0.086448
Destination EMP	-0.531298	-0.106288*	-0.124593*
	0.239124	0.109370	0.092303
R-squared	0.558455	0.955913	0.534726
F-statistic	44.12661	756.4803	-
Sample: 1990:4 2006:4, Included observations: 65			
Number of cross-sections used: 20			
Total panel (unbalanced) observations: 1296			

Note: standard errors are in the parentheses, and t-statistics significant is at 5 percent level (t-table=1,645), except * denotes not significant.

Source: Author's Own Calculation

Many relationship variables are not pass t-statistic test. SUR model get three (3) relationship are land border, origin and destination EMP. PLS model get four (4) relationship is not pass t-statistic test are destination GDP, land border, common language, origin EzMP, meanwhile destination EMP is significant. GLS model get five (5) consist of destination GDP, land border, common language, origin and destination EMP.

The PLS, SUR and GLS model have similar the relationship inter variable. The found that relationship GDP origin countries to export find to be positively appropriate with theory, but GDP destination is negative. Relationship distance to export is negative which appropriate with theory. The sign population is positive appropriate with theory. Sign variable dummy of Regional Trade Arrangement (RTA) are positive. Sign of variables origin and destination of EMP is

negative. Meanwhile, The GLS model is the origin EMP is positive. In general result state that global economic crisis get negative effect to economic integration.

CONCLUSIONS

The main objective of this paper is to examine empirically the effect of global economic crisis on economic integration. In doing so, we utilized panel data analysis to execute the gravity model of economic integration. We compare three method of panel data consist of pooled least square (PLS), generalized least square (GLS), and seemingly unrelated regression (SUR) to execute the model.

The finding can be summarized as follow. First, base on the core gravity model with PLS method indicate that the standard gravity model will explain possibility of ASEAN-5 economic integration. The PLS model find that relationship national income origin countries to export find to be positively appropriate with theory, but for destination countries are negative. Relationship distance to export is negative which appropriate with theory. The sign population is negative appropriate with theory. The sign all variable dummies as Land Border (B), Common Language (L), Regional Trade Arrangement (RTA) are positive and appropriate with theory. This result indicate that the model support the economic integration on ASEAN-5 countries

Second, The PLS, SUR and GLS model have similar the relationship inter variable. The found that relationship GDP origin countries to export find to be positively appropriate with theory, but GDP destination is negative. Relationship distance to export is negative which appropriate with theory. The sign population is positive appropriate with theory. Sign variable dummy of Regional Trade Arrangement (RTA) are positive. Sign of variables origin and destination of EMP is negative. Meanwhile, The GLS model is the origin EMP is positive. This result indicate that global economic crisis has given negative effect to economic integration.

In overall result reported here indicate that economic integration is possible to implement on ASEAN-5 countries. The ASEAN charter can be able foundation to build the free trade area. But, the global financial crisis will be threat implementation of the economic integration on ASEAN-5 countries.

REFERENCES

Burdekin, R.C.K. & Burkett, P., 1990. "A re-examination of the monetary model of exchange market pressure: Canada, 1963-1988." *The Review of Economics and Statistics*, 72 (4), 677-681.

Cheng, I.H & Wall, H.J., 2005. Controlling for Heterogeneity in Gravity Models of Trade and Integration." Federal Reserve Bank of St. Louis *Review*, 87(1), 49-62.

Connolly, M & Silveira, J.D., 1979. "Exchange market pressure in postwar Brazil: an application of the Girton-Roper Monetary model." *The American Economic Review*, 69(3), 448-454.

Frankel, J & Rose, A. (1998). "The Endogeneity of the Optimum Currency Area Criteria. "*The Economic Journal*, 108 (449), 1009-1025.

Frankel, J & Rose, A. (2002). "An Estimate of the Effect of Common Currencies on Trade and Income." *The Quarterly Journal of Economics*, 117(2), 437-466.

Girton L. & Roper, D. (1977). "A Monetary Model of Exchange Market Pressure Applied to the Postwar Canadian Experience." *The American Economic Review*, 67 (4), 537-548.

Kenen, P.B. (1969). "The Theory of Optimal Currency Areas: An Eclectic View," in Robert A. Mundell, and Swoboda, Alexander K. *Monetary Problem of International Economy*. Chicago: University of Chicago Press, 41-60.

McKinnon. R.I. (1963). "Optimum Currency Areas." *American Economic Review*, 53(4), 717-25.

Mongelli, F.P. (2002). "'New' Views on the Optimum Currency Area Theory: What is EMU Telling Us?" European Central Bank Working Paper No. 138, April.

Mundell, R.A. (1961). "A Theory of Optimum Currency Areas." *The American Economic Review* 51 (4), 657-665.

Oh, C.H. & Selmier, W.T. (2008). „Expanding International Trade Beyond The RTA Border: The Case Of ASEAN's Economic Diplomacy." *Economics Letters.*

Pontines, V & Siregar, R (2007). "The Yen, the US dollar, and the trade weighted basket of currencies: Does the choice of anchor currencies matter in identifying incidences of speculative attacks?" *Japan and the World Economy*, 19, 214–235.

Rose, A.K & Engel, C. (2002). "Currency Unions and International Integration." *Journal of Money, Credit, and Banking*, 34 (4), 1067-1089.

Rose, A.K. & van Wincoop, E. (2001). "National Money as a Barrier to International Trade: The Real Case for Currency Union." *The American Economic Review*, 91(2), 386-390.

Rose, A.K. (2000). "One Money, One Market: The Effect of Common Currencies on Trade." *Economic Policy*, XXX (2000), 7-45.

Rose, A.K. (2004). "A Meta-Analysis of the Effect of Common Currencies on International Trade." NBER Working Peper No.10373.

Summary, R.M. (1989). "A Political-Economic Model of U.S. Bilateral Trade." *The Review of Economics and Statistics*, 71(1), 179-182.

Tanner, E. (2001). "Exchange Market Pressure And Monetary Policy: Asia And Latin America In The 1990s." *IMF Staff Papers*, 47(3), 311-333.

Tavlas, GS. (1993). "The 'New' Theory of Optimum Currency Area." *World Economy*, 16 (6), 663-85.

Appendix

Variable	Definition	Sources
Export	Export between countries quarterly	DOT IMF
GDP	Gross Domestic Product quarterly	IFS IMF
Pop	Population interpolation annually population data to quarterly	IFS IMF
Distance	Distance between capitol	CIA
Border	Land Border	CIA
Language	Common language	CIA
RTA	Members of ASEAN	ASEAN
EMP	The Sum of the growth of REER and total reserve (minus gold)	IFS IMF

Sources: Author's data summary