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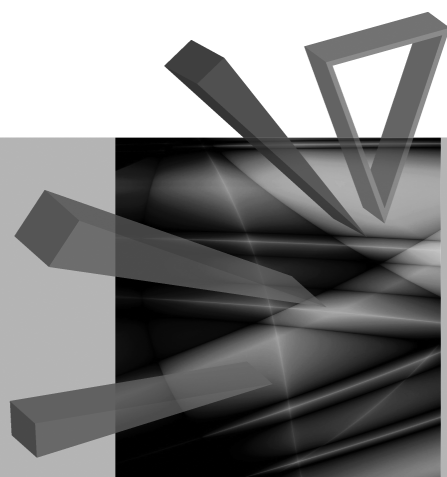
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# Contents

## Streszczenia

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# PREFERENTIAL TRADE LIBERALIZATION IN SOUTHEAST ASIA. THE CASE OF ASEAN COUNTRIES

**Summary:** This paper studies the effectiveness of preferential trade liberalization in the ASEAN countries, using four different estimations methods: OLS, fixed effects, random effects, and the Hausman-Taylor estimators. Bilateral trade data covering the period of 1967-2008 and 50 nations are used to estimate a gravity model for ASEAN 10 countries. The findings show that the regionalism of ASEAN significantly increases their bilateral trade volumes.

**Keywords:** ASEAN, gravity model, trade liberalization.

## 1. Introduction

The proliferation of preferential trade liberalization has become one of the major features of the contemporary global trading system. Given the limited ability of GATT/WTO to liberalize trade on the multilateral basis, preferential free trade areas are often viewed as the second best solution to trade liberalization. Some of them have been proved to work successfully, while others are still not very successful in stimulating trade. However, whether the preferential free trade area can really increase national welfare through trade creation depends on how deeply the free trade area stimulates regional co-operation.

The main goal of this paper is to investigate the economic link between international trade and regionalism in the ASEAN countries. The main research hypothesis is that the ASEAN membership should positively affect bilateral trade among its member countries. If the empirical results reject the null hypothesis, it means that the membership in the ASEAN can hardly help in the development of trade among its members. Otherwise, it is very important to become a member of the ASEAN. Empirically, this paper assesses how deeply the ASEAN has spurred regional co-operation in Southeast Asia. This empirical study will mainly contribute to the literature on the regional trade blocs by providing new evidence for the ASEAN countries and explaining controversial conclusions reported in the previous studies.

The structure of this paper is as follows: in Section 2, we summarize the relevant literature; in Section 3, we describe the analytical framework and data sources; in

Section 4, we discuss the econometric methodology and estimation results. Finally, Section 5 provides summary and conclusions.

## 2. Literature review

Many economists have studied the trade effects of regionalism in the ASEAN countries, using a variety of different approaches. One of the first attempts was made by Frankel and Wei, who estimated a simple gravity using the standard OLS (ordinary least squares) technique to evaluate the effects of regionalism on ASEAN's international trade.[1] Their sample covered the ASEAN 7 countries from 1967 to 1992. They implemented OLS as the econometric estimation and reached the conclusion that ASEAN's regionalism was statistically significant for ASEAN's international trade. They concluded that the establishment of AFTA (Asian Free Trade Agreement) had a positive impact and was statistically significant for ASEAN's bilateral trade.

However, later studies, such as by Endoh[2] and Hassan[3], did not find such a positive effect. This may be due to the use of different specifications of the gravity equation, estimation techniques and data sample differences. Endoh examined the effect of an ASEAN regionalization on international trade also using a simple gravity model.[4] However, he added two new dummy variables into his estimating equation. One was to represent the imports from out-the region countries and exports into the out-the region countries. Another dummy variable was to represent the association in different years.

Soloaga and Winters estimated export implications of export of ASEAN.[5] They estimated the trade influence of regionalism of ASEAN 5 from 1980 to 1996, which were the founding countries of ASEAN, using the fixed effects. In their estimation equation, they added the real exchange rate as one of the independent variable to estimate the impact of ASEAN regionalism on exports. The real exchange rate was calculated by using nominal exchange rate divided by US GDP deflator. Soloagan and Winters concluded that the regionalism had a positive impact on ASEAN's exports.

Sharma and Chua studied the bilateral trade impacts of ASEAN and APEC regionalism. Their empirical sample consisted of the initial ASEAN 5 countries from

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[1]  J. Frankel, S.J. Wei, *Regional Trading Blocs in the World Economic System*, Institute for International Economics, Washington 1997.

[2]  M. Endoh, The transition of postwar Asia-Pacific trade relations, *Journal of Asian Economics* 2000, Vol. 10, pp. 571-589.

[3]  M.K. Hassan, Is SAARC a viable economic bloc? Evidence from gravity model, *Journal of Asian Economics* 2001, Vol. 12, pp 263-290.

[4]  M. Endoh, *op. cit.*

[5]  I. Soloaga, A. Winters, *How Has Regionalism in the 1990s Affected Trade Policy?*, Research Working Paper WPS 2156, World Bank, Washington 1999.

1980 to 1996.[6] They employed the simple OLS estimation techniques and found the lack of positive impact of the ASEAN dummy.

Hassan obtained a negative coefficient on the ASEAN6 dummy variable.[7] He estimated the trade effects of ASEAN, only using the annual data for two years separately. He employed the GLS (generalized least squares) estimation to conclude that the regionalism of ASEAN 6 had a negative effect on the ASEAN's trade. This result was completely different from other scholars' results in terms of the sign of the ASEAN dummy.

Therefore, given the variety of opposing views, it is necessary to provide new evidence on the effectiveness of regional co-operation in the ASEAN countries. In this paper we re-examine the previous empirical findings using more up-to-date information on ASEAN preferential trade area and a variety of different estimation techniques to study the robustness of estimation results.

## 3. Analytical framework and data sources

In this section, we present the analytical framework used to evaluate empirically the effectiveness of preferential trade liberalization in the ASEAN countries. The gravity equation has been extensively used to assess the trade effects of FTAs. However, most previous studies use gravity equations derived from theoretical models that assume complete specialization in production. The gravity equation in its simplest form predicts that trade between two countries depends only on their size and trade costs between them. In our view, such equations cannot be regarded as fully satisfactory as the estimates of the effects of FTAs obtained on the basis of such models may be biased due to the lack of controls for factor proportions that play a key role in the determination of trade flows in the incomplete specialization models.[8]

Therefore, in contrast to the standard gravity equations derived from complete specialization models, in our empirical study we use the generalized estimating equation which is derived from theoretical models assuming incomplete specialization in production.[9] Moreover, the gravity equation can also be expanded with some other variables in order to estimate the effects of additional control factors that may be significant for determining international trade flows. Therefore, our estimating equation in its logarithmic form for total bilateral trade of ASEAN can be expressed as follows:

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[6] S.C. Sharma, S.Y. Chua, ASEAN economic integration and intra-regional trade, *Applied Economic Letters* 2000, Vol. 17, pp. 165-169.

[7] M.K. Hassan, *op. cit.*, pp. 263-290.

[8] In particular, in the case of ASEAN countries, where agriculture still plays an important role in the economy, models assuming that all trade takes place in different varieties of manufactured products do not seem plausible.

[9] For example, see A. Cieślik, Bilateral trade volumes, the gravity equation and factor proportions, *Journal of International Trade & Economic Development* 2009, Vol. 18, pp. 37-59.

$$\ln Trade_{ijt} = c + \beta_1 ASEAN_{ijt} + \beta_2 GATT/WTO_{ijt} + \beta_3 biagreements_{ijt} +$$
$$+ \beta_4 FDI_{it}/GDP_{it} + \beta_5 \ln GDP_{it} + \beta_6 \ln GDP_{jt} + \beta_7 \ln land_{it} +$$
$$+ \beta_8 \ln land_{ijt} + \beta_9 PGNP_{it} + \beta_{10} PGNP_{jt} + \beta_{11} \ln distance_{ij} +$$
$$+ \beta_{12} border_{ij} + \beta_{13} language_{ij} + \beta_{14} colony_{ij} + \varepsilon_{ij}$$

where:

- $Trade_{ijt}$ is the bilateral trade volume between two economies, $i$ and $j$, in year $t$; $i$ is one of the ASEAN members; according to the stipulation of the WTO, the trade value is expressed in current US dollars as the actually imported goods price.
- $ASEAN_{ijt}$ is a dummy variable which takes value 1, when both countries are members of ASEAN. This dummy is organized in the following way. According to the membership granted for each ASEAN country, from the time when the specified country enters ASEAN, the value of the ASEAN for this reporting country would be one until 2007. That is to say, before the country enters ASEAN or is granted membership, the value of ASEAN is 0. This is a key variable used to evaluate the effect of trade regionalism of ASEAN.
- $GATT/WTO_{ijt}$ is a dummy variable that is 1 if both trading countries are members of GATT or WTO.
- $biagreements_{ijt}$ is a dummy variable that is 1 if both countries have a bilateral trade agreement with each other, otherwise, it takes 0.
- $FDI_{it}/GDP_{it}$ is the ratio of FDI stock in an ASEAN country in the nominal GDP of the respective country. FDI is a crucial element for international trade, especially for exporting leading economies. The reason for using the ratio of FDI to GDP is due to the consideration that an economies' size affects the final estimation.
- $GDP_{it}$ and $GDP_{jt}$ are the gross domestic production of country $i$, which is one of the ASEAN countries, and $j$ in year $t$ respectively; GDP reflects the economic size of each country. The GDP is expressed in current US dollars.
- $land_{it}$ and $land_{jt}$ are arable land *per capita* in country $i$ and $j$ in year $t$ respectively; land is an important physical capital for production, which is the basic component of economic activity. Arable land per person is an important measure for agricultural goods. Considering the large share of agriculture sector in most of ASEAN economies, it may be important to include arable land per person to control for the factor proportions.
- $PGNP_{it}$ and $PGNP_{jt}$ are the GNP *per capita* in country $i$ and $j$ in year $t$, respectively. They may reflect the differences in endowments of other factors of production, such as capital, or factor productivity of labour in both trading countries. GNP *per capita* data for both trading countries are expressed in current US dollars.
- $distance_{ij}$ is the distance between country $i$ and country $j$, which is actually the weighted distance between two countries based on bilateral distances between the biggest cities of these two countries. Distance can be regarded as a good

proxy for transport costs as a bigger geographic distance means a higher transport cost. Higher transport cost will translate into the final products' prices, which is a direct factor that determines the bilateral trade flows.
- $border_{ij}$ is a dummy variable to measure whether country $i$ and $j$ share the same border; it is 1 when both countries share the same border; otherwise, it is 0. The border variable in addition to distance is used to measure transaction costs between two countries, which can affect international trade.
- $language_{ij}$ is a dummy variable that is 1 if both countries have at least 9% population able to speak the same language; otherwise, it is 0. The common language may be a significant determinant of bilateral trade flows as it lowers transaction costs.
- $colony_{ij}$ is a dummy variable that is 1 if both countries have a common colonial history. Historical ties may be important for determining the volume of international trade.

The sample covers 50 nations, which comprise Asia-Pacific Economic Cooperation, ASEAN and European Union over 42 years from 1967 to 2008 (see Table 1). The time period of the sample is determined by the data availability. It begins in 1967, since this is the ASEAN founding year. It ends with 2008, since this is the most updated year available. The bilateral trade takes place between reporting countries and partner countries. Ten ASEAN members are the reporting countries. The rest 40 nations are the partner countries. The detailed names of those countries are available in Table 1. The ASEAN members appear also as a part of the partner countries. That is to say, intraregional trade is taken into account. Taiwan is excluded from the sample due to the lack of data.

**Table 1.** The list of countries used in the empirical study

| Reporting countries | Partner countries | | |
|---|---|---|---|
| | EU | APEC | ASEAN |
| Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam | Austria, Belgium, Bulgaria, Cyprus, Czech Rep., Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom | Australia, Brunei Darussalam, Canada, Indonesia, Japan, Republic of Korea, Malaysia, New Zealand, Philippines, Singapore, Thailand, United States, Hong Kong, China, Mexico, Papua New Guinea, Chile, Peru, Russian Federation, Vietnam | Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam |

Source: authors' own selection.

Trade values are obtained from the UN Comtrade database available on-line. Due to various reasons, trade data for some countries are not available.[10] The years when particular countries became the members of the ASEAN are obtained from the official website of ASEAN. The data on GATT/WTO membership ($GATT/WTO_{ijt}$) as well as on bilateral trade agreements ($Biagreements_{ijt}$) come from the official website of WTO. Data on the arable land *per capita*, GDP and GNP *per capita* is obtained from the World Development Indicators (WDI) database. Distance ($distance_{ij}$) and border ($border_{ij}$) dummy variables are obtained from the CEPII database available on-line. Data for common language ($comlang_{ij}$) and colonial past ($colony_{ij}$) is also obtained from the CEPII database. Finally, the ratio of FDI stock of ASEAN countries to their nominal GDPs ($FDI_{it}/GDP_{it}$) comes from UNCTAD database available online.[11]

## 4. Econometric methodology and estimation results

The gravity equation can be estimated using a variety of different estimation methods. The first possible way traditionally employed in many previous studies is to use the simple OLS method. However, due to a large heterogeneity of the sample, the estimation result may not be efficient. Therefore, the simple OLS may not be the best estimation method and it would be better to use panel data techniques. However, to provide comparability with previous studies we first report the estimation results obtained by the simple OLS and then investigate their robustness using panel data techniques including the fixed effects, random effects, and Hausman-Taylor estimators.

The estimation results of the gravity equation obtained for the sample of ASEAN countries are reported in Table 2. The first and the second column show the benchmark estimation results obtained using the OLS without and with time effects, respectively. The third column shows the estimation results using the fixed effects, controlling for time effects. The fourth column shows the estimation results using the random effects with time effects. Finally, the fifth column shows the estimation result using the Hausman-Taylor estimation with time effects.

The estimation results obtained using the simple OLS method without controlling for individual time effects, reported in the first column, show that the ASEAN dummy is not statistically significant. The estimated coefficient on the GATT/WTO dummy

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[10]  For instance, the bilateral trade with Germany begins with 1991 after the fall of the Berlin Wall. Similar problems happen to some of the former Soviet Union members, such as Estonia and the Russian Federation. As far as the ASEAN countries are concerned, the dataset is complete except for Vietnam, Laos, and Myanmar. The trade data for Vietnam are available only from 1997 to 2008, while Laos and Myanmar report import and export data only for some specific years. Hence, in the latter case, we set their export or import in those specific years to zero. Therefore, in those cases, bilateral trade will be equal to single imports or exports.

[11]  Regarding Indonesia, the FDI stock in GDP included the FDI values of East Timor before 2003. This was mainly because of the political change in Indonesia.

**Table 2.** ASEAN10 Bilateral Trade Volume Estimation

| Dependent: Bilateral Trade | [1] | [2] | [3] | [4] | [5] |
|---|---|---|---|---|---|
| ASEAN 10 Bilateral Trade Estimation | | | | | |
| Estimation methods | OLS | OLS | FE | RE | HT |
| 1 | 2 | 3 | 4 | 5 | 6 |
| ASEAN dummy | 0.040 | 0.327*** | 0.673*** | 0.596*** | 0.669*** |
|  | (0.66) | (0.00) | (0.00) | (0.00) | (0.00) |
| GATT/WTO dummy | 0.432*** | −0.001 | 0.128*** | 0.222*** | 0.144*** |
|  | (0.00) | (0.982) | (0.01) | (0.00) | (0.01) |
| Bilateral dummy | 0.323 | 0.254 | −0.043 | −0.0316 | −0.414 |
|  | (0.31) | (0.38) | (0.80) | (0.86) | (0.80) |
| $FDI_i$ | 0.117*** | 0.527*** | −0.095*** | 0.020 | −0.070*** |
|  | (0.00) | (0.00) | (0.00) | (0.34) | (0.00) |
| $GDP_i$ | 1.196*** | 1.450*** | −0.414*** | 1.059*** | 0.745*** |
|  | (0.00) | (0.00) | (0.01) | (0.00) | (0.00) |
| $GDP_i$ | 1.044*** | 1.056*** | 0.939*** | 1.086*** | 0.051*** |
|  | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| Arable land$_i$ | −0.240*** | −0.076*** | 0.111** | −0.226** | 0.058 |
|  | (0.00) | (0.00) | (0.03) | (0.00) | (0.24) |
| Arable land$_i$ | −0.145*** | −0.146*** | −0.233*** | −0.221*** | −0.263*** |
|  | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| $PGNP_i$ | −0.126*** (0.00) | 0.056** (0.02) | 0.678*** (0.00) | −0.373*** (0.00) | −0.380*** (0.00) |
| $PGNP_j$ | 0.057*** (0.00) | 0.197*** (0.00) | −0.526*** (0.00) | −0.270*** (0.00) | −0.604*** (0.00) |
| Distance | −1.445*** | −1.448*** | (dropped) | −0.910*** | −0.406* |
|  | (0.00) | (0.00) |  | (0.00) | (0.10) |
| Border dummy | 0.181 | 0.063 | (dropped) | 0.543 | 0.190 |
|  | (0.31) | (0.38) |  | (0.14) | (0.83) |
| Language dummy | 0.916*** | 0.816*** | (dropped) | 1.479*** | 2.560*** |
|  | (0.00) | (0.00) |  | (0.00) | (0.00) |
| Colony dummy | 0.392*** | 0.339*** | (dropped) | 0.684 | 0.575 |
|  | (0.00) | (0.01) |  | (0.13) | (0.60) |
| Constant | −26.102*** | −34.248*** | 5.335 | −23.803*** | −16.750*** |
|  | (0.00) | (0.00) | (0.12) | (0.00) | (0.00) |
| Prob > $F$ | (0.00) | (0.00) | (0.00) |  |  |
| Prob > chi2 |  |  |  | (0.00) | (0.00) |

**Tabela 2,** cd.

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| Time Effects | NO | YES | YES | YES | YES |
| F-test: time effects | | 33.19 | 12.96 | 131.44 | 257.77 |
| | | (0.00) | (0.00) | (0.00) | (0.00) |
| Observations | 5888 | 5888 | 5888 | 5888 | 5888 |
| F-test & LM test: country effects | | 44.09 (0.00) | 42.570 (0.00) | 13488.19 (0.00) | |
| Hausman test FE vs RE & FE vs HT | | | | 440.00 (0.00) | 113.86 (0.00) |
| $R^2$ overall | 0.7667 | 0.8037 | 0.2690 | 0.7236 | |
| $R^2$ within | | | 0.5792 | 0.5594 | |
| $R^2$ between | | | 0.0903 | 0.7825 | |

1. All variables except dummies are expressed in logarithms. 2. \*\*\* denotes significance at 1% level; \*\* denotes significance at 5% level; \* denotes significance at 10% level. 3. All numbers in the parentheses are *p* values.

Source: authors' own calculations.

is a positive and statistically significant already at 1% level of statistical significance. The bilateral agreement dummy is not statistically significant at all. The ratio of FDI to GDP has a positive coefficient and is statistically significant at 1% level. The nominal GDPs of both countries display positive signs and both are statistically significant at 1% level. The arable land *per capita* and distance display negative coefficients and are all significant at 1% level. The nominal GNPs *per capita* in both reporting and partner countries are statistically significant and display different coefficients. The GNP *per capita* in reporting country has a negative coefficient for reporting country and a positive coefficient for partner country. The border dummy is not significant. The common language and colony dummies have positive impacts on the bilateral trade are significant at 1% levels.

In the second column, we report the OLS estimation results having controlled for individual time effects. It turns out that now the ASEAN dummy becomes statistically significant at 1% level, which means that ASEAN has a positive impact on the bilateral trade volumes. The F-test confirms appropriateness of controlling for individual time effects. The robustness of this result is tested using panel data techniques that allow controlling for individual country specific effects. In the third column, the estimation results obtained by the fixed effects estimator show that the ASEAN dummy has a positive coefficient and is still statistically significant at 1% level. In the fourth column, the estimation results, obtained by using the random effects estimator, show that the ASEAN has a positive coefficient and dummy

remains significant at 1% level. The Hausman test favours the fixed effects over the random effects as an appropriate estimation format. Finally, in the fifth column, the Hausman-Taylor estimation shows that the dummy ASEAN has a positive coefficient and is still statistically significant at 1% level. The Hausman test favours, however, the use of fixed effects over H-T.

## 5. Conclusion

In this paper, we investigated the trade effects of regionalism in the ASEAN 10 countries, using the generalized gravity model estimated on the panel data set covering 50 countries from 1967 to 2008. Four different estimations methods were used including: OLS, fixed effects, random effects, and Hausman-Taylor estimators with and without individual time effects. The Hausman test identified the fixed effects as the preferred method of estimation. The dummy ASEAN variable was positive and statistically significant across the specifications when the individual time effects were controlled for. The appropriateness of controlling for these effects was confirmed by the F-test. Therefore, the hypothesis stating that regionalism of ASEAN facilitates development of trade among its member countries finds support in the data.

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# PREFERENCYJNA LIBERALIZACJA HANDLU
# W KRAJACH AZJI POŁUDNIOWO-WSCHODNIEJ.
# PRZYPADEK KRAJÓW ASEAN

**Streszczenie:** Niniejszy artykuł poświęcony jest badaniu skuteczności preferencyjnej liberalizacji handlu w krajach ASEAN przy użyciu czterech różnych metod estymacji: MNK, a także estymatorów efektów stałych, losowych oraz Hausmana-Taylora. W badaniu przeprowadzona została estymacja modelu grawitacji dla 10 krajów ASEAN przy użyciu bilateralnych danych handlowych dla okresu 1967-2008 oraz 50 partnerów handlowych. Uzyskane wyniki potwierdzają skuteczność przeprowadzonej liberalizacji handlu w ramach ASEAN.