

Panel Analysis of Asean's Intra-Regional Trade Dynamics

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Abstract *Countries have liberalized their trade policies to enhance economic integration and developmental processes. In this context, this research focuses on the Association of South-East Asian Nations (ASEAN) to examine impact of economy size, geographical distances, common language, cultural variations, common border, and trade agreements on the enhancement of trade, exports, and imports. This empirical study uses the gravity model to investigate the dynamics of the constructs. Panel data analysis is conducted from 1985 to 2015. Results show that the ASEAN region's economy size and distance significantly affect trade, exports, and imports. It is also concluded that ethnicity and regional trade agreements are effective in increasing total trade. In ASEAN, common border and regional trade agreements increase exports while common border, common language, ethnicity, and regional trade agreement are effective ways to promote imports. This study can be utilized for the formulation of effective policy tools to enhance intra-regional trade of ASEAN member states.*

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Introduction

Trade is defined as the transfer of goods and services from one entity to the other. Earlier, trade transactions depended on barter trades; however, with the evolution of the economic systems, the exchange was conducted using currency. International trade has existed throughout history, and its remnants can be seen in the form of the ancient Silk Route, Amber Road, Salt Roads, and even the Atlantic slave trade. During the past centuries, international trade has played a vital role in the economy, society, and politics. The role is further enhanced as trading partners experience positive impacts on the economy such as acquiring cheaper goods, disposal of surplus production, specialization in the production, achieving economies of scale, and ultimately the profits from expanded markets. While economies have expanded because of increased trade on a global

level, it can also be observed that a multitude of barriers are built up by the trading partners in the form of the direct tariff as well as non-tariff barriers (licenses, quotas, subsidies, embargoes, currency devaluation, etc.).

The world trade scenario is integrating at a phenomenal speed, and the analysis of the process and its consequent academic, practical, and policy implications deserve attention. While the conventional trade models by Ricardo (1817), Heckscher Ohlin (1919), and Samuelson (1949, 1953) show contradiction to the behaviour witnessed in the real world, the gravity model (with its strong micro foundation, empirical foundation, and predictive capability) surfaces as an efficient and effective tool to better understand the trade dynamics while addressing the policy management aspect (Grossman, Helpman, & Kircher, 2017). Regional and global

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trade integration is not only inevitable, but it also forms the basis for global harmony and a well-thought-out strategy devised with the help of the gravity equation. It is instrumental in deciding a future course of action that favors global trade integration.

Supporting results of the World Trade Organization's (WTO) initiative are the North American Free Trade Agreement (NAFTA), European Union (EU), which show phenomenal success and follow consolidated trade policies (DiCaprio, Santos-Paulino, & Sokolova, 2017). Contrary to NAFTA and EU, bringing trade partners in Asia at par with the developed world remains a dream. Asian trade agreements, namely Association of Southeast Asian Nations (ASEAN), formed in 1967, surfaces as the oldest and most effective forum covering most nation-states, whereas agreements like Bangkok Agreement (BA) signed in 1975, Economic Cooperation Organization (ECO) signed in 1985, and South Asian Preferential Trade Agreement (SAPTA) established in 2006. While regional integration of ASEAN is advantageous, it lacks the benefits accrued when compared to NAFTA and EU.

Considering that regions in ASEAN have a moderate level of integration among the unified trade areas, they warrant a careful comparative analysis. The model extension in terms of the bilateral agreements is an avenue that lacks analysis (Baier & Bergstrand, 2007) and (Baier, Kerr, & Yotov, 2018) and will be addressed through this research. To address this issue, the gravity model is utilized for analysis as it shows robust results in terms of accurate portrayal of international trade scenario, hence the selection of gravity model to analyze intra-regional trade agreement of ASEAN.

It is evident from past research that despite enhanced integration that results from regional trade agreements, the level of welfare attained by developed countries is much more when compared to the developing regions. High-income regions like the European Union gain more by engagement in trade activities. The edge attained by having a commonality of factors like common language, common ethnicity, and common border under the same regional agreement is also evident from past studies. In contrast, the struggles of the developing nations in ASEAN and SAARC to attain complete integration are prevalent despite having a common language, ethnicity, and borders.

Association of Southeast Asian Nations (ASEAN) is a group of ten Asian countries that practice intergovernmental co-operation through economic, sociocultural, political, and security integration within the region. It maintains a network with the global players and is thus called the "global powerhouse". ASEAN is an influential group that has numerous international cooperation initiatives that are propagated through its diplomatic missions. The aim of this integrated association is to ensure social and cultural development, economic growth, regional peace, mutual assistance in agriculture and industry, and increasing the standard of living in the region. ASEAN also maintains a co-operative coexistence with other similar organizations.

Of the four currently existing trade agreements in Asia, the oldest and largest agreement is ASEAN. It was formed in 1967 by Indonesia, Malaysia, Philippines, Singapore, and Thailand and later expanded to include Brunei Darussalam (1984), Vietnam (1995), Myanmar and Lao Peoples Democratic Republic (1997), Cambodia (1999), and China (2004). The overall economic structure of the ASEAN member states points towards a mixed group of countries. The structural overview of the ASEAN economy is best explained by World Bank's World Development Index (WDI) that classifies economies according to agriculture, industry, and services sector; although data for the past three decades shows an impressive growth in agricultural and industry, the region has yet to establish and improve upon the services sector to achieve parity with the developed nations of the world.

ASEAN accounts for 3.3 percent of world GDP and 7.6 percent of the total world trade share. The steady increases in trade based on inter regional trade (that accounts for 75 per cent of the total trade conducted by ASEAN) and intra-regional trade (that accounts for 25 percent of the total trade conducted by ASEAN) backed by improved infrastructure promises economic development of the associated regions.

A closer look at the trade growth trends indicates a setback experienced by ASEAN members during the 2008-09 financial crises that led to a global downturn. Another major shock surfaces in 2014-15 as petroleum prices decline and G-20 countries implement trade-restrictive policies. A trend was also prevalent in the EU and other regions during these two time periods.

However, the overall picture is reflective of the growth in trade transactions within and across regions.

The counterargument to the existing integration of effort is reflected in the "ASEAN Way" that highlights the importance of non-interference by the signatory states. The cultural norms of the region constantly force policymakers to practice nonconflicting ways when addressing a problem that leads to less embarrassment, tension, and conflict. The price they pay is obviously a compromise in the adoption of the most effective policy implementation. Common solutions to practical issues are not reached.

Free Trade efforts were spearheaded by a signed ASEAN charter that establishes the group as a legal entity in the global arena. Trends considered in the context of trading agreements and their effect on members and non-members can be seen in the research conducted ([Panagariya, 1999](#)) and ([Castro, 2013](#)). With the advent of globalization and intermittence or the "Spaghetti Bowl Effect" according to ([Panagariya & Bhagwati, 1999](#)), inter and intra-regional trade agreements further complicate the empirical estimation techniques that explain each agreement's influence on the total trade volume of a region. This confusion needs to be clarified, and a great deal of effort has been put in to empirically investigating the flow of goods, services, and even labor based on the gravity model ([Castro, 2013](#)).

Earlier evidence of the validity of the gravity equation in the context of regional trade for the determination of world trade/export/import flows and its accuracy as an indicator of previous trade trends and prediction mechanism surfaced in the last seven decades. With the revival of the interconnectedness of economics and geographic proximity, new variables were added to enhance the explanatory power of the gravity equation in the context of inter and intra-regional trade. The factors included, in addition to geographical proximity and the cultural similarities like the ones that surface during the examination of ASEAN partner nations.

With regard to ASEAN, it is reasonable to say that a number of factors affect overall trade volume, such as policy influences on domestic prices, the quality of infrastructure, transportation costs, redistributive and trickle-down effects, and trade barriers. ASEAN is a part of "the nested country grouping" that is most

aply explained under the tenets of gravity model. The country group is a clear example of the concept that "proximity promotes trade" ([Eichengreen & Lrwin, 1998](#)). With the emergence of globalization, there is evidence of some inherent biases such as common languages and colonial connections that have brought about fifty percent more trade to associated regions. Thus, the gravity model leads to important implications for Asian economies that show inward bias pointing towards trade deepening. A remedy to this issue is to focus on the maintenance of liberal trade relations with the nations within and outside the trading blocs ([Ekanayake & Chatra, 2010](#)).

Objectives of the study

A core issue for various trade analysts is to determine the extent of enhancement in welfare due to existing trade agreements. Thus, the indeterminate empirical issue of welfare is a focal point for researchers. In this context, there is a need to consolidate regions and important factors overlooked in the past and evaluate the advantages that can be attained through the overall globalization process ([Head & Mayer, 2014](#)) and ([Baier, Kerr, & Yotov, 2018](#)).

Moreover, there are social factors, such as common language, ethnicity, and shared border, which play a significant role in strengthening trade among trading partners across regions. In this regard, the main regional arrangement of ASEAN has been selected for the purpose of analysis here. There is a need to utilize an augmented gravity model to empirically investigate the effectiveness of various social and trade-related factors among trading partners within the regions. As per identified research problems and questions, the objectives of the study have been divided into the following three categories:

To investigate the effectiveness of the size of the economy and geographical distances on total trade in ASEAN.

1. To investigate the effectiveness of common border, ethnicity, regional trade agreement, and common language and its effect on total trade in the presence of economy size and geographical distances for ASEAN.
2. To investigate the effectiveness of common border, ethnicity, regional trade agreement, and common language effect

on total exports in the presence of size of economy, geographical distances, and other relevant control variables for ASEAN.

To investigate the effectiveness of common border, ethnicity, regional trade agreement, and standard language effect on total exports in the presence of size of the economy, geographical distances, and other relevant control variables for ASEAN.

3. To investigate the effectiveness of common border, ethnicity, regional trade agreement, and common language affect the total imports in the present size of the economy and geographical distances and other relevant control variables for ASEAN.

To estimate the objectives of this study, the ASEAN region is selected in accordance with the World Bank classification. Within the region, the country selection is carried out by gathering data for those countries that are responsible for approximately seventy-five percent of the total merchandise trade. The time regime selection is for the period of 1985 – 2015 that is commensurate with the beginning of the regionalism phenomenon. Thus, this research utilizes the extended gravity model for empirical estimation.

Materials and Methods

International trade is an integral part of global development. It is a crucial contributor to innovative product development and enables countries to earn foreign exchange, thus leading participants to sustain economic development. For the past half-century, the gravity model has proved to be a robust and empirically powerful tool for the evaluation of trade flows (Baier, Kerr, & Yotov, 2018). This robustness makes the gravity model most appropriate for the evaluation of regional trade, as will be explained in the following section.

Empirical Methodology and Equations

The application of the above-mentioned model has proved instrumental because of its explanatory and predictive properties in the context of Regional Trade Agreements (RTA) (Baier & Bergstrand, 2007). Thus, the aim of these agreements is to encourage and enhance trade by relaxing institutional barriers. Some of the

best examples of the tool come from major trade pacts such as ASEAN. Therefore, the size of the economy, the distance between trading partners, the forecast of future trade and its limitations are best explained by the gravity equation (Baier & Bergstrand, 2007). To examine bilateral trade behaviour, this study utilizes the gravity model to estimate various patterns of international trade among trading partners. Multiple studies have emerged that utilize augmented gravity equation and implement it based on trade among different nations of the world (Egger & Nigai, 2015) the strongest evidence surfacing in the study that endorses the predictive capability of the model and its variants (Bayar, 2016).

Due to its robustness and accuracy of forecasting trends, the gravity model is successfully employed for evaluating trade and Regional Trade Agreements (RTA) effects on overall economic development of the trading partners. The gravity model has a multiplicative form and is mathematically represented as follows:

$$X_{ij} = G S_i M_j \varphi_{ij} \text{ (Equation.No.1)}$$

Where X_{ij} is the monetary value of exports from country i to j , M_j denotes all importer-specific factors, making total importer's demand (importing country's GDP) and S_i comprises exporter-specific factors (exporter's GDP) representing total volumes exporters are willing to supply. G stands for level of world liberalization and φ_{ij} represents ease of exporter i to access market j .

As a continuation of the gaps identified and the pressing need for trade assessment and analysis, this study utilizes the augmented gravity model to analyse global trade flows among key trade agreements in ASEAN. A further augmented version of the trade, export and import equations are formulated as follows:

$$\text{LogTijt} = \alpha + \beta_1 \text{LogGDPi} + \beta_2 \text{LogGDPj} + \beta_3 \text{LogBilDistij} + \beta_4 \text{LANGij} + \beta_5 \text{BRDij} + \beta_6 \text{ETHNij} + \beta_7 \text{RTAij} + \text{Eijt} \text{ (Equation No.2)}$$

$$\text{LogEXPijt} = \alpha + \beta_1 \text{Log GDPi} + \beta_2 \text{Log GDPj} + \beta_3 \text{Log BilDistij} + \beta_4 \text{Log INFi} + \beta_5 \text{Log INFj} + \beta_6 \text{Log EXChi} + \beta_7 \text{RTAij} + \beta_8 \text{LANGij} + \beta_9 \text{BRDij} + \beta_{10} \text{ETHNij} + \beta_{11} \text{Log TTj/GDPj} + \text{Eijt} \text{ (Equation No.3)}$$

$$\text{Log IMPijt} = \alpha + \beta_1 \text{Log GDPi} + \beta_2 \text{Log GDPj} + \beta_3 \text{Log BilDistij} + \beta_4 \text{Log INFi} + \beta_5 \text{Log INFj} + \beta_6 \text{Log EXChi} + \beta_7 \text{LANGij} + \beta_8 \text{BRDij} + \beta_9 \text{ETHNij} + \beta_{10} \text{RTAij} + \beta_{11} \text{Log TTj/GDPj} + \text{Eijt} \text{ (Equation No.4)}$$

In Equation No.2 Tijt is bilateral trade among the partner nations, GDPi and GDPj is the originating and destination country's GDP and taken as a proxy for masses. The BilDistij is the aerial distance between the partner's capital cities. The composite error term ϵ_{ijt} discusses the effect of unexplained factors across countries.

However, since total trade is limited effect there is need to look at the export and import component separately (reflected through Equation No. 3 and 4). The export equation surfaces as the aspect that takes export from country i to country j as dependant variable while independent variables include respective masses of countries (proxy used is GDP), distance between the trade partners, inflation rates in the exporting and importing country INF_i and INF_j respectively, EXCHI that accounts for the exchange rates of the exporting countries and TTj/GDP_j i.e. the total trade of the export destination in ratio to the gross domestic product of the same is generated by dividing the aggregated values of export and import with GDP at export destination.

The Equation No. 3 and 4 incorporate non-tariff barrier aspects, common language denoted

by LANGij, border commonalities denoted by BRDij, similar ethnicity ETHNij and presence of regional trade agreements RTAij. The above-mentioned models for analysis of trade, export and import are examined through this research for ASEAN in this novel study as a comprehensive comparison of intra-regional trade.

Results and Discussion

Through the agreement, ASEAN develop and enhance their economic integration with their trading partners to fill the identified trade gaps. For ASEAN members (including Thailand, Singapore, Vietnam, Malaysia, and Indonesia) t^{th} cross-sectional units with t^{th} time period, the dependent variables are total trade, total export and total imports. During panel data analysis of the ASEAN region, Hausman statistic is found to be significant at conventional standards; hence the research estimates fixed effects model results (Baltagi, Kao, & Liu, 2017). The detailed results for total trade, total exports and total imports within the selected region are presented in Table 1, Table 2 and Table 3, respectively.

Table 1. Empirical Relationship between Total Trades, Economy Size

Variable	Co-efficient	t-statistic
Constant	27.67	(2.82)**
GDP1	0.62	(2.48)**
GDP2	0.22	0.22
Distance	-1.26	(-1.90)**
Language	0.83	-1.2
Border	-0.15	(-0.53)
Ethnicity	10.65	(2.80)**
RTA	1.86	(7.82)**
R Square:	0.48	
Adjusted R Square:	0.47	
F. Statistic:	52.27 (0.00)	

** indicates 5 per cent level of significance.
() shows t-statistic.

For ASEAN, throughout analysis, for Table 1 indicates empirical relationship between total trade, economy size (both source and destinations), and distance for ASEAN member countries that are significant at conventional standards. Due to the increase in the economic size of the source and destination countries total trade increases at the rate of 62 and 22 percent respectively, while the effect of distance on total

trade is negative and significant, which is consistent with results found earlier (Head & Mayer, 2014) and (Panda, Sethi, & Kumaran, 2016). The results reveal that except for language and border, all other factors are significantly affecting the total trade of selected countries.

In Table 2 below, exports are taken as the dependent variable to examine the impact of factors such as economic size, distances,

inflation, exchange rate, trade openness, language, ethnicity, border, and regional trade agreement. The results reveal that if the economy sizes of source and destination increase, then

their total exports increase at the rate of 52 percent and 1.69 percent respectively. Distance is not seen as a significant contributor to export promotion within ASEAN.

Table 2. Impact of Factors such as, Economy Size, Distances, Inflation, Exchange rate, Trade Openness, Language, Ethnicity, Border, and Regional Trade Agreement

Variable	Co-efficient	t-statistic
Constant	15.98	(7.78)**
GDP1	0.52	(3.89)**
GDP2	1.69	(8.39)**
Distance	-0.23	(-0.98)
INF1	0.51	(8.23)**
INF2	-0.15	(-2.25)**
Exchange Rate1	0.03	(0.76)**
Total Trade/GDP	1.96	(12.09)**
Language	-1.2	(-0.49)
Border	0.67	(1.97)**
Ethnicity	-0.2	(-1.30)
RTA	2.41	(11.27)**
R Square:		0.53
Adjusted R Square:		0.54
F. Statistic:		74.60 (0.00)

** indicates a 5 percent level of significance.
() shows t-statistic.

The result shows that if inflation in the source country changes, then exports changes at the rate of 51 percent, which is significant at a 5 percent level of significance. Similarly, in destination countries, inflation positively and significantly affects exports. In ASEAN, due to variation in the exchange rate, exports are increasing at the rate of 3 percent. Results reveal that if selected economies exhibit openness their exports increase at a rate of 1.96 percent (Karemera, Smith, Ojah, & Cole, 1999). The result reveals that the effect of language on total exports is negative and insignificant; suggesting that within the region for ASEAN, language does not play a significant role in the context of exports. The result, however, also reveals that other than language and inflation of source

countries, the effect of all other variables on total exports of ASEAN countries remain significant.

Finally, it is observed that by the inclusion of RTA, exports are increasing at the rate of 2.14 percent, which is significant at a 5 percent level of significance. The result reveals that within region across countries, regional trade agreement positively and significantly impacts total export (Wang & Badman, 2016).

Imports, just like exports, are believed to be important for business activity generation. In this part, we empirically examine how factors such as economy size, distance, inflation, exchange rate, border, language, ethnicity, and regional trade agreement are affecting total imports within ASEAN. Table 3 below shows empirical results of the fixed-effects model.

Table 3. Empirical Results of the Fixed Effects Model

Variable	Co-efficient	t-statistic
Constant	17.68	(8.93)**
GDP1	0.25	(2.12)**
GDP2	1.4	(7.36)**
Distance	-0.53	(-2.31)**
INF1	0.5	(8.49)**
INF2	-0.11	(-1.78)**
Exchange Rate1	0.06	-1.67

Variable	Co-efficient	t-statistic
Total Trade ² /GDP ²	1.94	(12.76)**
Language	1.08	(2.47)**
Border	0.78	(2.06)**
Ethnicity	0.08	(2.35)**
RTA	1.95	(10.38)**
R Square:		0.56
Adjusted R Square:		0.55
F. Statistic:		81.00 (0.00)

** indicates 5 per cent level of significance.
() shows t-statistic.

For ASEAN, the empirical results show that except for exchange rate, all other factors significantly affect imports, which are significant at conventional standard. The results of trade openness exhibit a positive impact, i.e., imports are increasing at the rate of 1.94 per cent. Moreover, role of border is also positive and significant at 5 per cent level of significance. The results reveal that the effect of RTA is positive and highly significant, suggesting that import through RTA is quite beneficial within regions across countries.

In the case of ASEAN countries, depending upon the structure of economies, common border, common language, ethnicity, and regional trade agreement all are effective ways to promote the level of imports in this region.

Conclusion and Recommendation

The empirical results show that in ASEAN region economy size and distance significantly affect the total trade. The source country's GDP is dominant in explaining the total trade within the region. Similarly, ethnicity and regional trade agreement can be an effective way to increase total trade over a period as their effectiveness remains significant at conventional standards. To

examine the effectiveness of underlying factors of exports and imports further specifically for ASEAN region are studied and the results show that in all regions, economy sizes of sources and destinations and their geographical distances, existing inflation rate and exchange rate and especially trade openness can be used to significantly enhance exports within the region. While the non-tariff barriers like common border and regional trade agreement may be utilized for favourable export growth policies within the region. Common border, common language, ethnicity, and regional trade agreement are effective ways to promote imports. The above findings can be utilized to form policy tools to accelerate intra-region integration and to get enhanced benefits from increased trade.

Other than the above-mentioned policy implications, this research can also be used in the context of empirical investigation of extended gravity model for export and import that contributes to methodology by presenting augmented models that can be further tested in other regions of the world. This research examines one out of the seven regions classified by the World Bank and may form the basis for regional integration studies in the future.

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