Is a regional trading bloc forming in southeast Asia?
New evidence for ASEAN countries

Abstract

This article studies the impact of ASEAN on the bilateral exports of its 10 member countries. It reports the results of applying the gravity model to a data set covering 50 partner countries from 1967 to 2008. The study's empirical findings show that on average ASEAN regionalism significantly increases bilateral exports. However, the results are country-specific and indicate that ASEAN seems to benefit only large economies with a long history of membership, while smaller more recent members do not show significant expansion of exports.

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Introduction

Over the last few decades, preferential trade liberalization has become a major feature of the global trading system. The difficulty of achieving far reaching multilateral trade liberalization under the auspices of the General Agreement on Tariffs and Trade (GATT), and later the World Trade Organization (WTO), led to the proliferation of regional trade agreements (RTAs) around the world. Some of these agreements significantly increased regional trade flows, while others have still not achieved success.[1]

The aim of this article is to evaluate the trade consequences of regional economic integration among the members of the Association of Southeast Asian Nations (ASEAN). ASEAN is an economic organization created on 8 August 1967 by five founding members: Indonesia, Malaysia, the Philippines, Singapore and Thailand. Since then, membership has expanded to include Brunei (1984), Vietnam (1995), Myanmar (1997), Laos (1997) and Cambodia (1999). One of the main aims of ASEAN is to accelerate economic growth and social progress through trade liberalization within the ASEAN Free Trade Area (AFTA).

Despite some efforts to promote economic cooperation in the region in the 1970s, far-reaching trade liberalization did not gain momentum until the early 1990s. In January 1992 ASEAN members signed the Singapore Declaration, the most significant part of which was the creation of AFTA, a comprehensive program of tariff reduction in the region. AFTA was to be established in several phases over a 15 year period through to 2008 but this date was subsequently moved forward and it became fully operational on 1 January 2003.

The primary mechanism for achieving trade liberalization in ASEAN countries is the Common Effective Preferential Tariff (CEPT) scheme. However unlike the EU, AFTA does not apply a common external tariff on imported goods. Each ASEAN member can impose tariffs on goods entering from outside the member states in accordance with its national schedules. For goods originating within ASEAN, members apply a tariff rate of 0% to 5%. In addition, the initial program of tariff reductions was broadened and accelerated and other "AFTA Plus" activities were initiated. These include efforts to eliminate non-tariff barriers, harmonization of customs nomenclature, valuation as well as the introduction of procedures and development of common product certification standards.[2]

The main hypothesis of the research presented in this paper is that if trade liberalization among ASEAN countries is effective, membership should positively affect bilateral exports of its members. If the empirical results reject the null hypothesis, it means that ASEAN membership is not effective in the development of trade among its members. Empirically, this article assesses to what extent ASEAN drove regional cooperation in South-East Asia. This study contributes to the literature on regional trade blocs by providing new evidence for ASEAN countries and explaining controversial conclusions reported in previous studies.

One of the first attempts to evaluate the effects of regionalism on ASEAN's trade was made by Frankel and Wei (1997) who estimated a simple gravity equation using the OLS technique on

[1]See for example, Cieślik and Hagemejer (2009, 2011), De Benedictis et al. (2005), Medvedev (2010), Peridy (2005).

[2]See www.usasean.org/ASEAN/afta.php

a pooled dataset. Their sample covered the ASEAN 7 countries that were members between 1967 and 1992. They concluded that the establishment of a free trade area among ASEAN countries had a positive and statistically significant impact on ASEAN's bilateral trade.

However, subsequent studies did not confirm these positive effects. In particular, Endoh (2000) used the OLS technique and pooled data from 1960 to 1995 to examine the effect of ASEAN regionalization on international trade using an extended gravity equation and some new variables. One of these variables represented the imports from and exports into the out-of-the-region countries while another represented the Association in different years of the sample. Endoh's main finding was that ASEAN had no effect on promoting trade among its member countries.

Sharma and Chua (2000) studied the bilateral trade impacts of ASEAN and APEC (Asia-Pacific Economic Cooperation). Their sample consisted of data for the initial ASEAN 5 countries for the period from 1980 to 1995. They also employed the OLS technique and reported the lack of a positive impact of the ASEAN dummy variable, although their analysis revealed that an increase in trade occurred with members of a wider APEC group.

Soloaga and Winters (2001) focused on the implications of ASEAN for bilateral exports. They studied the effects of preferential trade liberalization using panel data for the ASEAN 5 founding countries from 1980 to 1996, and they applied the fixed effects estimator. In contrast to earlier studies, they concluded that the regionalism had a positive impact on ASEAN exports.

Elliott and Ikemoto (2004) used a modified gravity equation and the OLS method to examine ASEAN intra- and extra-regional bias in bilateral trade flows between 1982 to 1999. They paid particular attention to the periods before and after the signing of AFTA, as well as the crucial years prior to and following the Asian crisis. They found that trade flows were not significantly affected in the years immediately following the signing of the AFTA agreement. They also found that the traditional stance of ASEAN countries to outward-oriented economic activity has not been significantly damaged, but in fact it has been stimulated by the AFTA process and/or the Asian economic crisis.

More recently, Siah et al. (2009) examined ASEAN economic integration and its ability to promote intra-ASEAN trade in five ASEAN countries between 1970 and 2001. They used a gravity model estimated within an autoregressive distributed lag (ARDL) framework. Their empirical results indicated that AFTA preferential arrangements were important and prevalent in enhancing intra-ASEAN trade.

These opposing results may be due to the use of different specifications of the gravity equation, estimation techniques and data samples. Given the variety of different views, it is clearly necessary to provide more recent evidence on the effectiveness of regional cooperation in the ASEAN countries. In this paper the previous empirical evidence is reexamined using more up-to-date information on ASEAN preferential trade area as well as four different estimation techniques to study the robustness of the results.

The contribution of this article to the literature is twofold. Firstly, it provides estimates of the extended gravity equation that are derived from incomplete specialization models which seem to be more suited for explaining trade among ASEAN countries where the agricultural sector still plays an important role. Secondly, in contrast to previous studies, it provides estimates for bilateral exports for the whole group of ASEAN countries as well as for individual members.

The structure of this article is as follows: in the next section we describe the research methodology and statistical data, this is followed by a discussion of the estimation results and the final section summarizes the findings and conclusions.

Methodology and Data

The most popular tool used to study the effects of preferential trade liberalization is the gravity equation. In its simplest form, this equation predicts that trade between two countries depends only on their sizes and the trade costs between them. However, our view is that such an equation cannot be regarded as fully satisfactory as it may generate biased estimates of the trade liberalization effects due to the lack of controls for factor proportions and technology differences.

In our study we use the generalized equation that is derived from theoretical models assuming incomplete specialization in production.[3] Moreover, the gravity equation can also be augmented with other explanatory variables to estimate the effects of additional factors that may be important for determining trade flows. Therefore, our estimation equation for the total bilateral exports of ASEAN countries can be expressed in its logarithmic form as follows:

$$\ln Exports_{ijt} = c + \beta_1 ASEAN_{ijt} + \beta_2 GATT/WTO_{ijt} +$$
$$+ \beta_3 Biagreements_{ijt} + \beta_4 FDI_{it}/GDP_{it} + \beta_5 \ln GDP_{it}$$
$$+ \beta_6 \ln GDP_{jt} + \beta_7 \ln rate_{it} + \beta_8 \ln land_{it} +$$
$$+ \beta_9 \ln land_{jt} + \beta_{10} PGNP_{it} + \beta_{11} PGNP_{jt} + \beta_{12} \ln dis\tan ce_{ij}$$
$$+ \beta_{13} border_{ij} + \beta_{14} language_{ij} + \beta_{15} Colony_{ij} + \varepsilon_{ij}$$

where:

$Exports_{ijt}$ are exports from reporting country i (ASEAN member) to partner country j in year t expressed in current US dollars. Export data was obtained from the UN Comtrade database.

$ASEAN_{ijt}$ is a dummy variable that takes a value of 1 when both countries are members of ASEAN. Otherwise it has a value of 0. The year when a country became a member of ASEAN was obtained from the official ASEAN website.[4]

$GATT/WTO_{ijt}$ is a dummy variable that has a value of 1 if both countries are members of GATT or WTO. Otherwise it has a value of 0. Data on GATT/WTO membership was obtained from the official WTO website.[5]

$Biagreements_{ijt}$ is a dummy variable that has a value of 1 if both countries have a bilateral trade agreement with each other. Otherwise it has a value of 0. The data on bilateral agreements was also obtained from the WTO website.

FDI_{it}/GDP_{it} is the ratio of FDI stock to GDP for an ASEAN country and is a measure of the activity of multinational firms. This ratio was calculated based on data from the UNCTAD database. GDP_{it} and GDP_{jt} are the gross domestic product of countries i and j in year t expressed in current US dollars and are measures of the economic size of trading economies. GDP data was obtained from the WDI database compiled by the World Bank.

$rate_{it}$ is the nominal exchange rate between the currency of the exporting country i and the US dollar. The exchange rate data was obtained from the IFS database complied by the IMF.

$land_{it}$ and $land_{jt}$ are the measure of arable land per capita in countries i and j in year t respectively and are measures of the relative factor endowments. The data was obtained from the World Development Indicators database compiled by the World Bank.

Table 1. Estimates for the ASEAN 10 sample

Estimation method	(1) OLS	(2) OLS	(3) FE	(4) RE	(5) HT
ASEAN dummy	0.123	0.251***	0.471***	0.382***	0.452***
	(0.23)	(0.01)	(0.00)	(0.00)	(0.00)
GATT/WTO dummy	0.285***	0.176***	0.539***	0.620***	0.566***
	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Bilateral dummy	0.565	0.492	-0.070	-0.032	-0.063
	(0.12)	(0.15)	(0.72)	(0.88)	(0.75)
FDIi	0.367***	0.813***	0.142***	0.251***	0.155***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
GDPi	1.40***	1.621***	0.315***	1.218***	0.967***
	(0.00)	(0.00)	(0.13)	(0.00)	(0.00)
GDPj	1.034***	1.038***	0.985***	1.102***	1.130***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Exchange rate	-0.178***	0.037**	0.539***	0.245***	0.432***
	(0.00)	(0.02)	(0.00)	(0.00)	(0.00)
Arable landi	-0.275***	-0.009	0.484***	-0.050	0.458***
	(0.00)	(0.63)	(0.00)	(0.22)	(0.00)
Arable landj	-0.184***	-0.171***	-0.176**	-0.177***	-0.177***
	(0.00)	(0.00)	(0.04)	(0.00)	(0.02)
PGNPi	-0.541*** (0.00)	0.125** (0.02)	0.856*** (0.00)	0.054 (0.59)	0.241** (0.07)
PGNPj	0.104*** (0.00)	0.185*** (0.00)	-0.187 (0.14)	-0.10** (0.06)	-0.303*** (0.01)
Distance	-1.429***	-1.496***	(dropped)	-1.247***	-0.90***
	(0.00)	(0.00)		(0.00)	(0.008)
Border dummy	0.398***	0.072	(dropped)	0.256	-0.756
	(0.00)	(0.52)		(0.53)	(0.68)
Language dummy	0.734***	0.857***	(dropped)	1.842***	3.663***
	(0.00)	(0.00)		(0.00)	(0.00)
Colony dummy	0.409***	0.464***	(dropped)	0.541	1.136
	(0.01)	(0.00)		(0.28)	(0.48)

Continued *Table 1. Estimates for the ASEAN 10 sample*

Estimation method	(1) OLS	(2) OLS	(3) FE	(4) RE	(5) HT
Constant	-29.290***	-40.341***	-21.540***	-31697***	-21.620***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Prob > F	(0.00)	(0.00)	(0.00)		
Prob > chi2				(0.00)	(0.00)
Time Effects	NO	YES	YES	YES	YES
F-test: time effects		27.14 (0.00)	2.21 (0.00)	95.29 (0.00)	59.92 (0.00)
F-test & LM test: country effects			34.7	12619.99	
			(0.00)	(0.00)	
Hausman test FE vs RE & FE vs HT			493.14		54.25
			(0.00)		(0.01)
Observations	5463	5463	5463	5463	5463
R^2 overall	0.736	0.765	0.0909	0.6597	
R^2 within			0.5519	0.5766	
R^2 between			0.1526	0.7184	
1. All variables except dummies are expressed as logarithms;					
2. ***denotes significance at 1% level; ** denotes significance at 5% level; * denotes significance at 10% level;					
3. The numbers in the parentheses are p values.					

Source: Calculated using STATA statistical software.

$PGNP_{it}$ and $PGNP_{jt}$ is the Gross National Product per capita in countries *i* and *j* in year *t* respectively, expressed in current US dollars. These figures are proxies for technology differences and the values were obtained from the WDI database.

$distance_{ij}$ is the distance between countries *i* and *j* expressed in kilometers. This data was obtained from the CEPII database.

$border_{ij}$ is a dummy variable that has a value of 1 if countries *i* and *j* share the same border. Otherwise it has a value of 0. The information was obtained from the CEPII database.

$language_{ij}$ is a dummy variable that has a value of 1 if at least 9% of the population both countries can speak the same language. Otherwise it has a value of 0. The information was obtained from the CEPII database.

$colony_{ij}$ is a dummy variable that has a value of 1 if both countries have a common colonial history. Otherwise it has a value of 0. The information was obtained from the CEPII database.

Our sample covers 10 reporting ASEAN countries (exporters) and 50 partner countries (importers), which includes 27 European Union and 13 other countries. Data was obtained for the period between 1967 and 2008.[6] This time span was determined by data availability.

[6]The partner countries, in addition to ASEAN members, include Austria, Australia, Belgium, Bulgaria, Canada, Chile, China, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Ireland, Italy, Japan, Korea Rep., Latvia, Lithuania, Luxemburg, Malta, Mexico, Netherlands, New Zealand, Papua New Guinea, Peru, Poland, Portugal, Romania, Russian Fed., Slovakia, Slovenia, Spain, Sweden, United Kingdom, United States.

The gravity equation was calculated using four different estimation methods. The oldest method employed in the literature is simple OLS, but the high heterogeneity of countries may mean that this method is not efficient. For this reason, we also used three other estimation techniques that allowed us to control for unobserved country-pair characteristics. To provide comparability with previous studies, we first report the results obtained by OLS and then investigate their robustness using fixed effects (FE), random effects (RE), and Hausman-Taylor (HT) (Hausman, Taylor 1981) estimators. To identify the best estimation method, the Hausman test is used (Hausman 1978).

Estimation Results

In this section we present two sets of estimation results for bilateral exports of ASEAN countries. Estimation results obtained for the entire sample of ASEAN countries are reported in Table 1, while estimation results obtained for particular ASEAN countries are reported in Table 2.

Columns (1) and (2) show the benchmark estimation results obtained using OLS with and without time effects. The estimation results in column (1) show that our key explanatory variable - the ASEAN dummy variable - is not statistically significant. This would suggest the absence of a trade creation effect. Similarly, the bilateral agreement dummy variable is not statistically significant. The estimated coefficient on the GATT/WTO dummy is positive and statistically significant at the 1% level. This means

Table 2. HT estimation for particular ASEAN member countries

	Brunei	Cambodia	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
ASEAN dummy	1.398	7.934	0.367**	0.582***	0.568**	-0.019	0.621***	-0.046
	(0.38)	(0.60)	(0.05)	(0.00)	(0.02)	(0.92)	(0.00)	(0.94)
GATT/WTO dummy	8.031***	0.435	1.1065***	0.952***	0.480***	-0.065	0.296**	
	(0.00)	(0.44)	(0.00)	(0.00)	(0.00)	(0.495)	(0.02)	
Bilateral dummy				0.037		-1.016	1.451	1.357
				(0.98)		(0.44)	(0.388)	(0.24)
FDI$_i$	-1.240***		-0.100	0.460***	0.293		0.349***	
	(0.00)		(0.88)	(0.00)	(0.19)		(0.00)	
Exchange rate			0.885**		-0.459**			
			(0.04)		(0.09)			
GDP$_i$			1.224***	0.802***	0.251**	0.159**	1.022***	
			(0.00)	(0.00)	(0.33)	(0.04)	(0.00)	
GDP$_j$	3.806*	2.362***	1.261***	1.410***	1.062***	0.951***	1.207***	1.434***
	(0.07)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Arable Land$_j$	2.347	-0.338	-0.244	-0.329***	-0.031	-.209*	-0.453***	-0.210
	(0.12)	(0.54)	(0.26)	(0.00)	(0.81)	(0.06)	(0.00)	(0.25)
PGNPj	-3.80**	-1.34	-0.984***	-0.353	-0.459	0.289**	-0.705	-0.661
	(0.07)	(0.20)	(0.00)	(0.01)	(0.01)	(0.03)	(0.00)	(0.20)
Distance$_{ij}$	-7.092**	2.462	-1.233*	-0.926***	-1.672***	-1.611***	-0.337	-1.100**
	(0.15)	(0.66)	(0.09)	(0.00)	(0.00)	(0.00)	(0.37)	(0.02)
Border dummy	-7.500	2.447		0.472 (0.66)			1.652	0.322
	(0.64)	(0.98)		(0.33)			(0.18)	(0.81)
Language dummy	0.757		1.786	0.462	1.265***	1.356***	1.191	
	(0.95)		(0.30)	(0.62)	(0.00)	(0.001)	(0.48)	
Colony dummy	4.128	-0.055	2.713	0.623	-0.363	-0.798		-0.177
	(0.75)	(0.99)	(0.13)	(0.62)	(0.75)	(0.51)		(0.91)
Constant	12793	-58.412	-34.682**	-22.217***	-5.672***	-4.632	-31.048***	-3.719
	(0.80)	(0.23)	(0.00)	(0.00)	(0.44)	(0.19)	(0.00)	(055)

Continued *Table 2. HT estimation for particular ASEAN member countries*

	Brunei	Cambodia	Indonesia	Malaysia	Philippines	Singapore	Thailand	Vietnam
F-test: time effects	31.27 (0.00)	1.48 (0.83)	25.48 (0.06)	34.86 (0.05)	58.93 (0.00)	39.20 (0.03)	33.99	37.13 (0.00)
Observations	176	213	714	1007	1000	962	981	410
Prob>chi2	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
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. The numbers in parentheses are p values.								

Source: Calculated using STATA statistical software.

that institutionalized trade liberalization seems to be more effective in stimulating exports than regional or bilateral trade agreements.

The ratio of FDI to GDP has a positive coefficient and is significant at the 1% level, which means that exports are positively related to the activity of multinational firms. The nominal GDPs of both countries display positive signs and both are significant at the 1% level. The exchange rate displays a negative sign and is statistically significant at the 1% level, which means that higher exchange rate decreases trade. The arable land per capita variables display negative coefficients and are significant at the 1% level, which confirms the need of controlling for relative factor endowments.

The nominal GNPs per capita in both reporting and partner countries are statistically significant at the 1% level and display opposite signs: the GNP per capita in the reporting country has a negative coefficient and the partner country has a positive coefficient, which confirms the role of technological differences. The distance variable is negative and is statistically significant at the 1% level. The border, common language and colony dummies are positive and are significant at the 1% level.

In column (2) we report OLS estimation results after having controlled for individual time effects. The ASEAN dummy now becomes statistically significant at the 1% level, confirming that ASEAN has a positive impact on bilateral exports. The estimated parameters on control variables in most cases are similar to those reported in column (2). The F-test confirms the appropriateness of controlling for individual time effects.

The robustness of the OLS results is tested using panel data techniques that allow us to control for individual country specific effects in addition to controlling for time specific effects. In column (3), the estimation results obtained by the FE estimator show that the ASEAN dummy still has a positive coefficient and is statistically significant at the 1% level. In column (4), the estimation results obtained using the RE estimator also show that the ASEAN dummy has a positive coefficient and is significant at the 1% level. Finally, in column (5), the HT estimation shows that the dummy ASEAN variable has a positive coefficient and is still statistically significant at the 1% level. The Hausman test favors the use of the HT estimator at the 1% level as the proper estimation format.

To disentangle the overall effect of the ASEAN dummy on exports, Table 2 presents the estimation results obtained using the HT estimator for the particular ASEAN member countries. Unfortunately, the low number of observations for Laos and Myanmar meant that the specific results for these two countries could not be obtained, so in these estimations the GNP per capita variable for the reporting country was omitted.

It can be noted that the ASEAN variable displays positive coefficients and is significant only for Indonesia, Malaysia, Philippines and Thailand, although at different levels of significance. The common feature shared by these member countries is their size and age: they are the largest economies in the region and at the same time also the oldest members of ASEAN. As a result, we infer that ASEAN seems to benefit only large economies with a long history of membership, while smaller newer members do not report significant benefits in terms of the expansion of their exports.

The GATT/WTO dummy variable is statistically significant for Brunei, Indonesia, Malaysia, the Philippines and Thailand, while the dummy variable for bilateral trade agreements is not statistically significant. The ratio of FDI to GDP is significant only for three countries: Brunei, Malaysia and Thailand. However, for Brunei it displays a negative sign, while for the remaining two countries it displays a positive sign. The remaining control variables display coefficients similar to those reported for the whole sample but are not always statistically significant.

Conclusion

In this paper we investigated the impact of ASEAN on exports of its member countries using the generalized gravity equation and a dataset for 50 partner countries over the period from 1967 to 2008. Four different estimation methods were employed: OLS, FE, RE and HT estimators, with and without controlling for individual time effects. The ASEAN dummy variable was positive and statistically significant across the specifications of our estimating equation when the individual time effects were controlled for. The Hausman test favored the HT estimator as the proper estimation format. The hypothesis regarding the positive impact of regionalism on exports among ASEAN member countries found support in the data. Our empirical study showed that although the effect of ASEAN is on average positive, the results are country-specific. In particular, ASEAN seems to benefit only large economies with a long history of membership, while smaller economies that recently joined do not report significant expansion in their bilateral exports.

Acknowledgements

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