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THE TIME-VARYING IMPACT OF REGIONAL TRADE AGREEMENT: EVIDENCE FROM ASEAN

Pakasa Bary[1]

[1]*Bank Indonesia, Jl. M. H. Thamrin No. 2, Syafruddin Prawiranegara Tower, 19 Fl. Jakarta, Indonesia*

ABSTRACT

Regional Trade Agreements such as ASEAN Free Trade Area (AFTA) are expected to increase the trade flows among member countries through trade creation and trade diversion. This paper employs the gravity model using manufacturing trade data to analyse this hypothesised effect in a time-varying context. The estimation results suggest that AFTA has expanded the trade substantially. The trade creation effects occurred immediately, but the effects tend to decrease overtime. On the other hand, trade diversion was insignificant in the short-term, but the effects increased gradually over time.

Keywords: Gravity, International trade, ASEAN, Regional trade agreement, Trade diversion, Trade creation.

JEL Classification: F1, F14.

Contribution/ Originality

This study contributes in the existing literature that the effects of regional trade agreement may be time-varying. This study is one of very few studies which have investigated the impact of trade agreements in ASEAN in a time-varying context.

1. INTRODUCTION

A regional trade agreement (RTA) lowers trade barriers between members. Therefore, it promotes a trade creation between member countries. However, to some extent it may also create a trade diversion, which is not efficient, welfare reducing (Viner, 1950) and thus may create a "regionalization" instead of promoting globalization. Most of the studies measuring these two effects apply gravity models as the main tool of analysis.

† Corresponding author
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The impact of ASEAN Free Trade Area (AFTA), a free trade agreement among members of Association of South East Asian Nations (ASEAN), is generally considered positive by previous literatures. Elliott and Ikemoto (2004) and Kien (2009) suggest that AFTA has relatively strong trade creation effect but no trade diversion effect. Their findings indicate that AFTA not only had enhanced intra-ASEAN trade, but also extra-ASEAN trade. Moreover, Koo *et al.* (2006) also provides similar results regarding AFTA using agricultural trade data.

This main contribution of this paper is to investigate whether the RTA impacts vary overtime, particularly through the case study of AFTA. As it has been twenty years after the creation of AFTA, we can find a much longer time frame of to capture the AFTA impacts. Therefore, it is an opportunity to confirm whether the results on previous literatures still apply and to indicate whether there is an innovation of AFTA impacts overtime.

This paper contributes some evidence that RTA impacts may be time-varying. Particularly, the results suggest that trade creation impact is relatively immediate, but decreasing over time. On the other hand, trade diversion impact is insignificant at beginning but increasing overtime. The findings suggest the need of facilitating time-varying attributes on estimating the impact of an RTA.

The remainder of this paper is organized as follows. In section 2 we provide a short literature review about AFTA. Section 3 is methodology which explains specifications to estimate and data. In section 4, we explain estimation results and robustness tests. Finally, chapter 5 concludes.

2. REGIONAL TRADE AGREEMENT AND AFTA

A Regional Trade Agreement (RTA) is an agreement between several countries to liberalize regional trade, which usually takes the form of tariff reduction between member countries, and sometimes also takes the form of reducing non-tariff barriers. Thus, it will enhance trade flows between those countries. However, Clausing (2001) states that the effect on welfare depends on the source of the increased trade. Trade creation, which occurs when the tariff reduction makes the inefficient domestic-produced goods to be replaced by imports, raises welfare. Instead, trade diversion occurs when a tariff removal causes the trade to be diverted from the third (extra-regional) country to a member country, although the production in the third country is more efficient. The latter is the one which reduces welfare (Viner, 1950) and leads to regionalization instead of multilateralism – or global free-trade.

During ASEAN Summit in Singapore in 1992, Association of South East Asian Nations (ASEAN) members had agreed to enhance the liberalization of regional trade through ASEAN Free Trade Area (AFTA), which require members to reduce the tariff on most of the traded commodities (Soesastro, 2002). At that time, ASEAN have only six members, namely Brunei, Singapore, Malaysia, Indonesia, Philippines and Thailand. Vietnam joined ASEAN in 1995, Lao PDR and Myanmar in 1997, and then followed by Cambodia in 1999.

The main instrument of AFTA is in form of tariff liberalization through Common Effective Preferential Tariff (CEPT). Implementation scheduled to be in gradual form, with completion of

free trade of ten years (to year 2003). Commodity coverage includes roughly all trade commodities, which also include a number of unprocessed agricultural products. In 2001, the *inclusion list* of the liberalization represents 84 percent of all tariff lines in ASEAN (Soesastro, 2002). Moreover, the AFTA agreement also eliminates non-tariff barriers on a wide range of manufactured products (Soesastro, 2002).

ASEAN members are also involved in other trade agreements with other countries. These include ASEAN-India, ASEAN-Japan, and ASEAN-China. Many of these agreements had taken into force several years after the implementation of AFTA. Moreover, there are also bilateral trade agreements that include ASEAN members, such as Japan-Indonesia, Brunei-Japan, and Thailand-Australia.

3. METHODOLOGY

A. The Model

At the time it was first introduced by Tinbergen (1962) the gravity model of trade was purely atheoretical explaining that the trade between two countries is an increasing function of the economic size of both trading countries and a decreasing function of the distance as a measure of the transportation cost. The 'traditional' gravity model is represented as follows:

$$M_{ij} = G\frac{{Y_i}^{\alpha}{Y_j}^{\beta}}{{Dist_{ij}}^{\gamma}} \qquad (1)$$

M_{ij} denotes trade flows between country i and country j. G, α, β and γ are positive, constant parameters. Y_i and Y_j are the economic size of country i and country j, respectively, which is usually measured by GDP. Moreover, $Dist_{ij}$ denotes the distance between country i and country j. Theoretical foundations are consistent with the gravity model, as had shown by the contributions in last several decades. Anderson (1979) shows that the trade flows in equilibrium are positively related to the size of exporting and importing countries. Moreover, the gravity model can be derived directly from theoretical models in international economics, for example: the model of trade based on monopolistic competition (Bergstrand, 1985) the traditional factor-proportions explanation of trade (Deardorff, 1998) a Ricardian-type model (Eaton and Kortum, 2002) and the model in differentiated goods with firm heterogeneity (Helpman *et al.*, 2008). Furthermore, Evenett and Keller (2002) shows that the gravity model performs well in explaining variations of manufacturing trade.

Our specifications to estimate are derived from the theoretical-motivated gravity model of Anderson and Van Wincoop (2003) which is as follows:

$$\ln\left(\frac{x_{ij}}{Y_iY_j}\right) = k + (1-\sigma)\rho \ln Dist_{ij} + (1-\sigma)\ln b_{ij} - \ln P_i^{1-\sigma} - \ln P_j^{1-\sigma} + e_{ij} \qquad (2)$$

x_{ij} is export value between country i and j. b_{ij} is a factor representing trade cost other than distance. k is a constant, $\sigma > 1$ is the parameter in CES utility function, which implies $(1-\sigma) < 0$. ρ is the distance elasticity to trade costs. In Anderson and Van Wincoop (2003) illustrations, b_{ij} takes the value of 1 if i and j are located in the same country, and takes the value of 1 plus an

equivalent tariff if they are separated by an international border. Thus, the term $(1-\sigma)\ln b_{ij}$ is zero if both importer and exporter are located in the same country, which associated with no additional cost and higher trade flow, and $(1-\sigma)\ln b_{ij} < 0$ if otherwise. Further, if there is no sufficient quantitative data for 'equivalent tariff' for trade cost factors, one can replace the term $(1-\sigma)\ln b_{ij}$ with dummy variables of factors implying trade costs. The term $\ln P_i^{1-\sigma}$ and $\ln P_j^{1-\sigma}$ are the multilateral (price) resistance terms for country i and j, respectively, which are unobservable.

This study follows Baier and Bergstrand (2007) partially to add a time-dimension and relaxing unitary elasticity of income. Moreover, by assuming dyadic trade costs between importer-exporter pair as this study use import data, the panel specification become as follows:

$$\ln M_{ijt} = k + c_1 \ln Y_{it} + c_2 \ln Y_{jt} + (1-\sigma)\rho \ln Dist_{\text{ij}} + (1-\sigma)\ln b_{ijt} - \ln P_{it}^{1-\sigma} - \ln P_{jt}^{1-\sigma} + e_{ijt} \quad (3)$$

Where M_{ijt} is the country i's import from country j at time t.

To account for trade agreement effects, AFTA is essentially an elimination of trade 'border' among countries. In addition, it is also possibly a creation of implicit border with the rest of the world. Therefore, a proxy of AFTA can be seen as a partial measure of the trade costs impact on trade flows, which is implied by the term $(1-\sigma)\ln b_{ijt}$ in Eq. (3). Since the bilateral tariff data is insufficient, and thus the 'equivalent tariff' rates cannot be measured, two dummy variables of AFTA (*Expand* and *Diver*) are introduced instead.[1] *Expand* is a dummy that equals 1 if both countries are members of AFTA, and 0 otherwise. This reflects the internal relative trade cost subtraction (i.e. which has positive effect on trade). Moreover, *Diver* is a dummy that equals 1 if either home or foreign country is a member of AFTA, and 0 otherwise. This reflects the external relative trade cost addition (i.e. which has negative effect on trade). In other words, let $b_{ijt} = e^{a_4 Expand_{ijt} + a_5 Diver_{ijt}}$, where hypothetically $a_4 < 0$, and $a_5 > 0$. For simplicity, let $c_4 = (1-\sigma)a_4 > 0$ and $c_5 = (1-\sigma)a_5 < 0$ as $1-\sigma < 0$. Hence, by assuming the term $-ln\, P_{it}^{1-\sigma} - ln\, P_{jt}^{1-\sigma}$ is constant across observations[2], the specification becomes as follows:

$$\ln M_{ijt} = c_0 + c_1 \ln Y_{it} + c_2 \ln Y_{jt} + c_3 \ln Dist_{ij} + c_4 Expand_{ijt} + c_5 Diver_{ijt} + u_{ijt} \quad (4)$$

Eq. (4) is the "static" specification, which still only capture the static impact of AFTA. To note, the parameter of *Diver* (i.e. c_5) is included to capture *trade diversion*, whereas *trade creation* is inferred by $c_4 + c_5$. The parameter of *Expand* (i.e. c_4) alone implies *trade expansion* between

[1] Hayakawa (2013). Points out that omitting bilateral tariff rates presents no serious issue for the usual gravity variables. Moreover, specifications without bilateral tariff rates is commonly used on previous literatures(see for example, Koo, Kennedy and Skripnitchenko (2006), Trotignon (2010).

[2] As this study focuses on time-varying properties of AFTA impact, we restrict the multilateral price resistance terms to be constant. The most unrestrictive approach to allow multilateral price resistance terms is to use two-sided country-time dummies. However, it is expected to be perfectly collinear with time-variant country-specific variables, causing the generation of a large number of dummy variables (2,941 in this case), and therefore is not preferable. Nevertheless, considering potential omitted variable bias, this paper will only interpret the results in relative sense across time period.

members of AFTA (i.e. intra-regional bias of AFTA). The specification of Eq. 4 is similar to the commonly-used 'two or more RTA dummies' strategy as explained by Trotignon (2010).[3] Moreover, the potential bias due to other RTAs impacts is expected to be minimal due to the focus of observations on ASEAN countries.

As this research mainly investigates how AFTA impact evolves across time period, several further variables are introduced. This includes interaction of time and AFTA dummies, and their quadratic terms to allow turning points. A similar strategy is employed by Brun *et al.* (2005) to measure the time-varying effect of distance. Instead of applying it on the distance variable, this paper applies the approach on AFTA variables. Similarly as before, we assume that $b_{ijt} = e^{a_4 Expand_{ijt} + a_5 Diver_{ijt} + a_6 t * Expand_{ijt} + a_7 t * Diver_{ijt} + a_8 t^2 * Expand_{ijt} + a_9 t^2 * Diver_{ijt}}$, where $c_n = a_n(1 - \sigma)$, then the specification become as follows:

$$\ln M_{ijt} = c_0 + c_1 \ln Y_{it} + c_2 \ln Y_{jt} + c_3 \ln Dist_{ij} + c_4 Expand_{ijt} + c_5 Diver_{ijt} + c_6 t * Expand_{ijt} + c_7 t * Diver_{ijt} + c_8 t^2 * Expand_{ijt} + c_9 t^2 * Diver_{ijt} + u_{ijt} \quad (5)$$

Eq. (5) is the "time-varying" specification to estimate.

Other alternatives to capture the evolution of AFTA impacts are available but have important drawbacks regarding our interest. However, we conduct them anyway as a comparison and as a robustness test of our findings regarding AFTA impacts on a long term context. *First*, using lag dependent variable and interpreting the innovation in partial adjustment approach such as done by Head *et al.* (2010). This will restrict innovations of all variables (i.e. long-term adjustment) to be symmetric and exponentially equivalent. *Second*, employing lagged AFTA dummies such as done by Baier and Bergstrand (2007). This strategy cannot capture how the AFTA impacts evolving continuously overtime.

Also as a robustness test, this paper reports estimation results using several additional variables, namely GDP per capita for home country, GDP per capita for partner country, and a dummy representing common language. GDP per capita are usually included in gravity model estimations, although are not appear in Anderson and Van Wincoop (2003) empirical specification. Moreover, common language is commonly included as additional factor to measure trade costs.

B. Data

This paper use observations that consists of 8 *home* countries in South East Asia, namely Singapore, Indonesia, Malaysia, Brunei, Philippines, Thailand, Vietnam and Cambodia. Laos and Myanmar are not included in observations because of data insufficiency, especially on bilateral trade data. However, those 8 countries accounts for about 99 percent of ASEAN trade in 2013, as

[3] Elliott and Ikemoto (2004). and Kien (2009). use 3 RTA dummies instead of 2, thus they can differentiate import trade diversion and export trade diversion. Since this paper only use asymmetric observations between home and partner countries, where home countries only consists of ASEAN countries (see *section 3.2*), then it is irrelevant to differentiate those two effects. As an alternative to get the insights, estimations using export data also had been conducted, and generally imply similar AFTA effects.

reported by ASEAN Secretariat[4]. *Partner* countries are consists of about 120 countries[5]. Time series observations are annual from 1990-2012. Therefore, the maximum number of observations is 22,080. The basic descriptive statistics of the dataset is provided on the appendix.

As the main objective of this paper is focus to indicate AFTA impacts, the sample selection of *home* countries focus only on the members of ASEAN, while for *partner* observations include all countries which data available on all those sources. Accordingly, Haveman and Hummels (1998) states that changing sample of countries may result in a different prediction of trade in the absence of the RTA. Moreover, this strategy is also useful to minimize the number of zero entries in bilateral trade data.

All reported estimations are using import data as dependent variable, as data on imports are more consistent compare to data on exports (Koo *et al.*, 2006). However, export data also had been estimated on several specifications and generally indicate similar insights regarding the impact of AFTA.

The source of the bilateral trade flows data is OECD (STAN Database)[6]. GDP, exchange rates and consumer price index (CPI) are taken from World Development Indicators (World Bank). Moreover, distance data use measures by Santos Silva and Tenreyro (2006).[7] Finally, information regarding AFTA status, economic indicators of ASEAN countries, tariff and several trade measures were collected from ASEAN Secretariat and WTO (see *Table A2* in *Appendix* for further details).

4. ANALYSIS

A. Estimation Results

The estimation results using the *static* and *time-varying* specification are reported on Table 1. In general, the estimation results are consistent with the standard hypothesis of gravity model. GDP has a positive effect on trade, while on the other hand distance has a negative effect. Regression results suggest similar parameters with standard gravity model (where AFTA dummies are excluded) except distance parameter that is now reduced from about -0.8 to about -0.5.[8] These can be resulted from AFTA dummies considering RTA, including AFTA, is normally formed based on geographical location.

From regression with *static* AFTA dummies (Eq. 4), there is an indication the AFTA expands intra-AFTA trade significantly as the parameter of *Expand* is significant on 1 percent critical value.

[4] The data is available via www.asean.org.

[5] Refer to the appendix for the country list.

[6] Bilateral Trade Database by Industry and End-Use Category (BTDIxE), which derived from the OECD's International Trade by Commodities Statistics (ITCS) and the UNSD's Comtrade. Industry classification is based on ISIC Rev. 4. Such dataset is available via http://stats.oecd.org/Index.aspx?DataSetCode=STANi4

[7] Santos Silva and Tenreyro (2006). explains that distance data were measured using great circle formula algorithm. Such dataset is available on: http://privatewww.essex.ac.uk/~jmcss/regressors.zip

[8] Results of standard gravity model (without AFTA dummies) are available upon request.

AFTA has a significant trade creation impact, which implied by the positive sum between *Expand* and *Diver* parameters. Moreover, there is also an indication that AFTA has significant trade diversion, which alters trade flows (imports) from extra-AFTA partners to intra-AFTA partners. In other words, some of intra-ASEAN trade expansion due to AFTA implementation has resulted from a diversion from the countries outside AFTA.

Table-1. The Static and Time-Varying Impact of AFTA

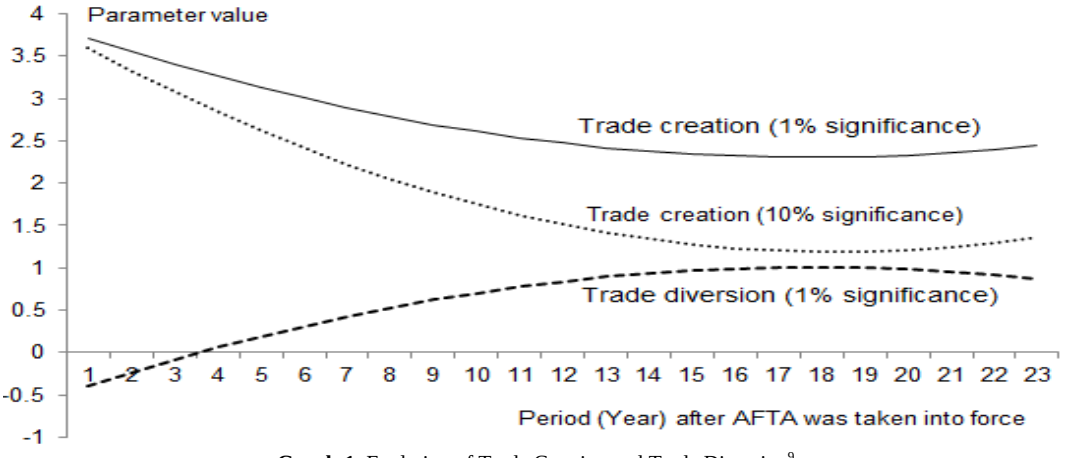
	Static	**Time-Varying**
Log of home GDP	1.262*** (0.018)	1.267*** (0.019)
Log of partner GDP	1.393*** (0.008)	1.399*** (0.008)
Log distance	-0.510*** (0.028)	-0.515*** (0.028)
$Expand_{ijt}$	2.510*** (0.102)	3.316*** (0.444)
$Diver_{ijt}$	-0.697*** (0.078)	0.576*** (0.151)
$t * Expand_{ijt}$		-0.116* (0.065)
$t * Diver_{ijt}$		-0.178*** (0.020)
$t^2 * Expand_{ijt}$		0.004* (0.002)
$t^2 * Diver_{ijt}$		0.005*** (0.001)
Constant	-34.052*** (0.440)	-34.193*** (0.444)
R^2	0.664	0.667
Obs.	14343	14343

Notes: Dependent variable: $\ln(M_{ijt})$, or log imports. Method: Pooled Least Squares. Tobit Estimations with exclusion of zero trade flows also provide very similar parameters. Estimations using export data had also been conducted and produce similar results regarding AFTA impacts. ***, **, * denote significance at 1%, 5%, and 10% critical level, respectively. Standard errors are in parentheses.

Using the *time-varying* specification (Eq. 5*), Diver* parameter is positive and significant, which contradicts the *static* model results *if* interpreted partially. At the point where AFTA was just introduced, trade creation effect was high, compare to trade diversion that was virtually invisible. This suggests that AFTA had expanded both intra-AFTA and extra-AFTA trade. The results are similar to findings of Elliott and Ikemoto (2004) and Kien (2009) but our results suggest this had only happened in a relatively short term, which is at the beginning of AFTA implementation.

Further interpretation of the parameters of AFTA's time-varying dummies is that the effect of trade creation is decreasing, whereas the trade diversion effect is increasing overtime (*Graph 1*). At some point forward (which is estimated about 18 years after AFTA implemented), the difference between the effects of trade diversion and trade creation become minimal. However, the results

show that the trade diversion effect has been never larger than trade creation, and that no evidence that AFTA may hinder overall trade expansion.



Graph-1. Evolution of Trade Creation and Trade Diversion[9]

There are several possible reasons for the lagging trade diversion. *First*, large international transactions usually held by periodical contract. *Second*, it may take some time to seek AFTA members' products which is similar to products from an extra-AFTA country, as manufacturing products are differentiated.

Estimations using export data, where not reported explicitly, have been conducted and resulted in similar parameters, especially regarding the indication of trade creation and trade diversion.[10]

B. Other Methods as Robustness Tests

Table 2 reports the estimation results using other strategies to capture time-varying impact. The specification that use lagged dependent variable (similar to Head *et al.* (2010) results in short-run *Expand* and *Diver* parameters of about 0.4 and -0.1, respectively. Further calculation of those short-run parameters results in the long-run parameters that are similar to the implied average of *Expand* and *Diver* parameters in Table 1.

Estimation using lagged AFTA dummies (similar to Baier and Bergstrand (2007) results in an immediate trade creation impact and a lagging trade diversion impact, similar to the results on Table 1 have indicated. Moreover, the sum of parameters is similar to the implied average of *Expand* and *Diver* parameters in Table 1. Thus, indicating robustness of our estimates.

[9]Figures were calculated using time-varying parameters from *Table 1*. Note that a positive trade diversion implied by negative parameters. The time-varying impact of trade diversion is calculated by: $-(b_{OAFTA} + t * b_{t*OAFTA} + t^2 * b_{t^2*OAFTA})$ while time-varying impact of trade creation is calculated by: $(b_{BAFTA} + t * b_{t*BAFTA} + t^2 * b_{t^2*BAFTA}) + (b_{OAFTA} + t * b_{t*OAFTA} + t^2 * b_{t^2*OAFTA})$ where b_X is parameter of variable *X*. We neglect parameters only significant in 10% critical level to imply trade creation evolution in 1% significance.

[10] The results using export data is available upon request.

Table 2. Time-Varying AFTA Impact: Lag Dependent, Lagged AFTA

	Lag Dependent		**Lagged AFTA dummies**
	Short run	**Long run (Implied)**	
Log Home GDP	0.210***	1.197	1.293***
	(0.0150)		(0.0186)
Log Partner GDP	0.241***	1.377	1.396***
	(0.0104)		(0.0085)
Log Distance	-0.100***	-0.572	-0.511***
	(0.0145)		(0.0280)
Expand	0.426***	2.428	2.971***
	(0.0581)		(0.3137)
Diver	-0.139***	-0.792	-0.245
	(0.0522)		(0.1605)
Log Imports (L1)	0.825***	-	-
	(0.00681)		
Expand (L1)			-0.056
			(0.4178)
Diver (L1)			0.043
			(0.1506)
Expand (L2)			-0.323
			(0.3097)
Diver (L2)			-0.433***
			(0.106)
Constant	-5.490***	-31.321	-34.736***
	(0.353)		(0.454)
Observations	12,652		13,621
R-squared	0.892		0.671

Notes: Dependent variable: log imports. Long run coefficient is calculated from $\frac{1}{1-\rho}b$, where ρ is parameter for lag dependent (Log Imports L1) and b is short-run parameter of each variables (see Head et al. , 2010). Choice of lag length in 'lagged AFTA dummies' estimation was based on maximum dummies possible before any AFTA dummies dropped due to collinearity. Dependent variable: (log of) imports. Method: Pooled least squares ***, **, * denote significance at 1%, 5%, and 10% critical level, respectively. Robust standard errors are in parentheses

Table 3 reports the estimation results using the static and time-varying specifications, by adding several variables that is usually included in empirical estimations of gravity models: GDP per capita and common language. The results suggest similar results on AFTA impacts compare to the results on Table 1, although there are slight differences in the significance of interaction terms. The standard variable of gravity models also suggesting similar results, with only a slight reduction on the elasticity of partner's GDP. Moreover, the elasticity of GDP per capita is found to be around 0.3, and countries with same language are indicated to trade about 13-15% higher than pairs with different language.

Table-3. Static and Time-Varying Impact with GDP per capita and common language

	Static	**Time-Varying**
Log of home GDP	1.265***	1.274***
	(0.0192)	(0.0195)
Log of partner GDP	1.233***	1.236***
	(0.0119)	(0.0118)
Log distance	-0.555***	-0.561***
	(0.0276)	(0.0277)
$Expand_{ijt}$	2.647***	2.853***
	(0.101)	(0.419)
$Diver_{ijt}$	-0.665***	0.335**
	(0.0747)	(0.147)
$t * Expand_{ijt}$		-0.0314
		(0.0627)
$t * Diver_{ijt}$		-0.134***
		(0.0198)
$t^2 * Expand_{ijt}$		0.00101
		(0.00217)
$t^2 * Diver_{ijt}$		0.00390***
		(0.000696)
Log of Home GDP Per capita	0.298***	0.283***
	(0.0148)	(0.0148)
Log of partner GDP Per capita	0.320***	0.324***
	(0.0153)	(0.0153)
Common language	0.141***	0.126***
	(0.0426)	(0.0425)
Constant	-35.95***	-36.02***
	(0.456)	(0.463)
R^2	0.685	0.687
Obs.	14,300	14,300

Notes: Dependent variable: log imports. Comlang is 1 if common language between exporter and importer, 0 otherwise. ***, **, * denote significance at 1%, 5%, and 10% critical level, respectively. Robust standard errors are in parentheses.

5. CONCLUSION

This paper mainly employs the gravity model to discuss the impact of AFTA using manufacturing trade data during 1990-2012. Estimations of gravity model are applied using static and time-varying AFTA dummies to measure the trade creation and trade diversion effect of AFTA, as well as to measure the evolution of those effects across time period. Moreover, this paper also conduct estimates using several other strategies to gain better insights and as a robustness test.

The estimation results suggest that because of AFTA implementation, trade creation appear instantly, but decreasing overtime. Meanwhile, trade diversion effect is insignificant at the beginning but rising overtime. This finding is different to Elliott and Ikemoto (2004); Koo *et al.* (2006) and Kien (2009) where they find insignificant trade diversion. The reason for the difference

is self-explanatory from our indication of the time-varying impacts. Indeed, when those previous studies were performed, it is likely that trade diversion still not take place.

The implication of this finding is that AFTA or possibly other RTAs, can support globalization for the short term but may hamper the globalization in the long-term for the sake of 'regionalization', which implies that further RTAs with extra-regional countries are advisable, and possibly 'inevitable'. This suggests reason why external countries had managed to form bilateral trade agreements with AFTA members or further RTAs with all AFTA members several years after AFTA had taken into force (Japan, China and Australia, for example). Furthermore, a globalization effort that liberalizes trade among nations globally should be carried out continuously through WTO to neutralize the increasing impact of trade diversion several years after RTA implementation. Finally, the best scenario we should wish is a mutual commitment for every country in the world to fade out RTAs towards a global free-trade without distortion of preferences.

There are several limitations in this study. First, we assume explanatory variables, including trade creation and trade diversion are exogenous. Second, we put restrictions on how multilateral resistance terms vary overtime, as limited by the data. Therefore, we are cautious to interpret RTA impacts to an exact multiplier, but we can interpret the RTA impact in relative sense across time.

Due to limitation and scope of this study there are some suggestions for further research attempts: *First*, to identify the impact of AFTA to welfare of ASEAN countries, especially due to the indication of trade diversion several years after AFTA had taken into force. *Second*, to estimate time-varying specifications which control multilateral resistance terms and unobserved heterogeneity.

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APPENDIX

Table-1. List of Other Regional/Bilateral Trade Agreements In Force Involving ASEAN Members

Title	Members	Scope	Year Enforced
Asia-Pacific Trade Agreement (APTA) / Bangkok Agreement	India, China, Korea, Lao PDR, Bangladesh and Sri Lanka	Multilateral	2001
Agreement between Japan and the Republic of Singapore for a New-Age Economic Partnership (JSEPA)	Singapore and Japan	Bilateral	2002
Thailand-India Framework Agreement for establishing an AFTA	Thailand and India	Bilateral	2003
Agreement between New Zealand and Singapore on a Closer Economic Partnership (ANZSCEP)	New Zealand and Singapore	Bilateral	2002
Singapore-Australia Free Trade Agreement	Singapore and Australia	Bilateral	2003
United States-Singapore Free Trade Agreement (USSFTA)	US and Singapore	Bilateral	2004
Thailand-Australia Free Trade Agreement	Thailand and Australia	Bilateral	2005
ASEAN-China Free Trade Area	ASEAN, China	Multilateral	2005
ASEAN-Korea Free Trade Agreement	ASEAN, Korea	Multilateral	2007
Thailand-New Zealand Closer Economic Partnership Agreement	Thailand and New Zealand	Bilateral	2005
India-Singapore Comprehensive Economic Cooperation Agreement	Singapore and India	Bilateral	2005
Korea-Singapore Free Trade Agreement	Korea and Singapore	Bilateral	2006
Trans-Pacific Partnership Agreement (TPP)	Brunei, Singapore, New Zealand and Chile	Multilateral	2006
Malaysia-Japan Economic Partnership Agreement	Malaysia and Japan	Bilateral	2006
ASEAN-India	ASEAN, India	Multilateral	2010
ASEAN-Japan	ASEAN, Japan	Multilateral	2008
Brunei-Japan	Brunei, Japan	Bilateral	2008
Chile-Malaysia	Chile, Malaysia	Bilateral	2012
Japan-Indonesia	Japan, Indonesia	Bilateral	2008
Japan-Malaysia	Japan, Malaysia	Bilateral	2006
Japan-Philippines	Japan, Philippines	Bilateral	2008
Japan-Thailand	Japan, Thailand	Bilateral	2007
Japan-Vietnam	Japan, Vietnam	Bilateral	2009
Malaysia-Australia	Malaysia, Australia	Bilateral	2013
New Zealand - Malaysia	New Zealand, Malaysia	Bilateral	2010
Pakistan-Malaysia	Pakistan, Malaysia	Bilateral	2008
Panama-Singapore	Panama, Singapore	Bilateral	2006
Peru-Singapore	Peru, Singapore	Bilateral	2009
Thailand-Australia	Thailand-Australia	Bilateral	2005
Thailand-New Zealand	Thailand, New Zealand	Bilateral	2005

Source: Sen *et al.* (2013) and RTA Gateway, WTO Website.

Table-2. Data and Sources

Variable	Source(s)	Note
Bilateral Manufacturing Imports	STAN Database – Bilateral Trade Database by Industry and End-Use Category (BTDIxE), OECD*	Thousand USD
Bilateral Manufacturing Exports	STAN Database – Bilateral Trade Database by Industry and End-Use Category (BTDIxE), OECD*	Thousand USD
GDP	World Development Index, World Bank, via UK Data Service	Thousand USD
Distance	Santos Silva and Tenreyro (2006)	Measured using great circle formula algorithm
Common Language	Santos Silva and Tenreyro (2006)	
RTA Information	WTO website, Sen *et al.* (2013) ASEAN Secretariat	
Exchange Rates	World Development Indicators, World Bank, via UK Data Service	Local currency per US Dollars
Consumer Price Index	World Development Indicators, World Bank, via UK Data Service	Index
Tariff rate: manufacturing, most preferred nation.	World Development Indicators, World Bank, via UK Data Service	

***** derived from the OECD's International Trade by Commodities Statistics (ITCS) and the UNSD's Comtrade.

Table-3. Country List

code	country	code	country	code	country	code	country
2	Albania	56	Ecuador	106	Lebanon	157	Russia
3	Algeria	57	Egypt	115	Madagascar	158	Rwanda
8	Argentina	58	El Salvador	116	Malawi	161	Saudi Arabia
11	Australia	62	Ethiopia	117	Malaysia	162	Senegal
12	Austria	64	Fiji	118	Maldives	163	Seychelles
15	Bahrain	65	Finland	119	Mali	165	Singapore
16	Bangladesh	66	France	120	Malta	170	South Africa
17	Belarus	68	Gabon	122	Mauritania	171	Spain
19	Belgium	69	Gambia	123	Mauritius	172	Sri Lanka
21	Benin	71	Germany	125	Mexico	176	Sudan
23	Bhutan	72	Ghana	129	Mongolia	177	Suriname
24	Bolivia	73	Greece	130	Morocco	179	Sweden
27	Brazil	77	Guatemala	131	Mozambique	180	Switzerland
28	Brunei Darussalam	78	Guinea	134	Nepal	181	Syrian Arab Rep.
29	Bulgaria	80	Guyana	135	Netherlands	183	Tanzania
30	Burkina Faso	82	Honduras	137	New Caledonia	184	Thailand
31	Burundi	83	Hong Kong	138	New Zealand	185	Togo
32	Cambodia	84	Hungary	139	Nicaragua	187	Trinidad & Tobago
33	Cameroon	85	Iceland	140	Niger	188	Tunisia
34	Canada	86	India	141	Nigeria	189	Turkey
37	Central African Rep.	87	Indonesia	143	Norway	191	Uganda
40	Chile	88	Iran	144	Oman	193	UAE
41	China	90	Ireland	145	Pakistan	194	United Kingdom
42	Colombia	92	Israel	147	Panama	195	United States
45	Congo	93	Italy	149	Paraguay	196	Uruguay
46	Costa Rica	94	Jamaica	150	Peru	199	Venezuela
47	Côte d'Ivoire	95	Japan	151	Philippines	200	Viet Nam
50	Cyprus	96	Jordan	152	Poland	203	Yemen
52	Denmark	98	Kenya	153	Portugal	205	Zambia
55	Dominican Republic	101	Korea	156	Romania	206	Zimbabwe

Note: Country selection is based on combination of OECD's STAN Database, World Bank's WDI, and Santos Silva and Tenreyro (2006) dataset. Country code refers to the latter. Countries in bold are members of ASEAN.

Table-4. Descriptive Statistics

Description	Obs	Mean	St. dev	Min	Max
Log of imports	14631	8.82	3.92	0.00	17.71
Log of exports	15110	9.94	3.21	0.00	17.71
Log of partner's GDP	21568	17.45	2.15	12.75	23.38
Log of home's GDP	21720	17.85	1.32	14.71	19.87
Log of distance	22080	9.05	0.67	5.79	9.90
Log of bilateral real exchange rates	18122	0.83	4.49	-10.14	10.83
Log of partner's GDP per capita	21520	8.07	1.67	4.72	11.12
Log of home's GDP per capita	21720	7.91	1.51	5.49	10.46