An Analysis of Trade Potential between China and ASEAN within China-ASEAN FTA

Tang Yihong

Wang Weiwei

University of International Business and Economics (UIBE), China

Abstract

This paper applies Export Similarity Index to examine China's export potential to ASEAN market by comparing China with six main ASEAN member countries (ASEAN 6) and the other main trade partners of ASEAN. It shows that competition is severe on industrial level in ASEAN market, and the bilateral trade potential is uncertain. While accounting for the factors of size, distance and integration etc., China-ASEAN FTA had a significant positive effect on bilateral trade volume. We extend the gravity model to panel data and test it.

Key Words: China-ASEAN FTA, export Similarity Index, trade potential, gravity model

I. Introduction

As one of the three largest regional economic organizations in world, the Association of South-East Asian Nations (ASEAN) is often seen as a key factor when economic integration issues are raised, especially when China and ASEAN endeavor to speed up trade liberalization by making Free Trade Arrangements since November 2002.

There are many viewpoints about the effects and economic integration. Some studies provide evidence that economic integration has a favorable impact on economic growth (Richard E. Baldwin and Anthony J. Venables, 2004). International integration[1] might change the long-run growth rates and specialization patterns of countries involved (Uwe Walz, 1997). Trade liberalization is also an essential factor in development. Arivind Panagariya (2004) suggested that sustained growth cannot be achieved without rapid growth in trade, which requires either low or decline barriers to trade.

As one phase of trade liberalization, FTA has drawn lots of interests. Harald Badinger (2001) shows that GDP per capita of the EU would be approximately one fifth lower than today, if no integration had taken place since 1950. As for ASEAN, Chen Wen (2003) indicated that the establishment of China-ASEAN FTA would put many of its members in more direct competition with China in export markets and in terms of attracting foreign investment. Tang Yihong and Wang Weiwei (2004) used the index of revealed comparative advantage, illustrating that the export structures of China and ASEAN 6 are similar,

[1] Include trade liberalization, liberalization of factor mobility, free flow of technological knowledge, etc.

competition in substitutes between China and ASEAN members are fierce in the ASEAN market.

Although economic theory clearly postulates growth enhancing effects of economic integration, empirical evidence for the China-ASEAN FTA is rather weak. There still exists different viewpoints as to effects of China-ASEAN FTA in studies with gravity model, for instance, Yang Changzhi (2003) explored the trade potential in China-ASEAN FTA and pointed out that there is excess trade between China and ASEAN countries at present. In contrast, Benjamin A. Roberts (2004) used the results of the Gravity model explaining trade flows within China-ASEAN Free Trade Area (CAFTA), and exhibited that trading partners are likely to gain from the formation of the FTA in 2010. A critical point in all previous studies is the disadvantages of economic integration, which is usually underestimated. In this paper we apply Export Similarity Index to examine China's export potential to ASEAN market by comparing China with six main ASEAN member countries (ASEAN 6) and the other main trade partners of ASEAN such as America, Japan, South Korea and India. We set up Gravity Model to test whether China is over or under traded relative to the predicted trade volumes in the period 1993-2003. Empirical study shows that after accounting for size and distance effects, China-ASEAN FTA had a significant effect on bilateral trade between China and ASEAN members, and the trade flows between them would take on a stimulative trend, especially for capital-intensive goods.

This paper is structured as follows. Section II analyzes China's motivation of building China-ASEAN FTA, and advantages and disadvantages from the economic integration. Section III applies Export Similarity Index to measure the similarity of the exports of China and other countries to ASEAN market, finding that there are fierce competitions in ASEAN market for China either on gross trade volume level or products level. And the bilateral trade potential is uncertain. Thus China should optimize its export structure so as not to lose existing market share in ASEAN market. Section IV presents the Gravity Model of trade to analyze China's trade potential with ASEAN members within China-ASEAN FTA. There are two major findings. First, China has different strong rivals when exports to ASEAN market. Regional effects are strong in ASEAN region. Second, China-ASEAN FTA had a significant positive effect on bilateral trade volume while accounting for the factors of size, distance and integration etc. Based on these findings we argue that although there is fierce competition in ASEAN market, China does not use up its potential in international trade with ASEAN members, especially for specific industrial products. Section V concludes with an overall summary and suggestions for future development of the China-ASEAN trade.

II. Background of China-ASEAN Integration

ASEAN was established on 8 August 1967 in Bangkok by the five original Member Countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined in 1984, Vietnam in 1995. Lao People's Democratic Republic and Burma became members in 1997. With Cambodia's admission in 1999 ASEAN expands to 10 countries.

The ASEAN region has a population of about 500 million, a total area of 4.5 million square kilometers, a combined GDP of US$800 billion, and a total trade of US$ 985 billion in 2004.[2] ASEAN has proved to be one of the most successful regional groupings in terms of regional cooperation (See Table 1).

TABLE 1 GDP at Current Market Prices in Million of USD, 1996-2004

Country	1997	1998	1999	2000	2001	2002	2003	2004
Brunei	5,102	3,865	4,190	4,315	4,176	4,270	4,715	5,185
Cambodia	3,320	3,027	3,427	3,546	3,783	4,028	4,327	4,864
Indonesia	-	-	-	-	164,805	204,499	243,508	258,266
Lao PDR	1,747	1,286	1,451	1,733	1,744	1,805	2,046	2,473
Malaysia	101,213	72,237	79,149	90,320	88,001	95,266	103,952	118,318
Myanmar[1)]	4,657	6,953	9,275	10,549	8,281	9,135	9,605	9,081
Philippines	82,764	65,584	76,076	74,837	71,985	76,648	79,149	86,106
Singapore	95,389	82,084	82,573	92,530	85,869	88,490	92,389	106,884
Thailand	155,965	112,751	122,698	122,955	115,595	126,774	143,170	163,547
Viet Nam	26,843	27,209	28,677	31,319	32,647	35,066	39,535	45,402
ASEAN	-	-	-	-	576,884	645,981	722,395	800,087

Notes:

Computed using the period average exchange rates. Value is in US$ million.

Myanmar figures are calculated using the exchange rates as used in the IMF-WEO Database of April 2005.

*) As a proxy, the combined GDP of ASEAN is computed as the sum of GDP of ASEAN Member Countries.

**) Indonesia is using the new series of 2000 based year. Data prior to 2000 are not available.

Source: ASEAN Finance and Macroeconomic Surveillance Unit (FMSU) Database.

Before the 1990s, there was no official relationship between the ASEAN as a grouping and China. In 1991, China founded or recovered its diplomatic relations with all ASEAN members. In 1996, China was upgraded as a dialogue partner of ASEAN. In 2001, China formally put forward the proposal to establish Free Trade Area (FTA) with ASEAN and got an active response. In November 2002, China and ASEAN signed Framework Agreement on China-ASEAN Comprehensive Economic Cooperation at the Sixth China-ASEAN Summit in Cambodia. China signed an agreement on Trading in Goods of the Framework Agreement on Comprehensive Economic Cooperation with ASEAN on 29 November 2004. The agreement

[2] Source: ASEAN Trade Statistics Database, available at http://www.aseansec.org.

is set to reduce and eliminate tariffs on trade in goods between the parties, and establish a mechanism to adjudicate ASEAN-China trade disputes. China-ASEAN Free Trade Area reduced tariff rate. Tariff cuts started 1 July 2005, and will aim to axe duties on some 4000 types of goods to between zero and five percent by 2010 for the six most advanced ASEAN members, i.e., Brunei and five original member nations. The four less advanced member states—Laos, Vietnam, Cambodia, and Myanmar (Burma)—will have to comply until 2015. The China-ASEAN FTA will allow all members to enjoy the benefits from trade effects, that is, enjoy more favorable trade and investment treatment than the World Trade Organization can offer. Now ASEAN members can enjoy low tariffs when exporting to China. Under the Early Harvest Programme, live animals，meat and edible meal offal，fish，dairy produce，other animal products，live trees，edible vegetables and edible fruits and nuts，as well as other specified products can enjoy the following ACFTA tariffs(See Table 2).

Table 2 Early Harvest Programme Tariff Rates

China's (MFN) Applied Tariff Rates:	ACFTA Tariff Rate	
	2005	2006
Greater than 15%	5%	0%
Between 5% (inclusive) and 15% (inclusive)	0%	0%
Less than 5%	0%	0%

Under the Trade in Goods Agreement，all other products，which are listed under the Normal Track[3] now also enjoy ACFTA tariffs(See Table 3).

Table 3 Trade in Good Agreement Tariff Rates

China's (MFN) Applied Tariff Rates:	ACFTA Tariff Rate	
	2005	2007
Greater than or equal to 20%	20%	12
Between 15% (inclusive) and 20%	15%	8
Between 10% (inclusive) and 15%	10%	8
Between 5% and 10%	5%	5
Less than and equal to 5%	Standstill	

Source: ASEAN Secretariat, available at http://www.aseansec.org

The objective of the China-ASEAN FTA agreement is to create a FTA by the year 2010.Thus the largest FTA with 1.8 billion people in the world will be born. Statistics from ASEAN Secretariat show that since 1990, ASEAN has become China's fourth largest trade partner, and China the sixth of the ASEAN, with ASEAN's total trade with China increased rapidly (See Table 4).

[3] For 2001 a complete list of products，visit http://www.aseansec.org/accfta tif/annex 1.zip.

Table 4 ASEAN Export and Import to China, 1993-2003

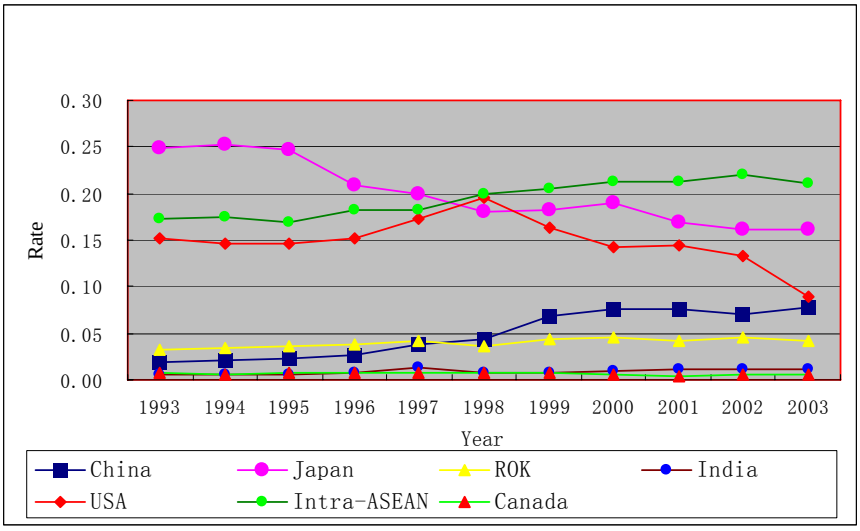
Year	Export	Import
1993	4,528,694.7	4,336,364.2
1995	6,200,891.8	7,129,723.3
1997	9,167,889.0	13,482,883.2
1999	26,472,377.3	19,407,997.9
2001	31,552,091.2	23,833,075.1
2003	27,044,232.1	28,272,242.8

Notes: Value is in US$ 1000.

Source: ASEAN Trade Database, available at http://202.154.12.33/trade/publicview.asp

However, there are still uncertain factors influencing the trade effects on China of China-ASEAN FTA. For instance, China will encounter a certain amount of other barriers except for tariff, there is competition in the substitutes between China and ASEAN members in the ASEAN market, there is competition in ASEAN market with other countries which sign Free Trade Agreements with ASEAN, etc. Figure released by the ASEAN Secretariat shows that fierce competition exists in ASEAN's import market (See Figure 5).

Figure 5 ASEAN Import by Partner (Per Cent of Total Trade, 1993-2003)



Note:

Figures cover only Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand (1993 - 1998);

Figures cover only Brunei Darussalam, Indonesia, Malaysia, Myanmar, Philippines, Singapore and Thailand (1999);

Figures cover only Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Singapore and Thailand (2000 - 2003)

China including Hong Kong in 1999 – 2001

Figure 5 shows the share of ASEAN import accounted for by the major trading partners from 1993 to 2003. The main trends are the relative decline in importance of import from

Japan (though it still accounts for exceeding 16 percent in 2003) and the increasing importance of Intra-ASEAN countries (about 21.1 percent in 2003). In contrast, import from India and Canada has remained approximately constant as a proportion of total import, at about 1 percent and 0.5 percent respectively. China's share kept below Japan, USA and Intra-ASEAN, but it takes on an ascending trend and achieved a peak of 7.86% in 2003.

Figure 5 suggests that ASEAN's import from China is a relatively small proportion of total ASEAN import. The fact would motivate some to suggest that there is substantial scope for increasing the level of trade between China and ASEAN. However, comparisons on the basis of trade share alone are open to misinterpretation. Of course the analysis so far is very simplistic. Any comparison should take account of the relative size, trade volume and income of the trading partner. A better benchmark would be the Export Similarity Index. We illustrate it in Part III.

III. Export Similarity Index

We present an index of export similarity (export similarity index[4]) to measure the similarity of the exports of China and other countries (or groups of countries) to the target market[5]. An advantage of such an index over other measures is that it requires only international trade data, and these are available on a standardized basis for all countries. We use the index to compute the similarity of exports between various countries or groups of countries to the market of ASEAN. The indices are computed from 1993 to 2003. We can observe changes over time in the similarity of exports between any two countries or groups of countries, and thereby assets the degree to which their export or economic structure is becoming more similar or more divergent. Policy implications of the results are then discussed.

The index is

$$s(ij,w) = [\sum_k Min(\frac{X^k{}_{iw}}{X_{iw}}, \frac{X^k{}_{jw}}{X_{jw}})] \times 100\%$$

where

$X^k{}_{iw}$ is the amount of export to ASEAN of products k of country i;

X_{iw} is the total value of export to ASEAN of country i;

$X^k{}_{jw}$ is the amount of export to ASEAN of products k of country j;

X_{jw} is the total value of export to ASEAN of country j;

Table 6 presents the results of export similarity index[6] from 1993 to 2003.

[4] First appeared in J. M. Finger, M. E. Kreinin(1979).
[5] We mean ASEAN here.
[6] We draw export data from ASEAN Trade Database. The data are reported in the Harmonized System (HS)

Note that $0 \le s(ij,w) \le 1$. If country i and country j export the same goods to ASEAN market, then $s(ij,w)$ =1, if export of the two countries is absolutely different, then $s(ij,w)$ =0. If the index takes on an ascending trend then we can conclude that China and that country share more and more similar export structure, i.e. they compete more and more fiercely in ASEAN market.

Table 6 Export Similarity Index[7] in ASEAN Market, 1993-2003

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
China-Japan	0.442256	0.474460	0.554444	0.466172	0.630204	0.625659	0.709351	0.715379	0.734307	0.737115	0.751614
China-ROK	0.522619	0.529241	0.628823	0.563689	0.678607	0.640732	0.628102	0.731995	0.694031	0.637221	0.656686
China-India	0.583506	0.521950	0.603185	0.572076	0.439270	0.517914	0.493829	0.531088	0.594266	0.429445	0.431941
China-USA	0.465651	0.526496	0.568834	0.510664	0.636591	0.622460	0.736286	0.736336	0.734127	0.698404	0.650212
China-ASEAN countries[8]	0.542796	0.560448	0.573025	0.534651	0.674888	0.721749	0.757458	0.787864	0.782431	0.698898	0.738465

Note:

Figures cover only Brunei Darussalam, Indonesia, Malaysia, Philippines, Singapore and Thailand (1993 - 1998);

Figures cover only Brunei Darussalam, Indonesia, Malaysia, Myanmar, Philippines, Singapore and Thailand (1999);

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China including Hong Kong in 1999 – 2001

Table 6 shows that during the period 1993-2003 China's export similarity degree with Japan, ROK, India, USA and ASEAN member countries. China and Japan have the biggest export similarity index value in 2003. The main trends are the relative increasing in export similarity of China and all these countries except India. The reasons are as follows.

First, on gross trade volume level, ASEAN has negotiated on FTA not only with China, but also with Japan, India and USA respectively. AS ASEAN's largest trading partner and investor, Japan started free trade talks with ASEAN in April 2005, with the objective of liberalizing trade in goods by 2012. India signed a comprehensive agreement with ASEAN which plans to establish an ASEAN-India free trade area by 2011 for five of the six advanced ASEAN members and by 2016 for the Philippines and the four less advanced member states. The closer trade partner relationship has positive effect on their export to ASEAN market. Besides, ASEAN members signed preferential agreements to eliminate import duties, accelerate the liberalization of intra-ASEAN trade. All these steps would cause a disadvantageous

classification code at the 2-digit level.

[7] If we compute with data in HS classification code at 3 or 4-digit level, the indices would be smaller.

8 ASEAN countries here include Brunei, Indonesia, Malaysia, Philippines, Singapore and Thailand.

environment for Chinese products in ASEAN market.

Second, on product level, export structures of China and other countries are similar to some extent in ASEAN market. ASEAN 6's biggest gains are textiles and apparel, electrical appliances and machinery, and other manufactures, nearly the same with China's main products exporting to ASEAN market. In 2003, in the leading 10 products of China and Japan exporting to ASEAN, 7 kinds of the products are the same, such as electronic equipments, electrical equipments, and telecommunications equipments, etc. The 7 kinds of products account for 67.4 percent of China's total export and 76.7 percent of Japan's total export to ASEAN market. In 2004, China's top 10 export products to ASEAN account for 76.7 percent of its total export to ASEAN, and Japan's top 10 export products to ASEAN market account for 86.3 percent of its total export to ASEAN (See Table 7).

The figures indicate that there are fierce competitions in ASEAN market for China. China should optimize its export structure so as not to lose existing market share in ASEAN market.

Table 7 Ten Major Export Commodities of China, Japan and India to ASEAN Market by 2 Digits HS Code, 2003-2004

Year	China			Japan			India		
	HS[9]	Value	Share	HS	Value	Share	HS	Value	Share
2003	85	7,927.1	28.7	85	17,496.0	30.3	27	525.3	13.4
	84	7,144.1	25.7	84	13,324.1	23.1	71	491.6	12.5
	27	1,644.4	5.9	87	5,818.0	10.1	29	329.7	8.4
	90	612.9	2.2	72	3,203.2	5.5	72	297.3	7.6
	10	511.7	1.8	90	2,502.4	4.3	84	240.7	6.1
	39	511.0	1.8	39	2,353.0	4.1	10	227.1	5.8
	73	456.6	1.6	73	1,463.9	2.5	02	130.6	3.3
	52	448.9	1.6	27	1,340.6	2.3	23	119.3	3.0
	28	447.7	1.6	29	1,157.4	2.0	85	114.5	2.9
	29	425.7	1.5	40	653.7	1.1	76	101.5	2.6
	10 Major	20,175.0	72.6	10 Major	49,312.3	85.3	10 Major	2,577.7	65.6
	Others	7,608.7	27.4	Others	8,476.6	14.7	Others	1,354.1	34.4
	Total	27,783.7	100.0	Total	57,788.9	100.0	Total	3,931.9	100.0
2004	85	14,136.7	33.2	85	22,721.2	31.5	27	1,371.8	20.8
	84	0,486.5	24.7	84	16,984.6	23.5	71	822.4	12.5
	27	1,866.3	4.4	87	6,715.2	9.3	29	535.6	8.1
	72	1,791.7	4.2	72	4,366.7	6.0	72	436.3	6.6
	90	979.9	2.3	90	3,260.8	4.5	23	432.2	6.6
	71	727.2	1.7	39	2,910.1	4.0	84	363.8	5.5

[9] For the commodities classified by 2 Digits HS Code, see appendix.

	39	701.1	1.6	73	2,262.7	3.1	10	238.6	3.6
	73	690.5	1.6	29	1,465.4	2.0	76	198.6	3.0
	28	630.3	1.5	38	837.4	1.2	85	190.4	2.9
	29	619.1	1.5	40	802.7	1.1	02	185.8	2.8
	10 Major	32,629.4	76.7	10 Major	62,326.9	86.3	10 Major	4,775.6	72.4
	Others	9,892.7	23.3	Others	9,865.3	13.7	Others	1,818.7	27.6
	Total	42,522.0	100.0	Total	72,192.2	100.0	Total	6,594.2	100.0

Note: Value is in US$ Million; Share is in %.

Source: ASEAN Trade Statistics Database, available at http://www.aseansec.org

It is undoubtedly that Chinese export products are facing competition with foreign products drastically in the ASEAN market. But there is still space for China to enhance its market share and increase trade flow. Before we can state this conclusion with any degree of confidence, however, we must note that there are many other variables that could exert a significant influence on trade volume and trade flow. What role did China and ASEAN free trade agreements play in the regionalization process? Would more trade potential exist for China and ASEAN? We would attempt to answer these questions by estimating a model includes more variables that May influence trade flows. The model that economists often used to account for trade flows between countries is known as the gravity model. We would set up the model and test in next section.

IV. The Gravity Model

1. The Gravity Model of Trade

The gravity model, used for modeling bilateral trade flow, is analogous to Newton's law that relates the gravity between two objectives to their masses and the distance between them. Tinbergen(1962) first applied the model to international trade flows, Linneman(1966) related trade between country i and country j to the proportion of the product of both countries GDP and to the distance between them as a proxy for transaction costs. That is, $T_{ij} = A\frac{Y_i Y_j}{D_{ij}}$ (1), where A is a constant for proportionality, Y_i is GDP for country i and Y_j is GDP for country j, D_{ij} is the distance between them. From equation (1) we can conclude that bilateral trade should be positively related to the two countries' incomes and negatively related to the distance between them. Later on, lots of adjustments and additions have been made to the standard gravity model. Krugman(1991) formalized the role played by geographical proximity in the regionalization process. Frankel et al. (1995) proved that countries with cultural links and common languages tend to trade more with each other.

Leamer and Levinsohn (1995) claim that they provide “some of the clearest and most robust empirical findings in economics”.

To explain bilateral trade between country i(importer)and country j(exporter), based in Linneman(1966) equation, we estimate a gravity equation of the form

$$LnTrade_{ijt} = \beta_0 + \beta_1 LnGDP_{it} + \beta_2 LnGDP_{jt} + \beta_3 Ln(GDP/POP)_{it} + \beta_4 Ln(GDP/POP)_{jt} + \beta_5 LnDis\tan ce_{ij}$$

$$+ \beta_6 LnAera_i + \beta_7 LnAera_j + \beta_8 Island_i + \beta_9 CommonB_{ij} + \beta_{10} CommonL_{ij} + \gamma_1 P_{ijt} + \gamma_2 P_{it} + Ln\varepsilon_{ij} \quad (2)$$

where

$Trade_{ijt}$ is the import of country i from country j in year t;

GDP_{it} is the GDP of country i in year t,;

$(GDP/POP)_{it}$ is the GDP per capita of country i in year t;

$Dis\tan ce_{ij}$ is the distance between country i and country j;

$Area_i$ is the surface area of country i;

$CommonB_{ij}$ is a dummy variable which takes value 1 if country i and country j share a common border;

$CommonL_{ij}$ is a dummy variable which takes value 1 if country i and country j share the same language;

P_{ij} is a dummy variable which takes value unity if importer i and exporter j are both in the AFTA in year t;

P_i is a dummy variable which takes value unity if the importer i is in the CAFTA and exporter j is a non-CAFTA country in year t;

$c, \beta_1, \beta_2, \beta_3 ... \beta_{10}, \gamma_1, \gamma_2$ are parameters, and ε_{ij} is an error term.

2. Data and Methodology

We study the bilateral trade between 15 countries from 1993 to 2003. The countries involve AFTA members and their main trading partners, including China, Japan, ROK, India and US. These countries are most important competitors for China in ASEAN market and consist of about 70% of ASEAN members’ total trade. To estimate the trade potential between China and ASEAN, offering arguments for future export structure improvement of China, the analysis is representative. With fifteen countries, where each of them has 14 country-pairs, our sample is of 210 groups and 2100 observations.

We obtained the bilateral trade data, measured in thousands of current US dollars, from UN Commodity Trade Statistics Database[10]. The data was available at a two-digit Harmonized

10 Available at http://unstats.un.org/unsd/comtrade/.

System (HS) classification code level. Some qualifications concerning the data should be noted. Some data (for example, import and export data of Myanmar, Cambodia, Lao PDR and Viet Nam) are not available. To address this issue, we use the conversion relationship of $CIF / FOB = 1.10$ (Benjamin A. Roberts, 2004) to estimate these missing data. A further concern is with the distance data. We use the great circle distance between capital cities as proxy of trading costs[11].In the case of the explanatory variables, the GDP data, population and surface area data were obtained from the World Bank Development Indicators (WDI) Database[12]. The adjacency dummy variable $CommonB_{ij}$ which takes value of one if export country and import country share a common border and zero otherwise. The P_{ij} dummy variable takes the value of unity when both countries are AFTA members and zero otherwise. In other words, its parameter γ_1 is a coefficient describing the intra-bloc trade. If the coefficient of this dummy is positive and significant, a regional effect exists and the interregional trade in ASEAN is more active than extra-ASEAN trade. The P_i dummy variable takes the value of unity when the importer is China or AFTA member and zero otherwise. Its parameter shows whether China and ASEAN member countries have a propensity to divert trade from other countries to CAFTA members. By analyzing the two parameters together, we can estimate whether there is trade diversion in CAFTA process.

3. Empirical Results

Table 8 shows the estimate of the gravity model over all countries in our sample. We estimate this first to check that our data and specification are consistent with other papers using the gravity model, such as Roberts (2004), Carlos Carrillo, and Carmen A Li(2002) and Peter Egger (2002). The first column shows the results from estimating Equation (2) using OLS applied to the pooled data set. Note that in all results, $LnAera_i$ and $LnAera_j$ were insignificant. All other coefficients have the expected sign and their magnitudes are similar to those found in other papers. The effects of the importer GDP and the exporter GDP are positive and statistically significant. Trade rises with GDP per capita. The estimated coefficients of distance and adjacency have the expected sign and are highly significant. Transportation cost is relevant to distances and adjacency. Trade falls with increasing physical distance between countries. Hence one of the policy suggestions is that China should make efforts to reduce transaction costs of trade with ASEAN, so as to achieve a deeper economic integration. Trade volume is larger between countries that share common borders and common language. The P_{ij} dummy variable indicates that, controlling for other factors

[11] Data of distance between capital cities can be available at http://www.indo.com/distance/.
[12] Available at http://devdata.worldbank.org/data-query/.

members of ASEAN FTA tend to trade more with each other than with other countries in the sample. The coefficient of P_i dummy variable implies that, other things being equal, China-ASEAN FTA members tend to trade less with the non-member countries. The significant coefficient for P_{ij} is of 1.54, while the significant coefficient for P_i is of 0.41. This means that the intra-ASEAN free trade agreement increased bilateral trade between its members by 366 %(exp(1.54)-1)[13]. Thus regional effects are at work in ASEAN and the interregional trade in ASEAN is more active than extra-ASEAN trade. On the other hand, imports from the non-CAFTA members was 50.6 %(exp(0.41)-1) of what could be expected from the gravity model. As a trader partner to ASEAN and a member of China-ASEAN FTA has positive effect on China's export to ASEAN.

Because heteroscedasticity is likely to appear, we assume that the error term is time-invariant, and then apply fixed effect[14] estimator to Equation (2). The second column of Table 8 shows the results of the fixed effects estimator applied to Equation (2). The results are not too different from the first column, except that the coefficient of P_{ij} is significantly higher, GDP per capita of both parts are higher.

A limitation of the fixed effect estimator is that it fails to provide estimate of the dummy variables, which are time-invariant. But we are interested in the coefficients of the dummies for common border and common language. To solve this problem, we apply the random effect estimator, which can avoid the defect of OLS method and fixed effect estimator method[15]. The third column of Table 8 shows the results of the random effect estimator of Equation (2).

An important consequence of these results is that their magnitudes suggest that the intra-ASEAN free trade agreement has a strong trade creation effect within its members in good trade, while China-ASEAN free trade agreement have a relatively strong trade creation effect within China-ASEAN Free Trade Area. Furthermore, the fact that China and member countries are natural partners, having transport infrastructures that facilities trade between them and the effect of the liberalization they undertook may explain an important proportion of the increasing in the trade volume.

Table 8 Gravity Model Estimation Results

Variable	Pooled Regression	Fixed Effects	Random Effects
Importer GDP	1.4526**	1.3768**	1.5512**

[13] The model was estimated in logs. Thus the percentage equivalent for each dummy is [exp (dummy coefficient)-1]*100%.

[14] It is a consistent estimator developed by performing variables expressed as deviations from their means. The fixed effects estimator is consistent because the differencing process eliminates the time-invariant component of the error term, thus the remaining error term is uncorrelated with the dependent variables.

[15] The random effect estimator models the heteroscedasticity directly.

	(0.0742)	(0.2652)	(0.5684)
Exporter GDP	1.0149**	1.4891**	1.0963**
	(0.0985)	(0.3562)	(0.3576)
Importer GDP per	1.2425**	1.8579**	1.5781**
capita	(0.2764)	(0.3753)	(0.2258)
Exporter GDP per	1.1132**	1.7439**	1.3853**
capita	(0.3411)	(0.2119)	(0.1809)
Distance	-1.7598		0.9225**
	(0.2335)	-	(0.1587)
Importer Area	-	-	-
Exporter Area	-	-	-
Common Border	1.2754	-	1.5730**
	(0.7012)		(0.0563)
Common Language	0.4654	-	0.6852**
	(0.3271)		(0.0125)
P_{ij}	1.5401**	-	0.2334**
	(0.0136)		(0.0658)
P_i	0.4097**	-	0.6585
	(0.0203)		(0.5778)
Constant	-19.5936	-27.4952	-23.4136
	(2.2435)	(3.8758)	(2.6895)
Number of observations	2037	2037	2037
Adjusted R^2	0.7683	0.0413	0.8047

Notes:

All Variables marked ** are significant at 1% level, and those marked * are significant at 5% level. All other variables are statistically insignificant.

V. Conclusion

This paper aims to analyze trade potential between China and ASEAN within China-ASEAN FTA. It is undeniable that there exists uncertain factors weakening the trade effects on China of China-ASEAN FTA such as barriers except for tariff; competition in the substitutes between China and ASEAN members, competition from other countries signing FTA agreements with ASEAN members in ASEAN market. The uncertain factors should not be ignored.

In this context, we calculate the export similarity index of competitors in ASEAN market, conclude that there exists fierce competition in ASEAN market for China either on gross trade volume level or on product level, China should optimize its export structure so as not to lose existing market share in ASEAN market. Then we test for the effectiveness of the China-ASEAN FTA in increasing products trade. Applying the gravity model to provide a

benchmark for bilateral trade flows, relating them to GDP, distance, language and other characteristics of the trading partners, we found that the variables such as distance, adjacency have the expected signs and are all significant. Besides, after taking account of size and distance effects, the FTA between China and ASEAN had a statistically significant effect on the bilateral trade volume. The results suggest that the trade volume between China and ASEAN members may even be considerably increasing.

Of course, it is possible that if we use more disaggregated data such as differentiated, homogeneous and reference price products data instead of gross trade volume data, a different result might emerge. Yet we have not discussed welfare impacts of free trade agreements which require a different mode of analysis. We leave these important topics for future research.

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Appendix Commodities Classified by 2 Digits HS Code

HS	Commodities
02	Meat and edible meat offal
10	Cereals
23	Food industry residues; prepared animal feed
27	Min fuels, min oils & prd of distillation; bitum substan; min wax
28	Inor chemicals; org/inor compnds of precs metals/rd.active elmn
29	Organic chemicals
38	Miscellaneous chemical products
39	Plastics and articles thereof
40	Rubber and articles thereof
52	Cotton, including yarn and woven fabric thereof
71	Nat or cultred pearls, prec/semiprecs stn/metal; imitation jewelry; coin
72	Iron and steel
73	Articles of iron or steel
76	Aluminum and articles thereof
84	Nuclear reactors, boilers, machnry & mechan applnc/ parts
85	El. machnry, eqpmnt & parts; sound eqpmnt; tv equipment

87	Vehcl, (not railway, tramway, rolling stock); parts & accessories
90	Optcl, photo/cinmatgraphic, measuring, precision, medcl instrmnt