Whither a Regional-Wide FTA in East Asia?

Chong Wha LEE
Dept. of Economics and Trade
Kongju National University
cwhalee@kongju.ac.kr

Abstract

This paper examines the effects of hypothesized RTAs in East Asia to see whether they meet the criteria for “natural trading bloc”. Unlike previous studies, our research is focused on econometric methodology ranging from country-pair fixed effect to time-varying country dummies to avoid unobservable omitted variable bias. Several features deserve attention. First, the hypothesized FTAs, such as Korea-ASEAN FTA, Japan-ASEAN FTA, China-ASEAN FTA, and Korea-Japan-China FTA, are considered to be “natural trading bloc”. Second, the estimated coefficients on extra-bloc are positive and significant for hypothesized Korea-China FTA, Korea-ASEAN FTA, China-ASEAN FTA, and ASENA+3 FTA. Consequently, if we assume that East Asian blocs behave like other trade blocs, it is more likely that the formation of an East Asian FTA can enhance extra-bloc trade further. Third, the hypothesized Korea-Japan-China FTA seems to generate more intra-regional trade than any other pairings in the region. Fourth, the hypothesized ASEAN+3 FTA has no significant and apparent intra-regional trade bias. Instead, the hypothesized ASEAN+3 is open trade bloc toward external world. Finally, we can conclude that “natural trading bloc” seems to have emerged in the East Asian region, which implies that trade within the region has been promoted by implicitly preferentially trading policies such as concerted “unilateral liberalization” or by other economic or social-political factors.

Keyword: RTA, Natural Trading Bloc, East Asia, Fixed effect estimator(FE), Gravity Model.

Ⅰ. Introduction

Recently, the RTAs in the East Asia have proliferated rapidly. Motivated by open regionalism and 'concerted unilateral liberalization' through APEC principle in the mid-1990s, countries in the East Asia used to pursue non-preferential trade liberalization. However, the situation changed in 1998 when countries in the region were hit by financial crisis. To cope with difficulties, more close interdependence was needed among East Asian economies through trade and financial cooperation in the region. In addition, the progress of multilateral trade liberalization was stalled at that time just when it was really needed. For example, WTO failed to launch the New Round in 1999 and APEC also failed to implement EVSL.

Since 1998 the situation changed drastically, when there was initial discussion of a Korea-Japan trade agreement. This was significant, considering historical animosities coming from the legacies of Japanese colonialism. It was followed by the launching of trade initiatives between Singapore and New Zealand, Singapore and Japan, Singapore and United States, Association of South East Asian Nations(ASEAN) and China, ASEAN and Japan, and others.

The growing appeal for the RTAs has implications for the multilateral trading system. Most importantly, are RTAs stepping stones or stumbling blocks to the trading system? In general, it is believed that RTA increase trade among its members within the bloc, which is often referred to as trade creation effects. However, regionalism has the potential of diverting bilateral trade away from countries outside the bloc(trade diversion). The distinction between trade creation and trade diversion dates back to Viner(1950). Trade creation occurs as low-cost member countries displace high-cost domestic producers. Trade diversion, on the other hand, occurs when members of an RTA reorient their trade away from low-cost, non-member countries towards higher-cost member countries. Therefore, RTAs can either increase or decrease world welfare depending upon the relative magnitudes of the trade creation and trade diversion effects.

In this connection, a simple conceptual criterion for assessing trade creation and trade diversion is whether the member countries constitute "natural trading partners" or not. Wannacott and Lutz(1989) suggest that if the prospective members of an FTA are natural trading partners, trading creation is likely to be great and trade diversion small, thus facilitating improvements in economic welfare. Wannacott and Lutz propose two criteria to meet the natural trading bloc hypothesis:

- Are the prospective members already major trading partners? If so, the FTA will be reinforcing natural trading partners, not artificially diverting them.

- Are the prospective members close geographically? Groupings of distant nations may be economically inefficient because of the high transport costs.

These are referred to as 'volume of trade' and 'transport cost' criteria respectively (Panagariya, 1997). This paper examines the effects of potential RTAs in East Asia to see whether they meet the above-mentioned criteria for "natural trading bloc", including the various pairings of China, Japan, and South Korea; China-Japan-South Korea; China-ASEAN, China-ASEAN, and South Korea-ASEAN; and ASEAN+3 as a whole. There are several papers on natural trading blocs focused on East Asia. Lee and Shin(2006) find that geographic proximity constitutes valid criteria for "natural trading bloc" and East Asian RTAs are likely to be creating more trade among members without diverting trade from non-members. Similarly, Lee and Park(2005) show that the trade creating effects expected from the proposed East Asian FTAs will be significant enough to overwhelm the trade diversion effect. Lee and Park(2006) find no evidence that any trading bloc is naturally forming among China-Japan-Korea, but instead they find that ASEAN+3 shows a significant trade creating effects. Even more importantly, ASEAN+3 has less trade diversion effect, thus more open to the rest of the world. Nevertheless, their empirical methodology is restricted to the random effect estimations.

This paper explores whether any natural trading blocs are forming in East Asia, using a modified gravity model. Unlike other previous research, our approach adopts 'time varying country fixed effects' estimation technique. As this is very important for our further discussion, a more detailed explanation is needed. The majority of international trade economists use the gravity model to test for the trade effects of RTAs. By estimating various forms of the gravity model equations, researchers have reached a consensus that RTAs are trade creating. The gravity equation has emerged as useful instrument to analyze the ex-post effects of FTAs bilateral trade flows. It is typically used to explain cross-sectional variation in country pairs' trade flows in terms of the countries' incomes, bilateral distance, and dummy variables for common languages, for common land borders, and for the presence of absence of an RTA.

Let's consider a conventional specification of the gravity model equation commonly used in international trade literature.

$$\ln(\text{trade}_{ijt}) = \beta_0 + \beta_1 \ln(\text{GDP}_i \cdot \text{GDP}_j)_t + \beta_2 \ln(\text{distance}_{ij}) + \beta_3 X_{ijt} + \phi_1 \text{RTA}_{ijt} + \varepsilon_{ijt} \quad (1)$$

where i and j denote trading partners, t denotes time, X_{ijt} the vector of other explanatory variables, β represents coefficient vector, and RTA_{ijt} is a dummy vector which measures whether both countries *i* and *j* belong to the same regional trading arrangement (if it does it takes value of unity, and 0 otherwise).

Basic idea behind is that if Φ_1 is a positive value, it indicates that the two countries trade more with one another than predicted by the core factors and other variables, and thus taken as evidence of trade creation.

Is this trade creation hypothesis robust enough to warrant exact magnitude of trade creating impacts, without serious over- or under-estimation? To put it differently, is RTA dummy in the right hand side(RHS) of equation(1) exogenous? The gravity equation has become dominant empirical framework for analyzing bilateral trade flows primarily because of its strong explanatory power. Explanatory power, measured by R^2, generally ranges from 60 to 80%. However, virtually majority of the literature on bilateral trade flows and bilateral FTAs using gravity equation is subject to the endogenous bias of explanatory variables.

Most researches, except a few, typically assume an exogenous RHS dummy variable to represent the RTA. In reality, however, RTA dummies are not exogenous random variables; rather, countries are likely to select endogenously their FTA partnerss, and possibly correlated with the levels of trade(Baier and Bergstrand, 2007). If this is true, i.e., if FTAs are endogenous, previous cross-section empirical estimates of the effects of FTAs on trade flows may be biased. If any of the RHS variables in equation (1) are correlated with the error term, ε_{ij}, that variable is considered econometrically endogenous and ordinary least squares (OLS) may yield biased and inconsistent coefficient estimates.

It is well known that in presence of endogenous explanatory variables in cross-section data, the method of instrumental variables(IV) or two stage least squares(2SLS) can be used to solve the endogenous problem. However, it is difficult to find a suitable instrumental variable for FTAs.[1] Alternatively, with panel data, fixed effects and first differencing can be employed to treat endogeneity bias. This paper, by adopting fixed effect estimation, investigates relative magnitude of trade creating and trade diverting effects of some hypothetical RTAs in East Asian region. As we adopt more complicated

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[1] According to Baier and Bergstrand(2007), about a decade several researchers have acknowledged potential endogeneity bias, but only that created by GDPs as RHS variables. Several authors have instrumented for GDPs, but none have instrumented for the FTAs. However, as Cardamone(2007) indicates, a strong effort is needed to replace the RTA dummy variable with variables providing more accurate information on the specific preference margin associated with the RTA. For example, a good indicator of RTAs could be based on the difference between the average PTA tariff and the average MFN tariff. However, the main problem is the availability of data in this respect.

fixed effect estimations including time varying country fixed effects, we use a slightly modified version of Andrew Rose's gravity model(2004) database.[2] Section 2 explains our empirical methodology. Section 3 discusses the regression results. And section 4 discusses the effects of a number of RTAs comprising of various groupings of East Asian countries, and section 5 concludes.

[2] The data taken from Rose's web home page are greatly appreciated.

Ⅱ. Data and empirical methodology

The approach of including RTAs by using dummy variables can be problematic because the dummy captures a range of other country-pair specific effects contemporaneous with RTA implementation. In addition, dummy variables treat all the countries in a certain RTA as a homogenous group not taking into account the country heterogeneity. To cope with this problem, fixed effects model can be used to control for all factors that are fixed over time. Moreover, distance does not reflect the cost of trading between the countries of the pair and is considered to be a poor measure of such costs.

According to Anderson and Wincoop(2003) the standard gravity model might have been misspecified in ignoring a "multilateral resistance" or "remoteness" term. Anderson and Wincoop(2003) suggest that the inclusion of country fixed effects captures "multilateral resistance" reasonably well and thus corrects this misspecification. Subramanian and Wei(2007) argue that incorporating time-varying country fixed effects serve to proxy for "multilateral resistance". Country fixed effects capture all country-specific effects omitted from the rest of model specification like preferences, institutional differences etc. Therefore, their inclusion avoid omitted variable bias identified by Anderson and Wincoop(2003).

The gravity equation used in this paper follows the specification of Cheng and Wall(2005), but introduces important modifications-in particular it includes time varying country dummies(Subramanian and Wei, 2007).

In addition, following Ghosh and Yamarik(2004) we have added $\phi_2 RTA_{it}$ to include RTA dummy variables to capture the external effects of RTA on trade as follows;

$$\ln(trade_{ijt}) = \eta_{ij} + \delta_t + \beta_1 \ln(GDP_i \cdot GDP_j)_t + \beta_2 \ln(distance_{ij}) + \beta_3 X_{ijt} + \phi_1 RTA_{ijt} + \phi_2 RTA_{it} + \varepsilon_{ijt} \quad (2)$$

where η_{ij} indicates the country-pair fixed effects between country i or j and δ_t is year specific dummies. Our empirical experiment later will test time varying country fixed effects as well, therefore in this case $\eta_{ij} + \delta_t = \lambda_{it} + \mu_{jt} + \eta_{ij}$ where μ_{jt} and η_{ij} are time varying country dummies for country i and j respectively.

RTA_{it} is a vector of variables which measures current membership of either country i or j in a regional trading arrangement (*i.e.*, only one country belongs to RTA and another is outside). The coefficient ϕ_2 is interpreted as the extent of abnormal trade between nation in the trading bloc and a country outside the bloc relative to a random pair of countries.

Consequently, a positive value for ϕ_2 implies that trade between a country within the bloc and countries outside the bloc is more than a random pair of countries, and is interpreted as openness of that region to imports from outside the region. A negative value for ϕ_2 indicates less trade with nonmembers and is thus interpreted as evidence of trade diversion.

Specifically, the following gravity model was estimated:

$$\begin{aligned}\ln(trade_{ijt}) = {} & \eta_{ij} + \delta_t + \\ & \beta_1 \ln(GDP_i \cdot GDP_j)_t + \beta_2 \ln(distance_{ij}) + \beta_3 \ln(GDP_i \cdot GDP_j / Pop_i Pop_j)_t \\ & + \beta_4 Lang_{ij} + \beta_5 Cont_{ij} + \beta_6 Landl_{ij} + \beta_7 Island_{ij} + \beta_8 \ln(Area_i \cdot Area_j) \\ & + \beta_9 ComCol_{ij} + \beta_{10} Curcol_{ijt} + \beta_{11} Colony_{ij} + \beta_{12} ComNat_{ij} \\ & + \beta_{13} CU_{ijt} + \phi_1 RTA_{ijt} + \phi_2 RTA_{it} + \varepsilon_{ijt} \qquad (3)\end{aligned}$$

Where the variables are defined as:

•ln(trade) denotes the log of bilateral trade between country i and country j(*i.e.*, dependent variable) at time t,
•Pop is population,
•Lang is a binary dummy variable which takes value of unity if I and j have a common language and zero otherwise,
•Cont is a binary variable which is unity if i and j share a land border,
•Lnadl is the number of landlocked countries in the country-pair(0, 1, or 2),
•Island is the number of island nations in the pair(0, 1, or 2),
•Area is the area of the country(in square kilometers),
•ComCol is a binary variable which is unity if i and j were ever colonies after 1945 with the same colonizer,
•Curcol is a binary variable which is unity if i is a colony of j at time t or vice versa,
•ComNat a binary variable which is unity if i and j remained part of the same nation during the sample(e.g. France and Guadeloupe)
•CU is a binary variable which is unity if i and j use the same currency at time t,
•Year is dummy variable for year.

As mentioned above, the parameters of interest are ϕ_1 and ϕ_2. When trade is created then both countries are in the RTA, ϕ_1 should be positive; if trade is diverted from non-members, then ϕ_2 may be negative. Positive coefficients of ϕ_2 could be taken as evidence of an open trade bloc.

Later, we will split both RTA variables(ϕ_1 and ϕ_2) into 10 pieces, one for each specific regional RTA to see if trade creation effect is higher than trade diversion effect in that specific RTA.

For estimation of the gravity model specified above, we used a Hausman test first of all. The Hausman test is used to check for any correlation between the error component and the regressors in a random effects model. The test compares the coefficient estimates from the random effects model to those from fixed effect model.[3]

The result of the Hausman test shows that random effect estimator(RE) is inconsistent. It may be the result of an endogeneity bias that we have mentioned. Therefore, when it comes to panel data usually used in gravity model, fixed effect estimator are more suitable than random effect estimators.

Our data, taken from Rose (2004), covers bilateral trade between 178 IMF trading entities between 1948 and 1999(with gaps) which is easily accessible on his website. The main difference is that our panel dataset consists of observations for every 5 years beginning in 1950 and ending in 1999. The summary statistics of the main variables are shown in table 1.

[3] The idea underlying Hausman's test is that both the random effects(RE) and fixed effects estimators(FE) are consistent if there is no correlation between ε_{ijt} and explanatory variables. Since FE is consistent when ε_{ijt} and explanatory variables are correlated, but the RE is inconsistent, a statistically significant difference is interpreted as evidence against the RE.(cf. Wooldridge 2002, ch. 10) The Hausman statistic is distributed asymptotically as chi-square distribution. In this case the Hausman statistic value takes the value of χ^2 (5) = 3276.52, which is well above the critical limit.

Table 1: Summary Statistics

Variables	Mean	Std. Dev.
Log of trade	10.087	3.306
Log of distance	8.164	0.811
Log of product of real GDPs	47.904	2.686
Log of product of real GDPs per capita	16.013	1.562
Common Currency dummy	0.0139	0.1169
Common language dummy	0.2171	0.4122
Land border dummy	0.0309	0.1731
Landlocked dummy	0.258	0.473
Island dummy	0.336	0.536
Log of product of land area	24.220	3.254
Current colony dummy	0.0019	0.0432
Ex-colony-coloniser dummy	0.0984	0.2979
Ex-common colonizer dummy	0.0204	0.1414
All RTAs/Insiders	0.015	0.122
All RTAs/Outsiders	0.312	0.463
EC(EU)/Insiders	0.0058	0.0758
EC(EU)/Outsiders	0.1761	0.3809
US-ISRAEL/Insiders	0.0001	0.0087
US-ISRAEL/Outsiders	0.0151	0.1219
NAFTA/Insiders	0.0001	0.0116
NAFTA/Outsiders	0.0139	0.1170
CARICOM/Insiders	0.0054	0.0734
CARICOM/Outsiders	0.0302	0.1711
PATCRA/Insiders	0.00002	0.0044
PATCRA/Outsiders	0.0123	0.1103
ANZCERTA/Insiders	0.00008	0.0087
ANZCERTA/Outsiders	0.0182	0.1336
CACM/Insiders	0.0015	0.0383
CACM/Outsiders	0.0275	0.1636
MERCOSUR/Insiders	0.0004	0.0200
MERCOSUR/Outsiders	0.0179	0.1325
ASEAN/Insiders	0.0007	0.0269
ASEAN/Outsiders	0.0154	0.1231
SPARTECA/Insiders	0.0011	0.3270
SPARTECA/Outsiders	0.0196	0.1386

Ⅲ. Estimation results

The table 2 shows estimation results. As expected, real trade is positively correlated with the product of bilateral real GDP and negatively correlated with distance. For the most, the correlation coefficients between real bilateral trade and the other variables are consistent with expectations. Even though the random effect estimators were ruled out after Hausman test, it is shown here just for a comparison reason.

The variable ‘arta’ is a dummy variable in which every individual RTA dummy(RTA_{ijt}) is aggregated. Thus the coefficient indicates an overall assessment of trade creating effects of RTAs as a whole. The coefficient ‘arta’ is positive suggesting the possibility for an overall trade creation effect. The coefficient(0.67) under the FE means that a pair country in a certain RTA trade with each other 95% more than with a nonmember.[4] Next step, we use only fixed effect estimators because the random effect estimators could not be trustable in presence of endogeneity bias. Consequently, the other control variables in equation(4) does not include any time-invariant variables in table 1. Specifically RTA variables(ϕ_1 and ϕ_2) above is now split into 10, one for each specific regional RTA to see if trade creation effect is higher than trade diversion effect in that specific RTA.

$$\ln(trade_{ijt}) = \text{Other Control variables} + \Sigma_s \phi_{1s} RTA_{ijt} + \Sigma_s \phi_{2s} RTA_{it} + \varepsilon_{ijt} \quad (4)$$

where subscript “s”denotes each specific RTA.

It is worth noting that the 10 RTAs were originally included in Rose(2004). Thus, all we had to do was just to create their dummy variables(RTA_{it}). To keep consistency with Rose’s selected RTAs(more precisely RTA_{ijt}), special attention was paid when making dummy variables. That is, in some regional RTA such as EU, member countries differ in their accession to the Union. The trade diversion dummy variables for each member country are allowed to be effective in parallel with its accession to the union. The logic behind is that trade diversion effect is assumed to occur simultaneously with trade creation effect.

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[4] As the model was estimated in log, the percentage change for a dummy is computed as [exp(0.67)-1]*100.

Table 2: Random effect estimators vs. Fixed effect estimators

Variable	Random effect	Fixed effect
Ldist	-1.2208*** (0.000)	-
lrgdp	0.6506*** (0.000)	0.4095*** (0.000)
lrgdppc	0.0658*** (0.000)	0.1399*** (0.000)
custrict	0.7321*** (0.000)	0.6444*** (0.000)
comlang	0.2160*** (0.000)	-
border	0.6735*** (0.000)	-
landl	-0.7169*** (0.000)	-
island	0.0605 (0.242)	-
lareap	0.0492*** (0.000)	-
curcol	0.5825*** (0.000)	0.3988*** (0.000)
colony	2.5797*** (0.000)	-
comcol	-0.0983 (0.214)	-
comtry	1.2680 (0.412)	-
Arta(all RTAs/Insiders)	0.5691*** (0.000)	0.6721*** (0.000)
Orta(all RTAs/Outsiders)	-0.1138*** (0.000)	0.0788*** (0.000)
Observations	52315	52315
R^2	0.56	0.49

Note: P-values in parenthesis. *, ** and *** denote significant at 10 percent, 5 percent, and 1 percent level respectively. The dependent is the log of trade between country i and country j.

Following Baier and Bergstrand(2007) and Baldwin and Taglioni(2006), the equation (4) is estimated, first of all, using country-pair fixed effect and then time dummies are included. Finally, time-varying country dummies are incorporated. Our empirical results are heterogeneous, demonstrating that the trade creating effects of existing RTAs are not evident. From the fixed effects estimates of the gravity equation in table2, the coefficient of intra-bloc trade(0.67) shows that joining an RTA raises intra-bloc trade by 96%, which is higher than random effects estimate(0.57, thus 77%). Whereas the estimated coefficient on extra-bloc trade is statistically significant and positive(0.079). This means that extra-bloc trade increases 8.2%. However, based on random effects estimation, extra-bloc trade decreases 11%. When it contradicts between random effects and fixed effects, we prefer the latter as explained before. Hence, after a country joins an RTA, its intra-bloc trade increases considerably, and its extra-bloc trade increases as well. This is overall effects.

It seems to be difficult to conclude unequivocally when we turn to each individual RTA. However, unlike Dee and Gali(2003),[5] EC and MERCOSUR are shown to have significant trade creating effects. The point estimates of $\mathbf{RTA}_{ijt}$ are positive and significant for only five out of 10 RTAs whatever the methodology we use. There are several features deserving attention. First, statistically significant RTAs in both coefficients are only CACM, MERCOSUR, and ASEAN. Second, what is interesting is to see the trade creating effects decreasing in some RTAs(EC, CACM, MERCOSUR ASEAN) if we move toward to the right column, shown in their coefficients(φ_{1s}). In the fourth column, country fixed effects with time varying country dummies are considered to absorb multilateral trade resistance more than the second and the third column, thus they are less unreliable. For example, the coefficients for the EU are decreasing from 0.83(in fixed effects only) to 0.63(fixed effects and time varying country). Therefore countries in the EC trade 88% more. One interesting feature is that if we collect statistically significant coefficients on $\mathbf{RTA}_{ijt}$ (upper hand of the fourth column), and compute the percentage change using conventional formula, the trade creating effects in the five out of ten RTAs(EC, CACM, MERCOSUR, ASEAN, SPARTECA) are striking.[6]

Moreover, in the fourth column, the coefficients on $\mathbf{RTA}_{it}$ are positive and significant for three RTAs(NAFTA, MERCOSUR, ASEAN) implying relatively open trade block whereas they are negative and significant for another four RTAs(US-Israel, CARICOM, PATCRA, CACM) meaning more trade diversion instead of relative openness.

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[5] Recall that they showed that apparently quite liberal RTAs-including EU, NAFTA and MERCOSUR-have failed to create significant additional trade among members

[6] That is, for the EU 88%, the CACM 497%, MERCOSUR 150%, ASEAN 180%, SPARTECA 96%.

If we compare, in each estimation experiment, the coefficients of EC and NAFTA on one hand and MERCOSUR and ASEAN on the other hand, it seems to be safe to say that the EU and NAFTA seem to be relatively less open trade bloc than the MERCOSUR and ASEAN do.

Table 3: Estimation Results of Regression equation(4)

Variable	Fixed effects (φ_{1s})/(φ_{2s})	Fixed effects & Time	Fixed effects & Time varying country
EC Outsiders	0.8299***(0.000) 0.0747**(0.014)	0.7933***(0.000) 0.0394(0.219)	0.6295***(0.000) -0.009(0.777)
US-Israel Outsiders	0.4904(0.548) -0.1861***(0.010)	0.6403(0.428) -0.0224(0.757)	0.3770(0.638) -0.1308*(0.069)
NAFTA Outsiders	0.9635*(0.085) 0.1933***(0.003)	0.9340*(0.092) 0.0583(0.376)	0.7855(0.153) 0.1216*(0.068)
CARICOM Outsiders	-0.0757(0.695) -0.7021***(0.000)	-0.1223(0.524) -0.8267***(0.000)	-0.0496(0.795) -0.7144***(0.000)
PATCRA Outsiders	0.2902(0.835) -0.0774(0.490)	0.0165(0.990) -0.2520**(0.024)	0.0028(0.998) -0.3021***(0.006)
ANZCERTA Outsiders	0.6925(0.417) -0.1357(0.584)	0.6978(0.408) -0.1697(0.489)	0.3655(0.663) -0.3790(0.128)
CACM Outsiders	1.9488***(0.000) -0.3122**(0.027)	1.9374***(0.000) -0.3247**(0.021)	1.7872*** (0.000) -0.3709***(0.008)
MERCOSUR Outsiders	1.0757***(0.000) 0.5118***(0.000)	0.9331*** (0.002) 0.4190*** (0.000)	0.9170*** (0.002) 0.4390*** (0.000)
ASEAN Outsiders	1.4591***(0.000) 0.8120***(0.000)	1.2962*** (0.000) 0.7102*** (0.000)	1.0269*** (0.001) 0.4962*** (0.000)
SPARTECA Outsiders	0.0584(0.878) -0.1211(0.610)	0.3257(0.386) 0.1227(0.602)	0.6749*(0.073) 0.3087(0.194)
Observations	52315	52315	52315
R^2	0.50	0.51	0.49

Note: P-values in parenthesis. *, ** and *** denote significant at 10 percent, 5 percent, and 1 percent level. The dependent is the log of trade between country i and country j. (CARICOM; Caribbean Community and Common Market, PATCRA; Papua New Guinea-Australia Trade and Commercial Relations Agreement, ANZCERTA; The Australia New Zealand Closer Economic Relations Trade Agreement, CACM; Central American Common Market, SPARTECA; South Pacific Regional Trade and Economic Cooperation Agreement). The 'Outsiders' at the lower bound in the first column are extra-bloc trades, i.e., trades between member countries belonging to RTA and the outsiders of the corresponding RTA.

Ⅳ. The effects of East Asian FTAs

In this section, we explore various groupings of East Asian RTAs. Our empirical technique is to estimate the equation (4), replacing existing RTAs with each hypothetical RTA in East Asian region, by using fixed effect estimation first of all, and fixed effect combined with time dummy, and finally 'time varying country fixed effect' as we did in the previous section. We assume that the proposed East Asian RTAs will work like other existing RTAs and try to estimate their effects. For example, the estimated coefficientfor the variable 'arta' from the fixed effects estimation in table2(0.67), the East Asian FTA such as China-Japan-Korea FTA is expected to increase intra-bloc by 96%, while incurring no significant impact on extra-bloc trade. Take an example, if we assume that the East Asian FTA operates like EC, it will increase intra-bloc trade by 129%, while also expanding extra-bloc trade by 7.8%, considering the fixed effects estimation in table3.

Our assumption is that the hypothetical RTAs are all effective in 1990. Here we have two reasons. First, this is designed to capture whether there has been any tendency to promote an FTA among the East Asian economies including China, Korea, and ASEAN. Second, if we consider that the mean value of the year stemming from the whole RTA creation dummy(RTA/insiders) variables in Rose's original data is simply 1990,[7] our assumption is not unrealistic. Hence, the dummy variable for the East Asian trade bloc members shows the extent to which the group of countries belonging to the hypothetical trade bloc has increased intra-bloc trade since 1990. Therefore, since our data are taken from every 5 years from Rose(2004) original data set, the number of dummy variable(RTA/Insider) with value 1 for each hypothetical RTA is only 1990, 1995, and 1999.[8] We also add the dummy variable for the country pairs between the proposed East Asian trade bloc members and outsiders as well. This extra-bloc dummy explains whether the group of countries belonging to the East Asian bloc has increased trade with outsiders since 1990.

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[7] See table 4 in Lee and Shin (2006, p. 289).

[8] Our empirical results do not change even if we run Rose's original data set. The reason why we use condensed form is simply for memory concern. That is, if the estimation technique switches to the time varying country fixed effects, then it requires so enormous memory that is beyond us. Alternatively, we have run other data ranged from 1980 to 1999 taken from Rose's original data, the results remain the same.

Table 4: Effects of Individual Hypothetical RTAs on Trade Flows

Hypothetical RTA	Fixed effects	Fixed Effects & Time dummy	Fixed Effects & Time Varying Country dummy
Korea-Japan/ Insiders	0.739(0.413)	0.693(0.437)	0.626(0.478)
Korea-Japan/Outsiders	0.088(0.244)	0.069(0.360)	0.017(0.823)
Korea-China/Insiders	-	-	-
Korea-China/Outsiders	0.673(0.000)***	0.652(0.000)***	0.540(0.000)***
Japan-China/Insiders	1.167(0.207)	1.132(0.215)	1.349(0.136)
Japan-China/Outsiders	-0.116(0.170)	-0.139(0.100)*	-0.164(0.050)**
Korea-ASEAN/Insiders	0.825(0.000)***	0.805(0.000)***	0.726(0.000)***
Korea-ASEAN/Outsiders	0.596(0.000)***	0.584(0.000)***	0.456(0.000)***
Japan-ASEAN/Insiders	0.822(0.000)***	0.794(0.000)***	0.716(0.000)***
Japan-ASEAN/Outsiders	0.062(0.412)	0.046(0.540)	-0.008(0.915)
China-ASEAN/Insiders	0.823(0.000)***	0.798(0.000)***	0.720(0.000)***
China-ASEAN/Outsiders	0.483(0.001)***	0.455(0.002)***	0.338(0.020)**
Korea-Japan-China /Insiders	0.732(0.000)***	0.726(0.000)***	0.883(0.000)***
Korea-Japan-China /Outsiders	0.085(0.256)	0.077(0.304)	0.033(0.655)
Korea-Japan-China-ASEAN/Insiders	-0.752(0.180)	-0.719(0.194)	-0.715(0.193)
Korea-Japan-China-ASEAN/Outsiders	1.015(0.000)***	1.003(0.000)***	0.928(0.000)***

Note: Each equation takes the form of those in table2, except that the variable for RTA/Insiders(arta) and RTA/Outsiders(orta) are replaced by individual hypothetical RTA variables. The other explanatory variables included in the equations of table 2 are also controlled but not reported here.

Another point we have to mention is that to what extent we could admit that some pairings constitute “natural trading blocs”. In other words, we need a reference RTA to compare with any parings in East Asia. As countries in East Asia are geographically proximate, they are likely to trade more intra-regionally. If some parings in the region trade intra-regionally more than the average RTAs (in the whole world) do intra-regionally, we can admit that they are "natural trading bloc". For this reason, we think the coefficient of 'arta'(the aggregated intra-regional RTA dummy variable) can be a suitable candidate for the reference RTA. In table2, the coefficient for 'arta' is 0.67. Consequently, if any coefficient in table 4 is over than 0.67, we can admit that those pairings can constitute "natural trading bloc". Among the estimation results in table 4, the plausible candidates for this criterion are hypothesized Korea-ASEAN FTA, Japan-ASEAN FTA, China-ASEAN FTA, and Korea-Japan-China FTA as well. What's more the point estimates are positive and significant for the above 4 intra-regional trade(RTA_{ijt}) whatever the methodology we used. For example, the estimated coefficients on intra-bloc membership of hypothesized Korea-ASEAN RTA are 0.83 in fixed effects estimation, 0.81 in fixed effects and time dummy, and 0.73 in time varying country fixed effects. Here again, we can confirm, from the fourth column, that fixed effects with time varying country dummies are considered to absorb multilateral trade resistance more than the second and the third column, thus they are less unreliable.[9]

The estimated coefficients on extra-bloc are positive and significant for hypothesized Korea-China FTA, Korea-ASEAN FTA, China-ASEAN FTA, and ASENA+3 FTAs. The estimates are between 0.34 and 0.93, indicating that the extra-bloc trade between East Asian countries and outsiders has already increased by about 40-153 per cent. This positive impact from an RTA on extra-bloc trade is substantial and slightly more than the estimated effects from existing FTAs such as MERCOSUR(55 per cent) and ASEAN(65 per cent) shown at table3. Consequently, if we assume that East Asian blocs behave like other trade blocs, it is more likely that the formation of an East Asian FTA can enhance extra-bloc trade further.

Next, if we admit that the time varying country fixed effects are considered to absorb more "multilateral trade resistance" than the other two methods, and thus less unreliable, we can consider that the hypothesized Korea-Japan-China FTA seems to generate more intra-regional trade than any other pairings in the region. This suggests that although those three countries have no formal free trade agreements, there are unidentified factors that promote trilateral trades among Korea, Japan, and China.

The hypothesized ASEAN+3 FTA has no significant and apparent intra-regional trade bias, with statistically insignificant coefficients in all three methods. Instead, the estimated coefficient for the extra-bloc dummy(ASEAN+3/outsiders) is

[9] One exception is the estimated coefficients on intra-bloc trade of the hypothesized Korea-Japan-China RTA. Unlike other coefficients, they are 0.732 in fixed effects estimation, 0.726 in fixed effects and time dummy, and 0.883 in time varying country fixed effects.

statistically significant and highly positive. In the fourth column, i.e., fixed effects and time varying country dummy, the estimated coefficient is 0.93. Thus, the countries belonging to the hypothesized ASEAN+3 are engaged in trade with outsiders 150% more than are any random pair countries. This implies that the hypothesized ASEAN+3 is open trade bloc toward external world. As we admit that ASEAN appeared to be open trade bloc to outward, its outward openness is thus still valid even if Korea, China, and Japan are added.

Finally, based on our estimation results, we can conclude that "natural trading bloc" seems to have emerged in the East Asian region, which implies that trade within the region has been promoted by implicitly preferentially trading policies such as concerted "unilateral liberalization" or by other economic or social-political factors.

Ⅴ. Conclusion

This paper examines the effects of potential RTAs in East Asia to see whether they meet the criteria for "natural trading bloc." Following Baier and Bergstrand(2007) and Baldwin and Taglioni(2006), the various estimation experiments were used from country-pair fixed effect to time-varying country dummies to avoid unobservable omitted variable. Several features deserve attention. First, the hypothesized FTAs such as Korea-ASEAN FTA, Japan-ASEAN FTA, China-ASEAN FTA, and Korea-Japan-China FTA are considered to be "natural trading bloc" based on our estimation results. Second, the estimated coefficients on extra-bloc are positive and significant for hypothesized Korea-China FTA, Korea-ASEAN FTA, China-ASEAN FTA, and ASENA+3 FTA. This positive impact from an RTA on extra-bloc trade is substantial and slightly more than the estimated effects from existing FTAs such as MERCOSUR(55 per cent) and ASEAN(65 per cent). Consequently, if we assume that East Asian blocs behave like other trade blocs, it is more likely that the formation of an East Asian FTA can enhance extra-bloc trade further. Third, if we admit that time varying country fixed effects are considered to absorb more "multilateral trade resistance" than the other two methods, and thus less unreliable, we can consider that the hypothesized Korea-Japan-China FTA seems to generate more intra-regional trade than any other pairings in the region. This suggests that although those three countries have no formal free trade agreements, there are unidentified factors that promote trilateral trades among Korea, Japan, and China. Fourth, the hypothesized ASEAN+3 FTA has no significant and apparent intra-regional trade bias, with statistically insignificant coefficients in all three methods. Instead, the estimated coefficient for the extra-bloc dummy(ASEAN+3/outsiders) is statistically significant and highly positive. This implies that the hypothesized ASEAN+3 is open trade bloc toward external world.

Finally, we can conclude that “natural trading bloc” seems to have emerged in the East Asian region, which implies that trade within the region has been promoted by implicitly preferentially trading policies such as concerted “unilateral liberalization” or by other economic or social-political factors.

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