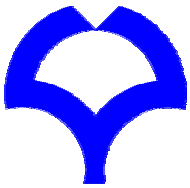

Discussion Papers In Economics And Business

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BY A COUNTRY PANEL DATA

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Abstract

This paper is an attempt to use the Hausman-Taylor (HT) estimation to examine the determinants of trade flows of Asean Free Trade Area (AFTA). Based on the two-way error component form of the gravity model, we employ the HT technique to estimate export flows by a country panel data of 39 countries for the period 1988-2002. The estimations have shown the following important results. Firstly, export flows among two countries increase more proportionately with GDPs. More interestingly, trade is higher between countries of identical preferences than those of different ones. Secondly, the most crucial result is that AFTA has only produced the trade creation among its members. Finally, this study suggests the importance of trade facilitation policy to support the targets of FTA.

Key words: AFTA, gravity models, panel data, trade.

JEL Classification: F1, F15, C23

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I. Introduction

Whether the formation of ASEAN[1] Free Trade Area (AFTA) has intensified intra-regional trade in South East Asian region is still a controversy in the literature though AFTA has been in place for a decade since 1993. For the one thing, some studies argue that intra-regional trade in ASEAN had been strengthened in the 1990s (see Elliott & Ikemoto, 2004). What is more, is that these arguments have not been consistent with other studies such as Endoh (2000) and Tran Van Tho (2003). More importantly, Krugman (1991) argues that the formation of Free Trade Area[2] from geographically-close countries would stimulate intra-regional trade; the closer are countries to each other, the larger the trade volume between them. Therefore, the purpose of this paper is to examine the determinants of trade flows of AFTA members in the interdependent context with other FTAs in the world. Furthermore, we are particularly interested in what kinds of trade effects does AFTA bring in play among its members and non-members.

In recent years, there has been renewal of interest in using a gravity model to estimate the determinants of trade flows, especially in the context of regional trade groupings. Typical examples of application of the gravity model to investigate trade flows in the selected regional trade arrangements inclusive of AFTA consist of Endoh (2000) and Elliott & Ikemoto (2004), which have been estimated in a cross-section approach. Only few attempts have sofar been made by a panel data approach (See Cheng & Wall, 2002; Martinez-Zarzoso & Nowak-Lehmann, 2003).

In this paper, we develop an empirical specification of the gravity model by the panel data. Our model is related to several recent papers. Endoh (2000) employed the gravity model with some institutional dummy variables to examine the feature and transition of trade relations in Asia-Pacific region through cross-section data analysis, but the roles of heterogeneity in spatial and time effects which can explain trade flows are neglected. Our two-way error component model concerns these

[1] The Association of South East Asia Nations.
[2] Hereafter referred to as FTA.

heterogeneous effects. On the other hand, Elliott & Ikemoto (2004), using the modified gravity model, investigated AFTA intra-and extra-regional bias in bilateral trade flows for several distinct time periods, but they do not explicitly mention a role of exchange rate on trade flows. Therefore, we add both exchange rates and common languages as factors affecting transaction costs of trade in our empirical model over a long continuous period. It is easy to make a transaction if two countries share a similar language since the language factor can facilitate communication between them.

Based on this two-way error component form of the gravity model, we employ the Hausman-Taylor estimation for the panel data of export flows among 39 countries over the period 1988-2002. Then, we provide different estimations in various contexts in which AFTA is interdependent with other FTAs. Furthermore, the context which incorporates FTA impacts provides us insights on what kinds of effects does AFTA influence export flows.

The paper is organized as follows. Section II mentions an overview of trade movement of AFTA . Section III reviews gravity models of international trade and develops an empirical model. The method, data, regression results and discussions are shown in Section IV. Finally, Section V presents conclusions.

II. An overview of trade movement of AFTA

The ASEAN Free Trade Area (AFTA), including Brunei, Indonesia, Malaysia, the Philippines, Singapore and Thailand, was established in January 1992 in order to strengthen economic cooperation between ASEAN members. This agreement provided for the elimination of tariffs and non-tariffs barriers within the 15 years from January 1994 with the completion date set at 2008. Until then, tariffs will be reduced to less than 5%. The main instrument of the tariff reduction scheme is the Common Effective Preferential Tariff (CEPT), covering manufactured goods, agricultural products as well as services. However, following the financial crisis in 1997, the summit meeting of ASEAN in December 1998 decided to further speed up the trade liberalization by

accelerating the time-frame to 2002. In addition, in the mid-1990s four more countries joined ASEAN: Vietnam in 1995, Myanmar and Lao PDR in 1998 and Cambodia in 1999. They are also participating in AFTA with deadlines set for Vietnam in 2006, Myanmar and Lao PDR in 2008 and Cambodia in 2010. In summary, AFTA that currently has a membership of ten countries and a population of over 500 million has been in place for above a decade up to now.

Appendix A examines 1992-2002 changes in the direction of exports and imports of AFTA with other FTAs as well as its major trading countries. Overall, AFTA intra-regional trade shares for both exports and imports increased significantly during 1992-2002, thus pointed out increased dependency on intra-regional trade. Moreover, AFTA as a whole has become increasingly interdependent in trade with outside trading partners. On one hand, the United States as a key in NAFTA, EU and Japan have been AFTA's largest export markets. On the other, Japan, followed by the U.S and EU, has been the largest source of AFTA imports. In summary, while increased dependency on the intra-regional trade seems explicitly reflected in both directions of export and import, it is a matter whether or not AFTA is really inclined to be less reliance on extra-regional markets for its exports as well as imports.

III. Gravity models of International Trade

1. Gravity Models

In international trade, the gravity model was first introduced by Tinbergen (1962) and Poylonen (1963) mainly to account for the patterns of bilateral trade flows among the European countries. Accordingly, exports from a country i to a country j are explained by their economic sizes (measured by GNP or GDP) and the geographical distance between them. Since then, the gravity model has been widely used and increasingly improved in empirical studies of international trade. Specifically, a population variable was incorporated to show a negative effect of it on trade flows (Oguledo & MacPhee, 1994 and Endoh 1999, 2000).

Furthermore, other development used a per capita income variable to provide a good proxy for the level of economic development that has its positive effect on international trade (Frankel, Stein and Wei, 1995 and Elliott & Ikemoto, 2004). It should be noted that several kinds of dummy variables have been added in the gravity models to account for specific factors that can support or hinder bilateral flows of goods such as geographical factors, cultural factors and institutional factors.

While gravity models used in empirical applications are known for their strong fit to the data, it is in recent decades that their predictive ability began to be justified by many theoretical studies of the model. Since Anderson (1979) - the first attempt to provide theoretical foundations of the gravity model, scholars have tried to demonstrate that the gravity model can be derived as a foundation from various trade theory models such as Ricardian models, Heckcher-Ohlin models and Increasing Returns to Scale (IRS) models; see, Bergstand (1985, 1989), Helpman & Krugman (1985) among others. Especially, it is today recognized that the gravity equation can provide a useful multivariate approach for assessing the impacts of regional trade agreements on the level and direction of bilateral trade flows. Illustrations of the application to the analysis of the preferential trade liberalization are refered to Aitken (1973), Endoh (1999, 2000) among others.

Aitken (1973) first included a dummy variable showing intra-regional trade to capture trade creation between members. Later, other studies tried to add a second dummy variable to illustrate extra regional trade effect with non-members. Recently, Endoh (1999) made good progress to incorporate 3 dummy variables in order to offer a simple and clear distinction between the trade creation and trade diversion. We will follow his institutional dummy treatment; i.e. the first dummy capturing the trade creation, the second one the import trade diversion and the third one the export trade diversion.

2. Specification of Empirical Model

We now look at the issue of econometric specification more closely. In most of previous

empirical studies based on the cross section estimation techniques, exports from i country to j (X_{ij}) are specified by the typical gravity equation for a given year as follows:

$$\log X_{ij} = \beta_0 + \beta_1 \log Y_i + \beta_2 \log Y_j + \beta_3 \log D_{ij} + \log u_{ij} \quad (1)$$

where Y_i (Y_j) indicates the GDP of the exporter (importer), D_{ij} measures the geographic distance between the two countries' capital cities. The disturbance term $\log(u_{ij})$ is assumed to be *iid* with zero mean $E(\log(u_{ij})) = 0$ and a constant variance.

However, it is remarkable to observe that heterogeneous factors may influence bilateral trade. An exporting country would export different amounts of a certain good to two countries, even if GDPs of these two countries are identical and they have the same distance from the exporter. Therefore, the cross-section OLS estimations are likely to suffer from heterogeneous bias because they explicitly fail to consider heterogeneous structural factors in errors. Furthermore, Matyas (1997) claims that the gravity model based on the specification (1) is misspecified.

Taking into account of unobserved heterogeneous factors in errors, an econometric specification of the gravity model in our paper is a two-way error component model as follows:

$$\begin{aligned}\log X_{ijt} = {} & \beta_0 + \alpha_{ij} + \theta_t + \beta_1 \log Y_{it} + \beta_2 \log Y_{jt} + \beta_3 \log D_{ij} + \beta_4 \log N_{it} + \beta_5 \log N_{jt} + \\ & \beta_6 \log FX_{ijt} + \beta_7 LAN_{ij} + \sum_k \beta_{8k} FTA_{(ijk)_t} + \sum_k \beta_{9k} imFTA_{(ijk)_t} + \sum_k \beta_{10k} exFTA_{(ijk)_t} + \log u_{ijt}\end{aligned} \quad (2)$$

where i, j denote the exporter, the importer respectively, t denotes time and k denotes the number of FTAs. The explanatory variables are defined as:

X_{ijt} denotes the value of export from a country i to a country j at time t.

Y_{it} , Y_{jt} denote the GDP of country i, j at time t, respectively.

D_{ij} denotes the geographic distance between capitals of two countries.

N_{it} , N_{jt} denote the population of country i, j at time t, respectively.

FX_{ijt} denotes the exchange rate between country i and country j at time t.

LAN_{ij} is a dummy variable which is unity if the two countries speak the same official language.

FTA_{ijk} is a dummy variable which is unity if both countries i and j belong to FTA k at time t, and 0 otherwise.

$imFTA_{ijk}$ similarly is a dummy variable which is unity if only the import country j belongs to FTA k at time t, and 0 otherwise.

$exFTA_{ijk}$ likewise is a dummy variable which is unity if only the export country i belongs to FTA k at time t, and 0 otherwise.

β_0 is an unknown constant.

α_{ij} is individual effects which imply direction of export effects from country i to country j.

θ_t is time-specific effects.

u_{ijt} is the log normally distributed idiosyncratic error term, where $E(\log(u_{ijt})) = 0$.

Our econometric specification in (2) is different from the previous empirical models by Endoh (2000), Elliott & Ikemoto (2004) in two main issues. First of all, we take into account of unobserved heterogeneous factors in errors, namely specific direction of export effects α_{ij} and specific time effects θ_t in the econometric model. The specification built in this way allows us to deal with both spatial and time dimension. Whereas the time dimension makes it possible to monitor common business cycle or globalization trend over our whole period, the spatial dimension has its ability to capture time invariant direction of export effects. Therefore, our panel data approach leads us to a totally different model in an econometric specification. As can be seen, Matyas (1997) and Egger (2000) strongly support the two-way error component one.

Secondly, we add two new variables to the explanatory in the model. The one is a common language dummy. We are interested in language since this factor plays a role as cultural distance. When two countries speak the same language, it will make communication easy and reduce transaction costs between them. Therefore, language proximity can promote bilateral trade. The other is an exchange rate of which impact are easily estimated in the panel data approach.

Expectations for all explanatory variables would indicate as follows. Y_i and Y_j would have positive coefficients, since the positive correlations between GDP and export supply as well as import demand are expected. Coefficient on D_{ij} would be expected to be negative, given that greater distances increase transportation costs.

Next, N_i and N_j would be likely to be positive or negative, depending on which is dominant of an absorption effect or economies of scale. On one hand, a large population may certainly indicate a big domestic market and large resource endowment, so that the bigger absorption effect of this domestic market causes less reliance on international trade transactions. In this case, a negative sign would be justified. On the other, a large domestic market allows the advantages of economies of scales to be fully exploited. It follows that opportunities for trade with foreign partners in a wide variety of goods will increase, and the expected sign of this coefficient would be positive.

In addition, we consider the impact of exchange rate which is defined as the price of the country j currency expressed in terms of the country i currency unit. A coefficient on FX_{ij} is predicted to possess a positive sign since depreciation in the country i will stimulate export flows from the country i to the country j.

Furthermore, the cultural distance measured by a dummy LAN_{ij} would be expected to be positive because two countries which speak the same official language will have an opportunity to make a transaction smoothly and quickly.

Note that a dummy variable FTA captures the intra regional trade creation. If a coefficient on this dummy is positive and statistically significant, it can be showed that the members of FTA have traded with each other more than the hypothetical level predicted by basic explanatory variables. The dummy imFTA reflects any trade diversion occurring as a result of changes in the import structure of FTA. It takes account of the import trade diversion defined by Balassa (1967). If a coefficient on this dummy variable is negative and statistically significant, it can be argued that the members of FTA

have diverted their importing activities from non-members trading countries to member countries. Finally, the dummy exFTA characterizes the extra-regional bias of FTA to the rest of world or the export trade diversion defined by Endoh (1999). A negative and statistically significant coefficient on the exFTA variable indicates that integration has led a member country to prefer exporting to other members rather than non-members.

IV. Empirical investigations

1. Method

Having not considered the panel structure of the data, we can assume that all coefficients in the equation (2) β_z, z =1, 2 ...are the same for all years. Therefore, we can pool all cross-section data to have OLS estimators where β_0, α_{ij} and θ_t can not be separately identified. However, the pooled OLS estimators obtained by that way do not deal with the heterogeneous issue.

Hence, a proper estimation method should take both direction of export effects α_{ij} and time effects θ_t into consideration. Directions of export effects allow each direction of export to have its own effects for unobserved time-invariant historical, cultural and diplomatic influences. It is clear that α_{ij} showing direction of export from a country i to a country j is totally different from α_{ji}. These unobserved effects might be correlated with some of the explanatory variables. On the other hand, time-specific effects imply unrelated influences on direction of export such as potential trend or business cycle. Since most of these influences are usually unobservable, it is appropriate to include these effects in the econometric model in order to control them.

To take into account heterogeneous effects in errors in our two-way error component model, there are basically two available models: a fixed effects model (hereafter, referred to FEM) and a random effects model (referred to REM). We use the Hausman test to examine whether the specification of REM is correct.

It is interesting to note that we select the dynamic way[3] to follow FTA introduction, in which a set of FTA institutional dummies takes unity only for the effective years of FTA between two trading countries. This way allows us to catch up the dynamic effect of the formation, expansion or contraction of FTA.

We pay particular attention to the fact that this model contains not only time varying variables such as GDPs, population, exchange rate and sets of FTA dummies but also time invariant variables namely distance and language. It is worth noting that FEM does not allow for estimating these time invariant variables. On the contrary, REM has a merit of treating this kind of explanatory variables, but produces inconsistent estimators since it neglects possible correlation between unobserved effects in errors and the explanatory variables. A technique that can utilize this merit of REM and correct a plausible correlation of the heterogeneous effects in errors with the explanatory variables, will be a good solution. Hausman and Taylor's estimator (1981) suggests a way to solve this issue, provided that a subset of the explanatory variables is correlated with the unobserved individual effects (Greene, 2003).

Employing the Hausman and Taylor (henceforth HT) instrumental variable estimation technique requires us to clarify endogenous and exogenous variables in our model.[4] We assume that Y_i, Y_j correlate with unobserved direction of export effects α_{ij} while LAN_{ij} has the same endogenous property. Other remaining variables are exogenous, uncorrelated with α_{ij}. Furthermore, we identify instrumental variables as follows. First, the time-varying variables are instrumented by the deviations from their group means. The exogenous time-invariant variable D_{ij} serves as its own instrumental. Lastly, the endogenous time-invariant variable, the language dummy, is instrumented

[3] An antimode way is different. It allows these variables to take a value of one for an overall observed period no matter when FTAs occur. Note that AFTA has been effective since 1993, NAFTA started in 1994, and that MERCOSUR in 1995.

[4] This model satisfies the identification requirement since the number of exogenous time-varying variables is bigger than the number of endogenous time-invariant ones.

by the group means for the exogenous time-varying variables (N_i, N_j, FX_{ij}).

2. Regression results

In order to provide empirical results, we investigate a data set covering 39 countries of which 26 are members of four FTAs, namely, EU, AFTA, NAFTA and MERCOSUR[5] for the overall 15-year period, 1988-2002. Data sources are given in Appendix B.

We have estimation results in two contexts. Firstly, we estimate the gravity model (2) without including any institutional dummy variables as the benchmark context. Then, we estimate it in a full specification to measure the impacts of AFTA on its export flows.

2.1 Regression results in the benchmark context.

From Table 1 showing the regression results, we find that all coefficients on the levels of GDPs and the distance show highly significant estimates at 1% level with the expected sign in all estimation methods. It is remarkable that the coefficients on GDPs show the income elasticities of trade in respect to an exporter's and an importer's income . At first glance at the pooled OLS result, 1% increase in an exporter's GDP raises volume of exports on average by about 1.05 % while trade is inelastic with respect to an importer's GDP. Then, allowing for direction of export effects in FEM, REM and HT greatly raises these estimated income elasticities of trade.

Our result shows that the income elasticities of trade are entirely different from Elliott & Ikemoto (2004) but are consistent with the previous studies by Cheng & Wall (2002), and Martinez-Zarzoso & Nowak-Lehmann (2003) who support that controlling the heterogeneous effects in errors is likely to increase the estimates of GDPs. One possible reason for this is that growth in volume of exports is partly attributed to unobserved heterogeneous factors in errors that seemed to be neglected in the Pooled OLS.

[5] Specific names for the set of institutional dummy variables in each corresponding FTAs are denoted as follows: AFTA, imAFTA, exAFTA; EU, imEU, exEU; NAFTA, imNAFTA, exNAFTA and MER, imMER and exMER.

Table 1: Gravity equation in the benchmark specification

Dependent variable : exports	Pooled OLS	FEM	REM	HT
An exporter ‘s GDP	1.051	1.322	1.140	1.318
	(143.46)**	(36.53)**	(58.21)**	(40.70)**
An importer’s GDP	0.934	1.111	1.065	1.110
	(128.06)**	(84.61)**	(92.29)**	(86.26)**
Geographic distance	-0.907	-------	-0.889	-0.790
	(94.43)**		(27.88)**	(13.25)**
An exporter’s population	-0.126	-0.026	-0.114	-0.135
	(18.79)**	(0.79)	(6.27)**	(5.17)**
An importer’s population	-0.085	-0.270	-0.222	-0.255
	(12.57)**	(21.69)**	(20.30)**	(21.06)**
Exchange rate	0.022	0.018	0.019	0.018
	(10.38)**	(8.14)**	(8.82)**	(8.24)**
Language	1.124	--------	1.089	3.054
	(34.97)**		(10.12)**	(2.21)*
Constant	-10.879	-23.857	-13.312	-16.851
	(71.61) **	(53.98) **	(33.72) **	(22.59) **
Observations	21901	21901	21901	21901
Adjusted R-squared	0.75			
F test (1493, 20400)	49.49			
Hausman Test	127.59			
Hausman Test*	129.45			

Notes: Absolute value of t statistics is reported in parentheses.

* denotes significant at 5%; ** denotes significant at 1%.

All individual effects are not reported.

The coefficient on geographic distance shows that the distance negatively affects export flows. Controlling for heterogeneous effects considerably lowers this coefficient value except for FEM result although the effect of distance is still highly significant.

In turn, we actually reconsider specification test of estimation methods. We perform the F-test on the null hypothesis of the same direction of export effects α_{ij} across countries and the same time effect θ_t over time. The F-statistic in Table 1 shows that we can not accept the null hypothesis of

equality of heterogeneous effects in errors. Then the Hausman Test gives us more insights. A high value of the statistic which follows the chi-squared test allows us to reject the null hypothesis that explanatory variables and unobserved heterogeneity are uncorrelated. This leads us to prefer FEM although time-invariant variables are absorbed into the fixed effects. Importantly, we use Hausman Test* on the null hypothesis that some explanatory variables are uncorrelated with heterogeneous effects in errors. Rejecting the null hypothesis further convinces us that this HT estimation is more appropriate than others in order to satisfy the properties of explanatory variables in our model.

The coefficients on population reflecting for the market size are negative and highly significant at the HT result. Regarding the exchange rate, its coefficient is generally positive and highly significant. The time-invariant endogenous variable LAN_{ij} is also significant at 5% with a positive sign at the HT result. This result confirms our assumption that language factor can correlate with other unobserved time-invariant effects such as cultural and historical factors. This point also highlights that two countries sharing common linguistic, cultural or historical features tend to trade more than what they would otherwise.

2.2 Regression results in the FTA context

Table 2 provides partly the estimates of all explanatory variables similar to the benchmark context. The estimates of GDPs at the HT result further strengthen our finding that trade increases lightly more than proportional with the GDPs of the exporter and the importer. A close look at the HT result reveals that the absolute estimate on distance is bigger than the one in the benchmark context. This point can infer that the distance becomes more important impediment to export flows under FTA impacts. One explanation for this may be that the impacts of FTAs have caused trading countries to prefer doing transaction with their closer ones. Furthermore, the population variables remain highly significant. At the same time, we find that the impact of an exchange rate is still effective in spite of a little reduction in its coefficient value. It is noteworthy that the coefficient

obtained for the language dummy presents an expected sign but appears statistically insignificant.

Table 2: Gravity model in the FTA context

Dependent variable: export	Pooled OLS	FEM	REM	HT
An exporter ‘s GDP	1.202	1.090	1.117	1.047
	(156.92)**	(29.20)**	(63.56)**	(40.50)**
An importer’s GDP	1.008	1.118	1.064	1.088
	(132.80)**	(86.31)**	(96.29)**	(89.27)**
Geographic distance	-0.858	----------	-0.936	-0.950
	(77.95)**		(33.41)**	(26.55)**
An exporter’s population	-0.223	-0.030	-0.139	-0.104
	(33.54)**	(0.93)	(8.50)**	(5.17)**
An importer’s population	-0.141	-0.280	-0.222	-0.245
	(21.00)**	(22.91)**	(21.18)**	(21.88)**
Exchange rate	0.027	0.004	0.010	0.008
	(13.81)**	(1.88)	(4.25)**	(3.75)**
Language	1.064	----------	1.047	0.458
	(35.08)**		(11.37)**	(1.22)

Notes: Absolute value of t statistics is reported in parentheses.

* denotes significant at 5%; ** denotes significant at 1%.

All individual effects are not reported.

One of our main objectives in this paper is an evaluation of FTA impacts on trade relationships. Table 3 presents the regression results of all FTA dummy variables. In general, it is clear that FTA regime has not brought the same impacts to every regional trade grouping. While it has had likely similar effects on MERCOSUR and NAFTA, it has caused totally opposite effects on AFTA and EU. But in another aspect, we realize that the trade creation has been appeared in all FTAs except for EU. However, only the EU has resulted in the import trade diversion while all FTAs excluding AFTA has yielded the export trade diversion.

Table 3: Trade Creation and Trade Diversion

	Pooled OLS	FEM	REM	HT
AFTA	2.225	0.529	0.666	0.626
	(29.50)**	(8.49)**	(10.81)**	(10.24)**
Import AFTA	0.681	0.169	0.223	0.204
	(21.45)**	(6.42)**	(8.56)**	(7.90)**
Export AFTA	0.994	0.562	0.597	0.593
	(31.35)**	(20.76)**	(22.84)**	(22.76)**
EU	-0.456	-0.053	-0.187	-0.156
	(11.93)**	(1.07)	(4.05)**	(3.29)**
Import EU	-0.200	-0.067	-0.129	-0.119
	(8.59)**	(1.91)	(4.09)**	(3.66)**
Export EU	-0.571	0.020	-0.086	-0.048
	(24.66)**	(0.59)	(2.73)**	(1.48)
MERCOSUR	1.085	0.453	0.480	0.474
	(8.77)**	(4.93)**	(5.22)**	(5.20)**
Import MERCOSUR	-0.255	0.556	0.486	0.508
	(6.39)**	(18.42)**	(16.23)**	(17.10)**
Export MERCOSUR	-0.853	-0.061	-0.095	-0.087
	(21.05)**	(1.98)*	(3.10)**	(2.87)**
NAFTA	0.073	0.292	0.279	0.287
	(0.45)	(2.22)*	(2.13)*	(2.21)*
Import NAFTA	-0.0001	0.143	0.126	0.134
	(0.00)	(4.33)**	(3.83)**	(4.12)**
Export NAFTA	-0.982	-0.160	-0.199	-0.181
	(22.83)**	(4.82)**	(6.04)**	(5.53)**
Constant	-13.335	-21.084	-12.473	-11.801
	(86.21)**	(46.17)**	(35.41)**	(24.80)**
Observations	21901	21901	21901	21901
Adjusted R-squared	0.79			
F-test (1493,20388)	41.52			
Hausman Test	3331.54			
Hausman Test*	130.73			

Notes:Absolute value of t statistics is reported in parentheses.

* denotes significant at 5%; ** denotes significant at 1%.

All individual effects are not reported.

Our result showing the trade creation in AFTA is similar to Elliott & Ikemoto (2004) but differs from the previous studies such as Endoh (2000) and Tran Van Tho (2003). It is more important to note that all FTA dummies were entered in the dynamic way. This point allows us to offer a new finding that AFTA has significantly affected export flows in the subsequent years of its effective. The HT result exhibits that the intra-regional trade for AFTA has increased to a higher level of 0.626, implying that AFTA members have traded with each others about 87% above the level predicted in the benchmark context.

Nevertheless, it can be seen, the magnitude of trade diversion effects involves two aspects. A positive sign of the coefficient on the import AFTA dummy suggests that AFTA members have not transferred their import transaction from non-member trading partners to member ones. It means that there has been no import trade diversion over the period of 10 effective years. One possible interpretation is that the dynamic network of domestic production together with foreign investment projects in AFTA countries have caused these countries to prefer importing from non-members outside the region.

On the other hand, we detect that AFTA have not given rise to the export trade diversion since the significant coefficient on the export AFTA dummy is positive. Our plausible explanation for this is that export-oriented strategies have been an engine of economic growth for these countries in many years. Moreover, characteristics of production and consumption in all member countries may have led them to persistently search for non-members as their export destinations.

On the whole, the test statistic for the significance of the heterogeneous effects in errors in our models affirms our prior assumption on this issue. Furthermore, the results of the Hausman Test on the uncorrelation between explanatory variables and heterogeneous effects in errors are rejected further to convince us of the appropriateness of HT estimators. Therefore, this overall argument proves the advantage of our preferred estimation method over the conventional OLS in the empirical

specification of the gravity model.

3. Further discussions and implications

Firstly, we notice the language impact in our empirical investigations. These coefficients on the language dummy suggest that the less the cultural difference in two countries the more the volume of exports between them. It would be better to say that if two countries have linguistic links, these cultural ties will encourage bilateral trade. In addition, what has to be noticed is that the language variable correlates with direction of exports effects at our specific assumption in the subsection IV(1). In this respect, language and other cultural factors can symbolize tastes, habits and wants that influence consumer choice. Therefore, all these things may suggest that cultural differences can express differences in consumer preference in this paper. Viewed in this light, we can argue that two countries of identical preferences would trade more than that of different ones. This finding is somehow similar to what account for intra-industry trade in the trade theory of monopolistic competition (Krugman, 1979; Helpman & Krugman, 1985).

Secondly, our investigation on export flows aims at examining an AFTA effect in interrelationship with other FTA; thus, comparison among them may be useful. It is interesting to note that all FTAs have not obtained the identical patterns of the trade creation and trade diversion. Of four regional trade arrangements empirically analyzed, only NAFTA and MERCOSUR have the same patterns of trade effects, while AFTA is completely contrary to EU in trade effects. We find only trade creation in AFTA, but only trade diversion in EU. The reasons why such things happen require further study and investigation.

Finally, it is noteworthy that the distance has increased its negative impact on export flows, and that FTA has strengthen the distance impacts. One remarkable fact is that transport costs still take a larger share in transaction costs when compared with those of tariffs, and that they represent the main impediment to trade flows (World Bank, 2002). It is widely known, however, that transport

costs have declined considerably in the past fifty years, especially in the last decade when a global economic integration rapidly progressed (Word Bank, 2004). Hence, in order to further promote export flows, an improvement in trade facilitation, which implies improved efficiency in the administration, procedures, and logistics at ports and customs, is one of the most suitable policies in transport. Without such improvement, FTA regime might be failed to achieve the targets of promoting intra regional trade.

V. Conclusion

This paper has investigated what factors can account for trade flows and particularly how important is the impact of FTA relative to other factors in explaining trade flows of AFTA in the interdependent context among other FTAs.

Empirical results plausibly indicate that our preferred method- HT fits the data remarkably and its estimated results are highly significant. Our first finding is that the GDPs, population and language among other factors can explain export flows in our observation. We find that export flows among countries increase more than proportionately with GDPs. This point reconfirms the result obtained before by including the heterogeneous effects in errors but differs from Elliott and Ikemoto (2004). In addition, it seems reasonable to conclude that trade might be higher among countries in which the same language is used rather than the different.

Next, our crucial finding is that AFTA has only produced the trade creation among its members. This finding is inconsistent with a number of previous studies but strengthens the finding of Elliott and Ikemoto (2004). More importantly, the dynamic way of following FTA effects allows us to reach another finding that the impact of AFTA has immediately appeared in export flows in the subsequent years of 1993.

Finally, we find that the geographic distance might impede trade rather more strongly in the context of FTAs. This result suggests the importance of improvement of trade facilities, which could

strengthen the targets of FTA regime.

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Appendix A: Direction of AFTA trade in 1992, 1997 and 2002. (unit: million US dollars , %)

Trading partners	1992	1997	2002
Direction of exports			
Intra regional	39475.32	88773.44	95492.93
Share of total exports (%)	20.98	24.95	23.66
NAFTA	38817.94	68860.322	76839.078
Share of total exports (%)	20.63	19.35	19.04
EU	43196.11	87179.65	115707.80
Share of total exports (%)	22.95	24.50	28.67
MERCOSUR	447.29	1940.24	1150.56
Share of total exports (%)	0.24	0.55	0.29
Japan	31471.77	48132.13	50654.16
Share of total exports (%)	16.72	13.53	12.55
China	4,006.92	10,709.20	21,316.82
Share of total exports (%)	2.13	3.01	5.28
Total exports to The World	188197.41	355867.85	403563.67
Direction of imports			
Intra regional	37931.71	76743.34	86100.55
Share of total imports (%)	18.77	20.48	24.24
NAFTA	31756.05	61653.48	49277.29
Share of total imports (%)	15.71	16.46	13.87
EU	30735.81	54673.41	39391.75
Share of total imports (%)	15.21	14.59	11.09
MERCOSUR	1662.99	2529.21	2406.71
Share of total imports (%)	0.82	0.68	0.68
Japan	47588.57	75211.29	58211.56
Share of total imports (%)	23.54	20.07	16.39
China	5794.23	13821.31	27154.69
Share of total imports (%)	2.87	3.69	7.65
Total imports from The World	202128.40	374667.55	355192.24

Source: Direction of Trade, IMF (2003)

Appendix B Data Sources

The volume of trade (in FOB terms, American dollars) are derived from The Direction of Trade (DoT) CD-ROM 2003 by IMF, Population and real GDP (in constant 1995 American dollars) from the World Development Indicators 2004 by World Bank. The foreign exchange rata are obtained and converted from the International Financial Statistics Database 2003 by IMF. In addition, the geographic distance between two capital cities has been downloaded from this website http://www.indo.com/distance and expressed in km. Information about the official language of countries is extracted from the Encyclopedia Britannica..

Country coverage: 13 EU countries (Austria, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Netherlands, Portugal , Spain, Sweden and UK), 6 AFTA countries[6] (Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam), 3 NAFTA countries (United States, Canada and Mexico) and 4 MERCOSUR countries (Argentina, Brazil, Paraguay and Uruguay). The remaining 13 are Australia, New Zealand, Japan, Korea, China, Hong Kong, India, Pakistan, Bangladesh, Turkey, Norway, Switzerland, and Chile.

[6] AFTA has a total of 10 member countries, but other members such as Brunei, Myanmar, Lao PDR and Cambodia do not have sufficiently necessary data.