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Lurong CHEN
Graduate Institute of International Studies and UNU-CRIS

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This paper creates a new index ("index of bilateral trade relation") to quantitatively evaluate the degree of regional economic integration based on countries' de facto bilateral trade relations. It concludes that a fundamental arrangement of East Asian regionalism should involve at least one of the two "hub" candidates – Japan and China. It also suggests that the China-ASEAN FTA (CAFTA) may trigger domino effects of regionalism in East Asia.

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1. Introduction

East Asian countries have been said to be on their way towards regionalism for many years. Just as many other regional trade agreements that are mainly involved in developing countries, the institutional progress of East Asian regional integration seemed to be a topic in the papers until the last decade. The participation of Japan, Korea, China and ASEAN has made it feasible that East Asian countries come together to create the third largest regional economic entity in the world following EU and NAFTA.

More than eighty regional and bilateral free trade agreements (FTAs) have been implemented in Asia (Kuroda, 2006), over half of which are signed by East Asian countries. The various degrees of liberalization and the different paces in the negotiations have made up a dazzling network, which prevents us from having a comprehensive picture on the real process of East Asian regionalism. In contrary to the EU and NAFTA, it is popularly believed that the integration in East Asia is indeed driven by the cross border connection within its business sector instead of the formatted integration. It would be an alternative for us to understand the process and the structure of East Asian regional integration more easily based on the observation on the *de facto* integration of East Asian economies, rather than the one-by-one interpretation and comparison of legal terms in agreements.

However, if East Asian regional integration is initiated by the market mechanism, to what extent has the market driver influenced the bilateral trade flow between East Asian countries? Is it possible to measure and compare their *de facto* bilateral trade relations quantitatively? Suppose the prospective institutional building in East Asia would mostly base on this market-initiated regional integration, what could be a possible arrangement of East Asian regionalism? To investigate the *de facto* trade liberalization in East Asia, this paper regards bilateral trade relations as parts of the policy frictions that may influence trade flows via their impacts on trade cost and introduces a new method to measure countries' *de facto*

bilateral trade relations in relative terms by calculating *BTR* index ("index of bilateral trade relation"). In combination with *HM* index ("index of Hubness-Measure"), it plans to outline the structure of East Asian regional integration and suggest a possible approach towards East Asian regionalism from pure economic perspectives.

This paper is structured as follows. Section 2 introduces method to calculate the *BTR* index and the "economic distance" between countries. Section 3 reviews some policy debates on East Asian regional integration. Section 4 investigates the formation of East Asian regional integration. It evaluates the relative intensity of intra-regional trade and calculates *BTR* index and *HM* index, based on which it will also image an "economic map" of East Asia. Moreover, it will also evaluate the influence of China-ASEAN FTA (CAFTA) in the progress of East Asian regional integration. Section 5 concludes.

2. To measure the *de facto* Bilateral Trade Relations

2.1 The logic and methodology

The basic idea to get the *BTR* index is to decompose the policy frictions from the gravity model. This is based on two considerations: first, bilateral trade between countries increases with the expansion of economic size and contracts with the growth of the costs of trade[1]; Second, policy frictions can play a much more decisive role on trade than natural frictions. Suppose two countries, *A* and *B*, hold the *a priori* advantages needed for opening trade with each other (ie. both of them are big economies, they are adjacent, they have a similar cultural background, a similar language, and so on), this does not necessarily mean that they would become close trade partners. For instance, if the government of country *A* implements extra restrictions on trade with country *B*, then it is very unlikely that the two countries will end up trading at the level that *a priori* natural factors would suggest. In this case, even though

[1] Since the distance between countries seems to be the primary determinant of the cost of transportation, the geographic measurements are used for simplification.

natural conditions would encourage the two countries to trade freely, we may fail to observe substantial trade flows between them because the government of country *A* artificially undermined natural trading preference.

Basically the determinants of bilateral trade between countries (or regions) can be classified into two categories: trade cost and partner countries' properties, such as *GDP*, population, and *GDP* per capita. Lowering trade costs will encourage bilateral trade between countries while increasing costs may discourage it. Trade costs could be roughly grouped into two categories. One is the natural frictions, typically transportation costs that are induced by the geographic distance, technology and trade infrastructure. The other is the policy frictions, such as technical barriers and trade facilities. Because of the non-discrimination of multilateral trade liberalization, one may regard the policy frictions as the mirror of the *de facto* bilateral trade relations when comparing the relative closeness of trade partnership between economies. Since the regional integration in East Asia is market-led, the policy frictions existing in bilateral trade between East Asian countries may reflect how close the two economies are driven by the market. In the short run, the policy frictions could be regarded as the "fixed effects" that exist between countries on the level of bilateral trade. The estimation based on the time series could be seen as the average effects of the policy frictions during the period under investigation.

It is worthwhile to mention that just like many other empirical studies, the method presented in this paper is not totally neutral from critiques theoretically. Besides those flaws that are inherited from the gravity model, the calculation of the *BTR* ignores the fact that the exclusion of other factors that could affect the bilateral trade flows (such as common language effects, common border effects, etc.) from the estimation will lower the precision of the index. Moreover, since the elasticity of economic size on international trade has been assumed to be identical throughout the sample, it is very likely that the index is biased in favor of those

countries whose development depends more on international trade. In principle, for those countries whose trade policies are freer, the value of *BTR* should be relatively lower than those whose bilateral trade is more restricted by governments.

2.2 The gravity equation

The gravity equation is chosen to pool all these trade determinants. It may be one of the most popular models used in empirical studies of international trade and migration in the last fifteen years. Historically, Tinbergen (1962) and Pöyhönen (1963) independently developed it first in a series of econometric models of bilateral trade flows (Deardorff, 1984). Since then, various versions of gravity-type models were widely applied in the empirical studies. Taken from the famous Newtonian Gravity theory, the equation can explain the relationship of trade flows between countries, and their geographic and economic properties quite well. Similar to the result obtained in physics, which tells us that the gravity between two objects is positively related to their masses and inversely related to the distance between them, the gravity model shows that the larger the economic size of the trade partners, the higher the possible bilateral trade flow between them, while the higher the trade cost, the lower the bilateral trade flow may occur.

It has been very successful empirically in fields such as the examination of bilateral trade patterns and "natural" regional trading blocs (Frankel, Stein and Wei, 1996); the estimation of trade creation and trade diversion effects from regional integration (e.g., Mendez and Brada, 1985; Hamilton and Winters, 1992; Baldwin, 1994). The high degree of flexibility of the model allows for many "versions" of approaches. In the study of trade blocs, there are two commonly used approaches. One is the "dummy variable" approach, which was especially popular in the last decade. The simplicity of the procedure and the straightforward results are the key advantages of the method, even if it is constrained by the use of dummy variables. The other approach is called the "factor endowment-based gravity equation"

approach, which essentially uses instrumental variable methods to solve a "*multivariate, multiplicative error-in-variable problem.*" (Saxonhouse, 1993) With a constructed tolerance interval indicator and a given probability, one can consider those observations falling outside the tolerance intervals as signs of regional bias. The large number of extreme observations suggests that there is significant internal trade bias and the existence of a trading bloc. This method provides us with a quantitative approach to the study of trading blocs. However, the conclusion may depend closely upon the tolerance interval chosen. Moreover, since different factor endowments must be classified and the estimation for each sector in turn must be performed, it is relatively complex in application.

Though the gravity equation is initially "discovered" in empirical studies, its theoretical foundation has also been shown by economists based on various assumption and models. After Anderson's (1979) first formal attempt to derive the gravity equation under the assumption of product differentiation, many economists also tried to prove the model theoretically via different approaches, such as Bergstrand (1989), who explored the model associated with monopolistic competition, Helpman and Krugman (1985), who justified the model based on an IRS type of model. Most recently, Deardorff (1995) found the gravity model to be consistent with a wide range of trade models including the H-O model, either with frictionless or with impeded trade. The differences in these theories help to explain the various specifications and the diversity in the results of the empirical applications. Anderson and Wincoop (2003) derive a theoretical gravity equation based on the assumption of differentiated goods from different country of original and CES utility function, in which they show that trade barriers are determinants of inter regional trade. Their model also shows that in the gravity model the effects of trade barriers are various according to the economic sizes of trading partners.

The gravity equation simplifies the determinants of bilateral trade between countries (or regions) into two categories: partner countries' properties, such as *GDP*, population, *GDP* per capita, etc. and trade cost of trade between partners, such as transport costs, tariff barriers, quotas, etc.. Lower trade costs will encourage bilateral trade between countries while higher costs will discourage it. Loosely speaking, there are two types of trade costs. One is related to "natural frictions", such as the geographical distance, level of technology, etc., and the other is related to "policy frictions", primarily the degree of bilateral liberalization.

As normal, *GDP* and *GDP* per capita are used to describe a countries' economy and the distance between the capitals of the two countries is employed to approximate "natural" trade costs. It is assumed that the marginal effect of either *GDP* or *GDP* per capita on bilateral trade is identical, and that the marginal effect of distance can be magnified or shrunk by individual bilateral trade relations.

The marginal effect of each trade determinant on bilateral trade can be represented in a gravity equation as follows:

$$Trade_{ij} = \frac{(GDP_i^{\alpha_i} \cdot GDP_j^{\alpha_j}) \cdot (K_i^{\beta_i} \cdot K_j^{\beta_j})}{Dist_{ij}^{\gamma_{ij}}} \qquad (1)$$

where α, β and γ_{ij} represent the marginal effect of *GDP*, *GDP* per capita(K) and distance respectively. It is assumed that α and β are identical while γ_{ij} could vary related to countries' bilateral trade relations. That is, the bilateral trade relation can influence bilateral trade flows via its impacts on the elasticity of the geographical distance. In practice, equation (1) is estimated in a logarithm form as equation (2) expresses.

$$\log(Trade_{ij})_t = C + \alpha_i \cdot \log GDP_{i,t} + \alpha_j \cdot \log GDP_{j,t} + \beta_i \cdot \log K_{i,t} + \beta_j \cdot \log K_{j,t} + \gamma_{ij} \cdot \log(Dist_{ij}) + u_{ij,t} \qquad (2)$$

where $\log\left(Trade_{ij}\right)_t$ denotes the logarithm of total bilateral trade flow at time *t*; $\log GDP_{i,t}$ and $\log GDP_{j,t}$ denote the logarithm of countries annual *GDP*; $\log K_{i,t}$ and $\log K_{j,t}$ denote the

logarithm of countries' annual per Capita *GDP*; log*(Dist$_{ij}$)* denotes the logarithm of the geographic distance between the trade partners' capitals; $u_{ij,t}$ is the disturbance.

The lower value of γ_{ij} will be interpreted as the closer bilateral trade relation between the two countries. If the average value of γ_{ij} is smaller than the average world level, the bilateral trade between the two economies is said to be "intensive". That is, they have relatively closer bilateral trade relations with each other. Besides the technological progress that directly affect on reducing the transportation cost, the progress of trade liberalization tends to improve countries' trade relations and therefore lower the value of γ_{ij} over time. When countries fully relax their restrictions on trade (as the situation would be with respect to trade within the same country), bilateral trade may only be constrained by the transportation cost related to the geographic distance.

2.3 The panel data framework

The term "panel data" refers to the pooling of observations on a cross-section of households, countries, firms, etc. over time periods. Econometrically, a panel data regression is different from either cross-sectional regression or time series regression. Variables in a regression equation of panel data normally have two subscripts: one denotes the time period while the other denotes the different objects (countries, individuals) of analysis. We can write this as

$$Y_{i,t} = C + X_{i,t}' \cdot \beta + u_{i,t} \quad i = 1, \cdots\cdots, N; t = 1, \cdots\cdots, T \qquad (3)$$

where the subscript *i* denotes the section, *t* denotes the time period. Furthermore, in order to use a one-way error component model for the disturbances, we need to decompose the last term $u_{i,t}$ as,

$$u_{i,t} = \mu_i + v_{i,t} \qquad (4)$$

where μ_i denotes the unobservable individual specific effect and $v_{i,t}$ varies with individuals and time, which can be thought of as white noise. The most significant advantage of this formulation is that we are able to capture the individual propensity on trade for each pair of trading partners.

The two most popular models of panel data are fixed-effect model and random-effect model. Eisenhart (1947) distinguished the two models into "class I" and "class II". Scheffé (1956) defines "class I" as fixed-effect model and "class II" as random-effect model. Theoretically, "fixed-effect" model applies to determine the existence of true differences among the estimated mean of section-specific errors; while the latter is used for the analysis on variant components since all effects are assumed to have zero mean. The "random-effect" is therefore a more restrictive model than the "fixed-effect". In practice, we normally apply Hausman-type specification test to evaluate the consistency of the estimates from random effects models and therefore to select fixed-effect versus random-effect model. Briefly speaking, the Hausman test is essentially a test of the hypothesis that random effects would be consistent and efficient. Under the null hypothesis, the random-effect estimators are consistent and efficient, otherwise it is inconsistent; the fixed-effect estimators are always consistent but only efficient when the null hypothesis is rejected.

2.4 To derivate *BTR* index from bilateral trade flows

Imaging that policy frictions can affect a country's bilateral trade flow through their impacts on the geographic distance, the economic distance (ED_{ij}) can be defined as geographic distance ($Dist_{ij}$) multiplied by a parameter *A,* which essentially reflects the relative degree of bilateral trade liberalization.

$$ED_{ij}=A*Dist_{ij} \tag{5}$$

Accordingly a revised version of gravity equation looks like

$$Trade_{ij,t}=\frac{(GDP_i^{\alpha_i}\cdot GDP_j^{\alpha_j})\cdot(K_i^{\beta_i}\cdot K_j^{\beta_j})}{(A_{ij}\times Dist_{ij})^{\chi_{ij}}} \tag{6}$$

To estimate equation (6) in the logarithm form using the fixed effect model as equation (7) illustrates, one can get $BTR_{ij} = \hat{A}_{ij} = \frac{exp\left(v_{ij} / \hat{\chi}_{ij} \right)}{Dist_{ij}}$ when combining it with equation (2).

$$\begin{aligned} \log(Trade_{ij})_t = C + \alpha_i \cdot \log GDP_{i,t} + \alpha_j \cdot \log GDP_{j,t} + \beta_i \cdot \log K_{i,t} + \beta_j \cdot \log K_{j,t} \\ + \chi_{ij} \cdot \log(Dist_{ij}) + \chi_{ij} \cdot \log(\hat{A}_{ij}) + v_{ij} + u_{ij,t} \end{aligned} \quad (7)$$

The smaller value of BTR_{ij} hints the higher degree of market openness of country *i* to country *j*. Furthermore, BTR_{ij} <1 can be interpreted as a signal of "pro-trade" effects of bilateral trade policy that encourage country *i* to import more from country *j*, while BTR_{ij} >1 is a signal of "anti-trade" effects showing the additional cost of country *i*'s import from country *j* due to political frictions.

3. Debates on East Asian regional integration

Fujita (2005) argues that Asian regionalism, as well as that in America and Europe, seems to be part of the recent globalization of the world economy. Due to the continual reduction in transportation costs, the world economic activity is relatively concentrated into these three regions. Of these East Asia is indeed the fastest growing. East Asian "highly integrated manufacturing system" allows the region to play as an "export platform" in the global economy. He points out that the neutral integration in East Asia has reached such a "critical stage" that a region-wide institutional scheme might be necessary to promote further integration in Asia. This is agreed by Watanabe (2006), who believes that East Asian countries are working to setup more government-level agreements to enforce their *de facto* market-driven integration founded on a common production bases across the region. Kuroda (2006) shares this opinion but extends it to pan-Asian integration. He expects to see a "multi-track and multi-speed approach" to pan-Asian integration, of which some countries would "play a leadership role."

Kawai (2004) tries to explain the logics behind various initiatives for institutional cooperation from three aspects. First of all, he points out East Asian countries have long enjoyed "market-driven" integration through trade and foreign direct investment. On one hand, intra-regional trade as a share of East Asia's total trade has reached 54 percent in 2003, which has exceeded that of NAFTA. On the other hand, mainly via foreign direct investment, regional production networks and supply chains have been set up by locating different sub-processes in various countries in Asia. Secondly, Asian countries are now facing challenge from the EU and NAFTA in global market. It is more urgent to secure an integrated market in a regional scope especially when multilateral trade negotiation is at an extremely slow pace. Finally, the Asian financial crisis gave Asian countries a lesson on the importance of regional monetary and financial cooperation. It made many East Asian countries realize the lack of capacities to meet global challenges individually (Kim, 2004). Because of the slow pace of multilateral trade liberalization, they move toward regionalism as an alternative to synchronize regional economy in global competition. These three drivers are summarized by Stubbs (2002) into three terms - the "long term regional trends," "competitive regionalism," and "the Asian economic crisis."

Yamazawa (2001) emphasizes that China's entry to WTO and emerging move toward regional free trade agreements might motivate other Asian countries to go for deeper integration. China is currently the second biggest economy in the region behind Japan. As one can see, it has established close trade relations with its neighbors, especially Korea and some key member states of ASEAN, who are also important trade partners with Japan. Historically, Japan seemed to be reluctant in leading the progress of East Asia regionalism. It may be when China showed its interest in the regional integration did Japan adjust its strategy and turn in an active negotiator on free trade agreements. To some extent, the term "competitive

regionalism" may refer to not only the competitiveness among the three big blocs, but also that within East Asia.

As Fujita (2005) comments: … *the economic integration of East Asia has been attained mostly through market mechanisms,… However, now East Asia has reached a critical stage such that for a further promotion of regional integration, developing region-wide political institutions is indispensable.* As East Asian regionalism seems to be initiated by the market itself rather than any top-to-bottom arrangement, one important reason for East Asian countries to accelerate their paces of trade liberalization might come from the appreciation of a deeper integrated economy that is desired by the market. Consequently, it is possible that the community building of Asian regionalism would be closely related to those intra-regional linkages that already play the fundamental role on shaping the "neutral" integration of the regional economy.

Different from NAFTA, where the U.S. could be an is unambiguous leader, and from EU, which is well institute-constructed, the situation in East Asia is rather intricate partially because of economic gaps among member nations plus the lack of an effective super-national institution or an overwhelming leader in the region. The existence of two big economies in the region, Japan and China, makes it hard to predict the direction of the regional integration in East Asia. It seems that neither the experience of EU, nor that of NAFTA could be directly cloned in East Asia. First, a well-organized intergovernmental structure is one of the significant characteristics of EU-type integration, which is almost impossible to be repeated in Asia. East Asian countries are so different from each other in their stages of development. For instance, their GDPs range from 2.6 billion US dollars per year (Lao, PDR) to about 5 trillion US dollars per year (Japan) [2]; and their populations range from 0.4 million (Brunei) to 1.3

[2] The data is statistics of year 2005. Data source: The World Bank online WDI database. http://web.worldbank.org/WBSITE/EXTERNAL/DATASTATISTICS/.

billion (China). It might not be an easy task to bring East Asian countries together under an intergovernmental institution such as that of EU where there is one vote per nation.

Second, the NAFTA type of integration might be applicable but needs to be employed by East Asia under preconditions. Though a balanced situation without hegemony in the region seems to be more welcome by most Asian countries, there are at least thirteen countries (ASEAN+three) in the region that might be included into the integrated regional circle. That means a network composed of at least 78 bilateral FTAs is necessary if trade liberalization is done bilaterally. The modest condition to make the NAFTA type available is that the ten ASEAN countries should speak in one voice like an integrated economic unit. In that case maybe only six bilateral trade agreements (between Japan, Korea, China and ASEAN) are enough to cover an integrated network of East Asian economies. Therefore, one precondition to transplant NAFTA's experience will be the deeper integration of ASEAN countries. Another "hard-to-deal-with" issue might be to harmonize Japan and China. Probably that is why the initiative of "ASEAN plus three"[3] (ASEAN plus Japan, Korea, and China) has received so much attention since its first summit.

Indeed, since the geopolitics of East Asia is quite different from that in Europe or North America, it is quite reasonable to see that East Asia will find its unique approach to regionalism based on its *de facto* region-wide integrated economy that is generated by the market mechanism. Basically, any approach to the community building of East Asia would be "acceptable" as far as it could meet three principles - openness, equality and evolution.[4]

[3] It is an informal group whose formation was motivated by the East Asian crisis. It does not have its own secretariat but meets at the invitation of ASEAN. The first meeting of the group occurred in December 1997.

[4] It is so called "open regionalism" (Bergsten, 1997, and Drysdale et al., 1998). Openness required non-discrimination and transparency in trade and economic policy, as well as in diplomatic stance. Equality implied that activities needed to be of mutual benefit to all participants and recognized the rapid transformation in the structure of economic and political power taking place in the region. And the evolution of the process of regional cooperation recognized the importance to success of a gradual, step-by step, pragmatic and sustained approach to economic cooperation based on consensus building and voluntary participation.

In a series of papers, Baldwin (2003a, 2003b, 2005, 2006) comprehensively analyzes regionalism in a "hub-and-spoke" framework and suggests East Asian regional integration to be in the "bicycle" formation. He concerns about the underlying connection between trade liberalization and industrial relocation that is theoretically founded on New Economic Geography (NEG)[5]. NEG discovers interactions between trade policy and industry relocation across country borders in theory. Briefly speaking, though trade liberalization can increase the overall welfare, it is not guaranteed that all the participant countries can be better off because the consequential cross border industry relocation might bring about long term impacts on the economy. Throughout the process of the market integration, policy makers from each party might be required to choose appropriate trade policies and implement the appropriate strategies when shaping the picture of trade liberalization. Even a temporarily inappropriate policy might lead to the unrecoverable welfare loss at the end.

One reason is that trade liberalization will allow producers to reconsider their business under the circumstance of an integrated market instead of several fragmental markets. The markets can be easily fragmented when trade barriers are high. Some producers choose to produce in big markets simply because of the larger demands; while some others choose small markets where competition is relatively less intense. The removal of trade barriers will however make big markets more attractive to producers because industries may find it more profitable to base their productions in big markets. From these they supply to the host market directly and export to markets that are relatively small under free trade. There are three key advantages of locating in big market: First, given demands from the whole free trade zone, sales to the domestic market can bring about higher markups than exports to foreign countries because of the existence of transport costs. Second, to be located close to upstream and downstream partners will help firms increase their efficiency. Third, though the competition

[5] The theory of NEG is initially raised by Krugman (1991) and later enriched by others such as Fujita et al. (1999) and Baldwin et al. (2003).

effect in big markets will reduce firms' profits by lowering the industry price index, in the long term the equity of real wages decreases nominal wages in big markets as price declines.

Baldwin (2003a) refers the 'hub-and-spoke' pattern as a possible outcome of regional trade liberalization where one or few nation(s) become the center of the regional economy because the relatively bigger market size(s) or the better initial conditions of trade facilities at the starting point might be able to attract more industries to move in at the cost that the markets of other economies in the region will shrink when eliminating the border barriers. Intuitively one may define the core economy in the regional free trade zone as 'hub' and title the others 'spokes'. Moreover, the formation of the "hub-and-spoke" pattern will be a self-enforced process. It will be hard to be revised once it gets started in forming driven by the market mechanism. Because of this possible outcome of free trade, policymakers need to set up their policies carefully lest domestic economies be marginalized as a result of regional trade liberalization. Generally speaking, there will be at least three advantages to be a "hub" rather than a "spoke" in the integrated regional economy: First, as many industries will agglomerate into the hub nation, the hub-based firms could be more efficient and more competitive. A "hub-and-spoke" formation might favor industries in the hub nation at the cost of industries in the spoke nations. Second, most new investments will choose to flow into the hub nation because the investors would normally find more potential in the big market(s). Such decisions may meanwhile re-enforce the advantages of the big market(s). Last but not the least, the self-enforced agglomeration will lead to a one-way process of industry reallocation in the region - '*Once a particular location gets a head start, it may be extremely difficult for other regions to catch up as investment deterring effects of the current hub and spoke system may have consequences that last far beyond the termination of that system*'.[6]

[6] See http://www.rieti.go.jp/en/events/bbl/03013101.html

East Asian economies seem to be looking for institutional scheme to deepen the initial market-led regional integration in the last decade. For most of them, it might not be a good idea to apply the *laissez- faire* policy as trade liberalization that is purely directed by the market mechanism might drive them to the "spoke trap". Instead, the analysis of the possible "hub-and-spoke" formation might be helpful for them to better design their approach towards a more integrated region.

4. To picture the pattern of East Asian regional integration

4.1 The intensity of intra-regional trade in East Asia

A starting point is to demonstrate the existence of the intensive intra-regional trade among East Asian economies using the gravity model containing augmented with dummy variables. The regressions are based on 87 countries' bilateral trade data in year 2001.

$$\log(Trade_{ij})_t = C + \alpha_i \cdot \log GDP_{i,t} + \alpha_j \cdot \log GDP_{j,t} + \beta_i \cdot \log K_{i,t} + \beta_j \cdot \log K_{j,t} + \gamma_{ij} \cdot \log(Dist_{ij}) + \eta \cdot Dummy + u_{ij,t} \quad (8)$$

The definitions of dummies used in the estimation are listed below:

Variable	Definition
DUMMY_East Asian countries as the importers	The value equals 1 if the importer is from East Asia; otherwise the value is 0.
DUMMY East Asian countries import from non-East Asian countries	The value equals 1 only if the importer is from East Asia but the exporter is outside the region; otherwise the value is 0.
DUMMY_East Asian countries as the exporters	The value equals 1 if the exporter is from East Asia, otherwise the value is 0.
DUMMY East Asian countries export to non-East Asian countries	The value equals 1 only if the exporter is from East Asia but the importer is outside the region; otherwise the value is 0.
DUMMY_ East Asian countries trade with each other	The value equals 1 only if both the importer and the exporter are from East Asia; otherwise the value is 0.

[Table 1 about here]

Each coefficient in the logarithmic function essentially represents the elasticity of the corresponding independent variable on the bilateral trade flow. We first run the OLS regressions. All the coefficients have the expected signs and at high level of significance in statistics. Column (1) shows the estimators of the basic equation, while the estimation shown

in columns (2) to (5) include the dummy variable(s) to measure the specific effect on trade of East Asian countries. As that the gravity model suggests, both the export country's and the import country's GDPs have significantly positive impacts on the bilateral trade flow, which is at the same time discouraged by geographic distance. The effect from the countries' GDP per capita is not always significant and stable however. The coefficient of the dummy in column (2) equals 0.57, showing that East Asian countries are more open to imports in comparison to most of the countries in the world given the assumption that the other factors have the identical impact on cross border trade. In 2001 East Asian countries import about 77% more than the volume predicted by gravity equations. On the other hand, East Asian countries' export almost three times as much as the world's average level given the same factors. These findings reflect that East Asian economies in general rely much more on international trade than other countries worldwide. Given the similar economic and geographic conditions, trade between two East Asian countries is around 2.3 times higher than the trade flow between two countries outside East Asia. The net trade "bias" within the region listed in Column (5) measures the real intra-regional trade preference more precisely. It shows that given the same trade conditions, the import between two East Asian countries is about twice as great as the average import from a country outside the region. On the other side, East Asian countries also export more (25% more) to each other than their exports to those partners outside the region.

However, the OLS regression (whether or not considering fixed effects) on the gravity equation has been criticized for its inconsistent estimators due to the presence of heteroskedasticity. One possible solution is to follow Santos Silva and Tenreyro's (2005) approach to apply Poisson pseudo-Maximum Likelihood method to obtain the consistent estimators of the gravity model.

One could see the inconsistence of OLS estimation from some basic algorithms. In the traditional logarithmic form of the gravity equation, we have $ln(Y_{ij})=\beta_0 \cdot ln(A)+\beta_i \cdot ln(X_i) +\beta_j \cdot ln(X_j) +\beta_1 \cdot ln(X_{ij})$, where Y_{ij} denotes bilateral trade between country i and j; X_i and X_j denotes country specific factors of i and j respectively; and X_{ij} denotes the "common" factors between them such as geographic distance. Transforming the equation above we have

$$Y_{ij}=exp[\beta_0 \cdot ln(A)+\beta_i \cdot ln(X_i) +\beta_j \cdot ln(X_j) +\beta_1 \cdot ln(X_{ij})] \quad (9)$$

The corresponding conditional expectation in general term is $E(Y_{ij} \mid X_i, X_j, X_{ij})$. The individual observation can therefore be presented as $y_i=E[y_i|x_i]+\varepsilon_i = exp[x_i \cdot \beta]+\varepsilon_i$. More precisely, the logarithmic function for the regression is

$$ln(y_i)= x_i \cdot \hat{\beta} + ln(\eta_i), \text{ where } \eta_i=1+ \varepsilon_i / exp(x_i \cdot \beta) \quad (10)$$

The OLS estimators on this equation are consistent only when the second term on the right hand side, $ln(\eta_i)$, is statistically independent from x_i. In order to eliminate x_i from the function of η_i we need to find a random variable v_i that is independent from x_i and meets the condition $v_i=\varepsilon_i / exp(x_i \cdot \beta)$, which implies a very specific condition on the error term. Furthermore, when the error term and explanatory variables are independent, the conditional variance of y_i should be proportional to $exp(x_i \cdot \beta)$. However, because of $y_i \in [1, \infty)$, the variance of y_i tends to be closer to zero as the value of y_i approaches its lower bound; while the deviations from the conditional mean of y_i will go up when y_i is moving to the opposite direction. It is therefore not realistic to assume that the conditional variance $V[y_i|x_i]$ in the OLS estimation is proportional to $exp(x_i \cdot \beta)$. Therefore the OLS estimators on the log-linear model tend to be inconsistent.

Though the alternative non-linear least squares (NLS) method could be used to resolve the problem of inconsistence, Santos Silva and Tenreyro (2005) shows that the NLS estimators are normally inefficient. In NLS $\hat{\beta} = arg \min_b \sum [y_i - exp(x_i \cdot b)]^2$, which implies the first order condition $\sum [y_i - exp(x_i \cdot \hat{\beta})] \cdot exp(x_i \cdot \hat{\beta}) \cdot x_i = 0$. The inefficiency comes from the

fact that the equations might be weighted more on those observations with larger value of the second term, $exp(x_i \cdot \hat{\beta})$. To improve the efficiency of NLS estimators, one needs to identify/assume the specific form of the conditional variance instead of assuming the conditional variance to be constant. The beauty of the Poisson pseudo-Maximum likelihood (PML) estimation is that it assumes the conditional variance as proportional to the conditional mean and takes into account the non-negative feature of y_i. The disturbance from the large conditional mean $exp(x_i \cdot \hat{\beta})$ will be offset by corresponding larger conditional variance. Holding the assumption that the conditional variance $V[y_i|x_i]$ is proportional to the conditional mean $E[y_i|x_i] = exp(x_i \cdot \beta)$, we estimate the parameter β by solving the first order condition $\sum [y_i - exp(x_i \cdot \hat{\hat{\beta}})] \cdot x_i = 0$. Moreover, Gourieroux, Monfort and Trognon (1984) shows that the function does not even have to be Poisson distributed or to be an integer. As long as the appropriate function of $E[y_i|x_i]$ is defined, the estimators of PML will be consistent and efficient.

The second part of Table 1 prints down the results based on PML regressions. The coefficients of the dummy variables in all regressions are positive and significant in statistics. It shows that East Asian economies trade much more than the world's average level (around 60% more in imports and double in exports). Under the same conditions, trade between two East Asian countries is much more intensive than that between an East Asian country and its trade partner outside the region (95% higher in imports and 43% higher in exports). In short, either OLS or PML estimation show the existence of a *de facto* regional trading bloc within East Asia. Intra-regional trade between East Asian countries is more intensive than the world's average level from either the aspect of imports or that of exports.

At the first glance, all coefficients in the estimations on Equation (8) have the expected signs. Most of them are at high level of significant in statistics. As that Gravity model suggests, both the export country's and the import country's GDPs have significantly positive

impacts on the bilateral trade flow, which is on the other side discouraged by geographic distance. The effect from the countries' GDP per capita is also positive but not always at high level of significant in statistics. The coefficient of the dummy in column (2) equals to 0.46, which means East Asian countries are in general more open to imports in comparison to most of countries in the rest of world given that the other factors have the identical impact on cross border trade. In 2001 East Asian countries import about 58% more than the volume predicted by gravity equations. The exports from East Asian economies are also more intensive – as it is shown in column (3), they export almost double as the world's average level. The "net" relative intra-regional trade intensity of East Asian economies is evaluated by the estimation that present in Column (5). Given the same trade conditions, the imports of one East Asian economy from another East Asian economy will be about twice as much as the imports from its extra-regional partner country; meanwhile the exports between the two East Asian economies will also be over 40% more than the average exports from one East Asian economy to another country that is outside the region.

4.2 The *de facto* bilateral trade relations and the economic distance between East Asian economies

It is further assumed that countries *i* and *j* will normally treat each other reciprocally and therefore the bilateral trade relation between them could be symmetric. That is, $BTR_{ij}=BTR_{ji}$. Since one country's import from country *j* is not only affected by its own import policy but also by its trading partner, country *j*'s export policy, one might image the bilateral trade relations are the "pool" of both countries' import and export policy. In practice, it might not be easy to distinguish their different effects on the bilateral trade. Accordingly, the economic distance is calculated based on the definition $ED_{ij} = ED_{ji} = BTL_{ij} \cdot Dist_{ij} = BTL_{ji} \cdot Dist_{ji}$.

[Table 2 about here]

[Table 3 about here]

Table 2 and Table 3 show the symmetric *BTR* index and "economic distance" between major Asia-Pacific economies. As expected, *BTR* index could either "prolong" or "shorten" the geographic distance between countries. Since *BTR* index measures the *de facto* bilateral trade relations in relative terms, the comparison of countries' bilateral trade relations across different pairs of countries would not be affected by the function's specification although it might be systematically affected by the accuracy of the geographic distance[7]. The results shown in Table 2 reaffirm trade orientation of East Asian countries. The generally low value of *BTR* index reflects a rather freer intra-regional trade environment in East Asia in comparison to the world's average level. Taking the fact that there is so far no formal institutional integration in the region, it is also evident of the *de facto* regional integration that is driven by the private sectors. East Asian economies might have strengthened their interdependence via intensive intra-regional trade facing the global competition.

Table 3 shows the observed economic distance between each country taking into account both natural and political factors. In combination of Table 2 and Table 3, one could have four key observations. First, the six major ASEAN member states—Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam are not only geographically, but also economically close to each other. In addition to the short geographic distance that facilitates their bilateral trade, the political interests of economic integration might also have shown the influences on tightening their economic connections via the cross-border exchanges of commodity and services.

Second, the observed economic distance between China and Korea is just about 1/5 of either that between Japan and China or that between Japan and Korea. The bilateral trade

[7] The estimate of *BTR* might be lower (or higher) than its real value when the geographic distance used is over (or under) estimated. Generally speaking, it might be less accurate for those countries with big geographic size than for small countries. For instance, in reality most of the exports from China to Malaysia should be shipped out from GuangZhou harbor, which is much closer to Malaysia than that of its capital. However, in this dataset, the distance between Beijing (the capital of China) and Kuala Lumpur (the capital of Malaysia) was still used to proxy the transportation between the two countries. The artificial magnification of the transportation distance leads to an estimator of *BTR* index that is under-estimated.

between China and Korea has been going rapidly since 1990s. China has overtaken the U.S and Japan to be the biggest trading partner of Korea while 15years before, China was just the seventh biggest export market of Korea. Besides the fast growth of both countries' economic sizes, the facilitation of bilateral trade seems to be one of the significant factors in explaining such an expansion of bilateral trade.

Third, trade costs between China and the main ASEAN countries seem to be quite low generally. In history, the main economies in ASEAN have played significant roles in the start-up phase of the development of Chinese economy. There were a large number of Chinese that immigrated into Indonesia, Malaysia (Singapore) and Philippines in the late 1800s and early 1900s. These people and their offspring are often called "*Nanyang Huaqiao*" ("overseas Chinese in Southeast Asia"). Based on the statistics as compiled by the Overseas Chinese Affairs Commission of the Republic of China, there are in total about 40 million Overseas Chinese worldwide. Sixty percent of them are living in ASEAN countries: Indonesia (19%), Thailand (18%), Malaysia (16%), Singapore (7%) and Philippines (3%)[8]. Though Overseas Chinese is still minority population in most of these countries (except in Singapore), their economic influences are quite significant in the local economies. It is generally believed that Overseas Chinese are the bridges between China and most of Southeast Asian countries. Indeed the majority of foreign investments came from Overseas Chinese in Southeast Asia in the first 10-15 years after China implemented its "open door" policy in 1979. It would be quite reasonable to say Overseas Chinese have played some fundamental roles in strengthening connection between China and most of ASEAN countries.

Albeit the value of *BTR* index between Japan and its partners is on average higher in comparison to that between other East Asian countries, it is generally[9] less than one, meaning Japan still applies "trade-promoting" rather than "trade-resisting" policy to its neighbor

[8] The percentages in the brackets represent the share of the total population of Overseas Chinese in the world.
[9] It is except that with New Zealand and that with Vietnams.

countries in Asia. Even though it seems that trade cost with Japan is relatively high, Japan is undoubtedly one of the most important trading partners to most East Asian economies. The gravity equation shows that international trade is not only determined by trade cost but also the participants' economic sizes. As the biggest economy in the region, the GDP of Japan is still about four times of that of China, the second biggest country. To some extent, one might image the "mega-size" of Japanese market could compensate its relatively closed economy and thus the relatively "long" economic distance between Japan and other Asian countries.

4.3 The relative market importance

Besides the comparison of the bilateral trade relations and the economic distance between East Asian economies, one might also need to evaluate the relative market interdependence when filtering the individual "hub" candidate(s) from the economic perspective. One may set up two criteria of the "hub" candidate(s): first, its market size is big enough; second, it is open enough to allow other countries to access to its market. To some extent, these two conditions are allowed to compensate with each other. In practice, Baldwin (2003a) applies the HM index ("index of Hubness-Measure") to describe the "*East Asian bicycle*", of which Japan plays as the hub of the bigger wheel while China is the center of the smaller wheel. The formula to calculate this index is:

$$HM_B = X_{AB} \cdot (1\text{-}M_{BA}) \qquad (12)$$

where HM_B measures the 'hub-ness' of country B to country A. X_{AB} denotes the exports from A to B as a share of country A's total exports; M_{BA} denotes country B's imports from A as a share of its total imports. The value of HM ranges from zero to one, of which the closer the value to one, the deeper the relative dependence of country A's exports on country B's market.

[Table 4 about here]

In Table 4, the number in the bracket ranks the importance of the markets. The number "1" means the most important market to the country, the number "2" means the second most

important market; while the number "9" means the most "ignorable" market. For instance, the *HM* index of China to Japan is 7.68 percent; the number "1" between the brackets indicates that to Japan, Chinese market is generally more important than that of any other East Asian economies; while from China's standing point, the *HM* index of Japan is 12.72 percent, meaning Japan is also the most important market to China within the region. For each individual country, the "overall rank" is calculated by simply summing up their ranks in each row. The country with the lowest value of "overall rank" will be concluded as the most important market in the region. In this case, Japan and China are the two most markets in the regional to most of Asia-Pacific countries.

4.4 Japan and China as the two individual "hub" candidates

Based on the both *HM* index and *BTR* index, the first argument of this paper is that Japan could be an individual "hub" candidate in Asian regionalism. It might not be rational for other Asian economies to be alleviated from Japanese market, which is so big in either the absolute term or the relative term even though the values of *BTR* indexes hint that the negotiation with Japan might not be as easy as that with some other more open economies (Singapore for instance). In other words, the benefits from accessing the Japanese market may drive other countries to input more resources into the free trade negotiation with Japan. However, unlike the U.S. in North America, Japan is not yet the overwhelmingly dominant economy in the region from the aspect of market independence. The U.S. and EU are very important external markets to East Asian countries. Economically they might be able to affect the process of East Asian regionalism to some degree despite that their roles in East Asia are far less significant than that in the western hemisphere (Baldwin, 2005). Fujita (2005) points out that East Asia seems to be a multi-cored economy from the dimension of economic geography. Although Japan is still the most important market in the region for most of its Asian neighbors, it faces challenges from China, who has grown so fast to compete for the

leadership of the regional economy. Moreover, China seems to have made much more progress in regional trade liberalization than Japan since its entry to WTO. It might be quite questionable that Japan could keep its position without actively participating in the process of regional integration.

[Table 5 about here]

Second, China might be a second "hub" candidate in the region. In relative terms, China is already the most important market in Asia for the other two big economies, Japan (the world's second biggest economy) and Korea (the world's eleventh biggest economy). In particular, China provides a most important market for the exports from Korea, meaning that Korea might give China more weight than Japan (or at least as much as that Japan has) when considering to liberalize bilateral trade relations. Furthermore, in addition to its close relation with ASEAN as that *BTR* index shows, *HM* index illustrates the high degree of ASEAN countries' reliance on Chinese market, especially Singapore and Malaysia.

Third, the role of ASEAN may be outstanding when considered as a *de facto* sub-regional integrated economic unity. From Korea's standing point, the whole market of ASEAN is slightly more important than that of Japan; while on the side of Japan, the market of ASEAN is indeed far more weighed than that of Korea. In comparison to the minor position in the case that they play individually, it might be more beneficial for ASEAN members to move synchronically as a group when liberalizing trade relations with other countries. Furthermore, the indicators suggest Singapore and Malaysia to be a "united" sub-regional hub within ASEAN: Singapore has a very open economy, the free trade policy and advanced trade infrastructure ensures its position as one of the major hubs of ocean transportation. Malaysia and Singapore and Malaysia are geographically close to each other. They have long historical connections (as Singapore used to be part of Malaysia before

WWII). Malaysia plus Singapore will give them a total GDP that is larger than Indonesia, the biggest economy in ASEAN.

Forth, on the level of aggregate trade, the two Oceania countries are closely related to East Asian economies especially Japan. About 20 percent of exports from Australia go to Japan, which is double the overall flow to the US and 50 percent more than the total exports to the EU. For both of them, Japan may be the first country in East Asia they consider about when liberalizing trade bilaterally.

4.5 The "economic map" of East Asian regionalism

To sum up, one can image an "economic map" of the market-led integration in East Asia where Japan may stay in the center of the regional trading bloc in terms of the market importance and the economic distance; Singapore plus Malaysia might play as the hub connecting all the other ASEAN members. Figure 1 shows that Japan holds a vital position in Asian regional trading bloc. Even though China is catching up as the second biggest market in the region, it seems that Japan is undoubtedly the biggest open market in the region and in consequence, one of the greatest exports destinations to most of the Asian countries.

[Figure 1 about here]

4.6 The fundamental arrangement(s) of East Asian regionalism

Generally speaking, there is so far not a single FTA or FTA under negotiation seems to have grasped the 'universal gravitation' to all the countries in the region. The 'wild fire' of Asian regionalism may refer to a situation where countries are running out to initialize their own FTA, but no one is willing to join those agreements set up by others. It is well understood that ASEAN members are relatively too small in economic size individually. It may be better for them to move together to negotiate free trade with other countries. They still

need to seek either China or Japan as their initial ally in order to generate a united market large enough to persuade other countries to join the agreement.

China seemed to have moved from a passive participant in regionalism to an active promoter of regional trade liberalization after its entry to WTO. China signed a FTA with ASEAN in late 2004 (CAFTA), which is supposed to create the most populous FTA in the world – with over 1.7 billion consumers and a total GDP of nearly 2 trillion US dollars. Compared to the progress of Japan-Korea free trade negotiation, the negotiation between China and ASEAN started later but reached the agreement earlier. This may make the Japanese government feel under pressure to participate into the process of regional trade liberalization. Indeed Japan accelerated a series of FTA negotiations with individual ASEAN members when CAFTA was publicly announced. It has signed agreements (or has started formal negotiations) with main ASEAN members (Philippines, Malaysia, Thailand and Indonesia). In the context, all these FTA or FTA under negotiations will be loosely called the Japan-ASEAN FTA (JAFTA) for the simplicity.

In principle, it seems either the CAFTA or the JAFTA seems to be capable of giving birth to a market that is big enough to marginalize the economies outside the arrangement. Though it might still be difficult to predict which one of the arrangements would be more appealing, the fact that the former is already in its position, plus Korea's *de facto* trade reliance on China, may persuade more weigh to be put on CAFTA. The substantive provisions of the China-ASEAN FTA will implement zero tariffs on bilateral trade in ten years. As one can witness, Japan, Korea, Australia and New Zealand are now talking to either China or/and ASEAN for an FTA. The rationale behind the scene is that once there is a dominant market generated by FTA in the region, the risk to be an "outsider" would be more and more costly along with the progress of regional trade liberalization.

From the perspective of Japan, the CAFTA seems to be last FTA that it would like to see. The complementarities of Japan and China are rather apparent; the former is capital abundant, labor expensive but resource scare; while the latter has the largest population and the third largest territory in the world. Historically, Japan might have "enjoyed" treating China as one of its "production bases" in East Asia. As Japan is shifting its economy to high value-added, service-focused industry, it outsources more and more fragmented manufacturing processes to China. One of the typical routines is that it exports high-tech intensive or capital-intensive parts and components to China, and finishes those labor-intensive procedures there. The cheap labor cost in China may guarantee the competitiveness of Japanese products in the global market. Japan has been China's biggest trade partner for ten years while China is currently Japan's biggest partner as well. An FTA between China and some other nations would probably pose negative impacts on Japan's exports either via the direct trade diversification effect or by weakening its competitiveness because China will not only import more final goods from those countries having FTA with it but also buy more intermediate goods from those preferential partners.

However, Japan may receive supports from the two Oceania economies -Australia and New Zealand, who are strongly Asia-oriented and depend on East Asian markets deeply. Being excluded from East Asian regional integration may cost them much. In comparison with the other participants, Australia and New Zealand are at an inferior position geographically but they try to compensate this disadvantage by unilaterally lowering trade barriers. It has been for a long time that Japan provides them the biggest market in East Asia. To either of them, a joint deal with Japan may be an ideal choice to engage more deeply into Asian regional integration.

Similarly, Korea will not be happy to see an FTA between China and another nation party without its participation, typically CAFTA. As seen above, Korea's export industries

depend on the Chinese economy (19.5 percent) much more deeply than on the Japanese market (8.8 percent). China is currently the largest market for Korea while ASEAN is the fifth. The implementation of the CAFTA will generate the world's most populous market. The preferential treatment between China and ASEAN would very likely diversify Korea's original exports to either of the markets. More seriously, effects of market agglomeration will not only force more industries to relocate in China-ASEAN free trade zone but also diversify foreign investments away from Korea. In order to avoid these negative effects, Seoul might choose either to join the agreement early or to contend with it by initiating, for instance, its own FTA with Japan.

After concluding an agreement with China in 2004, ASEAN seems to be a focus of East Asian regionalism as Japan, Korea, Australia, and New Zealand rush in for an FTA. By early 2005, all of them announced that they were going to open free trade negotiations with ASEAN. (*Asia Monthly*, 2004) In order to play a role as a real nucleus of Asian regionalism, ASEAN must first of all realize a single market or at least a highly integrated market among its ten member nations. The integration is not easily achievable, however, due to the wide difference in economic development among its members.

5. Concluding remarks

This paper explores a new approach to evaluate the de facto trade liberalization in quantitative by producing the *BTR* index. In combination with the *HM* index that measures the relative market importance, the calculation of the *BTR* index and the "economic distance" makes it possible to quantitatively compare the *de facto* bilateral trade relation between East Asian countries in relative terms. It opens another door to monitor the progress of economic integration from the aspect of international trade in an intuitive way.

Applying the *BTR* index into the study on East Asian regionalism, the study from the economic perspective suggests Japan and China to be the two individual "hub" candidates

who may play determinant role in the regional integration – any fundamental arrangement of East Asian regionalism should involve at least one of them. Currently, CAFTA seems to be an agreement that may trigger domino effects of regionalism in East Asia. Once it is fully implemented, it would be very difficult for the others such as Japan and Korea to keep away from that arrangement. The fear of being fall into the "spoke trap" may drive other nations to be more active in trade liberalization, which could effectively spur regional integration in East Asia. From this prospective, CAFTA might be a milestone of East Asian regional integration.

Table 1: Estimations of the de facto intra-regional trade bias in East Asia

	OLS					PML				
_constant	-21.22 (0.377) ***	-20.60 (0.382) ***	-20.15 (0.375) ***	-21.14 (0.377) ***	-19.40 (0.382) ***	-16.31 (04) ***	-15.76 (28) ***	-15.38 (0.96) ***	-16.19 (12) ***	-15.23 (05) ***
GDP importer	0.88 (0.011) ***	0.86 (0.011) ***	0.98 (0.011) ***	0.88 (0.011) ***	0.87 (0.011) ***	0.82 (0.034) ***	0.80 (0.042) ***	0.81 (0.034) ***	0.79 (0.033) ***	0.79 (0.040) ***
GDP exporter	1.02 (0.011) ***	1.02 (0.011) ***	0.98 (0.011) ***	1.02 (0.011) ***	0.98 (0.011) ***	0.84 (0.032) ***	0.83 (0.033) ***	0.79 (0.030) ***	0.81 (0.041) ***	0.79 (0.031) ***
GDP per Capita importer	0.03 (0.016) *	0.04 (0.016) **	0.02 (0.015) **	0.03 (0.015) *	0.03 (0.015) **	0.03 (0.034)	0.06 (0.038) *	0.05 (0.035) *	0.08 (0.041) *	0.08 (0.042) *
GDP per Capita exporter	0.02 (0.015)	0.02 (0.015)	0.06 (0.015) ***	0.03 (0.015) *	0.06 (0.015) ***	-0.12 (0.055) *	-0.11 (0.055) *	-0.06 (0.045)	-0.07 (0.054)	-0.05 (0.047)
Distance	-1.15 (0.021) ***	-1.18 (0.021) ***	-1.22 (0.021) ***	-1.13 (0.021) ***	-1.26 (0.022) ***	-0.71 (0.034) ***	-0.73 (0.038) ***	-0.75 (0.034) ***	-0.67 (0.034) ***	-0.75 (0.036) ***
DUMMY_East Asian countries as the importers		0.57 (0.063) ***					0.46 (0.148) ***			
DUMMY East Asian countries import from non-East Asian countries					0.66 (0.067) ***					0.31 (0.122) *
DUMMY_East Asian countries as the exporters			1.02 (0.058) ***					0.71 (0.116) ***		
DUMMY East Asian countries export to non-East Asian countries					1.09 (0.062) ***					0.62 (0.131) ***
DUMMY_ East Asian countries trade with each other				1.20 (0.171) ***	1.31 (0.168) ***				0.87 (0.231) ***	0.98 (0.236) ***
R^2	0.69	0.70	0.71	0.70	0.71	0.87	0.87	0.88	0.88	0.88
N	8671	8671	8671	8671	8671	8671	8671	8671	8671	8671

Notes: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
Sources: Data from year 1990 to 2002. The data of GDP and GDP per capita comes from WDI 2004, the data of distance comes from CEP II geography database; the bilateral trade in intermediate goods is from the calculation based on UN COMTRADE database 2004.

Table 2: The BTR matrix for the selected Asian countries

	Korea	China	Australia	New Zealand	Indonesia	Malaysia	Philippines	Singapore	Thailand	VietNam
Japan	0.85	0.45	0.36	1.03	0.34	0.27	0.69	0.29	0.27	2.38
Korea		0.20	0.17	0.50	0.06	0.08	0.14	0.12	0.11	0.17
China			0.14	0.39	0.01	0.05	0.04	0.13	0.04	0.05
Australia				0.34	0.17	0.17	0.24	0.17	0.17	0.68
New Zealand					0.30	0.16	0.22	0.40	0.26	0.56
Indonesia						0.12	0.03	0.27	0.06	0.02
Malaysia							0.05	0.28	0.07	0.11
Philippines								0.23	0.06	0.09
Singapore									0.14	0.15
Thailand										0.15

Source: Author's calculation based on UN COMTRADE database 2004.

Table 3: The estimated economic distance between countries

	Korea	China	Australia	New Zealand	Indonesia	Malaysia	Philippines	Singapore	Thailand	VietNam
Japan	980	938	2770	9836	1975	1435	2032	1520	1239	8651
Korea		188	1443	5126	296	364	372	558	403	461
China			1215	4303	73	215	120	568	133	111
Australia				784	922	1137	1494	1036	1240	5240
New Zealand					2353	1412	1846	3407	2573	5616
Indonesia						135	83	233	127	70
Malaysia							117	88	81	220
Philippines								530	130	149
Singapore									195	325
Thailand										144

Source: Author's calculation based on UN COMTRADE database 2004.

Table 4: HM matrix for the selected Asian countries

	Japan	China	Korea	Indonesia	Malaysia	Philippines	Singapore	Thailand	Australia	New Zealand
Japan		**12.72%**	4.89%	1.04%	2.10%	1.46%	2.89%	2.22%	1.64%	0.28%
		(1)	(2)	(8)	(5)	(7)	(3)	(4)	(6)	(9)
China	**7.68%**		3.16%	0.73%	1.17%	0.75%	1.85%	0.74%	1.14%	0.15%
	(1)		(2)	(8)	(4)	(6)	(3)	(7)	(5)	(9)
Korea	8.77%	**19.45%**		1.86%	1.85%	1.66%	2.49%	1.10%	1.39%	0.19%
	(2)	(1)		(4)	(5)	(6)	(3)	(8)	(7)	(9)
Indonesia	**20.71%**	7.22%	7.14%		3.55%	1.35%	9.35%	1.82%	3.33%	0.26%
	(1)	(3)	(4)		(5)	(8)	(2)	(7)	(6)	(9)
Malaysia	10.67%	10.89%	3.20%	1.86%		1.39%	**13.14%**	3.39%	2.20%	0.34%
	(3)	(2)	(5)	(7)		(8)	(1)	(4)	(6)	(9)
Philippines	**14.51%**	10.36%	3.71%	0.58%	4.47%		6.81%	3.79%	1.00%	0.06%
	(1)	(2)	(6)	(8)	(4)		(3)	(5)	(7)	(9)
Singapore	6.97%	14.06%	3.99%	n.a.	**15.43%**	2.27%		4.03%	2.61%	0.33%
	(3)	(2)	(5)	(9)	(1)	(7)		(4)	(6)	(8)
Thailand	**14.11%**	9.16%	1.83%	1.86%	3.92%	1.69%	7.54%		2.01%	0.27%
	(1)	(2)	(7)	(6)	(4)	(8)	(3)		(5)	(9)
Australia	**18.50%**	9.97%	8.30%	2.51%	1.91%	0.96%	4.12%	1.78%		5.76%
	(1)	(2)	(3)	(6)	(7)	(9)	(5)	(8)		(4)
New Zealand	11.58%	6.72%	4.46%	1.48%	1.92%	1.52%	1.26%	1.21%	**19.83%**	
	(2)	(3)	(4)	(7)	(5)	(6)	(8)	(9)	(1)	
Overall ranking	**15**	**18**	38	63	40	65	31	56	49	75

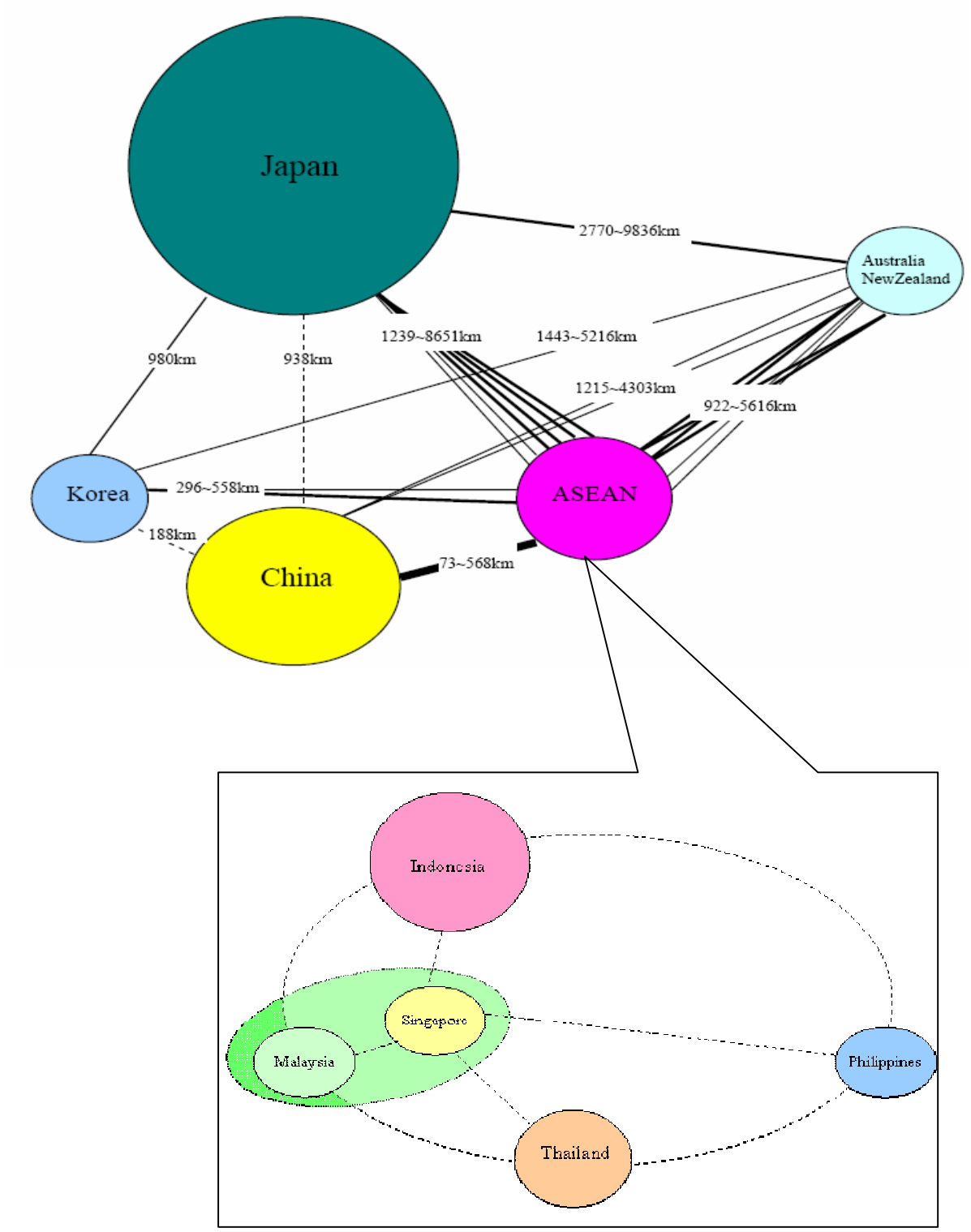
Source: Author's calculation based on UN COMTRADE database 2004.

Table 5: HM index of East Asian economies on the selected markets (%)

	Japan	China	Korea	ASEAN5	USA	EU
(a) aggregate trade						
Japan		12.72	4.89	9.90	**24.58**	13.95
China	7.68		3.16	5.26	**17.84**	13.35
Korea	8.77	**19.45**		9.00	19.41	13.16
Indonesia	**20.71**	7.22	7.14	16.01	13.10	13.78
Malaysia	10.67	10.89	3.20	**21.55**	20.08	12.17
Philippines	14.51	10.36	3.71	15.72	**24.33**	18.01
Thailand	14.11	9.16	1.83	15.37	**19.81**	15.91
Australia	**18.5**	9.97	8.30	11.28	9.67	12.37
New Zealand	11.58	6.72	4.46	7.38	**15.44**	15.00

Source: Author's calculation based on UN COMTRADE database 2004.

Figure 1: The “economic map” of East Asian regional integration



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