The Impact of Trade Integration on FDI Flows: Evidence from EU and ASEAN+3

Dr. Seyed Komail Tayyebi

Department of Economics
University of Isfahan
Isfahan, Iran
komail@econ.ui.ac.ir

Dr. Amir Hortamani

Department of Economics
University of Isfahan,
Isfahan, Iran
amir_hortamani@yahoo.com

Abstract

In recent years, the debate on the trade effects of regionalism experienced a strong revival. While empirical research has mostly focused on the impact of PTA (preferential trade agreements) FTA (free trade area), RTB (regional trade block), aspects of trade integration, on trade flows (Soloaga and Winters, 2001). Only a few efforts, however, examine the importance of joining an integration group (i.e., regionalism) on foreign direct investment flows. As far as trade integration affects impediments to both trade and multinational activity, one should expect an effect on bilateral FDI as well.

This paper will be first concerned with the most important regional trade blocks: European Union (EU) and ASEAN+3, and then will concentrate on the impact of the trade integration agreements (TIA) on the evolvement of FDI flows in these blocks. The purpose, in principle, is to investigate the hypothesis in which to what extent trade integration affects FDI flows in the blocks and how important it works in FDI creation or FDI diversion.

The empirical analysis follows the traditional literature on trade and FDI and is based on a gravity model. Our nested design of integration group and integration phase effects allows isolating the impact of these blocks' integration steps. A panel data method is empirically used to estimate the FDI gravity model employing data on the country members of EU and ASEAN+3 over the period 1992-2003.

***Key words*:** Trade Integration, FDI, Gravity Model, Panel Data, Trade Integration Agreements (TIA)

Résumé

Le débat sur les effets de la régionalisation de l'économie mondiale a connu récemment un regain d'intérêt. Les études empiriques se sont principalement focalisées sur l'impact des accords préférentiels régionaux : la zone de libre-échange, le regroupement commercial régional, les différents aspects de l'intégration économique et les flux commerciaux (Soloaga and Winters, 2001). Seuls quelques travaux se sont intéressés à l'étude des effets de l'intégration régionale sur les flux d'IDE. Dans la mesure où l'intégration commerciale a un effet direct sur les barrières aux échanges et aux activités transnationales, on pourrait s'attendre aussi à un effet sur les IDE bilatéraux.

Cet article s'intéresse tout d'abord à deux principaux accords régionaux que sont l'UE et l'ASEAN+3 avant d'examiner l'impact des accords régionaux commerciaux sur l'essor des flux d'IDE. L'objectif est ici d'évaluer dans quelle mesure l'intégration régionale peut affecter les flux d'IDE dans les régions concernées et de déterminer l'importance des effets de création et de détournement d'IDE.

L'étude empirique s'inspire de la littérature traditionnelle sur le commerce et les IDE et s'effectue dans le cadre d'un modèle de gravité. La prise en compte des effets de groupe et de phase d'intégration nous permet de distinguer l'impact des étapes de l'intégration. La méthode des données de panel est utilisée afin d'estimer une équation gravitationnelle pour les flux IDE, en utilisant les données relatives aux pays membres de l'UE et de l'ASEAN+3 sur la période 1992-2003.

1. Introduction

There is no doubt that foreign direct investment (FDI) is an important aspect of the recent wave of globalization. According to UNCTAD (2001), FDI inflows in the world rose from US$57 billion in 1982 to US$1271 billion in 2000. In the past few decades, the growth rate of world FDI exceeded both the growth rates of world trade and GDP. Although a large portion of world FDI is hosted by developed economies, FDI flowing into developing countries also increased at a rapid pace over the years, rising from an annual average of uS$13.1 billion for 1981–1985 to $240.2 billion in 2000 (UNCTAD, 1994, 2001).

Much of the rise in global FDI can be attributed to economic integration-falling barriers to international investment and trade (Gao, 2005). It has been well documented that communication and transportation costs have been decreasing considerably in the last few decades (see, for example, Dollar, 2001). Tariffs have also been reduced significantly through several rounds of multilateral negotiations under the GATT and trade policy initiatives by individual or integrated groups of countries (Clemens and Williamson, 2002).

Hence, over the last couple of decades, we have seen an increase in the number and depth of trade integration agreements (TIA) around the world. Indeed, the former European Economic Community has evolved into a single market (EU) and has recently adopted a

common currency, while other non-EU European countries have formed free trade areas (FTA) with the EU or are presently considering accession. The number of the block membership has also increased to 25 including East European countries. Likewise, important countries in Southeast Asia (like China, Japan and Korea agreed) have agreed to be integrated to form the ASEAN forming ASEAN+3.

In light of these developments, the role of TIA as a determinant of the location of FDI has become an increasingly relevant issue for emerging economies. This is the subject that we explore in this paper. In particular, we will look at the effects of regional integration on the flows of bilateral FDI in the context of a gravity model, using cross section and time series data from the international sources such as OECD, IMF, EUROSTAT and World Bank. The main questions are that what is the impact of TIA in the EU or ASEAN+3 on the bilateral FDI between members of the two regions? How will the implementation of the ITA create investment in these regions? What are the implications of ITA for the members of the both blocks? In what follows, in Section 2, we will discuss in detail a number of channels through which ITA could affect FDI. Section 3 will discuss further to explore the determinants of the FDI specification in the context of the gravity theory. The sources of data and the method of estimation will be also introduced in this section. The empirical results are analyzed in Section 4, while Section 5 will provide the concluding remarks.

2. Theoretical Discussion: FDI and Trade Integration

As the world economy has become globalized, the simultaneous move towards regionalization has been a striking feature of the past decade. Europe, Asia, and North America, among others, have developed a wide range of institutionalized arrangements to formalize the rising economic integration that has occurred between countries on a regional basis. The link between globalization and the growth of trade integration is foreign direct investment (FDI). FDI represents a major strategic weapon for multinational enterprises (MNEs) in their struggle for the world's appropriable surplus (Buckley, 1994). It is an important reality of the regionalized world economy that firms based outside trade blocs are highly discriminated against.

Regional economic integration (REI) can be therefore a way of increasing discrimination against firms outside the area of integration. Indeed, the literature, largely focused on the European experience, would suggest that MNEs should react differently to the formation of free trade areas (FTA) according to whether they are based in the integrated area (''insiders'') or outside (''outsiders'') (UNTCMD, 1993).

The theory of trade integration expresses that a number of countries make efforts to combine trade liberalization strategies with protective policies, to minimize trade restrictions amongst themselves accompanied by conducting discriminative policies for non-members. After integration, trade transactions followed by a decrease in costs and resource reallocation will result in an increase in products, trade and then economic welfare for members. Economic integration comprises various stages, so that each stage is more complete than pervious ones, where more obstacles are removed respect to former stages, to ease more trade and economic co-operation amongst countries (Gurler,

2000). "Preferential Trade Arrangement" (PTA) is the most primary sort of economic integration, while "economic union" is the most complete version that members follow up the conduction of joint monetary and fiscal policies.
Many studies are found in the literatures that have focused particularly on impacts of trade integration on trade flows and also FDI. Soloaga and Winters (1999), for instance, examine "the second wave of regionalism" that began in early 1990s and led to new PTAs in different blocks. Accordingly, they are concerned with nine PTAs that have been crucially expanded during the last decade. In their research, they compare trade models before and after the regionalization time, namely during 1980-96, to investigate its effect on blocks' trade flows through results of estimating such models.
Buckley, et al. (2003) discuss that the establishment of trading blocs is a way of increasing discrimination against firms outside the area of integration and, crucially, of raising the preference for local production within the integrating area. They examine that regional integration in North America has had impact on the foreign investment strategies of Canadian, European, and Japanese firms. Their results provide support for the theory that regional integration should exert a positive impact on FDI.

In fact, as previously discussed, the impact of economic integration on the FDI flows can be here generally analyzed in the context of theory of customs unions, common markets or economic union as the integrated blocks. There are several theoretical approaches that can be briefly summarized as follows (Halicioglu, 2001):

- The first group approach is based on the *Hechscher-Ohlin theory* and predicts that the increase in external barriers in economic integration will increase income of import-competing industries in the members of that integration, due to the return on capital increases in the integration area relative to foreign countries. Hence an inward FDI is also expected to increase.
- According to the second approach, which is based on the *theory of international production*, inward FDI is a strategic response to the common external tariff of CUs (custom unions) as MNEs substitutes foreign activities for exports. Moreover, MNE will take advantage of the dynamic effects of CUs by utilizing the enlarged market (i.e. economies of scale).
- The last approach is based on the *theory of CUs and the internal market*. The strategic response of MNEs to the creation of CUs gives rise to "investment creation" and "investment diversion" effects. As cited in Yannopoulos (1990), basically investment creation refers to a surge of inward FDI from non-member countries into the CUs and is regarded as the strategic response of MNEs to the trade diversion effects. Investment diversion refers to the shifting of FDI from one member of the CUs to another as a result of the trade creation effect.

However, Yannopoulos (1990) argues that investment creation and investment diversion effects do not capture the full complexity of interrelations between CU formation and FDI and proposed four possible strategic responses of MNEs to the economic integration areas:

(i) *Defensive import-substituting investment* refers to the strategic response of MNEs to the trade diversion effects of CUs. It is argued that MNEs invest in the CU areas to take advantage of the tariff realignment and to maintain its market share.

(ii) *Offensive import-substituting investment* is also a strategic response of MNEs to the formation of CUs in which they might wish to take advantage of market unification (i.e. growing demand) and growth enhancement (i.e. the opening up of new markets).
(iii) *Reorganization investment* takes places as MNEs regroup their production facilities in fewer locations in the CU where more favorable costs are found. It is regarded as a response to the trade creation effects.
(iv) *Rationalized investment* refers to decreases in the production costs in the CUs areas, which make these locations better places for international sourcing by MNEs. This type of investment may not give rise to a net increase in FDI but simply a change in its geographical and/or industrial structure.

3. The Model

3.1 Determinants of FDI

Hood and Young (1987) argued that the key feature of FDI is that it provides the host country with a "package" of knowledge, capital and entrepreneurship''. It may also make a positive contribution to economic growth and development in the host countries. But there are costs as well as benefits associated with inward FDI, such as the repatriation of profits to the parent company, which may cause balance of payments difficulties for the host state or Multinational Economic Enterprises (MNEs), which may use their monopoly power to exploit host country consumers, and so on.

Traditionally, FDI decisions have been examined within the conceptual framework of the Ownership, Location, Internalization model (OLI), introduced by Dunning (1958). This eclectic framework suggests that decisions of firms to engage in direct investment abroad are driven by factors related to cost advantages, market access, and the maintenance of knowledge assets internally (Claudia, et al. 2003). More recently, a new theory of FDI has emerged seeking to incorporate the location advantages of the OLI model into general equilibrium models. In this class of models, multinational corporations (MNCs) arise endogenously. Early approaches seek to explain the presence of MNCs as the result of differences in factor endowments (Helpman, 1984; Helpman and Krugman, 1985). More recently, Brainard (1993) argues that multinational activity is driven not by factor endowment differences, but instead by a trade-off between proximity and concentration advantages. The proximity advantage is derived from firm level economies of scale where any type of knowledge capital activity, such as R&D, is transferable to affiliates, thus allowing MNCs to be closer to foreign markets. The concentration advantage is derived from traditional plant-level economies of scales, which make it more profitable to concentrate production in one location rather than to export.
Generally, theoretical models show that factors such as proximity and market size should make countries attractive locations for FDI. One of the most robust methods for analyzing the importance of these factors using country-level data is the gravity model. While initially employed for empirical studies of trade theory, and indeed derivable from trade theory itself (Deardorff, 1995; Anderson and van Wincoop, 2001; Evenett and Keller, 2002), the gravity model approach has been applied more recently to studies of

FDI as a means of identifying the common determinants of FDI across countries (Bevan and Estrin, 2000; Brenton et al., 1999; Wei and Wu, 2001).
It is argued that characteristics of host countries such as market size, market growth, stage of development, and the presence of local competition will influence decisions to invest abroad. The level of FDI is positively related to the absolute size of a foreign market, which is also regarded as market size hypothesis. Empirical work has generally supported the hypotheses that both host market size and growth variables have significant positive effects on FDI, with the market size hypothesis supported more strongly (Clegg and Green 1999). In the literature, GDP is normally proxied for the variables of economy and market sizes.

Cost differentials between the host and home countries should have some impact on the location of production. In this way, particularly as technology becomes standardized, production may be transferred to the countries especially where the real wage costs are low. A few studies, however, record significance for this variable. Hood and Young (1987) argue that it should be largely related to the different stages of production. Routine production stages will require low labor cost locations but as the production gets sophisticated the types of manpower might differ completely at every stage. Thus, a single measure of labor cost will fail to explain aggregate FDI.

The exchange rate between the home and host countries' currencies is also used to measure the costs of production in respective locations. An appreciation of the investor's home currency against the host country should increase the FDI flows. It is also argued that planned FDI is deferred when the host currency's exchange value is high, and a rise is expected (Clegg and Green 1999).

According to B´enassy-Qu´er´e, et al. (2001), as far as attracting FDI is concerned; both the level and the volatility of the exchange rate have to be taken into account, since they affect FDI, particularly in developing countries. The relationship is, however, ambiguous and depends on the destination of the goods produced. This is because two relationships can theoretically be observed. First, if the investor aims at serving a local market where trade or non-trade barriers are impediments to enter the market, FDI and trade are substitutes, and an appreciation of the local currency in real terms lifts inward FDI, because the purchasing power of consumers is increased and also because barriers to trade usually tend to increase in such a context. Alternatively, if the output from FDI is to be re-exported, trade and FDI are complements; an appreciation of the local currency, because it brings competitiveness down (higher labor and capital costs) and lowers the relative wealth of foreign investors, reduces inward FDI.
Turning to exchange rate volatility, its impact on FDI is ambiguous too. In the line of Dixit and Pindyick (1994), Darby et al. (1999) emphasize the value of the option to wait in a situation of uncertainty and sunk costs. Notwithstanding such an option, exchange-rate volatility affects FDI in various ways. Cushman (1988) advocates that producing in the destination market is a good substitute for exports if there is a strong uncertainty on exchange rates. But this benefit vanishes if the production is partially re-exported. Hence, a foreign firm facing large exchange rate volatility will produce in the local country if it intends to sell on the local market, but refrain from doing so if it intends to re-export. From an empirical point of view, Cushman (1988) finds a positive impact of volatility on outward FDI.

Monetary integration may affect FDI through different channels. First, it reduces uncertainty related to price variables and changes in policies and rules. Uncertainty about future returns should deter partially irreversible investments as there is an 'option value' of waiting (Dixit and Pyndick, 1994). The greater the economic and political uncertainty, the more likely the firm will wait before entering the market.
Finally, a single currency could foster FDI since it makes comparison of international costs and price decisions easier and reduces transaction costs, such as currency conversion costs and in-house costs of maintaining separate foreign currency expertise. Thus, a variable that indicated the price effect of partners on their FDI flows can be included in the model (Cheng, et al., 1998).

3.2 FDI Specification: a Gravity Model

Tinbergen (1962) and Pöyhönen (1963) were the first authors to apply the gravity equation to analyze international trade flows. Since then the gravity model has become a popular instrument in empirical foreign trade analysis. The model has been successfully applied to flows of varying types such as migration, foreign direct investment, and more specifically to international trade flows. According to this model, exports from country i to country j are explained by their economic sizes (GDP or GNP), their populations, direct geographical distances and a set of dummies incorporating some kind of institutional characteristics common to specific flows.
Our empirical strategy is thus based on the gravity model, which has also been recently used in the analysis of FDI location (Eaton and Tamura,1994; Frankel and Wei, 1997; Wei , 2000; Blonigen and Davis, 2000; and Stein and Daude, 2001). In its simplest formulation, it states that bilateral FDI stocks (FDI from country i to country j) depend positively on the product of the GDPs of both economies and negatively on the distance between them. As discussed previously, typical variables added to the gravity specification including a set of economic determinants (such as exchange rate, price effect, market size), as well as dummies indicating whether the two countries share a common border, a common language, past colonial links, etc. In this paper, however, we will use a modified version of the standard gravity model that considers these later variables (distance, borders, common language, or colonial links) are time-invariant pair-specific such, and will be subsumed in country pair fixed effects, in order to isolate the dynamic effects and leave out the cross-sectional variation. Finally, we augment the equation with a number of variables associated with the effects of trade integration agreements (TIA) between members of both ASEAN+3 and EU15 members, as discussed above (Section 2).
To examine the impact of trade integration agreements (TIA) on the FDI flows of the two blocks, ASEAN+3 and EU15, we specify the FDI gravity model in four cases. In the **Case I**, the integration variable in our baseline specification is $TIA_{ASEAN+3}$, a cross impact of a dummy that takes a value of 1 when the source countries belong to the ASEAN+3 and $EX_{i,j}$ that denotes exports from an ASEAN+3 member (country i) to her partner from the EU15 (country j). This case implies the effect of the regional integration in East Asia on the trade flows of both Asian and European sides. The **Case II** refers to the integration variable in the FDI specification which is denoted as TIA_{EU15}, a cross impact of a dummy that takes a value of 1 when the source countries belong to the EU15 and $EX_{i,j}$ that shows exports from an EU member (country i) to her partner from the ASEAN+3 (country j).

This case implies the effect of the regional integration in EU on the trade flows of both blocks. In fact, these two cases can compare and measure the impact of trade integration on FDI flows of both sides[1].

The degree of openness of each country in each of two blocks can implies the degree of trade creation that might be as a result of integration between members of two blocks. Accordingly, the integration variables, TIA_{OPEN1} and TIA_{OPEN2}, are constructed as the ratio of export flows ($EX_{i,j}$) to summation of GDP_i and GDP_j (**Case III**), and then the ratio of import flows ($IM_{i,j}$) to summation of GDP_i and GDP_j (**Case IV**), respectively[2]. As discussed by Liu et al. (2001), the strategies of export promotion and outward orientation conducted by countries through tariff-jumping, international vertical integration, and regional trade liberalization can result in investment creation, and hence affect FDI directly.

Hence, the generalized gravity model of FDI between pairs of countries, FDI_{ij}, is a function of their incomes (*GDPs*), exchange rate (B´enassy-Qu´er´e, et al.,2001), price effect (Cheng, et al., 1998) and a set of trade integration variables (TIA_k, k= ASEAN+3, EU15, OPEN1 and OPEN2):

$$PDF_{ij} = \beta_0 GDP^{\beta 1} i\ GDP^{\beta 2} j\ ER^{\beta 3} i\ PE^{\beta 4} ij\ TIA^{\beta 5} k\ uij \qquad (1)$$

where ER_i denotes the units of the source country per US dollar, and PE_{ij} is the squared difference between the domestic price indexes (*Pd*) of both source and host countries in the both sides of Asia and Europe[3].

For estimation purposes the model given be Equation (1) in log-linear form, which has typically shown the best adjustment to the data in the empirical trade literature using the gravity model, is expressed as,

$$LnFDI_{ij} = \beta_0 + \beta_1 Ln\ GDP_i + \beta_2 Ln\ GDP_j + \beta_3 LnER_i + \beta_4 LnPE_{ij} + \beta_5 LnTIA_k + U_{ij} \qquad (2)$$

where *Ln* denotes variables in natural logs[4].

3.3. Data and method of Estimation (gravity model in Japan)

To estimate the FDI models for different mentioned cases, we have collected annual data on bilateral FDI, and bilateral trade flows between members of two blocks: ASEAN+3 and EU15. The Asian part contains the major 10 members of the ASEAN plus other three important East Asian countries: China, South Korea and Japan. The EU consists of 15 main European countries. The data used for all variables have been drawn from various sources, mainly from the websites of the OECD, EUROSTAT, IMF, World Investment Report by UNCTAD, and Country Statistical Information Database of the World Bank. These sources provide data for 28 source countries of the two regions over the period

[1] The two variables can respectively defined as, $TIA_{ASEAN+3} = DUM_A * EX_{ij}$, $DUM_A = 1$ for each member of ASEAN+3 that is a source of FDI, otherwise zero. $TIA_{EU15} = DUM_E * EX_{i,j}$, $DUM_E = 1$ for each member of EU15 that is a source of FDI, otherwise zero.

[2] These variables are also defined as, $TIA_{OPEN1} = EX_{ij} / (GDP_i + GDP_j)$ and $TIA_{OPEN2} = EX_{ij} / (GDP_i + GDP_j)$, respectively.

[3] The relevant variable can be defined as, $PE_{ij} = (Pd_i - Pd_j)^2$.

[4] In principle, $LnITA_{ASEAN+3}$ and $LnITA_{EU15}$ are calculated as, $LnTIA_{ASEAN+3} = DUM_A * LnEX_{ij}$ and $LnTIA_{EU15} = DUM_E * LnEX_{ij}$.

1992-2003. Table (1) introduces briefly the data sources and their relevant website addresses.

Table (1): Data sources and their relevant website addresses

Sources	Website Address
Organization for Economic Co-operation and Development (OECD)	http://cs4hq.oecd.org/oecd/
EUROSTAT	http://epp.eurostat.cec.eu.int/portal/
International Monetary Fund (IMF)	http://dsbb.imf.org/Applications/web/gdds/gddscountrylist/IMF/
World Investment Report by UNCTAD	http://www.unctad.org/Templates/Page.asp/
Country Statistical Information Database of the World Bank	http://www.worldbank.org/data/countrydata/

Source: Compiled by the researchers

Any attempt at estimating the Equation (2), which assumes the intercept ($ß_0$) is homogeneous for each partner pairs, yields biased results. In the following we will demonstrate the fact that the crucial source of the mentioned bias is as a result of failure to apply the Ordinary Least Squares (OLS) method to deal with the heterogeneity among bilateral trade relationships. We will implement this through the F- Leamer test.
Accordingly, one of the solutions to control for heterogeneity is the use of the Panel Data procedure, which allows the intercepts of the gravity equation to be specific to each partner pairs (Cheng and Wall, 1999).
Generally formed the gravity model using in Panel Data is as follows:

$$LnFDI_{ijt} = \alpha_0 + \alpha_t + \alpha_{ij} + ß' W_{ijt} + U_{ijt} \quad t=1, 2, 3, \ldots, T \qquad (3)$$
$$W'_{ijt} = [W_{it}, W_{jt}, \ldots.]$$

where, $LnFDI_{ijt}$ is FDI flows (in logarithm) between country i and country j in year t, and W'_{ijt} is the 1* k row vector of gravity variables ($LnGDP_{it}$, $LnGDP_{jt}$, $LnER_{it}$, etc.). In this model the intercept contains three parts; the first is the same for all years and individuals including country pairs, α_0, and α_t becomes specific to year t and the same to all individuals (that is, a year fixed effect), while α_{ij} refers to specific individuals, but the same to all years,. It is the so-called individual effect (a country pair fixed effect), which is allowed to be different across partner pairs, namely $\alpha_{ij} \neq \alpha_{ji}$. The estimation results obtained by OLS, therefore, show serious problems of biasness due to the restriction that the country pair intercepts terms equal zero (or $\alpha_{ij} = \alpha$). Furthermore, if α_t is used in the

model, Panel Data will convert to "Two Way Panel Data", otherwise we will have "One Way Panel Data" (Baltagi, 1995)[5].

The Panel Data procedure consists of three estimation sets; first, Between Estimates that capture differences between individuals, but ignores any information within them. It is usually used to estimate long-run coefficients (Martinez-Zarzoso and Nowak-Lehmann, 2000). Second, Fixed Effects (FE) estimates that it is assumed the slope of the gravity equation is the same for all partner pairs, but there are specific intercepts for each of them (individual effects) that would be correlated or uncorrelated with explanatory variables (Hsiao, 1986). The third relies on Random Effects (RE) estimates or the Variance Components method in which there exist intercepts (α_{ij}s), affiliating the same distribution function with average α and variance $\sigma^2\alpha$, that are uncorrelated with the explanatory variables. Since individual effects (α_{ij}) are included in the regressions, we have to decide whether they are treated effectively as fixed or random effects. In order to distinguish between the FE and RE method we investigate through the Hausman Test for the null hypothesis that the explanatory variables and individual effects are uncorrelated. The fixed effects estimates are consistent with both the null and alternative hypotheses, whereas the random effects estimates are only compatible with the null hypothesis. Therefore, the RE method is preferred if the null hypothesis holds, otherwise the FE method will be applicable.

4. Basic Results

The gravity model, as specified in Equation 3, is estimated by use of Panel Data, containing totally 2304 observations on both 192 cross-section individuals of ASEAN+3 and EU+15 (country-pair fixed effects) and the time period of 1992-2003. Since we use a standard double log specification, there is, however, a problem in taking logs of the FDI variable. There are a number of observations where FDI values are zero, which would be dropped by taking logs. Some authors (for example, Rose, 2000) simply leave out the observations that the dependent variable takes a value of zero, for which the log does not exist. A problem with this approach is that those observations do in fact convey important information for the problem at hand, particularly if they tend to be associated with pairs of countries that do not belong to the same ITA. For this reason, and given the importance of zero observations in the sample, this strategy could lead to a serious estimation bias (Yeyati, et al., 2003). A simple transformation to deal with the problem of zeroes is to work with log (1 + *FDI*), instead of the log of *FDI*. When the values of the dependent variable tend to be large, the value of log (1 + *FDI*) is approximately equal to log (*FDI*). Hence, the finalized specification is as follows:

$$Ln(1+FDI_{ijt}) = \alpha_0 + \alpha_t + \alpha_{ij} + \beta_1 Ln\ GDP_{it} + \beta_2 Ln\ GDP_{jt} + \beta_3 LnER_{it} + \beta_4 LnPE_{tjt} + \beta_5 LnTIA_{kt} + U_{ijt} \quad (4)$$

The estimation results for the aforementioned cases (with the application of four integration variables to the gravity model) are summarized in Tables (A-1), (A-2), (A-3)

[5] Under the method of Two Way Panel Data, α_t is present in the regression model that stands for the time effect, whereas it is not included in a regression estimated by the One Way Panel Data method (Baltagi 1995).

and (A-4) shown in the Appendix. The results obtained are based upon methods of pooling data (OLS), mean estimates of Between Group (BG), Fixed Effects (FE) and Random Effects (RE).
As the values of the F-test in all cases show, by the comparison with the relevant critical values (F_{Leamer}), the null hypothesis of the same individual effects cannot be accepted. This implies that the OLS results are biased and, more specifically, there exists heterogeneity for each country-pair of partners. This means that the problem of heterogeneity should be controlled through concentrating on different individuals effects.
The comparison of estimation results reveals that FE and RE are more reliable rather than OLS and BG. The main reason is that the former ones detect the existence of heterogeneity in individuals (countries). The estimation results arising from the FE and RE procedures are shown in the third and forth columns of the tables. In addition, the Hausman statistic indicates that the FE results are more reliable than those obtained by RE.
The estimation results obtained by FE (within group) indicates that the GDP coefficients of both source and host countries have positive signs, and, as expected, are statistically significant at the 95 percent confidence level. Estimates for these GDP coefficients are in a range of about 0.87 to about 1.14 percent. It implies that economic conditions of each member in the both blocks play a major role in promoting foreign investment flows.
The real exchange rate has statistically a significant and negative effect on FDI (in all cases). Estimates for the relevant coefficients are in a range of about 0.065 to about 0.103 percent. Although quite inelastic, the results show any depreciation in the currency of a source country either in ASEAN+3 or in EU can decrease FDI flows. However, if the real exchange rate falls, the source country becomes encouraged to promote the outflows of the FDI. On the other hand, considering the price effect, it seems that none of the estimation has produced a significant result for it in all cases. It reveals the fact that price differences between countries cannot motivate a significant inflows or outflows of FDI within or between the two regions. As indicated, effects of exchange rate pass-through on FDI are more pronounced.

4.1 Integration Impact

Table (2) reports impacts of the conducted trade integration on FDI flows between ASEAN+3 and EU. According to the four cases explained previously, with the exception of **Case II**, the integration variable has statistically a significant and anticipated effect on the FDI flows between two blocks. These results obtained by the FE method through using Panel Data. It appears that the EU15 and ASEAN+3 respond positively to the integration process in order to they can create investment causing again trade expansion between them.
In **Case I**, the integration variable stands for the cross effect of a dummy for the regional integration in ASEAN+3 and trade flows between all countries of two Asian and European blocks. It affects positively and significantly FDI flows by about 0.60 percent.
The result implies that integration in the Asian block can create investment flows between two blocks. However, the hypothesis is rejected concerning **Case II**, in which the coefficient of the integration variable is not statistically significant. It reveals that

Table (2): Impacts of trade integration on FDI flows between ASEAN+3 and EU

Case	*Integration Variable**	*Coefficient Estimates***	*Result Implication*
Case I	$TIA_{ASEAN+3}$	0.591 (6.79)	Investment Creation
Case II	TIA_{EU15}	-0.088 (-0.83)	-
Case III	TIA_{OPEN1}	0.373 (5.43)	Investment Creation
Case IV	TIA_{OPEN2}	0.233 (3.42)	Investment Creation

* Logs of variables have been used in estimation.
**Values of t-ratio are represented in parentheses.

trade integration between 15 major members of the EU cannot solely create investment between two blocks. If any trade integration agreements rely upon the export promotion or outward orientation strategies of all members, the investment flows will increase significantly, while conducting the policy of export promotion by all countries in two regions (**Case III**) is more pronounced than the import liberalization (**Case VI**).

5. Concluding Remarks

This paper has attempted to empirically identify and explain the determinants of the FDI inflows between all members of the two important regional integrating blocks in the world, ASEAN+3 and EU15, for the period 1992-2003. The hypothesis suggested in this study of trade integration impact on the FDI was tested for two regions by a specifying a panel gravity model. We found that regional integration in East Asia can have a significant effect on foreign direct investment implying investment creation in both blocks. On average, membership in ASEAN+3 with an increase of one percent in the bilateral trade flows can increase the FDI flows between two blocks by about 0.60 percent, the most effective integration process among all four cases discussed by this paper. The deepening of trade integration by the expansion of export market within the two blocks, or by trade liberalization between Asian and European countries can significantly lead to investment creation.

Moreover, these results are in line with the insights provided by the related theoretical literature in which the impact of a rise in bilateral trade due to the launch of a TIA (trade integration agreement) on FDI is a positive function of the openness degree of a country. This suggests, for example, that a move towards the TIA of the Asian nations would considerably bolster North-South FDI flows to particularly some low income countries in ASEAN (like Lao, Cambodia, Brunei, …), given the difference in relative endowments and the benefit to reduce trade barriers in many countries in the region.

References

- Anderson, J. E. and E. van Wincoop (2001), Gravity with Gravitas: A Solution to the Border Puzzle, NBER, Working Paper No. 8079, National Bureau of Economic Research, Cambridge, MA.
- B´enassy-Qu´er´e, A., L. Fontagn´e, and A. Lahr`eche-R´evil (2001), "Exchange-Rate Strategies in the Competition for Attracting Foreign Direct Investment" *Journal of the Japanese and International Economies*, Vol. 15, pp.178–198.
- Baltagi, B. H. (1995), Econometric Analysis of Panel Data, John Wiley & Sons Ltd., New York.
- Baltagi, B. H. (2001), Econometric Analysis of Panel Data, Wiley, New York.
- Bevan, A. A. and S. Estrin (2000), The Determinants of Foreign Direct Investment in Transition Economies, CEPR Discussion Paper 2638, Centre for Economic Policy Research, London.
- Blomstrfm, M., R. Lipsey and M. Zejan (1994), What Explains Developing Country Growth?, in Baumol, W., Nelson, R., Wolff, E. (Eds.), Convergence and Productivity: Cross-National Studies and Historical Evidence. Oxford, University Press, Oxford.
- Blonigen, B., and R. Davis (2000), "The Effects of Bilateral Tax Treaties on U.S. FDI Activity." NBER Working Paper 7929, Cambridge, United States: National Bureau of Economic Research.
- Borensztein, E., J. De Gregorio and J.-W. Lee (1998), "How Does Foreign Direct Investment Affect Economic Growth?" *Journal of International Economics*, Vol. 45, No. 1, pp. 115–135.
- Brainard, S. L. (1993), A Simple Theory of Multinational Corporations and Trade with a Trade-off between Proximity and Concentration, NBER Working Paper No. 4269, National Bureau of Economic Research, Cambridge, MA.
- Brenton, P., L. Di Mauro, L .Francesca and M. Lucke (1999), "Economic Integration and FDI: An Empirical Analysis of Foreign Investment in the EU and in Central and Eastern Europe", *Empirica*, Vol. 26, No. 2, pp. 92–121.
- Buckley P. J, C. L. Pass, and K. Prescott (1994), Canada–UK Bilateral Trade and Investment Relations, London, Macmillan.
- Buckley, P. J., C. Jeremy, F. Nicolas and T. R. Kevin (2003), "Evolution of FDI in the United States in the Context of Trade Liberalization and Regionalization", *Journal of Business Research*, Vol. 56, pp. 853– 857.
- Chakrabati, A. (2001), "The Determinants of Foreign Direct Investment: Sensitivity Analyses of Cross-Country Regressions, Kyklos, Vol. 54, No. 1, pp. 89– 114.
- Cheng, I. H. and H. J., Wall (1999), "Controlling for Heterogeneity in Gravity Models of Trade", Federal Reserve Bank of St. Louis, pp.1-29.
- Cheng, L. T. W., J. K.W. Fungc, and K. Lam (1998), "An Examination of the Determinants of Stock Price Effects of US–Chinese Joint Venture Announcements", *International Business Review*, Vol. 7, pp. 151–161.
- Clegg, J. and Green, S.S. (1999), "The Determinants of New FDI Capital Flows into the EC: Statistical Comparison of USA and Japan", *Journal of Common Market Studies*, Vol. 37, pp. 597-616.

- Clemens, M. and J. Williamson (2002), Why Did the Tariff-Growth Correlation Reverse after 1950? NBER, Working Paper No. 9181.
- Cushman, D. O. (1988), "Exchange-Rate Uncertainty and Foreign Direct Investment in the United States", *Weltwirtschaftliches Archiv,* Vol. 124, pp. 322–336.
- Darby, J., A. H. Hughes Hallett, J. Ireland, and L. Piscitelli (1999), "The Impact of Exchange Rate Uncertainty on the Level of Investment", *Economic Journal,* Vol**.** 105, pp. 55–67.
- Deardorff, A. V. (1995), Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?, NBER Working Paper, No. 5377, National Bureau of Economic Research, Cambridge, MA.
- Dixit, A., and R. Pindyck, (1994), Investment under Uncertainty, Princeton University Press, Princeton, USA.
- Dollar, D. (2001), Globalization, Inequality, and Poverty since 1980, Development Research, Group Working Paper, World Bank.
- Dunning, J. (1958), American Investment in British Manufacturing Industry, George Allen and Unwin, London.
- Eaton, J., and A. Tamura (1994), "Bilateralism and Regionalism in Japanese and U.S. Trade and Direct Foreign Investment Patterns", *Journal of the Japanese and International Economies,* Vol. 8, pp. 478-510.
- Evenett, S. J. and W. Keller (2002), "On Theories Explaining the Success of the Gravity Equation", *Journal of Political Economy*, Vol. 110, No. 2, pp. 281–316.
- Frankel, J., and S. Wei. (1997), "Regionalization of World Trade and Currencies: Economics and Politics." In: J. Frankel, editor. *The Regionalization of the World Economy*, Chicago, United States: University of Chicago Press.
- Gao, T. (2005), "Foreign Direct Investment and Growth under Economic Integration", *Journal of International Economics*, Vol. 67, pp. 157–174.
- Grossman, G. and E. Helpman (1991), Innovation and Growth in the Global Economy, MIT Press, Cambridge.
- Halicioglu, F. (2001), An Econometric Analysis of Foreign Direct Investments Flows into Turkey from the Major Global Regions", paper presented at International Conference in Economics V, Economic Research Center, Middle East Technical University, Ankara, September 2001.
- Helpman, E. (1984), "A Simple Theory of International Trade with Multinational Corporations", Journal of Political Economy, Vol. 92, No. 3, pp. 451–471.
- Helpman, E. and P. Krugman (1985), Market Structure and Foreign Trade, MIT Press, Cambridge.
- Hood, N. and Young, S. (1987) *The Economics of Multinational Enterprise*, seventh impression, Longman Group UK Limited, Essex.
- Hood, N. and Young, S. (1987), The Economics of Multinational Enterprise, Seventh impression, Longman Group UK Limited, Essex.
- Hsiao, C. (1986), Analysis of Panel Data, New York, Cambridge University Press.
- Krugman, P., A. Venables (1995), "Globalization and the Inequality of Nations", *Quarterly Journal of Economics*, No. 4, pp. 857– 880.
- Lipsey, R. (2000), Interpreting Developed Countries' Foreign Direct Investment, NBER, Working Paper, No. 7810.

- Liu, X., C. Wang, and Y. Wei (2001), "Causal Links between Foreign Direct Investment and Trade in China", *China Economic Review*, Vol. 12, pp. 190–202.
- Martinez-Zarzoso, I. and F. Nowak-Lehmann (2001), at: http:\\ www.gwdg.De/~uwia/ pdf /iai-bb77.pdf, pp.1-23.
- Poyhonen, P. (1963), "A Tentative Model for the Volume of Trade between Countries", *Weltwirtschaftliches Archiv*, Vol. 90, pp.93-99.
- Rose, A. (2000), "One Money, One Market: The Effect of Common Currencies on Trade." *Economic Policy*, Vol. 14, Vol. 30, pp. 7-46.
- Stein, E., and C. Daude, (2001), "Institutions, Integration, and the Location of Foreign Direct Investment." Washington, DC, United States: Inter-American Development Bank, Research Department.

- Tinbergen, J. (1962), Shaping the World Economy, Suggestions for an International Economic Policy, New York.
-United Nations Transnational Corporations and Management Division, UNTCMD, (1993), from the common market to EC 92: regional economic integration in the European community and transnational corporations, New York: United Nations, Department of Economic and Social Development.
- UNCTAD (1994), World Investment Report: Transnational Corporations, Employment and the Workplace, United Nations.
- UNCTAD (1998), World Investment Report: Trends and Determinants, United Nations.
- UNCTAD (2001), World Investment Report: Promoting Linkages, United Nations.
- Wei, S. J. and Y. Wu (2001), Negative Alchemy? Corruption, Composition of Capital Flows, and Currency, Crises, NBER Working Paper, No. 8187, National Bureau of Economic Research, Cambridge, MA.
- Wei, S-J (2000), "How Taxing is Corruption to International Investors?", Review *of Economics and Statistics,* Vol. 82 No. 1, pp. 1-11.

- Yannopoulos, G. N. (1990), "Foreign Direct Investment and European Integration: the Evidence from the formative Years of the European Community", *Journal of Common Market Studies*, Vol. 28, pp. 235-259.

- Yeyati, E. L., E. Stein and C. Daude (2003), Regional Integration and the Location of FDI, Inter-American Development Bank, Banco Interamericano de Desarrollo (BID), Research Department, Working Paper No. 492.

Appendix

Table (A-1): Estimation Results for the Gravity Model of FDI (Case I)*

Explanatory Variables	*Pooling Data*	*Between Estimates*	*FE Estimates*	*RE Estimates*
Constant	-19.621 (-20.28)	-19.175 (-7.46)	-	-24.880 (-11.26)
$LnGDP_{it}$	0.269 (10.42)	0.257 (3.8)	0.836 (5.25)	0.401 (6.55)
$LnGDP_{jt}$	0.531 (20.29)	0.531 (7.66)	0.708 (4.53)	0.585 (9.53)
$LnTIA_{ASEAN+3}$	0.026 (4.66)	0.021 (1.41)	0.591 (6.79)	0.046 (3.44)
$LnER_{it}$	-0.187 (-12.91)	-0.214 (-4.55)	-0.065 (-3.43)	-0.126 (-7.54)
$LnPE_{ijt}$	-0.021 (-1.63)	-0.033 (-0.65)	-0.787 (-0.06)	-0.204 (-0.16)
$\overline{R^2}$	0.260	0.364	0.647	0.604
Number of Observations	2304	192	2304	2304
F-statistic	14.205 (p=0.000)* [Critical F value for diffuse prior (Leamer) = 9.9280]			
Hausman - statistic	76.253 (p=0.000)*			

- Values of t-ratio are represented in parentheses. Also the probability of null hypothesis acceptance for F-statistic and Hausman statistic is available in parentheses.

Table (A-2): Estimation Results for the Gravity Model of FDI (Case II)*

Explanatory Variables	*Pooling Data*	*Between Estimates*	*FE Estimates*	*RE Estimates*
Constant	-20.116 (-20.78)	-19.628 (-7.66)	-	-25.492 (-11.50)
$LnGDP_{it}$	0.282 (10.84)	0.268 (3.94)	1.05 (6.66)	0.419 (6.80)
$LnGDP_{jt}$	0.548 (21.10)	0.547 (7.98)	0.832 (4.42)	0.610 (9.96)
$LnTIA_{EU15}$	-0.014 (-2.56)	-0.010 (-0.67)	-0.088 (-0.83)	-0.025 (-1.84)
$LnER_{it}$	-0.200 (-14.02)	-0.231 (-4.99)	-0.096 (-5.20)	-0.133 (-7.99)
$LnPE_{ijt}$	-0.020 (-1.53)	-0.028 (-0.55)	0.589 (0.464)	-0.197 (-0.16)
R^2	0.256	0.359	0.639	0.602
Number of Observations	2304	192	2304	2304
F-statistic	13.834 (p=0.000), [Critical F value for diffuse prior (Leamer) = 9.9280]			
Hausman – statistic	37.208 (p=0.000)			

- Values of t-ratio are represented in parentheses. Also the probability of null hypothesis acceptance for F-statistic and Hausman statistic is available in parentheses.

Table (A-3): Estimation Results for the Gravity Model of FDI (Case III)*

Explanatory Variables	*Pooling Data*	*Between Estimates*	*FE Estimates*	*RE Estimates*
Constant	-12.171 (-10.77)	-11.890 (-3.99)	-	-17.218 (-7.27)
$LnGDP_{it}$	0.202 (7.85)	0.190 (2.87)	1.143 (7.28)	0.340 (5.77)
$LnGDP_{jt}$	0.520 (20.58)	0.521 (7.97)	0.546 (3.39)	0.558 (9.50)
$LnTIA_{OPEN1}$	0.386 (12.43)	0.381 (4.507)	0.373 (5.43)	0.368 (7.10)
$LnER_{it}$	-0.163 (-11.94)	-0.184 (-4.39)	-0.083 (-4.46)	-0.116 (-7.01)
$LnPE_{ijt}$	-0.010 (-0.79)	-0.935 (-0.19)	0.256 (0.20)	-0.322 (-0.26)
$\overline{R^2}$	0.300	0.421	0.645	0.606
Number of Observations	2304	192	2304	2304
F-statistic	12.656 (p=0.000)*, [Critical F value for diffuse prior (Leamer) = 9.9280]			
Hausman - statistic	40.618 (p=0.000)*			

- Values of t-ratio are represented in parentheses. Also the probability of null hypothesis acceptance for F-statistic and Hausman statistic is available in parentheses.

Table (A-4): Estimation Results for the Gravity Model of FDI (Case IV)*

Explanatory Variables	*Pooling Data*	*Between Estimates*	*FE Estimates*	*RE Estimates*
Constant	-13.924 (-12.33)	-13.778 (-4.65)	-	-18.571 (-7.71)
$LnGDP_i$	0.257 (10.14)	0.250 (3.81)	0.922 (5.68)	0.362 (6.06)
$LnGDP_j$	0.491 (18.81)	0.492 (7.24)	0.784 (4.96)	0.553 (9.23)
$LnTIA_{OPEN2}$	0.302 (10.01)	0.295 (3.60)	0.233 (3.42)	0.296 (5.79)
$LnER_i$	-0.202 (-15.30)	-0.230 (-5.66)	-0.103 (-5.58)	-0.141 (-8.66)
$LnPE_{ij}$	-0.968 (-0.54)	-0.333 (-0.68)	0.345 (0.27)	-0.284 (-0.23)
$\overline{R^2}$	0.285	0.399	0.642	0.604
Number of Observations	2304	192	2304	2304
F-statistic	12.987 (p=0.000)*, [Critical F value for diffuse prior (Leamer) = 9.9280]			
Hausman - statistic	31.731 (p=0.000)*			

- Values of t-ratio are represented in parentheses. Also the probability of null hypothesis acceptance for F-statistic and Hausman statistic is available in parentheses.