**Iranian Economic Review, Vol.13, No.20, Fall & Winter 2007**

# A Difference-in-Differences (DID) Analysis of Financial Integration and International Trade in ASEAN+5[*]

**Seyed Komail Tayebi**[*]
**Ahmad Googerdchian**[**]

## Abstract

As economies progressively integrate globally, the financial structures of markets and the world of finance changes. One of the definitions of financial globalization is integration of domestic financial system of a country with the global financial markets and institutions. It is now accepted that international financial integration allows the optimizing of inter-temporal consumption path and managing of financial risks by increasing the availability of assets in the local markets. It also has the spillover effect of increasing competition and efficiency throughout the international trade.

There are different arguments on the impact of financial globalization on the world trade relations, however the empirical evidence is still scarce. This paper tries to fill this gap partially by studying the effects of financial integration on the trade structure operating in the country members of ASEAN+51. The focus on mutual trade relations of the block is of interest, because some arguments suggest that the trade flows extend with globalization, while others predict limitations in financial integration make trade costly at least in the short-term. It is evident that cross-country financial flows to the emerging market economies were low, at during the mid-1970s. They increased at a healthy clip during the decades of 1980s and 1990s, peaking in 1997. They suffered a sharp decline after that because of the "Asian financial and economic crises". Therefore, the actual impact of financial integration on trade patterns remains an empirical question, which is the main subject of this paper.

---

[*] This paper is a part of the PhD student's, Ahmad Googerdchian, dissertation being written at the University of Isfahan.

* Associate Professor of International Economics, Department of Economics, University of Isfahan, Iran, komail@econ.ui.ac.ir.

** PhD Student, Department of Economics, University of Isfahan, Iran, agoogerdchian@yahoo.com.

1- The block includes ten major members of the ASEAN (Singapore, Thailand, Indonesia, Malaysia, Laos, Nepal, Cambodia, The Philippines, Brunei and Vietnam) plus China, Japan, South Korea, Australia and New Zealand.

We analyze whether financial integration contributes to international trade across countries. The analysis focuses on before and after Asian crisis, as a proxy for financial integration, in 1997. We examine how financial integration in both Asian pre-crisis and post-crisis affects the rate of trade flows in the block. To explore this effect on trade, we rely on a dynamic analysis and use a "difference-in-differences" (DID) approach which compares the trade flows among the ASEAN+5 members before and after 1997 Asian crisis. Overall, the results obtained conclude that financial integration makes trade diversion among the ASEAN+5 members.

**Key words:** Financial Integration, International Trade, Difference-in-Differences (DID) Method, ASEAN+5

## 1- Introduction

Financial globalization has a grate role in specification of financial relationship between countries. Although the contemporary wave of globalization is a quarter century old, during the last decade, the concept of globalization acquired a great deal of currency and emotive force. Globalization can simply be defined as a gradually evolving interaction and integration of economies and societies around the world. Keohane and Nye (2001) defined globalization as "a state of the world involving networks of interdependence at multi-continental distances". They emphasize on the interaction between the flow of finance, goods, services, information, ideas, and people. Accordingly, we may define financial globalization as a global financial network of the world economy.

Financial globalization is now increasing, neither the concept nor the phenomenon of financial globalization can be considered novel. One of the early eras of well-documented financial integration and financial globalization was the 1870-1914 period, as trans-country capital movements were centuries old (Das, 2006). However, one important distinction between the past and the present periods of financial globalization is that in the past a limited number of countries, and a small number of sectors in the economies participated in financial globalization, while a larger number of firms and companies are now involved in outsourcing of trade and finance.

One of the definitions of financial globalization is integration of domestic financial system of a country with the global financial markets and institutions. It is now accepted that international financial integration allows the optimizing of inter-temporal consumption path and managing of financial risks by increasing the availability of assets in the local markets. It

also has the spillover effect of increasing competition and efficiency throughout the international trade. It has thus strengthened interdependencies between markets and market participants across national boundaries.

In addition, rapid progress in information and communication technology (ICT) and computer-based technologies and products have been responsible for dramatic expansion in cross-border trade and financial flows. Advances in ICT and computer-based technologies reduced the cost of communications, increased power of computers, shrunk the globe and made national boundaries less significant. Managing of large and rapid transactions, which are widely spread across continents and countries, could not be accomplished without the support of ICT and computers. Because of advances in IT, reverse flows of capital can now be really rapid. It implies that the probability of a contagion setting in or an economy suffering from a financial crisis increases with progress in financial globalization.

In the process of financial integration, various currency unions, such as Euro in the EU and dollarization in Latin America, have been implemented by the members of a specific block. Rose and Engle (2002) examine the behavior of countries that are or have been members of international currency unions, and ask whether existing currency unions replicate the desirable features of optimal currency areas as set out by Mundell (1961), which deepen dramatically trade and financial relations between integrating countries. However, a number of studies have shown that national borders restrain economic integration. Internal trade is disproportionately large compared to international trade; relative prices are more stable inside countries than across national boundaries; domestic assets tend to be held disproportionately, and so forth. Perhaps the large size of this "border effect" is mostly the result of exchange rate volatility or, more generally, the consequence of having different national moneys. Ultimately, Rose and Engle (2002) show that members of currency unions systematically engage in more international trade.

There are different arguments on the impact of financial globalization on the world trade relations so that the empirical evidence is still scarce. The main goal of this paper is to investigate dynamically the impact of financial

integration on trade structure operating in the country members of ASEAN+5[1]. We analysis whether financial integration contributes to international trade across countries. The analysis focuses on before and after Asian crisis, as a proxy for financial integration, in 1997. We examine how financial integration in both Asian pre-crisis and post-crisis affects the rate of trade flows in the block. To explore this effect on trade, we rely on a dynamic analysis and use a "difference-in-differences" (DID) approach which compares the trade flows among the ASEAN+5 members before and after 1997 Asian crisis.

In Section 2, an overview of relevant experiments is raised to bring more evidence on financial integration in some countries. Section 3 specifies a model for the relationship between international trade and financial integration in countries of the block (ASEAN+5). The concept of DID approach and empirical specification of such model is discussed in this section. Section 4 analyses the estimation results obtained by this method. Finally, Section 5 concludes.

## 2- An Overview

Financial markets are integrating in East Asia as a result of the deregulation of domestic financial systems, opening of financial services, and relaxation of capital and exchange controls. Foreign operations by commercial banks from developed countries and portfolio investment by developed-market investors have significantly strengthened linkages among the region's financial markets. Relative to trade and FDI integration, however, financial integration has been less pronounced. Table 1 indicates that cross-border portfolio investment flows—particularly equity investment flows—have been expanding among the East Asian economies, but the share of intraregional portfolio investment flows in East Asia is still low (a mere 6% in 2004) compared with those of EU-15 (64%) and NAFTA (15%). An important reason for the limited degree of financial integration is that, apart from Japan, Hong Kong, China, and Singapore, many economies in East

1- The block includes ten major members of the ASEAN (Singapore, Thailand, Indonesia, Malaysia, Lao, Nepal, Cambodia, The Philippines, Brunei and Vietnam) plus China, Japan, South Korea, Australia and New Zealand.

Asia still impose significant capital and exchange restrictions and other cross-border barriers, which impede free flows of financial capital within the region. In particular, the PRC and low-income ASEAN countries apply heavy controls and regulations (Kawai, 2007).

In the aftermath of the Asian currency crisis of 1997, a discussion has started about possibilities of monetary cooperation in East Asia as an alternative to pegging solely to the US dollar. A special role is often assigned to the Japanese yen or to a basket of the yen, the US dollar and the euro. Hefeker and Nabor (2005) also focus on the potential role of the Chinese economy in the process of regional integration and of the Chinese Renminbi (RMB) in a regional basket arrangement. According to many observers, China is set to become the most important economy of the region in the future and now takes serious steps of integrating into the world economy. Both aspects imply a special role for the Chinese currency in any future exchange rate arrangement for East Asia.

The European process of monetary integration, however, suggests that it is possible to design a flexible system in which the relative weights of currencies shift over time, allowing the RMB's role to grow over time. The evolution of the Exchange Rate Mechanism (ERM) of the European Monetary System (EMS) is an example that could provide guidance to East Asia.

In conjunction with these global financial activities, the Asian crises of 1997-98 and the Russian crisis of 1998 demonstrated that financial instability in one country can destabilize the entire global financial system. When Russia defaulted on its external liabilities and devalued the ruble, stock markets in emerging market economies as well as industrial economies tumbled and investors around the globe suffered large losses. Furthermore, with the start of currency crisis, a number of Asian currencies were put under huge pressure. As expectations of further devaluation accumulated, Taiwan decided to devalue the Taiwanese dollar by stopping further intervention in the foreign exchange market in 1997. At this time, the off-shore forwards market of foreign exchange showed an ever-growing premium on the U.S. dollar, which became more than 30% in early November. The domestic stock market kept plunging with an index futures' negative premium of more than 11% on November 1st. During mid-

November, the domestic foreign exchange market was almost paralyzed even with the widened daily band of 10% (Kim 2000).

Given the frequency of the crises, international banks' perception of risk of lending to emerging market economies (EMEs) and the other developing economies increased considerably. Another structural factor was that banks increasingly crossed borders to buy local subsidiaries from which they could lend at a smaller risk in local currency. It resulted in a decline in cross-border lending to the EMEs and developing countries. Another new development is that, for all appearance, many EMEs and developing economies that were rapidly financially globalizing began to diverge from the rest of the developing economies.

### 2-1- Korean Developments in Capital Liberalization

People seem to believe that financial liberalization in Korea started in the early 1980s and accelerated in the 1990s. Bandiera et al. (2000) examined five measures of financial liberalization in Korea (i.e., interest liberalization, reduction in directed credit, prudential regulation, privatization of financial intermediaries, and pro-competition measures). Interest rate liberalization was one of the most important measures of financial liberalization in Korea. The government and the Bank of Korea (BOK) first introduced a comprehensive measure of interest liberalization in December 1988. Even though the government effectively resumed interest regulations in 1989, when the interest rate became unstable as a result of high inflation, most people regard the official declaration of interest liberalization in 1988 as the first step in this reform measure.

Until year 1990, the nominal exchange rate of Korean Won was determined under a multi-currency basket system. Under this system, fluctuations in the exchange rate were heavily regulated and, consequently, the exchange rate did not closely reflect demand and supply changes in the foreign exchange market. In order to reduce this problem, the flexible exchange rate system was adopted in March 1990. However, the exchange rate was still regulated in this new system. But a band in daily fluctuations in the exchange rate was abolished altogether in December 1997, leading to the current system of fully flexible exchange rate.

Figure 2 illustrates that the won appreciated by 14.5% relative to the dollar between the first quarter of 2004 and the first quarter of 2005, the largest rise of any Asian currency. In effective terms (relative to Korea's 41 major trading partners), the won increased 12% over the same period. The appreciation occurred despite large-scale intervention in the foreign exchange market aimed at smoothing the currency's upward trend. As a result, Korea's foreign exchange reserves increased 28% to $205 billion in March 2005, the second highest in the OECD area (OECD, 2006). Indeed, reserves are now three times higher than short-term foreign debt and, at 30% of GDP, represent a significant stock of national wealth. Since the first quarter of 2005, the won has depreciated slightly against the dollar, while foreign exchange reserves remained steady, suggesting that intervention has largely ceased.

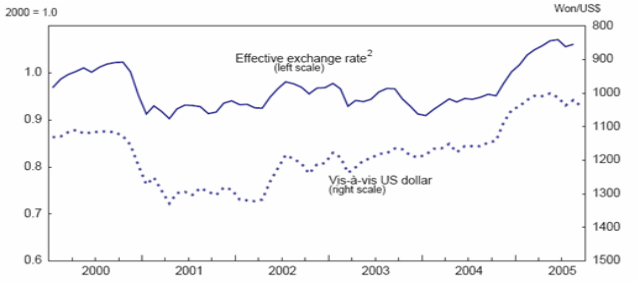


**Figure 2: The Won Appreciation[1]**

1- A rise indicates an appreciation of the won.
2- Calculated vis-à-vis forty-one trading partners.
Source: OECD (2006)

## 3- The Model: A DID Analysis

As noted before, many countries began liberalizing their domestic economies in a methodical manner, lowering barriers to trade and financial flows, consequently increasing both global trade in goods and services and financial integration. These developments resulted in heightened demand for trans-border financial flows. Therefore, an internationally mobile pool of capital and liquidity was created, which allowed financial globalization to make further advances (Das 2006).

Thus, the basic assumption is that if financial globalization promote trade flows, financial integration will able to increase multilateral trade flows in the ASEAN+5 region. To meet this goal, the difference-in-differences

(DID) method should match the trade effect among the ASEAN+5 members before and after financial integration with other Asian countries (non members), which are so-called control group[1]. In the preceding sections, we firstly review the concept of DID, and then specify a theoretical framework to analyze dynamically the relationship between trade and financial integration among Asian-Pacific countries.

### 3-1- A Concept of DID

Lee (2005) shows that a 'difference-in-difference' (DID) design is an improvement over the before-after program (e.g. financial program) in which there is a control group that gains the time effect but not the treatment effect. A difference-in-differences (DID) estimator measures the impact of the program by the difference between participants and non-participants in the before-after difference in outcomes. Using the control group, the treatment effect can be identified even if the treatment takes place step by step. In a DD, the treatment is given only to a certain group of units (countries), and those left out constitute the control group. A difference-in-differences estimator uses both pre- and post-program data ($t_a$ and $t_b$ data) on $D = 1$ and $D = 0$ observations. A drawback of a before-after estimation strategy is that identification of several breaks down in the presence of time-specific intercepts. Before-after estimates can also be sensitive to the choice of base time period, the commonly observed pattern that the mean earnings of program participants decline during the period just prior to participation (Ashenfelter 1978).

Following Heckman et al. (1999), the equations for two periods, thus concerning the treatment effect in $t_a$, can be written as

$$Y_{ita} = f(X_{ita}) + D_i\beta_D + \varepsilon_{ita} \quad (1)$$

and

$$Y_{itb} = f(X_{itb}) + \varepsilon_{itb} \quad (2)$$

1- In this research, we have used data for 43 Asian-Pacific countries of which 15 countries are supposed to be the member of ASEAN+5.

Subtracting two equations, the difference-in-differences estimator ($\hat{\beta}_D^{DID}$) applies the least squares method for $\beta_D^{DID}$ in the following specification:

$$Y_{ita} - Y_{itb} = f(X_{ita}) - f(X_{itb}) + D_i\hat{\beta}_D^{DID} + (\varepsilon_{ita-}\varepsilon_{itb}) \quad (3)$$

The estimator requires that

$$E(\varepsilon_{ita-}\varepsilon_{itb}) = 0\,,\; E[(\varepsilon_{ita-}\varepsilon_{itb})D_i] = 0 \text{ and } E\{[f(X_{ita}) - f(X_{itb})][\varepsilon_{ita-}\varepsilon_{itb}]\} = 0.$$

Treatment effects with general changes in the economy motivate the DID estimator, which compares the before-after change of treated units with the before-after change of untreated units. In this situation, the outcomes of the untreated units as well as the treated units get differenced out in any common trend. Thus, the difference-in-differences estimator consists of

$$\Delta^{DID} = [E(Y_{1ta} \mid D=1) - E(Y_{0tb} \mid D=1)] - [E(Y_{0ta} \mid D=0) - E(Y_{0tb} \mid D=0)] \quad (4)$$

The common time trend assumption that justifies the estimator is given by:

$$E(Y_{0ta} \mid D=1) - E(Y_{0tb} \mid D=1) = E(Y_{0ta} \mid D=0) - E(Y_{0tb} \mid D=0)] \quad (5)$$

Overall, panel data methods represent a powerful tool when longitudinal data are available on treated and untreated units, when the timing of treatment varies among units, and when the timing of treatment is unrelated to the outcomes, conditional on the included variables. Accordingly, a special case for equation (3) is that when $\varepsilon_{it_A} = \phi_i + v_{it_A}$ where $\phi_i$ depends on *i* but does not change over time and $v_{it_A}$ is a random error term, and satisfies a fixed effect assumption (Lee, 2005).

Panel data models constitute the most general version of these estimators. These models apply to data sets with multiple observations over time on many treated and untreated units. A regression is run of the outcome variable of interest on exogenous covariates plus dummy variables for each unit and each time period. The unit dummy variables control for permanent

differences in outcomes among units, just as in the simple difference-in-differences model. The time period dummies control for aggregate effects in each period. Panel models require some variation in the timing of the treatment; without such variation, the treatment effect cannot be distinguished from the aggregate time effects. Thus, a basic panel model has the following general form:

$$Y_{it} = \beta_0 + \beta_D D_{it} + \beta_k X_{kit} + \mu_i + \mu_t + \varepsilon_{it} \quad (6)$$

where $\beta_D$ is the panel data impact estimator, $D_{it}$ is a time-varying indicator for treatment, $\mu_i$ is a unit-specific intercept (individual effects), $\mu_t$ is a time-period-specific intercept and $X_{kit}$ is a set of $k$ regressors (including time variable).

**3-2- Empirical Specification**

As explained previously, the before and after conditions of a response variable (trade flows), which is affected by a treated policy (financial integration) is compared by the DID analysis. More specifically, the members of ASEAN+5 participate in financial integration (treated group), and other Asian countries do not participate (untreated or control group). Both groups experience effect of participation and face differences before and after financial integration. In fact, the rate of differences in trade flows between two groups points out the DID analysis.

For the difference-in-differences specification, let the $j$ indicate country group, with $j$=1 the financial integration group (ASEAN+5 members) and $j$= 0 some control group. Moreover, r describes two different regimes; if r=0 means the period before financial integration, whereas r=1 denotes the period after financial integration. D is thus a set of dummy variables denoting these mentioned cases. Now we estimate Equation (7) following Slaughter (2001) and Equation (6) as its concept was discussed in the previous section:

$$LEX_{jrt} = \alpha_1 + \alpha_2 D_r + \alpha_3 D_j + \alpha_4 D_{jr} + \beta_1 t + \beta_2 t D_r + \beta_3 t D_j + \beta_4 t D_{jr} + u_{jrt} \quad (7)$$

where $LEX_{jrt}$ denotes the natural logarithm of trade flows, the dichotomous variable $D_r$ equals 1 after the period of financial integration and zero otherwise; the dichotomous variable $D_j$ indicates the ASEAN+5 members group; the dichotomous $D_{jr}$ variable equals one if both $j$=1 and $r$=1 and zero otherwise; $t$ denotes a time dummy variable for the period under consideration (1990-2005). $u_{jrt}$ is an error term (whose variance varies by both $j$ and $r$). For each of the four country-group /regimes, Equation (7) estimates a separate intercept term and trade rate.

Generally, Table (2) draws four stages where stage I refers only to the membership of the countries in the block. In this stage the following equation is estimated:

$$LEX_{jrt} = \alpha_1 + a_3 D_j + \beta_1 t \ + \beta_3 t \ D_j + u^1_{jrt} \tag{8}$$

Stage II considers the membership of the block after financial integration. In this stage the model specified in Equation (7) is estimated. The condition of pre-integration is considered in stage III, while we estimate the following equation:

$$LEX_{jrt} = \alpha_1 + \beta_1 t + u^2_{jrt} \tag{9}$$

Stage IV devotes to the post-integration, in which the following regression is estimated:

$$LEX_{jrt} = \alpha_1 + \alpha_2 D_r + \beta_1 t + \beta_2 tDr + u^3_{jrt} \tag{10}$$

**Table 2: The coefficients of trade rates in four stages**

| Stage | Intercept | Trade Rate |
|---|---|---|
| **I** | $\alpha_1 + \alpha_3$ | $\beta_1 + \beta_3$ |
| **II** | $\alpha_1 + \alpha_2 + \alpha_3 + \alpha_4$ | $\beta_1 + \beta_2 + \beta_3 + \beta_4$ |
| **III** | $\alpha_1$ | $\beta_1$ |
| **IV** | $\alpha_1 + \alpha_2$ | $\beta_1 + \beta_2$ |
| DID = $[(\beta_1 + \beta_2 + \beta_3 + \beta_4)-(\beta_1 + \beta_3)]-[(\beta_1 + \beta_2)-\beta_1] = \beta_4$ | | |

The effect of financial integration on trade flows can be obtained by calculating the "difference in differences" of the estimated rates. The difference in trade rates within the integrating group pre- and post-integration is given by $B_2$. The similar difference in trade rates within the control group is given by $(B_2+B_4)$. The difference in differences is thus given by $(B_2+B_4)-(B_2)=B_4$ . Assuming that the only treatment pre- and post-integration between the two groups is integration, *B4* identifies its effect. If financial integration tends to increase (decrease) among the integrating countries then $B_4$ is positive (negative).

## 4- Results

The trade model (Equation 7), which has been specified by the DID method, is applied to all Asian and Pacifica countries including ASEAN+5 members. The model is estimated by the panel fixed or random effects tested by the Hausman statistic. We use data of trade flows of the countries over 1990-2005 who they are obtained from IFS, WDI CD-ROM (2005 and 2006). To estimate the DID trade rate affected by financial integration, we consider the pre and post Asian financial crisis as the before and integration in which the ASEAN+5 members are involved.

Table 3 draws the estimated trade rates on the basis of the DID approach. In stage I, which includes only ASEAN+5 members before financial integration, measures trade rate ( $\hat{\beta}_1 + \hat{\beta}_3$ ) that equals 0.0812. This rate in stage II( $\hat{\beta}_1 + \hat{\beta}_2 + \hat{\beta}_3 + \hat{\beta}_4$ ), which include members after financial integration, is equal to 0.059. Thus, the difference rate between these two stages is negative and equals -0.222.

**Table 3: Difference-in-Differences in Rates of Trade, Pre – vs. Post Financial Integration in ASEAN+5**

| Stage | Intercept | Trade Rate | Estimation Method | Hausman Test |
|---|---|---|---|---|
| **I** | 9.53 | 0.0812 | Random | H=0 ,P=1 [Random vs. Fixed] |
| **II** | 9.78 | 0.059 | Random | H=0 ,P=1 [Random vs. Fixed] |
| **III** | 8.25 | 0.0745 | Random | H=0 ,P=1 [Random vs. Fixed] |
| **IV** | 8.18 | 0.0793 | Random | H=0 ,P=1 [Random vs. Fixed] |
| **DID Trade Rate = -0.0271** | | | | |

Source: Table 5

Stage III measures the trade rate ( $\hat{\beta}_1$ ) for non-members (other Asian countries in control group), which is equal to 0.0745. This rate is calculated by about 0.0794 in stage IV, which refer to the involvement of non-members after financial integration. The difference rate between stage III and IV is about 0.0049. Therefore, the DID trade rate, which is the rate of difference in differences, is obtained by about -0.027. This value revolves the fact that the net and dynamic effect of financial integration in the ASEAN+5 on the trade flows is still negative.

**4-1- An Application of the DID Approach to the Gravity Model**

In the literature, gravity model is the most popular to explore the impacts of determinants on trade flows. To specify a new framework for the relationship between ASEAN+5 and financial integration, we define the following gravity model which also includes the DID part:

$$LEX_{jrt} = \alpha_1 + \alpha_2 D_r + \alpha_3 D_j + \alpha_4 D_{jr} + \beta_1 t + \beta_2 t\, Dr + \beta_3 t D_j + \beta_4 t D_{jr} + \gamma G_{jrt} + u'_{jrt} \qquad (11)$$

where $G$ includes a set of the gravity variables, such as *GDP*, population (*POP*) and exchange rate (*ER*).

According to the new estimated results obtained by the random effects and reported in Table (4), the gravity variables affect significantly and expectedly trade flows in all Asian-Pacific countries, while GDP has the dominant role in trade creation between economies. In this situation, the DID trade rate is measured by about -0.0148. Although the value is still negative, its value is lower than the previous result (it was -0.027). Hence, the finding implies that financial integration in the ASEAN+5 block should make a better effect on the trade flows of all countries if more macroeconomic reforms are conducted to create further economic cooperation implementations.

**Table 3: Gravity Model and Difference-in-Differences in Rates of Trade, Pre vs. Post Financial Integration in ASEAN+5**

| Stage | Intercept | Trade Rate | Coefficients of Gravity Variables | | | Estimation Method | Hausman Test |
|---|---|---|---|---|---|---|---|
| | | | LGDP | LPOP | LER | | |
| **I** | 0.1708 | 0.0404 | 0.886 | -0.135 | 0.018 | Random | H=101.94<br>P=0<br>[Fixed vs. Random] |
| **II** | -0.483 | 0.0246 | 0.879 | -0.130 | 0.0198 | Random | H=66.81<br>P=0<br>[Fixed vs. Random] |
| **III** | 2.3 | 0.058 | 0.687 | -0.355 | 0.0057 | Fixed | H=10.47<br>P=0.033<br>[Random vs. Fixed] |
| **IV** | 2.382 | 0.0622 | 0.658 | -0.391 | 0.0026 | Fixed | H=28.57<br>P=0.0001<br>[Random vs. Fixed] |
| **DID Trade Rate = -0.01478** | | | | | | | |

Source: Table 6

## 5- Conclusion

This paper has tried to identify financial integration's effect on trade flows by using a difference-in-differences estimation strategy. The main empirical result is that financial integration did not foster significant trade among the ASEAN+5 members in any of the cases analyzed. This result comes from the initial single-difference estimates and the core difference-in-difference estimates using also a gravity specification. In fact, it is evident that financial integration makes trade diversion among the ASEAN+5 members. This finding is consistent with the discussion in Section 2, as financial liberalization is likely to trigger forces both for trade creation and diversion.

However, based on the various specifications of the gravity models available in the literature, in which the specific determinants create bilateral-multilateral trade among the members of a trading block, our findings imply that financial integration in the ASEAN+5 block should make a better effect on the all countries' trade flows if more macroeconomic reforms are conducted to create further economic cooperation implementations. In addition, a future work can be conducted using a DID analyzing of a developed gravity model with a larger number of the trading partners of ASEAN+5 countries around the world.

## References

1- Ashenfelter, O. (1978), "Estimating the Effect of Training Programs on Earnings," *Review of Economics and Statistics*," pp. 47-57.

2- Bandiera, O., G. Caprio, P. Honohan, and F. Schiantarelli, (2000), "Does Financial Reform Raise or Reduce Saving?" *Review of Economics and Statistics*.

3- Barro, R. J. and X. Sala-i-Martin (1992), "Convergence", *Journal of Political Economy*, Vol. 100, pp. 223-251.

4- Das, D. K. (2006), "Globalization in the World of Finance: An Analytical History," *Global Economy Journal,* Vol. 6, No. 1.

5- Evans, P. (1998), "Using Panel Data to Evaluate Growth Theories," *International Economic Review*, Vol. 39, pp.295–306.

6- Evans, P. and G. Karras (1996), "Convergence Revisited," *Journal of Monetary Economics*, Vol. 37, pp. 249–265.

7- Guetat, I. and F. Serranito (2007), "Income Convergence within the MENA Countries: A panel Unit Root Approach," *The Quarterly Review of Economics and Finance*, Elsevier Publisher.

8- Heckman, J., LaLonde, R. and J. Smith (1999), "The Economics and Econometrics of Active Labor Market Program," in Ashenfelter, O. and Card, D. (eds.), the Handbook of Labor Economics, Volume III**.**

9- Hefeker, C. and A. Nabor (2005), "China's Role in East-Asian Monetary Integration," International Journal of Finance and Economics, Vol. 10, pp. 157-166.

10- International Monetary Fund (2002, 2004) *Coordinated Portfolio Investment Survey,* December.

11- Kawai, M. (2007), Toward a Regional Exchange Rate Regime in East Asia, ADB Institute Discussion Paper No. 68.

12- Kim, S. (2000), "Currency Crisis in Korea – When and Why It Happened," *Asia-Pacific Financial Markets*, No. 7**,** pp. 11–30.

13- Krugman, P. R. and M. Obstfeld (2000), International Economics: Theory and Policy, 5th ed., New York: Addison-Wesley.

14- Leamer, E. E. and J. Levinsohn (1996), "International Trade Theory: the Evidence," in R. W. Jones and P. B. Kenen, Vol. 3, Amsterdam: Elsevier Publisher.

15- Lee, M. J. (2005), Micro-Econometrics for Policy, Program, and Treatment Effects, Oxford: Oxford University Press.

16- Lim L. K. (2005), A Dollar or Yen Currency Union in East Asia, Mathematics and Computers in Simulation, Elsevier Publisher.

17- McKinnon, R. I. (1963) "Optimum Currency Areas," *American Economic Review*, Vol. 53, pp. 717-724.

18- Mundell, R. A. (1961), "A Theory of Optimum Currency Areas," *American Economic Review*, Vol. 51, pp. 657-665.

19- Prasad, E. et al. (2003), Effect of Financial Globalization on Developing Countries, Some Empirical Evidence, International Monetary Fund.

20- Rose, A. (2001), Common Currency Areas in Practice, Revisiting the Case for Flexible Exchange Rates, Prepared for the Bank of Canada Conference.

21- Rose, A. and C. Engle (2002), "Currency Unions and International Integration," *Journal of Money, Credit and Banking*, No. 34, pp. 804-829.

22- Rose, A. and E. van Wincoop (2001), "National Money as a Barrier to International Trade: The Real Case for Currency Union," *American Economic Review,* pp. 386-90.

23- Slaughter, M. J. (2001), "Trade Liberalization and Per Capita Income Convergence: a Difference-in-Differences Analysis," *Journal of International Economics*, Vol. 55, pp. 203–228.

**Table 5: Estimation Results for Equation 7 Obtained by Stata9.2**

```
Random-effects GLS regression           Number of obs      =       688
Group variable (i): id                  Number of groups   =        43
R-sq:  within  = 0.6368                 Obs per group: min =        16
between = 0.1791                        vg =      16.0
overall = 0.1982                        max =        16
Random effects u_i ~ Gaussian           Wald chi2(7)       =   1129.37
corr(u_i, X)   = 0 (assumed)            Prob > chi2        =    0.0000
------------------------------------------------------------------------------
lex |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
------------+-----------------------------------------------------------------
dr |  -.2671965    .089452    -2.99   0.003    -.4425191   -.0918738
dj |   1.574153   .6483762     2.43   0.015     .3033593    2.844947
drj |   .7191669   .1626869     4.42   0.000     .4003065    1.038027
t |    .057875   .0094128     6.15   0.000     .0394262    .0763238
tdr |   .0298088   .0113995     2.61   0.009     .0074662    .0521513
tdj |   .0754076   .0171191     4.40   0.000     .0418547    .1089605
tdrj |  -.1026607   .0207323    -4.95   0.000    -.1432953   -.0620261
_cons  |     7.758666     .3565041       21.76     0.000         7.059931
8.457401
------------------------------------------------------------------------------
Fixed-effects (within) regression       Number of obs      =       688
Group variable (i): id                  Number of groups   =        43

R-sq:  within  = 0.6368                 Obs per group: min =        16
between = 0.1791                        avg =      16.0
overall = 0.1040                        max =        16
                                        F(6,639)           =    186.74
corr(u_i, Xb)  = 0.1503                 Prob > F           =    0.0000
------------------------------------------------------------------------------
lex |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----+-------------------------------------------------------------
dr  |  -.2671965    .089452    -2.99   0.003    -.4428518   -.0915411
dj  |  (dropped)
drj |   .7191669   .1626869     4.42   0.000     .3997014    1.038632
t   |    .057875   .0094128     6.15   0.000     .0393912    .0763588
tdr |   .0298088   .0113995     2.61   0.009     .0074238    .0521937
tdj |   .0754076   .0171191     4.40   0.000     .0417911    .1090242
tdr |  -.1026607   .0207323    -4.95   0.000    -.1433724    -.061949
_cons |   8.234573    .035161   234.20   0.000    8.165528    8.303618
------------------------------------------------------------------------------
F test that all u_i=0:     F(42, 639) =   790.00   Prob > F = 0.0000
. hausman random
                    ---- Coefficients ----
     |      (b)     (B)      (b-B)     sqrt(diag(V_b-V_B))
     |    random     .     Difference       S.E.
-------------+----------------------------------------------------------------
--------
Dr  |   -.2671965    -.2671965       -4.00e-15        1.91e-08
drj |    .7191669     .7191669       -2.49e-14        3.15e-08
t   |     .057875      .057875       -6.04e-16        4.21e-09
tdr |    .0298088     .0298088        6.28e-16        4.87e-09
tdj |    .0754076     .0754076       -1.25e-15        4.20e-09
tdrj|   -.1026607    -.1026607        2.94e-15        5.54e-09
------------------------------------------------------------------------------
                b = consistent under Ho and Ha; obtained from xtreg
    B = inconsistent under Ha, efficient under Ho; obtained from xtreg
    Test:  Ho:  difference in coefficients not systematic
                      chi2(6) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                              =        0.00
                    Prob>chi2 =      1.0000
```

**Table 6: Estimation Results for Equation 8 Obtained by Stata9.2**

```
Fixed-effects (within) regression               Number of obs      =       688
Group variable (i): id                          Number of groups   =        43
R-sq:  within  = 0.6956                         Obs per group: min =        16
between = 0.7514                                avg =      16.0
overall = 0.7366                                max =        16
                                                F(9,636)           =    161.45
corr(u_i, Xb)  = 0.5487                         Prob > F           =    0.0000
------------------------------------------------------------------------------
lex |      Coef.   Std. Err.      t    P>|t|     [95% Conf. Interval]
----+-------------------------------------------------------------------------
lgdp|   .6901289    .075207     9.18   0.000     .5424448     .837813
lpop|  -.4057887   .1806495    -2.25   0.025    -.7605302   -.0510472
ler |   .0041503   .0086295     0.48   0.631    -.0127953     .021096
dr  |  -.1434399   .0880202    -1.63   0.104    -.3162853    .0294055
dj  |  (dropped)
drj |   .5052379   .1518289     3.33   0.001     .2070913    .8033846
t   |   .0675267   .0115149     5.86   0.000     .0449149    .0901384
tdr |   .0054654   .0114895     0.48   0.634    -.0170964    .0280273
tdj |    .025364   .0166338     1.52   0.128    -.0072999    .0580279
tdrj|  -.0610753   .0196111    -3.11   0.002    -.0995858   -.0225649
_cons|  2.356551   .8125278     2.90   0.004     .7609898    3.952113
------------------------------------------------------------------------------
F test that all u_i=0:    F(42, 636) =   115.75      Prob > F = 0.0000
Random-effects GLS regression                   Number of obs      =       688
Group variable (i): id                          Number of groups   =        43
R-sq:  within  = 0.6910                         Obs per group: min =        16
between = 0.8867                                avg =      16.0
overall = 0.8779                                max =        16
Random effects u_i ~ Gaussian                   Wald chi2(10)      =   1736.85
corr(u_i, X)       = 0 (assumed)                Prob > chi2        =    0.0000
------------------------------------------------------------------------------
lex |      Coef.   Std. Err.      z    P>|z|     [95% Conf. Interval]
----+-------------------------------------------------------------------------
lgdp|   .8797754   .0535392    16.43   0.000     .7748406    .9847103
lpop|  -.1306643   .0684571    -1.91   0.056    -.2648377    .0035091
ler |   .0198859   .0072694     2.74   0.006     .0056381    .0341336
dr  |  -.1799388   .0873271    -2.06   0.039    -.3510967   -.0087809
dj  |   .4536827   .2626638     1.73   0.084    -.0611289    .9684943
drj |   .5020126    .153296     3.27   0.001     .201558    .8024672
t   |   .0521433    .010038     5.19   0.000     .0324692    .0718173
tdr |   .0093599   .0113493     0.82   0.410    -.0128843     .031604
tdj |   .0223765   .0165808     1.35   0.177    -.0101212    .0548742
tdrj|  -.0588427   .0197358    -2.98   0.003    -.0975243   -.0201612
-cons| -.3646772   .4703793    -0.78   0.438    -1.286604    .5572493
------------------------------------------------------------------------------
. hausman fixed
                    ---- Coefficients ----
     |      (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
     |     fixed           .          Difference          S.E.
-----+------------------------------------------------------------
lgdp |    .6901289     .8797754       -.1896465        .0528171
lpop |   -.4057887    -.1306643       -.2751244        .1671761
ler  |    .0041503     .0198859       -.0157355        .0046501
dr   |   -.1434399    -.1799388        .0364989        .0110247
drj  |    .5052379     .5020126        .0032254              .
t    |    .0675267     .0521433        .0153834        .0056419
tdr  |    .0054654     .0093599       -.0038944        .0017893
tdj  |     .025364     .0223765        .0029875        .0013278
tdrj |   -.0610753    -.0588427       -.0022326              .
------------------------------------------------------------------------------
              b = consistent under Ho and Ha; obtained from xtreg
    B = inconsistent under Ha, efficient under Ho; obtained from xtreg
    Test:  Ho:  difference in coefficients not systematic
                  chi2(9) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                          =       66.81
                Prob>chi2 =      0.0000
```