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Abstract

In this paper we explore three important areas where deeper trade and financial integration in East Asia can influence: (1) business cycle co-movements in the region, (2) the extent of risk sharing across countries and (3) price co-movements across countries. We find evidence that trade integration enhances co-movements of output but not of consumption across countries. Especially the fact that trade integration does not raise co-movements of consumption as much as that of output is interpreted as trade integration does not improve the extent of risk sharing. Co-movements of price arise most significantly as trade integration deepens, lowering the border effects and allowing better opportunities for resource reallocation across countries. In contrast, financial integration demonstrates much weaker evidence of enhancing co-movements across countries. Deeper financial integration improves price co-movements weakly but does not enhance output or consumption co-movements at all. However, since the current level of financial integration in East Asia is quite low, our evidence is too early to firmly determine the role of financial integration.

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Keywords: Trade integration, Financial integration, Co-movements, East Asia

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1. Introduction

A number of East Asian countries are seeking for economic integrations in various ways. Trade integration is one avenue. For example, aside from the already established ASEAN free trade arrangement, both China and Japan show much interest in forming free trade agreements with Korea as well as with ASEAN countries. The other avenue is financial integration. After the sudden exchange crisis of 1997, East Asian countries are also seeking deepening financial cooperation, as indicated by the discussions on the Chang Mai Initiative and on the Asian bond market.

What are the effects of the trade and financial integration in East Asia? In this paper, we explore three important areas where the trade and financial integration can influence. First, we examine how the trade and financial integration affect on business cycle co-movements in the region. Second, we also investigate how the trade and financial integration affect on the extent of risk sharing across countries by comparing its impact on consumption co-movements with output co-movements. Finally, we examine how the trade and financial integration affect on price co-movements across countries.

By analyzing the changed patterns of various co-movements, we can also gauge how they in turn influence the prospects of further integration in East Asia. For example, how synchronized are business cycles of output has an important implication for forming an extreme form of integration, a single market and single currency area, namely a monetary union. Since members of monetary union sacrifice independent monetary policy, the cost of forming monetary union will be lower if business cycles are synchronized so that the common monetary policy works effectively for all member countries.

While most studies focus on business cycles of output, we believe that considering the extent of output co-movement is not enough to determine how costly it is to form monetary union. Since the eventual objective of monetary policy is to smooth consumption not output, if consumption does not move along with output, low co-movements of output is not necessarily undesirable for forming monetary union. For example, if risk sharing is complete across countries, despite any possible asymmetric movements of output, consumption movements will be perfectly

correlated across countries.[1] In this case it is not necessary to implement independent monetary policy across countries because the common monetary policy can be effectively used to respond to the same movement of consumption across countries. Hence the extent of financial integration that is essentially expected to improve risk sharing should be also taken into consideration in order to determine whether it is desirable to form monetary union or not.

We also investigate how price co-movements are affected by deeper trade and financial integration. A number of studies point out that prices across countries are not converged because of so called "border effects." The high border effects imply that resource allocation is not efficiently made across countries. The degree of integration between economies can be assessed by estimating the border effects. As trade and financial integration deepen, however, the border effects are expected to diminish. We attempt to examine which integration is more effective in reducing the border effects reflected in the price movements.

The remainder of the paper follows in five sections. In section 2, we briefly review how trade and financial integration have advanced in East Asia. In section 3, we explain the data used in the empirical analyses. Section 4 presents our model and discusses the main empirical results on the impacts of trade and financial integration on output, consumption and price co-movements. Concluding remarks follow in Section 5.

2. Trade and Financial Integration in East Asia

The export-led growth strategy in East Asia has provided impetus for their rapid growth in the volume of trade in this area. This is well illustrated by Table 1 that reports the share of trade (exports+imports) and GDPs of East Asian countries and other areas in the world economy. In the table, East Asian countries are further

[1] This is true under an appropriate assumption on preference. Mace (1991) showed that if the utility function takes a CRRA (constant relative risk aversion) form, complete risk sharing implies that the growth rate of consumption is equalized across countries.

divided into individual countries such as China, Japan and Korea, and a group of remaining countries, ASEAN .[2]

According to Table 1, East Asia's share in total global trade continuously increased from 13.9% in 1980 to 22.2% in 2000 and then more or less stayed around at the same level until 2003. The share of GDP in East Asia also shows a similar pattern: East Asia' share of GDP increased from 13.9% in 1980 to 22.6% in 2000, but rather decreased a little since then. However China's share of trade or GDP has continuously increased. While China's share in trade (1%) was far less than that of Japan in 1980 (7.3%), it has been increasing tremendously for the last 25 years, being comparable to Japan in 2003. China's accomplishment in promoting trade is especially remarkable since China's share of GDP (3.9%) is still far less than that of Japan (11.8%) as of 2003.

Due to the astonishing performance of China, the integration of trade among East Asian economies has been also steadily increasing. According to Shin and Wang (2005), the percentage of intra-regional exports in total exports increased from 30.3% in 1980 to 45.8% in 2003. The corresponding percentage of intra-regional imports in total imports increased from 30.9% in 1980 to 49.2% in 2003. Among the economies in East Asia, Japan had the lowest intra-regional share of trade at about 39.2% in 2003.

On average, the share of intra-regional trade in East Asia was somewhat lower than the corresponding value for Euro area, which was 66% in 2000. One reason for relatively lower levels of intra-regional trade is a relatively larger share of trade with the United States. The share of trade with the United States of total trade was about 14.1% for East Asian economies on average, contrasting to about 8% for European countries in 2000. But, East Asia's trade with the U.S. tended to decline gradually over the past decade and the same share amounts to 11.3% in 2003. As this trend continues, the share of intra-regional trade is expected to grow further.

In East Asia, there has been also a rapid increase in international capital mobility, as East Asia has been deregulating their financial markets since the early 1990s. Bekaert and Harvey (1995), World Bank (1997), and Eichengreen and Park (2005a) pointed out that this continuous financial opening process has contributed to

[2] ASEAN includes Myanmar, Cambodia, Indonesia, Malaysia, the Philippines, Singapore,, Thailand, and Vietnam. We have added Hong Kong, Macau, and Mongolia to ASEAN instead of treating them separately.

the economies to become more integrated into global financial markets. However, it is not clear that this process has also rendered the Asian economies to be financially more integrated within the region. In general, while trade liberalization tends to bring about trade integration more at the regional level, we may not expect that financial integration also takes place more intensely at the regional level as well because financial assets are weightless. In other words, since transaction costs are far less important for asset trade, there is no advantage of financial integration among neighboring countries.

In fact, several studies claimed that the degree of financial market linkage in East Asia remains still low and that, unlike trade integration, the integration of financial markets in this region has been occurring more on a global level rather than on a regional level. Park and Bae (2002) and Eichengreen and Park (2005b) pioneered this issues and found that East Asia has developed stronger financial ties with the U.S. and Western Europe than with one another. Based on various tests utilizing cross-country interest rate and stock price data, Jeon, Oh, and Yang (2005) and Keil, Phalapleewan, Rajan and Willett (2004) also supported this finding. By estimating the degree of risk sharing for East Asia, Kim, Kim, and Wang (2005) also found supporting evidence that the degree of regional risk sharing within East Asia is quite low. Hence the majority of empirical studies seem to suggest that the level of financial market integration in East Asia is relatively lower.[3]

3. The data

We consider nine countries in East Asia: China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, and Thailand. The data for output, consumption, price and the interest rate are from the *International Financial Statistics*. Real output and consumption are annually reported and based on constant local currency unit and price refers to CPI index. The interest rate data on 90-day local money market rates are available at monthly frequency. The bilateral trade data are collected from the *Directions of Trade* data set. Other variables are obtained from the

[3] Despite this general tenor of existing research, some studies provide opposing evidence. For instance, McCauley, Fung, and Gadanecz (2002) argued that the financial markets of East Asia are more integrated than is often suggested by investigating the international bond market and the international syndicated loan market.

data set provided by Rose (2004) that includes control variables related to various measures of distance and size used in a standard gravity equation. Since most data are available from 1971 our sample starts from 1971. Because of the crisis in 1997 in East Asia, we consider two different sample periods: the first sample is up to 1996 excluding the crisis period and the second sample is up to 2003 including the crisis period.[4]

In this paper, we have also added another important variable, the exchange rate regime, which is believed to play a crucial role in determining co-movements across countries.[5] Based on the *de facto* classification of exchange rate regimes made by Reinhart and Rogoff (2004), we reclassify exchange rate regimes into two broad groups: a peg and a float. To define exchange rate regimes between East Asian countries, we infer the exchange rate regime between any two countries based on their relationship with an anchor currency. If the two countries have their currencies pegged simultaneously to a common anchor currency, we classify their bilateral exchange rate arrangement as a peg. If one country pegs its currency and the other floats, their relationship is dominated by a float and classified as a float.

The data set has a feature of panel structure consisting of 914 annual bilateral observations clustered by 30 country pair groups over time for sample I (1971-1997) and 1166 annual bilateral observations for sample II (1971-1999). The number of observations varies per year. Summary statistics for the data used in estimation is presented in Table 2 (a) for sample I and Table 2 (b) for sample II.

4. The Impacts of Trade and Financial Integration on Co-movements

As trade and financial integration deepen, the business cycle dynamics of output, consumption and price are also affected. In the literature, a number of studies have produced various theoretical implications of trade and financial integration. We will summarize the implications of trade and financial integration first and then use them to construct an empirical model that will be implemented later.

[4] The interest rate data are used until 1999.

[5] See Lee and Shin (2004) for the importance of exchange rate regimes in determining co-movements of output, consumption and price across countries. Based on 186 countries, they find that exchange rate regimes are crucial in explaining the co-movements across countries.

4.1. Theoretical Foundation

Trade integration affects on co-movements in various channels and, therefore the theory does not warrant an unambiguous guidance for whether more trade will increase the degree of output and consumption co-movements or not. First, the spillover of aggregate demand shocks through trade tends to make business cycles more correlated across countries. For example, if one country is hit by a positive demand shock, increased income will generate higher demand for imports as well, acting as a positive demand shock for a trading partner. Second, as Eichengreen (1992) and Krugman (1993) argued, if an increase in trade linkages encourages greater specialization of production, it will result in less synchronization of business cycles. In this case, industry compositions are shaped quite asymmetrically across major trading partners, and if business cycles are driven mainly by industry specific shocks, different compositions of industries will contribute to less synchronization.

Third, Frankel and Rose (1998) countered the above argument, insisting that if intra-industry trade is more pronounced than inter-industry trade, business cycles will become more positively correlated as trade integration strengthens. Based on 21 industrialized countries, Frankel and Rose (1998) actually found that the more countries trade with each other, the more highly correlated their business cycles are. While they conjectured that this positive correlation is due to intra-industry trade, actual confirmation is made by Shin and Wang (2004) that explicitly find that intra-industry trade is a major source for generating higher co-movements. Lastly, increased trade may create a greater need for more coordinated fiscal as well as monetary policies, which synchronize policy shocks. Then, business cycles become more correlated as movements of outputs are also driven by coordinated policy shocks.

Financial integration can also affect business cycle co-movements. First, Claessen, Dornbusch and Park (2001), Calvo and Reinhart (1996) and Cashin, Kumar and Mcdermott (1995) argued that capital flow can generate business cycle comovement for the countries in the same area that experience ebb and tide of capital at the same time. For example, during the Asian crisis and the Latin American crises, a number of countries in the same area faced outflow of capital simultaneously, aggravating their economies at the same time. Second, as suggested by Kalemli-Ozcam, Sorensen and Yosha (2001), better risk sharing attained through greater financial market integration may induce higher specialization of production and hence larger asymmetric shocks across countries. In other words, better income insurance

provided by risk sharing across countries enables each country to take more risk by specializing more in industries, which leads to less synchronization of business cycles.

Third, better risk sharing due to deeper financial integration also has important implication for co-movements of consumption across countries as well. Despite of asymmetric shocks to outputs, pooling of incomes across countries enhances consumption co-movement. Hence, financial integration may increase or at least does not decrease consumption co-movement as much as output co-movement does.

While there have been various models developed to demonstrate how trade and financial integration affect on output and consumption co-movements across countries, less attention has been made on the effects of trade and financial integration on price co-movements. We expect, however, that both types of integration enhance price co-movements. Especially, deeper financial integration implies that the arbitrage opportunity of trading financial assets weakens, implying quicker convergence of prices of assets. As trade increases, the arbitrage opportunity of trading goods also disappears, suggesting that the price of real goods converges more quickly.

4.2. The Model

Since theoretical predictions are varied and often conflicting in some cases, the answer to the impacts of trade and financial integration on output, consumption and price co-movements lies in the empirical analyses. To implement the empirical analyses, we need to construct co-movement measures and the indices of trade and financial integration.

We compute co-movements of each variable empirically by following the same approach to Lee and Shin (2004) that extends Alesina, Barro and Tenreyro (2002) and Tenreyro and Barro (2002). For output co-movement, we calculate relative output movements between countries *i* and *j* by subtracting output growth for country *j* from that for country *i*: $\Delta \ln(Y_{it}) - \Delta \ln(Y_{jt})$. Then for every pair of countries, (i, j), we compute the second-order auto-regression of the annual time series:

$$\Delta \ln(Y_{it}) - \Delta \ln(Y_{jt}) = c_0 + c_1(\Delta \ln(Y_{it-1}) - \Delta \ln(Y_{jt-1})) + c_2(\Delta \ln(Y_{it-2}) - \Delta \ln(Y_{jt-2})) + u_{ijt}^{\ Y} \quad (1)$$

We use the negative of the absolute value of the estimated residual multiplied by 100 as the extent of output co-movement at each point of time:

$$CoY_{ijt} = -|u_{ijt}^{Y}| \times 100 \quad (2)$$

We also measure the extent of co-movements for the entire sample period by computing the negative of the root-mean-squared error multiplied by 100.[6]

In the same way, we use relative consumption and price movements, $\Delta \ln(C_{it}) - \Delta \ln(C_{jt})$ and $\Delta \ln(P_{it}) - \Delta \ln(P_{jt})$, between countries *i* and *j*, and compute the co-movement measures of consumption and price:

$$CoC_{ijt} = -|u_{ijt}^{C}| \times 100 \quad (3)$$

$$CoP_{ijt} = -|u_{ijt}^{P}| \times 100 \quad (4)$$

where u_{ijt}^{C} and u_{ijt}^{P} are the residuals estimated by the second order auto regression of relative consumption and price movements between countries *i* and *j* respectively.

Trade integration between a pair of countries, (*i*,*j*) is defined by normalizing trade (exports + imports) between the pair by the sum of world trade made by the pair as follows[7]:

$$\text{tradeint}_{ijt} = \frac{x_{ijt} + m_{ijt}}{X_{it} + M_{it} + X_{jt} + M_{jt}}$$

where x_{ijt} (x_{jit}) denotes total nominal exports from country *i* (*j*) to country *j* (*i*) during period *t*; m_{ijt} (m_{jit}) denotes total nominal imports from country *j* (*i*) to country *i* (*j*) during period *t*; and X_{it} (X_{jt}) and M_{it} (M_{jt}) denote total global exports and imports for country *i* (*j*) during period *t*.

While trade integration measure is quite straightforward, a measure of financial integration is generally hard to obtain. In the literature, some studies used direct measures of bilateral capital flows for a subset of countries. However such

[6] See Lee and Shin (2004) for a detailed derivation of the co-movement measures.

[7] An alternative way is to normalize trade by the sum of total trade made by the pair of the countries. The main results do not change if this alternative measure is used.

measures are not available for the countries considered in this paper. Henceforth we decide to use an indirect measure based on the returns on financial assets. Relying on the high-frequency movements of the short term interest rate, we derive an index of financial integration. Namely, we calculate the correlation of the monthly interest rates during the corresponding year and use it as a measure of financial integration.

Unlike the measure of trade integration, a caution is warranted to draw the measure of financial integration from the co-movements of the returns on financial assets such as the interest rate. That is, we cannot conclude that the financial integration is deeper simply because the interest rates move more closely together. For example, if each country is strongly integrated to a third country, despite no actual integration between the two countries, the interest rates in the two countries can move together closely. This is a very realistic scenario for East Asian countries because a number of countries in this area are expected to have a strong connection to the global financial markets such as the U.S. market.

In order to isolate the bilateral integration between any two countries, we eliminate the connection of each country to the global market by regressing the interest rate of each country on the interest rate of the U.S. and use the residuals. For example, for each year *t*, we regress the monthly interest rates of Korea and Japan on the monthly interest rate of the U.S. respectively:

$$i_{mt}^{Kor} = \alpha_0^{Kor} + \alpha_1^{Kor} \times i_{mt}^{U.S.} + \upsilon_{mt}^{Kor}$$
$$i_{mt}^{Jap} = \alpha_0^{Jap} + \alpha_1^{Jap} \times i_{mt}^{Jap} + \upsilon_{mt}^{Jap}$$

where i_{mt}^{Kor}, i_{mt}^{Jap} and $i_{mt}^{U.S.}$ are the monthly interest rates for Korea, Japan and the U.S. for year *t* Then we use the residuals, υ_{mt}^{Kor} and υ_{mt}^{Jap} to calculate the correlation for each year *t* that will act as a measure of financial integration between Korea and Japan for the corresponding year. In general we define the degree of financial integration between countries, (i,j) as follows:

$$\text{finacneint}_{ijt} = \text{corr}(\upsilon_{mt}^{i}, \upsilon_{mt}^{j})$$

where υ_{mt}^{i} and υ_{mt}^{j} are the monthly residuals calculated from the regression of each country's monthly interest rate on the monthly U.S. interest rate for each year.

In the main equation that investigates how trade and financial integration affect on output co-movements, we employ two types of estimation based on the panel regression and cross-section regression respectively. The first type of equation for the panel analyses is as follows:

$$Co\_Y_{ijt} = \beta_0 + \beta_1 \text{tradeint}_{ijt} + \beta_1 \text{exchange}_{ijt} + \delta YEAR_t + \varepsilon_{ijt} \qquad (5)$$

$$Co\_Y_{ijt} = \beta_0 + \beta_1 \text{financeint}_{ijt} + \beta_1 \text{exchange}_{ijt} + \delta YEAR_t + \varepsilon_{ijt}$$

where Co_Y_{ijt} is the extent of output co-movement between country (*i,j*) at each point of time and exchange_{ijt} is the regime classification dummy. Equation (5) enables us to utilize information in (1) at each time of the period, and hence to adopt a panel regression approach which allows us to eliminate unobserved, country-specific effects.

While the first type of equation has its advantage of adopting panel regression, the residual term may not reflect the degree of co-movement at every period of time. Instead it is more likely that the degree of co-movement is measured by the sum of the residuals for the entire sample period. The second type of equation hinges on this idea and forms a cross-section regression as follows:

$$Co\_Y\_SE_{ij} = \beta_0 + \beta_1 \overline{\text{tradeint}}_{ij} + \beta_1 \overline{\text{exchange}_{ijt}} + \varepsilon_{ij} \qquad (6)$$

$$Co\_Y\_SE_{ij} = \beta_0 + \beta_1 \overline{\text{finaceint}}_{ij} + \beta_1 \overline{\text{exchange}_{ijt}} + \varepsilon_{ij}$$

where the variables with the upper-bar are the average of each dummy variable for the entire sample period. In this case, since equation (6) does not rely on time series variation, a disadvantage arises that we cannot eliminate unobserved heterogeneity across countries. We form the same sets of equations for consumption and price to analyze the impacts of trade and financial integration on the co-movements of these two variables.

4.3 Empirical Results

The estimated results for the 1971-1996 period (Sample I) are reported in columns 1-3 of the upper panel, Table 3. For the panel equation (5), we report both regression results with random-effects and fixed-effects in columns 1 and 2. The cross-section regression results are reported in column 3. The same set of the regression results for the 1971-2003 period (Sample II) are reported in columns 4-6. In the upper panel we report six regression results when only trade integration or financial integration is used as a regressor and in the lower panel we also report the same set of the six regression results with the additional explanatory variables, the peg regime dummy.

In Table 3 (A), we report the OLS panel regression results for trade integration. Generally we find that deeper trade integration reinforces output co-movement across countries. The estimated coefficient of trade intensity is mostly positive, but mainly for the random effects and cross section estimations. For the sample I, the coefficient of trade intensity is statistically significant in two out of six cases. On the other hand the coefficient of the peg regime dummy is statistically very significant even at the 1 % level in two out of three cases, indicating that maintaining the fixed exchange rate leads to more synchronization of output. For the sample II, we find even stronger evidence that higher trade intensity enhances output co-movements: four out of six cases are statistically significant. We also find that the exchange rate regime is important in explaining output co-movements.

While the OLS regression results are indicative, it is hardly expected that the output co-movements should be explained solely based on the two explanatory variables. If there are missing variables that are correlated to the trade or financial integration, the estimated coefficients can be biased. To get around this problem we report the instrumental variable (IV) regression results in Table 3 (B). The instrumental variable for the trade intensity is obtained by estimating a conventional gravity model of international trade that is identical to that of Glick and Rose (2002). The dependent variable is the logarithm of bilateral trade. The various measures of size and distance are used as control variables that are standard in the gravity equation. The regression results of the gravity equation are reported in appendix. We calculated the predicted value of bilateral trade and constructed predicted trade intensity that is used for the IV of trade intensity. Since the explanatory variables in the gravity

equation are relatively exogenous, the constructed trade intensity can be used for an instrumental variable.

The IV regression results in Table 3 (b) show a little bit weaker evidence that trade integration leads to more synchronization of business cycles of output. While the estimated coefficient of trade intensity is mostly positive, it is statistically significant in one case for sample I and two cases for sample II. The coefficient of the peg regime dummy is highly significant in most cases, indicating the importance of the exchange rate regime.

The results for the impact of financial integration on output co-movements are reported in Table 3 (C) and (D). Unlike the results for trade integration, the OLS results show that financial integration does not contribute to co-movements of output. Both results for samples I and II, irrespective of adding the peg dummy or not, demonstrate that the coefficient of financial integration is not statistically significant. Table 3 (D) reports the IV regression results. The IV for financial integration is harder to obtain. Based on the recent findings by Portes and Rey (2005) that bilateral equity flows are also well explained by the gravity equation, we estimate the predicted degree of financial integration from the gravity equation and use the estimated value for the IV of financial integration. The IV results also demonstrate that there is very weak evidence that financial integration affects on output co-movements. Only the fixed-effects results show that the coefficient of financial integration is statistically significant if financial integration is used as a sole regressor (upper panel), but the significance disappears as the peg dummy is added (lower panel).

The results for consumption co-movements are reported in Table 4. Generally we find that the coefficient of trade integration is positive but there is no single case where the coefficient is statistically significant even at the 10 % level. The results indicate that trade integration does not raise consumption co-movement across countries. The fact that trade integration does not lead to co-movement of consumption more than to co-movement of output can be interpreted as the extent of risk sharing is not enhanced as trade integration progresses. Even in the extreme case of financial autarky where consumption is solely based on its own output, consumption co-movement should increase as much as output co-movement increases. If financial integration is also enhanced, however, the advancement in consumption co-movement should be even larger than that in output co-movement.

Financial integration is again, however, found not to contribute to consumption co-movement. While financial integration is not expected to increase output co-movement because it may encourage more specialization of industries, consumption co-movement should rise if risk sharing improves. However, we do not find any evidence that financial integration boosts up consumption co-movement. There are two possibilities to explain our findings. First, the measure of financial integration might be poor. As explained, financial integration measure is inferred indirectly from the movement of interest rates that may not appropriately reflect the true degree of financial integration. Since the bond markets in most Asian countries are not fully developed, the official interest rate may not reflect the true market pressures. Second, financial integration is not enough to provide risk sharing across countries in East Asia. It is a well known puzzle that despite no evident impediment to the international capital flows, the evidence of risk sharing is hardly obtained in the international data (Backus, Kehoe and Kydland (1992)). East Asia is not an exception in the sense that international capital flows do not contribute to enhancing risk sharing across countries.

Table 5 reports the impact of trade and financial integration on price co-movement across countries. The random-effects and cross-section results show that trade integration raises price co-movement across countries. This is true for both OLS and IV regression results. Interestingly fixed effects results again show weaker evidence. While the estimated coefficients of fixed effects are generally positive, only one case is statistically significant.

Financial integration also shows, if any, weaker evidence of enhancing price co-movement. While the estimated coefficient is statistically significant when financial integration is solely used as a regressor, it loses significance as the peg regime dummy is included.

5. Concluding Remarks

In this paper we explored three important areas where the deeper trade and financial integration in East Asia can influence: (1) business cycle co-movements in the region, (2) the extent of risk sharing across countries and (3) price co-movements across countries. We find some evidence that trade integration enhances co-

movements of output but not of consumption across countries. Especially the fact that trade integration does not raise co-movements of consumption as much as output is interpreted that trade integration does not improve the extent of risk sharing. Co-movements of price rise most significantly as trade integration deepens, lowering the border effects and allowing better opportunities for resource reallocation across countries. Generally trade integration tightens overall integration across countries, which provides better environments for further integration in the form of monetary union.

In contrast financial integration demonstrates much weaker evidence of enhancing co-movements across countries. Deeper financial integration improves price co-movements weakly but does not enhance output or consumption co-movements at all. Since the current level of financial integration in East Asia is quite low, our evidence is too early to firmly determine the role of financial integration and may be overturned as financial integration proceeds in this area.

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Table 1: Trade Share of East Asia in the World

	Trade						GDP					
	1980	**1990**	**2000**	**2001**	**2002**	**2003**	**1980**	**1990**	**2000**	**2001**	**2002**	**2003**
World	100	100	100	100	100	100	100	100	100	100	100	100
East Asia	13.9	18.2	22.2	21.4	22.1	22.2	13.9	18.7	22.6	20.9	19.5	19.7
Japan	7.3	8.0	6.6	6.1	5.8	5.6	9.6	14	15.4	13.3	12.2	11.8
Korea	1.1	2.1	2.6	2.3	2.4	2.5	0.6	1.2	1.5	1.5	1.1	1.7
Other NIES	1.2	2.5	3.3	3.3	3.3	3.1	0.3	0.4	0.5	0.6	0.5	0.5
ASEAN	3.5	4.4	6.1	5.7	5.7	5.5	1.6	1.5	1.8	1.7	1.8	1.8
China	1	1.7	3.7	4.1	4.8	5.6	1.8	1.6	3.4	3.8	3.9	3.9
U.S.A.	13.0	13.2	15.5	15.4	14.5	13.2	24.9	26.4	31.2	31.9	32	30
EU	43.1	45.3	37.5	38.8	39.2	40.3	25.5	25.4	19.2	19.6	20.5	22.5
Others	31.2	24.5	26.1	25.7	25.4	25.2	35.7	29.5	27	27.5	28	27.8

Note: ASEAN includes Myanmar, Cambodia, Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam and other NIES includes Hong Kong, Macau, and Mongolia.
Source: International Monetary Fund. *Direction of Trade Statistics.*

Table 2: Summary Statistics

(a) Sample Period: 1971-1996 (Number of Obs. = 914)

	Mean	Std. Dev
Log of trade	16.68	1.68
Log of distance	7.38	0.46
Log of GDP in pairs	41.72	2.09
Log of per capita GDP in pairs	6.84	1.80
Log of area in pairs	23.64	3.97
Common land border dummy	0.085	0.28
Peg dummy	0.68	0.46

Note: This sample statistics are for country pairings in East Asia: China, Hong Kong, Indonesia, Japan, Korea, Malysia, Phillipines, Singapore, Thailand.

(b) Sample Period: 1971-2003 (Number of Obs. = 1166)

	Mean	Std. Dev
Log of trade	17.02	1.71
Log of distance	7.38	0.46
Log of GDP in pairs	42.08	2.12
Log of per capita GDP in pairs	7.02	1.86
Log of area in pairs	23.66	3.98
Common land border dummy	0.085	0.28
Peg dummy	.62	.49

Note: See note for Table 2 (a).

Table 3: Effects of Trade and Financial Integration on Output Co-movements

A. OLS Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	0.046 (0.035)	0.030 (0.116)	0.083* (0.048)	0.528* (0.031)	0.168 (0.111)	0.079* (0.043)
	R-squared	0.21	0.20	0.002	0.24	0.23	0.002
Panel II	Log of bilateral trade intensity	0.074** (0.036)	-0.005 (0.117)	0.082 (0.050)	0.095** (0.033)	0.155 (0.113)	0.074* (0.040)
	Peg	0.008** (0.002)	0.016** (0.003)	-0.002 (0.003)	0.010** (0.002)	0.023** (0.003)	0.000 (0.003)
	R-squared	0.21	0.18	0.001	0.21	0.18	0.003
	No. Observations	756	756	756	799	799	799

Note: The dependent variable is comovement measure of output. Sample I refers to 1971-96 and sample II, 1971-2003. Intercept and year dummy variables are included (not reported). Robust standard errors of the estimated coefficients are reported in parentheses. ** and * indicate that the estimated coefficients is statistically significant at 1 % and 5 % respectively.

B. IV Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	0.032 (0.136)	-0.147 (0.549)	0.030 (0.146)	0.046 (0.111)	-0.486 (6.085)	0.088 (0.113)
	R-squared	0.21	0.17	0.001	0.24	0.11	0.002
Panel II	Log of bilateral trade intensity	0.337* (0.194)	5.091 (3.855)	0.113 (0.294)	0.262* (0.134)	5.605* (3.370)	0.085 (0.141)
	Peg	0.009** (0.003)	0.020** (0.006)	-0.005 (0.006)	0.011** (0.002)	0.025** (0.005)	-0.000 (0.040)
	R-squared	0.16	0.16	0.001	0.19	0.14	0.003
	No. Observations	756	756	756	799	799	799

Note: See note for Table 3 A.

C**. OLS Regression for Financial Integration**

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Bilateral financial integration	0.001 [0.003]	0.003 [0.003]	-0.006 [0.005]	0.002 [0.003]	0.001 [0.004]	-0.002 [0.005]
	R-squared	0.22	0.21	0.68		0.22	0.63
Panel II	Bilateral financial integration	-0.001 [0.003]	-0.001 [0.003]	0.002 [0.011]	-0.002 [0.003]	-0.001 [0.003]	0 [0.009]
	Peg	0.002 [0.003]	0.034** [0.005]	-0.006 [0.007]	0.004 [0.003]	0.031** [0.005]	-0.003 [0.006]
	R-squared	0.22	0.3	0.7		0.28	0.65
	No. Observations	377	377	377	407	407	407

Note: Sample I refers to 1971-96 and sample II, 1971-99. For others see note for Table 3 A.

D. IV Regression for Financial Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Bilateral financial integration	0.005 [0.005]	0.121** [0.044]	-0.005 [0.006]	0.002 [0.005]	0.123** [0.045]	-0.001 [0.006]
	R-squared	0.22	0.01	0.002			
Panel II	Bilateral financial integration	-0.011 [0.025]	0.122 [0.195]	0.07 [0.086]	-0.054 [0.029]	0.623 [2.619]	0.023 [0.026]
	Peg	0.007 [0.011]	0 [0.055]	-0.044 [0.048]	0.025* [0.012]	-0.124 [0.652]	-0.016 [0.015]
	R-squared	0.22	0.01	0.002			
	No. Observations	377	377	377	407	407	407

Note: See note for Table 3 A.

Table 4: Effects of Trade Integration on Consumption Co-movements

A. OLS Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	-0.006 (0.059)	0.179 (0.148)	0.018 (0.078)	0.028 (0.054)	0.114 (0.151)	0.080 (0.075)
	R-squared	0.11	0.08	0.001	0.20	0.20	0.002
Panel II	Log of bilateral trade intensity	-0.003 (0.060)	0.181 (0.151)	0.006 (0.081)	0.012 (0.056)	0.200 (0.152)	0.053 (0.076)
	Peg	0.002 (0.003)	0.001 (0.003)	-0.007 (0.006)	0.004 (0.003)	0.007** (0.003)	-0.007 (0.006)
	R-squared	0.11	0.08	0.01	0.12	0.10	0.002
	No. Observations	756	756	756	792	792	792

Note: The dependent variable is comovement measure of consumption. See note for Table 3 A for other things.

B. IV Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	-0.017 (0.368)	1.211 (2.031)	0.155 (0.316)	0.061 (0.309)	1.686 (5.437)	0.278 (0.313)
	R-squared	0.11	0.02	0.002	0.20	0.03	0.001
Panel II	Log of bilateral trade intensity	0.028 (0.404)	0.638 (2.594)	-0.206 (0.431)	0.225 (0.303)	2.646 (2.736)	-0.004 (0.350)
	Peg	0.002 (0.004)	0.001 (0.004)	-0.009 (0.009)	0.006 (0.003)	0.008 (0.004)	-0.007 (0.007)
	R-squared	0.11	0.02	0.001	0.09	0.03	0.005
	No. Observations	756	756	756	792	792	792

Note: See note for Table 4 A.

C**. OLS Regression for Financial Integration**

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	0.001	0.006	-0.014	-0.001 [0.004]	0.006 [0.005]	-0.024* [0.009]
	R-squared	0.17	0.22	0.55		0.22	0.47
Panel II	Log of bilateral trade intensity	0.003	0.004	-0.004	0.003 [0.004]	0.005 [0.004]	-0.022 [0.017]
	Peg	-0.003	0.019*	-0.006	-0.004 [0.003]	0.006 [0.007]	0.003 [0.012]
	R-squared	0.17	0.22	0.56		0.2	0.44
	No. Observations	377	377	377	407	407	407

Note: See note for Table 4 A.

D. IV Regression for Financial Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	-0.005 [0.038]	0.073* [0.185]	-0.02 [0.142]	0.008 [0.013]	0.031 [0.025]	0.033 [0.042]
	R-squared	0.17	0.12	0.004			
Panel II	Log of bilateral trade intensity	-0.037 [0.038]	0.1 [0.185]	-0.094 [0.142]	0.023 [0.075]	0.034 [0.057]	-0.316 [0.490]
	Peg	0.015 [0.017]	-0.008 [0.052]	0.044 [0.080]	-0.006 [0.026]	-0.002 [0.016]	0.163 [0.268]
	R-squared	0.17	0.12	0.004			
	No. Observations	377	377	377	407	407	407

Note: See note for Table 4 A.

Table 5: Effects of Trade Integration on Price Co-movements

A. OLS Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	0.341** (0.119)	0.040 (0.273)	0.802** (0.259)	0.442** (0.132)	0.631** (0.312)	0.814** (0.317)
	R-squared	0.27	0.27	0.008	0.26	0.25	0.01
Panel II	Log of bilateral trade intensity	0.414** (0.123)	0.048 (0.266)	0.770** (0.275)	0.463** (0.120)	0.320 (0.267)	0.670** (0.328)
	Peg	0.014** (0.004)	0.029** (0.005)	-0.005 (0.012)	0.014** (0.004)	0.029** (0.005)	-0.018 (0.014)
	R-squared	0.27	0.21	0.008	0.27	0.21	0.02
	No. Observations	574	574	574	770	770	770

Note: The dependent variable is co-movement measure of price. See note for Table 3 A for other things.

B. IV Regression for Trade Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	1.215** (0.433)	-3.029 (3.595)	1.448** (0.612)	1.276** (0.469)	8.988 (13.561)	1.718** (0.775)
	R-squared	0.21	0.04	0.02	0.21	0.05	0.01
Panel II	Log of bilateral trade intensity	1.529** (0.449)	4.694 (3.644)	1.640** (0.820)	1.588** (0.512)	3.013 (3.508)	1.533** (0.914)
	Peg	0.020** (0.005)	0.030** (0.007)	0.006 (0.017)	0.021** (0.005)	0.029** (0.006)	-0.013 (0.019)
	R-squared	0.19	0.08	0.02	0.19	0.12	0.02
	No. Observations	574	574	574	770	770	770

Note: See note for Table 5 A.

C**. OLS Regression for Financial Integration**

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	-0.003 [0.005]	0.004 [0.005]	-0.018 [0.015]	-0.008 [0.005]	-0.007 [0.005]	-0.033 [0.022]
	R-squared	0.31	0.33	0.56	0.29	0.25	0.16
Panel II	Log of bilateral trade intensity	-0.006 [0.005]	-0.003 [0.005]	0.005 [0.033]	-0.008 [0.005]	-0.006 [0.005]	-0.015 [0.042]
	Peg	-0.007 [0.005]	0.002 [0.008]	0.049 [0.021]	0.022** [0.006]	0.048** [0.007]	-0.013 [0.028]
	R-squared	0.27	0.43	0.58	0.20	0.38	0.16
	No. Observations	377	377	377	407	407	407

Note: See note for Table 5 A.

D. IV Regression for Financial Integration

		(1)	(2)	(3)	(4)	(5)	(6)
		Sample I			**Sample II**		
		Random Effects	Fixed Effects	Cross Section	Random Effects	Fixed Effects	Cross Section
Panel I	Log of bilateral trade intensity	0.062** [0.024]	0.150** [0.049]	0.074 [0.082]	0.043* [0.020]	0.160** [0.054]	0.071 [0.090]
	R-squared	0.30	0.00	0.00	0.19	0.01	0.01
Panel II	Log of bilateral trade intensity	-0.004 [0.141]	-0.039 [0.056]	-0.484 [0.778]	-0.023 [0.109]	0.051 [0.069]	-0.558 [0.925]
	Peg	0.048 [0.047]	0.074** [0.018]	0.254 [0.435]	0.045 [0.032]	0.034 [0.019]	0.282 [0.506]
	R-squared	0.30	0.00	0.001	0.03	0.01	0.01
	No. Observations	377	377	377	407	407	407

Note: See note for Table 5 A.

Appendix Table: The Gravity Equation Estimation of Trade

	(1)	(2)	(3)	(4)
	Sample I		**Sample II**	
	Random Effects	Fixed Effects	Random Effects	Fixed Effects
Log of distance	-0.311 (0.280)	--	-0.341 (0.260)	--
Log of GDP in pair	0.920** (0.120)	1.615** (0.255)	1.045** (0.103)	1.597** (0.166)
Log of per capita GDP in pair	-0.363** (0.118)	-1.048* (0.233)	-0.585** (0.101)	-1.141* (0.154)
Log of area in pair	-0.381** (0.068)	--	-0.459** (0.059)	--
Common land border	1.012** (0.456)	--	1.058** (0.433)	--
No. Observations	861	861	1113	1113
R-squared	0.71	0.10	0.70	0.10

Notes: The dependent variable is the log of real bilateral trade. Sample I refers to 1971-96 and sample II, 1971-2003. Intercept and year dummy variables are included (not reported). Robust standard errors of the estimated coefficients are reported in parentheses. ** and * indicate that the estimated coefficients is statistically significant at 1 % and 5 % respectively.