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경제학박사학위논문

Essays on regional economic integration

경제통합에 관한 에세이

2012년 8월

서울대학교 대학원
경제학부 경제학 전공

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Essays on regional economic integration

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Abstract

Essays on regional economic integration

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This dissertation consists of three essays on regional economic integration. In Chapter 1, we will investigate the economic impacts of possible FTAs among China, Japan, and Korea and then compare the GDP and welfare effects of FTAs. In order to make a CGE analysis, we employ a multi-region, multi-sector static CGE model with 5 regions, 12 sectors, and 5 endowments. Considering four possible FTA scenarios (FTA-CJK, FTA-KC, FTA-KJ, and FTA-CJ), we examine the economic effects of FTAs then show which form of FTAs is most beneficial for each country. For the best scenario of FTA policy, Korea would establish an FTA with China; China and Japan would form a trilateral FTA. In addition, we provide the output and trade effects of FTA-KC and FTA-CJK. Finally, we also compare the effects of FTA signed in 2001 and 2007.

In chapter 2, we examine the effects of internal (or regional) vs. external (inter-regional) and trade vs. financial integration on internal (or regional) business cycle synchronization in Asia during the 2000s. The empirical results show that (1) similar and positive external linkages have significant positive effects on regional

business cycle synchronization in Asia (2) after controlling external linkages, internal trade integration has a positive effect on regional business cycle synchronization but internal financial integration has a negative effect on regional business cycle synchronization. The negative effect of financial integration is especially interesting because past empirical studies often found a positive effect despite of the negative effect predicted by theories.

In chapter 3, we will find the internal and external effects on business cycle synchronization in developing countries under the background of globalization. Meanwhile, to find the different effects in different developing regions, especially the indirect effects brought about by external effects, we will compare the result of three developing regions Emerging Asia, Latin America, and Central and Eastern Europe. The empirical results show us that the similar and positive trade linkage have significant positive effects and that positive financial linkage have direct significant negative effects on regional business cycle synchronization, while the indirect effect and the importance of each variable is not the same in different regions.

Keywords: Free Trade Agreement (FTA), Northeast Asian FTA, Computable General Equilibrium (CGE) Analysis, Business Cycle Synchronization, internal and external integration, trade and financial integration, Asia, Emerging Asia, Latin American, Central & Eastern Europe

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Thesis Introduction

Since 1990s, the rapid growth of regional trade and financial integrations across countries is significantly impelling the economic development. From another side, this development, which brings high international good and capital mobility, has tied the countries more closely in recent decades, especially in a certain region.

On the trade side, the accumulative increase in the volume of world trade is almost three times larger than that of world output in the period 1960~2010, and the world trade amount sharing of world GDP increased from 19% in 1980 to 24% in 2010, and in Emerging & Developing economics it increased from 6% in 1980 to 9% in 2010, which is higher than that of advanced economics.

On the financial side, the gross FDI stock shared 6.5% of world GDP in 1980 which has jumped to 30% of world GDP in 2010, while it increased over 6 folds to 19.9% of the world GDP in advanced countries and it increased almost fourfold to 9.5% of world GDP in emerging markets. Although there is a difference between advanced countries and emerging countries, it still shows us the strong growth momentum in regional trade and financial integration, especially after the fail of Doha round of trade negotiations.

This thesis will mainly discuss the economic effects of free trade agreements (FTA) and the factors which affect business cycle synchronization and the cost of common monetary.

On the side of trade integration, we will mainly discuss the FTAs among Northeast Asian countries. As we know, compared with other regions, Northeast Asia takes up an important position in the world economic territory while their economic integration course gets behind greatly. We employ a multi-region, multi-sector static computable

general equilibrium (CCE) model, a general method to study trade integration, to investigate the economic impacts of possible FTAs among China, Japan, and Korea, and then compare the GDP and welfare effects of those FTAs. Considering four possible FTA scenarios, we examine the economic effects of the FTAs and then rank them to show which form of FTA is most beneficial for each country. In addition, we provide the output and trade effects of two different FTA scenarios for Korea.

Then turning to the financial integration, synchronized business cycles can make sure the common monetary policy works effectively, so it can present the cost of forming currency union. Thus, we will examine the effects of internal (or regional) vs. external (inter-regional) and trade vs. financial integration on internal (or regional) business cycle synchronization in Asia during the 2000s and find that internal financial integration has a negative effect on regional business cycle synchronization. The negative effect of financial integration is especially interesting because past empirical studies often found a positive effect despite of the negative effect predicted by theories. It also reflects that FTA among Northeast Asia not only impels the development of their economy, but also can lower the cost of impelling their common monetary policy.

It is necessarily to further develop and verify the results of the last chapter. As we know, the integration process of developing countries is still far behind advanced countries. It is more interesting to study the developing cases. Thus, we will find the effects of internal and external on business cycle synchronization in developing countries under the background of globalization. Meanwhile, we compared the result of 3 developing regions, Emerging Asia, Latin American and Central and Eastern Europe. The empirical results show us that the similar and positive trade linkage have significant positive effects and positive financial linkage have significant negative effects on regional business cycle synchronization, while the indirect effect is not the same in different regions.

In conclusion, this thesis helps us know the CGE model, the economic effects of FTAs among the Northeast Asia, and how the relative factors affect business cycle synchronization.

**Chapter 1 A CGE Analysis of Free Trade Agreements --
among China, Japan, and Korea**

1. Introduction

In recent years, we have witnessed the rising tide of regionalism in the form of regional trading arrangements (hereinafter RTAs) such as Customs Unions (CUs) and Free Trade Agreements (FTAs). In the period 1950-2012, 511 RTAs, counting goods, and services notifications separately, have been received by the GATT/WTO and 370 PTAs were notified by the GATT/WTO under Article XXIV, 36 RTAs were notified under the Enabling Clause, and the remaining 105 were notified under Article V of the GATS.^{1 2} The surge in RTAs is expected to continue unabated in the early 21st century as RTAs have become a popular trade policy for many governments.

Northeast Asia is a late-comer in a sense that it was the only major region in the world without any meaningful RTAs before the late 1990s. Recently, regionalism has spread to Northeast Asia. Moreover, in the last decade alone half of the all PTAs signed involve at least one Asian economy (ESCAP, 2011). The number of concluded FTAs in Asia increased from only three to 61 during 2000 ~ 2012. 47 of these FTAs are currently in effect. Another 79 are either under negotiation or proposed. Asia is ahead of the Americas in FTAs per country—on average Asia has 3.8 concluded FTAs per country compared with 2.9 for the Americas.³ China, Japan, and Korea, in Northeast Asia have joined the worldwide trend of regionalism. Since the late 1990s, they all have actively engaged in establishing FTAs and have begun to be involved in the FTA-related research and official FTA negotiations, but no FTA has been signed among them.

Since the early 2000s, Northeast Asian countries have been pursuing in bilateral and trilateral FTAs within the region. As for the possibility of an FTA between Korea and

¹ Database of the World Trade Organization (WTO), available at <http://rtais.wto.org>

² For the information about Article V and other relative Clause, see http://www.wto.org/english/res_e/booksp_e/analytic_index_e/gats_02_e.htm

³ ADB report 2010

China (hereafter FTA-KC), the joint research has been conducted to examine the macroeconomic and industrial impacts of an FTA-KC since 2005. The joint research on a tripartite FTA among China, Japan, and Korea (hereinafter FTA-CJK) has been undergoing since 2002. Then during 2003~2009, a Trilateral Joint Research Project on a FTA among China, Japan and Korea (CJK FTA) was conducted jointly by the Development Research Center (DRC) of the State Council of China, the National Institute for Research Advancement (NIRA)⁴ of Japan, and the Korea Institute for International Economic Policy (KIEP). They concluded that a trilateral FTA would bring macroeconomic benefits to all three countries, leading to a win-win-win situation. Then the Joint Study Committee (JSC) for a CJK FTA was launched in Jan. 2010. Especially, in May 2012, China, Japan, and South Korea agreed to launch talks on a free trade area later this year as their leaders gathered in Beijing for the fifth annual trilateral summit, committing to the free movement of goods, services, and freer flows of capital.

Some research institutions and academics have explored the proposition of a trilateral FTA among China, Japan, and Korea. For instance, among these are Abe (2003), Park (2004), Lee *et al* (2005), and Choi (2010). They all applied a computable general equilibrium (hereafter CGE) model to assess the economic impacts of an FTA among China, Japan, and Korea. However, these prior studies are different one way or another depending upon CGE model or GTAP (Global Trade Analysis Project) database and scenarios of trade liberalization, especially in services. Some utilized the static CGE model only, while others considered the dynamic or capital accumulation CGE model, too. Most of them also simulated the CGE model using the GTAP Database version 5.0~7.0, and there are few studies using the version 8.0, which released in March 2012.

Virtually, the CGE analysis enables researchers to quantitatively derive changes in

⁴ The Japanese institution was replaced from NIRA to the Japan External Trade Organization (JETRO) in 2009

national income, industrial production, and welfare resulting from a policy change or a certain shock. In trade literature, it has been extensively utilized to analyze the effects of changes in trade policy such as a RTA and multilateral trade liberalization negotiations for each country and industry. For example, Lee & Moon (2010) took a CGE approach to investigate the impacts of FTA in East Asia. The standardized CGE model has the advantage of deriving many valuable results at a relatively small expense and little effort.

Meanwhile, trade economists also used a CGE model to investigate the economic effects of a bilateral FTA between China, Japan, and Korea. Lee, H.S. et al (2005) and Zhang (2006) conducted a CGE analysis to obtain the economic impacts of a FTA between Korea and China. Ahn et al (2005) analyzed the economic effects of a FTA between Korea and Japan (FTA-KJ) in the framework of a CGE model. Huh (2011) examined the issue of efforts to shelter agricultural sectors influenced by FTAKJ. However, few researchers have comparatively analyzed the economic impacts of 4 possible forms of FTA among China, Japan, and Korea, 3 possible bilateral FTAs and a trilateral FTA, except for Lee, C.J. et al (2005). Even though they did spare some discussion on the bilateral FTAs between Korea and China and between Korea and Japan, they did not actually compare the macroeconomic and sectoral effects, especially the time varying effects⁵, of 4 alternative FTAs with additional assumption that capital and skilled labor is mobile.

This paper intends to fill the gap in the research and complement the prior literature. We will use the GTAP database (Version 8), which was released in March 2012. The purpose of this paper is to explore the economic impacts of four different forms of FTAs between China, Japan, and Korea and compare them with each other. Examining the

⁵ Here, the time varying effects means the different effects brought by the same FTA signed at different time.

effects of FTAs on GDP, welfare, trade volume, and terms of trade, this paper could answer which form of FTAs is most beneficial for each country. In addition, this paper will investigate the effects of FTA-CJK on the industrial productions as well as the sectoral effects of FTA-KC which gives rise to the largest GDP and welfare effects for Korea. More importantly we will exam the time varying effects to find the different signing time points of the FTA, and then try to find why there is change. Finally, this paper deals with the best option for CJK's FTA strategy.

This paper is organized as follows: in section 2, this paper summarizes development of FTAs in Northeast Asia. Section 3 briefly explains the trade structures of and trade relations among China, Japan, and Korea. In section 4, the macro economic impacts of bilateral and trilateral FTAs among China, Japan, and Korea are quantitatively analyzed using a CGE model and extensively compared. The sectoral effects and time varying effects of an FTA-KC and a trilateral FTA-CJK are examined in section 5. Section 6 concludes this paper.

2. FTAs in Northeast Asia

Until late 1990s, the three Northeast Asian countries, China, Japan, and Korea had not shown much interest in any form of regional trading arrangements (RTAs) despite the growing fever of regionalism in most other parts of the world because they have greatly profited from an open world economy and hence for a long time have been strong believers in multilateralism. However, the attitude of three countries toward regionalism dramatically changed after the financial crisis in East Asia. They all began to show much interest toward regional economic cooperation in the form of FTAs. Now, a dramatic increase in the number of such agreements in recent years shows us FTAs are

explosion of FTAs in East Asia. And most of them are led by the large economies of Northeast Asia—China, Korea, and Japan.

Korea, up to late-1990s, still relied on the multilateral framework of GATT/WTO and implemented its trade policy consistently with the multilateral trade agreements. However, both external and internal factors made Korea consider the adoption of an FTA policy at the wake of the financial crisis in 1997. In the beginning, in order to recover from the economic crisis, the Korean government announced its basic FTA strategy to launch an FTA negotiation with Chile and sequential FTAs with similar, small and medium sized countries. Now Korea is pursuing FTAs with a priority in large advanced markets, emerging large economics and countries with rich natural resources.⁶

As a result of aggressive efforts, Korea has succeeded in establishing FTAs with Chile, Singapore, EFTA⁷ (European Free Trade Association), ASEAN⁸, India, EU, Peru, and the United States. Currently, Korea is involved in FTA negotiations with Canada, Mexico, GCC⁹ (Gulf Cooperation Council), Australia, New Zealand, Indonesia, and China

Korea also raised the possibility of a trilateral FTA with China and Japan from late 1990s. The three countries first made an official attempt to discuss stronger economic cooperation in Northeast Asia during a trilateral summit meeting in Manila in November, 1999. Then a trilateral joint research project was initiated and since 2002 it has been undertaken by the Development Research Center (DRC) of the China State Council, the Japan National Institute for Research Advancement (NIRA), and the Korea Institute for International Economic Policy (KIEP). This research has been carried out on a

⁶ The talk of Taeho Bark, Minister for Trade of Korea, in May 16, 2012

⁷ EFTA consists of 4 member countries such as Iceland, Liechtenstein, Norway, and Switzerland.

⁸ ASEAN (Association of Southeast Asian Nations) was established in 1967 by the five original Member Countries, namely, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Brunei Darussalam joined in 1984, Vietnam in 1995, Laos and Myanmar in 1997, and Cambodia in 1999.

⁹ GCC is a customs union whose member countries are Saudi Arabia, Kuwait, the United Arab Emirates, Bahrain, Oman, and Qatar.

step-by-step basis, examining “the economic effects of a possible free trade agreement among China, Japan, and Korea”. They find that a trilateral FTA would bring macroeconomic benefits to all three countries, leading to a win-win-win situation. Then the Joint Study Committee (JSC) for a CJK FTA was launched in January 2010 as the result. In May 2012, these three countries agreed to launch talks on a free trade area later this year as their leaders gathered in Beijing for the fifth annual trilateral summit, committing to the free movement of goods, services, and freer flows of capital.

A technical joint research which reported the macroeconomic effects of an FTA-CJK in static and capital accumulation CGE model based on two different scenarios was finished in 2005. In that research, scenario 1 assumes both complete liberalization in agricultural and manufacturing sectors with no opening in service market in static and capital accumulation CGE model, while scenario 2 includes 50% reduction in service trade barriers into scenario 1. Korea’s GDP is expected to increase by 3.27~4.74 percent in scenario 1 depending on CGE model, static or capital accumulation model, and an even higher increase, 3.54~5.15 %, is expected in scenario 2. Korea’s exports to the world would increase by 7.9~9.8 percent with the formation of a FTA-CJK.

Under those scenarios, Korea would enjoy the highest benefits in terms of GDP growth. The terms of trade are expected to improve 0.40~0.79 percent for Korea as a result of a FTA-CJK. Meanwhile it would improve 0.29~0.35 percent for China and 1.37~1.42 percent for Japan. In this respect, Japan would be the highest beneficiary from a FTA-CJK. In the static model with the scenario 1 of an FTA-CJK, Korea’s exports to China are expected to increase by 24.4 billion USD and Korea’s exports to Japan would increase by 3.5 billion USD. Under scenario 2 with service trade liberalization, Korea’s exports to China are expected to increase by 24.28 billion USD and Korea’s exports to Japan are expected to increase by 4.3 billion USD. Korea’s exports to China would increase by only 120 million USD due to the additional liberalization in service trade,

while Korea's exports to Japan would increase by 800 million USD. This is because the service market in China is still underdeveloped, so the service trade between Korea and China is quite small.

Now let us briefly summarize the FTA policies of China and Japan. Japan's FTA policies impelled in the early 2000s, especially after the failure of a Multilateral Agreement¹⁰, and it was much influenced by the economic interests of its businesses facing the competitive challenges abroad. Like Korea, Japan signed its first FTA with Singapore by considering the agriculture industry. Japan has been participating in promoting regionalism and establishing FTAs with major trading partners. This policy eventually gave birth to the establishment of FTAs (or EPA) with Mexico, Malaysia, Chile, Thailand, Indonesia, Brunei, ASEAN, Philippine, Switzerland, Viet Nam, India, and Peru.

Korea and Japan began an official negotiation for a bilateral FTA in 2003 and finished their 5th official negotiation in 2011. Japan also actively participated in and made contributions to various studies on frameworks possible for economic partnership in East Asia and the Asia-Pacific region, such as the Comprehensive Economic Partnership in East Asia (CEPEA), the East Asia Free Trade Agreement, (EAFTA) and the Free Trade Area of the Asia-Pacific (FTAAP). Japanese government considered to take advantage of an integrated market of 2 billion people, encompassing Japan, Korea, and ASEAN, as well as China, Hong Kong, and Taiwan. This group would represent a third of the world's population and would seek to liberalize trade and investment in East Asia's vast markets.

The Chinese Government deems Free Trade Agreements (FTAs) as a new platform to further opening up to the outside and speeding up domestic reforms and an effective approach to integrate into global economy and strengthen economic cooperation with

¹⁰ Such as the Doha Negotiation, Multilateral Agreement on Investment(MAI), sponsored by OECD.

other economies, as well as a particularly important supplement to the multilateral trading system. Currently, China has 14 FTA partners comprised of 31 economies, among which 8 Agreements have been signed already¹¹. China is also engaged in the joint study on the possibility of an FTA with Korea. The joint research team from both sides analyzed the macroeconomic and sectoral impacts of a Korea-China FTA and then discussed sensitive issues and coverage of FTA negotiation. A Korea-China FTA is expected to have considerable economic impacts on both countries as results of the removal of trade barriers and trade & FDI promotion effects.

3. Trade Relations among China, Japan, and Korea

From now on, this paper will examine trade relations among the three countries, China, Japan, and Korea. Such discussion will shed light on some features of proposed FTAs consisting of two or three of these countries. Table 1 shows some important information about the economies of the three countries.

Generally speaking, the overall speed of CJK's economic growth is faster than the average of the world. Table 2 shows general information about three regions of the world. The Northeast Asian region has about 1.55 billion people which make up 22.46% of the world population and possesses 24.01% percent of world GDP and 18.45% of the world trade volume in 2010. Compared with EU and NAFTA, the economy of CJK is larger than EU, while its total trade amount is larger than NAFTA. And this also reveals that CJK region has the largest consumers (potential market size) and the greatest

¹¹ After first announced its plan to promote FTAs at the end of 2000, they launched FTA negotiations with ASEAN, GCC, Chile, New Zealand, Chile, Pakistan, Singapore and New Zealand. With Hong Kong and Macao, China also concluded CEPA (Closer Economic Partnership Arrangement) to include the liberalization of trade both in goods and services in 2003. FTA negotiations with Australia, Singapore, and Peru are now in process, and energy security issues have been raised on the FTA negotiation with the GCC since 2004.

potential of the economic growth among the three regions of the world.

Table 1 The economic index of three countries¹², 2011

	Korea	China	Japan
Area (thousand sq.km)	9.9	960	37.8
Population (million USD)	48.86	1,343.23	127.37
GDP (ppp, trillion USD)	1.539	11.290	4.389
GDP rank	13 th	3 rd	5 th
GDP per capital (USD)	31,700	8,400	34,300
Growth rate of GDP (%)	3.6%	9.2%	-0.5%
Foreign exchange reserves (billion USD)	306.4(8 th)	3.236(1 st)	1.063(2 th) ¹³
Total Trade Volume (billion USD)	1080.9	3,641	1,595.5
Export (billion USD)	556.5	1,898	800.8
Import (billion USD)	524.4	1,743	794.7

Source: World Factor Book, 2012

Table 2 Comparison between CJK, EU, and NAFTA in 2010¹⁴

	Population		GDP		Total Trade Volume	
	million	%	Billion	%	Billion	%
CJK	1,548.75	22.46%	9,929.03	24.01%	6,864.37	18.45%
EU	502.13	7.28%	9,724.23	23.52%	13,039.90	35.05%
NAFTA	456.90	6.63%	13,163.12	31.83%	5,796.87	15.58%
world	6,894.59		41,351.04		37,205.35	

Source: World Development index, 2012.6

Table 3 shows the bilateral and intra-regional trade among Korea, China and Japan. The bilateral trade between China, Japan, and Korea has been rapidly increasing, while the interregional trade sharing was around 25% in recent years. This means that China, Japan, and Korea are very important trading partners with each other. Given deepening

¹² EU countries were counted as a country, and they also were counted as separate countries again.

¹³ The 2010 data

¹⁴ GDP is based on constant 2000 USD; the unit of GDP and trade volume is USD.

economic interdependency among them, the need for policy cooperation among them is obvious.

Table 3 Trilateral Trade among China, Japan, and Korea

(Unit: million USD, %)

		2000	2002	2004	2006	2008	2010	2011
Korea to(from)	Ex(A)	18454.54	23753.59	49763.18	69459.18	91388.9	116837.8	134204.9
	Im(B)	12798.73	17399.78	29584.87	48556.68	76930.27	71573.6	86425.82
China	A-B	5655.812	6353.808	20178.3	20902.5	14458.63	45264.23	47779.1
Korea to(from)	Ex(A)	20466.02	15143.18	21701.34	26534.02	28252.47	28176.28	39712.55
	Im(B)	31827.94	29856.23	46144.46	51926.29	60956.39	64296.12	68301.92
Japan	A-B	-11361.9	-14713	-24443.1	-25392.3	-32703.9	-36119.8	-28589.4
China to (from)	Ex(A)	41654.05	48483.03	73536.26	91772.49	116176.5	120262.4	147290.1
	Im(B)	41520.27	53489.04	94191.67	115810.9	150807.5	176304	194409.8
Japan	A-B	133.777	-5006.01	-20655.4	-24038.4	-34631	-56041.6	-47119.7
Intra-regional Trade Share	Ex	17.0%	18.9%	20.6%	19.3%	18.7%	19.3%	19.2%
	Im	24.2%	26.3%	28.1%	26.9%	24.6%	25.2%	23.5%

Source: IMF, DOT

As stated above, the trade relations among China, Japan, and Korea have been deepening very fast and their trade volumes with each other have been increasing year by year, while their trade complementarities are maintained at a high level. However, the trade imbalance is another nature of trade structure in the three countries. In recent years, Korea and China are running continuous trade deficits with Japan, while Korea and Japan are running continuous trade surpluses with China.

Let us now examine trade in agriculture among the three countries and the rest of the world.¹⁵ It is worthwhile to look at trade in agriculture among China, Japan, and Korea, as the agricultural sectors in Korea and Japan are highly protected and potential

¹⁵ Korea and Japan received the domestic pressure from agriculture industry on impelling the FTAs, while China is the main exporter in agriculture.

obstacles to a bilateral or trilateral FTA. Table 4 shows the percentage trade in agriculture (HS01 to HS24) among China, Japan, Korea and the rest of world in 2011.

Table 4 Trade in agriculture among China, Japan¹⁶, and Korea in 2011

(Unit: %)

To \ From	Korea	China	Japan	World ¹⁷
Korea	-	6.61%	10.96%	5.18%
China	16.89%	-	6.57%	4.90%
Japan	31.42%	5.27%	-	9.82%
World	1.34%	3.27%	0.71%	

Source: KITA, Trade Statistics of Japan

Korea is not a big exporter of agriculture. For example, 1.34% of the global imports from Korea were of agriculture, and 16.89% of them were exported to China and 31.42% were exported to Japan. So Japan did rely more on Korea in agriculture while 5.18% of Korea's import was agriculture. Table 4 shows that Japan was a big importer of agriculture compared with other industries, not only from the rest of the world but also from Korea and China.

High tariffs are barriers to trade and will throttle trade between countries. Although China, Japan, and Korea are one of the largest trade partners with each other, from the table 5A, there are still tariff barriers to trade between the countries. Especially, the average tariff¹⁸ rate between Korea and China is above 11%, and Korea's import tariff rate on Agriculture, Forestry, and Fishery from China is 106.7%.

¹⁶ Japan data comes from Trade Statistics of Japan; the exchange rate was calculated as 79.76 YEN/USD.

¹⁷ The World cell represent the proportion of internal agriculture trade amount to total trade amount

¹⁸ Electricity, gas and water & Other services are not counted.

Table 5-A Import tariff rate by source country¹⁹²⁰

(Unit: %)

	Korea		China		Japan	
	China	Japan	Korea	Japan	Korea	China
AFF	106.7	29.3	20.6	13.9	12.9	14.1
MIN	0.5	2.6	2	2.9	0.1	0
TEX	9.4	9.3	8.6	9.4	6.9	8.1
PPP	5	5.4	16	15.7	1.8	0
CHM	4.9	1.5	6.5	4.3	2.4	5.1
IAM	1.2	0.9	1.4	4.1	0	0
MVT	4.8	6.1	6.4	6.5	0.1	0
ELE	5	4.9	8.3	56.1	1.3	0.1
OME	2.5	2.5	5.3	5.9	0.6	0.1
OMF	2.2	5.7	13	13.9	0	0
EGW	0	0	0	0	0	0
OSP	0	0	0	0	0	0

From table 5B we can see that the tariff of most industries was decreased at least 20%, while several industries' tariff increased little. In particular, the electronic equipment of all three countries increased their tariff a lot. This also reflects the intense international competition in that industry.

As for the FTA among China, Japan and Korea, we cannot avoid discussing tariff barriers which restrict further development of their trade relations. If they eliminate the tariff and non-tariff barriers with each other, the development of their trade relations will get a strong impetus.²¹

¹⁹ Source: GTAP database version 6.0(2001) & version 8.0 (2007).

²⁰ Check table 6 for the abbreviation

²¹ Japan and ROK entrepreneurs jointly conducted a questionnaire survey showed that 45.8% think Japan should be combined to promote cross-Pacific Strategic Economic Partnership Agreement (TPP) and the Japan-ROK Free Trade Agreement (FTA), while China, South Korea is only 9.6% and 16.3% identity; 42.2%

Table 5-B the changing of import tariff rate among 2001~2007²²

(Unit:%)

	Korea		China		Japan	
	China	Japan	Korea	Japan	Korea	China
AFF	-23.9%	32.0%	1.5%	-31.9%	9.3%	-31.9%
MIN	-83.3%	-65.8%	-85.1%	-75.6%	-92.9%	0.0%
TEX	-12.1%	5.7%	-54.3%	-56.7%	-30.3%	-16.5%
PPP	-10.7%	20.0%	3.9%	13.8%	125.0%	-100.0%
CHM	-27.9%	77.9%	-44.0%	-65.9%	-22.6%	1600.0%
IAM	-73.9%	-76.9%	-85.1%	-48.8%	-100.0%	-100.0%
MVT	-30.4%	-17.6%	-86.0%	-82.9%	0.1%	0.0%
ELE	100.0%	188.2%	-26.5%	434.3%	1.3%	0.1%
OME	-61.5%	-60.9%	-59.2%	-54.6%	200.0%	0.1%
OMF	-72.8%	-21.9%	-36.0%	-35.3%	-100.0%	-100.0%

4. CGE Analysis of FTAs

4.1 Data

This paper investigated the static effects of FTAs using the CGE analysis. The CGE analyses are widely utilized to assess the effects of policy change that does not yet occur. The CGE analysis constructs a relatively complicated model based on economic theories to examine changes in various endogenous variables.

and 44.4% of Korean entrepreneurs FTA is appropriate that the three mechanisms of cooperation. And Japan compared to TPP as the main consideration, China and South Korea on the TPP care is low. South Korea 35.6% more support for the construction of FTA between the two countries.-- News from <http://www.financialinfo.co> (2012.Jan.06)

²² Check table 6 for the abbreviation

The CGE analysis incorporates all economic activities into the theoretical model, so that it can capture the outcomes of complicated interactions among diverse economic activities.

Table 6 Sectors and Goods (12 sectors)

Symbol	Description	The original GTAP sections
AFF	Agriculture, forestry, and fishery	PDR, WHT, GRO, etc. ²³
MIN	Mining	COL, OIL, GAS, OMN.
TEX	Textile products	TEX, WAP,
PPP	Pulp, paper and wooden products	LEA, LUM, PPP.
CHM	Chemical and petroleum refinery products	P_C, CRP.
IAM	Iron and metal	I_S, NFM, FMP, NMM
MVT	Motor vehicles and transport equipment	MVH, OTN
ELE	Electronic equipment	ELE
OME	Machinery and equipment	OME
OMF	Manufactures	OMF
EGW	Electricity, gas manufacture, and water	ELY, GDT, WTR.
OSP	Other Services	CNS, TRD, OTP, etc. ²⁴

This paper utilizes the new GTAP database which is a global database in version 8.0 and consists of regional input-output data, macroeconomic data, bilateral trade flows,

²³ The rest is V_F, OSD, C_B, PFB, OCR, CTL, OAP, RMK, WOL, FRS, FSH, CMT, OMT, VOL, MIL, PCR, SGR, OFD, B_T

²⁴ The rest is WTP, ATP, CMN, OFI, ISR, OBS, ROS, OSG, DWE

protection, and energy data for 2007 as a reference year. It also includes 87 countries/regions, 57 sectors, and 5 endowments/factors (land, skilled labor, unskilled labor, capital, and natural resources). We also applied GTAP database in version 6 for the comparison. The regional databases are derived from individual country input-output tables. For the simulation of the model, we aggregate 87 countries/regions, 57 sectors, and the 5 endowments into 6 regions, 12 sectors, and 5 endowments. We suppose that land, unskilled labor, and nature resource is not mobile among the regions and that skilled labor and capital is mobile among the regions. The lists of sectors and regions are displayed in table 6 and 7.

Table 7 Regions (6 regions)

The original GTAP regions	Description
JPN	Japan
KOR	Korea
CHN	China
US	United States
ROA	Rest of advanced countries
ROD	Rest of developing countries

4.2 The model

4.2.1 The CGE model

CGE models are a standard tool of empirical analysis and use actual economic data to estimate how an economy might react to the impacts of policy, technology or other external factors. Compared with the Input-Output model which emphasizes the connection or linkage effect between input and output of industry, CGE model makes

the connection among every sector of the whole economy, which exceeds the Input-Output model.

Generally, CGE is multi-sector application model.

The basic economic cell which CGE model analyzes is Producer, household, government, foreign trade, and all market clear. There are two kinds of equations that exist in the CGE model: one is description equation (accounting equation), such as the process of economic activities, process of intermediate input, etc.; another is optimization equation (or behavior equation).

There are three main contents that can reflect the characters of CGE model.

Firstly, CGE model supposes all commodity market and factor market is completed competition. The supply function, demand function, and excess demand function are the zero-order-homogeneity function of price, that is to say the price is the relative price. Excess demand is also known as a shortage. The case of negative excess demand is known as a surplus, and all the markets must be clear in the same time.

Secondly, the supply and demand function definitely reflects the activity that the producer maximizes profit and the household maximizes utility. And all the goods markets and factor markets satisfy the Walras's law, which means that they all are in equilibrium.

Thirdly, the prominent feature of CGE is that it generally discusses resource allocation of the whole economy, which allows the resource to be fully taken advantage of. In additional, for having solution, CGE model must be closed.

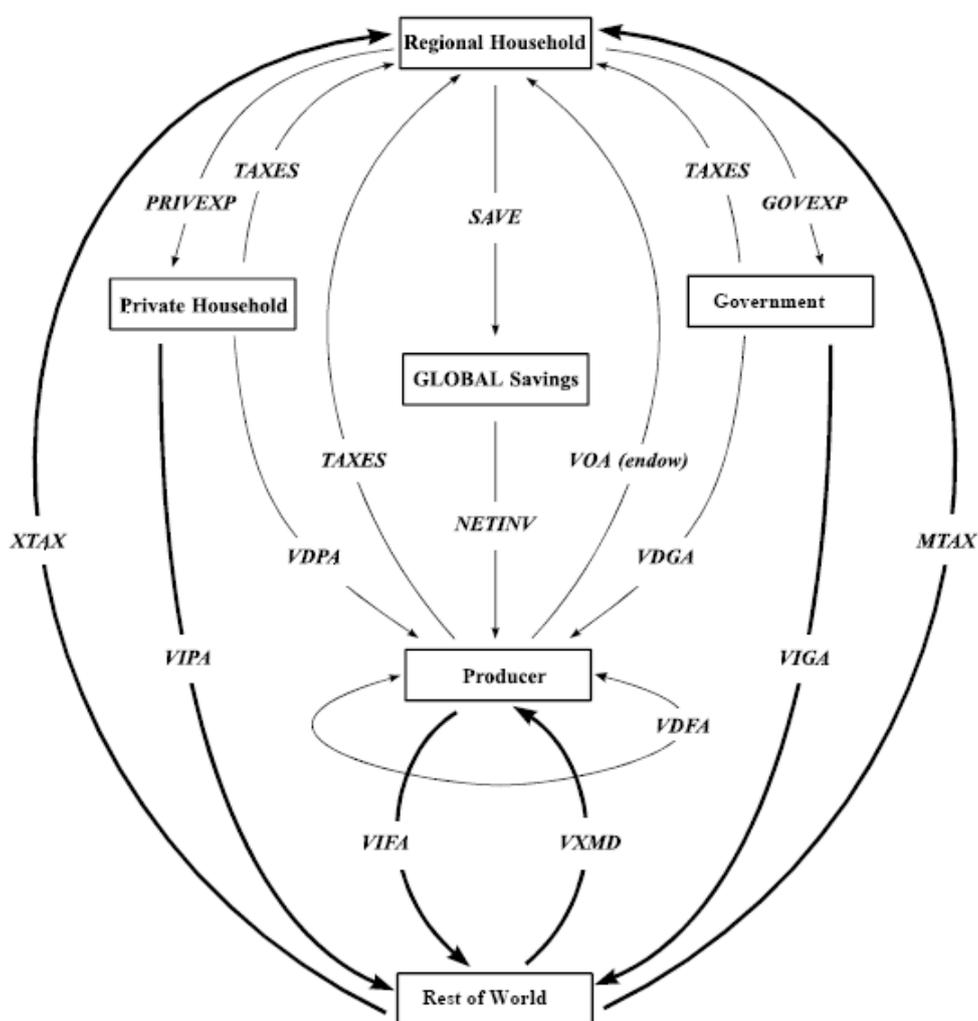
4.2.2 The GTAP model²⁵

Now there are several models mainly used to analyze the trade policy, such as

²⁵ see T.W. Hertel (1999)

GTAP, G-cubed, GREEN, INFORUM, MEGABARE, and etc. On the whole, the GTAP model, has the largest number of nation and sector, is widely used after 1990s for evaluating the issues of URAA, regional free trade agreement, technological shocks, EU eastward enlargement, and etc.

Figure 1 Structure of Multi Region Open Economy



In this chapter, the CGE model we have chosen is the GTAP model, which is a multi-region, multi-sector, and computable general equilibrium model with perfect competition and constant returns to scale.

Figure 1 represents the structure and the accounting relationships of the main entities in this multi-region open economy model. There are five main factors: land, capital, skilled labor, non-skilled labor, and natural resources. The main entities are Household (Private Household, Government) and Producer. This model has assumed an entity, the Global Bank (Global saving), to receive the regional saving and decide the investment capital's flow.

The household of a certain region will decide the consumption and saving of that region. For example, part of the consumption expenditures of household and government is derived from the domestic producer and foreign producer, and the rest is derived from taxes, including customs duties and inland tax. Producer's intermediate inputs also can come from abroad. Here, the GTAP model assumes that the products from different regions are heterogeneous, so they could not be absolutely substituted. In another words, the products traded internationally are differentiated by country of origin²⁶. This is the Armington Assumption (Armington, 1969).

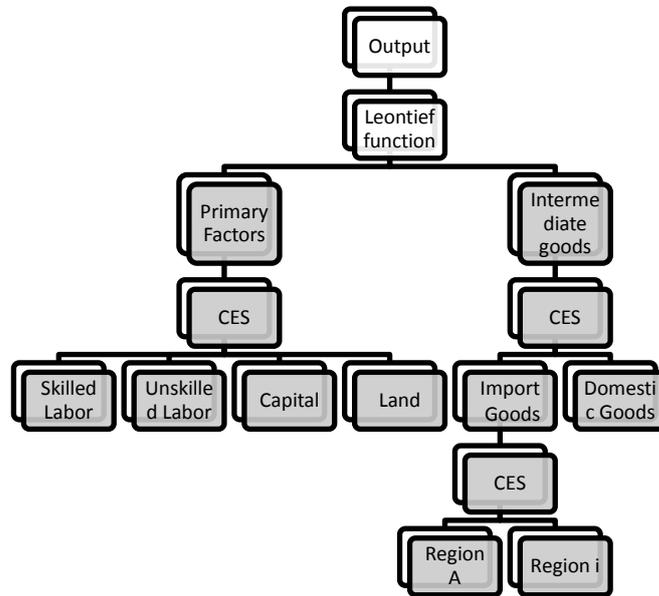
Now we will describe the GTAP model from the entities behavior.

4.2.2.1 Producer behavior.

Figure 2 provides a visual display of the assumed technology for producer in every kind of producer (industry) in the model.

²⁶ For example. $q_{xs}(i,r,s) = -ams(i,r,s) + q_{im}(i,s) - ESUBM(i) * [pms(i,r,s) - ams(i,r,s) - pim(i,s)]$
 ESUBM is the elasticity of substitution among imports of i in Armington structure (see Figure 5); $ams(i,r,s)$ is import i from region r augmenting tech change in region s

Figure 2 Producer Behavior



GTAP model assume that 1. The production function have separability and a nested structure of Constant Elasticity of Substitution (CES) function; 2. Primary factors (capital, skilled labor, unskilled labor, and land), intermediate inputs, and firms produce goods under constant returns to scale technology to maximize profits; 3. All markets are assumed to be perfectly competitive and thus all producers are price takers. Meanwhile, the combination of intermediate domestic goods input and import goods input is also based on CES function and Armington assumption.

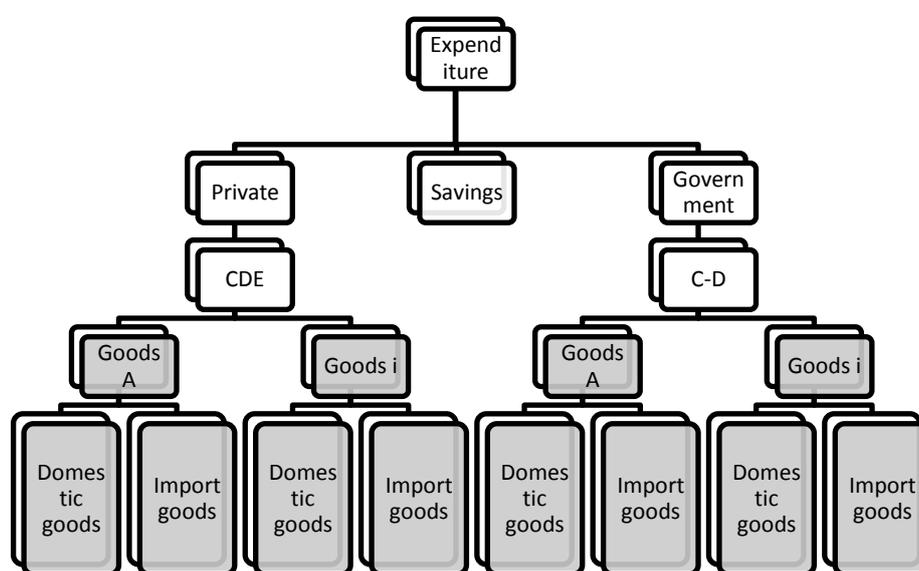
The main input of a producer can be divided into primary input and intermediate input. Under the assumption of separability, the optimal mix of primary factors independently of prices of intermediate inputs and vice versa. Meanwhile, under the constant returns to scale assumption, the proportion of factors inputs could not be changed by the changing of output. The Leontief function²⁷ which generally exists in CGE modeling and could reduce the number of parameters to be estimated in the model, ensures the intermediate input and aggregate primary input at a fixed proportion.

²⁷ The Leontief function is the special case of CES function

4.2.2.2 The household behavior

As shown in Figure 3, regional household behavior is governed by an aggregate utility function including the private expenditure, government expenditure, and savings.

Figures 3 The household behavior



On the side of private expenditure, the non-homothetic nature, the expenditure must take explicit account of the rate of population growth. Therefore, the Constant Difference of Elasticity (CDE) function (Hanoch, 1975)²⁸, on average, is applied in private expenditure. This ensures that the demand elasticity and price elasticity have a certain estimation space. Thus we can apply the elasticity data from other empirical studies to make calibration.

²⁸ For an exhaustive treatment of the calibration and use of the CDE functional form in CGE models, see Hertel et al. 1991

On the government side, the expenditure on different goods will be governed by Cobb-Douglas Utility functions. This ensures that the expenditure on goods share the total expenditure at a constant proportion.

The demand of domestic goods and import goods will, through the CES function, compose the aggregate goods.

4.2.2.3 Global Saving Side

GTAP model supposes that there exists a global bank sector as intermediates between global saving and global investment, whose function is to collect the savings of every region and allocate them back under the financing system. So that all the savers in the model are faced a common price for their savings commodity. This means that if all other markets in the multi-regional model are in equilibrium, all firms earn zero profits, and all households are on their budget constraint, then when the General Equilibrium is reached the total saving should equal total investment and Walras' Law will be satisfied.

4.2.2.4 International trade behavior

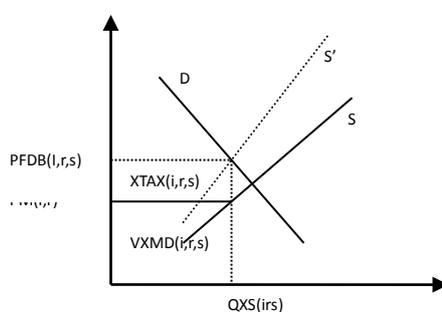
Trade generated tax revenues and subsidy expenditures are computed in a manner analogous to the ones which are being raised by policy instruments used in the domestic market. Figure 4 shows interventions on exports of commodity i from region r to region s . This export supply represents the sales to regions, net of export supplies to all other regions included in GTAP. The initial pretax equilibrium in figure 4A is given by the intersection of export supply and import demand.

The power of the export tax can be calculated as the ratio of the Value of exports of commodity i from region r to region s , valued at the exporter's domestic market, by

destination price (VXMD (i, r, s)) to the Value of exports of commodity i from region r to region s, valued at the world prices, by destination (VSWD (i, r, s)):

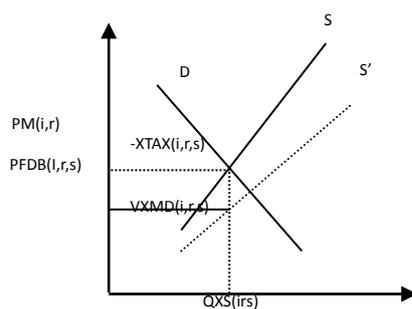
$$\text{TXS}(i, r, s) = \text{VXMD}(i, r, s) / \text{VXWD}(i, r, s) \quad (1)$$

Figure 4 Export Subsidy or Tax in Region s on Purchases from Region r
A. Export Tax



$$\text{VXWD}(i,r,s) = \text{VXMD}(i,r,s) + \text{XTAX}(i,r,s)$$

B. Export Subsidy



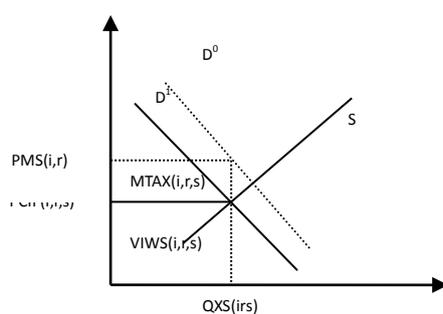
$$\text{VXWD}(i,r,s) = \text{VXMD}(i,r,s) + \text{XTAX}(i,r,s)$$

Figure 4B presents the situation where a subsidy is imposed on the exports of

commodity i from region r to region s . In addition, the export subsidy, calculated as $VXWD - VXMD$, represents an expenditure paid by the regional household in region r to the sellers of commodity i in region r . Figure 5A portrays the case of a tax on imports of commodity i from country s into country r .

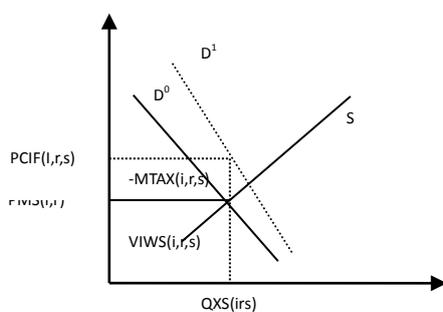
Figure 5: Import Subsidy or Tax in Region s on Purchases from Region r

A. Import Tax



$$VIMS(i,r,s) = VIWS(i,r,s) + MTAX(i,r,s)$$

B. Import Subsidy



$$VIMS(i,r,s) = VIWS(i,r,s) - MTAX(i,r,s)$$

The introduction of an import tax drives a wedge between the domestic price and the CIF price. Therefore, the power of the ad valorem import tax, TMS, calculated as the

ratio of the Value of Imports of commodity i from region s to region r , at Market prices, by Source (VIMS (i, s, r)) to the Value of Imports of commodity i from region s to region r , World prices, by Source price (VIWS (i, s, r)) is greater than one.

Given the price linkage relationship $pms(i,r,s) = tm(i,s) + tms(i,r,s) + pcif(i,r,s)$, the import tax revenues can be computed as follows:

$$MTAX(i, s, r) = VIMS(i, s, r) - VIWS(i, s, r) \quad (2)$$

Figure 5B demonstrates the situation which results in the presence of an import subsidy. Here, the CIF price of commodity i supplied from region s to region r exceeds the importer's domestic price. Accordingly, the power of the ad valorem import tax is smaller than one, and MTAX calculated as the difference between VIMS and VIWS is an expenditure that is withdrawn from the regional household.

Thus, we can easily estimate the shocks from policy changing by the GTAP system.

4.3 Analysis of FTAs

From now on, let us make the simulation of four possible forms of FTAs presented in table 9 below and compare the results to answer which form of FTAs is most beneficial for each country.

Table 8 Four different scenarios of FTA in Northeast Asia

FTA-CJK	Trilateral FTA among China, Japan, and Korea
FTA-KC	Bilateral FTA among Korea and China
FTA-KJ	Bilateral FTA among Korea and Japan
FTA-CJ	Bilateral FTA among China and Japan

We will now discuss the scenarios of FTAs analyzed in this paper. It is hard to predict the contents of FTAs in detail. Thus this study assumes complete liberalization (tariff removal across all products) in the agriculture and manufacturing sectors. However, it is also hard to predict how much of trade barriers in services would be removed by FTAs among China, Japan, and Korea. Since the services sectors of three countries are in quite different stage of development and trade liberalization, it is simply assumed that the services sectors have no further market opening than before.

Table 9 GDP Effects of FTAs²⁹

(Unit: %)

	FTA-CJK	FTA-KC	FTA-KJ	FTA-CJ
CHN	0.536	0.007	-0.008	0.536
JPN	0.188	-0.004	0.012	0.181
KOR	0.458	0.559	0.032	-0.133
US	-0.003	-0.001	-0.001	-0.002
ROA	-0.012	-0.002	-0.001	-0.009
ROD	-0.018	-0.004	-0.001	-0.012

We make a simulation using the data base and then discuss our simulation results from four possible forms of FTA among China, Japan, and Korea. First, let us examine the GDP effects of four possible FTAs. Table 9 compares the change in GDP which resulted from four different forms of FTA among China, Japan, and Korea.

The simulation results derived from table 9 are summarized as follows. First, FTA member countries can increase their GDP by establishing any form of FTAs among China, Japan, and Korea. It means that once a country signs a FTA with the other two countries or either of the rest countries, it will gain from that FTA. However, the size of change in GDP does depend on the form of FTA used for the simulation.

²⁹ Check the abbreviation from table 7

A FTA between Korea and China (hereinafter FTA-KC), which will bring the 0.56% increase in GDP to Korea, is the best form for Korea. Setting up a FTA with Japan or a trilateral FTA among China, Japan, and Korea (hereinafter FTA-CJK), China can gain more increasing in GDP, so it obtains the 0.54% increase in GDP. Meanwhile, Japan could achieve a greater increase in GDP from a trilateral FTA-CJK than FTAs with either Korea or China. More importantly, it is found that Korea could gain benefits from FTAs more than China and Japan. This is the reason why Korea has been lately most active to drive its FTA policy among the three countries. In fact, since 2004 the Korean government has shifted its FTA policy from a step-by step approach to a simultaneous multi-track one.

[Table 10] Social welfare (equivalent variation) of FTAs

(Unit: million USD)

	FTA-CJK	FTA-KC	FTA-KJ	FTA-CJ
CHN	17219.131	721.753	-505.219	17002.596
JPN	21086.813	-908.790	2287.635	19707.967
KOR	6897.501	9594.424	-26.421	-2670.501
US	-2413.712	-1218.726	-485.342	-709.647
ROA	-6060.303	-1715.041	-432.961	-3912.299
ROD	-10031.121	-1679.006	-617.254	-7734.856

Next, let us examine the social welfare effects of FTAs. From table 10, it is found that once a country establishes a FTA with other(s), the social welfare of that country increases. The social welfare of the world reaches 26,698.31 million USD from a trilateral FTA-CJK, 4,794.614 million USD from an FTA-KC, 220.438 million USD from an FTA between Korea and Japan, and 21,683.26 million USD from an FTA between China and Japan. So the FTA-CJK brings a largest increase in social welfare for

the world. Korea gets the largest increase in social welfare from FTA-KC. However, a trilateral FTA-CJK is most beneficial for China and Japan in terms of the social welfare.

Terms of trade effects are shown in table 11. Korea experiences an improvement in terms of trade from FTA-CJK and FTA-KC, while China undergoes the deterioration in terms of trade from all FTA scenarios except from FTA-KC. Korea gets no gains from FTA-KJ, which confirms the general objection for FTA-KJ from the public and academics. Especially, China should be more careful about the deteriorating terms of trade, thus resulting in the losses from FTAs. Japan is the only country whose terms of trade does not deteriorate, rather improves 0.252~1.821% from any forms of FTA with China and/or Korea.

[Table 11] Terms of trade effects of FTAs

(Unit: %)

	FTA-CJK	FTA-KC	FTA-KJ	FTA-CJ
CHN	-0.174	0.027	-0.028	-0.173
JPN	1.821	-0.109	0.252	1.678
KOR	0.528	0.937	-0.083	-0.326
US	-0.123	-0.055	-0.022	-0.046
ROA	-0.058	-0.021	-0.005	-0.032
ROD	-0.216	-0.036	-0.014	-0.167

From table 12 and 13, Korea gains a much larger increase in merchandise exports and imports from any forms of FTA, while it experiences a reduction in trade balance of merchandise because its import surpasses export. China and Japan have been running large trade surpluses, which brings about trade frictions with the United States and causes problem to sustainable and harmonious development of the whole world. These FTAs will decrease their trade surpluses and reduce the international trade friction with US and other countries. In another words, the United States will get an increase in trade

balance after the launch of a FTA among Korea, China and Japan. When any FTA is signed among them, the other countries' firms will focus on the other regions, so they may get a relative advantage in other regions. As a result, they experience the increase in trade balance after the establishment of a FTA among China, Korea and Japan.

[Table 12] Change in merchandise trade

(Unit: %)

	FTA-CJK		FTA-KC		FTA-KJ		FTA-CJ	
	export	import	export	import	export	import	export	import
CHN	3.024	3.621	1.054	1.419	-0.034	-0.072	2.004	2.274
JPN	1.953	5.728	-0.067	-0.271	0.186	0.657	1.834	5.343
KOR	2.142	3.796	1.886	3.716	1.044	1.367	-0.788	-1.287
US	-0.137	-0.412	-0.041	-0.123	-0.001	-0.059	-0.095	-0.23
ROA	-0.025	-0.17	-0.012	-0.043	0.007	-0.013	-0.019	-0.115
ROD	-0.001	-0.298	-0.024	-0.075	0.005	-0.024	0.018	-0.199

[Table 13] Change in trade balance(X-M)

(Unit: million

USD)

	FTA-CJK	FTA-KC	FTA-KJ	FTA-CJ
CHN	-4.136	-313.028	-91.432	400.317
JPN	-10956.107	549.202	-1208.2	-10297.096
KOR	-3643.656	-2621.144	-1303.75	281.24
US	7014.549	1428.149	1100.261	4486.141
ROA	5730.456	603.482	1013.482	4113.488
ROD	1858.901	353.339	489.645	1015.914

As we have analyzed above, the best scenario for Korea is a FTA with China, following a trilateral FTA-CJK. China would favor a Trilateral FTA with Korea and Japan, so it will be eager to establish a FTA-CJK. Meanwhile, Japan would not care too much about the FTA with Korea due to relatively little impacts of FTA-KJ. Japan would not welcome an FTA between Korea and China, either. But, Japan prefers to form a

trilateral FTA with China and Korea over other scenarios.

5. Sectoral and Time varying Effects³⁰ of FTAs

Following the analysis described in the previous section, the present section will examine the sectoral and time varying effects of FTA-CJK and FTA-KC. First, we will analyze the impacts of a FTA-KC because it is the best FTA option for Korea out of the 4 possible forms of FTA among China, Japan, and Korea.

Table 14 Macro effects comparison—FTA-KC

	GDP ³¹		Welfare ³²		Trade Balance ³³	
	2001	2007	2001	2007	2001	2007
CHN	0.116	0.007	1103.95	721.75	-250.35	-313.02
JPN	-0.002	-0.005	-410.23	-908.79	198.21	549.20
KOR	0.926	0.559	6478.83	9594.42	-839.35	-2621.14
US	-0.000	-0.001	-569.12	-1218.73	378.30	1428.15
ROA	-0.001	-0.002	-807.05	-1715.04	196.30	603.48
ROD	-0.006	-0.004	-1082.13	-1679.01	316.88	353.34

Table 14 shows us the macro effects of FTA-KC. In general, in comparison with the signing of FTA-KC in 2001, the response of signing FTA-KC in 2007 was decreased. This is mainly because the tariff before FTA was decreased in 2007. However, the response of Korea's welfare increased from 6478.8 million USD in 2001 to 9594.4 million USD in 2007. As we know, in GTAP, economic welfare is represented as being

³⁰ Here, the time varying effects means the different effects brought by the same FTA signed at different time.

³¹ Unit: %

³² Unit: Million USD

³³ Unit: Million USD

derived from the allocation of national income between private consumption, government consumption, and savings (Hertel, 1997). So it is hard to explain the change directly. By the method of the welfare decomposition (Huff and Hertel, 2001), we can decompose the welfare into endowment effect, the allocative efficiency effects (production side), and Term of Trade Effects. We find that the FTA-KC's Welfare change is mostly dependent on the allocation efficiency effect of a special industrial commodity, the Chemical and Petroleum Refinery Products.³⁴ Then from the Chemical and Petroleum Refinery Products to see, we find that, compared with 2001, the world comparative advantage of Korea's Chemical and Petroleum Refinery Products was increased by 2.3% while the gap between Korea and China was enlarged 5% in 2007. Therefore, with a combined tariff and export effects, Korea's Chemical and Petroleum Refinery Products gained more when FTA-KC was in effect in 2007. This is why Korea's welfare increased.

Table 15 shows the output effects of FTA-KC. If FTA-KC is in effect in 2007, the total outputs of Korea will increase 7398.28 million USD, while the outputs of textile products, chemical and petroleum refinery products, and Machinery and equipment will increase; the output of agriculture, forestry, and fishery decreases by 4,004.02 million USD. For China, the output of agriculture, forestry, and fishery and electronic equipment will increase; but the total output will decrease 4459.37 million USD in China.

³⁴ TOT's effect is much smaller than allocation efficiency effect.

Table 15 Change in output by FTA-KC

(Unit: million USD, %)

	China				Korea			
	2001		2007		2001		2007	
AFF	2889.44	0.579	6293.00	0.574	-2439.42	-3.313	-4004.02	-3.097
MIN	-123.41	-0.162	-372.84	-0.133	-59.34	-3.435	-108.40	-2.104
TEX	-1505.25	-0.691	-712.00	-0.151	2663.06	8.645	411.13	1.124
PPP	-1034.36	-0.687	-1380.78	-0.331	885.97	3.638	-31.67	-0.070
CHM	-2143.13	-0.757	-4925.38	-0.505	3012.88	3.341	9647.13	3.428
IAM	-907.28	-0.252	-1448.63	-0.120	-1438.08	-2.132	-1993.31	-1.115
MVT	-168.90	-0.204	-832.53	-0.233	-2420.30	-4.365	-2802.83	-1.902
ELE	1336.60	1.071	722.72	0.148	-957.59	-1.382	-2478.45	-1.804
OME	-684.00	-0.248	-2272.63	-0.265	-1568.26	-2.092	1688.05	0.830
OMF	-365.61	-0.408	-716.05	-0.369	-22.69	-0.397	-94.20	-0.641
EGW	-154.66	-0.235	-389.38	-0.141	241.46	0.863	196.89	0.415
OSP	325.06	0.036	-319.50	-0.010	1486.47	0.332	2261.50	0.192
CGDS ³⁵	1298.91	0.318	1894.63	0.133	2888.86	2.628	4706.47	1.590

However, some industries seem strange. For example, the output of Korea's Motor Vehicle and Transport equipment will decrease. As we know, the output is determined by the demand of domestic market and export. On one hand, domestic market's demand for domestic products will decrease because the substitutes from imports. On the other hand, FTA will benefit its members and increase their trade linkages, while it also has a relatively exclusive effect³⁶, which will decrease its members' demand for the goods from non-members. This exclusive effect will impel the non-members to partly adjust their supply to the rest of the market (non-member's market) and then relatively decrease the price as well. As the consequence, the exports (to non-member's market) of the FTA-members will be decrease because the price decreases. In particular, if this negative effect is large enough, it can reduce the output of the members. It will mostly

³⁵ Production of capital goods

³⁶ After signed FTA, the FTA members can enhanced there advantage over other countries within the FTA region. Then it can relatively decreasing the non-members' competitiveness within the FTA region. Thus it can think, to some extent, as a kind of exclusive effect.

happen in highly competitive industries. As we know, Motor vehicles and transport equipment is an intense competitive industry in the world. Although Korea has an advantage over China, it shows little disadvantage with Japan, US, and EU. This is why the output of Korea's Motor Vehicle and Transport equipment is decreasing.

Then we can also compare the time varying effect of output by signing the FTA-KC. First of all, as we know, tariff and comparative advantage shows different effects on the response of FTA. The tariff negatively affects one industry's response of FTA, while the comparative advantage positively affects its response of FTA. From the structure to see, the output of one industry is mainly determined by the domestic demand and export demand. Under a signed FTA, domestic demand's change is decided by the shock of import which is determined by the tariff; while export demand's change is determined by the comparative advantage. So we need combine the tariff effects and comparative advantage effects to analyze the change of output's response.

As seen in table 15, we can find that the response of most industries' production decreased, compared with the signing of FTA-KC in 2001. This is mainly because the decreased tariff can reduce the shock from FTA, and the increased shock amount does not change a lot, it mainly lies in the base figure of trade enlarged by development. There are still some strange industries which can be divided into two groups which cannot be explained by tariff. 1. The response shows negative (positive) in 2007 but positive (negative) in 2001 which can be seen through Korea's Pulp, Paper and Wooden Products and Machinery and Equipment; 2. The response increased, such as Korea's Chemical and Petroleum Refinery Products, Electronic Equipment, Manufactures, and China's Motor Vehicles and Transport Equipment, Machinery and Equipment.

For the first group, we can find that Korea has an advantage over China on the Pulp, Paper and Wooden Products and Machinery and Equipment in 2001, but the situation

was reversed or the gap was enlarged in 2007. In other words, the regional compare advantage³⁷ gap between Korea and China's Pulp, Paper and Wooden Products was 0.26 in 2001 which reversed to -1.28 while the gap of Machinery and Equipment was enlarged from 0.15 in 2001 to 0.47 in 2007. From the world comparative advantage, both countries' advantage decreased in Pulp, Paper and Wooden Products, and Korea's Machinery and Equipment becomes an advantage, not a disadvantage, over China.

For the second group, the negative response of Korea's Manufactures becomes stronger in that Korea shows a disadvantage in Manufactures while its gap between Korea and China was enlarged. China's Machinery and Equipment and Korea's Chemical and Petroleum Refinery Products also can be explained by similar reasons, and the change of China's Motor Vehicles and Transport Equipment is mainly in that China lost its regional compare advantage in Motor Vehicles and Transport Equipment.

In sum, the tariff shows stronger effects on most industries in FTA-KC, while in Korea's Pulp, Paper and Wooden Products, Machinery and Equipment, Chemical and Petroleum Refinery Products, Electronic Equipment, Manufactures, China's Motor Vehicles and Transport Equipment and Machinery and Equipment, the compare advantage shows stronger effects. Of course, we cannot deny other reasons which can cause this. It compels us to further study about it.

Table 16 shows the trade effects of FTA-KC. In 2007, the exports of most industries in Korea and China increase with the help of FTA-KC, especially chemical and petroleum refinery products and Machinery and equipment in Korea and agriculture,

³⁷ The compare advantage is evaluated by the method of revealed comparative advantage. A comprehensive / advanced measure of RCA was later on presented by Balassa (1965). This is a widely accepted and afterwards modified measure of RCA in the literature. It is expressed as follows:

$$RCA = (X_{ij} / X_{it}) / (X_{nj} / X_{nt}) = (X_{ij} / X_{nj}) / (X_{it} / X_{nt})$$
where X represents exports, i is a country, j is a commodity (or industry), t is a set of commodities (or industries) and n is a set of countries. RCA measures a country's exports of a commodity (or industry) relative to its total exports and to the corresponding exports of a set of countries.
You can find this index in Appendix tables

Machinery and equipment in China.

[Table 16] Changes in export and import by FTA-KC

(Unit: million
USD, %)

Export	China				Korea			
	2001		2007		2001		2007	
AFF	3112.12	18.94	6208.67	17.25	526.67	19.81	724.81	21.59
MIN	164.64	3.42	169.86	2.53	-0.24	-0.52	10.84	6.93
TEX	1897.82	3.10	610.38	0.38	3009.58	17.65	1471.72	11.67
PPP	-111.29	-0.23	-497.78	-0.50	843.75	17.64	298.96	6.38
CHM	542.40	1.97	1662.37	1.49	2699.18	11.93	7968.36	11.82
IAM	364.37	1.34	1215.63	1.02	264.39	1.95	426.53	1.28
MVT	173.56	2.02	258.50	0.63	-1728.51	-6.82	-2104.79	-3.19
ELE	2076.21	3.06	1346.13	0.49	-465.64	-0.93	-2032.91	-2.01
OME	612.81	1.06	2995.41	1.41	236.94	1.15	4532.25	6.18
OMF	-50.54	-0.12	-417.27	-0.55	82.00	3.00	52.55	2.42
EGW	-4.38	-1.23	-10.24	-0.66	-3.71	-14.52	-1.29	-7.33
OSP	-207.20	-0.80	-272.15	-0.23	-1981.39	-6.12	-2967.55	-3.72

Import	China				Korea			
	2001		2007		2001		2007	
AFF	627.8	2.9	1283.9	2.4	3116.9	16.3	5204.7	14.9
MIN	-49.9	-0.4	-691.7	-0.5	613.2	2.5	2263.1	2.5
TEX	2539.5	10.5	931.6	4.0	1333.3	21.1	1533.3	14.4
PPP	609.0	4.8	324.4	1.3	389.5	7.9	454.9	5.1
CHM	1934.2	4.2	4197.9	2.1	1143.1	6.1	2288.9	4.4
IAM	868.7	3.2	1165.1	1.4	618.2	3.9	1554.2	3.3
MVT	376.5	2.5	830.6	1.9	291.6	4.3	437.4	3.0
ELE	1391.3	2.4	850.0	0.4	726.7	2.7	542.7	1.2
OME	1382.4	2.5	4298.8	2.3	1265.3	5.3	2992.3	5.3
OMF	242.9	7.7	128.8	2.8	135.8	7.9	246.7	7.2
EGW	0.6	0.4	1.9	0.2	9.3	8.4	12.6	4.5
OSP	186.3	0.5	250.3	0.3	1268.6	4.7	2034.0	3.0

[Table 17] Internal trade by FTA-KC

(Unit: %)

	K to C		C to K	
	2001	2007	2001	2007
AFF	100.697	100.004	240.138	204.721
MIN	29.067	18.132	17.589	8.725
TEX	100.149	55.455	59.618	37.069
PPP	65.587	36.802	45.337	25.929
CHM	48.475	38.099	41.794	29.222
IAM	49.367	27.658	35.115	15.678
MVT	188.610	63.351	42.229	15.128
ELE	70.776	5.310	23.658	8.768
OME	75.170	35.489	50.386	35.275
OMF	105.956	95.016	48.481	30.919
EGW	-14.086	-7.105	7.169	3.826
OSP	-8.940	-5.688	3.586	2.245

The FTA-KC also makes the import volume increase in Korea and China. Higher import tariffs before the FTA-KC will bring more imports after the FTA-KC. For example, imports in agriculture, forestry, and fishery products increase by 14.94% (5204.7 million USD) and textile imports by 14.42% (1533.3 million USD) in Korea; machinery and equipment imports increase by 4197.94 million USD and imports in chemical and petroleum refinery products increase by 4298.77 million USD in China. As we talked before, under a FTA-KC, trade's change is mainly determined by its tariff rate, regional and world competitive power. So the time varying effect of trade is similar with the output side.

Let us now discuss the changes in internal exports of the two countries, Korea and China after the formation of FTA-KC. The results are summarized in table 17. As we have already discussed before, the internal exports of Korea and China largely increased after the establishment of FTA-KC. The Agriculture, Forestry, and Fishery, Textile Products, Motor Vehicles and Transport Equipment, Machinery and Equipment and

Manufactures sectors in Korea experience their exports increasing. Surprisingly, it is found from tables 18 that the percentage increase in Agriculture, Forestry, and Fishery exports to China of Korea is much larger than we expected. This is because the amount of Agriculture, Forestry, and Fishery exported to China was very little and its import tariff on Agriculture, Forestry, and Fishery was at a high level before the FTA-KC. The Agriculture, Forestry, and Fishery, TEXTILE, Machinery and Equipment, and Manufactures were the main exports to Korea of China benefiting from FTA-KC. For the FTA member countries, the time varying effect of internal trade was mainly determined by the tariff. So accompanied by the reduced tariff, the response of FTA-KC was decreased.

Now we turn to analyze the FTA-CJK. Table 18 shows us the macro effects of FTA-CJK. In comparison with the signing of FTA-CJK in 2001, the gain of China and Japan will increase and it will also increase much larger than when Korea signed FTA-CJK in 2007. This is mainly because that C-J-K's intra trade is sharing around 25% of world trade in 2007. So the effects from external market will be less than the bilateral case. And C-J's trade shares 50% of C-J-K's trade amount, while C-K's trade shares 32.6% of C-J-K's trade amount in 2007.

[Table 18] Macro effects comparison—FTA-CJK

	GDP		Welfare		Trade Balance	
	2001	2007	2001	2007	2001	2007
CHN	0.3484	0.5364	3615.343	17219.13	-1337.91	-4136.4
JAP	0.0317	0.1876	5855.278	21086.81	-3768.91	-10956.1
KOR	0.976	0.4584	6103.591	6897.501	-1388.34	-3643.66
US	-0.0016	-0.0025	-1863.24	-2413.71	2764.838	7014.549
ROA	-0.0063	-0.0124	-2831.16	-6060.3	2195.578	5730.456
ROD	-0.0135	-0.0176	-2877.31	-10031.1	1534.744	1858.901

Actually, C-J trade linkage³⁸ is much closer than C-K, which is closer than K-J in 2007. This also partly determined Korea could not gain as much as Japan and China.

[Table 19] Changes in output by FTA-CJK

Unit: %,

	China		Korea		Japan	
	2001	2007	2001	2007	2001	2007
AFF	1.2517	0.9896	-2.7171	-2.8412	-0.7395	-0.7717
MIN	-0.5962	-0.76	-3.6751	-2.3774	-1.0028	-2.7334
TEX	0.465	0.672	7.3074	1.5348	0.855	-2.2759
PPP	-0.4554	0.1878	4.2876	0.186	-0.7442	-1.3739
CHM	-1.8201	-3.8416	3.1601	0.5945	0.5519	6.8954
IAM	-1.1488	-0.2709	-2.5691	-0.7603	0.2219	-1.3346
MVT	-2.4171	-0.7016	-3.6644	-0.961	-0.9605	-3.1601
ELE	2.7408	1.3418	-0.1578	-0.0974	-0.3098	-2.3546
OME	-1.7356	-0.4918	-2.9188	0.7706	0.7769	1.5501
OMF	-1.0945	-0.7369	0.1821	-0.3992	-0.3174	-0.3832
EGW	-0.6321	-0.6283	0.6873	0.1227	0.0357	0.3877
OSP	0.1902	0.2421	0.3355	0.1616	0.0322	0.175
CGDS	1.0624	0.6803	3.0762	1.6977	0.4781	1.5029

Thus we can find that Korea's gain in GDP, Welfare and trade is much smaller than that of Japan's and China's in table 18.

Table 19 reports the percentage change in output of the three countries under FTA-CJK. If FTA-KC is in effect in 2007, as for Korea, the output of chemical and petroleum refinery products increases by 1672.97 million USD, the output of manufactures increases by 1567.66 million USD, while the output of agriculture, forestry, and fishery products drops by 2.84%. After the launch of FTA-CJK, the outputs of electronic equipment increased 1.34% in, Agriculture, Forestry, and Fishery products increased 0.98% and textile products increased 0.76% in China. For Japan, the output of

³⁸ the data resource from chapter 2

chemical and petroleum refinery products increased 6.90%.

Now, let us analyze the time varying effects. As we know a trilateral FTA is more complex than a bilateral FTA. Therefore, some industries cannot be explained by our method because there are many new determinants involved in trilateral relations. For example, within a trilateral FTA region, FTA members will compete with each other not only individually but also bilaterally. This needs to be further studied.

Then here we will select several industries to analyze.

1. Agriculture, Forestry, and Fishery: the positive response of output decreased in China while the negative response of output increased in Korea and Japan. This resulted not only by the tariff between Korea and Japan increased in 2007 which increased the negative effects, but also by the regional advantage gap in China of Agriculture, Forestry, and Fishery which was also enlarged while all three countries shows less world advantage in 2007 compared with 2001. So although faced the hard situation of the world, the positive response of output decreased in China just decreased 20%.

2. Textile Products: the positive response of output increased in China but decreased in Korea and Japan mainly because China's compare advantage (both regional and world) largely increased while Korea's and Japan's was decreased.

3. Chemical and Petroleum Refinery Products: the response of Japan's Chemical and Petroleum Refinery Products largely increased but decreased in Korea and China in 2007 mainly because it largely increased its compare advantage (both regional and world).

4. Motor Vehicles and Transport Equipment: the negative response of output decreased in China and Korea but increased in Japan mainly because Japan's regional compare advantage did not seem to change while Korea and China's regional compare advantage increased.

[Table 20] Changes in export and import by FTA-CJK

(Unit: %)

Export	China		Korea		Japan	
	2001	2007	2001	2007	2001	2007
AFF	38.32	27.00	42.09	39.13	7.71	7.61
MIN	5.68	5.66	-0.37	4.63	10.68	5.96
TEX	12.13	2.54	16.15	12.99	53.02	23.25
PPP	1.33	1.19	20.57	7.98	9.16	-2.64
CHM	1.83	6.06	13.73	4.41	6.32	35.91
IAM	1.29	1.78	3.28	2.62	3.94	-0.59
MVT	5.14	3.35	-5.29	-1.26	-1.94	-4.90
ELE	8.35	2.49	0.50	-0.01	0.83	-4.21
OME	3.13	3.32	2.22	7.20	2.58	1.57
OMF	-0.57	-0.95	5.18	5.38	-0.35	-1.38
EGW	-2.49	-1.68	-14.65	-5.70	-6.51	-9.77
OSP	-1.69	-0.64	-5.95	-2.77	-2.76	-5.36

Import	China		Korea		Japan	
	2001	2007	2001	2007	2001	2007
AFF	6.99	4.70	17.72	15.49	5.71	7.70
MIN	-2.27	-3.70	2.28	0.48	0.67	4.26
TEX	27.50	10.19	21.43	14.72	20.52	13.67
PPP	7.71	2.45	8.57	4.75	6.32	8.71
CHM	7.96	14.27	8.67	4.29	3.27	7.89
IAM	8.20	3.57	5.91	3.72	3.44	3.72
MVT	14.09	8.11	6.55	5.01	3.01	4.04
ELE	6.65	1.89	3.29	1.50	3.94	5.77
OME	11.38	5.48	9.60	8.34	4.09	5.24
OMF	17.11	10.99	9.72	8.28	3.55	5.55
EGW	0.66	0.48	8.47	3.74	3.34	5.66
OSP	1.09	0.77	4.75	2.34	2.27	4.27

So in conclusion, the situation becomes more complex in a trilateral FTA. Therefore the change in tariff, world and regional compare advantage can partly explain the time-varying effects of FTA-CJK. Thus, further studying of the issue is essential. Table 20 shows the changes in export and import of the three countries resulting from the FTA-CJK in 2007. The exports of Korea, China and Japan increase in most industries, especially Chemical and Petroleum Refinery Products, Machinery and Equipment in Korea; Agriculture, Forestry, and Fishery, Textile Products and Electronic Equipment products in China; and chemical products in Japan. The FTA-CJK also makes the import volume increase in the three countries. The import volumes of the industries which have higher import tariffs before FTA increase more than those of others. For instance, the import of agricultural products increases 15.49% and textile products increases 14.71% in Korea; the import of chemical products increases 14.27%, motor vehicles & transport equipment increases 8.11%, Manufactures increases 10.99%, and Machinery and Equipment increases 5.48% in China; the import of Agriculture, Forestry, and Fishery products increases 7.70%, textile products increases 13.67%, and Pulp, Paper and Wooden Products increases 8.71% in Japan.

According to table 21, the bilateral trade among the three countries, China, Japan, and Korea, increases considerably with the establishment of FTA-CJK in 2007. The average rate of increase in trade between Korea and China is over 30 percent, while the increase rate of trade for Japan is less than those of Korea and China. The increase in bilateral trade between Korea and China is much larger than those between Japan and Korea or China. So under the deteriorated situation of global economy, it's necessarily to set up the FTA-CJK. As we know, the tariff will mainly determine the internal trade among the members, so we can find that the response of internal trade changed along with the changing of tariff compared with the establishment of FTA-CJK in 2001

[Table 21] Change in bilateral trade by FTA-CJK

(Unit:
%)

A. Korea's export

	K to C				K to J			
	2001		2007		2001		2007	
AFF	180.26	100.56	304.87	101.79	816.20	59.01	740.93	67.31
MIN	1.73	26.72	10.84	13.46	-0.53	-3.52	-0.38	-1.28
TEX	3515.24	81.64	1332.35	52.13	297.42	29.14	132.09	22.77
PPP	1054.00	63.93	422.05	37.36	132.88	27.50	34.91	11.86
CHM	3403.59	43.38	2933.76	11.90	419.49	14.31	718.31	12.52
IAM	1234.53	43.30	1851.43	25.13	15.10	0.79	97.75	2.34
MVT	502.46	168.99	1352.18	55.02	-12.83	-5.19	-4.05	-0.67
ELE	3599.98	58.80	1873.38	5.27	-251.49	-5.00	103.58	1.66
OME	2185.06	62.59	8047.00	31.69	-110.12	-5.59	-46.98	-1.02
OMF	336.19	96.92	163.77	88.26	27.91	7.72	37.07	14.24
EGW	-0.09	-14.16	-0.19	-6.00	-0.19	-11.46	-0.02	-0.95
OSP	-24.59	-8.55	-138.62	-4.28	-85.17	-7.41	-63.25	-1.10

B. China's export

	C to J				C to K			
	2001		2007		2001		2007	
AFF	3604.06	70.71	4275.04	50.88	3729.81	235.02	7291.67	199.95
MIN	34.74	2.60	94.59	7.98	204.09	19.22	172.01	10.01
TEX	6166.13	37.44	5143.23	26.09	1412.49	54.39	1908.62	33.92
PPP	1691.11	33.76	2231.25	29.54	271.74	42.53	573.66	24.99
CHM	92.44	3.27	1304.97	11.37	454.02	34.89	1489.58	27.89
IAM	119.74	3.51	334.34	4.20	443.03	28.81	1530.11	14.73
MVT	48.01	5.09	190.83	5.51	177.61	40.92	176.96	13.53
ELE	905.23	10.12	1413.10	6.74	720.11	27.21	1302.74	11.27
OME	413.89	5.20	1310.19	6.16	632.41	41.09	2658.08	29.61
OMF	185.37	5.33	218.89	4.27	162.04	40.72	242.88	26.17
EGW	0.03	0.85	0.62	3.78	0.06	5.90	0.40	2.24
OSP	-0.19	-0.01	197.41	2.60	7.56	2.49	118.43	1.34

C. Japan's export

	J to C				J to K			
	2001		2007		2001		2007	
AFF	271.36	85.40	212.77	55.64	127.43	40.68	320.76	57.24
MIN	16.68	27.44	27.76	19.49	3.63	28.37	14.38	19.21
TEX	5121.10	92.73	1816.56	53.96	180.99	36.27	147.03	34.45
PPP	404.08	66.11	268.65	15.61	59.09	25.22	-21.62	-5.84
CHM	3082.81	48.72	40814.09	171.62	1372.08	29.48	1760.91	13.77
IAM	2207.22	37.74	3586.93	23.03	849.41	18.13	473.76	4.19
MVT	2904.54	147.12	4963.88	54.36	334.13	35.46	646.47	22.36
ELE	6788.57	53.10	5129.26	16.99	279.30	4.37	-609.83	-7.21
OME	8803.14	65.03	11344.87	25.54	2510.21	30.41	3739.79	24.02
OMF	402.53	107.63	540.22	78.87	92.15	30.44	115.66	18.15
EGW	-0.02	-5.92	-0.41	-10.25	0.00	1.82	-0.48	-6.73
OSP	-40.64	-3.37	-450.31	-7.29	2.80	0.26	-343.46	-5.37

6. Summary and the Concluding Remarks

Growing trend of regionalism is one of the main features of the recent international economic environment. In fact, regionalism is highly contagious³⁹, so it is spreading to the Northeast Asian region which has never been integrated with other countries under FTAs. It is also true that most of FTAs in the world are established among neighboring countries, for example, the North American Free Trade Area (NAFTA), the European Union (EU), and the Association of South East Asian Nations (ASEAN). It is thus natural to consider the bilateral or tripartite FTAs among China, Japan, and Korea, which are very close to each other historically and geographically.

This paper examined the economic impacts of FTAs between China, Japan, and

³⁹ The Thai trade representative, Dr. Kantathi Suphamongkhonm, said in a speech in January 2004 that "FTAs are spreading like the flu. They are very contagious, indeed much more contagious than SARs or the Bird Flu." See Wong, K.Y. (2004) and (2007)

Korea. For this purpose, we employ a multi-region multi-sector static CGE model with 6 regions, 12 sectors, and 5 factors. Using the GTAP in version 8.0, we analyzed the economic effects of the following four different FTA scenarios and compared them with each other: (1) FTA among China, Japan, and Korea; (2) FTA between Korea and China; (3) FTA between Korea and Japan; (4) FTA between China and Japan. By doing so, this paper gave rise to some policy implications which one out of four FTA scenarios is most beneficial for each country.

In the static CGE model, Korea's GDP is expected to increase by 0.58 from an FTA-KC, 0.47 from an FTA-CJK, and 0.03 from an FTA-KJ. Under the FTA-CJK and FTA-KC, out of the three countries, Korea would enjoy the highest benefits in terms of GDP growth. This is consistent with the traditional trade theory in the sense that a small open economy would gain more benefits from trade liberalization. Meanwhile, the FTA-CJK brings a largest increase in social welfare for the world. Korea gets the largest increase in social welfare from a FTA-KC. However, a trilateral FTA-CJK is most beneficial for China and Japan in terms of the GDP growth and social welfare.

In almost all FTA scenarios and models, the formation of a FTA increases national income and social welfare of member countries. As for its best choice, Korea would form a FTA with China because it produces the largest GDP and welfare effects. China would favor a FTA with Korea and Japan at the same time. While Japan would not care much about FTAs with China and Korea due to relatively small benefits, Japan will prefer to form a tripartite FTA with China and Korea over bilateral FTAs with China or Korea.

The static model of this paper also presented the output and trade effects of an FTA-KC as well as a trilateral FTA-CJK. Under a FTA-KC, the outputs of textile products, chemical and petroleum refinery products increase in Korea, while the output

of agriculture, forestry, and fishery decreases. For China, the output of agriculture, forestry, fishery, and electronic equipment will increase after the implementation of a FTA-KC. The exports of most industries in Korea and China increase with the help of a FTA-KC, especially textile products and chemical and petroleum refinery products in Korea and agriculture, forestry, and fishery, textile products, and electronic equipment in China. Under an FTA-CJK, the output of textile products, chemical and petroleum refinery products, manufactures increase in Korea, while the output of agriculture, forestry, and fishery products drops.

In addition, by comparing the effects of FTA signed in 2001 and 2007, we find that the tariff shows stronger effects on most industries in FTA-KC, while in Korea's Pulp, Paper and Wooden Products, Machinery and Equipment, Chemical and Petroleum Refinery Products, Electronic Equipment, Manufactures, China's Motor Vehicles and Transport Equipment and Machinery and Equipment, the compare advantage shows stronger effects. However, these two factors can partly explain the time-varying effects of FTA-CJK because the situation becomes more complex in a trilateral FTA. Thus, further studying of the issue is essential.

Lastly, much wider and deeper discussion on the feasibility and prospects for bilateral or tripartite FTAs among China, Japan, and Korea will continue in the academics and business sectors in the three countries. Further research is warranted.

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Appendix tables Compare Advatage

Table A1 World Compare Advantage

	China	Japan	Korea	China	Japan	Korea
	2001			2007		
AFF	0.610	0.116	0.214	0.462	0.082	0.130
MIN	0.248	0.006	0.005	0.057	0.005	0.004
TEX	3.081	0.410	1.859	3.532	0.294	0.831
PPP	2.374	0.145	0.516	2.016	0.187	0.285
CHM	0.613	0.808	1.093	0.614	0.920	1.118
IAM	0.900	0.971	0.973	1.084	1.020	0.913
MVT	0.211	2.029	1.345	0.326	2.352	1.587
ELE	1.492	1.765	2.390	2.675	1.606	2.973
OME	1.018	1.762	0.784	1.270	1.938	1.316
OMF	4.150	0.714	0.578	3.538	0.556	0.306
EGW	0.226	0.007	0.035	0.249	0.008	0.009
OSP	0.326	0.498	0.567	0.372	0.536	0.572

Table A2 Regional Compare Advantage(China-Korea-Japan)

	China	Japan	Korea	China	Japan	Korea
	2001			2007		
AFF	2.021	0.179	0.761	2.354	0.171	0.369
MIN	2.578	0.074	0.037	2.543	0.164	0.122
TEX	1.680	0.498	0.763	2.224	0.297	0.362
PPP	1.755	0.247	1.077	2.091	0.396	0.397
CHM	0.428	1.068	1.813	0.582	1.128	1.383
IAM	0.655	1.310	1.024	0.938	1.214	0.769
MVT	0.763	1.517	0.490	0.694	1.564	0.587
ELE	0.741	1.151	1.159	0.825	0.884	1.410
OME	0.692	1.493	0.647	0.725	1.289	0.950
OMF	1.974	0.324	0.587	2.189	0.430	0.214
EGW	1.646	0.180	1.369	1.894	0.572	0.407
OSP	0.966	0.985	1.081	1.214	0.863	0.909

Table A3 Regional Compare Advantage(China-Korea)

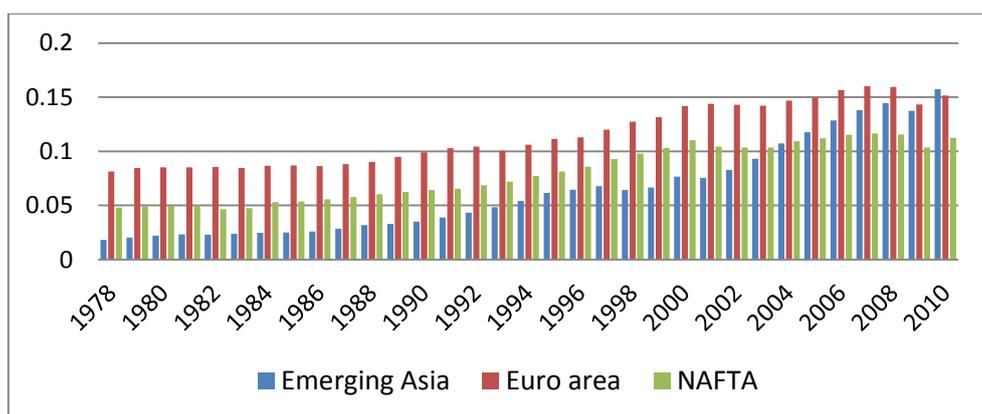
	China	Korea	China	Korea
	2001		2007	
AFF	2.651	0.153	2.445	0.121
MIN	2.932	0.009	2.535	0.067
TEX	1.110	0.944	1.841	0.489
PPP	0.824	1.090	1.796	0.516
CHM	0.420	1.298	0.487	1.312
IAM	1.033	0.983	1.579	0.648
MVT	1.751	0.615	0.941	1.036
ELE	0.890	1.056	0.663	1.205
OME	0.903	1.050	0.708	1.178
OMF	1.576	0.705	2.215	0.261
EGW	1.770	0.605	2.254	0.237
OSP	1.513	0.737	1.935	0.431

**Chapter 2 Regional Business Cycle Synchronization in
Asia: Internal or External Integration? Trade or
Financial Integration?**

1. Introduction

After Asian financial crisis, international economic linkages of Asian countries have increased rapidly for both financial and trade sides. Lowering trade barriers and forming free trade agreements have contributed to international trade integration of Asian countries. The total exports and imports of ASEAN+3 countries was 55.85% of their GDP (3.5% of world GDP) in 1990 but it increases up to 103.68% of their GDP (15.75% of world GDP).⁴⁰

Graph 1. Total Trade of Various Regions (% of World GDP)



Resource : The World Bank, World Development Indicators & Global Development Finance

Note: constant 2000 US\$

Figure 1 shows total trade of emerging Asian countries during the period of 1987-2010 in comparison to other major regions such as NAFTA and the Euro Area. Obviously, Asia countries become a vital region for the world trade, as important as Euro Area now.

⁴⁰ In this paper, ASEAN+3 countries indicate nine economies (Japan, China, Korea, Malaysia, the Philippines, Indonesia, Thailand, Hong Kong, Singapore). Data is from IMF

On the financial side, capital account liberalization and financial cooperation promote financial globalization of Asian countries. The ratio of total assets and liabilities to GDP of ASEAN+3 countries was 95.61% in 1990 (21.07% of world GDP), and it increases up to 246.44% (59.50% of world GDP) in 2009. These numbers are smaller than those for Euro Area and NAFTA in 2009. Euro Area's total assets and liabilities amount to 627.07% of its GDP (108.79% of world GDP). For NAFTA, they are 338.13% of its GDP (108.77% of world GDP)

Economic integration process has also progressed at regional level. Regional trade agreements such as ASEAN and production sharing networks in emerging Asian countries have led the deepening of regional trade integration. Regional financial cooperation such as CMIM and ABMI contributed to the developments of regional financial market integration.

On the other hand, many past studies documented that business cycle comovements of emerging Asian countries changed substantially after Asian financial crisis. In particular, some studies (i.e., Kim and Lee, 2011, Imbs, 2011, Moneta and Ruffer, 2009) documented that business cycles are more synchronized after Asian financial crisis. Business cycle comovements of emerging Asian countries have various important implications for the region. For example, the degree of business cycle synchronization in the region may suggest the need for common policy responses and policy cooperation in the region. It is also an important criteria to judge the costs of regional monetary integration.

This paper investigates how economic integration affects business cycle synchronization in emerging Asian countries. In particular, we distinguish two types of integrations, (1) trade integration vs. financial integration and (2) internal vs. external integration. That is, this paper examines how different types of integration (real vs.

financial and internal vs. external) affect business cycle synchronization of countries within the region.

Many past studies (i.e., Imbs, 2004, 2006, Kalemli-Ozcan et al, 2009) investigated the effects of trade and financial integration on business cycle synchronization. In the context of Asian countries, some past studies investigated a similar issue for Asian countries, that is, how trade and/or financial integration affects business cycle synchronization within Asian countries. However, most studies (Shin and Wang, 2003, 2004, Cortinhas, 2007, Choe, 2001, Crosby, 2003, Kumakura, 2006, Rana, 2007, 2008) concentrated on the effects of internal trade integration on business cycle synchronization. A few studies such as Shin and Sohn (2006) and Imbs (2011) examine the effects of both trade and financial integration but these studies either concentrate on internal integration or does not distinguish internal vs. external integration.

However, it is important to distinguish internal economic integration (within Asia) from external economic linkage (with the rest of the world), in explaining business cycle synchronization within Asia, because both internal and external economic linkages can affect business cycle synchronization within the region but in a different way. The size of the effects of internal trade (or financial) integration on regional business cycle may be different from the size of external trade (or financial) linkages. In such a case, the effects of internal and external integration are better to be estimated separately. In addition, internal and external integration may affect regional business cycle comovement in opposite directions. For example, a similar pattern of external financial linkage of countries in the region may increase business cycle synchronization within the region, but internal financial integration may decrease the business cycle synchronization within the region.

Further, by separately estimating the effects, we can infer which is more important,

internal integration or external integration, in explaining business cycle synchronization of Asian countries. Also, effects of regional economic integration efforts on business cycle synchronization can be better understood. For example, we can have a more clear answer on how further trade integration within the region such as FTA among ASEAN+3 and further developments of Asian financial cooperation will affect Asian business cycle synchronization, separately.

The rest of the paper is organized as follows. Section 2 shows the trends in internal vs. external and financial vs. trade integration of Asian countries, and business cycle synchronization of East Asian countries. Section 3 explains the empirical methodology. Section 4 discusses the empirical results. Section 5 concludes with a summary of results.

2. Trends in Economic Integration and Business Cycle Synchronization

As trade and financial integration deepen, the business cycle comovements among countries can change. Empirical literature suggests that trade integration tends to increase the co-movement of output (i.e., Canova and Dellas, 1993 and Frankel and Rose, 1998) although theoretical predictions are not always clear. Past empirical studies often found that financial integration also tends to increase the comovement of output (i.e., Imbs, 2004, 2006), but a recent study by Balemli-Ozcan et al. (2009) showed a negative effect, to be consistent with theoretical prediction.

Before we analyze the effects of economic integration on business cycle synchronization in Asia, we briefly show the trend in trade and financial integration and

business cycle comovements of Asian countries. In particular, we show the trend in internal vs. external and trade vs. financial integration and internal vs. external business cycle comovements of Asian countries.

2.1 Economic Integration

Table 1 shows trade relation of Asian countries, comprising intra-regional and inter-regional trade relations. It shows that intraregional trade among nine Asian economies (“ASEAN+3”) increased steadily to 46.1% of total trade in 2005, from 37.8% in 1990 although declines to 44.6% in 2009 due to global financial crisis. The level is higher than the North American Free Trade Agreement (NAFTA) economies (40.5% in 2009) but significantly lower than the EU economies (65.6% in 2009). If Japan is excluded, then the number for ASEAN+3 is lower than those of the other two regions. If measured by % of GDP, the intra-East Asian trade reached 25.6% in 2006 and 21.7% in 2009, from 11.1% in 1990, higher than the EU economies after 1995 (17.7% in 2005 and 15.9% in 2009) and substantially higher than NAFTA (11.2% in 2005 and 9.3% in 2009). The share of intra-regional trade is also substantial among the 13 Asia-Pacific economies (“ASEAN+7”), increasing to 49.4% in 2005, from 41.4% in 1990, but declining to 49.2% in 2009. As % of GDP, the intraregional trade has also increased, to 25.4% in 2006 from 11.6% but declining to 22.7% in 2009. This increasing trend of intra-regional trade is found not only for the overall Asia, but also for individual Asian countries. In 2009, the average of intra-regional trade between the individual of ASEAN+3 with the whole ASEAN+3 is over 60% of GDP. This average rate is near 50% of GDP for ASEAN+7 economies in 2009. This reflects a tight trade linkage among Asian countries.

Table 1. Trade Relation of Selected Economies in Asia⁴¹

A. as % of Total Trade

	ASEAN+3					ASEAN+7					G6				
	1990	1995	2000	2005	2009	1990	1995	2000	2005	2009	1990	1995	2000	2005	2009
HK	53.3	54.7	56.1	64.2	67.0	55.5	57.1	58.6	66.8	70.4	26.5	23.9	23.4	17.2	13.8
CHN	55.9	54.2	47.7	40.2	35.0	58.1	56.5	50.2	43.7	40.0	25.4	26.8	28.9	28.1	26.3
IND	53.8	49.9	51.0	58.1	57.3	58.3	55.0	56.6	64.6	65.6	24.3	26.2	22.0	15.6	14.2
JAP	24.3	34.3	33.9	39.5	42.5	29.4	38.6	37.6	44.0	47.8	43.7	37.8	36.5	27.7	21.7
KOR	34.5	40.9	39.9	44.7	44.0	38.3	44.6	43.4	48.7	48.9	39.3	32.1	29.9	22.2	16.9
MAL	54.3	54.2	53.7	54.6	57.4	58.8	57.9	57.6	59.4	63.6	28.0	28.2	26.4	23.6	17.4
PHI	37.6	44.2	45.1	55.3	57.9	40.7	47.0	47.0	57.3	60.5	38.6	35.6	32.3	22.4	19.0
SIN	44.4	51.4	50.3	52.0	51.7	48.6	54.8	54.1	57.8	58.4	30.0	26.5	24.7	19.7	16.9
THA	45.8	47.0	46.4	49.8	48.5	48.8	49.6	49.8	54.5	55.2	29.6	25.2	26.2	19.3	15.8
AUS	40.7	44.8	44.5	49.0	54.7	46.6	51.7	50.4	56.4	62.4	34.1	29.1	28.0	23.1	18.7
INA	18.3	22.5	22.4	25.7	26.7	20.7	24.8	24.4	28.8	30.2	35.4	33.9	30.2	25.3	19.4
NZ	26.7	30.7	29.8	31.1	33.6	47.5	54.3	53.0	54.7	57.9	31.6	27.9	28.6	25.7	20.7
PAK	27.2	29.6	23.2	23.7	24.9	29.7	31.7	26.5	27.2	29.3	35.6	33.0	30.3	26.9	22.4
A+3	37.8	45.0	44.2	46.1	44.6	41.8	48.5	47.5	50.2	49.9	35.8	30.9	29.9	24.3	21.0
A+7	37.1	44.1	43.3	45.1	43.8	41.4	48.0	46.9	49.4	49.2	35.6	30.8	29.8	24.4	20.8

⁴¹ HK is Hong Kong; CHN is China; IND is Indonesia; JAP is Japan; KOR is Korea; MAL is Malaysia; PHI is Philippine; SIN is Singapore; THA is Thailand; AUS is Australia; INA is India; NZ is New Zealand; PAK is Pakistan; A+3 is ASEAN+3; A+7 is ASEAN+7.

B. as % of GDP

	ASEAN+3					ASEAN+7					G6				
	1990	1995	2000	2005	2009	1990	1995	2000	2005	2009	1990	1995	2000	2005	2009
HK	102.6	112.2	109.7	177.0	177.4	106.9	117.2	114.7	184.0	186.5	51.0	49.1	45.7	47.4	36.6
CHN	18.2	24.6	21.6	26.8	16.0	18.9	25.6	22.7	29.2	18.3	8.3	12.1	13.1	18.8	12.1
IND	19.8	19.0	30.1	33.5	24.3	21.4	20.9	33.4	37.3	27.8	9.0	10.0	13.0	9.0	6.0
JAP	4.1	5.1	6.2	9.7	9.6	5.0	5.7	6.9	10.8	10.8	7.4	5.6	6.7	6.8	4.9
KOR	16.7	19.4	24.5	28.9	36.3	18.6	21.2	26.6	31.5	40.3	19.0	15.2	18.3	14.4	14.0
MAL	72.9	94.4	109.6	107.1	91.4	78.9	100.7	117.5	116.5	101.4	37.6	49.1	53.9	46.3	27.7
PHI	121.4	131.6	134.3	158.4	130.3	133.2	140.4	144.6	175.9	147.0	82.2	67.8	66.0	59.8	42.6
SIN	29.5	36.6	49.9	64.3	52.6	31.4	38.6	53.5	70.4	59.9	19.1	19.6	28.2	25.0	17.2
THA	4.6	6.0	5.6	5.7	5.3	5.0	6.4	6.0	6.2	5.8	5.6	6.2	6.8	6.5	5.3
AUS	10.1	13.3	15.1	15.4	17.8	11.5	15.3	17.1	17.7	20.3	8.4	8.6	9.5	7.2	6.1
INA	2.4	4.2	4.4	7.1	8.9	2.7	4.6	4.8	8.0	10.1	4.7	6.3	5.9	7.0	6.5
NZ	7.4	7.6	6.1	8.8	7.8	8.1	8.2	6.9	10.2	9.1	9.7	8.5	8.0	10.0	7.0
PAK	16.9	25.0	46.4	55.0	34.0	18.3	26.6	48.4	57.1	35.5	17.4	20.1	33.3	22.2	11.2
A+3	11.1	14.1	17.4	25.6	21.7	12.3	15.2	18.8	27.9	24.3	10.5	9.7	11.8	13.5	10.2
A+7	10.4	13.6	16.4	23.1	20.2	11.6	14.8	17.8	25.4	22.7	10.0	9.5	11.3	12.5	9.6

Note: Total trade is the average of export and import. GDP use the current price data.

Source: Direction of Trade Statistics, International Monetary Fund.

For external trade relation, the share of the G6 economy in trade for ASEAN+3 has been declining, but remains substantial at 24.3% in 2005 and 21.0% in 2009, from 35.8% in 1990. The share of the G6 economy in trade for ASEAN+7 has also been declining from 35.6% in 1990 to 20.8% in 2009. However, this does not necessarily imply that the trade linkage of Asian countries with G6 is weaker in the 2000s than in the 1990s. As a % of GDP, the trade of ASEAN+3 with G6 was 10.5% in 1990 and it is still 10.2% in 2009. Considering the rapid economic growth of Asian countries, this implies that the actual trade with G6 economy increased. In addition, as documented by some past studies (see ADB, 2007, Kim, Lee, and Park, 2011), a substantial part of intraregional trade is driven by trade of intermediate goods among the main Asian economies, with final production destined for export outside the region. In this context, intraregional trade dynamics remain sensitive to changes in external demand in industrialized economies.

Table 2 shows a quantitative measure of financial integration, cross-border holdings of portfolio assets and liabilities including equity and long-, and short-term debt securities. For the total portfolio assets and liabilities of ASEAN+3, the amount has increased from 0.95 and 0.72 trillion \$ in 1997 to 4.86 and 3.07 trillion \$, respectively, in 2010.

We can also see that intraregional financial integration has been increasing. The total recorded level of cross-border portfolio asset and liability holdings among ASEAN+3 economies was just about 85.52 billion \$ and 44.98 billion \$, respectively, in 1997. They increased to 579.03 billion \$ and 541.75 billion \$, respectively, in 2010. ASEAN+3's assets constituted 9.0 % of total holdings for ASEAN+3 in 1997, but decreased to 5.7% in 2001, which was partly affected by the Asia financial Crisis, but increased to 11.9% in 2010. In comparison, the sharing of their assets in G6 declined to 60.0% in 2001 and 46.6% in 2010, from 62.0% in 1997. For liabilities, we can see even

Table 2. Total Portfolio Investment in Asia

A. (\$ billion)

Year	Economy	Assets in			TOTAL	Liabilities from			TOTAL
		A+3	A+7	G6		A+3	A+7	G6	
1997	CHN	3.01	3.01	...	...	5.29	5.34	8.66	14.82
	HK	37.54	46.94	...	...	10.16	11.11	56.41	74.12
	IND	0.22	0.22	0.07	1.12	2.34	2.42	6.49	9.76
	JAP	29.07	63.18	573.56	906.66	1.23	5.71	305.03	364.96
	KOR	4.36	4.63	2.82	13.50	8.52	8.70	22.13	32.69
	MAL	0.92	1.08	0.53	1.79	10.38	10.52	13.29	25.08
	PHI	0.00	0.00	0.00	...	1.52	1.57	9.47	11.66
	SIN	10.35	11.40	9.36	22.79	2.67	2.88	16.83	21.54
	THA	0.07	0.08	0.11	0.27	2.85	2.89	7.94	11.52
	AUS	5.53	6.07	29.45	41.54	30.60	31.64	73.32	116.29
	NZ	0.65	1.70	4.06	6.45	2.92	3.41	12.79	17.69
	PAK	0.00	0.00	...	...	0.02	0.03	1.80	1.89
	INA	1.63	1.63	...	...	2.08	2.14	11.53	14.82
	A+3	85.52	130.53	586.45	946.14	44.98	51.15	446.24	566.15
	%T ⁴²	9.0%	13.8%	62.0%	100.0%	7.9%	9.0%	78.8%	100.0%
A+7	93.33	139.93	619.96	994.13	80.59	88.37	545.68	716.83	
%T	9.4%	14.1%	62.4%	100.0%	11.2%	12.3%	76.1%	100.0%	
2001	CHN	6.89	6.89	...	...	11.70	11.70	6.03	20.26
	HK	30.26	48.83	82.86	205.60	11.60	13.85	59.47	96.68
	IND	0.15	0.21	0.35	0.72	1.17	1.18	3.00	5.55
	JAP	21.05	42.91	832.18	1289.75	20.01	25.33	346.59	542.29
	KOR	1.71	1.83	4.53	8.03	14.17	14.64	52.08	76.79
	MAL	0.78	0.81	0.71	2.28	12.31	12.36	7.52	22.59
	PHI	0.11	0.12	1.94	2.13	4.19	4.20	5.63	12.75
	SIN	31.26	42.35	46.15	105.24	5.65	6.46	38.11	50.69
	THA	0.25	0.26	0.38	0.83	4.76	4.78	5.39	12.01
	AUS	8.11	9.00	59.60	79.35	45.65	47.25	88.70	169.97
	NZ	0.84	2.45	8.10	12.42	5.34	6.15	7.83	18.34
	PAK	0.00	0.00	...	...	0.01	0.01	0.22	0.47
	INA	0.06	0.06	...	...	0.75	0.83	10.51	15.38
	A+3	92.45	144.20	969.09	1614.58	85.56	94.51	523.81	839.61
	%T ⁴³	5.7%	8.9%	60.0%	100.0%	10.2%	11.3%	62.4%	100.0%
A+7	101.47	155.72	1036.79	1706.36	137.31	148.76	631.08	1043.77	
%T	5.9%	9.1%	60.8%	100.0%	13.2%	14.3%	60.5%	100.0%	

⁴² as % of Total

⁴³ as % of Total

Continued

2001	CHN	37.28	37.37	...	...	253.67	256.27	154.12	498.18
	HK	258.81	305.22	216.01	928.94	43.03	50.37	192.06	320.76
	IND	1.19	1.30	1.41	6.50	25.37	26.33	46.07	101.92
	JAP	79.77	230.09	1839.76	3345.83	55.26	77.53	812.43	1348.18
	KOR	25.76	31.42	51.34	116.69	78.34	82.66	230.85	407.80
	MAL	17.46	18.51	10.07	35.89	28.73	29.71	46.94	105.75
	PHI	1.14	1.14	2.57	5.86	9.18	12.33	21.46	46.53
	SIN	144.37	194.15	140.45	398.76	37.06	40.51	88.99	172.17
	THA	13.25	15.03	3.63	22.98	11.12	12.36	32.99	68.82
	AUS	44.46	54.03	298.21	468.04	198.73	216.35	483.53	931.48
	NZ	1.63	19.23	15.70	47.80	7.06	13.33	24.39	44.74
	PAK	0.01	0.01	0.02	0.18	0.06	0.06	1.53	4.60
	INA	0.24	0.26	0.70	1.58	49.27	52.56	130.79	376.48
	A+3	579.03	834.23	2265.25	4861.44	541.75	588.09	1625.90	3070.11
	%T ⁴⁴	11.9%	17.2%	46.6%	100.0%	17.6%	19.2%	53.0%	100.0%
	A+7	625.37	907.75	2579.89	5379.04	796.86	870.39	2266.13	4427.40
%T	11.6%	16.9%	48.0%	100.0%	18.0%	19.7%	51.2%	100.0%	

Note: (...) no data available

a sharper increase in the proportion of intra-regional portfolio investments. The proportion of intra-regional portfolio investment in liabilities increased from 7.9% in 1997 to 17.6% in 2010. However, as in the case of trade relation, this does not imply that the financial linkage with the G6 has decreased in recent years. As shown in Table 2, the actual size of cross-border assets between Asia and the U.S. increased substantially, along with financial globalization around the world.

Table 2. Total Portfolio Investment in Asia (Continued)

B. (as % GDP)

Year	Economy	Assets in				TOTAL	Liabilities from			TOTAL
		A+3	A+7	G6	A+3		A+7	G6		
1997	CHN	0.13	0.13	...	...	0.23	0.23	0.38	0.65
	HK	23.24	29.06	...	...	6.29	6.88	34.92	45.88
	IND	0.04	0.04	0.01	0.22	0.45	0.47	1.25	1.88	
	JAP	0.95	2.07	18.82	29.75	0.04	0.19	10.01	11.98	
	KOR	0.67	0.71	0.43	2.07	1.31	1.34	3.40	5.02	
	MAL	0.48	0.56	0.28	0.94	5.45	5.52	6.97	13.16	
	PHI	0.00	0.00	...	...	0.91	0.94	5.67	6.97
	SIN	9.21	10.16	8.34	20.29	2.38	2.57	14.98	19.18	
	THA	0.02	0.03	0.04	0.09	0.95	0.96	2.63	3.82	
	AUS	1.24	1.37	6.63	9.34	6.88	7.12	16.50	26.16	
	NZ	0.97	2.56	6.10	9.69	4.38	5.12	19.21	26.57	
	PAK	0.00	0.00	...	...	0.01	0.01	0.86	0.91
	INA	0.13	0.13	...	...	0.17	0.17	0.93	1.19
	A+3	1.77	2.71	12.16	19.62	0.60	0.69	6.00	7.61	
A+7	1.75	2.62	11.63	18.64	0.86	0.94	5.80	7.62		

⁴⁴ as % of Total

Year	Economy	Assets in			TOTAL	Liabilities from			TOTAL
		A+3	A+7	G6		A+3	A+7	G6	
2001	CHN	0.21	0.21	...	...	0.35	0.35	0.18	0.61
	HK	16.71	26.97	45.76	113.54	6.41	7.65	32.84	53.39
	IND	0.03	0.04	0.07	0.14	0.22	0.22	0.56	1.04
	JAP	0.64	1.30	25.27	39.16	0.61	0.77	10.52	16.47
	KOR	0.21	0.22	0.55	0.97	1.72	1.77	6.31	9.31
	MAL	0.35	0.37	0.32	1.04	5.61	5.63	3.43	10.29
	PHI	0.06	0.06	0.98	1.08	2.13	2.13	2.85	6.46
	SIN	23.17	31.40	34.22	78.03	4.19	4.79	28.26	37.59
	THA	0.08	0.08	0.12	0.25	1.47	1.48	1.66	3.71
	AUS	1.46	1.63	10.76	14.33	8.24	8.53	16.01	30.69
	NZ	1.06	3.07	10.15	15.57	6.69	7.71	9.82	22.99
	PAK	0.00	0.00	...	...	0.01	0.01	0.09	0.18
	INA	0.00	0.00	...	...	0.05	0.05	0.63	0.92
	A+3	1.62	2.53	16.99	28.30	0.95	1.04	5.79	9.28
A+7	1.60	2.46	16.36	26.92	1.18	1.28	5.44	9.00	
2007	CHN	0.37	0.37	...	...	2.51	2.53	1.52	4.92
	HK	79.09	93.27	66.01	283.88	13.15	15.39	58.69	98.02
	IND	0.12	0.13	0.14	0.63	2.46	2.55	4.46	9.87
	JAP	1.84	5.32	42.55	77.39	1.28	1.79	18.79	31.18
	KOR	1.76	2.14	3.50	7.96	5.34	5.64	15.75	27.81
	MAL	4.19	4.44	2.42	8.62	6.90	7.13	11.27	25.39
	PHI	0.31	0.31	0.70	1.59	2.49	3.35	5.82	12.63
	SIN	49.30	66.30	47.96	136.17	12.65	13.84	30.39	58.79
	THA	2.25	2.55	0.62	3.90	1.89	2.10	5.60	11.68
	AUS	5.03	6.11	33.74	52.96	22.49	24.48	54.71	105.39
	NZ	1.38	16.23	13.25	40.33	5.95	11.25	20.58	37.75
	PAK	0.00	0.00	0.01	0.04	0.01	0.01	0.33	0.98
	INA	0.01	0.01	0.02	0.04	1.21	1.30	3.22	9.28
	A+3	6.57	9.46	25.69	55.14	2.86	3.11	8.59	16.21
%T ⁴⁵	4.36	6.33	17.99	37.50	3.26	3.56	9.26	18.10	
A+7	0.37	0.37	...	...	2.51	2.53	1.52	4.92	
%T	79.09	93.27	66.01	283.88	13.15	15.39	58.69	98.02	

...= no data available

Source: *Coordinated Portfolio Investment Survey (CPIS)*, International Monetary Fund. China's asset data is calculated by the counter data (the liabilities data) from IMF; HongKong's 1997, India's 1997 and 2001, and Pakistan's 1997 and 2001 are also calculated by the counter data from IMF

⁴⁵ as % of Total

2.2 Business Cycle Comovements

This section gives a brief description on business cycle comovements of Asian countries. As in many past studies, we use the contemporaneous bilateral correlation coefficient of cyclical real GDP of two countries to describe business cycle comovements of two countries. To obtain cyclical real GDP, HP filter is applied to the logarithm of real GDP. Annual data is used for 1990-2009.⁴⁶

Table 3 present the correlation coefficients of cyclical real GDP for the pair of 14 Asia-Pacific countries, and also the correlation coefficients of cyclical real GDP of 14 Asia-Pacific countries and G-6 countries. Note that Japan is included in Asia-Pacific countries but not in G6 countries. First, business cycle comovements of Asian countries are higher in the 2000s than in the 1990s. Bilateral correlation among Asian countries increased in most cases. As can be seen in the average number (“Avg.”), the business cycle comovements increased in 7 out of 10 countries in ASEAN+3 and increased in 11 out of 14 countries in ASEAN+7. In addition, the business cycle synchronization of Asia-Pacific countries with U.S. and G6 also increased. On average, the correlation ASEAN+3 with the U.S. increased from -0.15 to 0.45 and the correlation with G6 increased from -0.13 to 0.66, while the correlation of ASEAN+7 with the U.S. increased from 0.03 to 0.45 and the correlation with G6 increased from 0.04 to 0.63.

Only from these tables, it is difficult to exactly infer why the business cycle synchronization of Asian countries has increased. However, this can be related to a higher degree of trade and financial integration within Asian economies documented in the previous section. This can also be related to a higher business cycle synchronization of Asian countries with advanced countries, which in turn can be related to a more

⁴⁶ Real GDP in local unit is used for all cases except for G6 aggregate, where real GDP in PPP is used.

Table 3. Correlation of Output in Asia**A. 1990–1999**

	HK	CHN	INO	JPN	KOR	MAL	PHI	SIN	THA	VIE	AU	NZ	PAK	INA	US	G6
HK	1.00	-0.27	0.92	0.67	0.72	0.87	-0.08	0.71	0.91	-0.30	-0.61	0.20	0.14	-0.60	-0.70	-0.73
CHN	-0.27	1.00	-0.09	-0.31	0.02	0.05	0.78	0.44	-0.20	0.88	0.90	0.81	-0.24	0.82	0.78	0.66
INO	0.92	-0.09	1.00	0.81	0.83	0.98	0.21	0.81	0.93	-0.02	-0.47	0.39	0.28	-0.35	-0.61	-0.60
JPN	0.67	-0.31	0.81	1.00	0.67	0.78	0.25	0.47	0.63	0.03	-0.52	0.04	0.46	-0.30	-0.59	-0.44
KOR	0.72	0.02	0.83	0.67	1.00	0.89	0.37	0.77	0.80	0.07	-0.26	0.52	0.30	-0.04	-0.35	-0.24
MAL	0.87	0.05	0.98	0.78	0.89	1.00	0.36	0.87	0.89	0.12	-0.32	0.52	0.27	-0.18	-0.46	-0.44
PHI	-0.08	0.78	0.21	0.25	0.37	0.36	1.00	0.57	-0.03	0.94	0.68	0.75	0.01	0.78	0.56	0.61
SIN	0.71	0.44	0.81	0.47	0.77	0.87	0.57	1.00	0.70	0.37	0.08	0.80	-0.10	0.08	-0.10	-0.15
THA	0.91	-0.20	0.93	0.63	0.80	0.89	-0.03	0.70	1.00	-0.24	-0.57	0.35	0.30	-0.45	-0.71	-0.71
VIE	-0.30	0.88	-0.02	0.03	0.07	0.12	0.94	0.37	-0.24	1.00	0.82	0.67	-0.02	0.86	0.71	0.71
Avg1	0.46	0.14	0.60	0.44	0.57	0.65	0.37	0.63	0.49	0.20	-0.03	0.51	0.14	0.06	-0.15	-0.13
AU	-0.61	0.90	-0.47	-0.52	-0.26	-0.32	0.68	0.08	-0.57	0.82	1.00	0.56	-0.29	0.91	0.96	0.88
NZ	0.20	0.81	0.39	0.04	0.52	0.52	0.75	0.80	0.35	0.67	0.56	1.00	-0.13	0.59	0.36	0.29
PAK	0.14	-0.24	0.28	0.46	0.30	0.27	0.01	-0.10	0.30	-0.02	-0.29	-0.13	1.00	0.00	-0.25	-0.16
INA	-0.60	0.82	-0.35	-0.30	-0.04	-0.18	0.78	0.08	-0.45	0.86	0.91	0.59	0.00	1.00	0.86	0.88
Avg2	0.25	0.27	0.40	0.28	0.44	0.47	0.43	0.50	0.31	0.32	0.07	0.47	0.08	0.16	0.03	0.04

B. 2000–2009

	HK	CHN	INO	JPN	KOR	MAL	PHI	SIN	THA	VIE	AU	NZ	PAK	INA	US	G6
HK	1.00	0.51	0.49	0.75	0.52	0.91	0.93	0.97	0.71	0.70	0.65	0.20	0.95	0.64	0.68	0.91
CHN	0.51	1.00	0.98	-0.12	-0.11	0.47	0.70	0.61	-0.11	0.97	0.22	-0.68	0.70	0.98	-0.24	0.18
INO	0.49	0.98	1.00	-0.15	-0.14	0.47	0.69	0.57	-0.13	0.95	0.23	-0.70	0.68	0.96	-0.28	0.14
JPN	0.75	-0.12	-0.15	1.00	0.79	0.73	0.57	0.66	0.94	0.10	0.71	0.75	0.52	0.01	0.98	0.94
KOR	0.52	-0.11	-0.14	0.79	1.00	0.56	0.37	0.50	0.69	0.05	0.71	0.59	0.28	-0.04	0.74	0.74
MAL	0.91	0.47	0.47	0.73	0.56	1.00	0.93	0.92	0.80	0.63	0.81	0.27	0.84	0.57	0.66	0.83
PHI	0.93	0.70	0.69	0.57	0.37	0.93	1.00	0.95	0.59	0.83	0.72	-0.01	0.93	0.78	0.46	0.75
SIN	0.97	0.61	0.57	0.66	0.50	0.92	0.95	1.00	0.67	0.77	0.68	0.12	0.95	0.72	0.59	0.83
THA	0.71	-0.11	-0.13	0.94	0.69	0.80	0.59	0.67	1.00	0.09	0.74	0.77	0.51	0.02	0.94	0.85
VIE	0.70	0.97	0.95	0.10	0.05	0.63	0.83	0.77	0.09	1.00	0.35	-0.52	0.85	0.99	-0.02	0.40
Avg1	0.72	0.43	0.42	0.47	0.36	0.72	0.73	0.74	0.47	0.57	0.58	0.08	0.72	0.56	0.45	0.66
AU	0.65	0.22	0.23	0.71	0.71	0.81	0.72	0.68	0.74	0.35	1.00	0.45	0.53	0.27	0.61	0.69
NZ	0.20	-0.68	-0.70	0.75	0.59	0.27	-0.01	0.12	0.77	-0.52	0.45	1.00	-0.04	-0.58	0.83	0.50
PAK	0.95	0.70	0.68	0.52	0.28	0.84	0.93	0.95	0.51	0.85	0.53	-0.04	1.00	0.81	0.45	0.74
INA	0.64	0.98	0.96	0.01	-0.04	0.57	0.78	0.72	0.02	0.99	0.27	-0.58	0.81	1.00	-0.10	0.32
Avg2	0.69	0.40	0.38	0.48	0.37	0.69	0.69	0.70	0.48	0.52	0.54	0.05	0.65	0.47	0.45	0.63

Notes: The figures indicate present the bilateral BCS as the description in the paper. Average is the simple average of correlations with nine East Asian economies (excluding own economy).AU(Australia), People's Republic of China (CHN); Hong Kong, China (HK); India(INA) Indonesia (INO); Japan (JPN); the Republic of Korea (KOR); Malaysia (MAL);New Zealand(NZ); Pakistan (PAK); Philippines (PHI); Singapore (SIN); Thailand (THA); and Vietnam(VIE).

Sources: Bloomberg, CEIC, *International Financial Statistics* (International Monetary Fund), and national sources.

similar and stronger economic linkages between Asian countries with advanced countries. In the next section, we formally examine the effects of internal vs. external and trade vs. financial integration on business cycle comovments of Asian countries.

3. Empirical Method

3.1 Empirical Model

This paper analyzes the effects of internal vs. external and trade vs. financial integration on business cycle synchronization. A simplified version of regression that analyzes the effects of trade and financial integration on business cycle synchronization, used in past studies (i.e., Imbs, 2004, 2006, 2011), may be summarized as follows.

$$\rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \varepsilon_{ij}$$

where ρ_{ij} is correlation between the cyclical components of real GDP of countries i and j , T_{ij} is the intensity of bilateral goods trade between countries i and j , and F_{ij} is the intensity of bilateral asset trade between countries i and j . α_1 and α_2 show the effects of trade and financial integration on business cycle synchronization.

Such a regression may not have much problem if the sample covers most countries around the world. However, if we consider only countries in a region (i.e., countries in Asia), it can be problematic because business cycle synchronization of countries in a region can be affected not only by economic integration of countries within the region but also by economic linkages with countries outside the region. For example, structural shocks in the U.S. can affect both Korea and Thailand in a similar

way, when Korea and Thailand have a similar and strong economic linkages with the U.S. As a more concrete example, U.S. recession is likely to decrease the exports of Korea and Thailand to the U.S., which may generate recession in Korea and Thailand and generate a positive business cycle comovement between Korean and Thailand. In particular, if Korea and Thailand's trade relation with the U.S. are strong and similar, business cycle comovements due to this external trade linkage is likely to be stronger.

To consider such effects from the economic relation with the countries outside the region, a variable is added in equation (1) as follows.

$$(2) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EX_{ij} + \varepsilon_{ij}$$

where EX shows the external linkage that generates business cycle synchronization between country i and j, or more precisely how strong and similar the external linkage of country i and j with the countries outside the region.

The external linkage may be divided into two types, trade and financial linkages as follows.

$$(3) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EXT_{ij} + \alpha_4 EXF_{ij} + \varepsilon_{ij}$$

where EXT and EXF are the variables that show the external trade and financial linkages, respectively, that generate business cycle synchronization between country i and j. Again, the measures show how strong and similar external linkages of countries i and j with the countries outside the region are.

We also consider the following equation system in which interactions among RHS variables are allowed.

$$(4) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EXT_{ij} + \alpha_4 EXF_{ij} + \varepsilon_{ij}^1$$

$$T_{ij} = \beta_0 + \beta_1 F_{ij} + \beta_2 I_{ij}^T + \beta_3 EXT_{ij} + \beta_4 EXF_{ij} + \varepsilon_{ij}^2$$

$$F_{ij} = \gamma_0 + \gamma_1 T_{ij} + \gamma_2 I_{ij}^F + \gamma_3 EXT_{ij} + \gamma_4 EXF_{ij} + \varepsilon_{ij}^3$$

where I_{ij}^T and I_{ij}^F are the instruments that affect bilateral trade and finance intensities between country i and j , respectively. In this system, interactions among internal financial and trade integration are allowed. Internal trade integration can have both direct effect (α_1) and indirect effect ($\gamma_1\alpha_2$) by affecting internal financial integration. Similarly, internal financial integration can have both direct effect (α_2) and indirect effect ($\beta_1\alpha_1$) by affecting internal trade integration. In addition, indirect effects of two external linkages through internal integration are also allowed; two external linkages are allowed to affect business cycle synchronization by affecting internal trade or financial integration.

Equations (1), (2), and (3) are estimated by OLS. Equation system (4) is estimated by three stage least square.

3.2 Measurement and Data

To measure the degree of trade integration, we use the measure of the trade intensity between country i and j ($T_{i,j}$) is constructed by the following formula.

$$T_{i,j} = \frac{1}{2T} \sum_t \frac{(X_{i,j,t} + M_{i,j,t})Y_t^W}{Y_{i,t} * Y_{j,t}}$$

where $X_{i,j,t}$ is the amount of export from country i to j at time t ; $M_{i,j,t}$ is the amount of import from country i to j at time t ; Y_t^w is the world GDP at time t ; $Y_{i,t}$ is the country i 's GDP in time t . This measure is used in many past studies including Imbs (2006). The measure has a theoretical background, as shown in the gravity model of Deardorff (1998). The measure depends only on trade barriers, but not on country size. Deardorff (1998) showed that it equals one if preferences are homothetic and there are no trade barriers.⁴⁷

A similar measure for financial integration between country i and j is constructed for financial integration because the huge diversity of country size among Asian countries may affect the results. The measure of the financial integration between i and j ($F_{i,j}$) is as follows.

$$F_{i,j} = \frac{1}{2T} \sum_t \frac{(I_{i,j,t} + I_{j,i,t})Y_t^w}{Y_{i,t} * Y_{j,t}}$$

where $I_{i,j,t}$ is the amount of portfolio investment from country i to j at time t . To measure the degree of financial integration, many past studies inclined to use the portfolio investment data when studying the effects of financial integration on business cycle synchronization. Following past studies, we also used bilateral portfolio investment data (CIPS).⁴⁸

The measure of external linkage that affects business cycle synchronization (EXij) is constructed as follows.

⁴⁷ Some past studies suggest that the gravity model can also explain international transactions in financial assets (i.e., Portes and Rey, 2001).

⁴⁸ China's asset data is calculated by the counter party's (liability) data throughout the sample period. The same method is used for the following countries' asset data: Hong Kong (1997), India (1997, 2001, 2002, 2003), and Pakistan (1997, 2001).

$$(6) EX_{ij} \equiv \sum_{k=1}^6 w_k \{2 - |\rho_{i,k} - \rho_{j,k}|\} \rho_{ij,k}$$

$$(7) \rho_{ij,k} = \min\{\rho_{i,k}, \rho_{j,k}\} \text{ if } \rho_{i,k} > 0 \text{ and } \rho_{j,k} > 0$$

$$= \max\{\rho_{i,k}, \rho_{j,k}\} \text{ if } \rho_{i,k} < 0 \text{ and } \rho_{j,k} < 0$$

$$= 0 \text{ if } \rho_{i,k} < 0 \text{ and } \rho_{j,k} > 0$$

$$= 0 \text{ if } \rho_{i,k} > 0 \text{ and } \rho_{j,k} < 0$$

where w_k is the relative weight of G7 countries (excluding Japan). The second term ($\rho_{ij,k}$) in equation (6) shows the common correlation between the correlation of country i and k and that of country j and k . Therefore, the larger the common correlation with countries outside the region, the larger the measure. The first term ($\{2 - |\rho_{i,k} - \rho_{j,k}|\}$) in equation (6) shows the similarity in correlation of country i and k and that of country j and k . Therefore, the larger the similarity in correlation with countries outside the region, the larger the measure.

The measure of external trade and financial linkages that affects business cycle synchronization are constructed in a similar way.

And MAXT is the largest value among $T_{i,j}$ and $T_{i,k}$ for all $i, j,$ and k . The first term $\{\text{MAXT} - |T_{i,k} - T_{j,k}|\}$ in equation (8) shows the similarity in the trade integration of countries i and k and that of countries j and k . $|T_{i,k} - T_{j,k}|$ shows the difference between the trade integration of countries i and j with k . By subtracting from the largest possible value of T in the sample, the first term $\{\text{MAXT} - |T_{i,k} - T_{j,k}|\}$ shows the similarity. The second term ($\min\{T_{i,k}, T_{j,k}\}$) in equation (8) shows the common part of the trade integration of countries i and k and that of countries j and k . The second term

shows how strong the common part of trade integration of countries i and j with country k .

The intuition behind this measure is the following. If two countries in a region, for example, Korea and Thailand in Asia, have a similar and strong external trade integration with the countries outside the region, for example, G6, business cycle comovement between Korea and Thailand is likely to be high. The first term naturally shows the similarity of Korea's external trade linkages and Thailand's external trade linkages. The second term shows how strong common external trade linkages of Korea and Thailand are. Trade intensities of Korea and Thailand with G6 themselves (T_{ik} and T_{jk}) show how strong external trade linkages of Korea and Thailand are, but business cycle correlation of Korea and Thailand is likely to be generated only to the extent that they have the common part. Therefore, the minimum of external trade intensities of two countries is used.

Then the first term $\{\text{MAXF} - |F_{i,k} - F_{j,k}|\}$ in equation (9) shows the difference between the financial integration of countries i and j with k . The second term ($\min\{F_{i,k}, F_{j,k}\}$) how strong the common part of financial integration of countries i and j with country k .

$$(8) \text{EXT}_{ij} \equiv \sum_{k=1}^6 w_k \{\text{MAXT} - |T_{i,k} - T_{j,k}|\} \min\{T_{i,k}, T_{j,k}\}$$

$$(9) \text{EXF}_{ij} \equiv \sum_{k=1}^6 w_k \{\text{MAXF} - |F_{i,k} - F_{j,k}|\} \min\{F_{i,k}, F_{j,k}\}$$

Also note that these measures for external linkages are different from the measures for internal integration in their nature. The measures for internal integration simply show how intensive trade and financial integration between countries i and j but the measures for external linkages show how strong and similar the external integration of countries i

and j with countries outside the region by using the basic measure of external trade intensities.

As instruments for the system estimation, we include the geographic distance of two countries' capital cities, whether the border exists between two countries, and whether the common official language is used in both countries, following past empirical studies on the determinants of bilateral trade. These three instruments are usually argued as clearly exogenous, with high predictive power, when analyzing the determinants of bilateral trade. For the financial integration, two instruments are used; the sum of two countries' per capital real GDP and the difference of two countries' per capital real GDP. The level of income and the difference of income may affect the degree of financial integration.

We consider the following group of countries. First, we consider large countries in ASEAN+3 (China, Japan, Korea, Malaysia, Thailand, Indonesia, the Philippines, Singapore, Hong Kong) since various policy cooperation such as CMIM and ABMI is lively discussed among these group of countries. Second, we add four countries (India, Pakistan, New Zealand, Australia, "ASEAN+7") to the above countries since policy debates often include these four countries as potential candidates for extended policy cooperation.

For the measure of business cycle correlation, we calculate the correlation of cyclical real GDP for 2001-2009 (annual data) as reported in Table 3. For all other measure, the average values of 2001-2009 are used. Correlations among various measures are reported in Table 4.⁴⁹ The table shows that the business cycle synchronization measure (ρ) is more correlated with external linkage measures than with internal integration measures. This might imply that business cycle synchronization

⁴⁹ ρ_1 , EXT1, and EXF1 are alternative measures to check the robustness of the results. Section 4 explains those measures.

of Asian countries is more related with external linkages than with internal integration, but the formal analysis will be performed in the next section.

Table 4. Correlation among Various Measures

ASEAN+3	ρ	ρ_1	T	F	EXT	EXT1	EXF	EXF1
ρ	1							
ρ_1	0.948	1						
T	0.261	0.231	1					
F	0.297	0.276	0.904	1				
EXT	0.382	0.374	0.675	0.811	1			
EXT ₁	0.382	0.374	0.676	0.812	0.999	1		
EXF	0.439	0.424	0.284	0.600	0.591	0.5902	1	
EXF ₁	0.444	0.430	0.290	0.605	0.594	0.594	0.999	1

ASEAN+7	ρ	ρ_1	T	F	EXT	EXT1	EXF	EXF1
ρ	1							
ρ_1	0.903	1						
T	0.208	0.164	1					
F	0.232	0.202	0.864	1				
EXT	0.281	0.243	0.712	0.757	1			
EXT ₁	0.282	0.244	0.712	0.758	0.999	1		
EXF	0.333	0.279	0.249	0.606	0.437	0.437	1	
EXF ₁	0.334	0.281	0.253	0.612	0.439	0.439	0.999	1

Note: Subscripts “1” stands alternative measure.

4 Results

In Tables 5-7, we report the results from various regression for ASEAN+3 and ASEAN+7. Below we explain the results mostly based on the results for ASEAN+7 but the results for ASEAN+3 are similar.

Table 5 shows the results for the single equation method; each equation is estimated by OLS. When the measure for internal trade integration is included as the only regressor, the coefficient on the measure for internal trade integration is positive for both

ASEAN+3 and ASEAN+7, although it is significant at 10% level only for ASEAN+7. Similarly, when the measure for internal financial integration included as the only regressor, the coefficient on the measure for international financial integration is positive and significant at 5% level for ASEAN+7 and at 10% level for ASEAN+3. However, when both measures are included as regressors, both coefficients are not significantly estimated. This is probably because of the high correlation between these two measures as reported in Table 4.

Table 5. Single Equation Estimation

A. ASEAN+3					
ρ	OLS	OLS	OLS	OLS	OLS
T	0.00537(1.58)		-0.00091(-0.110)	0.00045(0.08)	0.0272(2.56)**
F		0.0188(1.82)*	0.0213(0.87)	0.0027(0.15)	-0.109(-2.61)**
EX				1.146(5.9)***	
EXT					0.0154(1.45)
EXF					0.0902(3.2)***
\bar{R}^{250}	0.068	0.0885	0.0888	0.564	0.360

*P<0.1; ** P<0.05; ***P<0.01

B. ASEAN+7					
P	OLS	OLS	OLS	OLS	OLS
T	0.0060(1.86)*		0.0009(0.14)	0.00263(9.51)	0.0177(2.09)**
F		0.0200(2.08)**	0.0177(0.92)	-0.00365(-0.23)	-0.0687(-2.24)**
EX				1.088(6,59)***	
EXT					0.0107(1.18)
EXF					0.0673(3.16)***
\bar{R}^2	0.0434	0.0538	0.0541	0.404	0.191

*P<0.1; ** P<0.05; ***P<0.01

When the measures for external financial and trade linkages (EXF and EXT) are

⁵⁰ \bar{R}^2 is adjusted R-square

added, the coefficients on the measures for internal trade integration and two external linkages are positively estimated but the coefficient on the measure for internal financial integration is negatively estimated. The estimated coefficients on the measures for internal trade and financial integration are significant at 5% level, while the estimated coefficients on the measure for external financial integration are significant at 1% level. From Table 5, we can also see that adjusted R2 increased substantially when two measures of external linkages are added in the regression.

These results suggest that external linkages have a positive effect on regional business cycle. Similar and positive external linkages of two countries are likely to increase the business cycle synchronization. Foreign shocks are likely to affect two countries in a similar way if external linkages of two countries are positive and similar. Internal trade integration has a positive effect on internal business cycle correlation, which is consistent with many past studies that document a positive effect of trade integration on business cycle comovements.

A very interesting result is the negative effect of internal financial integration on internal business cycle correlation. Past studies suggested that various theories predict a negative effect of financial integration on business cycle comovements but empirical studies mostly found a positive effect. Theoretically, as shown in Backus, Kehoe, and Kydland (1992) and Baxter and Crucini (1995), in a two country complete market model, a country-specific positive productivity shock induces capital from the other country by increasing in marginal productivity of capital and labor and generate a negative correlation between output of two countries. Obstfeld (1994) suggested that financial integration can promote investments on risky projects, leading countries to specialize based on comparative advantages. This suggests that financial integration generates a negative correlation of output. However, past empirical studies (i.e., Imbs, 2004, 2006,

Otto, Voss, and Wilard, 2001, Terrones, 2004, Davis, 2008) often found insignificant or positive effects of financial integration on business cycle comovements.

The result of current study is particularly interesting because the effect is positive when the measures for external linkages are not included in the estimation. In the estimations, we can see that external linkages have an important effect on internal business cycle synchronization. The coefficients on external linkage are significantly estimated. In addition, adjusted R square increases substantially when the measures for external linkages are added in the regression. By omitting the measure for external linkage, the effect of internal integration on internal business cycle synchronization can be improperly estimated. In our case, the effect of internal financial integration on business cycle synchronization is negative when external linkages are considered but it is positive when external linkages are not considered. This is in line with Kalemli-Ozcan, Papaioannou, and Peydró (2009). Kalemli-Ozcan, Papaioannou, and Peydró (2009) suggested that past studies suffer from omitted variable bias, for example, not controlling aggregate effect, and that the effect of financial integration on business cycle comovements is negative, after controlling such a bias.

Table 6 reports the results for the estimation of equation system. The result for the direct effect is similar to the result of the single equation estimation. The sign of the effects of each variable is the same. The significance level of the estimate changes to some extent. The measure for internal financial integration still has a significant positive effect on internal business cycle synchronization. Other measures still have positive effects.

For other equations, it is interesting to see that the measures for internal trade and financial integration affect each other positively. That is, internal trade integration has a positive effect on internal financial integration but internal financial integration also has

a positive effect on internal trade integration. This implies that internal financial integration has a positive indirect effect on internal business cycle synchronization by having a positive effect on internal trade integration, which in turn has a positive effect on internal business cycles. External linkages also tend to have a positive effect on internal integration.

Table 6. Equation System

	ASEAN+3	ASEAN+7
GDP correlations (ρ) equation		
T	0.0699 (2.84)***	0.0326 (1.60)
F	-0.303 (-2.82)***	-0.155 (-2.07)**
EXT	0.0383 (2.20)**	0.0234 (1.71)*
EXF	0.186 (3.28)***	0.112 (2.63)***
\bar{R}^2	-0.2016	0.0451
Trade (T) equation ⁵¹		
F	3.941 (7.02)***	3.794 (5.47)***
EXT	-0.285 (-1.16)	-0.0587 (-0.22)
EXF	-1.950 (-5.32)***	-2.0263 (-5.42)***
\bar{R}^2	0.9146	0.8480
Finance (F) equation ⁵²		
T	0.217 (7.18)***	0.243 (5.95)***
EXT	0.122 (2.09)**	0.0443 (0.494)
EXF	0.473 (4.34)***	0.517 (6.24)***
\bar{R}^2	0.9476	0.9080

In the regression, all the coefficients are often estimated significantly, so it is not so easy to infer which variable is the most important variable in explaining business cycle comovements. To infer the relative importance of the variables, we applied the method developed by Kruskal (1987).⁵³ Table 7 reports the results. The most important

⁵¹ Instruments: (1) the geographic distance of two countries' capital cities; (2) whether the border exists between two countries; (3) whether the common official language is used in both countries

⁵² Instruments: (1) the sum of two countries' per capital real GDP ; (2) the difference of two countries' per capital real GDP

⁵³ The method can be called as averaging relative importance over all orderings of the independent variables. First, we calculate the proportion of variance of the dependent variable linearly accounted by the

variable is external finance linkage. The next one is internal financial integration. This is interesting in that newly growing economic linkage, that is, financial linkage is more important than the traditional economic integration, that is, trade integration, in explaining business cycle synchronization of Asia. The result also suggests that external financial linkage is more important than internal integration, which is consistent with the popular notion that Asian economies are significantly affected by economic condition of advanced countries.

Table 7. Partial and Relative Important Index

A. ASEAN+3

Variable	Partial Corr.	Semipartial Corr.	relative important index
T	0.417	0.368	0.0599
F	-0.424	-0.375	0.0627
EXT	0.253	0.209	0.0212
EXF	0.499	0.460	0.0911

B. ASEAN+7

Variable	Partial Corr.	Semipartial Corr.	relative important index
T	0.238	0.221	0.0235
F	-0.254	-0.236	0.0267
EXT	0.137	0.124	0.00765
EXF	0.347	0.332	0.0514

Note: Partial correlation measures the degree of association between two random variables, with the effect of a set of controlling random variables removed. The semipartial correlation statistic is similar to the partial correlation statistic. Both measure variance

first independent variable. Then, we calculate the proportion of remaining variance of the dependent variable linearly accounted by the second independent variable, and so on. Then, we calculate the average proportion of all possible orderings. For the details, see Kruskal (1987).

correlations after certain factors are controlled for, but to calculate the semipartial correlation one holds the third variable constant for either X or Y, whereas for partial correlations one holds the third variable constant for both.

We also perform various robustness analysis. First, we use the correlation of real GDP growth rate (“ ρ_1 ”). Second, we use the alternative measures of the similarity and the size of external linkages as follows.

$$\begin{aligned} \text{EX1}_{ij} &\equiv \sum_{k=1}^6 w_k \rho_{ij,k} \\ \text{EXT1}_{ij} &\equiv \sum_{k=1}^6 w_k \min\{T_{i,k}, T_{j,k}\} \\ \text{EXF1}_{ij} &\equiv \sum_{k=1}^6 w_k \min\{F_{i,k}, F_{j,k}\} \end{aligned}$$

In these measures, the size of the common external linkage is only considered by dropping the term showing the similarity of external linkage. Third, alternative measures for trade and financial integration are considered.

$$\begin{aligned} T1_{i,j} &= \frac{1}{T} \sum_t \frac{(X_{i,j,t} + M_{j,i,t})}{Y_{i,t} + Y_{j,t}} \\ F1_{i,j} &= \frac{1}{T} \sum_t \frac{(I_{i,j,t} + I_{j,i,t})}{Y_{i,t} + Y_{j,t}} \end{aligned}$$

Table8. Extended Results⁵⁴

	1		2	
	ASEAN+3	ASEAN+7	ASEAN+3	ASEAN+7
GDP correlations (ρ) equation				
T	0.0642(3.18)***	0.0316(1.83)*	0.0742(3.54)***	0.344(1.69)*
F	-0.290(-3.29)***	-0.165(-2.6)***	-0.328(-3.46)***	-0.165(-2.17)**
EXT	0.0394(2.71)***	0.0258(2.17)**	5.250(2.46)**	3.040(1.77)*
EXF	0.168(3.61)***	0.106(2.91)***	6.264(3.96)***	3.690(2.71)***
\bar{R}^2	-0.7661	-0.3101	-0.5675	0.0299
Trade (T) equation				
F	4.034(7.26)***	3.713(5.4)***	4.154(7.48)***	3.869(5.35)***
EXT	-0.318(-1.31)	-0.0289(-0.11)	-45.454(-1.47)	-9.926(-0.28)
EXF	-2.000(-5.51)***	-1.988(-5.37)***	-2.057(-5.63)***	-65.298(-5.32)***
\bar{R}^2	0.9104	0.8515	0.9060	0.8461
Finance (F) equation				
T	0.223(7.44)***	0.241(5.99)***	0.221(7.96)***	0.244(6.09)***
EXT	0.113(1.95)*	0.0476(0.75)	14.150(2.05)**	5.010(0.66)
EXF	0.496(4.66)***	0.511(6.29)***	15.808(4.70)***	16.562(6.57)***
\bar{R}^2	0.9473	0.9081	0.9473	0.9096

1. shows the results when real GDP in log-difference is used, instead of cyclical real GDP.

2. shows the results when alternative measures for external trade and financial linkages are used.

⁵⁴ Instruments are same with table 6.

	3		4	
	ASEAN+3	ASEAN+7	ASEAN+3	ASEAN+7
GDP correlations (ρ) equation				
T	16.720(1.42)	14.708(1.75)*	0.00532(0.41)	0.0227(1.13)
F	-0.130(-1.41)	-0.140(-2.36)**	-9.324(-0.30)	-64.459(-1.57)
EXT	0.0298(1.46)	0.0315(2.26)**	0.00591(0.48)	0.0114(0.80)
EXF	0.0955(2.01)**	0.102(3.00)***	0.0443(1.24)	0.109(2.05)**
\bar{R}^2	0.0113	0.0050	0.1850	0.0641
Trade (T) equation				
F	0.00688(5.82)***	0.00672(4.51)***	1803.06(5.04)***	2035.663(3.99)***
EXT	-0.00099(-1.91)*	-0.000456(-0.78)	0.197(0.81)	0.322(1.11)
EXF	-0.0033(-4.22)***	-0.00348(-4.34)***	-1.651(-3.65)***	-2.553(-4.0)***
\bar{R}^2	0.8543	0.8280	0.8735	0.6856
Finance (F) equation				
T	122.3181(6.40)***	120.105(5.09)***	0.000295(4.34)***	0.000406(3.84)***
EXT	0.186(3.19)***	0.129(2.12)**	0.000240(1.85)*	-0.0000404(-0.24)
EXF	0.433(3.41)***	0.472(4.98)***	0.000563(2.33)**	0.00116(5.34)***
\bar{R}^2	0.9274	0.8772	0.8959	0.8074

3. shows the results when the alternative measure for internal trade linkages is used.

4. shows the results when the alternative measure for internal financial linkages is used.

Table 8. Extended Results (Continued)

	5	
	ASEAN+3	ASEAN+7
GDP correlations (ρ) equation		
T	0.0493(2.94)***	0.0321(2.81)***
F	-0.740(-3.08)***	-0.310(-3.31)***
EXT	4.423(1.360)***	0.967(1.29)
EXF	1.318(3.36)***	0.843(4.09)***
\bar{R}^2	-0.4718	-0.7034
Trade (T) equation		
F	16.061(3.88)***	7.204(2.87)***
EXT	-74.876(-2.03)***	17.979(0.81)
EXF	-24.999(-3.91)***	-14.245(-2.94)***
\bar{R}^2	0.6420	0.3707
Finance (F) equation		
T	0.0688(5.55)***	0.0847(3.15)***
EXT	4.334(3.25)***	1.470(0.56)
EXF	1.626(6.28)***	1.690(4.15)***
\bar{R}^2	0.8978	0.6178

5 shows the results when the integration measures are calculated based on 2001 data but the business cycle measures are calculated based on 2002-2009 data.

Differently from the original measures, these measures also depend on the country size. Fourth, business cycle comovement structure might have caused economic integration. In this regard, business cycle correlation measures are constructed for the sample period of 2002-2009 but integration measures are constructed only based on 2001 data. The results are reported in Table 8. The results are similar in general.

5 Conclusion

This paper examines the effects of economic integration on business cycle synchronization of Asian countries. In particular, this paper analyzes the effect of internal vs. external integration and trade vs. financial integration on internal business cycle synchronization of Asian countries.

The paper found that a similar and positive external linkage has a significant positive effect on business cycle synchronization. This finding is consistent with the popular notion that external shocks can affect countries of a region in a similar way through a similar and positive external linkage.

The paper also found that the internal trade linkage has a positive effect on business cycle synchronization but the internal financial linkage has a negative effect. The positive effect of trade integration is consistent with some theories and past empirical studies. On the other hand, past empirical studies often found a positive effect of the internal financial linkage although theory suggests a negative effect. After controlling the important variable that affects internal business cycle synchronization, namely, external linkage, the empirical effects turn out to be consistent with the theory.

The results suggest that the regional policy efforts on trade integration within Asia, such as FTA among ASEAN+3, is likely to increase business cycle synchronization within the region. On the other hand, the regional efforts on financial integration within Asia, such as ABMI and ACMI, are likely to decrease business cycle synchronization within the region. However, whatever the effects of internal economic integration within Asia, external economic linkages play an important role in determining business cycle synchronization within the region.

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**Chapter 3 The Study of Regional Trade & Financial
Integration and Business Cycle Synchronization –The
Cases of Developing Countries**

1 Introduction

1.1 Background

Since 1990s, the rapid growth of trade and financial integrations across countries are significantly impelling the economic globalization. Additionally, globalization, which brings high international good and capital mobility, has tied the countries more closely in recent decades, especially in a certain region.

On the trade side, the accumulative increase in the volume of world trade is almost three times larger than that of world output in the period 1960~2009, while the world trade amount sharing of world GDP increased from 19% in 1980 to 24% in 2010, and in Emerging & Developing economics it increased from 6% in 1980 to 9% in 2010, which is a greater increase than that of advanced economics.⁵⁵

On the financial side, the gross FDI stock shared 6.5% of world GDP in 1980 which jumped to 30% of world GDP in 2010, while it increased over six folds to 19.9% of the world GDP in advanced countries and it increased almost four folds to 9.5% of world GDP in emerging markets. Although there is a difference between advanced countries and emerging countries, it still demonstrates the strong growth momentum in trade and financial globalization.

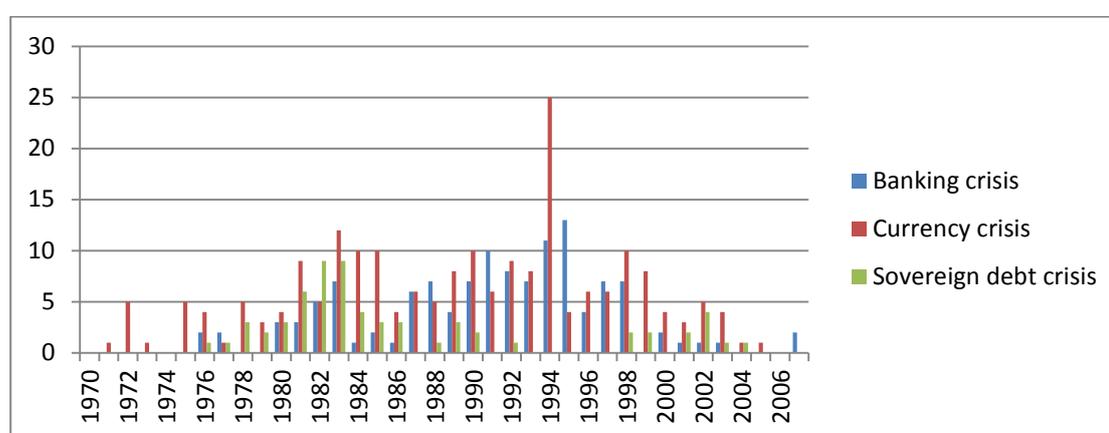
As commonly known, development is always accompanied by risks. According to Luc Laeven and Fabian Valencia(2008)'s statistics, there are over 124 systemic banking crises, 208 currency crises and 63 episodes of sovereign debt defaults and restructurings over the period 1970 to 2007. Graph 1 shows the frequency of financial crises in the world.

Moreover, the developing countries' ability to avoid and resist the economic crisis is

⁵⁵ resource from the World Economic Outlook Database

weaker than that of advanced countries. During 1970~2007, 91.9% of the Systemic Banking Crisis, 93.7% of the Currency Crisis and 100% of the Debt Crisis happened in non-advanced countries.⁵⁶ Thus, prevention of risk from economic crisis becomes one of their utmost priorities.

Graph 1 The Frequency of financial Crisis



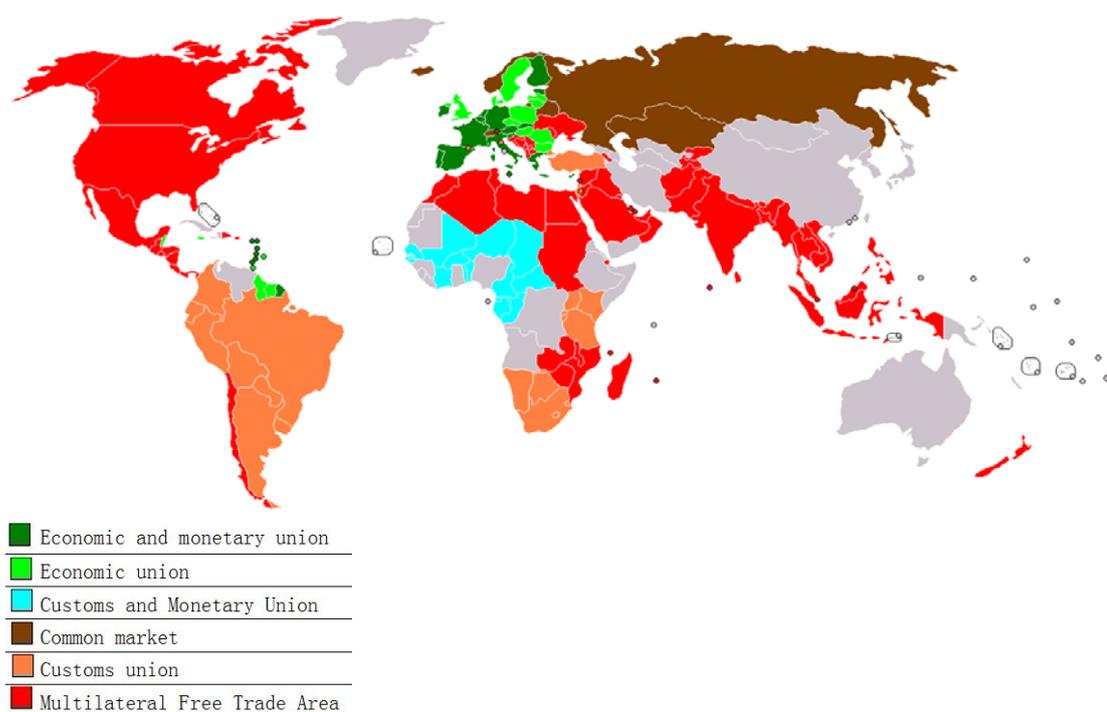
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Therefore, in aspiration for a more stable economic environment and resistance against a global crisis, many countries, especially developing countries, impel various regional cooperation policies. After several international financial crises and the collapse of Doha round of trade talks, most countries took various steps toward regional economic integration (RTA) and financial integration.(Graph 2) For example, East Asian countries are also seeking a way to strengthen financial cooperation, as indicated by setting up regional liquidity support arrangements through the Chiang Mai Initiative (CMI), establishing the Asian Bond Fund (ABF), and impelling the progress of the

⁵⁶ If one regional crisis happened in n countries, then the crisis will be counted n times. And here, the advanced Countries are Australia, Austria, Belgium, Canada, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Japan, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, and United States.

Asian Bond Market Initiative (ABMI). However, compared with EU and NAFTA, the economic integration course in the emerging area, such as East Asia and Latin America, falls behind greatly. This is why developing countries are of utmost concern in this paper.

Graph 2 The stages of economic integration around the world⁵⁷



On the other hand, Business Cycle Synchronization (BCS) has various important implications for a certain region, especially in its will to impel the integration policy. In other words, the degree of BCS in the region may suggest common policy responses and the need for policy cooperation in the region; it is also an important criterion to judge the costs of regional monetary integration. As known, the policy makers need to compare the benefits and costs of these movements. The benefits have been talked many

⁵⁷ the resource comes from wikipedia.org

times in other researches.

According to the theory of Optimum Currency Area (OCA) (Mundell, 1961), an important criterion for a monetary union to work is the degree of BCS across countries. In other words, policies will be less costly and exchange rates less risky for the economies to form a currency union if their business cycles are synchronized. Since the members of Currency Union sacrifice independent monetary policy, the cost of forming Currency Union will be lower if business cycles are synchronized so that the common monetary policy could work more effectively for all member countries. (Mackinnon 1963, Shin & Sohn 2006)

Then what is the impact of trade & financial integration on the business cycles synchronization across countries? At first glance, we will temporarily think that tighter trade and financial linkage contribute to higher business cycles synchronization. Definitely, trade and financial linkage will affect the cross country BCS in theory. Frankel and Rose (1998) reveal a positive correlation between the level of bilateral trade intensity and cross- country relations which result by a greater volume of intra-industry bilateral trade, making the pattern of business cycle for two countries more similar. Canova and Dellas(1993) and Baxter(1995) think intense bilateral trade will tend to accompany a highly correlated BCS. Backus, Kehoe and Kydland(1992) and Obstfeld(1994) state that the more closed financial linkage will result in a less correlated BCS.

However, empirical researches do not show us a clear relationship among them which is different from the theoretical perspective, especially in the financial aspect.

So, it is necessary to analyze the regional BCS not only for finding the reasons but also because it can provide a feasible reference for regional trade & financial cooperation.

As mentioned before, developing countries want to build a more stable economic

environment to resist an economic crisis. Then is there a difference in the impact of trade & financial integration on the business cycle synchronization among different developing regions? Many former researchers found that the developing mode was different among different regions because of the different history, culture, economic structure, and etc. So it is important to find the differences.

1.2 Literature reviews

Many past studies (i.e., Imbs, 2004, 2006, Kalemli-Ozcan et al, 2009) investigated the effects of trade and financial integration on BCS. However, most studies (Shin and Wang, 2003, 2004, Cortinhas, 2007, Choe, 2001, Crosby, 2003, Kumakura, 2006, Rana, 2007, 2008) concentrated on the effects of internal trade integration on BCS. A few studies such as Shin and Sohn (2006) and Imbs (2011) examine the effects of both trade and financial integration but these studies either concentrate on internal integration or does not distinguish internal and external integration.

As trade and financial integration deepen, the BCSs across countries can be changed. Empirical literature suggests that trade integration tends to increase the co-movement of output (i.e., Canova and Dellas, 1993 and Frankel and Rose, 1998). Although theoretical predictions always showed that financial integration tends to decrease the comovement of output, past empirical studies often found reverse results (i.e., Imbs, 2004, 2006), but a recent study by Kalemli-Ozcan et al. (2009) showed a negative effect, to be consistent with theoretical prediction.

Among these historical literatures, most of them concentrated on internal integration in the advanced countries, which does not concentrate on the developing countries or does not distinguish internal and external integration.

1.3 The purpose and content of this study

As previously mentioned, it is important to distinguish internal economic integration (within one region) from external integration (with the rest of the world) in explaining BCS, because both internal and external integration can affect BCS within the region but in a different way, especially in developing countries, which can be affected more by the global shock.

For example, although internal financial integration may decrease the BCS within the region, a similar pattern of external financial linkage of countries in the region may increase BCS within the region. In addition, the size of the effects of internal trade integration on BCS within the region may be different from the size of the effects of external integration.

Furthermore, by distinguishing the effects of internal and external integration, we can infer which is more important, internal integration or external integration, in explaining BCS of developing regions and the effects of regional economic integration efforts on BCS can be better understood.

It is more important to know it among the developing countries, whose ability to resist the economic shock is more fragile.

Thus three groups will be analyzed in this paper, Emerging Asia (EA), Central and Eastern Europe (CEE), and Latin America (LA), to find out any special characters in different developing groups. This will provide a clearer common answer on how trade and financial integration within different developing regions will affect BCS and whether it is costly to form a currency union for resisting the global shock.

The rest of the paper is organized as follows. Chapter 2 shows the trend of trade, financial integration and BCS, Chapter3 explains the empirical methodology, Chapter 4 discusses the empirical results, and Chapter 5 will conclude with the results.

2 The economic integration and BCS

Chapter 1 shows that it is necessary to examine how the different types of integration (real vs. financial and internal vs. external) affect BCS across countries in the developing regions. This section will introduce the trend of financial integration, trade integration and the bilateral BCS and their development in EA, CEE and LA.

2.1 The economic integration

Globalization and regional economic integration has gained momentum in recent decades. All the countries are trying to break through the restriction of the border to develop their economy by seeking optimal global resource allocation. Along with globalization, the trade linkages among countries or regions reached a higher level, and the relation between global and regional economic were deepened more than ever before.

2.1.1 The development of regional trade integration

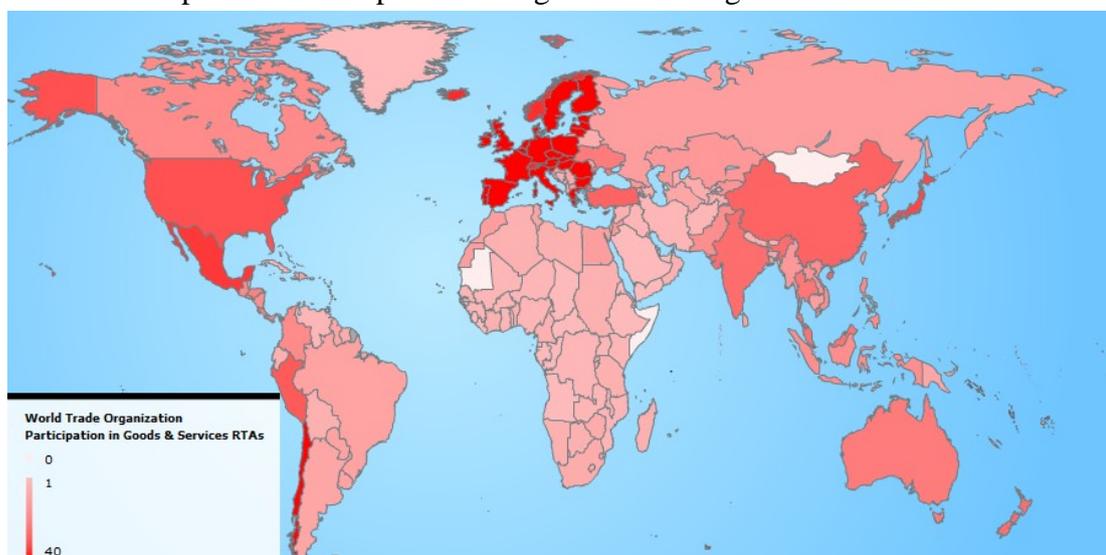
Regional economic integration covered most countries of the world. According to the statistics of World Bank, there are only 12 countries that did not participate in any regional trade agreement. The rest of the countries at least signed one RTA. The average number of RTAs signed among the world is 5, while the average number of RTAs signed among advanced countries reached 13. Obviously, the gap is large and so is the developing level of integration. Most of the RTAs were signed in Europe, North Africa, and America. The agreements signed by East Asia were relatively less.

Graph 3 and graph 4 show us the RTA's development of the world (Including the bilateral agreement). In the period 1948-1994, the GATT received 123 notifications of

RTAs (relating to trade in goods), and since the creation of the WTO in 1995 over 300 additional arrangements covering trade in goods or services have been notified.

The booming development of regional integrations mainly depends on three ways: 1. constantly further developing and upgrading the former form or structure (LA is the case); 2. expanding the group members (CEE is the case); 3. establishing new regional trade agreement or restarting the regional economic cooperation negotiation(EA is the case).

Graph 3 the Participation in Regional Trade Agreements 2012



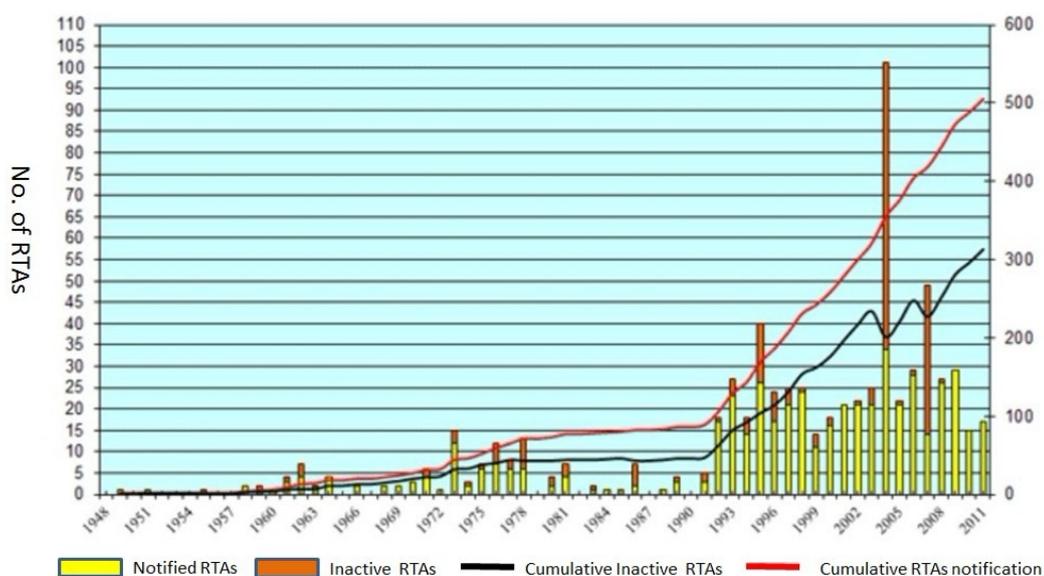
Note: WTO statistics on RTAs are based on notification requirements rather than on physical numbers of RTAs. Thus, for an RTA that includes both goods and services, we count two notifications (one for goods and the other services), even though it is physically one RTA.

Resource: WTO WEBSITE

Roughly speaking, trade integration is increased interaction and strengthened links between economies by removing the barriers. Jan Tinbergen (1965) defines the concept of integration as “the creation of the most desirable structure of the international economy, removing artificial hindrances to its optimum operation and deliberately introducing all the desirable elements of coordination or unification.” Milgate and

Newman (1987, p 43), for example, define economic integration as “a process and as a state of affairs. Considered as a process, it encompasses measures designed to eliminate discrimination between economic units that belong to different national states; viewed as a state of affairs, it represents the absence of various forms of discrimination between national economies.” So, fully integrated markets can be defined as a situation in which goods can move freely within an area, which also is a common method to evaluate the trade integration. Thus, in this paper, the usage of trade linkages to evaluate the trade integration is considered.

Graph 4 RTAs notified to the GATT/WTO (1948-2011), including inactive RTAs, by year of entry into force



Resource: WTO WEBSITE

2.1.1.1 Asia

Compared with other regions’ booming development, the development of Asian economic integration is far behind. There are three main reasons: 1. Asia is a

heterogeneous region, not simply in terms of size, but also in terms of development. 2. Asian countries are inclined to impel the multi-lateral trade framework. So they are not concerned with the integration dominated by the bilateral trade agreement. 3. Global factors include Asian countries being trade orientated economies and, especially, US being the main export market of Asia. So the Asian method of developing economic integration can be classified as the establishment of a new regional economic integration; and the global factors have a vital effect to its regional integration.

Table 1. Export and Import of developing regions, 1980 – 2009

		Units: Million USD, %					
		1980	1996	2000	2003	2006	2009
Export	EA	86468.5 4.72%	426772.0 8.04%	608611.0 9.53%	844658.0 11.24%	1634350.0 13.63%	1962470.0 15.88%
	CEE	64767.0 3.53%	87117.8 1.64%	120356.0 1.88%	195644.0 2.60%	372596.0 3.11%	437805.0 3.54%
	LA	65196.5 3.56%	142186.8 2.68%	168839.3 2.64%	185762.5 2.47%	378244.3 3.15%	404679.1 3.27%
	EU	789960.0 43.09%	2174390.0 40.99%	2424680.0 37.96%	3133380.0 41.68%	4568050.0 38.10%	4595750.0 37.18%
	total	216432.0 11.81%	656076.6 12.37%	897806.3 14.05%	1226064.5 16.31%	2385190.3 19.89%	2804954.1 22.69%
Import	EA	88326.7 4.60%	458883.0 8.51%	546233.0 8.28%	791072.0 10.23%	1479810.0 12.00%	1840960.0 14.45%
	CEE	84827.6 4.42%	136764.0 2.54%	188764.0 2.86%	273553.0 3.54%	515182.0 4.18%	548702.0 4.31%
	LA	68580.9 3.57%	148739.2 2.76%	155803.1 2.36%	130703.1 1.69%	270075.3 2.19%	348038.1 2.73%
	EU	891150.0 46.42%	2093460.0 38.84%	2471970.0 37.49%	3093450.0 40.02%	4685790.0 38.00%	4649770.0 36.49%
	total	241735.2 12.59%	744386.2 13.81%	890800.1 13.51%	1195328.1 15.46%	2265067.3 18.37%	2737700.1 21.49%

Notes: Numbers in parentheses represent the shares of exports (imports) in the world exports (imports). Source: IMF, DOTS.

Despite the lack of development in economic integration, the trade and financial

linkages are closer than before. This strengthens the economic basis of regional economic integration in Emerging Asia.

East Asian countries adopt the export-oriented economic development strategy. As a result, their domestic economic operation directly merges with the world economic operation.

In the past thirty years, East Asia has been the fastest-growing region in international trade. The export and import trends of the EA can be seen in table 1. The total exports of EA have increased from USD86468.5 million in 1980 to USD1962470.0 million in 2009. And the total imports also increased from USD88326.7million to USD1840960.0 million USD during the same period. Meanwhile, the total exports of EU have increased from USD789960.0 million in 1980 to USD4595750.0 million in 2009, and the total imports also increased from USD891150.0million to USD4649770.0 million USD. The import and export of these countries grew faster than those of the world as a whole, the share of the total export of these countries increased from 4.72% in 1980 to 15.88% in 2009, and the corresponding increase in import share was from 4.60% to 14.45%. At the same period, the share of the total export of EU decreased from 43.09% to 37.18% and from 46.42% to 36.49% separately.

On the financial side, although Asia's financial integration with the world is well advanced by some measures, including net private capital flows, foreign participation in some markets, and stock market correlations (IMF, 2005b); compared with other regions, financial integration in Asia has been more sluggish and typically lower than in other regions of the world. (Cowen, Salgado, Shah, Teo, and Zanello, 2006).

Table 2 Regional trade relations ⁵⁸

Units: Billions USD, % of Total

	Developing Asia					CEE					LA				
	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009
DA	13.0	29.4	137.9	384.4	651.6	3.2	3.2	11.3	39.9	71.3	2.0	3.4	15.0	49.5	116.3
	7.4%	7.6%	11.9%	14.9%	17.1%	2.3%	2.2%	3.0%	4.5%	5.9%	1.5%	2.3%	4.6%	9.4%	15.5%
CEE	3.6	4.9	7.2	23.1	47.8	10.8	7.1	37.8	125.4	194.8	2.1	1.8	2.0	4.7	6.4
	2.0%	1.3%	0.6%	0.9%	1.3%	7.6%	4.9%	10.1%	14.1%	16.1%	1.5%	1.2%	0.6%	0.9%	0.8%
LA	1.9	3.9	13.6	47.5	113.4	2.2	2.1	2.5	5.6	7.1	18.4	21.2	75.3	113.0	163.3
	1.1%	1.0%	1.2%	1.8%	3.0%	1.6%	1.4%	0.7%	0.6%	0.6%	13.8%	14.7%	23.2%	21.4%	21.7%
AE	128.6	309.0	871.3	1751.2	2334.1	48.2	68.3	321.7	709.5	926.3	81.8	96.9	183.6	269.5	351.2
	73.6%	79.8%	75.4%	67.9%	61.4%	34.1%	46.8%	85.8%	79.6%	76.6%	61.2%	67.1%	56.5%	51.0%	46.7%
EU	30.8	70.9	175.4	380.6	577.3	52.3	77.8	257.6	607.4	814.1	34.4	38.8	64.1	95.1	131.6
	17.6%	18.3%	15.2%	14.8%	15.2%	37.0%	53.3%	68.7%	68.2%	67.3%	25.7%	26.9%	19.8%	18.0%	17.5%
World	174.8	387.4	1154.8	2577.7	3803.4	141.1	145.9	375.2	891.1	1209.8	133.8	144.5	324.6	528.7	752.7
	AE					EU					W				
	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009
DA	141	342	1091	2099	2705	35	79	203	445	634	176	412	1347	2826	4095
	5%	6%	11%	14%	17%	2%	3%	4%	5%	7%	5%	6%	10%	13%	16%
CEE	53	103	233	482	626	56	93	215	472	630	90	166	304	687	930
	2%	2%	2%	3%	4%	3%	3%	4%	6%	7%	2%	2%	2%	3%	4%
LA	85	106	193	302	373	36	42	68	107	137	123	149	314	543	751
	3%	2%	2%	2%	2%	2%	1%	1%	1%	1%	3%	2%	2%	3%	3%
AE	1978	4492	7401	10297	10646	1219	2593	4019	6325	6912	2603	5428	9595	14342	15767
	70%	80%	75%	69%	65%	73%	84%	82%	78%	75%	69%	79%	74%	68%	63%
EU	1206	2587	4014	6295	6947	967	2026	3187	5307	6017	1506	3027	4789	7926	9105
	43%	46%	41%	42%	43%	58%	65%	65%	65%	65%	40%	44%	37%	38%	36%
World	2822	5593	9905	14880	16313	1681	3097	4897	8159	9246	3753	6901	12982	21121	25102

Units: % of GDP

	Developing Asia					CEE					LA				
	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009	1980	1990	2000	2005	2009
DA	1.99%	2.64%	5.89%	9.44%	8.24%	1.29%	0.90%	1.89%	3.42%	0.90%	0.24%	0.29%	0.70%	1.86%	2.88%
CEE	0.55%	0.44%	0.31%	0.57%	0.61%	4.34%	1.97%	6.32%	10.73%	2.46%	0.25%	0.16%	0.09%	0.18%	0.16%
LA	0.29%	0.35%	0.58%	1.17%	1.43%	0.89%	0.57%	0.41%	0.48%	0.09%	2.21%	1.85%	3.53%	4.25%	4.05%
AE	19.74%	27.71%	37.23%	42.99%	29.52%	19.46%	18.99%	53.76%	60.73%	11.72%	9.84%	8.46%	8.60%	10.14%	8.71%
EU	4.73%	6.36%	7.49%	9.34%	7.30%	21.11%	21.63%	43.04%	51.99%	10.30%	4.14%	3.39%	3.01%	3.58%	3.26%
World	26.83%	34.74%	49.34%	63.27%	48.10%	56.99%	40.57%	62.69%	76.27%	75.65%	16.08%	12.61%	15.22%	19.90%	18.67%

In terms of overall financial flow, Asia has benefited from the flow of international capital to emerging markets in recent years. Table 3 shows the net foreign direct

⁵⁸ DA is developing Asia; LA is Latin America; CEE is Central and Eastern Europe; AE is advanced countries;

investment flow during 1980~2010.

Despite the slight increase around 2005, Asia still increased constantly and received more than one quarter of world supply of net foreign direct investment, while the net flow to EU decreased after entering 2000.

Table 3 the Foreign direct investment, net inflows

	(BoP, billions USUSD)					
	1980	1990	2000	2005	2008	2010
EAP ⁵⁹	4.88	29.93	163.59	170.63	373.55	378.82
EE ⁶⁰	0.02	0.69	9.80	51.96	162.12	86.99
EU ⁶¹	21.50	98.45	713.26	684.86	698.55	426.08
LAC ⁶²	6.43	8.39	87.39	86.30	154.28	132.60
World	53.01	204.48	1408.21	1211.87	1955.88	1430.44

Recourse: World Development Indicators & Global Development Finance, WB

Table 4 shows a quantitative measure of financial integration, cross-border holdings of portfolio assets and liabilities including equity and long-, and short-term debt securities. From the total portfolio assets and liabilities of Developing Asia, the amount has increased from 0.95 and 0.72 trillion USD in 1997 to 4.86 and 3.07 trillion USD, respectively, in 2010.

We can also see that intra-regional financial integration has been increasing. The total recorded level of cross-border portfolio asset and liability holdings among Developing Asian economies were just about 85.52 billion USD and 44.98 billion USD, respectively, in 1997. They increased to 579.03 billion USD and 541.75 billion USD, respectively, in 2010. Developing Asia's assets constituted 9.0 % of total holdings for itself in 1997, but decreased to 5.7% in 2001, which was partly affected by the Asian Financial Crisis, then increased to 11.9% in 2010. In comparison, the sharing of their assets in G6 declined to 60.0% in 2001 and 46.6% in 2010, from 62.0% in 1997.

For liabilities, we can see even a sharper increase in the proportion of intra-regional

⁵⁹ East Asia & Pacific

⁶⁰ Eastern Europe

⁶¹ European Union

⁶² Latin America & Caribbean

Table 4. Total Portfolio Investment in Asia

A. (USD billion)

Year	Economy	Assets in		TOTAL	Liabilities from		TOTAL
		A+3	G6		A+3	G6	
1997	CHN	3.01	...	...	5.29	8.66	14.82
	HK	37.54	...	...	10.16	56.41	74.12
	IND	0.22	0.07	1.12	2.34	6.49	9.76
	JAP	29.07	573.56	906.66	1.23	305.03	364.96
	KOR	4.36	2.82	13.5	8.52	22.13	32.69
	MAL	0.92	0.53	1.79	10.38	13.29	25.08
	PHI	0	0	...	1.52	9.47	11.66
	SIN	10.35	9.36	22.79	2.67	16.83	21.54
	THA	0.07	0.11	0.27	2.85	7.94	11.52
	A+3	85.52	586.45	946.14	44.98	446.24	566.15
	%T	9.00%	62.00%	100.00%	7.90%	78.80%	100.00%
2001	CHN	6.89	...	...	11.7	6.03	20.26
	HK	30.26	82.86	205.6	11.6	59.47	96.68
	IND	0.15	0.35	0.72	1.17	3	5.55
	JAP	21.05	832.18	1289.75	20.01	346.59	542.29
	KOR	1.71	4.53	8.03	14.17	52.08	76.79
	MAL	0.78	0.71	2.28	12.31	7.52	22.59
	PHI	0.11	1.94	2.13	4.19	5.63	12.75
	SIN	31.26	46.15	105.24	5.65	38.11	50.69
	THA	0.25	0.38	0.83	4.76	5.39	12.01
	A+3	92.45	969.09	1614.58	85.56	523.81	839.61
	%T	5.70%	60.00%	100.00%	10.20%	62.40%	100.00%
2010	CHN	37.28	...	...	253.67	154.12	498.18
	HK	258.81	216.01	928.94	43.03	192.06	320.76
	IND	1.19	1.41	6.5	25.37	46.07	101.92
	JAP	79.77	1839.76	3345.83	55.26	812.43	1348.18
	KOR	25.76	51.34	116.69	78.34	230.85	407.8
	MAL	17.46	10.07	35.89	28.73	46.94	105.75
	PHI	1.14	2.57	5.86	9.18	21.46	46.53
	SIN	144.37	140.45	398.76	37.06	88.99	172.17
	THA	13.25	3.63	22.98	11.12	32.99	68.82
	A+3	579.03	2265.25	4861.44	541.75	1625.9	3070.11
	%T	11.90%	46.60%	100.00%	17.60%	53.00%	100.00%

B. (as % GDP)

Year	Economy	Assets in			TOTAL	Liabilities from		
		A+3	G6			A+3	G6	TOTAL
1997	CHN	0.13	...	...		0.23	0.38	0.65
	HK	23.24	...	...		6.29	34.92	45.88
	IND	0.04	0.01	0.22		0.45	1.25	1.88
	JAP	0.95	18.82	29.75		0.04	10.01	11.98
	KOR	0.67	0.43	2.07		1.31	3.4	5.02
	MAL	0.48	0.28	0.94		5.45	6.97	13.16
	PHI	0	...	...		0.91	5.67	6.97
	SIN	9.21	8.34	20.29		2.38	14.98	19.18
	THA	0.02	0.04	0.09		0.95	2.63	3.82
	A+3	1.77	12.16	19.62		0.6	6	7.61
2001	CHN	0.21	...	...		0.35	0.18	0.61
	HK	16.71	45.76	113.54		6.41	32.84	53.39
	IND	0.03	0.07	0.14		0.22	0.56	1.04
	JAP	0.64	25.27	39.16		0.61	10.52	16.47
	KOR	0.21	0.55	0.97		1.72	6.31	9.31
	MAL	0.35	0.32	1.04		5.61	3.43	10.29
	PHI	0.06	0.98	1.08		2.13	2.85	6.46
	SIN	23.17	34.22	78.03		4.19	28.26	37.59
	THA	0.08	0.12	0.25		1.47	1.66	3.71
	A+3	1.62	16.99	28.3		0.95	5.79	9.28
2010	CHN	0.37	...	...		2.51	1.52	4.92
	CHN	79.09	66.01	283.88		13.15	58.69	98.02
	HK	0.12	0.14	0.63		2.46	4.46	9.87
	IND	1.84	42.55	77.39		1.28	18.79	31.18
	JAP	1.76	3.5	7.96		5.34	15.75	27.81
	KOR	4.19	2.42	8.62		6.9	11.27	25.39
	MAL	0.31	0.7	1.59		2.49	5.82	12.63
	PHI	49.3	47.96	136.17		12.65	30.39	58.79
	SIN	2.25	0.62	3.9		1.89	5.6	11.68
	THA	6.57	25.69	55.14		2.86	8.59	16.21
A+3	0.13	...	...		0.23	0.38	0.65	

... = no data available Source: *Coordinated Portfolio Investment Survey (CPIS)*, International Monetary Fund, China's asset data is calculated by the counter data (the liabilities data) from IMF; HongKong's 1997, India's 1997 and 2001, and Pakistan's 1997 and 2001 are also calculated by the counter data from IMF

portfolio investments. The proportion of intra-regional portfolio investments in liabilities increased from 7.9% in 1997 to 17.6% in 2010. However, as in the case of trade relation, this does not imply that the financial linkage with the G6⁶³ has decreased in recent years. As shown in Table 4, the actual size of cross-border assets between Asia and the U.S. increased substantially, along with financial globalization around the world.

2.1.1.2 Central and Eastern Europe

Most CEE countries are former communist countries and now members of EU. And its experience facilitated its very quick trade integration into world markets since the early 1990s, while the economies have been considerably transformed, including transition from planned economy to market economy, increasing trade openness, FDI etc.

The export and import trends of the CEE can be seen in table 1. Although the amount does not reach 25% of EA's in 2009, the ether import and export of CEE increased more than 5 times. The total exports of CEE have increased from USD 64767 million in 1980 to USD 437805 million in 2009, and the total imports also increased from USD 84827.6 million to USD 548702 million USD over the same period. Meanwhile, the total export of EU increased from USD789960.0 million in 1980 to USD4595750.0 million in 2009, and the total imports also increased from USD891150.0million to USD4649770.0 million USD. However, the share of total exports of these countries decreased from 3.53% in 1980 to 1.64% in 1996 then increased to 3.54% in 2009, and the import share decreased from 4.42% in 1980 to 2.54% in 1996, then increased to 4.31% in 2009. At the same period, the share of total export of EU decreased from 43.09% to 37.18% and from 46.42% to 36.49% separately. Thus, the

⁶³ G6 is G7 excluding Japan

CEE region shares smaller part in the world trade in comparison with the EA region.

Although the trade amount is smaller than Asian countries, the ratio of intra-trade is almost the same except around 1990, the Soviet Union Collapse. Recently, the intra-trade in CEE increased rapidly, thus the trade linkage is closer than before. From 1980~2010, the sharing of CEE intra-trade to its total trade decreased from 7.6% in 1980 to 4.9% in 1990, then increased to 16.1% in 2009, while its external trade⁶⁴ sharing increased from 34.1% in 1980 to 85.8% in 2000, then decreased constantly to 76.6% in 2009, which imply that the external trade linkage of CEE with Advanced countries is tighter than Asian from the ratio side; and at the same period, this intra-trade sharing in EU fluctuated around 65%. And from the real size (% of GDP), the trade is more important to CEE, in which the total trade amount sharing its GDP increased from 56.99% in 1980 to 75.65% in 2009. In the same period, EA's rate increased from 26.83% to 48.10%.

Although some indices show that the size of CEE's economic linkage is lower than Asian countries, the trade is rendered more important to CEE from the real size; the CEE's actual policy active in economic integration is more than Asian countries. For example, some CEE countries have joined Euro Area.

From the financial side, the FDI net inflows of CEE countries increased from 0.02 billion USD in 1980 to 162.12 billion USD in 2008 then affected by the Europe Fiscal Crisis this number decreased to 86.99 billion USD in 2010, which is smaller than Asia. This is also because the economic scale of CEE is just 10% of Asia. So absolutely speaking, the external effect is much larger than Asia.

Table 5 shows a quantitative measure of financial integration, cross-border holdings of portfolio assets and liabilities including equity and long and short-term debt securities. For the total portfolio assets and liabilities of CEE, the amount has increased from 0.063

⁶⁴ with advanced economies

and 0.009 trillion USD in 2001 to 0.381 and 0.111 trillion USD, respectively, in 2010.

We can also see that intraregional financial integration has been increasing. The total recorded level of cross-border portfolio asset and liability holdings among CEE economies was just about 0.6 billion USD in 2001. They increased to 11.3 billion USD in 2010. CEE's assets constituted 6.55% of total holdings of itself in 2001, and increased to 10.25% in 2010, which is slower than Asia. In comparison, the sharing of their assets in G7 declined to 31.83% in 2010, from 43.74% in 2001. This is because CEE is more closed with EU countries; some of them joined the EU. For liabilities, the proportion of intra-regional portfolio investment in liabilities increased from 0.96% in 2001 to 2.98% in 2010. However, this does not imply that the financial linkage with the G7 has decreased in recent years. As shown in Table 5, the actual size of cross-border assets between CEE and the G7 increased substantially, along with financial globalization around the world.

Table 5. Total Portfolio Investment⁶⁵

A. (USD billion)

	Asset in				Liability from			
	LA	CEE	G7	TOTAL	Latin	CEE	G7	TOTAL
2001								
ARG	162.02	0.00	10838.88	11543.04	313.14	0.79	19492.54	25153.73
BRA	243.46	0.51	2029.36	4820.56	789.11	32.32	57860.99	81390.96
CHI	438.22	1.95	3102.22	6757.28	33.77	0.00	6844.86	8385.78
URU	664.12	7.35	314.46	1203.39	325.60	0.00	1165.05	1903.31
BUL	0.28	4.29	766.55	798.65	0.00	0.01	3665.43	4532.62
HUN	32.39	70.12	315.27	682.32	0.08	218.34	10981.52	16026.27
POL	1.00	7.10	701.40	1536.52	7.00	182.91	8534.73	12916.01
TUR	0.47	0.09	435.30	545.66	0.72	4.65	13342.58	16900.55
LA	1592.05	9.80	19714.67	28273.15	1592.05	34.22	101910.62	138637.60
	5.63%	0.03%	69.73%	100.00%	1.15%	0.02%	73.51%	100.00%
CEE	34.22	604.21	4034.94	9225.50	9.80	604.21	44984.51	63228.60
	0.37%	6.55%	43.74%	100.00%	0.02%	0.96%	71.15%	100.00%
G7	101910.62	44984.51	4011491.45	7212606.35	19714.67	4034.94	4011491.45	7775022.54
	1.41%	0.62%	55.62%	100.00%	0.25%	0.05%	51.59%	100.00%
total	138637.60	63228.60	7775022.54	12712368.52	28273.15	9225.50	7212606.35	12712368.52
2005								
ARG	932.52	0.00	13515.68	16270.33	956.30	2.27	19467.02	26632.47
BRA	149.60	1.02	2775.04	6380.00	2107.60	49.73	119643.92	171321.25
CHI	532.25	14.76	7531.60	25135.60	93.21	1.58	14087.26	17862.90
URU	942.84	27.55	671.86	1858.30	73.32	0.96	1972.46	3528.30
BUL	2.28	86.59	348.27	789.41	0.00	1.98	1854.71	3575.32
HUN	5.34	229.90	958.64	2508.26	30.16	848.56	19727.86	46107.46
POL	0.00	574.89	4073.92	8772.00	5.51	818.43	32367.43	64962.94
TUR	46.02	0.00	364.13	718.41	7.02	204.38	32198.99	60411.85
LA	3444.01	43.33	31570.29	58964.99	3444.01	68.54	186475.20	264182.76
	5.84%	0.07%	53.54%	100.00%	1.30%	0.03%	70.59%	100.00%
CEE	68.54	2934.23	13990.85	35968.70	43.33	2934.23	104894.73	215406.26
	0.19%	8.16%	38.90%	100.00%	0.02%	1.36%	48.70%	100.00%
G7	186475.20	104894.73	6938490.00	13957677.50	31570.29	13990.85	6938490.00	14669181.38
	1.34%	0.75%	49.71%	100.00%	0.22%	0.10%	47.30%	100.00%
T	264182.76	215406.26	14669181.38	25967247.07	58964.99	35968.70	13957677.50	25967247.07

⁶⁵ ARG is Argentina; BRA is Brazil; CHI is Chile; URU is Uruguay; BUL is Bulgaria; HUN is Hungary; POL is Poland; TUR is Turkey; LA is Latin America; CEE is Central and Eastern Europe; T is total

2 0 1 0	ARG	517.88	0.00	17591.46	18909.26	1186.38	49.69	20080.43	29094.49
	BRA	407.01	17.54	19097.23	37629.95	8343.86	216.34	372711.93	553672.52
	CHI	9739.52	1.91	60517.10	119101.24	258.62	8.47	26795.02	35368.94
	URU	1600.07	3.42	2233.18	5433.91	887.65	1.19	3220.11	6379.44
	BUL	4.41	796.14	1256.78	3399.86	0.20	77.48	735.19	2702.83
	HUN	18.29	1466.75	4103.51	12421.58	16.50	2258.22	22829.79	46494.57
	POL	2.36	1712.83	1804.59	14068.01	0.51	3377.52	64642.35	116005.20
	TUR	95.63	0.61	1343.78	2226.66	4.36	741.81	72364.81	124791.28
	LA	13920.28	22.89	115282.24	204254.65	13920.28	296.95	463758.77	690735.32
		6.82%	0.01%	56.44%	100.00%	2.02%	0.04%	67.14%	100.00%
	CEE	296.95	11375.70	35334.91	111018.62	22.89	11375.70	202018.57	381202.84
		0.27%	10.25%	31.83%	100.00%	0.01%	2.98%	53.00%	100.00%
	G7	463758.77	202018.57	9428858.71	20532116.11	115282.24	35334.91	9428858.71	21376722.18
		2.26%	0.98%	45.92%	100.00%	0.54%	0.17%	44.11%	100.00%
T	690735.32	381202.84	21376722.18	40290261.60	204254.65	111018.62	20532116.11	40290261.60	

B. (% of GDP)

	Asset in				Liability from			
	LA	CEE	G7	TOTAL	Latin	CEE	G7	TOTAL
ARG	0.06%	0.00%	4.03%	4.29%	0.12%	0.00%	7.24%	9.35%
BRA	0.04%	0.00%	0.37%	0.87%	0.14%	0.01%	10.44%	14.68%
CHI	0.61%	0.00%	4.35%	9.48%	0.05%	0.00%	9.60%	11.76%
URU	3.18%	0.04%	1.50%	5.76%	1.56%	0.00%	5.57%	9.11%
2 BUL	0.00%	0.03%	5.53%	5.76%	0.00%	0.00%	26.43%	32.68%
0 HUN	0.06%	0.13%	0.60%	1.29%	0.00%	0.41%	20.83%	30.40%
0 POL	0.00%	0.00%	0.37%	0.81%	0.00%	0.10%	4.48%	6.78%
1 TUR	0.00%	0.00%	0.22%	0.28%	0.00%	0.00%	6.82%	8.64%
LA	0.13%	0.00%	1.61%	2.30%	0.13%	0.00%	8.30%	11.29%
CEE	0.01%	0.09%	0.62%	1.41%	0.00%	0.09%	6.86%	9.64%
G7	0.49%	0.21%	19.12%	34.38%	0.09%	0.02%	19.12%	37.06%
total	0.43%	0.20%	24.23%	39.61%	0.09%	0.03%	22.48%	39.61%
ARG	0.51%	0.00%	7.39%	8.89%	0.52%	0.00%	10.64%	14.55%
BRA	0.02%	0.00%	0.31%	0.72%	0.24%	0.01%	13.57%	19.43%
CHI	0.43%	0.01%	6.12%	20.42%	0.08%	0.00%	11.45%	14.51%
URU	5.39%	0.16%	3.84%	10.63%	0.42%	0.01%	11.29%	20.19%
2 BUL	0.01%	0.30%	1.21%	2.73%	0.00%	0.01%	6.42%	12.37%
0 HUN	0.00%	0.21%	0.87%	2.27%	0.03%	0.77%	17.88%	41.79%
0 POL	0.00%	0.19%	1.34%	2.89%	0.00%	0.27%	10.65%	21.37%
5 TUR	0.01%	0.00%	0.08%	0.15%	0.00%	0.04%	6.67%	12.52%
LA	0.21%	0.00%	1.94%	3.62%	0.21%	0.00%	11.44%	16.20%
CEE	0.01%	0.22%	1.04%	2.66%	0.00%	0.22%	7.76%	15.95%
G7	0.68%	0.38%	25.41%	51.11%	0.12%	0.05%	25.41%	53.71%
T	0.58%	0.47%	32.19%	56.98%	0.13%	0.08%	30.63%	56.98%
ARG	0.14%	0.00%	4.75%	5.11%	0.32%	0.01%	5.43%	7.86%
BRA	0.02%	0.00%	0.89%	1.76%	0.39%	0.01%	17.39%	25.84%
CHI	4.51%	0.00%	28.01%	55.12%	0.12%	0.00%	12.40%	16.37%
URU	4.06%	0.01%	5.67%	13.79%	2.25%	0.00%	8.17%	16.19%
2 BUL	0.01%	1.67%	2.63%	7.12%	0.00%	0.16%	1.54%	5.66%
0 HUN	0.01%	1.14%	3.19%	9.66%	0.01%	1.76%	17.75%	36.14%
1 POL	0.00%	0.36%	0.38%	3.00%	0.00%	0.72%	13.77%	24.71%
0 TUR	0.01%	0.00%	0.18%	0.30%	0.00%	0.10%	9.85%	16.99%
LA	0.39%	0.00%	3.20%	5.67%	0.39%	0.01%	12.87%	19.17%
CEE	0.01%	0.56%	1.74%	5.45%	0.00%	0.56%	9.92%	18.73%
G7	1.46%	0.64%	29.68%	64.64%	0.36%	0.11%	29.68%	67.30%
T	1.10%	0.60%	33.89%	63.88%	0.32%	0.18%	32.55%	63.88%

2.1.1.3 Latin America

General speaking, there are three phases of economic integration process in Latin America. The first stage started in the 1960s, with the creation of FTAs in the context of import substitution industrialization. The second started in 1980s, Latin American countries started drastic policy reforms based on “neo-liberalism”, abandoning interventionist strategy that had brought about the region’s financial and economic crisis. The third stage of integration started from the end of the 1990s, with a greater emphasis on inter-regional FTAs. So LA countries adopted the formal regional integration earlier than East Asia.

From the perspective of economic growth, there are two major empirical regularities that emerge clearly when compared with East Asia: first, East Asian countries have posted impressive economic growth rates, on average, compared with the poor ones observed in Latin America; second, East Asian economies have proved to be more stable (despite the financial crisis of the late 1990s) than Latin American ones.⁶⁶

Table 1 also shows the export and import trends of the LA. The trade amount gaps exist between LA and EA. In 1980, the trade amount of LA is 76.5% of EA’s; and this number decreased to 19.7% in 2009. The total exports of LA have increased from USD 65196.529 million in 1980 to USD 404679.1 million in 2009, and the total imports also increased from USD 68580.9 million to USD 348038.1 million USD during the same period. Meanwhile, the total exports of EU have increased from USD789960.0 million in 1980 to USD4595750.0 million in 2009, and the total imports also increased from USD891150.0million to USD4649770.0 million USD. Although the trade numbers are increasing; as the sharing of the total export of these countries seem to not develop, the import sharing decreased from 3.57% in 1980 to 2.73% in 2009. At the same period, the

⁶⁶ J. Reyes(2009)

share of the total export of EU decreased from 43.09% to 37.18% and from 46.42% to 36.49% separately. Obviously, the LA region's external trade is smallest among the three regions.

Although the trade values are smaller than that of the other two regions, the intra-trade increased constantly. Recently, the intra-trade in LA increased rapidly, thus the trade linkage is more closed than before. From 1980~2010, the LA intra-trade share of total trade increased from 13.8% in 1980 to 21.7% in 2009, while its external trade (to advanced economies) decreased from 61.2% in 1980 to 46.7% in 2009, which is the same with Asia and different from CEE at the same period. And the real size (% of GDP) of trade is much smaller than that of CEE and LA.

And some indices show that the LA's economic integration is lower than Asian countries; LA impels more actual policies in economic integration than Asian countries.

From the financial side, the FDI net inflows of LA countries is similar with CEE countries before 2008, increased from 6.43 billion USD in 1980 to 154.28 billion USD in 2008 then affected by the Europe Fiscal Crisis this number decreased to 132.60 billion USD in 2010. According to table 3, CEE countries are the most influenced regions in the Europe Fiscal Crisis among the three regions followed by LA and Asia being the least influenced.

The total portfolio assets and liabilities of LA, increased from 0.14 and 0.028 trillion USD in 2001 to 0.69 and 0.204 trillion USD, respectively, in 2010.

Intraregional financial integration has been increasing. The total recorded level of cross-border portfolio asset and liability holdings among LA economies were just about 1.59 billion USD in 2001. They increased to 13.9 billion USD in 2010. LA's assets constituted 5.63% of total holdings in 2001, and slightly increased to 6.82% in 2010, which is slower than Asia. In comparison to the sharing of their assets in G7 declined to 56.44% in 2010, from 69.73% in 2001. Similar with the asset proportion, we can see the

liabilities slightly increase in the proportion of intra-regional portfolio investments. The proportion of intra-regional portfolio investment in liabilities increased from 1.15% in 2001 to 2.02% in 2010. And the sharing of their liabilities in G7 declined to 67.14% in 2010, from 73.51% in 2001. However, this does not imply that the financial linkage with the G7 has decreased in recent years. As shown in Table 4-b, the actual size of cross-border assets between LA and the G7 increased substantially, along with financial globalization around the world.

There is evidence that in the external side, like Asia, LA has closed linkage with G7 countries; but CEE countries show the closed linkage with EU.

2.2 The BCS

This part gives a brief comparison on BCSs among the three regions.

Graph 5 shows the changing GDP growth rate during 1980~2009 in these three regions. It shows that all three regional economic fluctuations become more and more synchronized to some extent over time.

Like chapter 2, the contemporaneous bilateral correlation coefficient of cyclical real GDP of two countries is used to describe business cycle co-movements of two countries. To obtain cyclical real GDP, HP filter is applied to the logarithm of real GDP. Annual data is used for 1990-2009.⁶⁷

⁶⁷ Real GDP in local unit is used for all cases except for G6 aggregate, where real GDP in PPP is used.

Graph 5 the change of GDP growth rate during 1980~2010

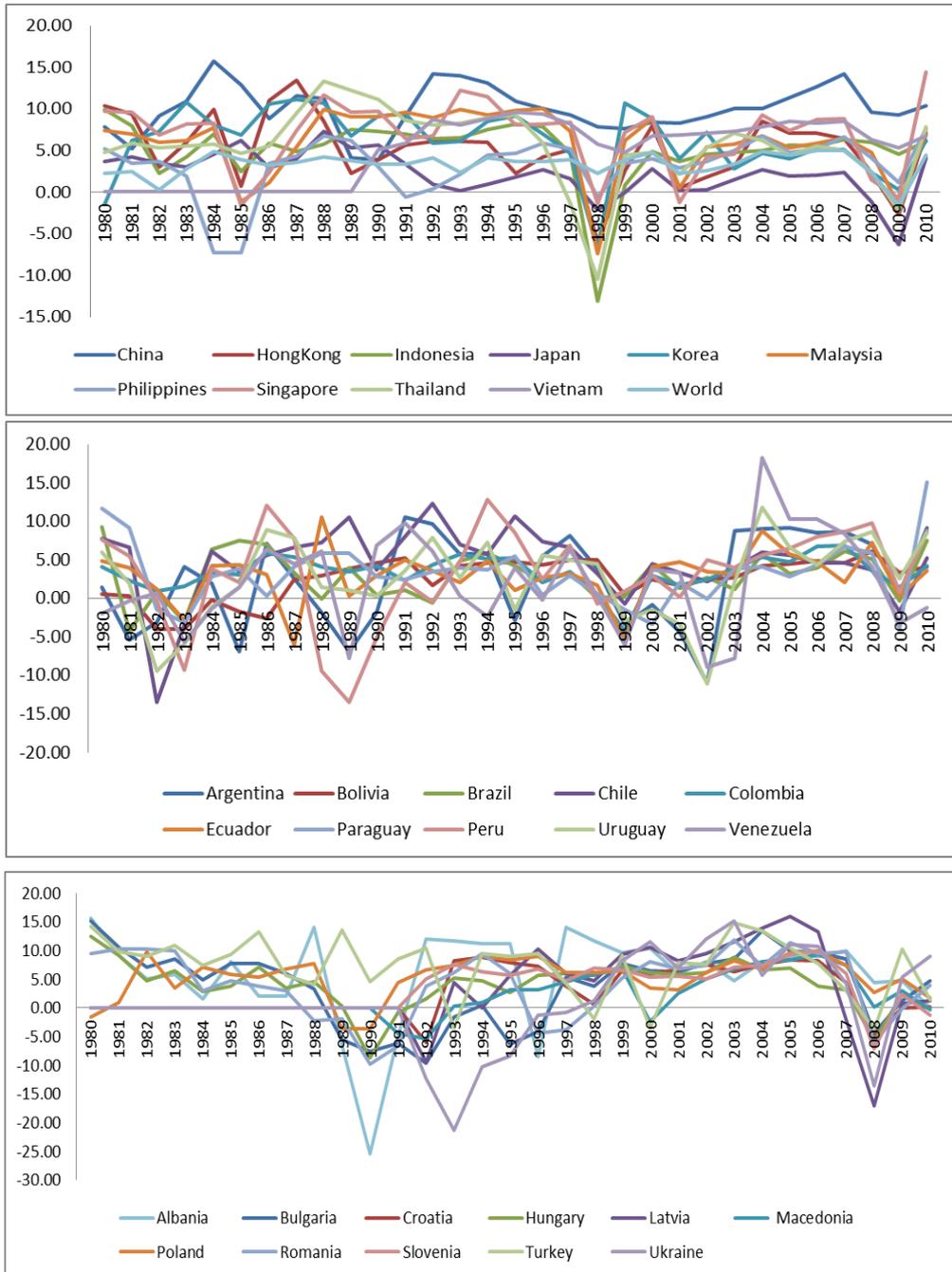


Table 6 Correlations of Output

A. East Asia

	HK	CHN	INO	JPN	KOR	MAL	PHI	SIN	THA	VIE	US	G6
	1990s											
HK	1										-0.7	-0.73
CHN	-0.27	1									0.78	0.66
INO	0.92	-0.09	1								-0.61	-0.6
JPN	0.67	-0.31	0.81	1							-0.59	-0.44
KOR	0.72	0.02	0.83	0.67	1						-0.35	-0.24
MAL	0.87	0.05	0.98	0.78	0.89	1					-0.46	-0.44
PHI	-0.08	0.78	0.21	0.25	0.37	0.36	1				0.56	0.61
SIN	0.71	0.44	0.81	0.47	0.77	0.87	0.57	1			-0.1	-0.15
THA	0.91	-0.2	0.93	0.63	0.8	0.89	-0.03	0.7	1		-0.71	-0.71
VIE	-0.3	0.88	-0.02	0.03	0.07	0.12	0.94	0.37	-0.24	1	0.71	0.71
0.36 ⁶⁸	0.46	0.14	0.6	0.44	0.57	0.65	0.37	0.63	0.49	0.2	-0.15	-0.13
	2000s											
HK	1										0.68	0.91
CHN	0.51	1									-0.24	0.18
INO	0.49	0.98	1								-0.28	0.14
JPN	0.75	-0.12	-0.15	1							0.98	0.94
KOR	0.52	-0.11	-0.14	0.79	1						0.74	0.74
MAL	0.91	0.47	0.47	0.73	0.56	1					0.66	0.83
PHI	0.93	0.7	0.69	0.57	0.37	0.93	1				0.46	0.75
SIN	0.97	0.61	0.57	0.66	0.5	0.92	0.95	1			0.59	0.83
THA	0.71	-0.11	-0.13	0.94	0.69	0.8	0.59	0.67	1		0.94	0.85
VIE	0.7	0.97	0.95	0.1	0.05	0.63	0.83	0.77	0.09	1	-0.02	0.4
0.56	0.72	0.43	0.42	0.47	0.36	0.72	0.73	0.74	0.47	0.57	0.45	0.66

⁶⁸ the average of all the East Asian countries

B. Central and Middle Europe⁶⁹

	ALB	BUL	CRO	HUN	LAT	MAC	POL	ROM	SLO	TUR	URK	US	G7
1990s													
ALB	1.00											-0.26	-0.42
BUL	0.15	1.00										0.79	0.65
CRO	-0.38	0.20	1.00									0.13	0.65
HUN	-0.19	0.93	0.28	1.00								0.91	0.77
LAT	-0.50	0.68	0.63	0.83	1.00							0.84	0.92
MAC	-0.24	0.85	0.44	0.90	0.93	1.00						0.91	0.88
POL	-0.63	0.42	0.79	0.58	0.88	0.77	1.00					0.55	0.82
ROM	0.43	-0.62	0.07	-0.80	-0.71	-0.73	-0.45	1.00				-0.90	-0.52
SLO	-0.24	0.78	0.39	0.86	0.80	0.82	0.57	-0.57	1.00			0.82	0.92
TUR	-0.58	-0.32	0.29	-0.19	0.16	0.05	0.52	-0.10	-0.34	1.00		-0.12	-0.02
URK	-0.28	0.78	0.15	0.83	0.80	0.91	0.64	-0.85	0.66	0.17	1.00	0.89	0.68
0.2270	-0.25	0.38	0.28	0.40	0.45	0.47	0.41	-0.43	0.37	-0.03	0.38	0.41	0.48
2000s													
ALB	1.00											-0.43	-0.19
BUL	0.14	1.00										0.83	0.93
CRO	-0.13	0.95	1.00									0.93	0.96
HUN	-0.38	0.85	0.93	1.00								0.98	0.92
LAT	-0.26	0.90	0.97	0.94	1.00							0.97	0.99
MAC	0.57	0.83	0.67	0.42	0.61	1.00						0.43	0.67
POL	0.71	0.52	0.35	0.04	0.29	0.89	1.00					0.06	0.35
ROM	0.19	0.98	0.92	0.82	0.85	0.83	0.58	1.00				0.78	0.88
SLO	0.17	0.98	0.94	0.79	0.90	0.88	0.63	0.97	1.00			0.79	0.92
TUR	-0.42	0.82	0.91	0.96	0.96	0.45	0.07	0.77	0.78	1.00		0.99	0.95
URK	-0.24	0.90	0.97	0.96	0.93	0.54	0.23	0.89	0.87	0.91	1.00	0.95	0.92
0.63	0.03	0.79	0.75	0.63	0.71	0.67	0.43	0.78	0.79	0.62	0.70	0.66	0.76

⁶⁹ Because the data availability, the 1990s' data of CEE was 1992~1999, and 2000s' data is 2002~2009

⁷⁰ the average of all the CEE countries

C. Latin America

	ARG	BOL	BRA	CHI	COL	ECU	GUY	PAR	PER	URU	VEN	US	G7
	1990s												
ARG	1.00											-0.58	-0.63
BOL	-0.21	1.00										0.35	0.54
BRA	0.46	-0.07	1.00									-0.83	-0.50
CHI	0.28	0.19	0.13	1.00								-0.45	-0.32
COL	0.34	0.14	0.24	0.81	1.00							-0.54	-0.53
ECU	0.71	0.20	0.52	0.72	0.82	1.00						-0.66	-0.55
GUY	0.24	-0.03	0.18	0.70	0.82	0.61	1.00					-0.42	-0.34
PAR	0.24	0.07	0.30	0.77	0.97	0.74	0.76	1.00				-0.59	-0.54
PER	-0.38	0.53	-0.08	0.38	0.58	0.27	0.59	0.60	1.00			0.12	0.27
URU	0.82	0.08	0.11	0.44	0.51	0.79	0.39	0.34	-0.02	1.00		-0.27	-0.36
VEN	0.74	-0.02	0.62	0.56	0.36	0.69	0.17	0.36	-0.30	0.49	1.00	-0.70	-0.51
0.39 ⁷¹	0.32	0.09	0.24	0.50	0.56	0.61	0.44	0.51	0.22	0.40	0.37	-0.42	-0.32
	2000s												
ARG	1.00											0.17	0.49
BOL	0.83	1.00										-0.27	0.14
BRA	0.79	0.83	1.00									0.19	0.56
CHI	0.68	0.34	0.70	1.00								0.79	0.95
COL	0.90	0.82	0.91	0.73	1.00							0.26	0.63
ECU	0.62	0.42	0.61	0.78	0.51	1.00						0.49	0.60
GUY	0.36	0.68	0.58	-0.06	0.54	-0.17	1.00					-0.48	-0.10
PAR	0.76	0.67	0.91	0.79	0.86	0.56	0.46	1.00				0.35	0.68
PER	0.81	0.95	0.91	0.47	0.89	0.41	0.67	0.81	1.00			-0.08	0.33
URU	0.94	0.96	0.82	0.48	0.87	0.52	0.56	0.72	0.90	1.00		-0.12	0.27
VEN	0.85	0.74	0.84	0.75	0.86	0.74	0.39	0.74	0.72	0.83	1.00	0.26	0.61
0.68	0.75	0.72	0.79	0.57	0.79	0.50	0.40	0.73	0.75	0.76	0.75	0.14	0.47

Table 6 presents the correlation coefficients of cyclical real GDP for the pair of the three regions' countries and also the correlation coefficients of cyclical real GDP of these countries and G-7 countries.⁷²

First, BCSs of most countries are higher in the 2000s than in the 1990s. Bilateral correlation among Asian countries increased in most cases. As seen in the average

⁷¹ the average of all the LA countries

⁷² Japan is included in Asia-Pacific countries but not in G7 countries.

number (“Avg.”), the BCSs increased in 7 out of 10 countries in EA; and all increased in 11 countries of CEE; and increased in 9 out of 11 countries in LA. The numbers of bilateral correlations that are higher than 0.5 is 32 pairs in EA, 40 pairs in CEE, and 45 pairs in LA. In addition, the BCS of these regions with U.S. and G6 also increased. On average, the correlation of EA with the U.S. increased from -0.15 to 0.45 and the correlation with G6 increased from -0.13 to 0.66, while the correlation of CEE with the U.S. increased from 0.41 to 0.66 and the correlation with G7 increased from 0.48 to 0.76, and the correlation of LA with the U.S. increased from -0.42 to 0.14 and with G7 increased from -0.32 to 0.47.

It is difficult to exactly infer why the BCS of these three developing regions’ countries has increased only from these tables, because the trade and financial linkage is different with each other documented in the previous section, especially the external linkage. This can also be related to a higher BCS with advanced countries, which in turn can be related to a more similar and strong economic linkage between the regions with advanced countries. In the next section, we formally examine the effects of internal vs. external and trade vs. financial integration on BCSs of these three regions to find their special characters.

3. Estimation

3.1 The model

This paper compares the effects of internal vs. external and trade vs. financial integration on BCS among EA, LA and CEE regions. A simplified version of regression that analyzes the effects of trade and financial integration on BCS, used in past studies (i.e., Imbs, 2004, 2006, 2011), may be summarized as follows.

$$\rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \varepsilon_{ij}$$

where ρ_{ij} is correlation between the cyclical components of real GDP of countries i and j , T_{ij} is the intensity of bilateral goods trade between countries i and j , and F_{ij} is the intensity of bilateral asset trade between countries i and j . α_1 and α_2 show the effects of trade and financial integration on BCS.

Such a regression may not have much problem if the sample covers most countries around the world. However, if we consider only countries in a region (i.e., countries in Asia), it can be problematic because BCS of countries in a region can be affected not only by economic integration of countries within the region but also by economic linkages with countries outside the region. For example, similar and large economic linkages of Asian countries with advanced countries may affect BCS of Asian countries. To consider the effects from the economic relation with the countries outside the region, a variable is added in equation (1) as follows.

$$(2) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EX_{ij} + \varepsilon_{ij}$$

where EX shows the external linkage that generates BCS between country i and j . The external linkage may be divided into two types, trade and financial linkages as follows.

$$(3) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EXT_{ij} + \alpha_4 EXF_{ij} + \varepsilon_{ij}$$

where EXT and EXF are the variables that show the external trade and financial

linkages, respectively, that generate BCS between country i and j .

We also consider the following equation system in which interactions among RHS variables are allowed.

$$(4) \quad \rho_{ij} = \alpha_0 + \alpha_1 T_{ij} + \alpha_2 F_{ij} + \alpha_3 EXT_{ij} + \alpha_4 EXF_{ij} + \varepsilon_{ij}^1$$

$$T_{ij} = \beta_0 + \beta_1 F_{ij} + \beta_2 I_{ij} + \beta_3 EXT_{ij} + \varepsilon_{ij}^2$$

$$F_{ij} = \gamma_0 + \gamma_1 T_{ij} + \gamma_2 I_{ij} + \gamma_3 EXF_{ij} + \varepsilon_{ij}^3$$

where I_{ij} is the instrument. In this system, interactions among internal financial and trade integration are allowed. Internal financial integration can have both direct effect (α_1) and indirect effect ($\gamma_1 \alpha_2$) by affecting internal trade integration. Similarly, internal trade integration can have both direct effect (α_2) and indirect effect ($\beta_1 \alpha_1$) by affecting internal financial integration. In addition, indirect effects of external integration through internal integration are also allowed. External trade (or financial) linkage can affect BCS by affecting internal trade (or financial) integration.

Equations (1), (2), and (3) are estimated by OLS. Equation system (4) is estimated by three stage least square.

3.2 Measurement and Data

To measure the degree of trade integration, we use the measure of the trade intensity between country i and j ($T_{i,j}$) is constructed by the following formula.

$$T_{i,j} = \frac{1}{2T} \sum_t \frac{(X_{i,j,t} + M_{i,j,t})Y_t^W}{Y_{i,t} * Y_{j,t}}$$

where $X_{i,j,t}$ is the amount of export from country i to j at time t ; $M_{i,j,t}$ is the amount of import from country i to j at time t ; Y_t^W is the world GDP at time t ; $Y_{i,t}$ is the country i 's GDP in time t . This measure is used in many past studies including Imbs (2006). The measure has a theoretical background, as shown in the gravity model of Deardorff (1998). The measure depends only on trade barriers, but not on country size. Deardorff (1998) showed that it equals one if preferences are homothetic and there are no trade barriers.⁷³

A similar measure for financial integration between country i and j is constructed for financial integration because the huge diversity of country size among Asian countries may affect the results. The measure of the financial integration between i and j ($F_{i,j}$) is as follows.

$$F_{i,j} = \frac{1}{2T} \sum_t \frac{(I_{i,j,t} + I_{j,i,t})Y_t^W}{Y_{i,t} * Y_{j,t}}$$

where $I_{i,j,t}$ is the amount of portfolio investment from country i to j at time t . To measure the degree of financial integration, many past studies inclined to use the portfolio investment data when studying the effects of financial integration on BCS. Following past studies, we also used bilateral portfolio investment data (CIPS).⁷⁴

The measure of external linkage that affects BCS (EX_{ij}) is constructed as follows.

⁷³ Some past studies suggest that the gravity model can also explain international transactions in financial assets (i.e., Portes and Rey, 2001).

⁷⁴ China's asset data is calculated by the counter party's (liability) data throughout the sample period. The same method is used for the following countries' asset data; Hong Kong (1997), India (1997, 2001, 2002, 2003), and Pakistan (1997, 2001).

$$(6) \quad EX_{ij} \equiv \sum_{k=1}^6 w_k \{2 - |\rho_{i,k} - \rho_{j,k}|\} \rho_{ij,k}$$

$$(7) \quad \begin{aligned} \rho_{ij,k} &= \min\{\rho_{i,k}, \rho_{j,k}\} \text{ if } \rho_{i,k} > 0 \text{ and } \rho_{j,k} > 0 \\ &= \max\{\rho_{i,k}, \rho_{j,k}\} \text{ if } \rho_{i,k} < 0 \text{ and } \rho_{j,k} < 0 \\ &= 0 \text{ if } \rho_{i,k} < 0 \text{ and } \rho_{j,k} > 0 \\ &= 0 \text{ if } \rho_{i,k} > 0 \text{ and } \rho_{j,k} < 0 \end{aligned}$$

where w_k is the relative weight of G7 countries (excluding Japan). The second term ($\rho_{ij,k}$) in equation (6) shows the common correlation between the correlation of country i and k and that of country j and k . Therefore, the larger the common correlation with countries outside the region, the larger the measure. The first term ($\{2 - |\rho_{i,k} - \rho_{j,k}|\}$) in equation (6) shows the similarity in correlation of country i and k and that of country j and k . Therefore, the larger the similarity in correlation with countries outside the region, the larger the measure.

The measure of external trade and trade linkages that affects BCS are constructed in a similar way.

$$(8) \quad EXT_{ij} \equiv \sum_{k=1}^6 w_k \{MAXT - |T_{i,k} - T_{j,k}|\} \min\{T_{i,k}, T_{j,k}\}$$

$$(9) \quad EXF_{ij} \equiv \sum_{k=1}^6 w_k \{MAXF - |F_{i,k} - F_{j,k}|\} \min\{F_{i,k}, F_{j,k}\}$$

where $MAXT$ and $MAXF$ are the largest value of $T_{i,k}$ and $F_{i,k}$, respectively. Note that $T_{i,k}$ and $F_{i,k}$ are always non-negative, so we use the minimum value. Also Note that $T_{i,k}$ and $F_{i,k}$ do not have the theoretical maximum values, so we check the all values in

the sample to define MAXT and MAXF.

As instruments for the system estimation, we include the geographic distance of two countries' capital cities, whether the border exists between two countries, and whether the common official language is used in both countries, following past empirical studies on the determinants of bilateral trade. These three instruments are usually argued as clearly exogenous, with high predictive power, when analyzing the determinants of bilateral trade. For the financial integration, two instruments are used; the sum of two countries' per capital real GDP and the difference of two countries' per capital real GDP. The level of income and the difference of income may affect the degree of financial integration.

We consider the following three groups of countries as mentioned before. 1. Emerging Asia (China, Japan, Korea, Malaysia, Thailand, Indonesia, the Philippines, Singapore, Hong Kong); 2. Central and Middle Europe (Albania, Bosnia, Bulgaria, Croatia, Czech, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovakia, Slovenia, Turkey); 3. Latin America (Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Uruguay, Venezuela).

For the measure of business cycle correlation, we calculate the correlation of cyclical real GDP for 2001-2009 (annual data) as reported in Table 3 and table 4. Cyclical real GDP is obtained by excluding the trend real GDP. HP filter is applied to construct the trend real GDP. For all other measure, the average values of 2001-2009 are used.

Correlations among various measures are reported in Table 7. The table shows that the BCS measures (ρ_1 and ρ_2) are more correlated with external linkage measures than with internal integration measures, except Latin Case. This may imply that BCS of EA and CEE is more related with external linkages than with internal integration. LA's case did not show low correlated with external linkage measures briefly because LA's

economy always shocked by their internal factors, which need further study.

Table 7. Correlation among Various Measures

A. EA

	ρ	T	F	EX	EXT	EXF
ρ	1					
T	0.261	1				
F	0.297	0.904	1			
EX	0.758	0.277	0.321	1		
EXT	0.382	0.675	0.811	0.431	1	
EXF	0.439	0.284	0.600	0.489	0.591	1

B. CEE

	ρ	T	F	EX	EXT	EXF
ρ	1					
T	0.1764	1				
F	0.1288	0.5633	1			
EX	0.7586	0.1611	0.125	1		
EXT	0.1822	0.1953	0.6245	0.2575	1	
EXF	0.136	0.0486	0.4018	0.2274	0.6135	1

C. LA

	ρ	T	F	EX	EXT	EXF
ρ	1					
T	-0.0487	1				
F	-0.2022	-0.0271	1			
EX	0.0082	-0.1001	-0.1088	1		
EXT	-0.1168	-0.0897	0.5721	0.146	1	
EXF	0.1708	-0.1602	0.4369	-0.0431	0.667	1

4. Empirical result

In Table 8, we report the results from various regressions for EA, CEE, and LA. Below we compare the results among them.

Table 8 shows the results for single equation estimation. EA and CEE's results are

almost the same. When the measure for internal trade integration is included as the only regressor, the coefficient on the measure for internal trade integration is positive and significant around a 10% level. Similarly, when the measure for internal financial integration is included as the only regressor, the coefficient on the measure for international financial integration is positive and significant at a 10% level.

However, when both measures are included as regressors, both coefficients are not significantly estimated. This is probably because of the high correlation between these two measures as shown in Table 7.

Table 8. Single Equation Estimation

A. EA

ρ	OLS	OLS	OLS	OLS	OLS
T	0.00537(1.58)		-0.00091(-0.110)	0.00045(0.08)	0.0272(2.56)**
F		0.0188(1.82)*	0.0213(0.87)	0.0027(0.15)	-0.109(-2.61)**
EX				1.146(5.9)***	
EXT					0.0154(1.45)
EXF					0.0902(3.2)***
R ²	0.068	0.0885	0.0888	0.564	0.360

*P<0.1; ** P<0.05; ***P<0.01

B. CEE

P	OLS	OLS	OLS	OLS	OLS
T	0.0102(1.69)*		0.0088 (1.2)	0.00303(0.62)	0.0122(3.04)***
F		0.256(1.23)	0.0858(0.34)	0.011(0.07)	-0.258(-1.13)
EX				0.8159(10.62)***	
EXT					0.548(1.21)
EXF					2.0853(0.53)
R ²	0.02	0.006	0.01	0.564	0.063

*P<0.1; ** P<0.05; ***P<0.01

C. LA

P	OLS	OLS	OLS	OLS	OLS
T	-0.00202(-0.32)		-0.00226(-0.36)	-0.00234(-0.37)	-0.00257(-0.11)
F		-0.130(-1.74)*	-0.131(-1.35)	-0.132(-1.35)	-0.154(-2.12)**
EX				-0.0315(-0.13)	
EXT					-2.0773(-1.15)
EXF					14.349(2.69)***
R ²	-0.021	0.0538	-0.0017	-0.03	0.164

*P<0.1; ** P<0.05; ***P<0.01

For the LA case, the internal trade integration showed is not significant. Internal financial integration is negative and significant when the measure for internal financial integration is included as the only regressor. Similarly, when both internal measures are included as regressors, both coefficients are not significantly estimated.

When the overall measure for external linkages (EX) is added as a regressor, only the measure for external linkages is estimated positively and significantly except the LA case, whose results are not significant.

When the measures for external financial and trade linkages (EXF and EXT) are added, in EA case, the coefficients on the measures for internal trade integration and two external linkages are positively estimated, but the coefficient on the measure for internal financial integration is negatively estimated. Most coefficients are estimated significantly at 5% level, except for the measure for external trade linkage. CEE shows the same direction effects, but only internal trade integration is estimated significantly at 1% level, which reflects its trade's importance. For the LA case, only the internal and external integration are estimated to be the same and significant with EA.

These results suggest that external financial linkages have a positive effect on regional business cycle in the developing regions. This result reflects the importance of foreign investment to regional development, which also coincides with latter result.

Positive external linkages are likely to increase the BCS. Foreign shock is likely to

affect two countries in a similar way if external linkages of the two countries are positive and similar.

Internal trade integration has a positive effect on business cycle correlation except the LA case⁷⁵. This is consistent with many past studies of documented positive effects of trade integration on business cycle co-movements.

The different results of current study are particularly interesting because these effects reflect the correctness and the meaning of differentiating the developing regions.

In addition, adjusted R square increases substantially when the measures for external linkages are added in the regression. By omitting the measure for external linkage, the effect of internal integration on internal BCS can be improperly estimated.

Table 9 reports the results for the estimation of equation system. Compared with the former regression, the result for the direct effect is similar to the result of the single equation estimation except the LA case which changed.

The sign of the direct effects of each variable is the same, while the significance level of the estimate changes to some extent. The measure for internal financial integration still has a significant negative effect on internal BCS. Other measures still have positive effects.

For other equations, it is interesting to see that the measures for internal trade and financial integration affect each other positively. That is, internal trade integration has a positive effect on internal financial integration and internal financial integration also has a positive effect on internal trade integration. This implies that internal financial integration has a positive indirect effect on internal BCS by having a positive effect on internal trade integration, which in turn has a positive effect on internal BCS, and internal trade integration has a negative indirect effect on BCS.

⁷⁵ Internal trade integration is not significant in LA case.

Table 9. Equation System

	SYSTEM 1			SYSTEM 2		
	EA	CEE	LA	EA	CEE	LA
GDP correlations () equation						
T	0.782 (3.22)***	0.0823 (5.1)***	0.00529 (0.4)	0.0699 (2.84)***	0.051 (2.96)***	0.006 (0.45)
F	-0.326 (-3.03)***	-5.583 (-7.73)***	-0.662 (-1.81)*	-0.303 (-2.82)***	-3.913 (-5.05)***	-0.719 (-1.99)**
EXT	0.0300 (1.71)*	3.228 (5.99)***	-0.246 (-0.10)	0.0383 (2.20)**	3.512 (6.39)***	1.0238 (0.42)
EXF	0.212 (3.8)***	14.044 (2.42)**	19.404 (3.00)***	0.186 (3.28)***	6.182 (0.98)	17.840 (2.60)***
Trade (T) equation						
F	1.580 (2.41)**	36.248 (2.13)**	2.840 (0.13)	3.941 (7.02)***	42.435 (2.34)**	37.808 (1.10)
EXT	0.465 (1.36)	-20.882 (-1.36)	10.856 (0.08)	-0.285 (-1.16)	-31.52 (-2.02)**	-209.003 (-1.03)
EXF				-1.950 (-5.32)***	-79.88 (-1.39)	-224.501 (-0.91)
Finance (F) equation						
T	0.271 (16.31)***	0.0188 (5.31)***	0.00876 (0.48)	0.217 (7.18)***	0.0134 (4.18)***	0.0119 (0.70)
EXT				0.122 (2.09)**	0.83 (5.52)***	5.221 (2.73)***
EXF	0.564 (7.25)***	0.717 (0.43)	2.652 (0.19)	0.473 (4.34)***	2.147 (1.40)	2.961 (0.26)
R2	0.0988	0.1216	-0.2736	-0.0999	0.4803	-0.3635

External linkages also tend to have a negative effect on internal trade integration and have positive effects on internal financial integration. The enhanced similarity of external linkages will increase the competition among internal countries, which will loosen their trade linkage. Not only can this make them face the same global risk but also increase their potential profitability; as a result it will positively affect the internal financial integration.

According to the equation system of Table 9, the indirect effect of financial linkage

through the trade linkage on BCS tends to be positive, countervailing the direct impact. This is why some researchers find positive effects between financial linkage and BCS. However, the overall financial effect remains negative in these three developing regions, and the indirect effects from trade linkage shows a negative trend in them. However, by their different developing background, the overall effect of trade is different, EA is still positive, but CEE and LA show a small negative (LA is not significant). In other words, the indirect effect of CEE's trade through internal financial linkage is little larger than its direct effects.

In the regression, all the coefficients are often estimated significantly, so it is not too easy to infer which variable is the most important variable in explaining BCSs. To infer the relative importance of the variables, we applied the method developed by Kruskal (1987).

Table 10 reports the results; the order of importance is different. The general findings are that the external financial linkage is more important than internal financial linkage; internal trade linkage is more important than external trade linkage.

Table 11 Relative Important Index

Variable	EA	CEE	LA
T	0.0599	0.054642	0.001757
F	0.0627	0.014879	0.056643
EXT	0.0212	0.04247	0.029031
EXF	0.0911	0.018774	0.099003

In EA, the most important variable is external finance linkage; the next one is internal financial integration. This is interesting in that newly growing economic linkage of financial linkage is more important than the traditional economic integration, that is, trade integration, in explaining BCS of Asia. The result also suggests that external

financial linkage is more important than internal integration, which is consistent with the popular notion that Asian economies are significantly affected by the economic condition of advanced countries.

In comparison with EA, internal trade integration is the most important variable. Former researchers found that although CEE countries have, over recent years, recorded a period of robust economic growth, accompanied in some cases by sizeable strong capital inflows, which still cannot be compared with the large amount of trade. As seen in table 2 and 5 in this paper, the imbalanced development between trade and finance exist in CEE, and trade shares over 70% GDP of CEE and shows a vital role to GDP in CEE⁷⁶. Thus their situation is reversed, trade linkage is more important than financial linkage, and internal trade linkage is the most important.

LA is similar with EA, but the internal trade shows little importance to BCS, which confirmed the former results that the internal trade is insignificant in system analysis.

5. Summary and Conclusion

This paper examines the effects of economic integration of BCS in EA, CEE, and LA countries. In particular, this paper analyzes the effect of internal vs. external integration and trade vs. financial integration of internal BCS in EA, CEE, and LA countries.

Same as the last chapter, this paper found that a similar and positive external linkage has a significant positive direct effect on BCS. This finding is also consistent with the popular notion that external shocks can affect the countries in a certain region in a similar way through the external linkage.

This paper also found that the internal trade linkage has a positive effect on BCS, but

⁷⁶ we have showed in previous section

the internal financial linkage has a negative effect. The positive effect of trade integration is consistent with some theories and past empirical studies. However, past empirical studies often found a positive effect of the internal financial linkage although theory suggests a negative effect. After controlling the important variable that affects internal BCS, namely, external linkage, the empirical effects turn out to be consistent with the theory.

More importantly, relying on these three regions' analysis, this paper found their differences at the trade indirect effects and the importance of factors.

The results suggest that the regional policy efforts on trade integration within EA, is likely to increase BCS within the region. But in CEE and LA, the effects were reversed in that their different developing background in the former regional integration of indirect effects slightly exceeds the direct effects. On the other hand, the regional efforts on financial integration within developing regions are likely to decrease BCS within the region. However, whatever the effects of internal economic integration within developing regions, external economic linkages play an important role in determining BCS within EA or LA; while internal trade plays an important role in determining BCS within CEE. External financial linkage is more important than internal financial linkage in all three regions, and internal trade linkage is more important than external trade linkage in EA and CEE, while this situation was reversed in LA.

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국 문 요 약

본 논문은 경제통합에 관한 에세이를 세개 포함하였다.

제 1 장은 GTAP 의 database 를 이용하여 FTA 에 미치는 영향을 분석하였다. 여기서는 multi-region, multi-sector 모형을 사용하여 분석하였다. 이 모형에서는 5 regions, 12 sectors 와 5 endowments 를 포함하였다. 그리고 우리는 FTA-KCJ, FTA-KC, FTA-KJ 와 FTA-CJ 를 중심으로 연구하였으며 그 영향을 비교 분석하였다. 연구결과에 따르면, 한국은 중국과 FTA 를 체결하면 유리한 것으로 나타났다. 일본과 중국은 한중일 삼개국 간 동시에 FTA 를 체결하면 유리한 것으로 나타났다. 이 외에 본고에서는 2001 년도와 2007 년도 두 database 의 시뮬레이션 결과도 비교하였다.

제 2 장은 2000 년대 내부요인(지역영향)과 외부요인(국제영향) 및 무역통합요인과 금융통합요인이 아시아지역 경제주기의 동기화에 미치는 영향을 분석하였다. 결과를 보면 (1) 외부링키지는 아시아지역 경제주기 동기화에 유의한 긍정적인 영향을 미칠 것이다; (2) 일단 외부링키지를 도입하면 내부 무역통합은 경제주기 동기화에 긍정적인 영향을 미칠 것이고 내부 금융통합은 경제주기 동기화에 부정적인 영향을 미칠 것이다. 내부금융통합이 미치는 부정적인 영향은 약간 흥미롭다. 왜냐하면 이론연구자들은 부정적인 영향을 미친다고 생각하지만 기존의 연구결과들은 늘 긍정적인 영향을 미친다고 발견하였기 때문이다.

제 3 장에서는 내부요인(지역영향)과 외부요인(국제영향)이 개발도상지역의

경제주기 동기화에 미치는 영향을 분석하였다. 특히 우리는 Asia 와 Latin America, Central and Eastern Europe 등 세 지역을 비교하였다. 우리가 사용한 각 요인은 각 지역의 경제주기 동기화에 비슷한 직접적인 영향을 미치고 있었다. 그러나 각 요인의 간접적인 영향은 지역마다 약간의 차이를 보였다.

주요어 : 자유무역협정(FTA), 동북아, CGE분석, 경제주기동기화, 내부와 외부 통합, 무역과 금융통합, 아시아, 라틴 아메리카, 중(中)·동(東)유럽.

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