

The core-AMU denominated Asian bonds for local investors in
East Asia

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Abstract

In 2003 the ASEAN+3 Financial Ministers have established the Asian Bond Markets Initiative (ABMI), which aims to develop efficient and liquid bond markets in Asia. The EMEAP also has introduced currency basket denominated Asian Bond Fund (so-called ABF2) in 2005. Although the regional economic integration and the Asian local bond markets are gradually developing in these days, much of savings in the region still tend to leave for developed countries rather than directly investment in the region.

In Ogawa and Shimizu (2005), we proposed an Asian Monetary Unit (AMU) as a weighted average of thirteen East Asian currencies (ASEAN10 plus Japan, China, and Korea) to enhance the monetary authorities' surveillance capacity in East Asia. At the second stage, we should create a core-AMU currency basket, which is composed of some regional currencies with convertibility in both current and capital accounts. We recommend that we should use the core-AMU as a denomination currency of Asian bond in order to reduce mismatching of assets and liabilities in terms of currency. Accordingly, it is necessary to create the core-AMU that is composed of only Asian currencies with convertibility in the foreign exchange transaction for practical uses.

In this paper, we have two objectives. The first is to decide criteria to select the core-AMU currencies among the East Asian currencies. The Second is to create a core-AMU denominated Asian bond to investigate their return and risk profiles for local investors in East Asian countries. In addition, we calculate a correlation matrix among the core-AMU denominated Asian bond, the US Treasury, and the euro denominated bond for local investors in East Asian countries. These results suggest that the Core-AMU denominated Asian bond might play an important role for international diversification in the region.

JEL classification codes: F31, F36, G11

Keywords: AMU (Asian Monetary Unit), Asian Bond Market Initiative, core-AMU denominated Asian bond

1. Introduction

In August 2003, the ASEAN+3 Financial Ministers have established Asian Bond Markets Initiative (ABMI), which aimed to develop efficient and liquid bond markets in Asia. The ABMI has been promoting to issue local currency denominated bonds to contribute to mitigation of currency and maturity mismatches in financing regional borrowers. To further contribute to the development of deeper and more liquid regional bond markets, the Financial Ministers agreed to take some measurements at the ASEAN+3 Finance Ministers' Meeting in May 2005 in Istanbul, Turkey. One of the agreements is to launch a study on Asian currency basket bond.

At the same time, the Executive Meeting of East-Asia Pacific central banks (EMEAP) has promoted the Asian Bond Fund (ABF) Initiative to improve capital allocation efficiency in the region by deepening regional domestic bond markets. The first stage was to establish the so-called ABF 1, which was a kind of fund to invest in US dollar denominated bonds issued by sovereign and quasi-sovereign entities in the EMEAP member countries. The second project is to establish the so-called ABF 2. The ABF2 is local currency denominated bonds of eight EMEAP countries.¹ This is the type of Fund of Bond Funds, which was a similar concept of currency basket denominated bonds.

In Ogawa and Shimizu (2005), we proposed an Asian Monetary Unit (AMU) as a regional common currency unit that is a weighted average of the thirteen East Asian currencies (ASEAN10 plus Japan, China, and Korea) in order that the monetary authorities should monitor the exchange rates in their surveillance process in East Asia. At the second stage, we should create a core-AMU currency basket, which is composed of some core currencies in the region. We recommend to use it as a denomination currency of Asian bond in order to reduce mismatching of assets and liabilities in terms of currency. Because the AMU is composed of the thirteen East Asian currencies, it is appropriate to use it as a surveillance indicator in ASEAN +3 Finance Ministers' Meeting. However, it is not adequate as a denomination currency of Asian bond for private sector's uses. For a practical use, we need to create a core-AMU, which is composed of only the Asian currencies with convertibility in both the current and capital accounts. Then, we expect that local investors as well as foreign ones would freely

¹ In ABF 2, there was another USD 1 billion invested in the Pan Asia Index Fund (PAIF), which is a USD denominated passive fund tracking the total returns of the iBoxx Pan Asian Index.

make cross-boarder transactions in terms of a core-AMU in the regional bond markets.

In this paper, we have two objectives. At first, we decide criteria to choose core-AMU currencies among the East Asian currencies. We expect that the criteria will promote further coordinated efforts to deregulate their capital and foreign exchange controls to join in the core-AMU currencies. Second, we create a core-AMU denominated Asian bond to investigate their return and risk profiles for local investors in East Asian countries. In addition, we use historical data to simulate a simple case where local investors in East Asian countries invest in portfolio that composes of the core-AMU denominated Asian bond, the US Treasury bond, and the euro denominated bond and calculate the optimal portfolio share of each bond.

The reminder of this paper consists of the following sections. Section 2 overviews the current progress of Asian bond markets in East Asia. Section 3 discusses the role of AMU and the choice of composition currencies. Section 4 proposes a core-AMU currency basket as a denomination currency of Asian bond and decides a criteria to choose core-AMU currencies. Section 5 simulates a core-AMU denominated Asian bond and investigates their return and risk profiles for local investors in the region. Section 6 calculates a correlation matrix among the core-AMU denominated Asian bond, the US Treasury, and the euro denominated bond for local investors in East Asian countries. And final section summarizes the concluding remarks.

2. The current progress of Asian bond markets in East Asia

Most countries in East Asia have actively developed their local bond markets after the Asian currency and financial crises as the governments of the countries recognized the importance of strengthening their financial sectors for prevention and management of currency and financial crises. As a part of the Asian Bond Market Initiative, the Asian Bond Online Website has been launched by ADB in May 2004 to disseminate information on the region's bond markets. From the website, we briefly show the current progress of Asian bond markets in the region.

Figure 1 shows the movement of domestic outstanding issuance from 1997 to 2005. Among eight East Asian countries, the domestic bond markets in South Korea and China are constantly expanding. In other countries, figure 2 indicates that their sizes are still small but their trends are upward. Table 1 shows the size of local currency bond market in 1999 and 2005. We found that the local currency bond markets in each Asian country were still extremely small except for Japan, South Korea and China in 2005. However, the ratios of local currency bond markets to GDP also have increased rapidly

in some countries.

Table 2 shows the cross- border portfolio flows among the areas in the world in 2003. It indicates that share of intra-regional portfolio flow in East Asia was 4.9 percent, which was low compared with those in EU 15 (63.5 percent) and NAFTA (15.8 percent). According to Asian Bond Monitor 2005 by ADB, China, Singapore and Malaysia invested a higher portion of their total cross-border portfolio assets in other East Asian market in 2003 (17.2 percent, 22.9 percent and 47.2 percent, respectively). In contrast, Japan only invested 1.3 percent of its total cross-borer portfolio flows in East Asian assets. It also reported that a significant amount of the US dollar and the euro denominated debt issued by East Asian issuers were bought by East Asian investors.

These facts indicate that there might be much room for expanding cross-border portfolio flows especially for the Japanese investors.

3. The role of the AMU and the choice of composition currencies

Regarding the high intra-regional trade linkage, the internal stability of exchange rates in the region is very important for growth and stability in the region. Therefore, the coordinated currency mechanism should be necessary for stability of intra-regional exchange rates among the East Asian countries. Ogawa and Shimizu (2005) proposed an AMU as a surveillance indicator in the EPRD of the ASEAN +3 Finance Ministers' Meeting. Accordingly, we need to monitor each East Asian currency in terms of a weighted average of East Asian currencies such as the AMU. We calculated the AMU Deviation Indicators for each East Asian currency, which showed the degree of deviation from the hypothetical benchmark rate for each of the East Asian currencies in terms of the AMU. At a glance of the graph of them, we can easily find the current situation of misalignments among the East Asian currencies. We suggest that such a deviation measurement is useful indicator for monitoring misalignments of intra-regional exchange rates in the surveillance process.

As we discussed, conditions to be a composition currency of a common currency basket like the AMU depends on purposes for what we use it. As a kind of surveillance index in the region, we have to include all ASEAN + 3 currencies. We might include the Australian dollar, the New Zealand dollar and the Indian rupee along with the expansion of the regional coordination area in the future.

The AMU should include all of ASEAN+3 currencies for the surveillance regardless to their convertibility (and inconvertibility) in both current and capital accounts. Because of its role of a benchmark (or numeraire) of regional currencies, the

AMU has to include all regional currencies even if the weights of some minor currencies are very small. However, more than half of them actually have still a lot of barriers to conduct transactions freely in foreign exchange markets due to their monetary authorities' regulation. Therefore, it is not practical to use the AMU as a denomination currency of regional bonds that are freely traded at the cross-boarder transactions.

Dammers and McCauley (2006) and Iwata (2005) indicated that development in private ECU in the financial field begun in the early 1980's and developed rapidly. In the same way, we expect that the AMU could be used not only by the monetary authorities but also by the private sector. It could use the AMU to denominate regional economic transactions (trade and capital transactions) and asset stocks (foreign exchange reserves and cross-border bonds) as the ECU used as a denomination currency in the EU under the EMS. Iwata (2005) indicated that there were still rooms for the private ACU (Asian Currency Unit) composed of main Asian currencies to develop.² In addition, he suggested that the relatively small size of domestic bond market and the shortage of its liquidity might render ACU bond market comparative advantage.

Thus, we may use the AMU as a denomination currency for the Asian Bond which has been studied under the Asian Bond Market Initiative. The AMU as a common denomination currency would contribute to increasing of the liquidity in the Asian Bond Market or deepening the Asian Bond Market. In the history of the ECU, the "private" ECU was created by the commercial banking system. It was treated as a "foreign currency" by the monetary authorities of the Communities.³ Consequently, European countries could use ECU for their international commercial and financial dealings, such as ECU denominated syndicated loans, ECU denominated Eurobond, ECU in the international bank credit and deposit market, and ECU in invoicing and payments currencies between Community countries. We learn the experiences of the private ECU to decide criteria to choose core-AMU currencies in the next section.

4. Criteria to choose core-AMU currencies

We should start an AMU composed of only core currencies in the region if we

² Iwata(2005) explained that the reason for this prospects were from the lack of convergence of interest rate and inflation rate within Asian and some restrictions of capital movements in some Asian countries. He indicated that these circumstances are similar to that of early development of private ECU from 1979 to 1987.

³ Also an increasing number of foreign monetary authorities treated ECU as one of "foreign currency".

expect an AMU as a same role like ECU. We name it core-AMU. Because we expect a core-AMU as a denomination currency of Asian bond, which will be traded in a secondary market, a core-AMU currency basket also should be freely traded in the inter-bank foreign exchange market. Among East Asian currencies, the Japanese yen, the Singapore dollar, and the Hong Kong dollar have already ensured convertibility in both current and capital accounts and liberalized capital and foreign exchange controls. On one hand, the other East Asian countries have liberalized only the current account transaction of foreign exchange while they have not yet opened the capital account transactions of foreign exchange by keeping capital and foreign exchange controls. In this situation, it is possible for us to focus on foreign exchange transaction, or “foreign exchange convertibility” as a criterion in order to decide composition currencies of a core-AMU currency basket.

When we consider the foreign exchange convertibility, we have to check it in two different markets. One is a spot market and the other is a forward swap market. Additionally, we divide a spot transaction into two categories, current account related transaction and capital account related transaction. Hopefully, we recommend a currency, which has no restriction of foreign exchange transaction related to both current and capital account in both markets, as a member of a core-AMU currency basket. However, we could loose our criteria to select core AMU currencies to no restriction on current account related transaction only. It is because this might be enough if a monetary authority agrees to regard the foreign exchange transactions backed with Asian bond as a kind of trade demand. Further, we add possible transaction in forward swap market within 1year as a criterion to be a member of core-AMU currency basket, because forward swap is one of most popular measures to hedge foreign exchange risks. Needless to say, the liquidity conditions of both spot and forward swap market have to be checked. We use the published reports about the actual foreign exchange market liquidity by Deutsche Bank, which recognized the market condition into three categories, such as good, average, and poor.⁴ We add the calculated bid-ask spread of 1 month forward swap (against the US dollar) to indicate a market liquidity, in the same way of Ogawa and Shimizu (2004) and Shimizu and Ogawa (2005) just for a reference.⁵

Table 2 shows the current situation of foreign exchange transaction in East Asia and core-AMU qualification. As mentioned above, the Japanese yen, the Hong Kong

⁴ PAIF also introduce “market openness” as one of the currency weight factors. According to this, “Highly open” is Japan and Singapore, “Generally open” is Indonesia, Korea, Malaysia, Philippines and Thailand, and “Relatively less open” is China and others.

⁵ Forward swap bid-ask spreads of each currency are calculated by bid and ask quotations on Bloomberg screens of both spot and forward rates against the US dollar in May 2006

dollar and the Singapore dollar are fully convertible for both current and capital account related foreign exchange transactions. In forward swap market, their bid-ask spread are smallest level among the sampled countries. Thus we could select these three currencies as a member of “hard” core-AMU currencies. The South Korean won, the Thai baht and the Indonesian rupiah have no restriction on current account related foreign exchange transaction in spot market. Although their regulatory in capital account related foreign exchange transactions in spot market and in forward swap market are still left in some cases, we are able to make a forward swap transaction of these currencies within a certain amount. Their market liquidity conditions also are above average.

As a result, we selected the Japanese yen, the Hong Kong dollar, the South Korean won, the Singapore dollar, the Thai baht, and the Indonesian rupiah to create a core-AMU currency basket. Unfortunately the Chinese yuan could not be selected since they are still strictly restricted even in spot market. According to the latest reports, China's central bank hasn't given a timetable for full convertibility, when it will lift restrictions on inflows and outflows of money for investment purposes, or the capital account, but analysts say it will be at least five years, possibly more than 10, before the yuan matched the criteria. Hong Kong also will keep the existing regime for at least five years. On the other hand, Korea recently announced that it will move up the target date of its plan to fully liberalize its capital account to 2009 from 2011.

5. Return and risk profiles of core-AMU denominated Asian bond

At first, we create a core-AMU currency basket which is composed of the six East Asian currencies which include the Japanese yen, the Hong Kong dollar, the South Korean won, the Singapore dollar, the Thai baht, and the Indonesia rupiah. We calculate the core-AMU with the basket weights based on both the trade share and the share of GDP measured at PPP according to Ogawa and Shimizu (2005, 2006).⁶

The basket weights of the six East Asian currencies are based on

- each county's respective share of GDP measured at PPP
- each country's respective share of trade volumes (the sum of exports and imports of the core-AMU countries with ASEAN+3 countries)

We use averages of both the shares for recent three years from 2001 to 2003. Table 4 shows the basket weights of each of the six East Asian currencies for the core-AMU.

⁶ Refer the details of the AMU calculation to Ogawa and Shimizu (2005, 2006).

The Japanese yen dominates the highest share of the core-AMU (58.9 percent). The Hong Kong dollar, the South Korean won, and the Indonesian rupiah have above 10 percent of share, which is 12.07 percent, 10.81 percent and 10.02 percent, respectively. The share of the Thailand baht is 7.05 percent. The smallest share is the Singapore dollar (1.14 percent) since both the trade volume and the GDP measure at PPP of Singapore are the smallest among the six countries. Figure 3 shows movements of the core-AMU compared with those of the AMU, which is composed of the thirteen East Asian currencies. Both the core-AMU and the AMU move almost similarly while the core-AMU seems to be more volatile than the AMU. It is because the basket weight of the Japanese yen in the core-AMU is much higher than that in the AMU (27.8 percent).

Next, we use yield data of local government bonds to calculate the core-AMU denominated Asian bond in order to investigate the risk properties of the core-AMU denominated Asian bond for regional investors.⁷ It is supposed to be a portfolio investment into the local government bonds with same basket weights of the core-AMU.

We suppose that local investors in the East Asian countries who evaluate their returns of the core-AMU denominated Asian bond in terms of their local currencies. Returns on investing in the bonds for 1 month are calculated as follows: the investors exchanges an initial fund of a local currency into the core-AMU at the relevant exchange rate, purchases the core-AMU denominated Asian bonds at a price in terms of the core-AMU, holds them for one month, sells them at their price in terms of the core-AMU one month later, and exchanges the revenue in terms of the core-AMU into a local currency.^{8 9} The returns are then divided into interest rate (bonds yield) returns and foreign exchange returns.¹⁰ Our formula for calculating the value of a core-AMU denominated Asian bond in terms of a local currency for a one month investment is represented as follows:

⁷ We use the yield data of Japanese government bonds 10years, exchange fund notes 5 year for Hong Kong, treasury bonds 10years for Singapore, Loan bonds 10years for Thailand, and treasury bonds 5 year for South Korea. Due to data constraint, we use 3 month deposit rate for Indonesia from the website of Bank Indonesia.. All data except Indonesia are from Datastream.

⁸ We suppose the case in which investors do not use forward swap transactions for covering foreign exchange risk.

⁹ We suppose each local bond as a zero coupon bond. In addition, the yield data are rate on annual basis, so we convert them to a monthly basis for calculation.

¹⁰ A similar calculation is conducted for investors who buy the US dollar denominated bond and the euro denominated bond in next section to calculate a correlation matrix.

$$\begin{aligned}
& \text{Core - AMU denominated Bond return (local currency equivalent)} \\
& = \text{Core - AMU denominated Bond return (in terms of the Core - AMU)} \\
& \quad + \text{Foreign exchange return} \\
& = \frac{Bond_t - Bond_{t-1}}{Bond_{t-1}} \cdot \frac{E_t}{E_{t-1}} \times 100 + \frac{E_t - E_{t-1}}{E_{t-1}} \times 100
\end{aligned}$$

where $Bond_t$ is the closing bond price in terms of the core-AMU at month t and E_t is the closing foreign exchange rate vis-à-vis the core-AMU at month t .¹¹ We suppose the East Asian investors in the ASEAN5 plus Japan, South Korea, China, and Hong Kong to compare their risk properties of returns on the core-AMU denominated Asian bond from January 2000 to March 2006.

Table 5 shows the results. The average 1 month return of the core-AMU denominated Asian bond was minus 0.02 percent. It was very small since it was mainly composed of the Japanese government bonds with its major share, whose returns were very low during the sample period. However, its standard deviation also was very small. Thus, the core-AMU denominated Asian bond itself could be a kind of riskless assets. The main factor of the core-AMU denominated Asian bond returns equivalent of each local currency depends on each foreign exchange return. It means that the fluctuations of each East Asian currency vis-à-vis the core-AMU affect the volatilities of each East Asian investor's return on the core-AMU denominated Asian bond.

In fact, total returns of each East Asian investor through the whole period were completely different. We suppose that the total return is the return which investors buy core-AMU denominated Asian bond at the beginning of January 2000, hold it for the whole period, and sell it at the end of March 2006. The results were largely affected by the foreign exchange rate both at the beginning and the end of the period. For example, the Japanese yen vis-à-vis the core-AMU did not move a lot since the core-AMU was shared more than half with the Japanese yen itself. Therefore the bond returns of the Japanese investors were very small but stable. The Chinese yuan, the Malaysian ringgit, the South Korean won, the Singapore dollar and the Hong Kong dollar were appreciated vis-à-vis the core-AMU in this period. Therefore, the bond returns of these countries' investors who hold the core-AMU denominated Asian bond were minus. On the other hand, the Indonesian rupiah and the Philippine peso were depreciated vis-à-vis the core AMU, and their return were plus.

¹¹ The interest returns for each of the bonds are calculated from yield data of local bonds, and foreign exchange returns are calculated from actual ex-post returns which are uncovered by forward transactions at the beginning of the month and realized at the end of the month.

When we compared the standard deviations of 1 month core-AMU denominated Asian bond returns among the East Asian countries, we found that those of the core-AMU member countries were basically lower than those of the other East Asian countries except for Indonesia. It suggests that the risks of core-AMU denominated Asian bond returns for local investors could be lower if a country joins in the core-AMU member countries.

These results show that the core-AMU denominated Asian bond is a stable investment choice especially for the Japanese investors. Thus, we expect that they will play an important role to create and promote a core-AMU denominated Asian bond market at the first stage.

6. Correlation between core-AMU, US dollar, and euro denominated bonds

In this section, we calculate a correlation coefficient matrix among the returns on the core-AMU denominated Asian bond, the US Treasury, and the euro denominated bond for local investors in East Asian countries. International portfolio diversification has been widely practiced by international investors who seek to reduce their investment risks. However, it is said that the monetary authorities in East Asia hold most of their international reserves in US treasury bonds. If the returns of the core-AMU denominated Asian bond in terms of each local currency are negatively or less correlated with the returns of the US dollar denominated bond in terms of each local currency, we could recommend for them to hold the core-AMU denominated Asian bond in order to mitigate their foreign exchange risks.

Table 6 shows the results. For China, Malaysia and Hong Kong, their correlation coefficients between the US dollar denominated bond and the core-AMU denominated Asian bond were not negative, but very small. For Indonesia, South Korea, the Philippines, Singapore, Thailand and Japan, those were negative. These results indicate that the core-AMU denominated Asian bond could be a useful asset to diversify their international portfolio and to reduce their foreign exchange risks. Accordingly, we suggest that the core-AMU denominated Asian bond might play an important role for international diversification in the region.

7. Conclusion

In this paper, we have the two objectives. At first, we decide the criteria to select core-AMU currencies among the East Asian currencies. Second, we create a core-AMU denominated Asian bond to investigate their return and risk profiles for local investors in East Asian countries.

Because we expect the core-AMU currency basket as a denomination currency of Asian bond, which will be traded in a secondary market, a core-AMU currency basket also should be freely traded in the inter-bank foreign exchange market. Thus, we focused on the convertibility as a criterion to be one of composition currencies. As a result, we selected the six East Asian currencies, which include the Japanese yen, the Hong Kong dollar, the South Korean won, the Singapore dollar, the Thai baht, and the Indonesian rupiah to create the core-AMU currency basket. According to Ogawa and Shimizu (2005), we calculated the core-AMU with the basket weights based on the trade share and the share of GDP measured at PPP. The core-AMU moved more volatile than the AMU because the core-AMU's basket share on the Japanese yen was 58.9 percent, which was much higher than the AMU (27.8 percent).

When we created the core-AMU denominated Asian bond, we found that it was a kind of riskless asset. The main factor of the core-AMU denominated Asian bond returns equivalent of each local currency depends on each foreign exchange return. It means that the fluctuations of each East Asian currency vis-à-vis the core-AMU affect the volatilities of each East Asian investor's return on the core-AMU denominated Asian bond. When we compared their standard deviations among the East Asian countries, we found that those of the core-AMU member countries were basically lower than those of the other East Asian countries except for Indonesia. It implies that the risks of the core-AMU denominated Asian bond returns for local investors could be lower if a country joins in the core-AMU member countries.

At last, we calculated a correlation coefficient matrix among the core-AMU denominated Asian bond, the US Treasury, and the euro denominated bond for each local investor to obtain the following results. For China, Malaysia and Hong Kong, their correlation coefficients between the US bond and the core-AMU denominated Asian bond were not negative, but very small. For Indonesia, South Korea, Philippines, Singapore, Thailand and Japan, those were negative. These results indicate that the core-AMU denominated Asian bond could be a asset that can contribute to reducing their foreign exchange risks.

Accordingly, we suggest that the core-AMU denominated Asian bond might play an important role for international diversification in the region. Since the core-AMU denominated Asian bond is supposed to be a stable investment choice

especially for the Japanese investors, we expect that the Japanese investors will play an important role to create and promote a core-AMU denominated Asian bond market at the first stage.

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Table 1. Size of Local Currency Bond Market in 1999 and 2005

	as of December 1999		as of September 2005	
	as a Percentage of GDP	in USD billions	as a Percentage of GDP	in USD billions
China	21.7	215.0	32.3	586.3
Hong Kong	35.6	57.1	50.9	85.1
Indonesia	32.0	49.3	17.5	47.5
Japan	131.8	6,536.0	194.6	9,090.2
South Korea	59.6	265.6	81.6	626.7
Malaysia	83.6	66.1	91.2	116.1
Philippines	30.3	23.0	40.4	38.0
Singapore	45.2	37.4	71.8	82.5
Thailand	27.0	33.1	44.7	77.3

Source: Asianbond Online website (<http://asianbondsonline.adb.org/regional/regional.php>)

Table 2. Cross-Border Portfolio Flows in 2003

Investment to	Investment from (% of total)		
	NAFTA	EU 15	East Asia
Total Portfolio Investment			
NAFTA	15.8	18.6	33.5
EU 15	46.7	63.5	36.1
East Asia	13.7	4.4	4.9
Rest of the World	23.8	13.5	25.5
Total Global	100.0	100.0	100.0
Long-Term Debt Securities			
NAFTA	21.4	15.3	34.1
EU 15	45.4	69.0	38.2
East Asia	5.9	1.9	2.7
Rest of the World	27.3	13.8	24.9
Total Global	100.0	100.0	100.0
Equity Securities			
NAFTA	13.4	23.7	34.7
EU 15	44.8	53.6	27.8
East Asia	18.0	9.3	10.9
Rest of the World	23.9	13.3	26.5
Total Global	100.0	100.0	100.0

Source: Asian Bond Monitor 2005, ADB

Table 3. Foreign Exchange Market Condition in East Asia and core-AMU qualification

Country	FX Spot Market			FX Forward Swap Market			core-AMU qualification
	Regulatory on Current Account	Regulatory on Capital Market	Liquidity	Regulatory	Liquidity within 1year	1Month Swap Bid-Ask Spread in May 2006 (%)	
Japan	○	○	Good	○	Good	0.01	Yes
HongKong	○	○	Good	○	Good	0.02	Yes
Korea	○	△	Good	△	Good	0.11	Yes
Singapore	○	○	Good	△	Good	0.03	Yes
Thailand	○	△	Good	△	Good	0.1	Yes
Malaysia	△	△	Good	△	Good	0.19	No
Philippines	△	△	Good	△	average	0.19	No
Indonesia	○	○	Good	△	average	0.79	Yes
China	×	×	Good	×	Poor	-	No

Note:

1. Each country's regulatory information is from its central bank and monetary authority website. ○ means no restrictions, △ means some restrictions, and × means transactions are restricted for non residents.
2. Each market liquidity information is from Asian Currency Handbook 2005 (Deutsche Bank).
4. Each 1month swap bid-ask swap spread in May 2006 is calculated by the same procedure of Ogawa and Shimizu (2004). All spot rates and forward rates are collected from Bloomberg currency composite pages and Prebon Yamane Asia Region pages on sample days. Forward swap spreads are calculated by bid and ask spreads on both spot and forward rates.

Table 4. Core-AMU weights of East Asian Currencies (benchmark year=2000/2001)

Country	Trade volume* %	GDP measured at PPP** %	Arithmetic average shares %, (a)	Benchmark exchange rate*** (b)	AMU weights (a)/(b)
HongKong	20.96	3.18	12.07	0.1328	0.9084
Indonesia	8.03	12.01	10.02	0.0001	886.6957
Japan	56.80	61.00	58.90	0.0091	64.7562
South Korea	7.26	14.37	10.81	0.0009	125.3973
Singapore	0.53	1.75	1.14	0.5912	0.0193
Thailand	6.41	7.69	7.05	0.0246	2.8643

Authors calculation. Details are in O gawa and Shim izu(2005a).

* :The trade volume is calculated as the average of total export and import volumes in 2001, 2002 and 2003 taken from DOTS (MF).

** :GDP measured at PPP is the average of GDP measured at PPP in 2001, 2002 and 2003 taken from the World Development Report, World Bank. For Brunei and Myanmar, we again use the same share of trade volume since no GDP data are available for these countries.

*** :The Benchmark exchange rate (\$-euro/Currency) is the average of the daily exchange rate in terms of US\$-euro in 2000 and 2001.

Table 5. 1 Month Bond Value of Core-AMU denominated Asian Bonds (Jan 2000-March 2006)

	China	Indonesia	Japan	South Korea	Malaysia	Philippines	Singapore	Thailand	Hong Kong
< 1 month Core-AMU denominated Bond Return in terms of each local currencies*, % >									
Max	4.23	11.69	2.37	5.16	4.25	8.86	3.35	3.23	4.24
Min	-5.69	-15.53	-3.20	-4.35	-5.65	-4.52	-3.71	-3.46	-5.69
Average (μ)	-0.17	0.27	0.03	-0.34	-0.16	0.22	-0.17	-0.06	-0.13
Std. Dev. (σ)	2.08	3.65	1.12	1.73	2.07	2.37	1.44	1.61	2.04
μ / σ	-0.08	0.07	0.03	-0.19	-0.08	0.09	-0.12	-0.04	-0.06
Total return through the whole period**	-13.09	16.29	1.86	-22.84	-12.50	15.70	-12.34	-5.38	-10.72
< 1 month Core-AMU denominated Bond Return***, % >									
Max					0.92				
Min					-1.96				
Average (μ)					-0.02				
Std. Dev. (σ)					0.29				
μ / σ					-0.06				
< Foreign Exchange Return in each local currencies vis-à-vis the Core-AMU**** % >									
Max	4.24	11.60	2.04	5.16	4.25	8.84	3.40	3.28	4.25
Min	-5.69	-15.32	-2.70	-4.23	-5.66	-4.52	-3.73	-3.52	-5.69
Average (μ)	-0.15	0.29	0.05	-0.32	-0.14	0.24	-0.15	-0.04	-0.11
Std. Dev. (σ)	2.06	3.62	1.01	1.76	2.05	2.35	1.44	1.64	2.03
μ / σ	-0.07	0.08	0.05	-0.18	-0.07	0.10	-0.10	-0.03	-0.06

Author's calculation

* : 1 month Core-AMU denominated Bond Returns in terms of each local currencies are calculated by sum of 1 month Core-AMU denominated Bond Return and 1 month foreign exchange return in each local currencies vis-a-vis the Core-AMU.

** : Total return through the whole period is the return which investors buy core-AMU denominated bond at the beginning of Jan 2000, hold it for the whole period, and sell it at the end of March 2006.

*** : 1 month Core-AMU denominated Bond Return is calculated by Core-AMU denominated bond value. The bond value for 1 month is the weighted bond value invested in each core-AMU country's with same basket share of Core-AMU for 1 month.

**** : Foreign exchange returns are the actual ex-post foreign exchange related returns which are uncovered by forward transaction at the beginning of period.

**Table 6. Correlation Matrix of US bond, euro bond and Core-AMU denominated bond
(Jan 2000 – March 2006)**

China

	US bond	euro bond	Core-AMU
US bond			
euro bond	-0.0953		
Core-AMU	0.0976	-0.2912	

Hong Kong

	US bond	euro bond	Core-AMU
US bond			
euro bond	-0.3462		
Core-AMU	0.0339	-0.2737	

Indonesia

	US bond	euro bond	Core-AMU
US bond			
euro bond	0.8132		
Core-AMU	-0.5369	-0.5638	

South Korea

	US bond	euro bond	Core-AMU
US bond			
euro bond	0.4425		
Core-AMU	-0.2666	-0.2336	

Malaysia

	US bond	euro bond	Core-AMU
US bond			
euro bond	-0.1138		
Core-AMU	0.0405	-0.2968	

Philippines

	US bond	euro bond	Core-AMU
US bond			
euro bond	0.5399		
Core-AMU	-0.4317	-0.4173	

Singapore

	US bond	euro bond	Core-AMU
US bond			
euro bond	-0.0497		
Core-AMU	-0.0156	-0.0934	

Thailand

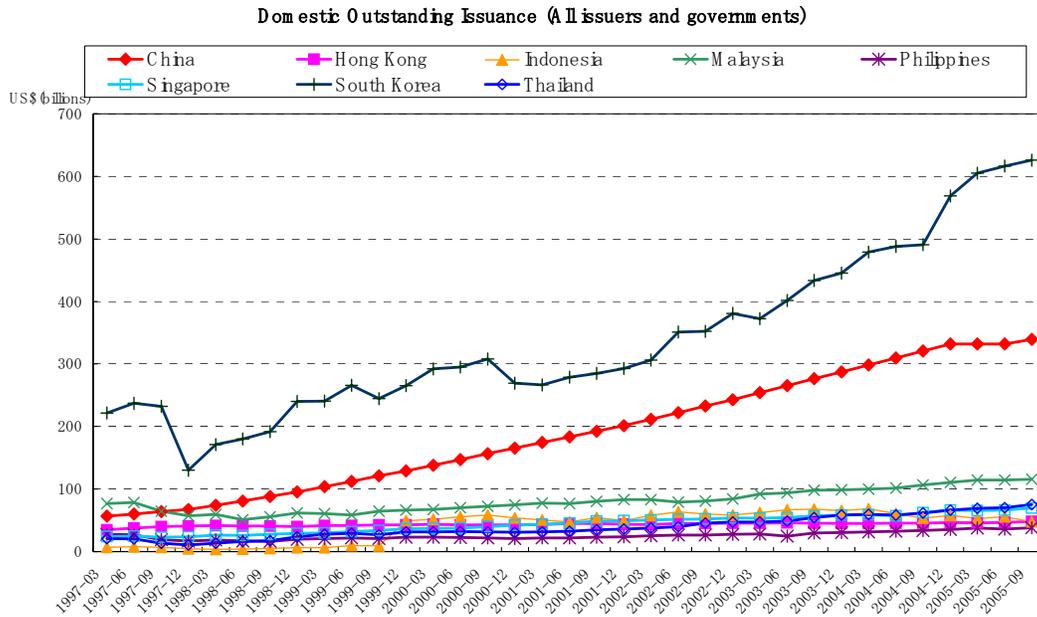
	US bond	euro bond	Core-AMU
US bond			
euro bond	0.2710		
Core-AMU	-0.3041	-0.1915	

Japan

	US bond	euro bond	Core-AMU
US bond			
euro bond	0.4223		
Core-AMU	-0.3125	-0.4916	

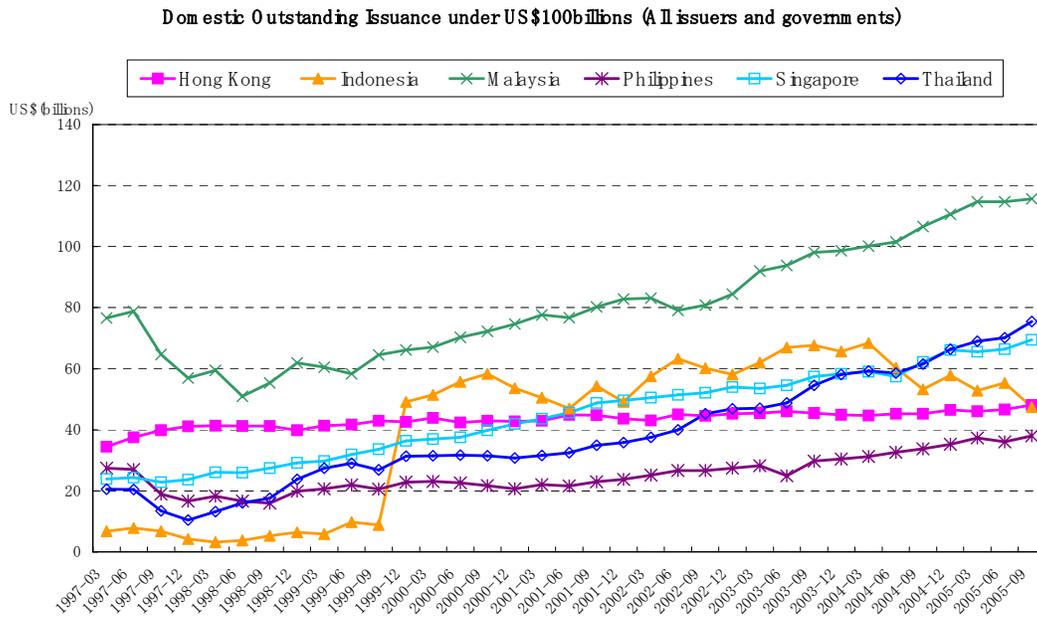
Authors Calculation
All bond returns are 1 month bond return in terms of each local currencies.

Figure 1. Domestic Outstanding Issuance (All issuers and Government)



Source: The BIS International Financial Statistics 2005

Figure 2. Domestic Outstanding Issuance below US\$100 billion (All issuers and Government)



Source: The BIS International Financial Statistics 2005

Figure 3. The AMU and the Core-AMU in terms of US\$-euro

