

## Roles of regional currency in bond markets in East Asia\*

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## 1. Introduction

It is said that we have both an abundance of savings in East Asia and profitable investment opportunities in East Asian emerging market countries. However, we have a problem of how efficiently we should match the savings with the investments within East Asia. One of its solutions may be to establish and activate regional bond markets in East Asia. Both borrowers and lenders in East Asia would face with foreign exchange risks if bonds were denominated in terms of a foreign currency in the regional bond markets in contrast with local bond markets. We might have another problem that is associated with the foreign exchange risks even if we established the regional bond markets.

It is usual for bond issuers to select an international currency as denomination currency of the bonds when they issue them in international bond markets. The US dollar is dominant as an international currency in the world economy. If a local currency of the bond issuers is different from the denomination currency in the issued bond, they face with foreign exchange risks that are volatility of exchange rate of the local currency in terms of the denomination currency in the issued bond. Also investors face with foreign exchange risks if their local currency is different from the denomination currency in bonds.

Risk-averse bond issuers and investors prefer smaller foreign exchange risks. It might be more desirable for them to select any other currency in issuing and investing into bonds from a viewpoint of foreign exchange risks. However, we should face with another problem that is associated with liquidity because network externalities might work in bond markets in terms of liquidity. Accordingly, both investors and bond issuers might face with trade-off relationship between foreign exchange risks and liquidity when they issue and invest into regional bonds as well as international bonds.

It is discussed whether the monetary authorities in East Asian countries should make regional cooperation in a field of exchange rate regimes and regional currency in order to prevent another currency crisis in the future (Ito, Ogawa, and Sasaki (1999), Bénassy-Quéré (1999), Williamson (2000), Ogawa and Ito (2002) and Ogawa, Ito, and Sasaki (2002)). It is suggested that a common currency basket as a region currency is needed for the regional cooperation. In this paper we suppose that a regional currency is equivalent to a currency basket.

This paper is to investigate advantages and disadvantages of choosing a regional currency over an international currency by taking into account both foreign exchange risks and liquidity. This paper is composed of the following sections. Next section reviews the current situation of international bond markets from a viewpoint of

currency composition. The third section focuses on foreign exchange risks to investigate what kind of currency is desirable for bond issuers and investors in term of foreign exchange risks. The fourth section considers about liquidity in regional bond markets from a viewpoint of denomination currency. The fifth section is a summary and conclusion of this paper.

## 2. Current Situation

### (1) Currency composition in international financial markets

We survey the current situation of currency composition in international financial markets, which include international money market instruments, international bond market, and euro currency market. We have no data on currency composition in bond market in East Asia.

Figure 1 shows shares of denomination currencies in international money market instruments. A share of the US dollar denominated international money market instruments has decreased from 79 percent in 1993 to 41 percent in 2001. A share of the Japanese yen denominated international money market instruments has been small but has increased from 0.3 percent in 1993 to 12.8 percent in 2001. A share of those denominated in terms of the euro area currencies, that included the EU 12 country currencies and the ECU before the introduction of the euro in January 1999, has increased from 10 percent in 1993 to above 30 percent in the 3rd quarter of 1999. It has kept at this level in 2000 and 2001.

Figure 2 shows shares of denomination currencies in international bond market. A share of the US dollar denominated international bonds and notes has increased from 38 percent in 1993 to 51 percent in 2002. A share of the Japanese yen denominated international bonds and notes has decreased from 14 percent in 1993 to 6 percent at the end of 2001. A share of the euro area currencies denominated international bonds and notes has increased a little from 26 percent in 1993 to 32 percent in 2001. Especially, the share of the euro area currencies has increased much more after the EU countries introduced the euro in 1999.

Figure 3 shows shares of denomination currencies in euro currency markets (liabilities in terms of foreign currencies of international banks) during a period from 1983 to 2001. A share of the US dollar denomination decreased from 79 percent in 1984 to 49 percent in 1995. However, it has recently increased to 68 percent in 2001. A share of the Japanese yen denomination has gradually increased from 2 percent in 1983 to 8 percent in 1999, then has decreased recently to 6 percent. A share of the euro area

currencies denomination increased from 12 percent in 1983 to 30 percent in 1993. Afterward, it has gradually decreased in 1990s. After the currency unification, it is 12 to 14 percent in 2000s.

Thus, the US dollar has been playing a dominant role in the international financial markets. The euro has the second position in the international financial markets. The euro as well as the Japanese yen is more likely to be used as a denomination currency in the longer-term capital markets than in the shorter-term money markets. The fact implies that they might have a relative advantage in using it as a means of a store of value in comparison with the US dollar. On one hand, not so much of the euro and the Japanese yen are used in money markets in which liquidity is regarded to be important. The euro and the Japanese yen have a disadvantage in using it as a means of a medium of exchange in comparison with the US dollar.

## (2) Currency composition in international bank loans to East Asian countries

Figure 4 shows currency composition in international bank loans (denomination currencies in credit obligation outstanding) to Singapore during a period from 1977 to 2001. A share of the US dollar denomination decreased from above 80 percent early in the 1980s to around 40 percent in the 1990s. On the other hand, a share of the Singapore dollar increased from 10 percent late in the 1970s to above 40 percent in the 1990s. A share of the Japanese yen also increased rapidly and kept at a level above 10% since 1990, but it has come down below 10% in recent years. The currency composition in international bank loans has been stable during the last ten years.

Figure 5 shows currency composition in international bank loans to Hong Kong during a period from 1977 to 2001. A share of the US dollar decreased from 80 percent in 1977 to a level below 40 percent in the middle of the 1990s. But it has recovered around 50 percent in 2001. A share of the Hong Kong dollar increased from 20 percent in 1977 to a level above 60 percent in the middle of the 1990s. After then it has decreased to 30 percent in 2001. A share of the Japanese yen has been increasing to 9 percent in recent years while shares of the euro area currencies and other European currencies are still very low.

We have only data that are classified into two categories of a local currency and non-local currencies for other six East Asian countries (Thailand, Malaysia, Indonesia, the Philippines, Korea, and Taiwan). Figure 6 to 11 show shares of currency denomination in credit obligation outstanding in the six East Asian countries during a period from 1977 to 2001. In the six East Asian countries, a share of category classified as non-local currencies is pretty high and a share of local currency is low in comparison

with that in the case of Singapore and Hong Kong. Especially in Malaysia, a share of local currency has been no more than 10 percent after the Asian currency crisis.

Figure 6 shows the currency composition in international bank loans to Thailand during a period from 1977 to 2001. The share of local currency decreased steadily early in the 1990s, which reflected financial liberalization and internationalization in Thailand such as establishing the BIBF. It is interesting that the decreasing trend of the share of local currency stopped in 1995 and the share of local currency abruptly increased to a level above 20 percent after the share of local currency touched the lowest level of 11.2 percent in the end of 1994. After then, the share of local currency has kept around 20 percent. Recently it has increased to 26.2 percent at the end of 2001.

Figure 7 shows the currency composition in international bank loans to Malaysia during a period from 1977 to 2001. The share of local currency is the lowest among the ASEAN 5 countries, Korea, and Taiwan in recent years. The share has been stable around 12 percent from the end of 1995. The stable movements have been kept during and after the Asian currency crisis.

Figure 8 shows the currency composition in international bank loans to Indonesia during a period from 1977 to 2001. The movements of the currency composition are nearly the same as those in Thailand and Malaysia. But the share of local currency has been rather increasing since the Asian currency crisis and it exceeded 20 percent at the end of 2000.

Figure 9 shows the currency composition in international bank loans to the Philippines during a period from 1977 to 2001. The currency composition has the movements that are similar to that in Indonesia. The share of local currency has been increasing since the Asian currency crisis. It has exceeded 20 percent since the early 2000.

Figure 10 shows the currency composition in international bank loans to Korea during a period from 1977 to 2001. The share of local currency has been the highest among all of the sampled East Asian countries through the period. It was above 50 percent late in the 1970s and early in the 1980s. It made an abrupt drop in 1983 and kept decreasing gradually. It decreased below 20 percent in the first half of 1998, which was the most severe time for Korean economy because of the currency and financial crises. The share of local currency has increased again and has been kept around 25 percent since the crises.

Lastly, figure 11 shows the currency composition in international bank loans to Taiwan during a period from 1977 to 2001. The movements of the currency composition are nearly the same as Korea. In the 1990s the share of local currency is as low as that

in ASEAN countries. It had been below 20 percent since 1993 and hit the lowest level of 9.6 percent in the first half of 1998. The share of local currency has been increasing since 2000 and it has reached to 29.1 percent in the end of 2001.

### 3. Foreign exchange risks

#### (1) Methodology and data

We investigate how much foreign exchange risks both investors and bond issuers would face with when they invest in or issue bonds denominated in terms of various currencies. Our analysis is focused on the volatility of foreign investment returns and foreign borrowing costs for various currencies denominated bonds. We compare those volatilities for each of East Asian countries among denomination in terms of three major currencies (the US dollar, the euro, and the Japanese yen) and a currency basket. The currency basket is supposed to be composed of the three major currencies with equal shares. We can investigate whether issuing of the supposed currency basket denominated bonds would contribute to decreasing volatility of the foreign borrowing costs and investment returns.

Both 3 months money market interest rates and exchange rates are used to calculate both daily rates of foreign borrowing costs and foreign investment returns. The time series data are used to calculate means and standard deviations of the borrowing costs and the investment returns because volatility is defined to be standard deviations. The daily rates of borrowing costs and investment returns in terms of home currency are regarded as the sum of daily interest rates and daily rates of change in exchange rates.

The daily interest rate are converted from annual rates of 3 months money market rate according to the following formula:

$$\text{Daily interest rate} = \exp^{\frac{1}{360} \log(1 + \text{annual rate})}$$

where  $\exp$  represents an exponential function.

The daily rates of change in exchange rates are computed as rates of change in exchange rates between two consecutive business days.

$$\text{Daily rates of change in exchange rates} = \frac{e_{t+1} - e_t}{e_t} \times 100$$

where  $e$ : exchange rate.

Our analytical period covers from 31 December 1998 to 29 March 2002. The data

set includes 847 daily observations for the analytical period.<sup>1</sup> Exchange rate data is bilateral rates of the East Asian currencies in terms of the US dollar. Exchange rates of the US dollar vis-à-vis the Japanese yen and the euro vis-à-vis the US dollar are used to calculate their cross rates in terms of both the Japanese yen and the euro.

At first we investigate the daily rates of foreign borrowing costs for the seven East Asian countries that include Singapore, Thailand, Malaysia, the Philippines, Indonesia, Taiwan, and Korea. For each of the countries, we calculate five different types of foreign borrowing costs by issuing bonds denominated in terms of home currency, the US dollar, the euro, the Japanese yen, or a currency basket. The borrowing by issuing the currency basket denominated bonds means a kind of borrowing by issuing portfolio of bonds denominated in terms of the US dollar, the euro, and the Japanese yen.

Similarly, we investigate the daily rates of foreign investment returns for each of investors in the US, the euro area, and Japan. For the investors, we calculate daily rates of returns from investing into the bonds denominated in terms of the US dollar, the euro, the Japanese yen, and a currency basket as well as daily rates of returns from investing into the home currency denominated bonds for each of the seven East Asian countries. Investment into the currency basket denominated bonds means a portfolio investment into the bonds denominated in terms of the US dollar, the euro, and the Japanese yen.

## (2) Results    Borrowing costs for bond issuers in seven East Asian countries

Table 1 shows means and standard deviations of daily rates of foreign borrowing costs when borrowers in each of the seven East Asian countries issue bonds denominated in terms of the home currency, the US dollar, the euro, the Japanese yen, and the currency basket. Table 1 provides substantial evidence that borrowings by issuing the currency basket denominated bonds are effective to decrease the volatilities of daily rates of borrowing costs across all the countries. Especially for Thailand, the Philippines, Indonesia, and Korea, the volatilities of borrowing costs in terms of the currency basket are the lower than those in terms of each of the three major currency. It means that the movements in daily rates of borrowing costs in terms of each of the three major currencies are offset each other. Accordingly, borrowing by issuing the currency

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<sup>1</sup> All data were obtained from Datastream. Exchange rates are daily closing rates and interest rates are the middle rate of 3 months money market rate. The details of the data are as follows: US TB 3 months, Japan CD 3 months (new issue), Euro Interbank 3 months, Singapore Interbank 3 months (MAS), Thailand Deposit 3 months, Malaysia Interbank 3 months, Indonesia Deposit 3 months, Philippine Treasury Bill 91 days, Taiwan Money Market 90 days, Korea Commercial Paper 91 days.

basket denominated bonds can make the volatility of borrowing costs much lower than that in the case of borrowing by issuing the single currency denominated bonds.

Figure 13 plots the relationship between means and standard deviations of borrowing costs by issuing bonds denominated in terms of five different currencies, which include the home currency, the US dollar, the euro, the Japanese yen, and the currency basket, for each of the seven East Asian currencies.

For Singapore, means of the borrowing costs of issuing the euro denominated bonds is 0.731 percent and it is most expensive and risky among the three major currencies. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 0.609 percent. It is slightly lower than that that in terms of the euro. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.259 percent and the lowest among the three major currencies. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.369 percent, which is much lower than those of issuing the bonds denominated in terms of the euro and the Japanese yen. It means that issuing the currency basket denominated bonds would decrease the volatility of borrowing costs in comparison with the bonds denominated in terms of the euro and the Japanese yen while it is still riskier than the borrowing costs of issuing the US dollar denominated bonds.

For Thailand, the standard deviation of borrowing costs of issuing the euro denominated bonds is 0.785 percent and it is most volatile but the cheapest. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 0.696 percent and less volatile than those of issuing the euro denominated bonds. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.423 percent and it is the lowest among the three major currencies denominated bond issuance. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.381 percent and it is lower than all of the three major currencies denominated bond issuance. It means that issuing the currency basket denominated bonds are effective to decrease the volatilities of borrowing costs for bond issuers in Thailand.

For Malaysia, the standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.014 percent and it is almost the same as that in the case of issuing the Malaysian ringgit denominated bonds. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 0.667 percent while that of issuing the euro denominated bonds is 0.646 percent. The former is slightly higher than the latter. The standard deviations of borrowing costs of issuing the bonds denominated in terms of both the Japanese yen and the euro are much higher than that of issuing the



US dollar denominated bonds. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.328 percent. Issuing the currency basket denominated bonds seems to be not so effective that borrowers can decrease the volatilities of borrowing costs in Malaysia.

For Indonesia, all of the standard deviations of borrowing costs of issuing bonds denominated in terms of the three major currencies are relatively high (1.470 percent for the Japanese yen, 1.467 percent for the euro, and 1.365 percent for the US dollar). The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.564 percent and it is far lower than that of issuing denominated in terms of each of the three major currencies. It means that issuing the denominated currency basket bonds can dramatically decrease the volatility of borrowing costs of issuing the currency basket denominated bonds in comparison with those of issuing the three major currency denominated bonds in Indonesia.

The Philippines stand in the same situation as Indonesia in terms of foreign exchange risks in issuing bonds. Issuing the currency basket denominated bonds is quite effective to decrease the volatilities of borrowing costs for borrowers in the Philippines. The standard deviations of borrowing costs of issuing bonds denominated in terms of the Japanese yen, the euro and the US dollar are 0.878 percent, 0.875 percent, and 0.612 percent, respectively. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.612 percent.

Borrowing costs in Taiwan is similar to those in Malaysia. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.213 percent and this level is much lower than those of issuing bonds denominated in terms of the other currencies. The standard deviation of borrowing costs of issuing the bonds denominated in terms of the Japanese yen and the euro are 0.697 and 0.691 percent, respectively. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.339 percent, which is smaller than those of issuing the bonds denominated in terms of the Japanese yen and the euro but is higher than that of issuing the US dollar denominated bonds.

For Korea, the standard deviation of the borrowing costs of issuing the euro denominated bonds is 0.738 percent while that of issuing the Japanese yen denominated bonds is 0.718 percent. The latter is slightly lower than the former. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.433 percent, which is the lowest among the three major currency denominated bonds. The standard deviation of borrowing costs of issuing the currency basket denominated bonds is 0.367 percent, which is smaller than that of issuing the US dollar denominated

bonds. It means that issuing the currency basket denominated bonds is effective to decrease the volatility of borrowing costs in comparison with those of issuing the three major currency denominated bonds in Korea.

In summary, foreign exchange risks of borrowing costs by issuing the home currency denominated bonds are the smallest for all of the seven East Asian countries. Issuing the currency basket denominated bonds has the second lowest foreign exchange risks of borrowing costs in Thailand, the Philippines, Indonesia, and Korea. On the other hand, foreign exchange risks of borrowing costs in the case of issuing the US dollar denominated bonds is smaller than those in the case of issuing the currency basket denominated bonds in Singapore, Malaysia, and Taiwan.

### (3) Results Investment returns for investors in the US, the euro area, and Japan

Table 2 shows means and standard deviations of daily rates of investment returns that international investors in the United States, the euro area, and Japan obtain by investing into bonds denominated in terms of the seven East Asian currencies, the US dollar, the euro, the Japanese yen or the currency basket. It is supposed that the international investors in the United States, the euro area, and Japan evaluate their investment returns in terms of the US dollar, the euro, and the Japanese yen, respectively. We can classify them into two groups from a viewpoint of foreign exchange risks of the currency basket denominated bonds among all of the five kinds of currency denominated bonds. One is that the foreign exchange risk of the currency basket denominated bonds is the smallest next to the investors' home currency denominated bonds because it is natural that the standard deviation of investment returns into the investors' home currency denominated bonds should be the lowest. The other is that it is larger than that of the US dollar denominated bonds.

Thailand, the Philippines, Indonesia, and Korea belong to the first group. As for investments into the countries, the standard deviation of investment returns into the currency basket denominated bonds is the smallest except for the investors' home currency bonds for all of the investors in the United States, the euro area, and Japan. Issuing the currency basket denominated bonds contribute to decreasing the foreign exchange risks for investors in the countries.

The second group includes Singapore, Malaysia, and Taiwan. As for investments into the countries, the standard deviation of investment returns into the currency basket denominated bonds is smaller than those of the euro and the Japanese yen denominated bonds while it is larger than those of the home currency and the US dollar denominated bonds for investors in the United States. For investors in the euro area

and Japan, the standard deviation of investment returns into the currency basket denominated bonds is the second lowest. It is possible to regard that the result reflects the US dollar-based pegging system that the monetary authorities of Malaysia have been adopting since September 1998 in the case of Malaysia. Also the fact that the foreign exchange risk for the Singapore dollar and the Taiwan dollar denominated bonds is smaller than that for the currency basket denominated bonds might reflect higher degree of linkages of the home currency into the US dollar.

Figure 14 shows the relationships between means and standard deviations of daily rates of investment returns for international investors in each of the United States, the euro area, and Japan.

For investors in the United States, investing into bonds denominated in terms of the Indonesian rupiah is the highest risk and highest return among the sampled countries. On the other hand, investing into bonds denominated in terms of the Malaysian ringgit is the lowest risk among the sampled countries and is almost the same as investing into the US dollar denominated bonds. It reflects a fact that the monetary authorities of Malaysia have been adopting the fixed exchange regime under which they have been pegging the home currency to the US dollar. Investing into bonds denominated in terms of the Taiwan dollar is the second lowest risky. Its standard deviation of investment return is 0.213 percent. The standard deviation of investment return into bonds denominated in terms of the Singapore dollar is the third lowest 0.259 percent. This level is lower than the standard deviation (0.329 percent) of investment returns into the currency basket denominated bonds. The standard deviation of investment returns into bonds denominated in terms of the Thai baht is 0.423 percent and is almost similar to that of investment returns into bonds denominated in terms of the Korean won, which is 0.433 percent. The standard deviation of investment returns into bonds denominated in terms of the Philippine peso, the euro and the Japanese yen are almost same level of 0.641 percent, 0.648 percent, and 0.667 percent, respectively. For investors in the United States, the standard deviation of investment return of investing into the currency basket denominated bonds is 0.329.

For investors in the euro area, investing into bonds denominated in terms of the Indonesian rupiah is the most risky but not the highest return. Investing into the United States is the highest return and its standard deviation is 0.646 percent while the standard deviation of returns from investing into the Japanese yen denominated bonds is 0.987 percent. Investing into the currency basket denominated bonds decreases volatility of investment returns for investors in the euro area. The standard deviation of returns from investing into the currency basket denominated bonds is 0.223 percent,

which is much lower than that in the case of investing into bonds denominated in terms of the US dollar or the Japanese yen. The standard deviations of investment returns into bonds denominated in terms of the East Asian currencies except the Indonesian rupiah are from 0.6 to 0.9 percent. It implies that none of the seven East Asian currencies are closely related with the euro.

For Japanese investors, investing into bonds denominated in terms of the Indonesian rupiah are the most risky though they obtain the second highest returns. Investing into the euro denominated bonds is the highest return and the second risky. The standard deviation of investment returns into the currency basket denominated bonds is 0.517 percent, which is slightly lower than 0.666 percent of investment returns into the US dollar denominated bonds. The levels of standard deviation of investment returns into bonds denominated in terms of the Singapore dollar, the Thai baht, the Malaysian ringgit, the Taiwan dollar, and the Korean won are from 0.6 percent to 0.7 percent. It implies that for Japanese investors there is not so much difference in the foreign exchange risks of investment returns between the countries with the US dollar peg regime and the other countries.

In summary, foreign exchange risks of investment returns into the investors' home currency denominated bonds are the smallest for the investors in the United States, the euro area, and Japan. Investments into the currency basket denominated bonds have the second lowest foreign exchange risks for the investors in the euro area and Japan. On the other hand, investments into the currency basket denominated bonds issued in Thailand, the Philippines, Indonesia, and Korea have the second lowest foreign exchange risks for the investors in the United States. Foreign exchange risks of investments into the home currency denominated bonds issued in Singapore, Malaysia, and Taiwan are lower than those of investments into the currency basket denominated bonds. Thus, investments into the currency basket denominated bonds can decrease foreign exchange risks in many cases.

#### 4. Liquidity

Next, we compare liquidity among bonds denominated in terms of each the three major currencies. Especially it is focused on differences in liquidity between the US dollar denominated bond vis-à-vis the euro and the Japanese yen denominated bonds.

Bid-ask spreads in foreign exchange markets are used as an indicator of liquidity. Bid-ask spreads are caused by three factors: (1) order-processing costs, (2) inventory holding costs, and (3) information costs for market-making (Hartmann (1998)). In terms

of order processing costs, economies of scale work because fixed costs of purchasing electric market information are needed for processing orders. In terms of inventory holding cost, average costs of holding inventory are diminishing by law of large numbers as statistically independent orders increase. Also economies of scale work because of substantial fixed information costs for market-making. Thus, a large volume of trading in liquid markets reduces their bid-ask spreads through the three factors.

Basically, bid-ask spreads in the major currencies vis-à-vis the US dollar and frequently quoted major cross currencies, such as the euro vis-à-vis the Japanese yen, the Sterling pound vis-à-vis the Japanese yen, the Swiss franc vis-à-vis the Japanese yen and the Sterling pound vis-à-vis the euro, are very narrow and costless. On the other hand, so-called Exotic currencies such as other East Asian currencies have some inconvenience and higher transaction costs to exchange directly with non-US dollar currencies, especially in forward outright trading.

It is usual that the East Asian currencies are quoted against the US dollar in foreign exchange market and not against the euro or the Japanese yen. Therefore, we have to calculate cross rates of the East Asian currencies vis-à-vis the Japanese yen by using exchange rates of the US dollar vis-à-vis the Japanese yen and the US dollar vis-à-vis East Asian currencies. We have to take the same procedure to calculate cross rates of East Asian currencies vis-à-vis the euro by using exchange rates of the US dollar vis-à-vis the euro and the US dollar vis-à-vis East Asian currencies. Also in the case of quoting forward outright rate, we take same procedure to calculate cross swap rates. Accordingly, the bid-ask spreads of East Asian currencies forward outright rates vis-à-vis the euro or the Japanese yen are wider in comparison with the other major currencies. This seems to be a reason why borrowers in the East Asian countries did not use their swap transactions to cover their foreign borrowings in terms of foreign currencies especially before the Asian currency crises in 1997.

We compare the bid-ask spreads in forward swap rates of the seven East Asian currencies against the three major currencies, and the euro and the Japanese yen vis-à-vis the US dollar. Table 3 shows the bid-ask spreads in forward swap rates in 1 month, 3 months, and 6 months vis-à-vis the US dollar, the euro and the Japanese yen. We use the spot rates and forward rates collected from Bloomberg Currency Composite pages and the broker's page of Prebon Yamane Asia Region on Bloomberg dated on 13 September 2002. The calculated bid-ask spreads are expressed in terms of daily percentage in order to compare the foreign exchange risks that are represented in terms of daily percentage of standard deviations of borrowing costs and investment returns.

Figure 14 shows the plots of the bid-ask spreads for each of the seven East Asian

currencies. The bid-ask spreads for all of the East Asian currencies vis-à-vis the US dollar are the lowest while the bid-ask spreads for all of the East Asian currencies vis-à-vis the euro are highest. In addition, the bid-ask spreads are lower as terms are longer. Differences in the bid-spreads between the lowest and the highest are 0.00135 percent to 0.00137 percent for 1 month swap transaction, 0.00043 percent to 0.00044 percent for 3 month swap transaction, and 0.00019 percent to 0.00020 percent for 6 month swap transaction.

The bid-ask spreads in the East Asian currencies vis-à-vis the US dollar are much higher than those for the euro and the Japanese yen vis-à-vis the US dollar, which are 0.00136 percent and 0.00059 percent for 1 month swap transaction, respectively. It is interesting that the spread in the Malaysian ringgit is the highest among the seven East Asian countries. It seems that there is not much demand to trade forward swap in the Malaysian ringgit because the monetary authorities of Malaysia have been adopting the dollar peg system by pegging the spot rate of the Malaysian ringgit to the US dollar.

We use the calculation results to supposed bid-ask spreads for the currency basket denominated bonds. As explained earlier, investment into the currency basket denominated bonds means a portfolio investment into the bonds denominated in terms of the US dollar, the euro, and the Japanese yen. It is possible to use weighted averages of the bid-ask spreads for the three currencies as a proxy of the currency basket denominated bonds. Differences in the bid-spreads between the US dollar and the currency basket are 0.00060 percent to 0.00065 percent for 1 month swap transaction, 0.00019 percent to 0.00022 percent for 3 month swap transaction, and 0.00000 percent to 0.00011 percent for 6 month swap transaction.

Thus, we use data on the bid-ask spreads of swap transactions to compare liquidity among the three major currencies and the currency basket. It proved that the US dollar has the highest degree of liquidity for all of the seven East Asian currencies. However, the differences between the US dollar and the currency basket are not so large especially for 3 and 6 month swap transactions though the differences are large for 1 month swap transactions.

## 5. Conclusion

This paper investigated advantages and disadvantages of choosing a regional currency over an international currency as a denomination currency in issuing and investing into bonds from a viewpoint of foreign exchange risks and liquidity. Here, a common currency basket was regarded as a regional currency according to some of the

earlier literature. Performance of the currency basket denominated bonds was compared with that bonds denominated in terms of the three major currencies that include the US dollar, the euro, and the Japanese yen.

Issuing the currency basket denominated bonds has the second lowest foreign exchange risks of borrowing costs in Thailand, the Philippines, Indonesia, and Korea. The foreign exchange risks are smaller than those in issuing the US dollar denominated bonds. Thus, issuing the currency basket denominated bonds would be able to decrease the foreign exchange risks for bond issuers. In addition, investments into the currency basket denominated bonds issued in these countries have the second lowest foreign exchange risks for the investors in the United States while investments into the currency basket denominated bonds issued in all of the ASEAN5 countries, Taiwan, and Korea have the second lowest foreign exchange risks for the investors in the euro area and Japan. Thus, investments into the currency basket denominated bonds can decrease foreign exchange risks in many cases.

Data on the bid-ask spreads of swap transactions shows that the US dollar has the highest degree of liquidity for all of the seven East Asian currencies. However, the differences between the US dollar and the currency basket are not so large especially for 3 and 6 month swap transactions though the differences are large for 1 month swap transactions.

Accordingly, it is true that investors and bond issuers face with trade-off relationship between foreign exchange risks and liquidity when they issue and invest into regional bonds in East Asia. Although the currency basket denominated bonds can decrease the foreign exchange risks, investors and bond issuers prefer the US dollar denominated bonds to the currency basket denominated bonds as long as they place heavier weights on liquidity. We should establish markets for regional bonds denominated in terms of a regional currency or a currency basket from a viewpoint of liquidity in order to activate the markets in East Asia.

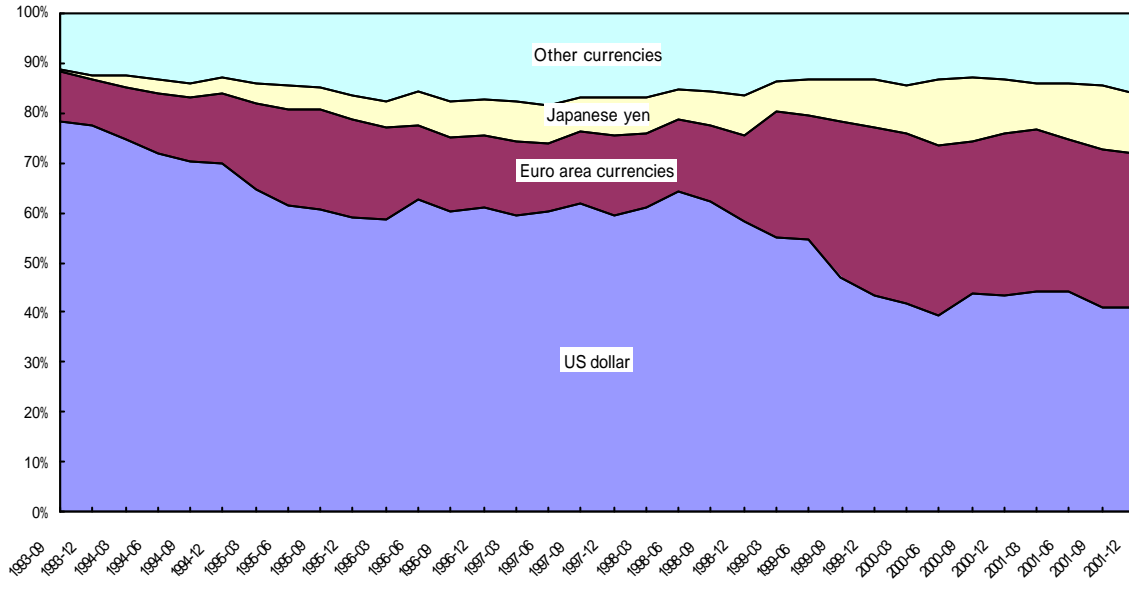
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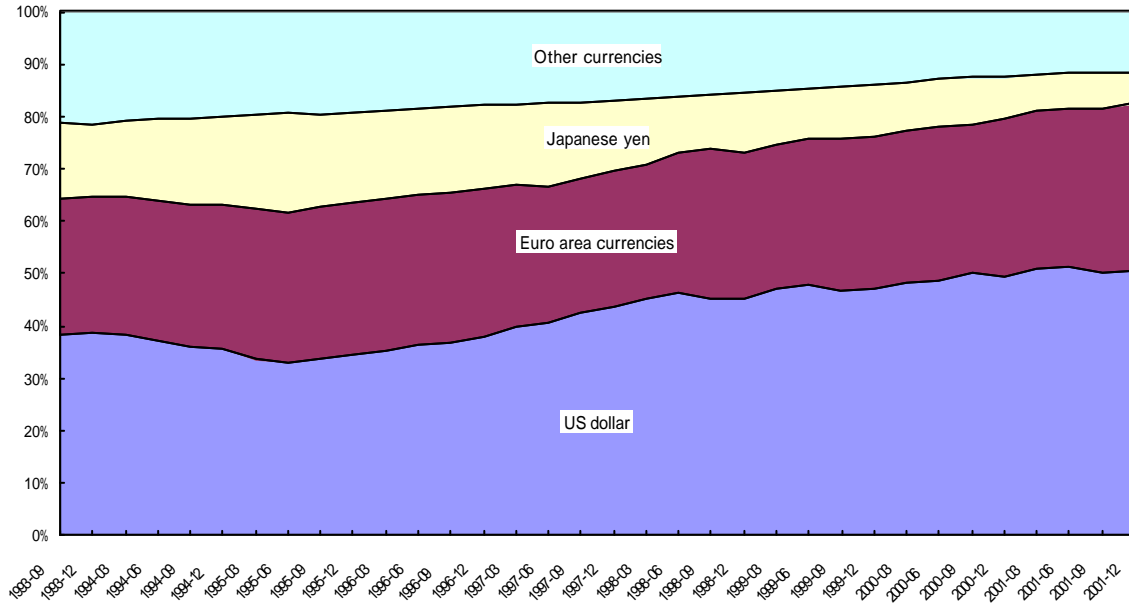


Figure 1: International Money Instruments  
(shares of amounts outstanding)



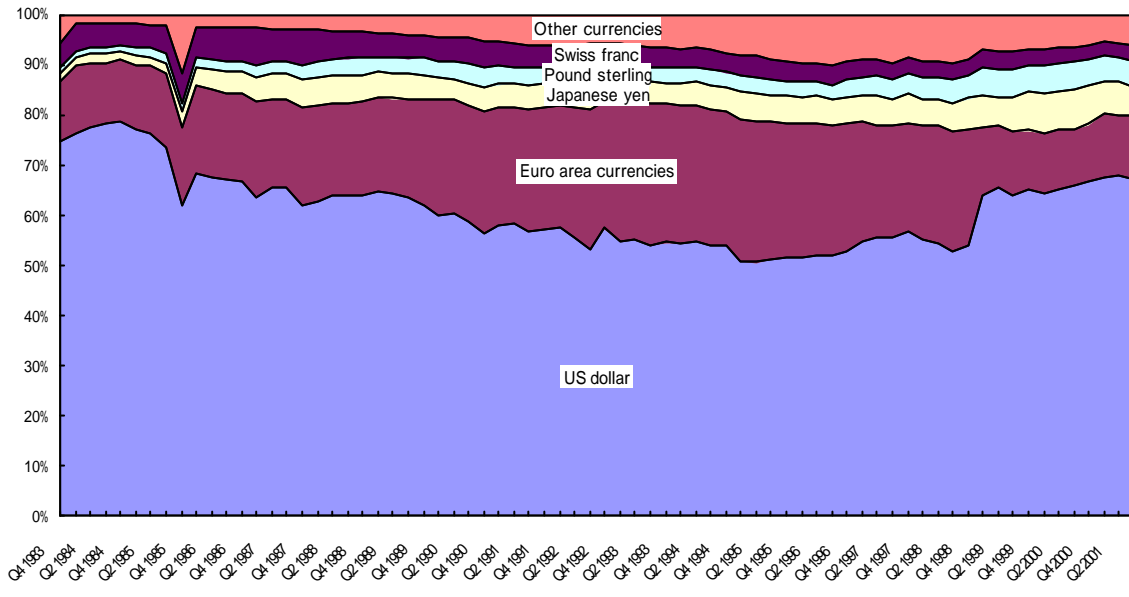
Source: BIS(2002)

Figure 2: International Bonds and Notes  
(shares of amounts outstanding)



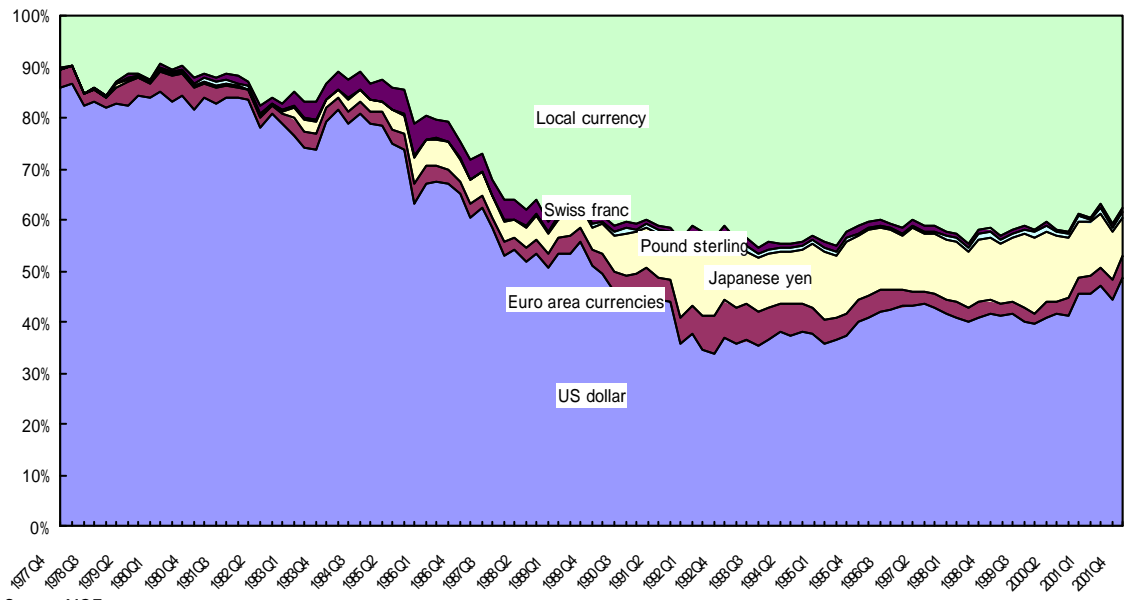
Source: BIS(2002)

Figure 3: Liabilities in Foreign Currencies of International Banks  
(shares of amounts outstanding)



Sourcr: BIS(2002)

Figure 4: Credit obligation - outstanding shares by local and foreign currencies  
(in Singapore)



Source: MOF

Figure 5: Credit obligation outstanding share by local and foreign currencies (in HongKong)

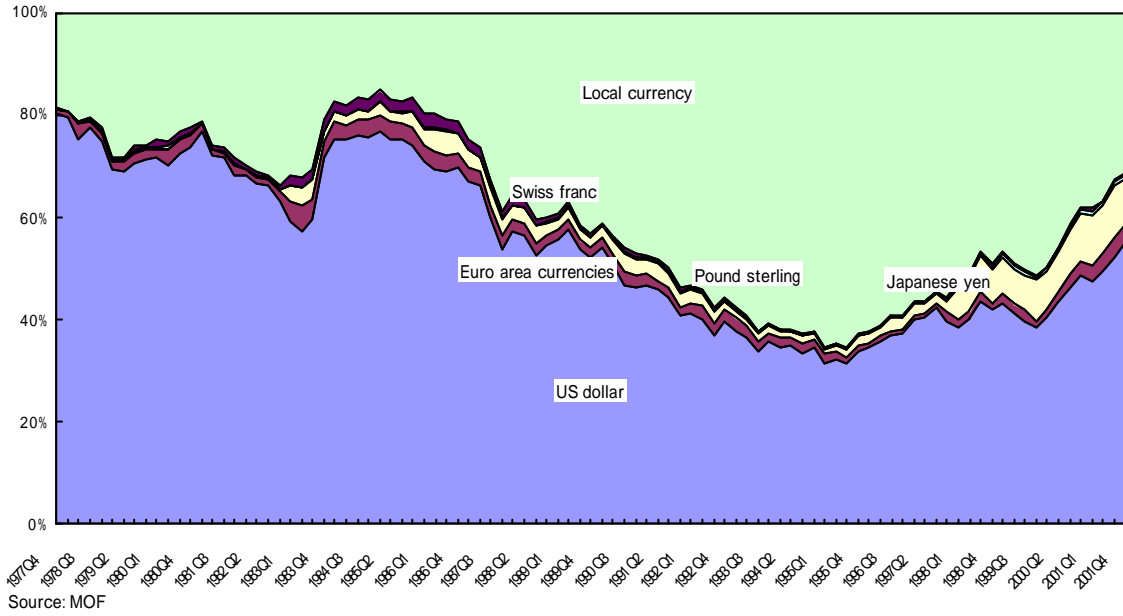


Figure 6: Credit obligation outstanding share by local and non-local currencies (in Thailand)

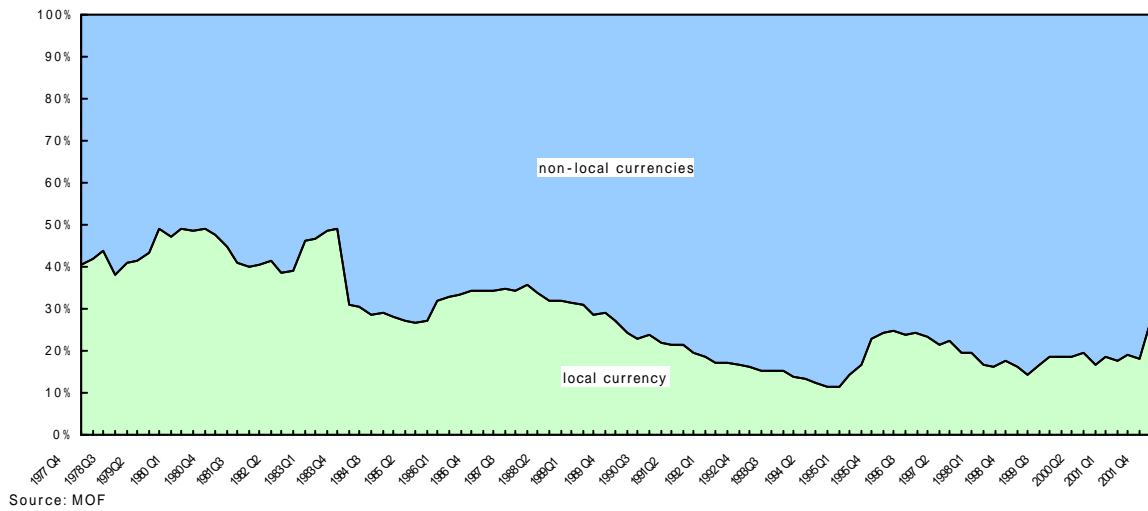


Figure 7: Credit obligation outstanding share by local and non-local currencies (in Malaysia)

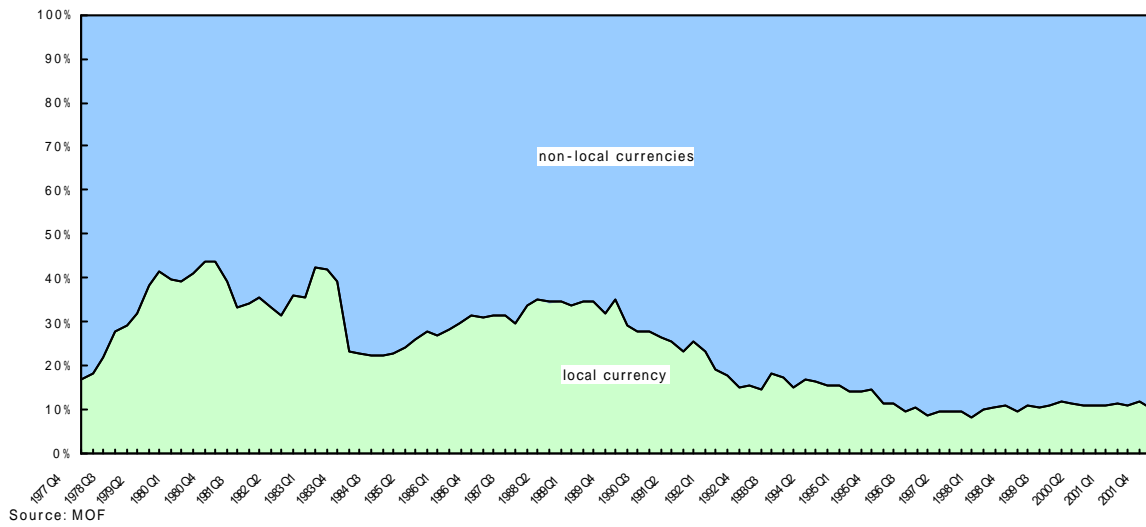


Figure 8: Credit obligation outstanding share by local and non-local currencies (in Indonesia)

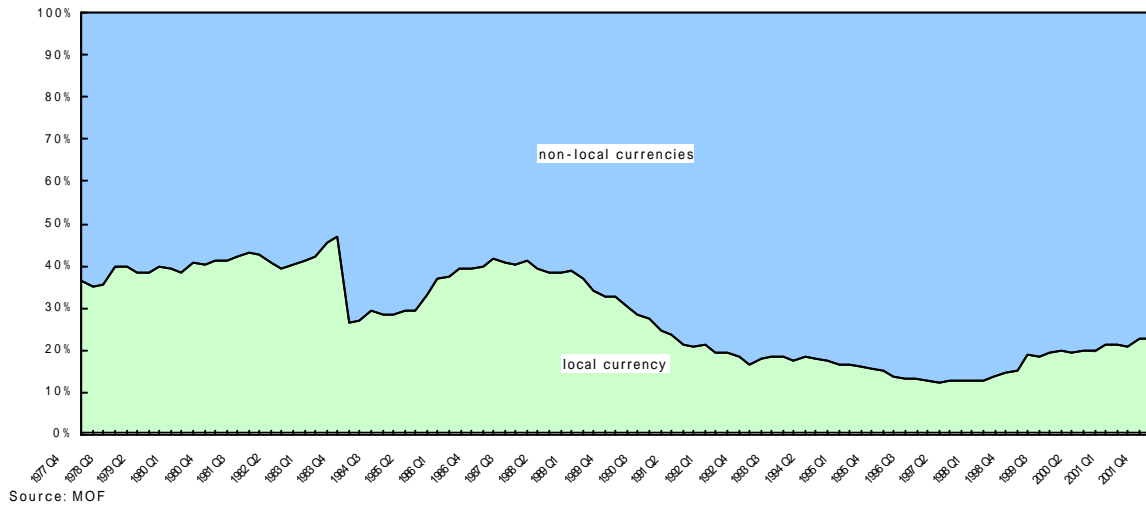


Figure 9: Credit obligation outstanding share by local and non-local currencies (in Philippines)

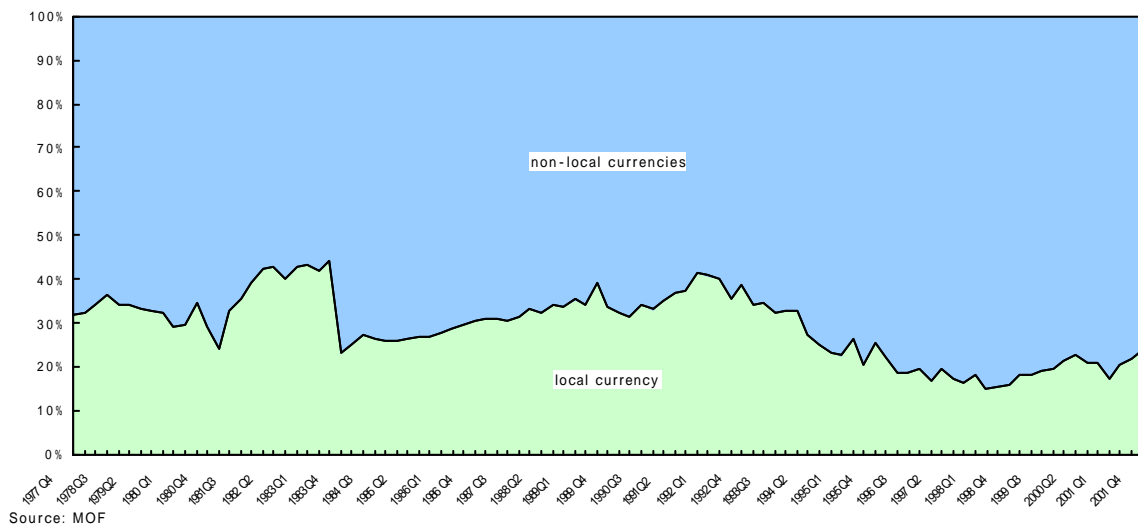
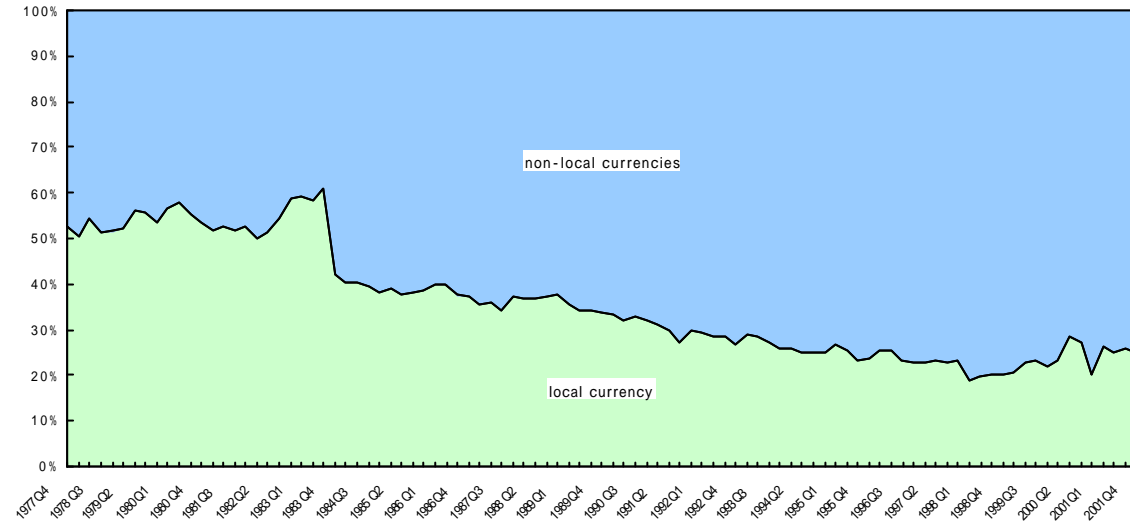
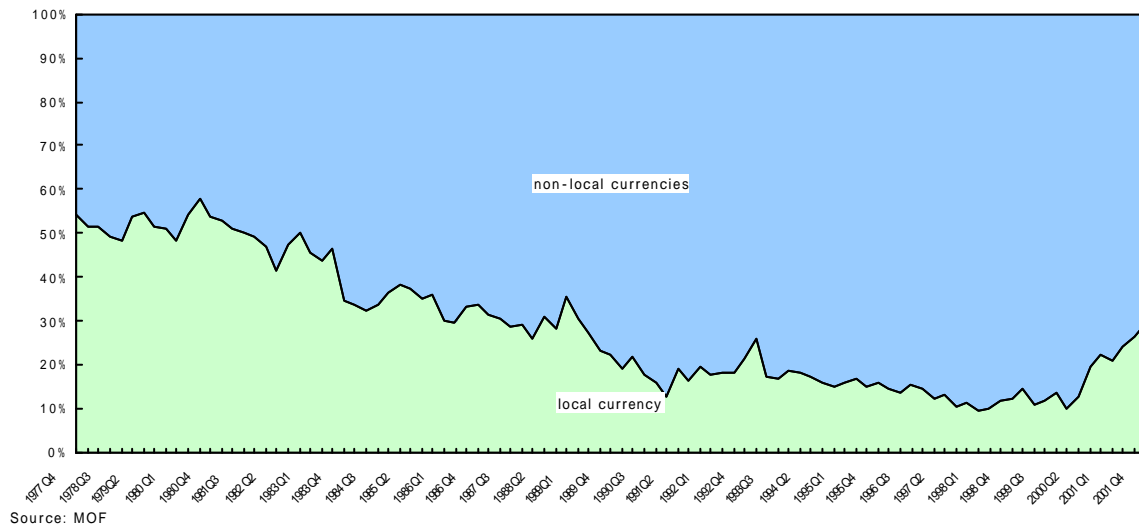


Figure 10: Credit obligation outstanding shares by local and non-local currencies  
(in Korea)



Source: MOF

Figure 11: Credit obligation outstanding share by local and non-local currencies  
(in Taiwan)



Source: MOF

Table 1 : Borrowing costs in East Asian countries (%)

Singapore	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.008	1.187	2.011	2.489	1.110
min	0.002	-1.429	-3.170	-2.259	-1.269
mean	0.006	0.026	0.061	0.009	0.032
Std.Dev.(%)	0.001	0.259	0.731	0.609	0.369
Thailand	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.038	-2.271	-2.967	-4.354	-1.068
min	0.007	3.568	3.410	2.551	1.253
mean	0.016	-0.035	-0.069	-0.001	-0.035
Std.Dev.(%)	0.009	0.423	0.785	0.696	0.381
Malaysia	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.017	-0.144	-1.839	-2.295	-0.990
min	0.008	0.120	3.256	2.707	1.113
mean	0.009	-0.012	-0.047	-0.023	-0.027
Std.Dev.	0.002	0.014	0.646	0.667	0.328
philippines	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.043	-2.568	-3.231	-11.088	-1.209
min	0.015	10.488	9.590	2.817	2.997
mean	0.026	-0.046	-0.081	0.008	-0.040
Std.Dev.	0.004	0.612	0.875	0.878	0.390
Indonesia	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.081	-8.193	-8.918	-9.405	-3.373
min	0.030	-7.755	-7.237	-6.992	-2.172
mean	0.041	0.046	0.080	0.007	0.044
Std.Dev.	0.015	1.365	1.467	1.470	0.564
Taiwan	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.016	2.091	2.675	4.220	0.995
min	0.007	-2.572	-3.992	-2.517	-1.191
mean	0.012	0.022	0.057	0.013	0.031
Std.Dev.	0.003	0.213	0.691	0.697	0.339
Korea	borrowing costs/in terms of home currency				
	home currency	usd	euro	yen	basket
max	0.027	2.013	3.082	2.343	1.238
min	0.013	-1.875	-3.041	-2.559	-1.232
mean	0.021	0.025	0.059	0.011	0.032
Std.Dev.	0.004	0.433	0.738	0.718	0.367

Data: Daily rates are calculated by authors.

All interest rate and foreign exchange rate data are from Datastream. Sample period is 1/1/1999 to 3/29/2002. The shares of currency basket are supposed to be usd : euro : yen = 1/3: 1/3: 1/3. Interest rate (middle rate); US TB 3month, Japan CD 3month(new issue), Euro Interbank 3month, Singapore Interbank 3month(MAS), Thailand Dposit 3month, Malaysia interbank 3month, Indonesia Deposit 3month, philippines Treasury bill91days, Taiwan Money Market 90days, Korea Commercial Paper 91days

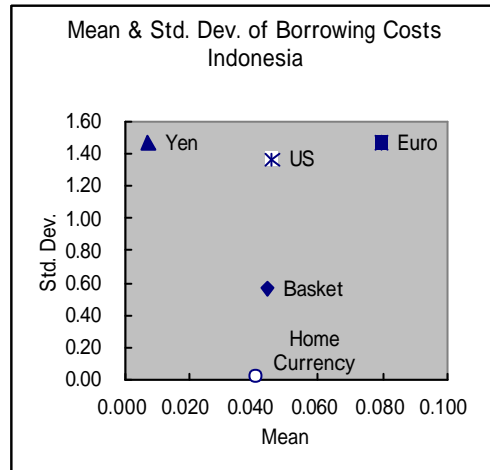
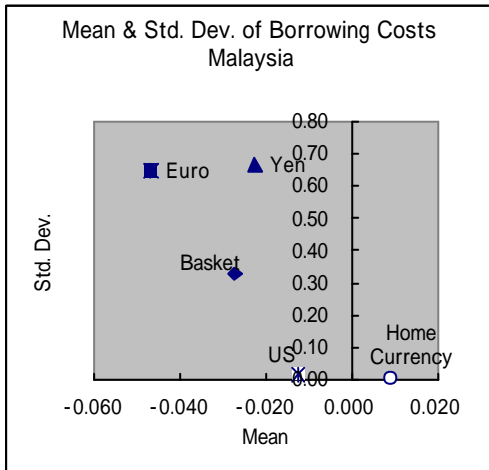
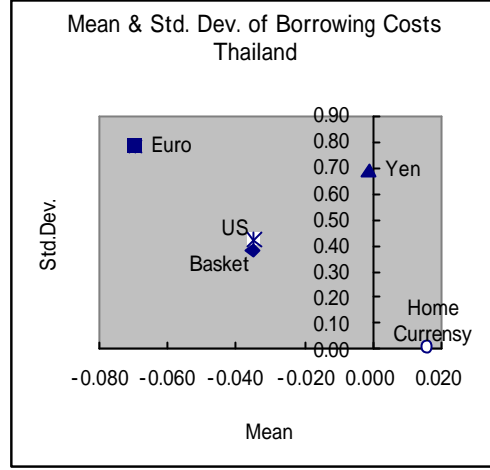
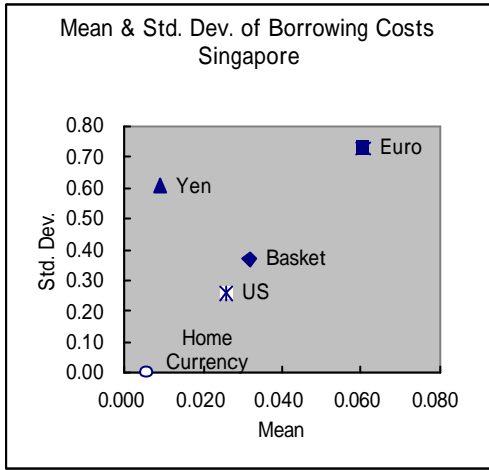
Table 2 : Investment returns in East Asian countries (%)

Singapore	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
	Singapore	usd	euro	yen	basket	Singapore	usd	euro	yen	basket	Singapore	usd	euro	yen	basket
max	1.466	0.017	3.391	2.787	1.152	3.295	1.845	0.014	3.456	0.944	2.317	2.307	2.982	0.002	1.710
min	-1.162	0.004	-1.781	-2.236	-0.959	-1.954	-3.250	0.007	-2.880	-0.734	-2.422	-2.693	-3.323	0.000	-2.005
mean	-0.007	0.012	-0.019	-0.013	-0.007	-0.039	0.051	0.010	-0.045	0.006	0.001	0.037	0.072	0.001	0.037
Std.Dev.(%)	0.259	0.004	0.648	0.667	0.329	0.733	0.646	0.002	0.987	0.223	0.610	0.666	0.984	0.000	0.517
Thailand	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	3.736	0.017	3.391	2.787	1.152	3.562	1.845	0.014	3.456	0.944	2.632	2.307	2.982	0.002	1.710
min	-2.185	0.004	-1.781	-2.236	-0.959	-2.850	-3.250	0.007	-2.880	-0.734	-4.150	-2.693	-3.323	0.000	-2.005
mean	-0.005	0.012	-0.019	-0.013	-0.007	-0.037	0.051	0.010	-0.045	0.006	0.020	0.037	0.072	0.001	0.037
Std.Dev.(%)	0.423	0.004	0.648	0.667	0.329	0.785	0.646	0.002	0.987	0.223	0.697	0.666	0.984	0.000	0.517
Malaysia	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	0.149	0.017	3.391	2.787	1.152	3.388	1.845	0.014	3.456	0.944	2.790	2.307	2.982	0.002	1.710
min	-0.117	0.004	-1.781	-2.236	-0.959	-1.787	-3.250	0.007	-2.880	-0.734	-2.225	-2.693	-3.323	0.000	-2.005
mean	0.009	0.012	-0.019	-0.013	-0.007	-0.023	0.051	0.010	-0.045	0.006	-0.008	0.037	0.072	0.001	0.037
Std.Dev.	0.014	0.004	0.648	0.667	0.329	0.647	0.646	0.002	0.987	0.223	0.668	0.666	0.984	0.000	0.517
philippines	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	11.767	0.017	3.391	2.787	1.152	10.655	1.845	0.014	3.456	0.944	2.922	2.307	2.982	0.002	1.710
min	-2.444	0.004	-1.781	-2.236	-0.959	-3.085	-3.250	0.007	-2.880	-0.734	-9.947	-2.693	-3.323	0.000	-2.005
mean	-0.004	0.012	-0.019	-0.013	-0.007	-0.037	0.051	0.010	-0.045	0.006	0.041	0.037	0.072	0.001	0.037
Std.Dev.	0.641	0.004	0.648	0.667	0.329	0.891	0.646	0.002	0.987	0.223	0.860	0.666	0.984	0.000	0.517
Indonesia	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	8.452	0.017	3.391	2.787	1.152	7.849	1.845	0.014	3.456	0.944	7.552	2.307	2.982	0.002	1.710
min	-7.528	0.004	-1.781	-2.236	-0.959	-8.148	-3.250	0.007	-2.880	-0.734	-8.563	-2.693	-3.323	0.000	-2.005
mean	0.026	0.012	-0.019	-0.013	-0.007	-0.007	0.051	0.010	-0.045	0.006	0.056	0.037	0.072	0.001	0.037
Std.Dev.	1.371	0.004	0.648	0.667	0.329	1.471	0.646	0.002	0.987	0.223	1.463	0.666	0.984	0.000	0.517
Taiwan	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	2.670	0.017	3.391	2.787	1.152	4.182	1.845	0.014	3.456	0.944	2.596	2.307	2.982	0.002	1.710
min	-2.022	0.004	-1.781	-2.236	-0.959	-2.583	-3.250	0.007	-2.880	-0.734	-4.034	-2.693	-3.323	0.000	-2.005
mean	0.003	0.012	-0.019	-0.013	-0.007	-0.029	0.051	0.010	-0.045	0.006	0.005	0.037	0.072	0.001	0.037
Std.Dev.	0.213	0.004	0.648	0.667	0.329	0.693	0.646	0.002	0.987	0.223	0.697	0.666	0.984	0.000	0.517
Korea	Investment returns for US					Investment returns for Euro Area					Investment returns for Japan				
max	1.942	0.017	3.391	2.787	1.152	3.169	1.845	0.014	3.456	0.944	2.645	2.307	2.982	0.002	1.710
min	-1.942	0.004	-1.781	-2.236	-0.959	-2.960	-3.250	0.007	-2.880	-0.734	-2.265	-2.693	-3.323	0.000	-2.005
mean	0.010	0.012	-0.019	-0.013	-0.007	-0.022	0.051	0.010	-0.045	0.006	0.015	0.037	0.072	0.001	0.037
Std.Dev.	0.433	0.004	0.648	0.667	0.329	0.738	0.646	0.002	0.987	0.223	0.720	0.666	0.984	0.000	0.517

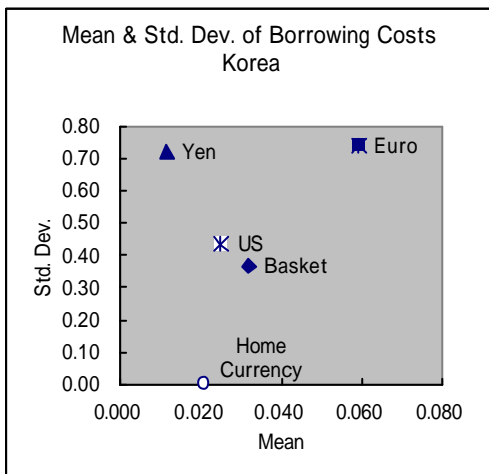
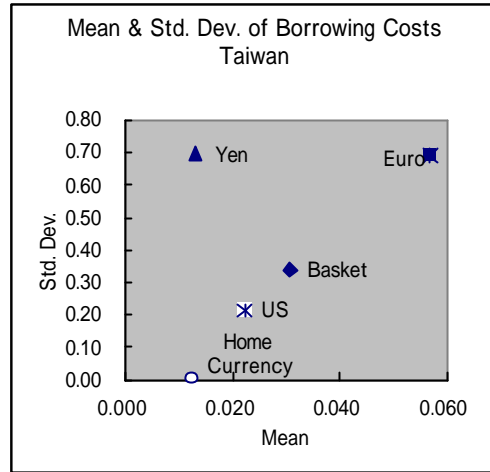
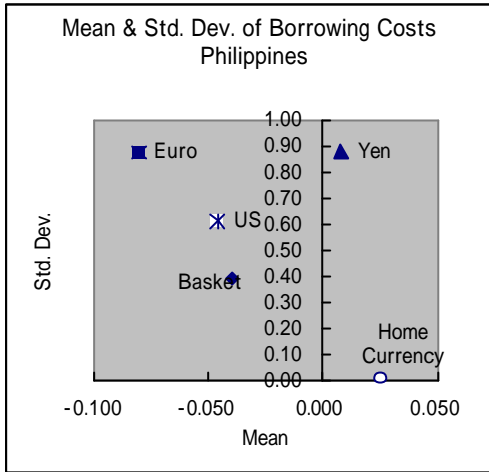
Data: Daily rates are calculated by authors.

All interest rate and foreign exchange rate data are from Datastream. Sample period is 1/1/1999 to 3/29/2002. The shares of currency basket are supposed to be usd : euro : yen = 1/3: 1/3: 1/3. Interest rate (middle rate); US TB 3month, Japan CD 3month(new issue), Euro Interbank 3month, Singapore Interbank 3month(MAS), Thailand Dposit 3month, Malaysia interbank 3month, Indonesia Deposit 3month, philippines Treasury bill91days, Taiwan Money Market 90days, Korea Commercial Paper 91days

Figure 13: Mean and Std. Dev. of Borrowing Costs in 7 East Asian Countries (%)

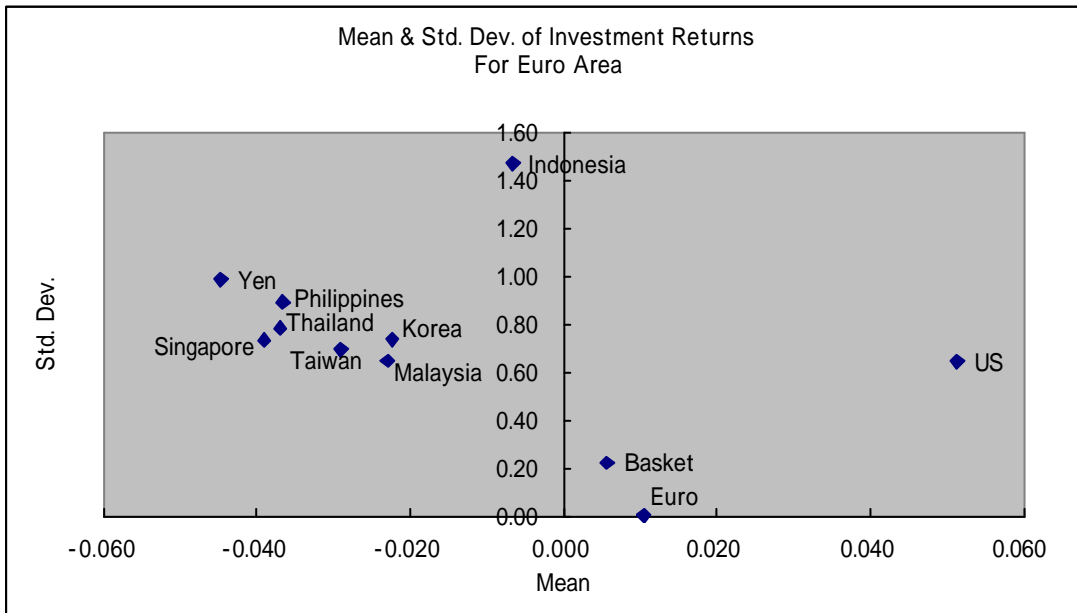
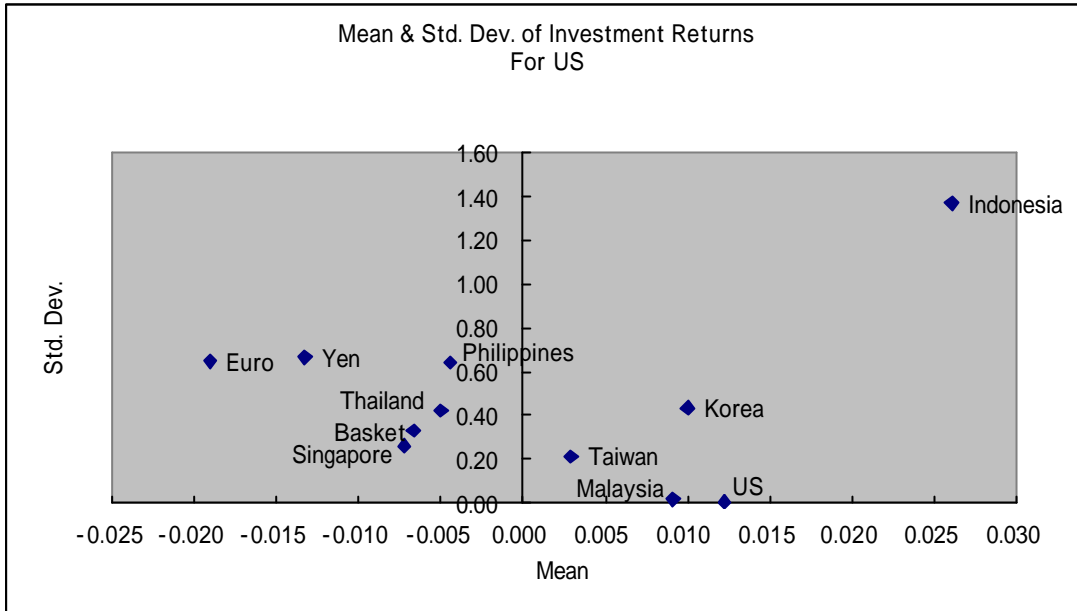


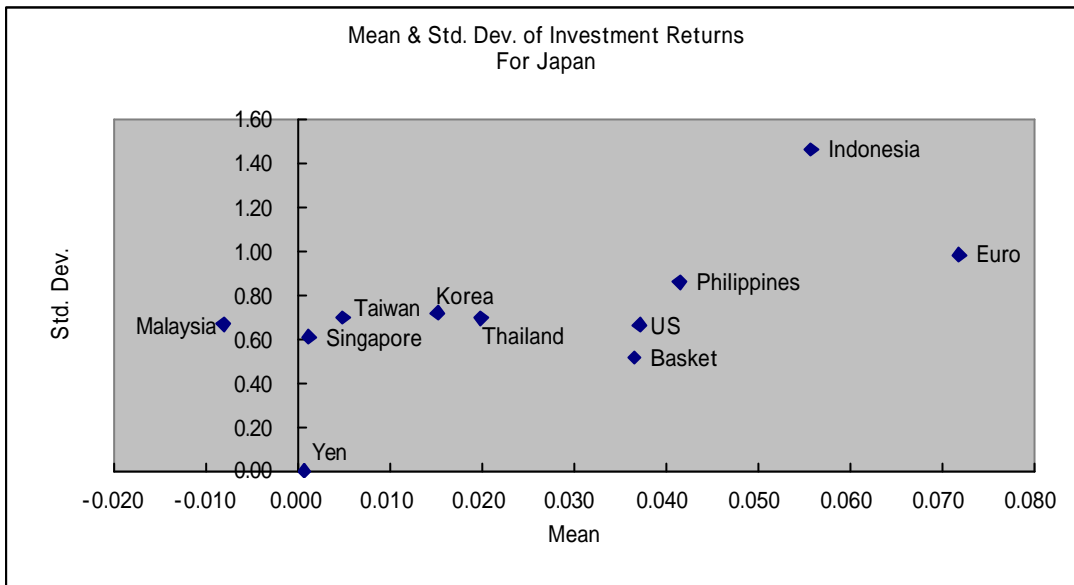




Source: Author's calculation from Table2. Sample period is 1/1/1999 to 3/29/2002.  
 The shares of currency basket are supposed to be usd : euro : yen = 1/3: 1/3: 1/3.

Figure 14 : Mean and Std. Dev. of Investment Returns for US, Euro Area and Japan (%)





Source: Author's calculation from Table2. Sample period is 1/1/1999 to 3/29/2002.  
The shares of currency basket are supposed to be used : euro : yen = 1/3: 1/3: 1/3.

Table 3. Forward swap bid-ask spreads in 7 East Asian Currencies  
against 3 Major currencies

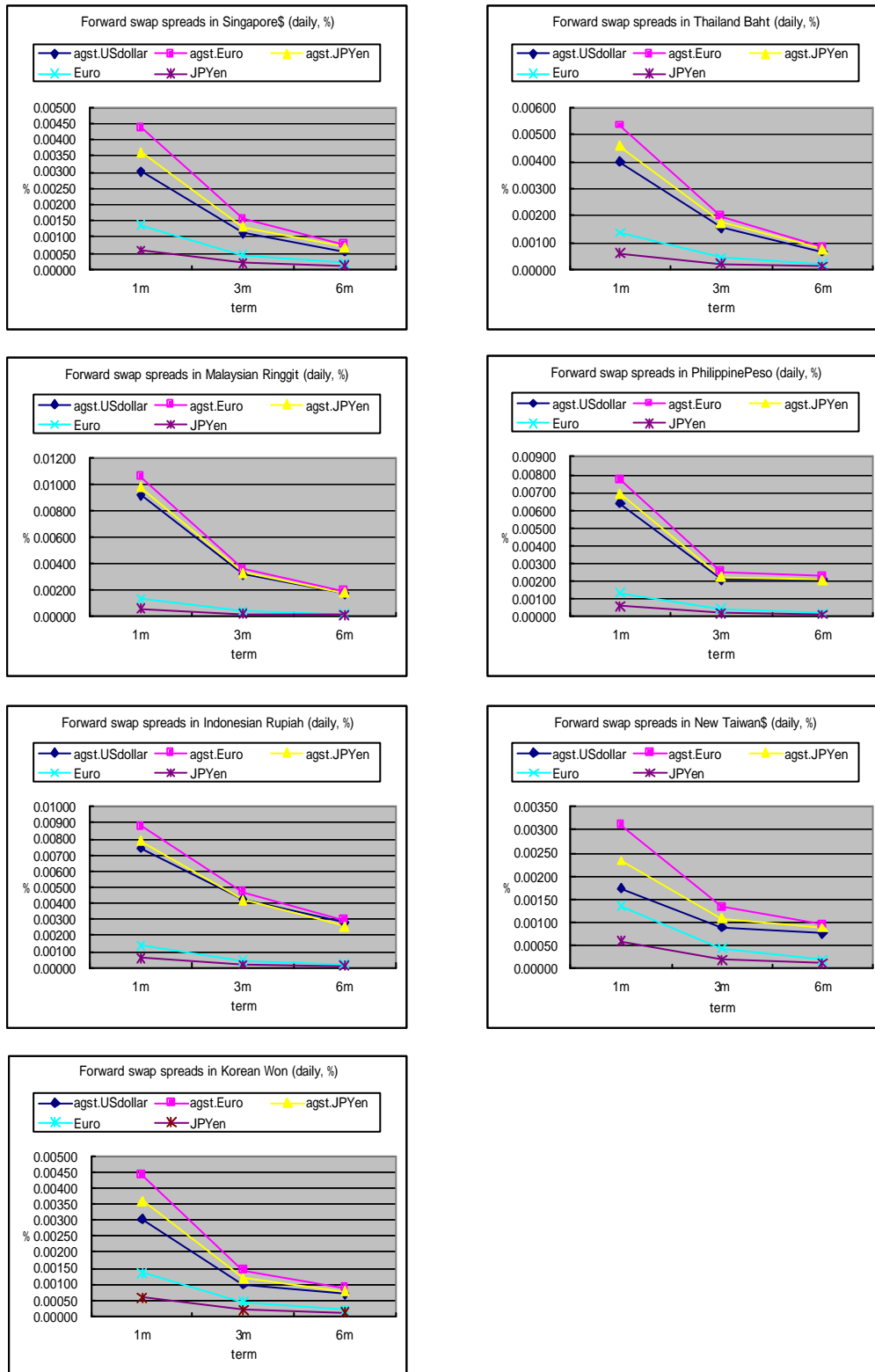
currency		spreads (daily, %)		
		1m	3m	6m
Singaporean Dollar	agst.USdollar	0.00302	0.00112	0.00056
	agst.Euro	0.00438	0.00156	0.00076
	agst.JPYen	0.00361	0.00132	0.00069
	average	0.00367	0.00133	0.00067
Thailand Baht	agst.USdollar	0.00398	0.00154	0.00065
	agst.Euro	0.00534	0.00198	0.00084
	agst.JPYen	0.00456	0.00172	0.00076
	average	0.00462	0.00175	0.00075
Malaysian Ringgit	agst.USdollar	0.00921	0.00318	0.00174
	agst.Euro	0.01056	0.00361	0.00193
	agst.JPYen	0.00978	0.00335	0.00183
	average	0.00985	0.00338	0.00184
Philippine Peso	agst.USdollar	0.00638	0.00210	0.00211
	agst.Euro	0.00774	0.00254	0.00231
	agst.JPYen	0.00691	0.00223	0.00210
	average	0.00701	0.00229	0.00217
Indonesian Rupiah	agst.USdollar	0.00743	0.00429	0.00277
	agst.Euro	0.00880	0.00473	0.00296
	agst.JPYen	0.00787	0.00422	0.00257
	average	0.00803	0.00441	0.00277
New Taiwan Dollar	agst.USdollar	0.00174	0.00089	0.00077
	agst.Euro	0.00310	0.00133	0.00096
	agst.JPYen	0.00234	0.00109	0.00089
	average	0.00239	0.00111	0.00088
Korean Won	agst.USdollar	0.00305	0.00100	0.00069
	agst.Euro	0.00441	0.00144	0.00089
	agst.JPYen	0.00362	0.00118	0.00079
	average	0.00369	0.00121	0.00079
Euro Japanese Yen	agst.USdollar	0.00136	0.00044	0.00020
	agst.Euro	0.00059	0.00020	0.00012

Data: Daily rates are calculated by authors.

Sources: All spot rates and forward rates are collected from Bloomberg currency composit pages and Prebon Yamane Asia Region pages on 13 Sept, 2002.

Forward swap spreads are calculated by bid and ask spreads on both spot and forward rates.

Figure 14. Forward swap bid-ask spreads in 7 East Asian currencies against 3 major currencies



Source: Authors calculation from Table3. Sample date is 13 Sept. 2002.