Trade-off for common currency basket denominated bonds in East Asia[*]

Eiji Ogawa[a] and Junko Shimizu

Graduate School of Commerce and Management, Hitotsubashi University,

2-1, Naka, Kunitachi, Tokyo, 186-8601 Japan

_____

Abstract

This paper is to investigate advantages and disadvantages of common currency basket denominated bonds over international currency denominated ones in terms of both foreign exchange risks and liquidity. Our empirical analysis obtained the following results: ( ) the currency basket denominated bonds would be able to decrease foreign exchange risks in both borrowing and investment sides; ( ) the US dollar has the highest degree of liquidity for all of the seven East Asian currencies; ( ) both investors and bond issuers face with trade-off between foreign exchange risks and liquidity.

JEL classification: F31, F33, G15

Keywords: Asian bond market, currency basket denominated bond; foreign exchange risk; liquidity
_____

_____

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 policies and create a common currency basket 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.

This paper is to investigate advantages and disadvantages of choosing a common currency basket 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

2-1 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 markets, and Euro currency markets. 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

3

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.

2-2 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). Figures 6 to 11 show shares of currency denomination in credit obligation

5

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

3-1 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 focuses on the volatility of foreign investment returns and foreign borrowing costs for various currencies denominated bonds. [1] We compare those volatilities for each of seven East Asian countries (Singapore, Thailand, Malaysia, the Philippines, Indonesia, Taiwan, and Korea) among denomination in terms of three major currencies (the US dollar, the Euro, and the Japanese yen) and several types of currency basket denominated bonds. The currency baskets are supposed to be composed of the three major currencies. Regarding basket shares of the three major currencies in a currency basket, we consider some types of basket shares, which are based on the exchange rate movements and the trade weights.

We have to prepare some data and calculation in order to estimate several patterns of share in currency baskets. At first, we estimate the weights of exchange rate movements in each of the seven East Asian currencies against the three major currencies. The estimated method depends on the regression model of Shimizu (2002) which empirically analyzed the

---

[1] Usually ex ante borrowing costs in the real world should be calculated from the prevailing benchmark interest rate, risk premium, and foreign exchange rate fluctuations. However, our aim is comparing the risk of several currency types of borrowing costs for one country, so we regard that risk premium is common for one country and concentrate the foreign exchange risk only here.

weights of the seven East Asia currencies against four major currencies from 1990 to 2002 by using daily exchange rates.[2] Here we regress daily exchange rates of the seven East Asian currencies in terms of the Swiss franc on those of the US dollar, the Japanese yen, and the Euro in terms of the Swiss franc for a sample period. The regression model is as follows.

$$\Delta \log e^{Asiancurrency/SF} = a_0 + a_1 \Delta \log e^{USD/SFR} + a_2 \Delta \log e^{JPY/SFR} + a_3 \Delta \log e^{Euro/SFR} + \varepsilon_t$$

where $e^{A/SFR}$: exchange rate of currency A vis-à-vis the Swiss franc.

The coefficients can be interpreted as the share of each anchor currency in the implicit currency basket peg country. As a result, the pattern of estimated weight on the three major currencies, a_1, a_2, and a_3 are regarded as the basket shares. We calculate the estimated weights of whole period (1999-2002) and four sub-periods (1999, 2000, 2001, and 2002). Due to the results of four sub-periods, we can compare the volatilities of borrowing costs and investment returns of currency basket denominated bonds with the shares based on the estimated weights annually.

Next, we apply the trade weights of the seven East Asian countries with the United States, Japan, and the Euro area countries as the basket shares. We consider three types of trade weights according to the following methods. The basket shares based on trade-weights I and II depend on the calculation methods of Ogawa and Kawasaki (2003). Their trade weights are the share of total trade amount of ASEAN+2 (Korea and Taiwan) with the United States, Japan,

---

[2] This regression model is originated from Frankel and Wei (1994). Other empirical studies related Asian currencies are Kawai and Akiyama (1998) and Ogawa (2002).

and the Euro area countries. A difference between trade-weights I and II is whether the trade weights include the trade amounts of the seven East Asian countries with the rest of the world. Trade-weight I indicates the trade share of total trade amounts in the seven East Asian countries only against the three major countries. On the other hand, trade-weight II includes the trade amounts against the rest of the world and puts them into the share of the United States.　We calculate both trade weights by using monthly data and apply the average share of monthly results during the period from January 1988 to August 2001. The results of currency basket share based on trade-weights I and II are the US dollar : the Japanese yen : the Euro = 42.4%　34.7%　22.9% and 63.4%　23.3%　13.3%, respectively.

　　We use another type of currency basket share based on trade volume, so-called trade intensity, which is calculated by the method of Perti (1993).[3] The index of trade intensity, which can measure the bilateral trade linkages among countries (or regions), is defined as follows:

　　$I_{j,k} = (T_{j,k}/T_j)/(T_k/T_w)$

where　$I_{j,k}$ is the index of trade intensity between country j and country k, $T_{j,k}$ is the trade volume of country j with country k, T_j is the total trade volume of country j, T_k is the total trade volume of country k, and T_w is the total trade volume in the world.

　　In other words, the index of trade intensity measures the closeness of bilateral trade

---

[3] Kawai and Akiyama (1998) calculated the trade intensity of in 1990.

linkage between country j and k, taking into account their relative trade volume in the world.[4]

Here we use an index of trade intensity in 2000. All trade data except Taiwan are from Directions of Trade (IMF). The data of Taiwan are from National Statistics of Taiwan.

As a total, we make four kinds of currency basket share for each of the East Asian currencies in whole sample period and another four kinds of currency basket share based on the estimated weights in four sub-periods. Appendix 1 shows the results of currency basket share for each of the East Asian currencies. Applying those different types of currency basket share, we can investigate not only whether the supposed currency basket denominated bonds would contribute to decreasing the volatilities of foreign borrowing costs and foreign investment returns, but also which type of currency basket would be more effective in decreasing the volatilities for each of the East Asian countries.

Both 3 months money market interest rates and daily closing of exchange rates are used to calculate the series of foreign borrowing costs and foreign investment returns for 3 months period (90 days). Then we calculate the means and the standard deviations of these series for whole sample period and four sub-periods. We define the standard deviation as a volatility. The 3 months borrowing costs and 3 months investment returns evaluated in terms of issuer's (or investor's) home currency are calculated under the uncovered condition.

---

[4] Note that $I_{j,k}$ is defined symmetrically, such that $I_{j,k} = I_{k,j}$. It can be found that intensity is extremely high in many trading pairs in East Asia, frequently exceeding the corresponding figures in European pairs.

For example, 3 months foreign borrowing costs from the United States for issuers in country A are calculated as follows:

$$\text{3 months foreign borrowing costs} = \left\{ \frac{\left\{ 1US\$ + \left(1 \times r_{3month,us}\right) \times \frac{90}{360} \right\} \times \left(A/US\$\right)_{t+90days}}{1US\$ \times \left(A/US\$\right)_t} - 1 \right\} \times 100(\%)$$

where $\left(\frac{A}{US\$}\right)_t$: the exchange rate of the US dollar vis-à-vis currency A at period t.

Our empirical analysis covers a period from 2 January 1999 to 31 December 2002. We calculate both 3 months borrowing costs and investment returns for each day during the period. As a result, we have 979 observations for each type of borrowing and investment patterns in the analytical period.[5] Exchange rates of the East Asian currencies in the market are usually quoted in terms of the US dollar. So we have to calculate the cross rates between the East Asian currencies vis-à-vis the Japanese yen and the Euro by using the exchange rates of the US dollar vis-à-vis the Japanese yen and the Euro vis-à-vis the US dollar.

At first, we investigate 3 months 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 eight different types of foreign borrowing costs in whole sampled period by issuing bonds denominated in terms of four single currencies, which include home currency, the US dollar, the Euro, the Japanese yen, and in terms of four types of

---

[5] 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.

currency basket. Additionally, we calculate the volatilities of currency basket denominated bonds with estimated weights based share for four sub-periods. We regard issuing the currency basket denominated bonds as issuing a kind of portfolio of bonds denominated in terms of the US dollar, the Euro, and the Japanese yen.

Similarly, we investigate 3 months of foreign investment returns for each of investors in the United States, the Euro area, and Japan. For the investors, we calculate 3 months investment returns of the bonds denominated in terms of the US dollar, the Euro, the Japanese yen, and the eight different types of the currency basket for each of the seven East Asian countries. Investment into the currency basket denominated bonds is regarded as a portfolio investment into the bonds denominated in terms of the US dollar, the Euro, and the Japanese yen.

3-2 Results   Borrowing costs for bond issuers in seven East Asian countries

Tables 1-1 to 1-7 show means and standard deviations of 3 months 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 eight different types of the currency basket. Those results provide two substantial evidences. At first, the standard deviations of home currency denominated bonds are far lower than those of foreign currency denominated bonds in the seven East Asian countries. It means that the foreign exchange risks

13

weighs heavily on the risk of issuing the foreign currency denominated bonds. Second, borrowings by issuing the currency basket denominated bonds are effective in decreasing the volatilities of foreign borrowing costs across all of the East Asian countries. Especially the volatilities of borrowing costs of the currency basket denominated bonds are far lower than those of the Euro and the Japanese yen denominated bonds. It means that the foreign exchange risks of the three major currencies are partially offset each other. Accordingly, borrowing by issuing the currency basket denominated bonds can make the volatility of foreign borrowing costs much lower than that of borrowing by issuing the single currency denominated bonds.

Figures 13-1 to 13-7 plot the relationship between means and standard deviations of borrowing costs by issuing bonds denominated in terms of the different currencies, which include the home currency, the US dollar, the Euro, the Japanese yen, and the eight types of the currency basket for each of the seven East Asian currencies.

For Singapore, the mean and the standard deviation of the borrowing costs of issuing the Japanese yen denominated bonds is 0.065 percent and 4.542 percent respectively, and it is the cheapest but the most risky among the three major currencies. The standard deviation of borrowing costs of issuing the Euro denominated bonds is 4.474 percent. It is almost the same level of the Japanese yen denominated bonds. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 2.346 percent and the lowest among the three

major currencies. The lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds among four types of basket share is the bonds with the basket share based on the trade-weight II. It is 1.558 percent and is lower than the US dollar denominated bonds and is much lower than the bonds denominated in terms of the Euro and the Japanese yen. It means that issuing the currency basket denominated bonds with the share based on the trade-weights would decrease the volatility of borrowing costs in comparison with the bonds denominated in terms of a single currency in Singapore. The second lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds is the bond with the share of the trade-weight I, which is 1.768 percent. The standard deviation of borrowing costs of the currency basket denominated bonds with a share of the estimated weights is lower than the bonds denominated in terms of the US dollar, the Euro and the Japanese yen. On the other hand, the standard deviation of issuing the currency basket denominated bonds with the share based on the trade intensity is 2.536 percent and is higher than the US dollar denominated bonds. It means that the currency basket denominated bonds with the basket share based on the trade-intensity does not contribute to decreasing the volatilities of the foreign borrowing costs in Singapore. Comparing the annual volatilities between the US dollar denominated bonds and the currency basket denominated bonds, the contribution of the currency basket denominated bonds to decreasing the volatilities becomes larger in 2002 for both estimated weights based currency basket and trade-weights based currency basket. It means that the

currency basket denominated bonds are more effective in decreasing the volatilities of foreign borrowing costs in Singapore.

For Thailand, the standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 6.761 percent and it is the most volatile but the cheapest among the three major currencies. The standard deviation of borrowing costs of issuing the Euro denominated bonds is 5.378 percent and less volatile than those of issuing the Japanese yen denominated bonds. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 3.972 percent and it is the lowest among the three major currencies. The currency basket denominated bonds with the share based on trade-weight II is the lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds among the four types of basket share. It is 3.964 percent and is slightly lower than the standard deviation of the US dollar denominated bonds and is much lower than those of the bonds denominated in terms of the Euro and the Japanese yen. The second lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds is the currency basket bonds with the share based on the estimated weights. It is 4.008 percent and is not so much different from the currency basket based on the trade-weight II, but this is slightly higher than the standard deviation of the US dollar denominated bonds. The standard deviation of issuing the currency basket denominated bonds with the share based on the trade-intensity is 5.147 percent and is higher than those of the US dollar denominated bonds. It means that the

currency basket denominated bonds with the trade-intensity based share does not contribute to decrease the volatilities of the foreign borrowing costs in Thailand. Comparing the annual volatility's difference between the US dollar denominated bonds and the currency basket denominated bonds, the contribution of the currency basket denominated bonds to decreasing the volatilities become larger in 2002 for both estimated weights based and trade-weights based currency basket. It means that the currency basket denominated bonds are more effective in decreasing the volatilities of foreign borrowing costs in Thailand.

For Malaysia, the standard deviation of borrowing costs of issuing the US dollar denominated bonds is 0.409 percent and it is close to the case of issuing the Malaysian ringgit denominated bonds. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 5.502 percent while that of issuing the Euro denominated bonds is 5.476 percent. Since Malaysia has adopted the dollar pegged currency system since September 1999, the US dollar in the basket share based on the estimated weights of foreign exchange movement is 100%. The Malaysian ringgit denominated bonds is completely the same as the US dollar denominated bonds. 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 with the share based on trade-weight II is 1.603 percent, which is the lowest among those of the other currency basket denominated

17

bonds. It is far lower than those of the Japanese yen and the Euro denominated bonds but far higher than that of the US dollar denominated bonds. It means that issuing the currency basket denominated bonds seems to be not so effective in decreasing the volatilities of borrowing costs in Malaysia.

For the Philippines, the standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 7.159 percent and it is the most volatile. The standard deviation of borrowing costs of issuing the Euro denominated bonds is 6.147 percent and less volatile than those of the Japanese yen denominated bonds. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 4.092 percent. It is the lowest volatile but the most expensive among the three major currencies. The currency basket bonds based on the estimated weights has the lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds among the four types of basket share. It is 4.066 percent and is slightly lower than that of issuing the US dollar denominated bonds and is much lower than those of issuing the bonds denominated in terms of the Euro and the Japanese yen. The other currency basket denominated bonds with the share based on the trade weights are not so effective in decreasing the volatility of the foreign borrowing costs in the Philippines.

For Indonesia, all of the standard deviations of borrowing costs of issuing bonds denominated in terms of the three major currencies are relatively high (11.658 percent for the Japanese yen, 11.453 percent for the Euro, and 11.451 percent for the US dollar). The currency

basket bonds with the share based on the trade-weight I have the lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds among the four types of basket share. It is 11.008 percent. The standard deviations of another type of currency basket denominated bonds are also slightly lower than those of bonds denominated in terms of the US dollar, the Euro, and the Japanese yen. It means that issuing the currency basket denominated bonds can decrease the volatility of borrowing costs in comparison with those of issuing the three major currency denominated bonds in Indonesia while the degrees of contribution are quite small compared with other East Asian currencies. Comparing the annual volatilities, the volatilities of the borrowing costs of currency basket denominated bonds with estimated weights, trade-weight II, and trade-intensity become lower than the US dollar denominated bonds in 2002. It means that the currency basket denominated bonds are more effective in decreasing the volatilities of foreign borrowing costs in Indonesia.

For Taiwan, the standard deviation of borrowing costs of issuing the Euro denominated bonds is 5.578 percent and it is the most volatile. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 4.894 percent. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 2.731 percent and it is far lower than those of the Euro and the Japanese yen denominated bonds. The lowest standard deviation of borrowing costs of issuing the currency basket denominated bonds among the four types of basket weights is the currency basket bonds based on the trade-weight II. It is 2.432

percent and is lower than the US dollar denominated bonds and is much lower than both of the Euro and the Japanese yen denominated bonds. The standard deviation of the currency basket denominated bonds with the estimated weights is also lower than the US dollar denominated bonds. While the standard deviation of other types of basket dominated bonds with the share based on trade-weight I and trade-intensity are far lower than the Euro and the Japanese yen denominated bonds while they are still higher than the US dollar denominated bonds. Comparing the annual volatilities, the contribution of issuing the currency basket denominated bonds to decreasing the volatilities becomes larger in 2002 for the currency basket denominated bonds with both estimated weights and the trade-weight II while there were no contribution of the currency basket denominated bonds to decreasing the volatilities in 2000 and 2001. It means that there might be some changes in their currency system to make the currency basket denominated bonds effective in decreasing the volatilities of foreign borrowing costs in Taiwan recently.

For Korea, the standard deviation of borrowing costs of issuing the Euro denominated bonds is 7.224 percent. The standard deviation of borrowing costs of issuing the Japanese yen denominated bonds is 4.988 percent and much lower than those of issuing the Euro denominated bonds. The standard deviation of borrowing costs of issuing the US dollar denominated bonds is 4.557 percent and it is the lowest among the three major currencies. The standard deviation of the currency basket denominated bonds with the share based on

trade-intensity is the lowest among the four types of basket share. It is 4.062 percent. The standard deviation of the currency basket denominated bonds with the share based on trade-weight II is the second lowest of 4.140 percent. Comparing the annual volatility's differences between the US dollar denominated bonds and the currency basket denominated bonds, the contribution to decreasing the volatilities becomes larger in 2002 for the currency basket denominated bonds with estimated weights and trade-weights. It means that issuing the currency basket denominated bonds becomes more effective in decreasing the volatilities of foreign borrowing costs 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 the East Asian countries except for Malaysia. It is interesting that the most effective type of currency basket share is different among the seven East Asian countries. Basically the volatilities of the currency basket denominated bonds with the share based on the trade weights are the lowest in most of the East Asian countries. [6] These results suggest that an optimal share of currency basket should be based on the trade relations between each of the East Asian countries and its trading partner countries.

---

[6] We calculate and compare the volatilities of the daily borrowing costs instead of 3month borrowing costs with same data and same sample periods. The results of daily borrowing costs indicate that the most effective share of currency basket is the share based on the estimated-weights in the East Asian countries except Malaysia and Indonesia.

The currency basket share based on trade-weight II is the most effective in decreasing the volatilities for Singapore, Thailand, Malaysia and Taiwan. The currency basket share based on trade-weight I is the most effective in decreasing the volatilities for Indonesia. The currency basket share based on trade-intensity is the most effective in decreasing the volatilities for Korea. The currency basket share based on the estimated weights is the most effective in decreasing the volatilities for the Philippines. Moreover, the degree of contribution to decrease the volatilities by issuing the currency basket denominated bonds becomes largest in 2002 in the East Asian countries except Malaysia and the Philippines.

3-3 Results - Investment returns for investors in the US, the Euro area, and Japan -

Table 2 shows means and standard deviations of 3 months investment returns that international investors in the United States, the Euro area, and Japan obtain by investing into the bonds denominated in terms of the seven East Asian currencies, the US dollar, the Euro, the Japanese yen and the several types of currency basket denominated bonds with shares based on trade weights. 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 two groups from a viewpoint of foreign exchange risks of the currency basket denominated bonds among seven East Asian countries. One is that the foreign exchange risks of the currency basket denominated bonds are 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.

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

The second group includes Singapore, Malaysia, and Taiwan. As for investments into these 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 in the case of Malaysia reflects the dollar peg 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.

Figures 14-1 to 14-3 show the relationships between means and standard deviations of 3 months investment returns for international investors in each of the United States, the Euro area, and Japan. As for international investors, we add the results of investment returns into the currency basket denominated bonds with the shares based on trade-weights I and II, and trade-intensity for each of the East Asia countries.

For investors in the United States, investing into the bonds denominated in terms of the Indonesian rupiah has the highest risks and the highest returns among the sampled countries. On the other hand, investing into the bonds denominated in terms of the Malaysian ringgit has the lowest risk among the sampled countries and is nearly 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 rate regime under which they peg the home currency to the US dollar. Investing into the bonds denominated in terms of the Singapore dollar is the second lowest risky. Its standard deviation of investment returns is 2.12 percent. The standard deviation of investment returns into the bonds denominated in terms of the Taiwan dollar is the third lowest of 2.64 percent. These levels are lower than the standard deviation of investment returns into the currency basket denominated bonds with share of trade-weight I (2.68 percent), which is the US dollar : the Japanese yen : the Euro=42.4%　34.7%　22.9%, but

higher than the standard deviation of investment returns into the currency basket denominated bonds with share of trade-weight II (1.61 percent), which is the US dollar : the Japanese yen : the Euro = 63.4% 23.3% 13.3%. The standard deviation of investment returns into the bonds denominated in terms of the Thai baht is 3.65 percent and is lower than that of investment returns into bonds denominated in terms of the Philippine peso, which is 3.95 percent. The standard deviation of investment returns into the bonds denominated in terms of the Korean won is 4.33 percent. The standard deviation of investment returns into the Euro denominated bonds and the Japanese yen denominated bonds are all above 5 percent, and they are 5.47 percent, 5.52 percent, respectively. For the US investors who invest into Indonesia, the standard deviation of investment returns into currency basket denominated bonds with shares of trade-intensity, which is the US dollar : the Japanese yen : the Euro = 73.9% : 17.9% : 8.2%, is 0.129 percent. This level is far lower than the bonds denominated in terms of the Indonesian rupiah. We obtained the same results for bond issuers in the Philippines, Korea and Thailand. It means that issuing bonds in terms of currency basket are much more attractive to the US investors than issuing bonds in terms of their own currency in Indonesia, the Philippines, Korea and Thailand.

For investors in the Euro area, investing into the bonds denominated in terms of the Indonesian rupiah is the most risky and the highest returns. Investing into the Korean won denominated bonds is the next highest return and its standard deviation is 6.95 percent while

the standard deviation of returns from investing into the Japanese yen denominated bonds is 6.33 percent, which is the third risky level. Investing into the currency basket denominated bonds with any shares decreases volatility of investment returns for investors in the Euro area. The standard deviation of returns from investing into the currency basket denominated bonds with share of trade-weight I is 4.22 percent, which is the next lowest level to investing into the Euro denominated bonds, and much lower than the case of investing into the US dollar or the Japanese yen denominated bonds, which is 5.59 percent and 6.33 percent, respectively. The standard deviations of investment returns into bonds denominated in terms of the East Asian currencies except the Indonesian rupiah and the Singapore dollar are from 5 to 7 percent. It implies that none of the seven East Asian currencies are closely related with the Euro except the Singapore dollar, whose standard deviation is 4.48 percent. The Singapore dollar is the only currency whose risk is lower than the US dollar for the investor in the Euro area. For the Euro Area investors, the standard deviation of investment returns into currency basket denominated bonds with shares of the trade-weights I and II and the trade-intensity are all lower than the bonds denominated in terms of each of the seven East Asian currencies except the Singapore dollar.   It means that bonds denominated in terms of the currency baskets are more attractive to investors in the Euro area than bonds denominated in terms of their home currencies in the seven East Asian Countries.

For Japanese investors, investing into the bonds denominated in terms of the Indonesian

rupiah are the most risky and the highest returns. The standard deviation of investing into the Euro denominated bonds is the third risky of 6.60 percent, while that of investing into the US dollar denominated bonds is 5.53 percent. The standard deviation of investment returns into the currency basket denominated bonds with shares of trade-weights I and II are 3.46 percent and 4.09 percent, respectively. They are lower than returns of investments into the US dollar denominated bonds. For Japanese investors, the standard deviation of returns of investments into currency basket denominated bonds with shares of trade-intensity are all around 2 percent except for trade-intensity of Indonesia, and much lower than the bonds denominated in terms of each of the seven East Asian currencies. It means that bonds denominated in terms of the currency baskets are more attractive to the Japanese investors than bonds denominated in terms of their home currencies in the seven East Asian countries.

In summary, foreign exchange risks of investment returns of 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, it is mixed for the investors in the United States. Foreign exchange risks of investments into the currency basket denominated bonds issued in Thailand, the Philippines, Indonesia, and Korea have the second lowest, but those 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. These results are supposed to be reflected by the currency system of the East Asian countries. We analyzed foreign exchange risks for the several types of currency basket share. It is interesting that bonds denominated in terms of the currency basket with the share of trade intensity is effective in reducing the foreign exchange risks for Japanese investors, while bonds denominated in terms of the currency basket with the share of trade-weights I and II are effective in reducing the foreign exchange risks for investors in the United States and the Euro area. 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 the 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 vis-à-vis the three major currencies, and the Euro and the Japanese yen vis-à-vis the US dollar. Comparing the bid-ask spreads, we try to express them in two different terms, the percentage of transaction-based cost and one of daily based cost. The transaction-based cost means how much we have to pay the cost to deal one forward outright transaction and the daily based cost means how much the per-day cost of one forward outright transaction is. We calculate those bid-ask spreads of seven East Asian currencies in terms of 1 month, 3 months, and 6 months vis-à-vis the US dollar, the Euro and the Japanese yen. In order to compare with the bid-ask spreads of major traded currencies, we calculate those of the Euro and the Japanese yen vis-à-vis the US dollar and the Japanese yen vis-à-vis the Euro, too. 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 and 6 February 2003.

Table 3-1 shows the transaction based bid-ask spreads. The bid-ask spreads for all of the East Asian currencies vis-à-vis the US dollar are the lowest in all period, while the bid-ask spreads for all of the East Asian currencies vis-à-vis the Euro are highest in terms of 1 and 3 months. In addition, the bid-ask spreads for all of the East Asian currencies are far higher than those of the Euro and the Japanese yen vis-à-vis the US dollar. The bid-ask spreads of the Euro

and the Japanese yen vis-à-vis the US dollar are 3 to 4 percent for one transaction, while those of the East Asian currencies vis-à-vis the US dollar are from the lowest of 5 percent for the Taiwan dollar to the highest of almost 50 percent for the Philippine peso and the Indonesian rupiah vis-à-vis the US dollar and above 50 percent vis-à-vis the Euro. The bid-ask spreads for all of the East Asian currencies vis-à-vis the Euro and the Japanese yen are almost 3 to 4 percent higher than those vis-à-vis the US dollar, and are higher than those of the Japanese yen vis-à-vis the Euro, too. Concerning the differences due to terms, there are not so much differences in the bid-ask spreads between 1 month, 3 months and 6 months for the Singapore dollar, the Thai baht and the Korean won same as for the Euro and the Japanese yen. On the other hand, the bid-ask spreads for the rest of the East Asian currencies become higher as the terms become longer.

Table 3-2 shows the daily based bid-ask spreads. As the daily based bid-ask spreads are equivalent of the transaction based bid-ask spreads divided by the number of days, they tend to reduce as the terms become longer. Comparing the differences in the bid-ask spreads vis-à-vis the US dollar and vis-à-vis the Euro or the Japanese yen, the differences between the lowest and the highest are 0.0006 percent to 0.0015 percent for 1 month swap transaction, 0.0002 percent to 0.0006 percent for 3 months swap transaction, and 0.0001 percent to 0.0003 percent for 6 month swap transaction. Comparing the differences in the bid-ask spreads of the East Asian currencies vis-à-vis the Euro or the Japanese yen and those of the Japanese yen vis-à-vis

the Euro, the differences between the lowest and the highest are 0.0001 percent to 0.0084 percent for 1 month swap transaction, 0.0001 percent to 0.0040 percent for 3 months swap transaction, and 0 percent to 0.0028 percent for 6 month swap transaction. These results shows that the differences of the daily based bid-ask spreads between the East Asian currencies and the major trading currencies become more trivial as the terms are longer.

Among the seven East Asian currencies, the Taiwan dollar is the lowest bid-ask spreads currency. The next lowest group currencies are the Singapore dollar, the Thai baht and the Korean won. On the other hand, the highest group currencies are the Malaysian ringgit, the Philippine peso and the Indonesian rupiah. It is interesting that the spread in the Malaysian ringgit is the highest of the sample day of September 13, 2002 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. The averaged based differences in the bid-spreads between the US dollar and the currency basket are 0.0007

percent to 0.0008 percent for 1 month swap transaction, 0.0002 percent to 0.0003 percent for 3

months swap transaction, and 0 percent to 0.0001 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 months

swap transactions though the differences are large for 1 month swap transactions.

Next, we choose two of the East Asian currencies, the Singapore dollar and the Thai baht,

which are relatively active traded currencies in East Asian markets. We calculate forward

bid-ask spreads vis-à-vis the US dollar, the Euro and the Japanese yen once a year from 1999

to 2003 for the currencies. We see how the market condition would improve after the Asian

currency crises. Table 4-1 shows the change of transaction based forward bid-ask spreads from

1999 to 2003 and Figure 15 shows the change of 6 months forward swap bid-ask spreads in

transaction basis from 1999 to 2003

Comparing the same calculation for the Euro and the Japanese yen vis-à-vis the US dollar

and the Japanese yen vis-à-vis the Euro, it is clear that the bid-ask spreads of the two East

Asian currencies become lower. For example, 6 months bid-ask spreads for the Singapore dollar

vis-à-vis the Japanese yen was 0.16 percent in June 20, 1999, and it was 0.08 percent in

February 6, 2003, which is almost same level with the bid-ask spread for the Japanese yen

vis-à-vis the Euro. Similarly 6 months bid-ask spreads for the Thai baht vis-à-vis the Japanese

yen was 0.36 percent in June 20, 1999, and it was 0.07 percent in February 6, 2003, which is

slightly better than the bid-ask spread for the Japanese yen vis-à-vis the Euro. It means that

the conditions of foreign exchange markets in East Asian countries are improving, and the

forward outright deals of major East Asian currencies are becoming less expensive to trade

recently.

5. Conclusion

This paper investigated advantages and disadvantages of choosing a common currency

basket over an international currency as a denomination currency in issuing and investing into

the 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. Regarding the shares of currency basket, we examined several patterns of currency basket share, which based on the estimated weights of foreign exchange movement and trade weights, both for bond issuers and for bond investors. It is interesting that each of bond issuing countries and bond investing countries has their own optimal share of currency basket to decrease the foreign exchange risk. Basically the volatilities of the currency basket denominated bonds with the share based on the trade weights are the lowest in most East Asian countries. Thus, investments into the currency basket denominated bonds can decrease foreign exchange risks in many cases, but it might be difficult to decide the optimal share of a common currency basket among the seven East Asian countries.

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 months 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 currency basket denominated 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. At the standpoint of forward swap bid-ask spread which we used as an indicator of liquidity, the forward outright deals of major East Asian currencies are less expensive to trade recently. We should establish markets for regional bonds denominated in terms of a common currency basket from a viewpoint of liquidity in order to activate the markets in East Asia.

REFERENCES

Bénassy-Quéré, Agnes, 1999, Optimal pegs for East Asian currencies, Journal of the Japanese and International Economies, vol. 13, 44-60.

Hartmann, Philipp, 1998, Currency Competition and Foreign Exchange Markets: The Dollar, the Yen and the Euro, Cambridge University Press.

Ito, T., E. Ogawa, and N. Yuri Sasaki, 1998, How did the dollar peg fail in Asia? , Journal of the Japanese and International Economies, vol. 12, 256-304.

Kawai, Masahiro and Shigeru Akiyama, 1998, Roles of the World's Major Currencies in Exchange Rate Arrangements,   Journal of the Japanese and International Economies, 12, 334-387.

Ogawa, Eiji, 2001, The Japanese Yen as an International Currency, in Yoon Hyung Kim and Yunjong Wang eds., Regional Financial Arrangements in East Asia, Korea Institute for International Economic Policy, 25-51.

Ogawa, Eiji and Takatoshi Ito, 2002, On the desirability of a regional basket currency arrangement, Journal of the Japanese and International Economies, (forthcoming).

Ogawa, Eiji, Takatoshi Ito, and N. Yuri Sasaki, 2002, Costs, Benefits, and Constraints of the Basket Currency Regime, Background Paper prepared for ADB's Technical Assistance on "Study on Monetary and Financial Cooperation in East Asia" (Kobe Research Project).

Shimizu, Junko, 2002, Empirical studies of the US dollar co-movement in 7 East Asian currencies, presented paper at the conference of Japan Society of Monetary Economics, Nov. 2002

Williamson, John, 2000, Exchange Rate Regimes of Emerging Markets: Reviving the Intermediate

Option, Institute for International Economics, Washington, D.C.

Figure 1: International Money Instruments
(shares of amounts outstanding)
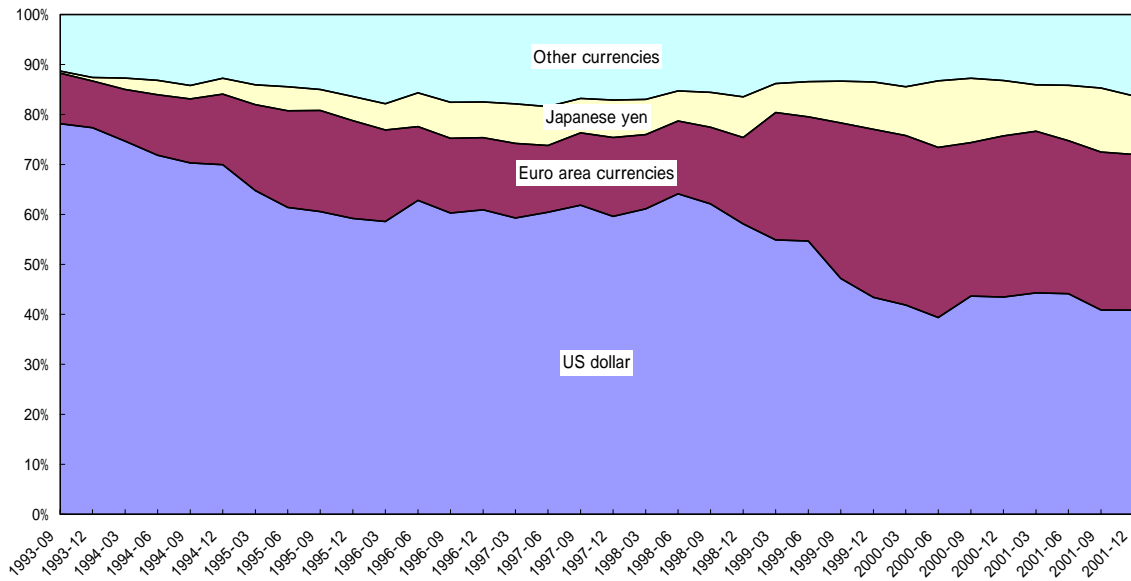
Source: BIS (2002)

Figure 2: International Bonds and Notes
(shares of amounts outstanding)
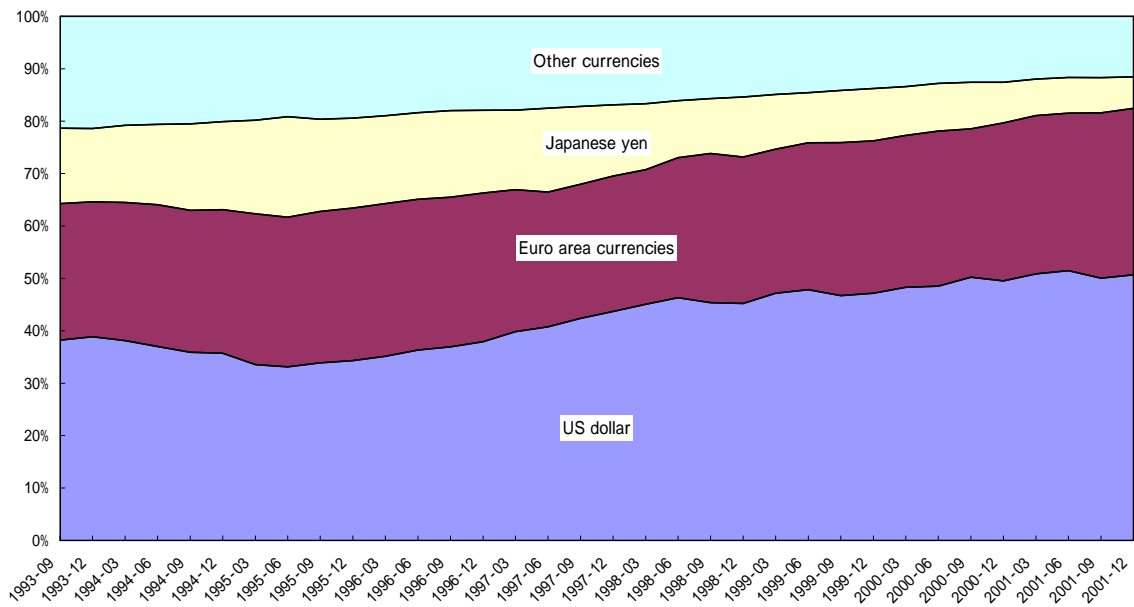
Source: BIS (2002)

Figure 3: Liabilities in Foreign Currencies of International Banks
(shares of amounts outstanding)
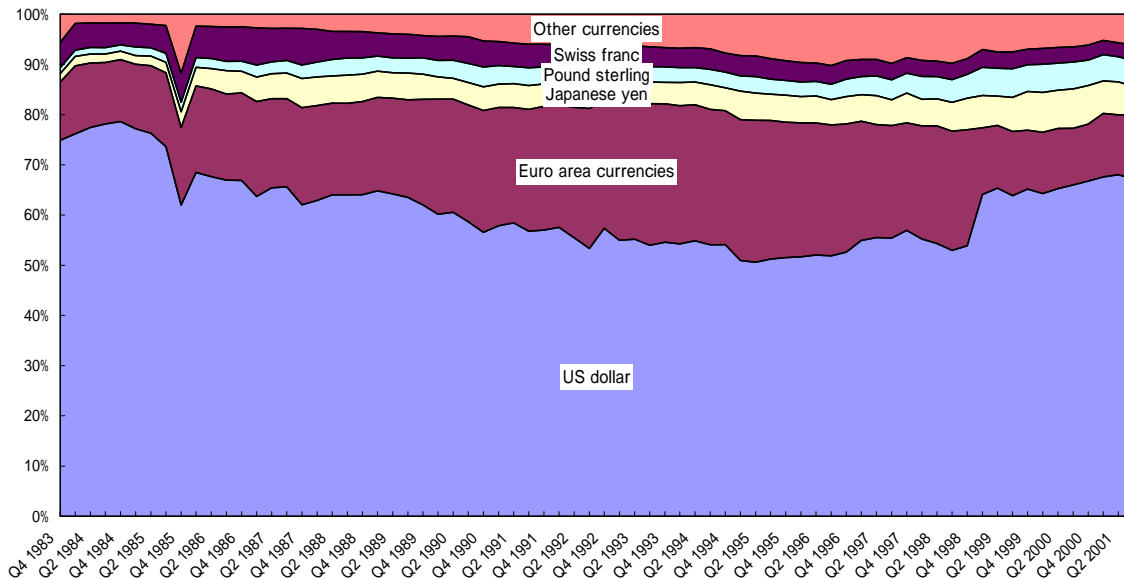
Sourcr: BIS (2002)

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

Source: MOF

40
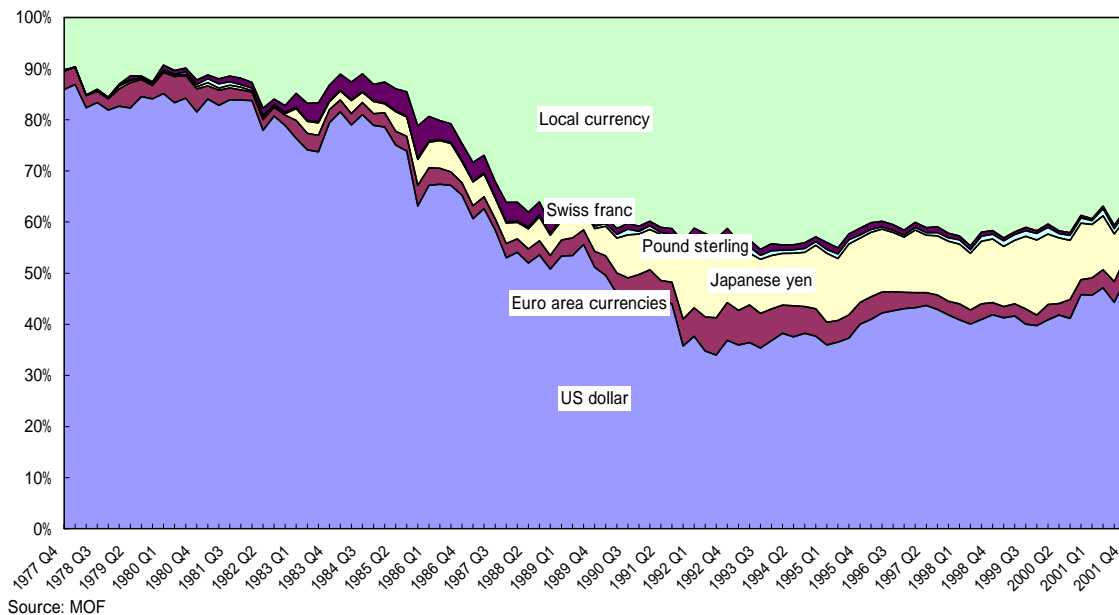
Figure 5: Credit obligation outstanding share by local and foreign currencies
(in HongKong)
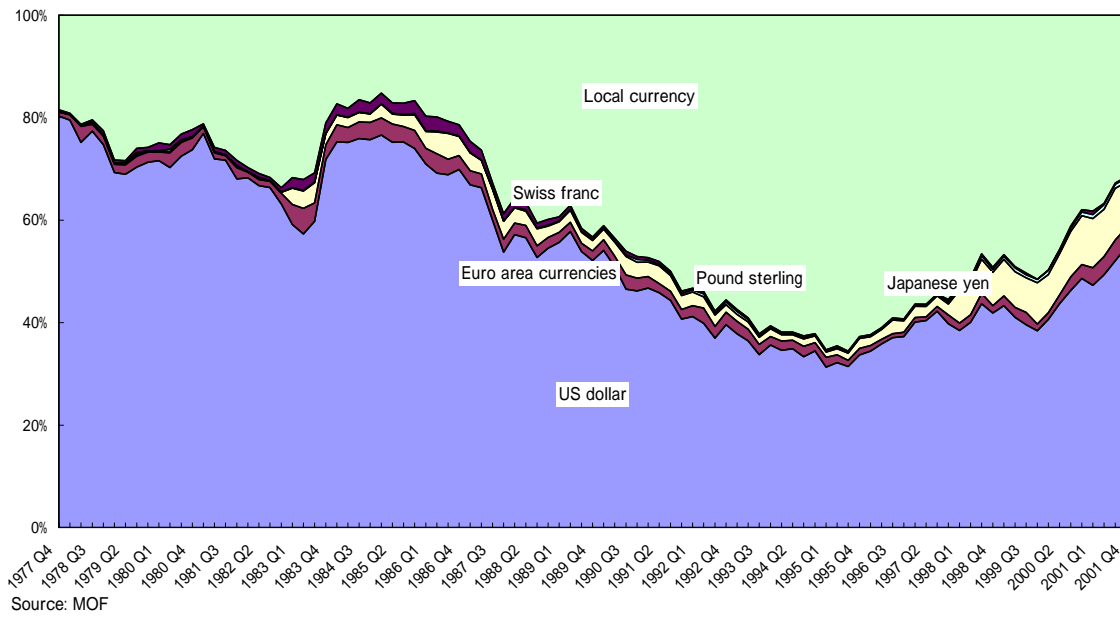
Figure 6: Credit obligation outstanding share by local and non-local currencies
(in Thailand)

Source: MOF

41
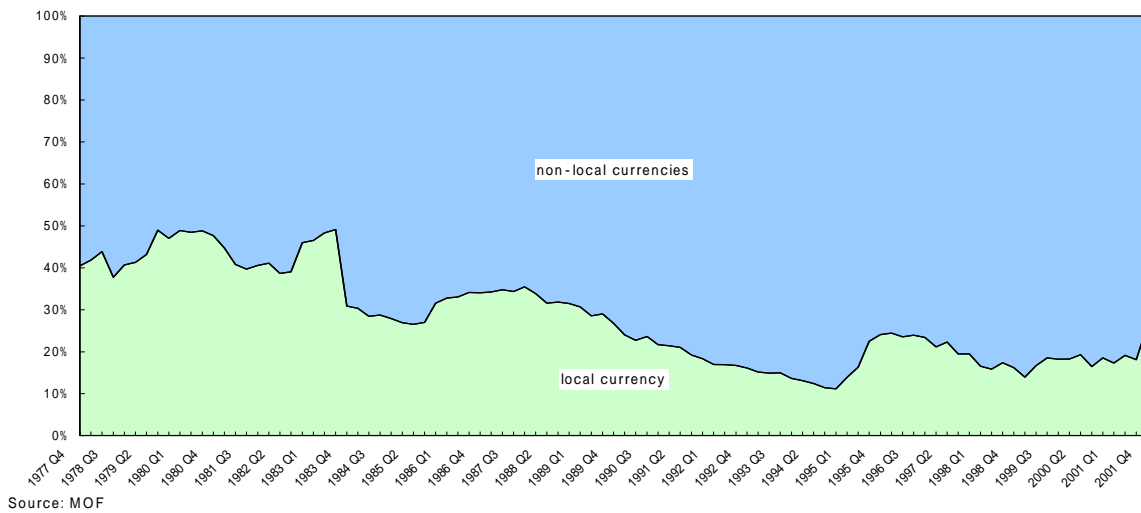
Figure 7: Credit obligation outstanding share by local and non-local currensies
(in Malaysia)

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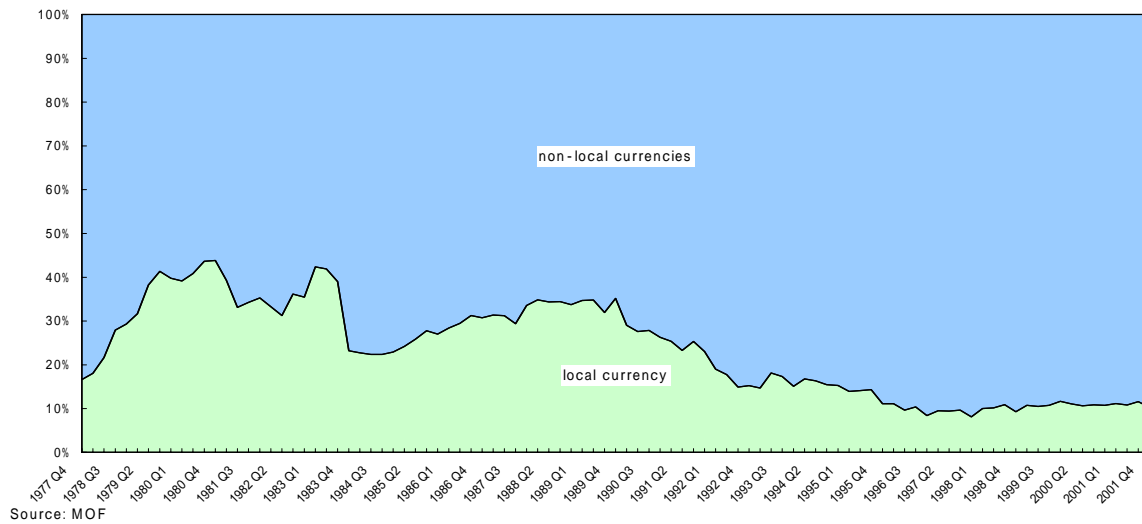
Figure 8: Credit obligation outstanding share by local and non-local currencies
(in Indonesia)

Source: MOF
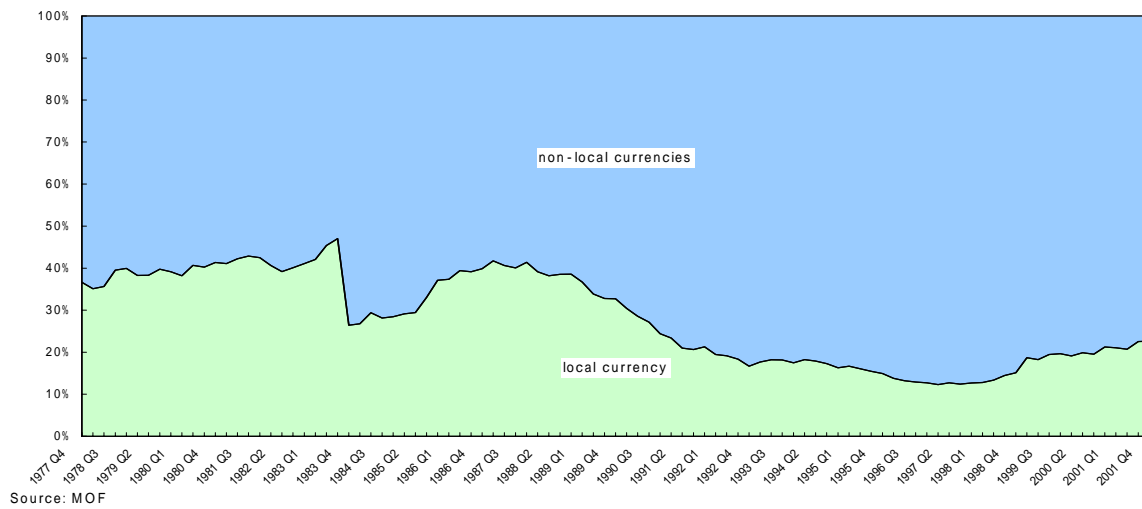
Figure 9: Credit obligation outstanding share by local and no-local currencies
(in Philippines)

Source: MOF

42
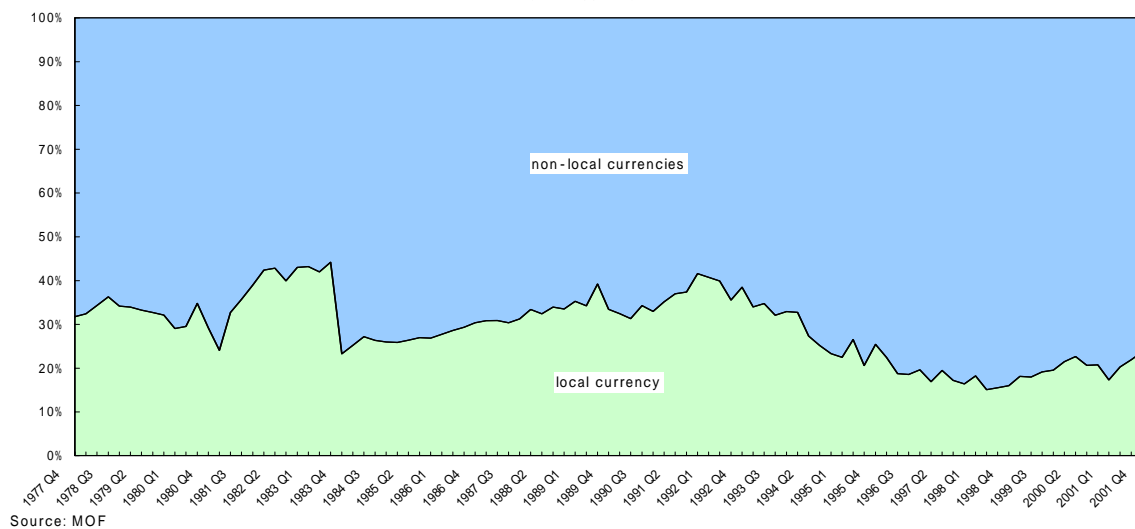
Figure 10: Credit obligation outstanding shares by local and non-local currencies
(in Korea)

non-local currencies

local currency

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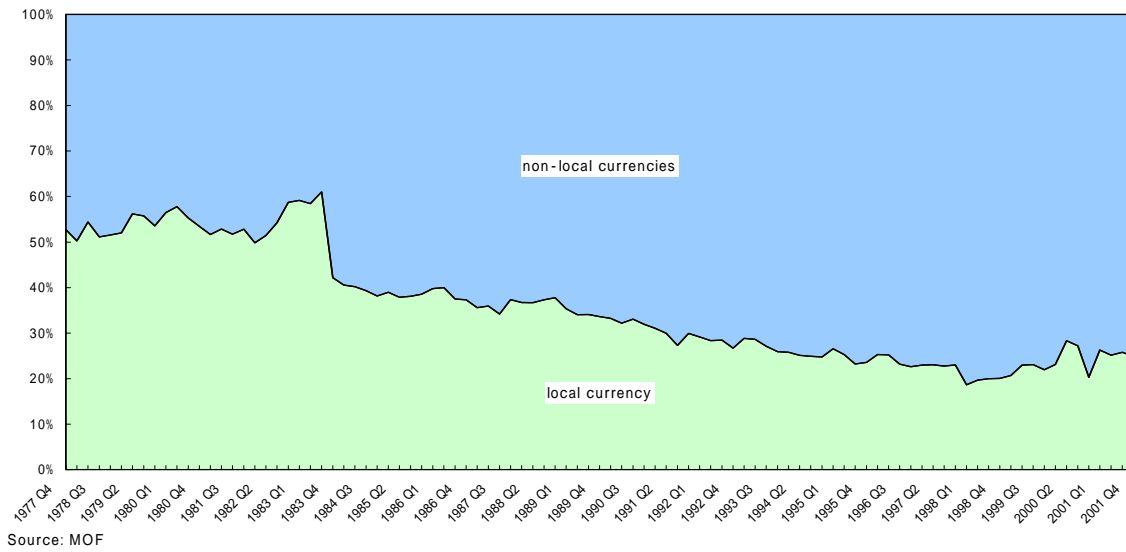
Figure 11: Credit obligation outstanding share by local and non-local currencies
(in Taiwan)

non-local currencies

local currency

Source: MOF

Table1-1 . 3month borrowing costs in East Asian Countiries(%)

Singapore borrowing from		Single currency type				Basket type								
						Estimated weights on 3major currencies based(1)					Trade based		
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	0.750	6.627	13.848	18.174	5.481	5.719	5.645	5.309	5.943	7.542	5.547	11.214
Min	1999-2002	0.172	-4.593	-9.445	-10.129	-3.065	-3.324	-3.259	-2.780	-2.811	-3.322	-2.536	-5.557
Mean	1999-2002	0.483	1.301	0.526	0.065	1.072	1.144	1.125	1.010	0.937	0.694	0.910	0.505
Std. Dev. (%)	1999-2002	0.167	2.346	4.474	4.542	1.836	1.997	1.963	1.698	1.703	1.768	1.558	2.536
	1999	0.085	1.385	2.999	6.137	1.323	1.233	1.252	1.452	1.717	2.609	1.744	3.694
	2000	0.046	1.144	3.742	2.294	1.040	1.089	1.084	0.986	1.010	0.988	0.935	1.274
	2001	0.067	2.945	4.273	3.589	2.499	2.684	2.652	2.299	2.253	1.624	1.985	2.174
	2002	0.053	1.896	3.150	4.465	1.021	1.262	1.195	0.878	0.856	1.624	0.886	2.410

All are calculated by authors. Sample period is 1/1/1999t- 12/31/2002 All data of exchange rate and interest rate are from Datastream.
(1) The basket share in Singapore depends on the results of Singapore Dollar's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression mode
(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share
(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest o
(4) The basket share of Trade-intensity in Singapore depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.03

Figure13-1. Mean & Std. Dev. of Borrowing Costs
Singapore

44
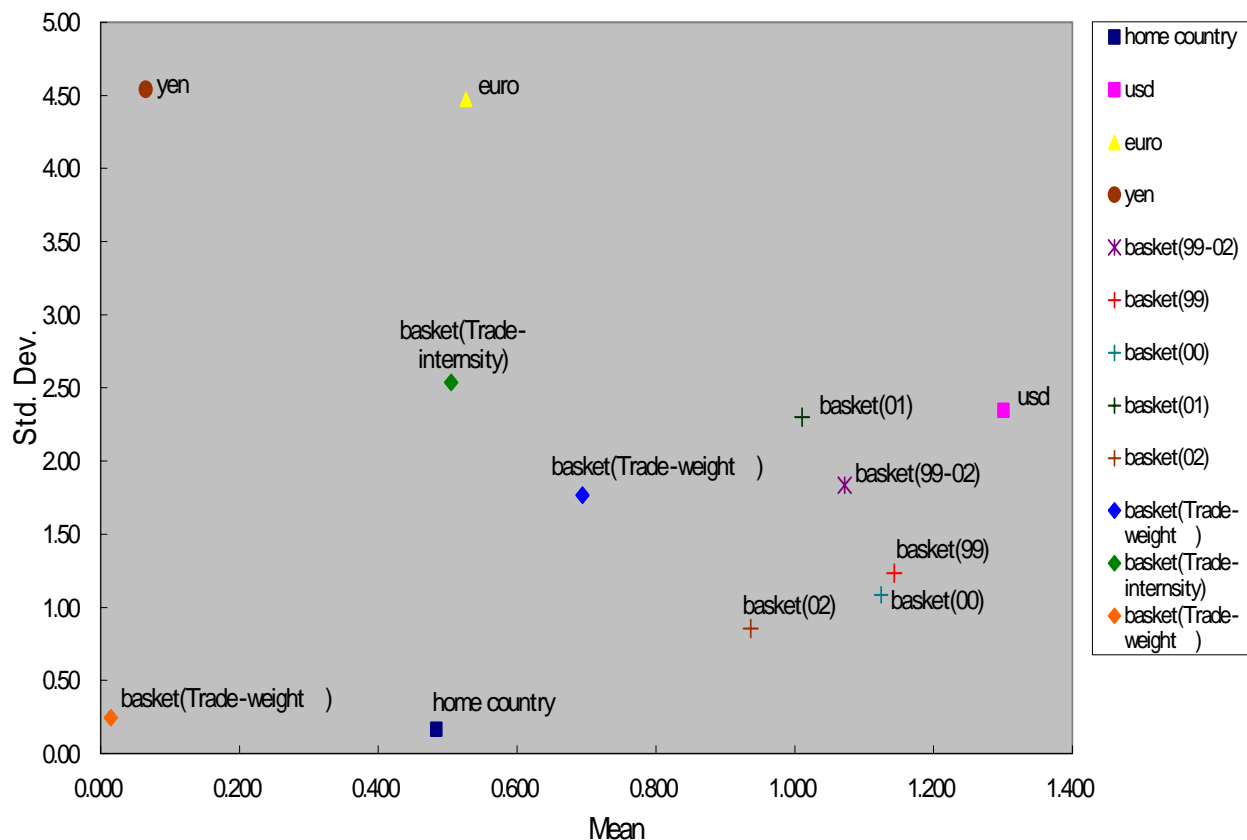
Table1-2. 3month borrowing costs in East Asian Countiries(%)

Thailand borrowing from		Single currency type				Basket type								
						Estimated weights on 3major currencies based(1)					Trade based		
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	1.937	14.210	16.051	31.819	17.022	16.358	17.236	17.272	16.778	20.220	18.254	25.092
Mn	1999-2002	0.516	-8.312	-12.676	-11.779	-7.937	-7.993	-7.899	-8.027	-8.221	-8.476	-8.272	-7.726
Mean	1999-2002	0.906	2.154	1.368	0.975	1.956	2.010	1.947	1.914	1.911	1.565	1.775	1.359
Std. Dev.	1999-2002	0.290	3.971	5.378	6.761	4.008	3.998	4.033	3.972	3.877	4.231	3.964	5.147
(%)	1999	0.243	4.233	6.793	10.143	5.015	4.796	5.062	5.165	5.125	6.616	5.700	7.900
	2000	0.120	4.047	5.413	4.822	4.083	4.077	4.092	4.072	4.047	4.110	4.065	4.330
	2001	0.154	3.170	4.449	4.186	2.929	3.010	2.948	2.802	2.671	2.297	2.482	3.004
	2002	0.081	2.992	3.912	5.005	2.564	2.651	2.554	2.513	2.507	2.830	2.486	3.439

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002 All data of exchange rate and interest rate are from Datastream.

(1) The basket share in Thailand depends on the results of Thailand Bsht's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression model of

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of

(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.43

Figure 13-2 Mean & Std. Dev. of Borrowing Costs
Thailand
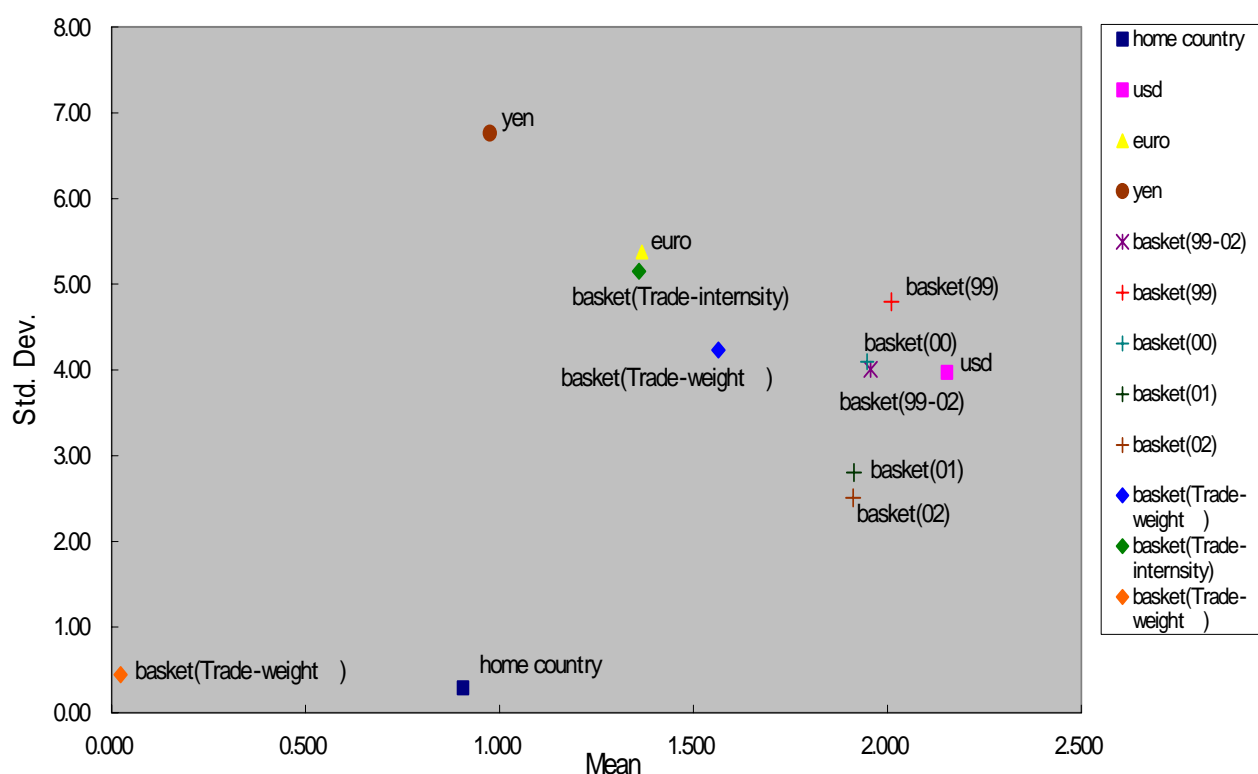
Table1-3 . 3month borrowing costs in East Asian Countiries(%)

Malaysia borrowing from		Single currency type				Basket type							
						Estimated weights on 3major currencies based(1)					Trade based		
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	1.425	1.610	14.741	17.765	1.610	1.610	1.610	1.610	1.610	7.994	5.234	11.698
Mn	1999-2002	0.800	0.379	-10.365	-10.811	0.379	0.379	0.379	0.379	0.379	-4.319	-2.471	-6.817
Mean	1999-2002	0.887	1.034	0.335	-0.126	1.034	1.034	1.034	1.034	1.034	0.471	0.671	0.248
Std. Dev. (%)	1999-2002	0.142	0.409	5.476	5.502	0.409	0.409	0.409	0.409	0.409	2.537	1.603	3.600
	1999	0.204	0.046	3.469	6.700	0.046	0.046	0.046	0.046	0.046	3.029	1.975	4.461
	2000	0.018	0.096	3.962	2.341	0.096	0.096	0.096	0.096	0.096	0.982	0.620	1.390
	2001	0.000	0.293	5.883	4.026	0.293	0.293	0.293	0.293	0.293	1.997	1.239	2.575
	2002	0.024	0.046	4.733	6.123	0.046	0.046	0.046	0.046	0.046	3.132	2.004	4.201

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002. All data of exchange rate and interest rate are from Datastream.

(1) The basket share in Malaysia depends on the results of Malaysia Ringgit's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression model

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki1(2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of

(4) The basket share of Trade-intensity in Singpore depends on the results of Kawai and Akiyama (2002). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.17:

Figure 13-3 Mean & Std. Dev. of Borrowing Costs
Malaysia

Table1-4 . 3month borrowing costs in East Asian Countiries(%)

Philippines borrowing from		Single currency type				Basket type								
						Estimated weights on 3major currencies based(1)					Trade based			
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	4.181	17.204	26.763	26.522	16.387	16.817	17.124	15.903	17.042	15.389	15.410	19.170
Min	1999-2002	1.075	-7.320	-12.567	-12.313	-7.977	-7.875	-7.624	-8.483	-7.551	-10.073	-9.059	-10.274
Mean	1999-2002	2.253	3.238	2.478	2.072	3.106	3.108	3.159	2.995	3.184	2.660	2.866	2.517
Std. Dev. (%)	1999-2002	0.590	4.092	6.147	7.159	4.066	4.127	4.128	4.143	4.095	4.695	4.318	5.345
	1999	0.467	3.221	6.263	9.827	3.833	3.873	3.634	4.386	3.489	6.091	5.059	7.123
	2000	0.034	3.906	6.150	4.553	3.950	3.921	3.906	3.982	3.911	4.149	4.023	4.128
	2001	0.504	4.085	6.022	5.671	3.978	4.040	4.078	3.957	4.061	4.092	3.986	4.511
	2002	0.504	2.509	5.267	6.361	2.552	2.534	2.497	2.730	2.496	3.840	3.070	4.345

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002. All data of exchange rate and interest rate are from Datastream.

(1) The basket share in Philippines depends on the results of Philippines peso's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression mo

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of

(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.58

Figure 13-4. Mean & Std. Dev. of Borrowing Costs
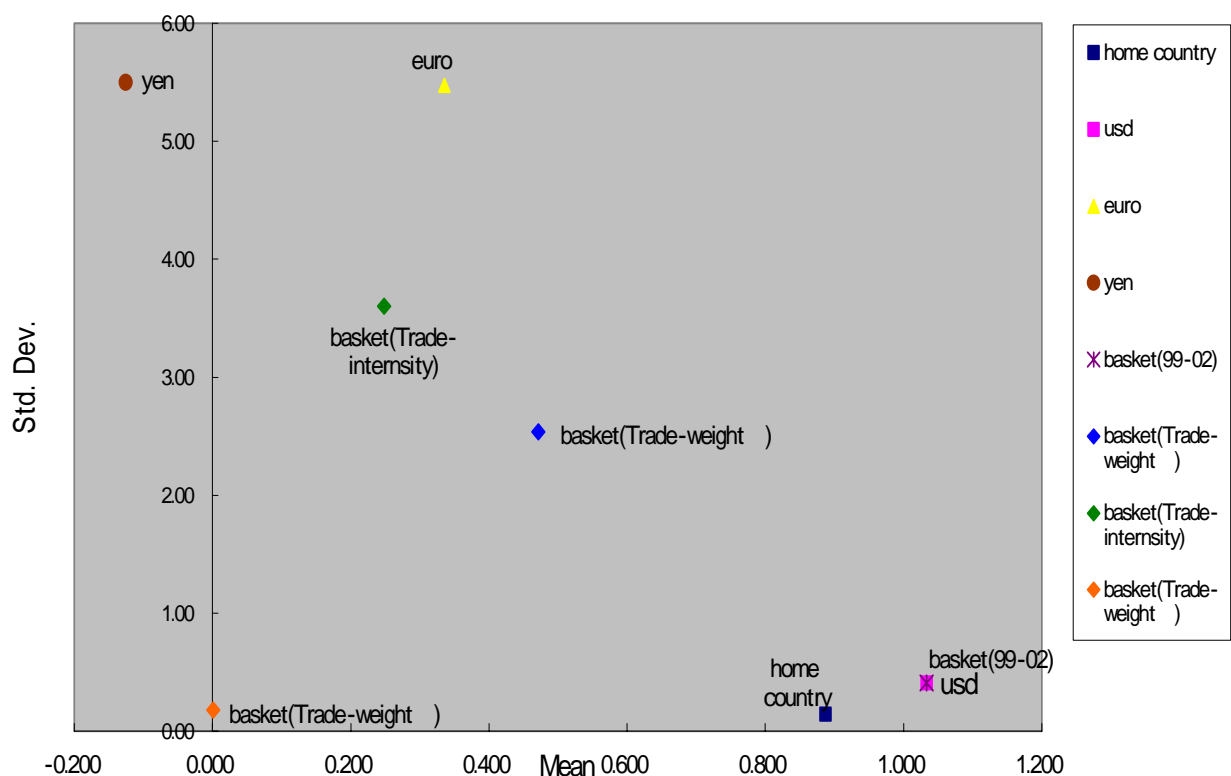## Philippines

Table1-5 . 3month borrowing costs in East Asian Countiries(%)

Indonesia borrowing from		Single currency type				Basket type								
						Estimated weights on 3major currencies based(1)					Trade based		
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	8.500	31.218	31.210	51.154	34.268	36.461	33.670	31.216	33.849	38.134	35.862	34.786
Mn	1999-2002	2.813	-24.957	-27.877	-26.575	-24.885	-24.833	-24.899	-24.645	-24.895	-25.460	-24.688	-24.735
Mean	1999-2002	3.977	1.920	1.080	0.614	1.720	1.576	1.759	1.764	1.747	1.274	1.504	1.617
Std. Dev.	1999-2002	1.587	11.451	11.453	11.658	11.291	11.218	11.317	11.241	11.309	11.008	11.100	11.178
(%)	1999	2.216	13.067	14.916	18.281	13.753	14.277	13.614	13.363	13.655	15.129	14.369	14.016
	2000	0.169	7.519	9.228	7.487	7.460	7.429	7.470	7.699	7.467	7.604	7.542	7.514
	2001	0.079	13.563	11.907	11.750	13.206	12.966	13.274	13.064	13.254	12.160	12.654	12.914
	2002	0.378	5.221	5.341	5.365	4.787	4.563	4.862	4.946	4.839	4.511	4.545	4.653

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002 All data of exchange rate and interest rate are from Datastream.

(1) The basket share in Indonesia depends on the results of Indonesia Rupiah's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression mode

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share o

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of

(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=3.6
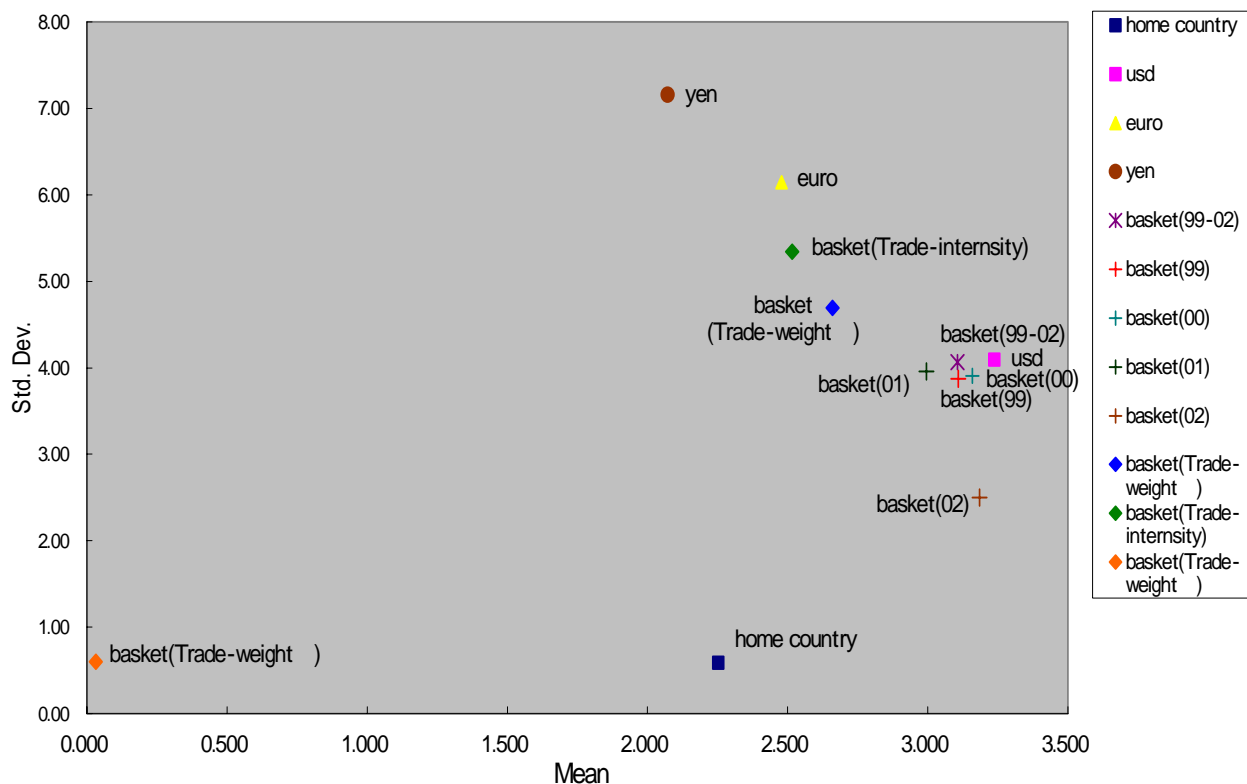
Figure 13-5. Mean & Std. Dev. of Borrowing Costs
Indonesia

Table1-6. 3month borrowing costs in East Asian Countiries(%)

Taiwan		Single currency type				Basket type								
						Estimated weights on 3major currencies based(1)					Trade based			
borrowing from		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	1.450	8.116	16.915	15.738	8.106	8.025	7.931	7.912	7.890	7.393	7.262	10.622
Min	1999-2002	0.500	-5.595	-10.122	-10.780	-4.859	-4.809	-5.297	-5.265	-3.433	-5.674	-4.357	-8.100
Mean	1999-2002	1.069	1.500	0.768	0.270	1.451	1.441	1.466	1.462	1.294	0.906	1.116	0.602
Std. Dev.	1999-2002	0.297	2.731	5.577	4.894	2.643	2.622	2.661	2.654	2.459	2.759	2.432	3.561
(%)	1999	0.043	1.483	2.833	5.885	1.350	1.325	1.383	1.373	1.176	2.403	1.578	4.061
	2000	0.029	2.967	5.600	3.490	3.013	3.003	2.957	2.956	3.072	3.229	3.081	3.179
	2001	0.184	2.482	5.673	5.126	2.425	2.438	2.498	2.500	2.469	3.044	2.694	3.970
	2002	0.065	2.764	2.938	4.176	2.539	2.505	2.627	2.613	1.959	1.768	1.594	2.752

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002 All data of exchange rate and interest rate are from Datastream.

(1) The basket share in Taiwan depends on the results of Taiwna New Dollar's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression model o

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share o

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of

(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.03
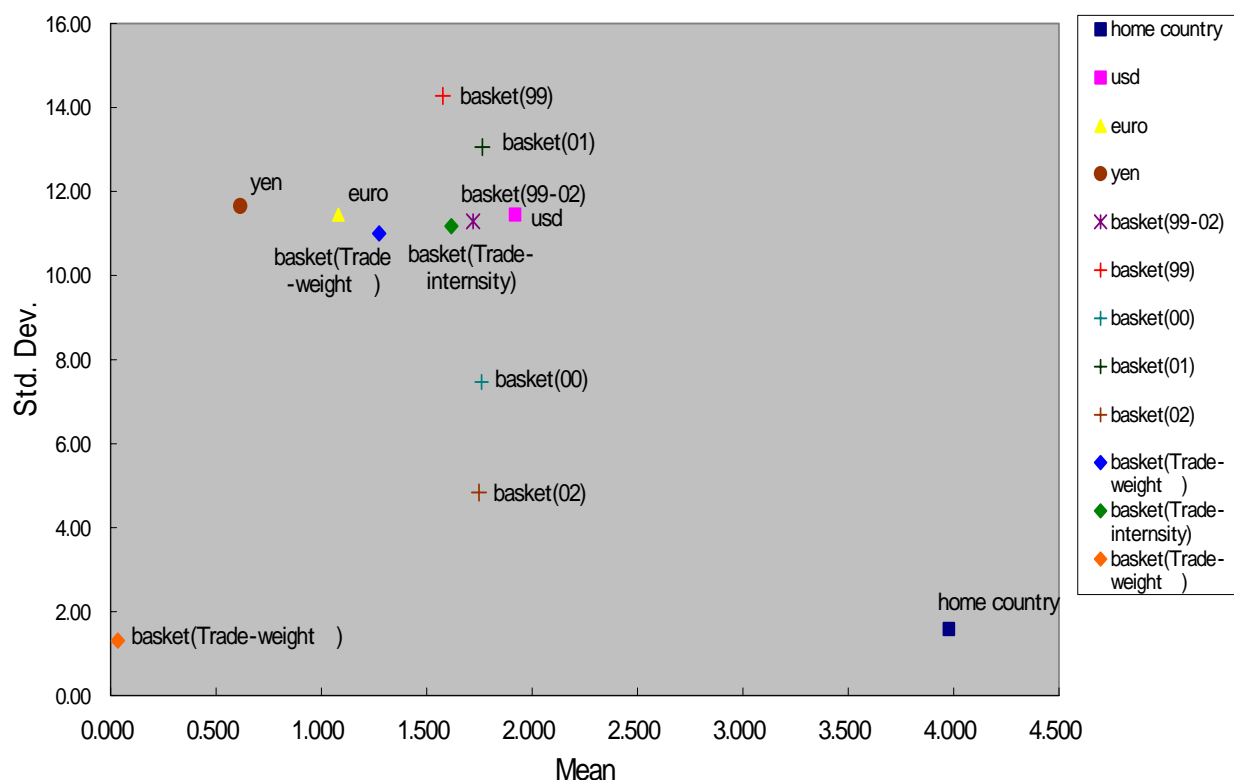

Figure 13-6 Mean & Std. Dev. of Borrowing Costs
Taiwan
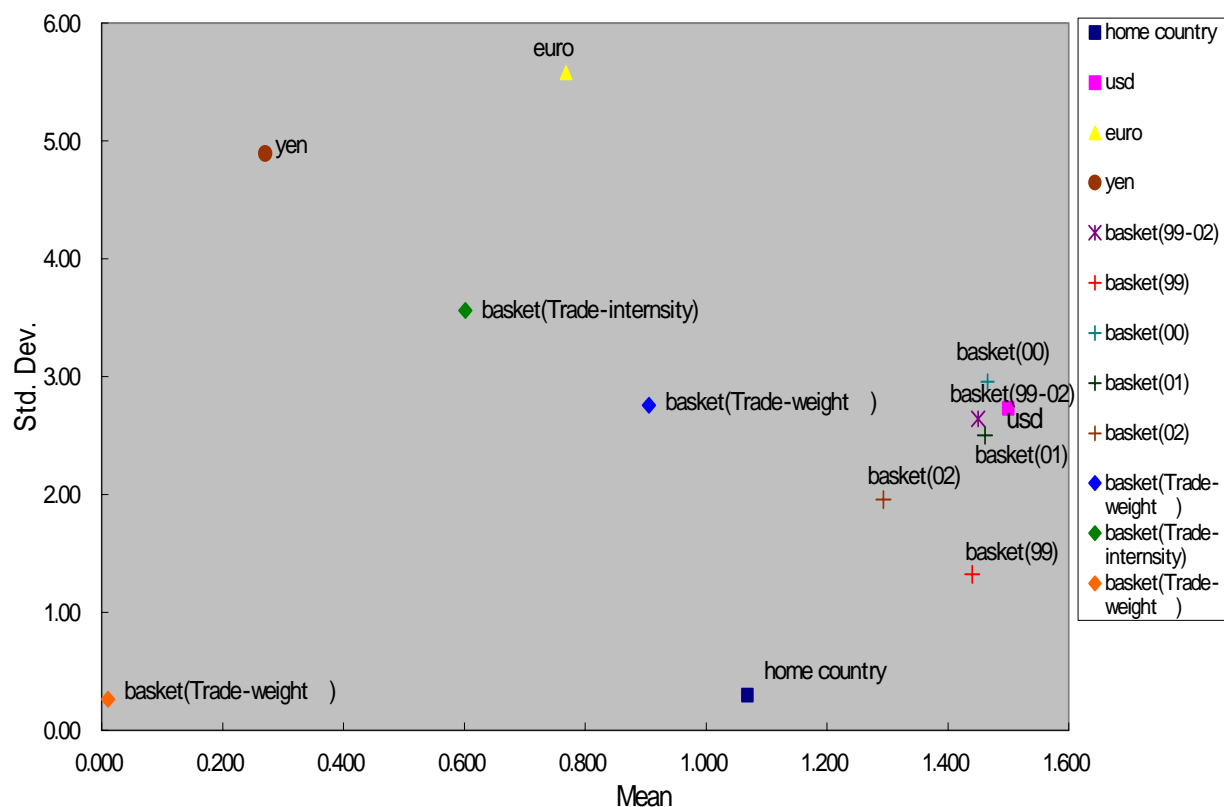
Table1-7 . 3month borrowing costs in East Asian Countiries(%)

Korea borrowing from		Single currency type				Basket type							
						Estimated weights on 3major currencies based(1)					Trade based		
		home country	usd	euro	yen	weights in all period (1999-2002)	weights in1999	weights in2000	weights in2001	weights in2002	Trade-weight (2)	Trade-weight (3)	Trade-intensity(4)
Max	1999-2002	2.068	15.710	28.557	22.852	14.918	15.605	15.710	14.064	16.034	15.299	15.258	15.793
Min	1999-2002	1.125	-11.052	-12.209	-9.857	-9.096	-9.968	-11.052	-8.614	-7.256	-7.512	-7.133	-7.422
Mean	1999-2002	1.571	1.248	0.548	-0.043	1.023	1.140	1.248	0.934	0.905	0.640	0.854	0.434
Std. Dev. (%)	1999-2002	0.283	4.557	7.224	4.988	4.163	4.386	4.557	3.990	4.295	4.246	4.140	4.062
	1999	0.167	3.280	5.312	8.090	3.689	3.434	3.280	3.943	4.007	4.928	4.171	5.834
	2000	0.045	3.885	6.576	3.628	3.794	3.886	3.885	3.683	4.042	4.017	3.909	3.644
	2001	0.197	4.755	9.265	3.475	4.384	4.672	4.755	4.050	4.873	4.740	4.558	3.741
	2002	0.038	4.555	1.952	2.896	3.631	4.077	4.555	3.345	3.035	2.194	2.908	2.069

All rates are calculated by authors. Sample period is 1/1/1999t- 12/31/2002. All data of exchange rate and interest rate are from Datastream.
(1) The basket share in Korea depends on the results of Korean Won's estimated weights on 3 major currencies. The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression model of Shimi
(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share
(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of
(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the result of 2000 and the shares are US:Japan: Euro=1.36


Figure 13-7. Mean & Std. Dev. of Borrowing Costs
Korea
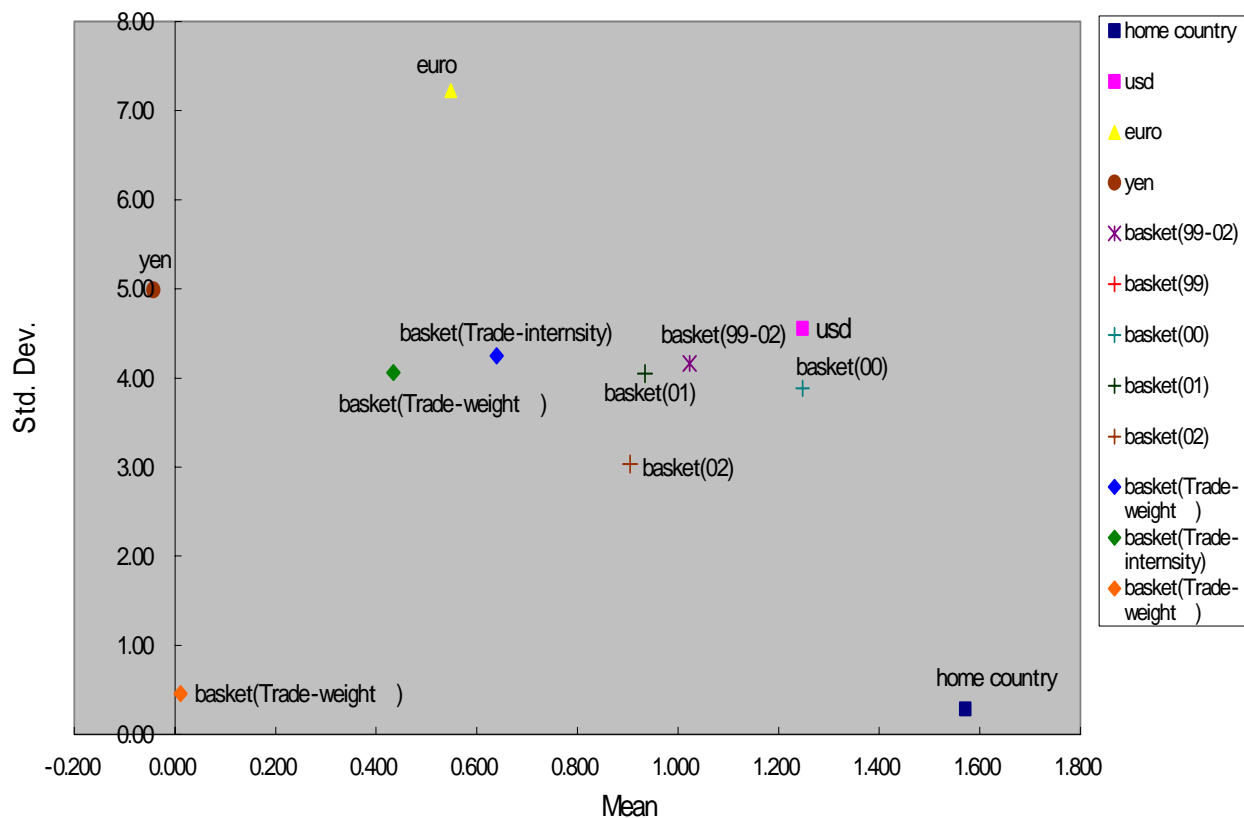
Table 2 : 3month investment returns in East Asian countries (%)

invest into		for US Investor (US dollar)	for Euro Area Investor (Euro)	for Japan Investor (Yen)
Singapore dollar	max	5.481	12.422	11.935
	min	-5.084	-10.469	-15.023
	mean	0.266	1.099	0.673
	Std.Dev.(%)	2.121	4.476	4.518
Thailand baht	max	11.497	16.554	14.182
	min	-10.396	-12.282	-23.262
	mean	-0.061	0.771	0.407
	Std.Dev.(%)	3.654	5.439	6.413
Malaysian ringgit	max	1.428	13.772	13.105
	min	0.773	-11.405	-14.264
	mean	0.886	1.795	1.364
	Std.Dev.	0.138	5.455	5.461
Philippines peso	max	12.660	19.317	18.547
	min	-11.413	-18.145	-19.146
	mean	0.221	1.092	0.735
	Std.Dev.	3.946	6.225	7.336
Indonesia rupiah	max	43.979	51.435	47.848
	min	-19.018	-19.651	-30.514
	mean	4.491	5.315	4.829
	Std.Dev.	12.936	13.398	12.829
New Taiwan dollar	max	7.063	13.675	13.678
	min	-6.221	-12.290	-12.492
	mean	0.673	1.554	1.090
	Std.Dev.	2.638	5.627	5.016
Korea won	max	14.281	17.058	13.047
	min	-10.670	-19.838	-17.274
	mean	1.549	2.465	1.904
	Std.Dev.	4.332	6.945	4.821
US dollar	max	1.610	14.612	12.656
	min	0.390	-11.733	-14.055
	mean	1.034	1.957	1.519
	Std.Dev.	0.408	5.587	5.528
Japanese yen	max	19.123	16.633	0.174
	min	-10.420	-18.807	0.011
	mean	0.849	0.682	0.050
	Std.Dev.	5.523	6.328	0.044
Euro	max	14.741	1.284	24.910
	min	-10.365	0.643	-13.665
	mean	0.327	0.944	0.722
	Std.Dev.	5.474	0.188	6.604

All are calculated by authors. Sample period is 1/1/1999t- 12/31/2002. All data of exchange rate and interest rate are from Datastream.

For Basket investment, we apply the basket share of Trade-weight and Trade-weight as a common basket ratio. They are depend on the calculation methods of Ogawa and Kawasak i (2003) and their basket shares are US:Japan:Euro=42.4% 34.7% 22.9%and 63.4% 23.3% 13.3%, respectively. The Basket shares which depend on each East Asian country's trade-intensity are also added.

Table2 3month investment returns in East Asian countries (%) -Continued-

invest into		for US Investor (US dollar)	for Euro Area Investor (Euro)	for Japan Investor (Yen)
Basket (Trade-weight)	max	8.589	11.861	10.666
	min	-4.284	-11.150	-8.969
	mean	0.833	1.303	0.828
	Std.Dev.(%)	2.676	4.216	3.463
Basket (Trade-weight)	max	5.543	12.809	10.730
	min	-2.384	-10.679	-10.658
	mean	0.897	1.537	1.071
	Std.Dev.(%)	1.607	4.582	4.087
Basket (Trade-intensity Singapore)	max	11.610	13.238	6.477
	min	-6.051	-13.907	-5.861
	mean	0.850	1.113	0.587
	Std.Dev.	3.376	4.870	2.258
Basket (Trade-intensity Thailand)	max	12.388	13.720	5.580
	min	-6.474	-14.626	-5.252
	mean	0.862	1.085	0.544
	Std.Dev.	3.559	5.074	2.027
Basket (Trade-intensity Malaysia)	max	12.549	13.748	5.475
	min	-6.571	-14.703	-5.126
	mean	0.860	1.073	0.530
	Std.Dev.	3.608	5.090	1.979
Basket (Trade-intensity Philippines)	max	11.436	13.570	6.179
	min	-5.895	-14.185	-6.000
	mean	0.872	1.153	0.622
	Std.Dev.	3.264	4.994	2.314
Basket (Trade-intensity Indonesia)	max	4.477	13.457	10.690
	min	-1.679	-10.848	-11.463
	mean	0.943	1.646	1.191
	Std.Dev.	1.171	4.873	4.429
Basket (Trade-intensity Taiwan)	max	13.484	13.883	4.900
	min	-7.142	-15.124	-4.391
	mean	0.849	1.005	0.452
	Std.Dev.	3.900	5.182	1.700
Basket (Trade-intensity Korea)	max	11.778	13.616	5.973
	min	-6.104	-14.336	-5.731
	mean	0.868	1.128	0.594
	Std.Dev.	3.371	5.018	2.210

All are calculated by authors. Sample period is 1/1/1999t- 12/31/2002. All data of exchange rate and interest rate are from Datastream.

For Basket investment, we apply the basket share of Trade-weight and Trade-weight as a common basket ratio. They are depend on the calculation methods of Ogawa and Kawasak i (2003) and their basket shares are US:Japan:Euro=42.4% 34.7% 22.9%and 63.4% 23.3% 13.3% respectively. The Basket shares which depend on each East Asian country's trade-intensity are also added.

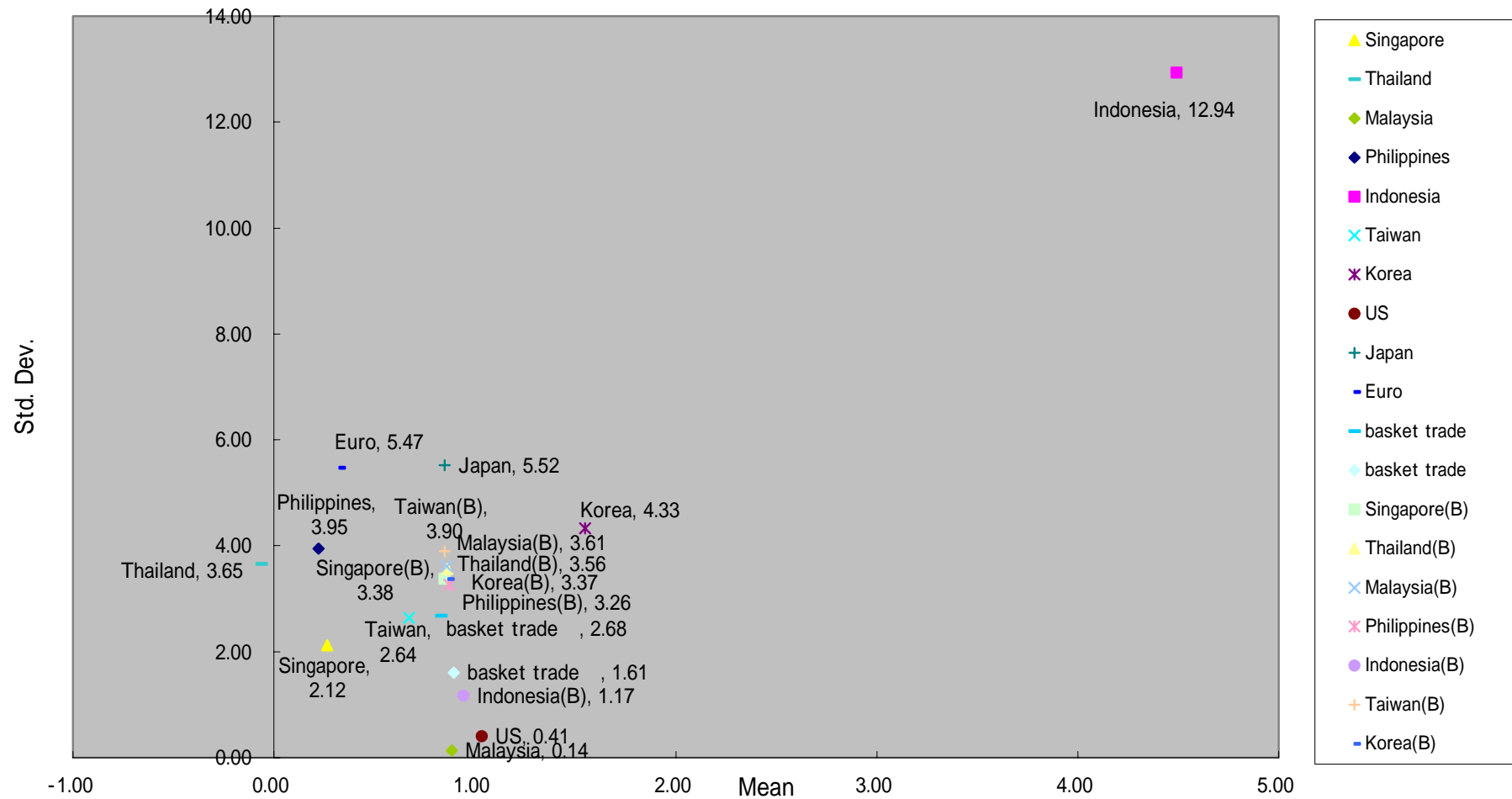Figure 14-1. Mean and Std. Dev. of Investment Return
for the US Investor

Figure 14-2. Mean and Std. Dev. of Investment Return
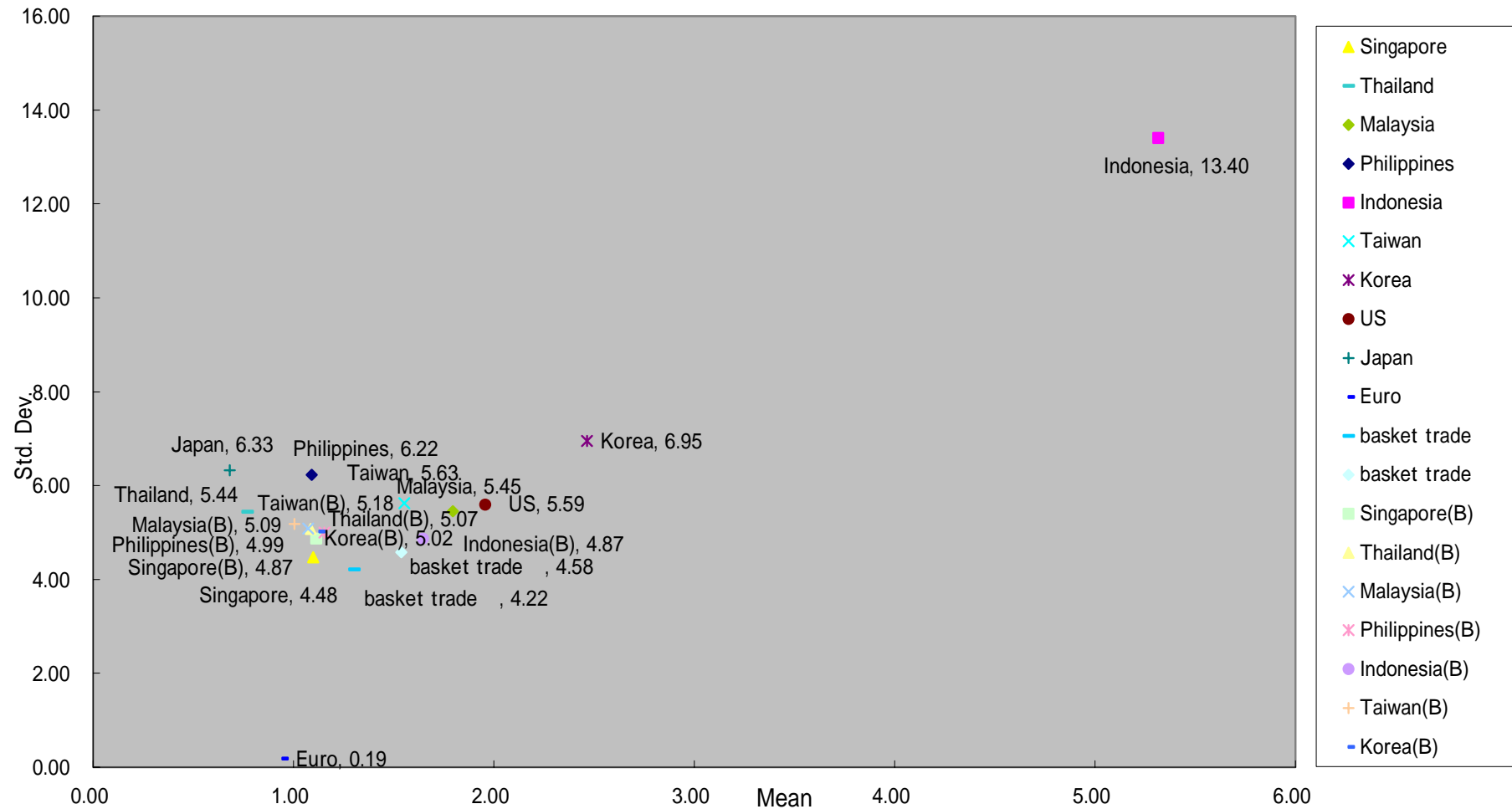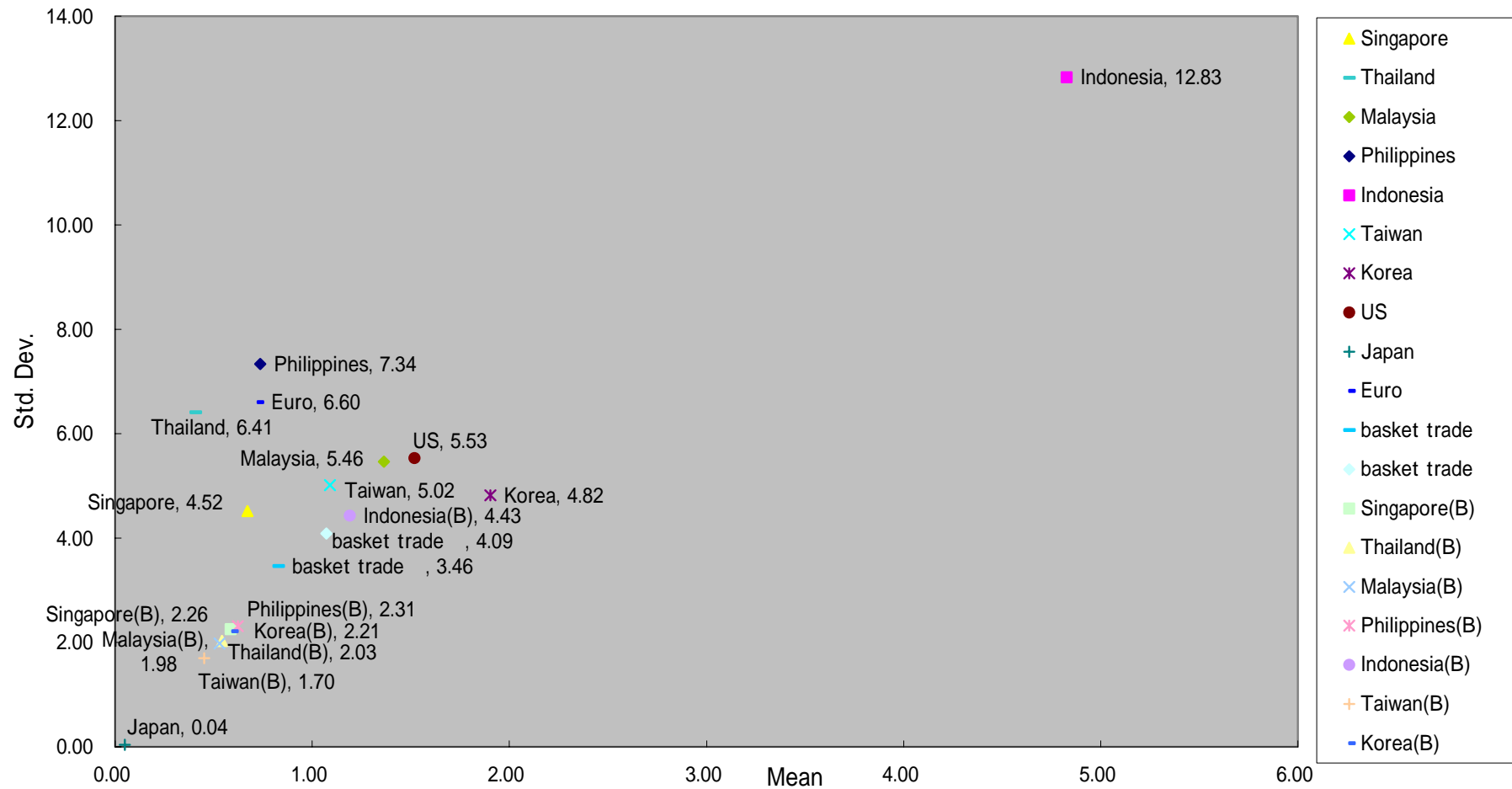for the Euro Investor

Figure 14-3. Mean and Std. Dev. of Investment Return for the Japanese Investor

Table 3-1. Forward swap bid-ask spreads (% in transaction basis)
in 7 East Asian Currencies against 3 Major currencies

currency	against	spreads (%) (sample day: Sept 13, 2002)			spreads (%) (sample day: Feb 6, 2003)			spreads (%) (average)		
		1m	3m	6m	1m	3m	6m	1m	3m	6m
Singapore Dollar	US dollar	0.0907	0.1020	0.1020	0.0344	0.0344	0.0344	0.0625	0.0682	0.0682
	Euro	0.1313	0.1417	0.1373	0.0714	0.0806	0.0693	0.1014	0.1111	0.1033
	JPYen	0.1168	0.1281	0.1327	0.0774	0.0787	0.0825	0.0971	0.1034	0.1076
	average	0.1129	0.1239	0.1240	0.0611	0.0646	0.0621	0.0870	0.0943	0.0930
Thailand Baht	US dollar	0.1194	0.1405	0.1171	0.0234	0.0409	0.0234	0.0714	0.0907	0.0702
	Euro	0.1601	0.1803	0.1526	0.0604	0.0872	0.0586	0.1103	0.1337	0.1056
	JPYen	0.1450	0.1652	0.1455	0.0662	0.0848	0.0708	0.1056	0.1250	0.1082
	average	0.1415	0.1620	0.1384	0.0500	0.0710	0.0509	0.0958	0.1165	0.0947
Malaysian Ringgit	US dollar	0.2763	0.2895	0.3158	0.0237	0.0368	0.0632	0.1500	0.1632	0.1895
	Euro	0.3168	0.3287	0.3499	0.0608	0.0832	0.0982	0.1888	0.2059	0.2241
	JPYen	0.3016	0.3129	0.3404	0.0665	0.0805	0.1094	0.1840	0.1967	0.2249
	average	0.2982	0.3103	0.3354	0.0503	0.0668	0.0903	0.1743	0.1886	0.2128
Philippine peso	US dollar	0.1914	0.1914	0.3827	0.1853	0.3706	0.5559	0.1883	0.2810	0.4693
	Euro	0.2321	0.2314	0.4172	0.2226	0.4170	0.5894	0.2273	0.3242	0.5033
	JPYen	0.2157	0.2115	0.3885	0.2233	0.3896	0.5368	0.2195	0.3006	0.4627
	average	0.2130	0.2114	0.3962	0.2104	0.3924	0.5607	0.2117	0.3019	0.4784
Indonesian Rupiah	US dollar	0.2230	0.3903	0.5018	0.1580	0.2821	0.4514	0.1905	0.3362	0.4766
	Euro	0.2639	0.4302	0.5365	0.1952	0.3287	0.4855	0.2296	0.3795	0.5110
	JPYen	0.2443	0.3918	0.4729	0.1975	0.3094	0.4486	0.2209	0.3506	0.4607
	average	0.2437	0.4041	0.5037	0.1836	0.3067	0.4618	0.2137	0.3554	0.4828
New Taiwan Dollar	US dollar	0.0581	0.0872	0.1453	0.0460	0.0748	0.1035	0.0521	0.0810	0.1244
	Euro	0.0988	0.1270	0.1804	0.0830	0.1207	0.1379	0.0909	0.1239	0.1591
	JPYen	0.0843	0.1134	0.1759	0.0890	0.1190	0.1516	0.0866	0.1162	0.1638
	average	0.0804	0.1092	0.1672	0.0727	0.1049	0.1310	0.0765	0.1070	0.1491
Korean Won	US dollar	0.0914	0.0914	0.1246	0.0764	0.0764	0.0764	0.0839	0.0839	0.1005
	Euro	0.1322	0.1315	0.1604	0.1135	0.1229	0.1117	0.1228	0.1272	0.1360
	JPYen	0.1169	0.1158	0.1505	0.1188	0.1189	0.1210	0.1178	0.1174	0.1357
	average	0.1135	0.1129	0.1452	0.1029	0.1061	0.1030	0.1082	0.1095	0.1241
Euro	US dollar	0.0408	0.0402	0.0362	0.0371	0.0463	0.0352	0.0389	0.0433	0.0357
JP Yen	US dollar	0.0261	0.0262	0.0308	0.0429	0.0442	0.0479	0.0345	0.0352	0.0394
JP Yen	Euro	0.0668	0.0661	0.0664	0.0799	0.0902	0.0826	0.0734	0.0781	0.0745

calculated by authors

Souces: 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.

Table 3-2. Forward swap bid-ask spreads (% in daily basis)
in 7 East Asian Currencies against 3 Major currencies

| currency	against	spreads (daily, %) (sample day: Sept 13, 2002)			spreads (daily, %) (sample day: Feb 6, 2003)			spreads (daily, %) (average)		
		1m	3m	6m	1m	3m	6m	1m	3m	6m
Singapore Dollar	US dollar	0.0030	0.0011	0.0006	0.0011	0.0004	0.0002	0.0021	0.0007	0.0004
	Euro	0.0044	0.0016	0.0008	0.0024	0.0009	0.0004	0.0034	0.0012	0.0006
	JPYen	0.0036	0.0013	0.0007	0.0026	0.0009	0.0005	0.0031	0.0011	0.0006
	average	0.0037	0.0013	0.0007	0.0020	0.0007	0.0003	0.0029	0.0010	0.0005
Thailand Baht	US dollar	0.0040	0.0015	0.0006	0.0008	0.0004	0.0001	0.0024	0.0010	0.0004
	Euro	0.0053	0.0020	0.0008	0.0020	0.0010	0.0003	0.0037	0.0015	0.0006
	JPYen	0.0046	0.0017	0.0008	0.0022	0.0009	0.0004	0.0034	0.0013	0.0006
	average	0.0046	0.0017	0.0007	0.0017	0.0008	0.0003	0.0031	0.0013	0.0005
Malaysian Ringgit	US dollar	0.0092	0.0032	0.0017	0.0008	0.0004	0.0003	0.0050	0.0018	0.0010
	Euro	0.0106	0.0036	0.0019	0.0020	0.0009	0.0005	0.0063	0.0023	0.0012
	JPYen	0.0098	0.0033	0.0018	0.0022	0.0009	0.0006	0.0060	0.0021	0.0012
	average	0.0098	0.0034	0.0018	0.0017	0.0007	0.0005	0.0058	0.0021	0.0012
Philippine peso	US dollar	0.0064	0.0021	0.0021	0.0062	0.0041	0.0031	0.0063	0.0031	0.0026
	Euro	0.0077	0.0025	0.0023	0.0074	0.0046	0.0033	0.0076	0.0036	0.0028
	JPYen	0.0069	0.0022	0.0021	0.0074	0.0043	0.0030	0.0072	0.0033	0.0025
	average	0.0070	0.0023	0.0022	0.0070	0.0043	0.0031	0.0070	0.0033	0.0026
Indonesian Rupiah	US dollar	0.0074	0.0043	0.0028	0.0053	0.0031	0.0025	0.0064	0.0037	0.0026
	Euro	0.0088	0.0047	0.0030	0.0065	0.0036	0.0027	0.0077	0.0042	0.0028
	JPYen	0.0079	0.0042	0.0026	0.0066	0.0034	0.0025	0.0072	0.0038	0.0025
	average	0.0080	0.0044	0.0028	0.0061	0.0034	0.0026	0.0071	0.0039	0.0027
New Taiwan Dollar	US dollar	0.0017	0.0009	0.0008	0.0015	0.0008	0.0006	0.0016	0.0009	0.0007
	Euro	0.0031	0.0013	0.0010	0.0028	0.0013	0.0008	0.0029	0.0013	0.0009
	JPYen	0.0023	0.0011	0.0009	0.0030	0.0013	0.0008	0.0027	0.0012	0.0009
	average	0.0024	0.0011	0.0009	0.0024	0.0012	0.0007	0.0024	0.0011	0.0008
Korean Won	US dollar	0.0030	0.0010	0.0007	0.0025	0.0008	0.0004	0.0028	0.0009	0.0006
	Euro	0.0044	0.0014	0.0009	0.0038	0.0014	0.0006	0.0041	0.0014	0.0008
	JPYen	0.0036	0.0012	0.0008	0.0040	0.0013	0.0007	0.0038	0.0012	0.0007
	average	0.0037	0.0012	0.0008	0.0034	0.0012	0.0006	0.0036	0.0012	0.0007
Euro	US dollar	0.0014	0.0004	0.0002	0.0012	0.0005	0.0002	0.0013	0.0005	0.0002
JP Yen	US dollar	0.0009	0.0003	0.0002	0.0014	0.0005	0.0003	0.0012	0.0004	0.0002
JP Yen	Euro	0.0022	0.0007	0.0004	0.0027	0.0010	0.0005	0.0024	0.0009	0.0004

calculated by authors

Souces: 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.

Table 4. The change of Forward swap bid-ask spreads (% in transaction basis) in 2 East Asian Currencies against 3 Major currencies

currency	against	spreads (%) (sample day: June 30, 1999)			spreads (%) (sample day: June 30, 2000)			spreads (%) (sample day: July 1, 2001)			spreads (%) (sample day: July 2, 2002)			spreads (%) (sample day: Feb 6, 2003)		
		1m	3m	6m	1m	3m	6m	1m	3m	6m	1m	3m	6m	1m	3m	6m
Singapore $	USdollar	0.0706	0.0882	0.1176	0.0608	0.0926	0.0984	0.0329	0.0604	0.0659	0.0240	0.0282	0.0395	0.0344	0.0344	0.0344
	Euro	0.0948	0.1128	0.1478	0.1139	0.1658	0.1817	0.0901	0.1461	0.1371	0.0847	0.0837	0.0997	0.0714	0.0806	0.0693
	JPYen	0.1121	0.1177	0.1603	0.0992	0.1453	0.1569	0.0684	0.0998	0.1224	0.0591	0.0701	0.0899	0.0774	0.0787	0.0825
	average	0.0925	0.1062	0.1419	0.0913	0.1346	0.1457	0.0638	0.1021	0.1084	0.0559	0.0607	0.0764	0.0611	0.0646	0.0621
Thailand Baht	USdollar	0.2171	0.2443	0.3257	0.1532	0.2042	0.2553	0.2869	0.3311	0.4414	0.1445	0.1686	0.1927	0.0234	0.0409	0.0234
	Euro	0.2417	0.2700	0.3591	0.2064	0.2787	0.3416	0.3443	0.4176	0.5138	0.2051	0.2237	0.2520	0.0604	0.0872	0.0586
	JPYen	0.2582	0.2716	0.3606	0.1912	0.2539	0.3062	0.3195	0.3596	0.4706	0.1793	0.2092	0.2402	0.0662	0.0848	0.0708
	average	0.2390	0.2620	0.3485	0.1836	0.2456	0.3010	0.3169	0.3694	0.4753	0.1763	0.2005	0.2283	0.0500	0.0710	0.0509
Euro	USdollar	0.0242	0.0242	0.0290	0.0530	0.0735	0.0840	0.0572	0.0861	0.0720	0.0608	0.0557	0.0608	0.0371	0.0463	0.0352
JPYen	USdollar	0.0413	0.0289	0.0413	0.0386	0.0518	0.0565	0.0354	0.0395	0.0564	0.0350	0.0417	0.0501	0.0429	0.0442	0.0479
JPYen	Euro	0.0654	0.0529	0.0701	0.0914	0.1244	0.1384	0.0925	0.1247	0.1268	0.0957	0.0970	0.1099	0.0799	0.0902	0.0826

calculated by authors

Souces: All spot rates and forward rates are collected from Bloomberg currency composit pages. Forward swap spreads are calculated by bid and ask spreads on both spot and forward rates.

Figure 15. The change of 6 months forward swap bid-ask spreads (% in transaction basis) 1999 - 2003 .
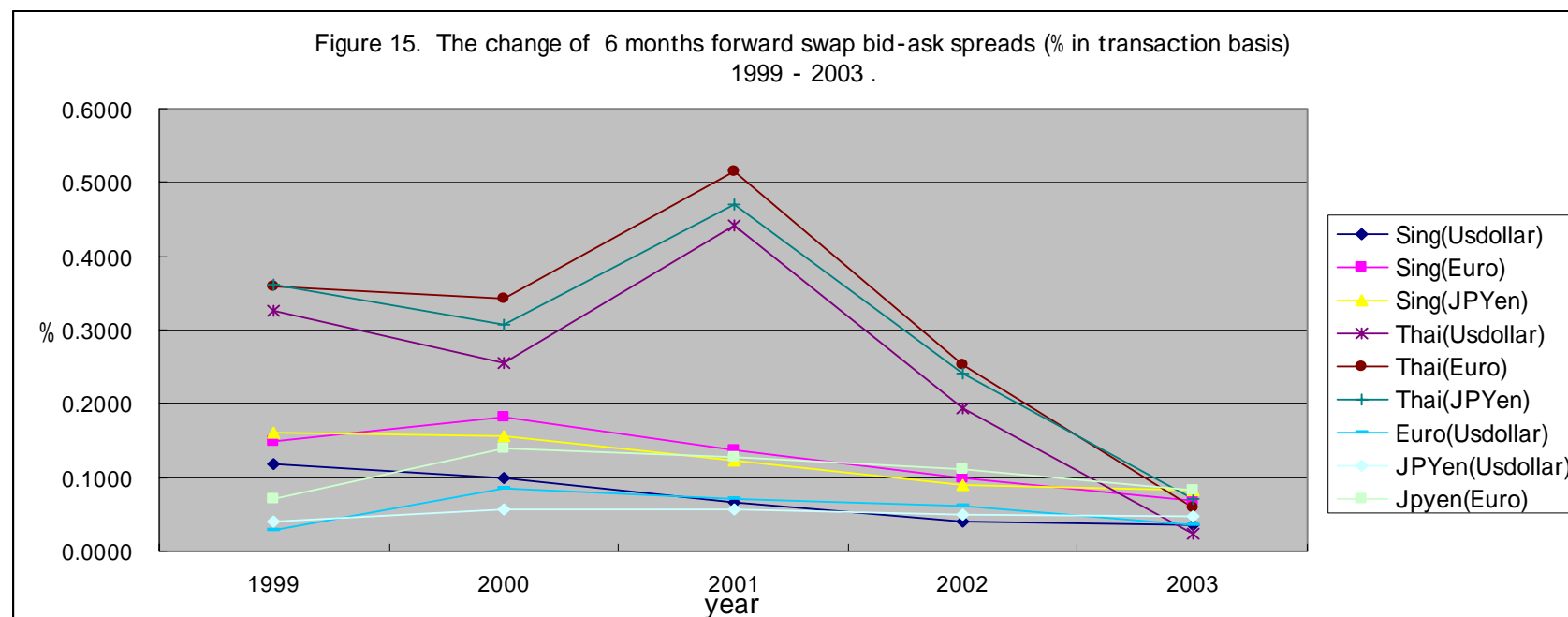
Appendix 1. The patterns of Currency Basket Share(%)

| | Estimated weights on 3major currencies based(1) | | | | | | | | | | | | | | | Trade based | | | | | | | | |
| | weights in all period (1999-2002) | | | weights in1999 | | | weights in2000 | | | weights in2001 | | | weights in2002 | | | Trade-weight (2) | | | Trade-weight (3) | | | Trade-intensity(4) | | |
	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro	USD	JPY	Euro
Singapore	80.5	16.8	2.7	87.4	12.7	0.0	85.7	14.1	0.2	74.1	19.4	6.5	68.4	25.8	5.8							31.5	57.5	11.0
Thailand	82.7	16.1	1.2	87.8	12.2	0.0	82.3	17.2	0.5	78.2	17.5	4.3	76.5	14.8	8.7							29.9	62.0	8.1
Malaysia	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0	100.0	0.0	0.0							29.0	62.9	8.1
Philippines	86.4	7.2	4.4	88.0	9.6	2.4	93.2	6.8	0.0	75.7	14.3	9.9	95.1	4.0	0.9	42.4	37.7	22.9	63.4	23.3	13.3	35.3	56.7	8.0
Indonesia	84.7	15.3	0.0	73.7	26.3	0.0	87.7	12.3	0.0	81.4	0.0	18.6	86.8	13.2	0.0							73.9	17.9	8.2
Taiwan	94.2	1.4	4.4	93.6	2.5	3.9	97.2	2.8	0.0	96.9	3.1	0.0	78.8	10.3	10.9							23.6	68.1	8.3
Korea	82.7	16.1	1.2	87.8	12.2	0.0	82.3	17.2	0.5	78.2	17.5	4.3	76.5	14.8	8.7							33.3	58.7	8.1

Calculated by authors.

(1) The estimated weights of whole period basket(1999-2002 and annual basket(1999, 2000, 2001 and 2002) are calculated by regression model of Shimizu(2002). We use daily exchange rates to calculate these estimated weights and all data are from Datastream.

(2) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasaki (2003). Thier traded weights are the share of total trade amount of ASEAN+2(Korea and Taiwan) against US, Japan and 12Euro countries. We use the average share of monthly results in the period of Jan. 1998 to Oct. 2000 . Data are from Directions of Trade(IMF). As a result, the basket share is US:Japan:Euro=42.4% 34.7% 22.9%

(3) The basket share of Trade-weight depends on the calculation methods of Ogawa and Kawasak i (2003). The difference of Trade-weight and Trade-weight is whether the trade share includes the trade amount of 7 sampled Asian countries against the rest of the world. Trade-weight includes these trade data and puts the total amount of trade against the rest of the world into US category. We use the average share of monthly results in the period of Jan. 1988 to Aug. 2001 . All trade data except Taiwan are from Directions of Trade(IMF). The data of Taiwan are from National Statistics of Taiwan. As a result, the basket share is US:Japan:Euro=63.4% 23.3% 13.3%

(4) The basket share of Trade-intensity in Thailand depends on the results of Kawai and Akiyama (2000). Each Asian country's trade intensity is calculated by the method of Perti(1993). Here we use the results calculated by trade data as of 2000.