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

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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: (i) the currency basket denominated bonds would be able to decrease foreign exchange risks in both borrowing and investment sides; (ii) the US dollar has the highest degree of liquidity for all of the nine East Asian currencies; (iii) both investors and bond issuers face 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

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1. Introduction

It is said that we have both an abundance of savings in East Asia and profitable investment opportunities in East Asian emerging market countries. However, we have a problem of how efficiently we should match the savings with the investments within East Asia. One of its solutions may be to establish and activate regional bond markets in East Asia. Both borrowers and lenders in East Asia would face 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 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 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 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 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 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 third section considers about liquidity in regional bond markets from a viewpoint of denomination currency. The forth section is a summary and conclusion of this paper.

2. Foreign exchange risks

2-1 Methodology and data

We investigate how much foreign exchange risks both investors and bond issuers would face 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 nine East Asian countries (Singapore, Thailand, Malaysia, the Philippines, Indonesia, Taiwan, Korea, Hong Kong and China) 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 nine East Asian currencies against the three major currencies. The estimated method depends on the regression model of Frankel and Wei (1994) which analyzed *de facto*

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.

foreign exchange regimes due to the fluctuations of currency to the fluctuation of various potential anchor currencies. Here we regress daily exchange rates of the nine 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.

$$\Delta \log e^{\text{Asian currency/Sfr}} = a_0 + a_1 \Delta \log e^{\text{USDollar/Sfr}} + a_2 \Delta \log e^{\text{Jpy/Sfr}} + a_3 \Delta \log e^{\text{euro/Sfr}} + \varepsilon \quad (1)$$

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.² 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.³

Next, we apply the trade weights of the nine East Asian countries with the United States,

² Regarding the model specification and statistical tests of each time series data, please see the Shimizu (2003) which empirically analyzed the weights of the seven East Asia currencies against four major currencies from 1990 to 2002 by using daily exchange rates. Other empirical studies related Asian currencies are Kawai and Akiyama (1998) and Ogawa (2002).

³ Since Malaysia, Hong Kong and China have assigned the dollar-peg currency system in our sample period (actually dollar-peg in Malaysia started from September 1999), their estimated shares of three major currencies are US dollar : Japanese yen : euro = 1 : 0 : 0 for both whole period and sub-periods.

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+4 (Korea, Taiwan, Hong Kong and China) with the United States, Japan, and the Euro area countries. A difference between trade-weights I and II is whether the trade weights include the trade amounts of the nine East Asian countries with the rest of the world. Trade-weight I is based on a trade share of total trade amounts in the nine East Asian countries only with each of the United States, Japan, and the Euro area countries. Trade-weight II is based on a trade share which includes trade amounts with the rest of the world other than the United States, Japan, and the Euro area countries. We put them into the share of the United States by assuming that the trade amounts with the rest of the world are invoices in terms of the US dollar. We calculate both trade weights by using annual data and apply the average share of annual results during the period from 1990 to 2002. The results of currency basket share based on trade-weights I and II are the US dollar : the Japanese yen : the euro = 35.7% : 35.1% : 29.2% and 69.3% : 16.7% : 14.0%, respectively.

We use another type of currency basket share based on trade volume, so-called trade intensity, which is calculated by the method of Petri (1993).⁴ The index of trade intensity, which

⁴ Kawai and Takagi (2000) calculated the trade intensity of East Asia and Western Europe. It can be found that intensity is extremely high in many trading pairs in East Asia, frequently exceeding the

can measure the bilateral trade linkages among countries (or regions), is defined as follows:

$$I_{j,k} = (T_{j,k}/T_j)/(T_k/T_w) \quad (2)$$

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.

A situation where the index of trade intensity is a unity can be interpreted as a neutral bilateral trade relationship. The index of trade intensity measures the closeness of bilateral trade linkage between countries j and k by comparing it with their trade volumes with the rest of the world. In the case where the index of trade intensity is over or under a unity, it means that the trade relationship is biased in comparison with the trade with the rest of the world. Values over a unity mean that the trade relationship between countries j and k is biased toward stronger interdependence than the trades with the rest of the world. On one hand, values under a unity mean that their trade relationship is biased toward weaker interdependence than the trades with the rest of the world.

Here we use an index of trade intensity in 2000.⁵ The index of trade intensity between East Asian countries and Japan are all larger than a unity. The index between Indonesia and

corresponding figures in European pairs.

⁵ See Appendix 1 for the results of trade intensity of East Asian countries in 2000. All trade data except Taiwan are from the Direction of Trade Statistics (IMF). The data of Taiwan are from the National Statistics of Taiwan.

Japan, which is 3.60, is the highest. The index of trade intensity between Hong Kong and Japan, which is 1.75, is the lowest. Some indexes of trade intensity between East Asian countries and the United States are larger than a unity but smaller than those between East Asian countries and Japan. The indexes of trade intensity between East Asian countries and the Euro area countries are smaller than a unity.

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 2 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.

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

3 months foreign borrowing costs

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

where $(A/US\$)_t$: 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.⁶ 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 nine East Asian countries that include Singapore, Thailand, Malaysia, the Philippines, Indonesia, Taiwan, Korea, Hong

⁶ 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, Hong Kong Interbank 3 months, China Time Deposit Rate 3months.

Kong and China. 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 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 nine 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.

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

Tables 1-1 to 1-9 show means and standard deviations of 3 months foreign borrowing costs when borrowers in each of the nine 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. We regard the foreign borrowing cost in terms of the US dollar as a benchmark and test the difference of standard deviation between bond denominated in terms of the US dollar and bond denominated in terms of currency basket statistically.⁷

Those results provide two substantial evidences. First, the standard deviations of home currency denominated bonds are far lower than those of foreign currency denominated bonds in the nine East Asian countries. It means that the foreign exchange risks 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. 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 1-1 to 1-9 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 nine East Asian currencies.

⁷ We use O'Brien test, Brown-Forsythe test and Levene test for the test that the variances are equal.

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 1.556 percent and the difference from the standard deviation of the US dollar denominated bonds is statistically significant. This level is much lower than 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 bond with the share of the trade-weight I, which is 1.881 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. These results mean that issuing the currency basket denominated bonds except the trade intensity would decrease the volatility of 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 3.971 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 3.787 percent and the difference from the standard deviation of the US dollar denominated bonds is statistically significant. This level is much lower than those of the bonds denominated in terms of the euro and the Japanese yen. The

standard deviation of issuing the currency basket denominated bonds with the share based on the trade-intensity is 5.146 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 percent. It means that there is no foreign exchange risk in the Malaysian ringgit 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 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. These results are almost common with other US dollar-peg countries which include Hong Kong and China. For these countries adopting US dollar-peg currency system, the foreign exchange risk of issuing the US dollar denominated bonds are lowest and there are less incentive to issue the currency basket denominated bonds.

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 but the difference from the standard deviation of the US dollar denominated bonds is not statistically significant. This

level 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 standard deviation of currency basket bonds with the share based on the trade-weights I is the lowest among the four types of basket share and it is 10.974 percent. The difference from the standard deviation of the US dollar denominated bonds is statistically significant. 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 5.577 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 2.465 percent and is significantly 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 slightly lower than the US dollar denominated bonds but the difference is not statistically significant. 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 seems 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 4.061 percent and the difference from the standard deviation of the US dollar denominated bonds is statistically significant. The standard deviation of the currency basket denominated bonds with the share based on estimated weights is the second lowest of 4.162 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 nine 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 the Philippines and three US dollar-peg countries, Malaysia, Hong Kong, and China. It is interesting that the most effective type of currency basket share is different among the nine 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. ⁸ The currency basket share based on trade-weight II is the most effective in decreasing the volatilities for Singapore, Thailand 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. 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.

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 the US

⁸ 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

dollar-peg countries and the Philippines.

2-3 Results - Investment returns for investors in the US, the Euro area, and Japan -

Table 2-1, 2-1 and 2-3 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 nine 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.⁹ 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 nine 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.

⁹ We test the unequal of variance between investment returns in US Dollar and investment returns into Trade-weight based basket bonds. Regarding the trade-intensity based basket bond, we test the unequal of variance between the trade-intensity based bond and investment returns into each of Asian currencies.

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 area, and Japan. Issuing the currency basket denominated bonds contribute to decreasing the foreign exchange risks for investors in the United States, Japan, and the Euro area countries.

The second group includes Singapore, Malaysia, Taiwan, Hong Kong and China. 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 the US dollar-pegged countries reflects their currency system. 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 2-1 to 2-3 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 US dollar-pegged currencies, Malaysian ringgit, Hong Kong dollar and Chinese renminbi has the lowest risk among the sampled countries and is nearly same as investing into the US dollar denominated bonds. Investing into the bonds denominated in terms of the Singapore dollar and Taiwan dollar is the second lowest risky group. Their standard deviations of investment returns are 2.12 percent and 2.64 percent, respectively. These levels are lower than the standard deviation of investment returns into the currency basket denominated bonds with share of trade-weight I (2.80 percent), which is the US dollar : the Japanese yen : the euro=35.7% : 35.1% : 29.2%, but higher than the standard deviation of investment returns into the currency basket denominated bonds with share of trade-weight II (1.31 percent), which is the US dollar : the Japanese yen : the euro = 69.3% : 16.7% : 14.0%. 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 is 4.22 percent and 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 3.74 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 nine 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 nine 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 nine East Asian Countries except Singapore.

For investors in Japan, 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 3.45 percent and 4.44 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 nine 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 nine 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, Taiwan, Hong Kong and China 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.

3. 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.

Due to constraints of data on bid-ask spreads in bond markets across the all sampled countries, we use the bid-ask spreads in foreign exchange markets as an indicator of liquidity.

¹⁰Bid-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

¹⁰ Our commentator indicates that the bid-ask spreads in foreign exchange forward swap market account for the hedging costs of foreign investment.

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 eight 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 Hong Kong dollar, 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 eight East Asian currencies, the Hong Kong dollar and the Taiwan dollar are the lowest bid-ask spreads currencies. 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 nine 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 nine 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 3 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.

4. 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, Korea, Hong Kong and China 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 nine 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 nine 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 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.

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

| Singapore borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-----------------------------|-----------|----------------------|--------|--------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 6.797 | 5.481 | 11.214 |
| Min | 1999-2002 | 0.172 | -4.593 | -9.445 | -10.129 | -3.065 | -3.324 | -3.259 | -2.780 | -2.811 | -3.707 | -2.330 | -5.557 |
| Mean | 1999-2002 | 0.483 | 1.301 | 0.526 | 0.065 | 1.072 | 1.144 | 1.125 | 1.010 | 0.937 | 0.668 | 0.998 | 0.505 |
| Std. Dev. (%) | 1999-2002 | 0.167 | 2.346 | 4.474 | 4.542 | 1.836*** | 1.997 | 1.963 | 1.698 | 1.703 | 1.881*** | 1.556*** | 2.536** |
| | 1999 | 0.085 | 1.385 | 2.999 | 6.137 | 1.323 | 1.233 | 1.252 | 1.452 | 1.717 | 2.620*** | 1.404 | 3.693*** |
| | 2000 | 0.046 | 1.144 | 3.742 | 2.294 | 1.040 | 1.089 | 1.084 | 0.986 | 1.010 | 1.205 | 0.970*** | 1.273*** |
| | 2001 | 0.067 | 2.945 | 4.273 | 3.589 | 2.499 | 2.684 | 2.652 | 2.299*** | 2.253 | 1.519*** | 2.019*** | 2.174*** |
| | 2002 | 0.053 | 1.896 | 3.150 | 4.465 | 1.021 | 1.262 | 1.195 | 0.878 | 0.856*** | 1.820 | 0.858*** | 2.409*** |

All are calculated by authors. Sample period is 1/1/1999 - 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Singapore depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USDollar : JPYen : euro = 31.5 : 57.5 : 11.0.

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

Figure1-1. Mean & Std. Dev. of Borrowing Costs Singapore

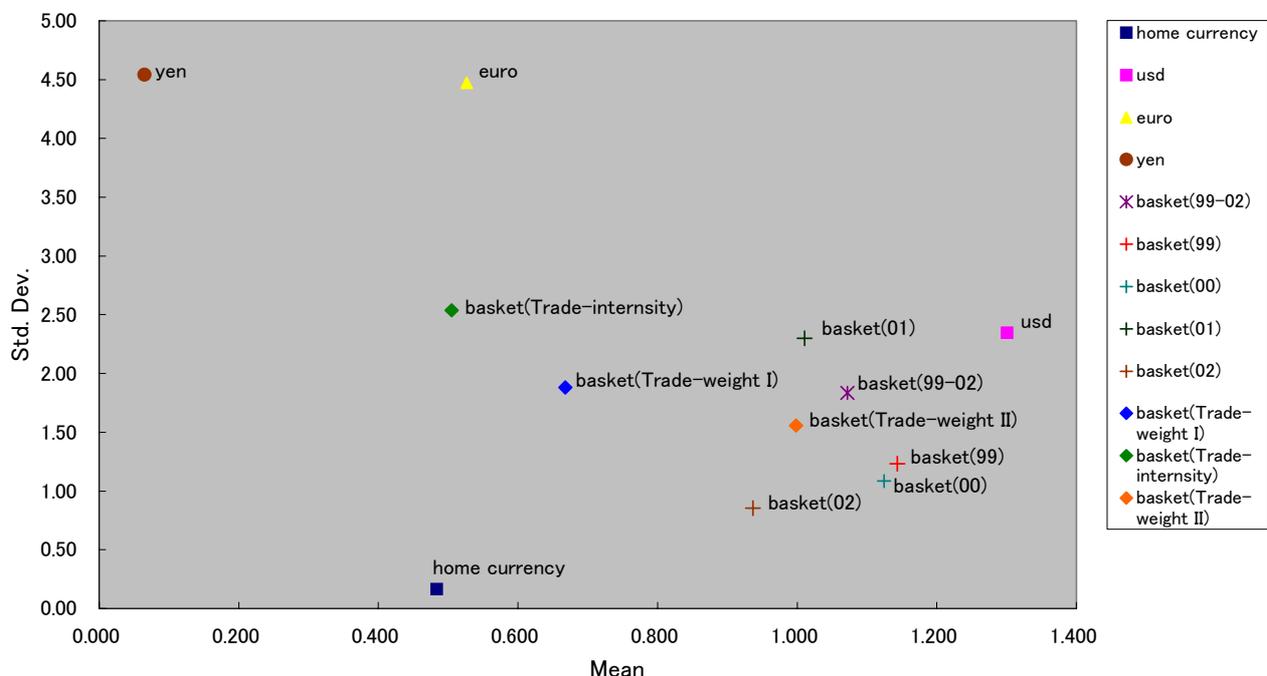


Table1-2 . 3month borrowing costs in East Asian Countries(%)

| Thailand borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|----------------------------|-----------|----------------------|--------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 19.198 | 16.602 | 25.092 |
| Min | 1999-2002 | 0.516 | -8.312 | -12.676 | -11.779 | -7.937 | -7.993 | -7.899 | -8.027 | -8.221 | -8.958 | -8.514 | -7.726 |
| Mean | 1999-2002 | 0.906 | 2.154 | 1.368 | 0.975 | 1.956 | 2.010 | 1.947 | 1.914 | 1.911 | 1.534 | 1.858 | 1.359 |
| Std. Dev. (%) | 1999-2002 | 0.290 | 3.971 | 5.378 | 6.761 | 4.008 | 3.998 | 4.033 | 3.972 | 3.877 | 4.164 | 3.787*** | 5.146*** |
| | 1999 | 0.243 | 4.233 | 6.793 | 10.143 | 5.015 | 4.796* | 5.062 | 5.165 | 5.125 | 6.621*** | 5.274*** | 7.900*** |
| | 2000 | 0.120 | 4.047 | 5.413 | 4.822 | 4.083 | 4.077 | 4.092 | 4.072 | 4.047 | 4.143 | 4.037 | 4.330 |
| | 2001 | 0.154 | 3.170 | 4.449 | 4.186 | 2.929 | 3.010 | 2.948 | 2.802** | 2.671 | 2.187*** | 2.445*** | 3.004 |
| | 2002 | 0.081 | 2.992 | 3.912 | 5.005 | 2.564 | 2.651 | 2.554 | 2.513 | 2.507* | 2.948 | 2.477*** | 3.439*** |

All are calculated by authors. Sample period is 1/1/1999 - 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 Thai baht'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 the regression model of Frankel and Wei (1994) and Shimizu (2003).
- (2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 35.7 : 35.1 : 29.2.
- (3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 69.3 : 16.7 : 14.0.
- (4) The basket share of Trade-intensity in Thailand depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USDollar : JPYen : euro = 25.5 : 65.9 : 8.6 . Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

Figure 1-2. Mean & Std. Dev. of Borrowing Costs Thailand

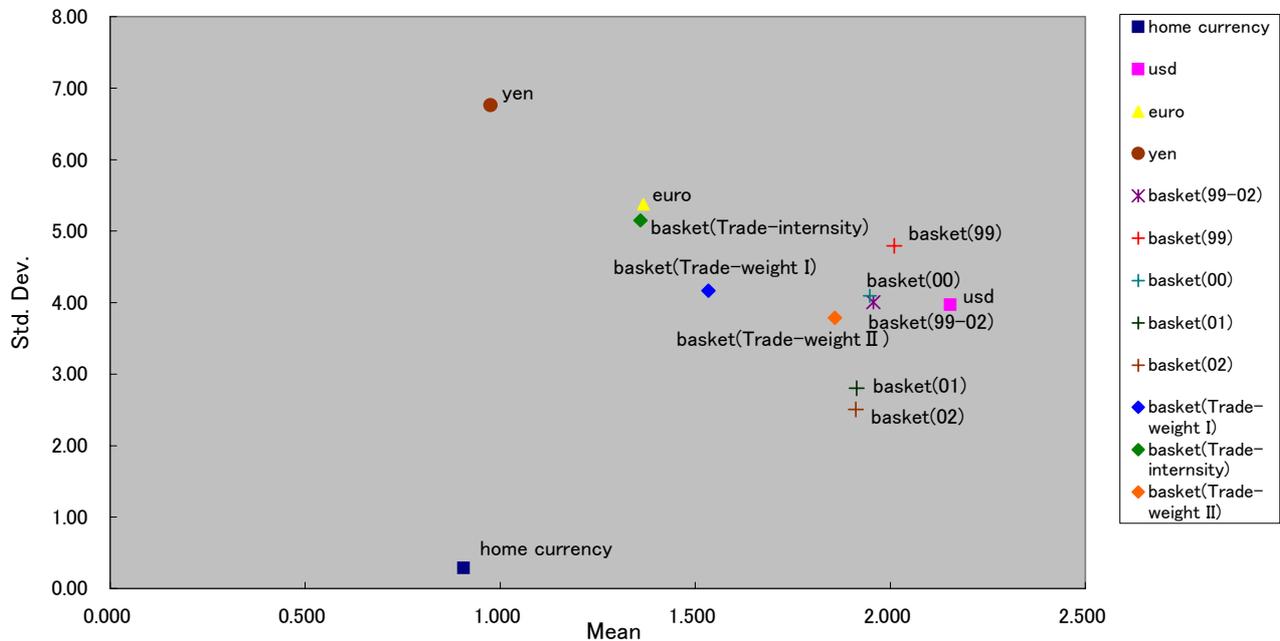


Table1-3 . 3month borrowing costs in East Asian Countries(%)

| Malaysia borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|----------------------------|-----------|----------------------|-------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 9.046 | 4.544 | 11.698 |
| Min | 1999-2002 | 0.800 | 0.379 | -10.365 | -10.811 | 0.379 | 0.379 | 0.379 | 0.379 | 0.379 | -4.856 | -1.730 | -6.817 |
| Mean | 1999-2002 | 0.887 | 1.034 | 0.335 | -0.126 | 1.034 | 1.034 | 1.034 | 1.034 | 1.034 | 0.450 | 0.755 | 0.248 |
| Std. Dev. (%) | 1999-2002 | 0.142 | 0.409 | 5.476 | 5.502 | 0.409 | 0.409 | 0.409 | 0.409 | 0.409 | 2.808*** | 1.298*** | 3.600*** |
| | 1999 | 0.204 | 0.046 | 3.469 | 6.700 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 3.056*** | 1.469*** | 4.461*** |
| | 2000 | 0.018 | 0.096 | 3.962 | 2.341 | 0.096 | 0.096 | 0.096 | 0.096 | 0.096 | 1.315*** | 0.640* | 1.389*** |
| | 2001 | 0.000 | 0.293 | 5.883 | 4.026 | 0.293 | 0.293 | 0.293 | 0.293 | 0.293 | 2.456*** | 1.183*** | 2.575*** |
| | 2002 | 0.024 | 0.046 | 4.733 | 6.123 | 0.046 | 0.046 | 0.046 | 0.046 | 0.046 | 3.360*** | 1.597*** | 4.200*** |

All are calculated by authors. Sample period is 1/1/1999 - 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 Malaysian 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Malaysia depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USdollar : JPyen : euro = 29.0 : 62.9 : 8.2 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Figure 1-3. Mean & Std. Dev. of Borrowing Costs
Malaysia**

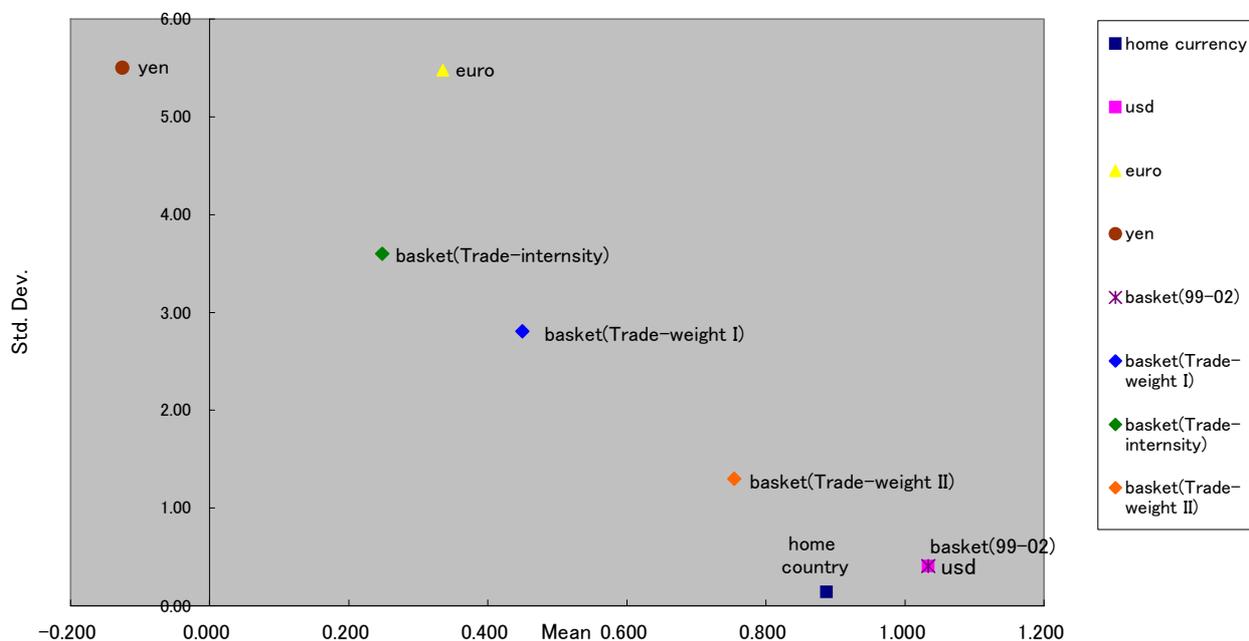


Table1-4 . 3month borrowing costs in East Asian Countries(%)

| Philippines borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-------------------------------|-----------|----------------------|--------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 15.081 | 15.129 | 19.170 |
| Min | 1999-2002 | 1.075 | -7.320 | -12.567 | -12.313 | -7.977 | -7.875 | -7.624 | -8.483 | -7.551 | -10.467 | -8.822 | -10.274 |
| Mean | 1999-2002 | 2.253 | 3.238 | 2.478 | 2.072 | 3.106 | 3.108 | 3.159 | 2.995 | 3.184 | 2.631 | 2.948 | 2.517 |
| Std. Dev. (%) | 1999-2002 | 0.590 | 4.092 | 6.147 | 7.159 | 4.066 | 4.127 | 4.128 | 4.143 | 4.095 | 4.705*** | 4.134 | 5.345*** |
| | 1999 | 0.467 | 3.221 | 6.263 | 9.827 | 3.833 | 3.873*** | 3.634 | 4.386 | 3.489 | 6.093*** | 4.555*** | 7.123*** |
| | 2000 | 0.034 | 3.906 | 6.150 | 4.553 | 3.950 | 3.921 | 3.906 | 3.982 | 3.911 | 4.323*** | 4.054 | 4.128 |
| | 2001 | 0.504 | 4.085 | 6.022 | 5.671 | 3.978 | 4.040 | 4.078 | 3.957 | 4.061 | 4.115 | 3.909 | 4.511*** |
| | 2002 | 0.504 | 2.509 | 5.267 | 6.361 | 2.552 | 2.534 | 2.497 | 2.730 | 2.496 | 4.036*** | 2.870 | 4.344*** |

All are calculated by authors. Sample period is 1/1/1999 - 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Philippines depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USdollar : JPyen : euro = 35.3 : 56.7 : 8.0 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

Figure 1-4. Mean & Std. Dev. of Borrowing Costs Philippines

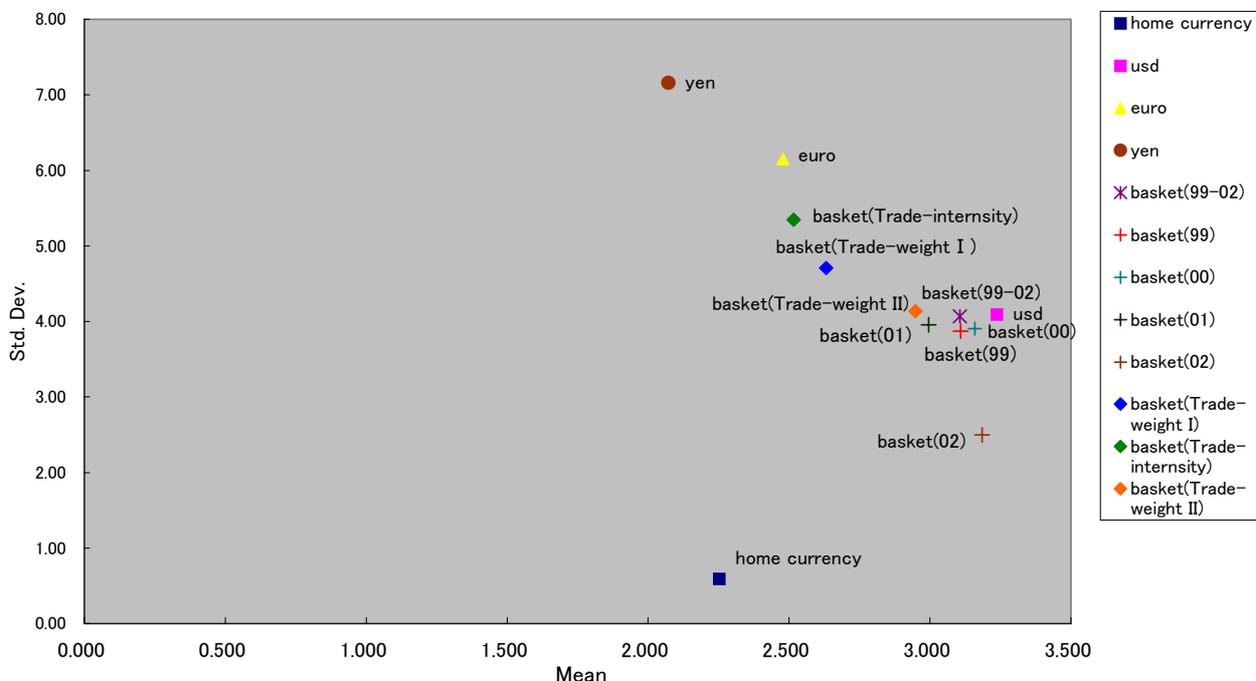


Table1-5 . 3month borrowing costs in East Asian Countries(%)

| Indonesia borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-----------------------------|-----------|----------------------|---------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 37.036 | 34.007 | 45.950 |
| Min | 1999-2002 | 2.813 | -24.957 | -27.877 | -26.575 | -24.885 | -24.833 | -24.899 | -24.645 | -24.895 | -25.802 | -24.611 | -26.089 |
| Mean | 1999-2002 | 3.977 | 1.920 | 1.080 | 0.614 | 1.720 | 1.576 | 1.759 | 1.764 | 1.747 | 1.244 | 1.597 | 0.886 |
| Std. Dev. (%) | 1999-2002 | 1.587 | 11.451 | 11.453 | 11.658 | 11.291 | 11.218 | 11.317 | 11.241 | 11.309 | 10.974** | 11.128 | 11.269** |
| | 1999 | 2.216 | 13.067 | 14.916 | 18.281 | 13.753 | 14.276*** | 13.614 | 13.363 | 13.655 | 15.085*** | 13.979*** | 16.956*** |
| | 2000 | 0.169 | 7.519 | 9.228 | 7.487 | 7.460 | 7.429 | 7.470 | 7.699 | 7.467 | 7.772 | 7.611 | 7.452 |
| | 2001 | 0.079 | 13.563 | 11.907 | 11.750 | 13.206 | 12.966 | 13.274 | 13.064 | 13.254 | 11.994*** | 12.775** | 11.845*** |
| | 2002 | 0.378 | 5.221 | 5.341 | 5.365 | 4.787 | 4.563 | 4.862 | 4.946 | 4.839 | 4.603*** | 4.666*** | 4.803*** |

All are calculated by authors. Sample period is 1/1/1999 – 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Indonesia depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USdollar : JPyen : euro = 17.9 : 73.9 : 8.2 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Figure 1-5. Mean & Std. Dev. of Borrowing Costs
Indonesia**

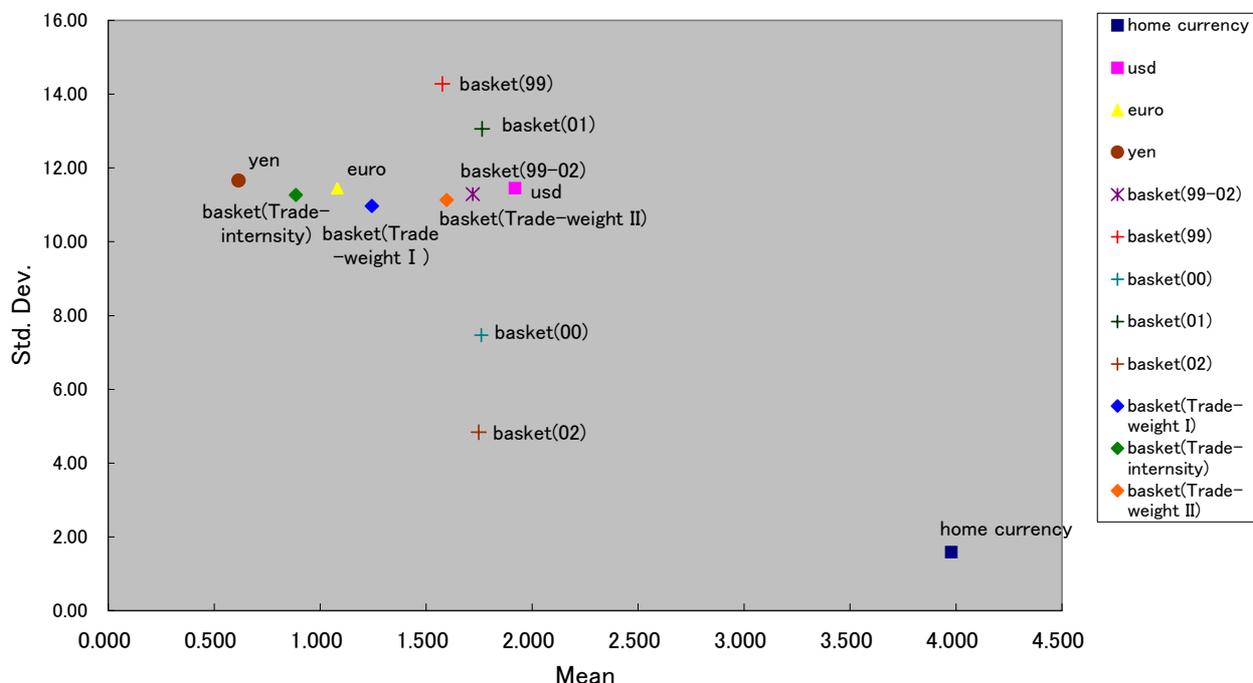


Table1-6 . 3month borrowing costs in East Asian Countries(%)

| Taiwan borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|--------------------------|-----------|----------------------|--------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 8.559 | 8.013 | 10.622 |
| Min | 1999-2002 | 0.500 | -5.595 | -10.122 | -10.780 | -4.859 | -4.809 | -5.297 | -5.265 | -3.433 | -5.968 | -3.955 | -8.100 |
| Mean | 1999-2002 | 1.069 | 1.500 | 0.768 | 0.270 | 1.451 | 1.441 | 1.466 | 1.462 | 1.294 | 0.884 | 1.206 | 0.602 |
| Std. Dev. (%) | 1999-2002 | 0.297 | 2.731 | 5.577 | 4.894 | 2.643 | 2.622 | 2.661 | 2.654 | 2.459 | 3.005*** | 2.465*** | 3.561*** |
| | 1999 | 0.043 | 1.483 | 2.833 | 5.885 | 1.350 | 1.325 | 1.383 | 1.373 | 1.176 | 2.417*** | 1.286** | 4.060*** |
| | 2000 | 0.029 | 2.967 | 5.600 | 3.490 | 3.013 | 3.003 | 2.957 | 2.956 | 3.072 | 3.478*** | 3.154 | 3.179 |
| | 2001 | 0.184 | 2.482 | 5.673 | 5.126 | 2.425 | 2.438 | 2.498 | 2.500 | 2.469 | 3.161*** | 2.538 | 3.969*** |
| | 2002 | 0.065 | 2.764 | 2.938 | 4.176 | 2.539 | 2.505 | 2.627 | 2.613 | 1.958*** | 1.876*** | 1.714*** | 2.752 |

All are calculated by authors. Sample period is 1/1/1999 - 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 New Taiwan 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPYen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPYen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Taiwan depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USdollar : JPYen : euro = 31.0 : 60.6 : 8.4 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Figure 1-6. Mean & Std. Dev. of Borrowing Costs
Taiwan**

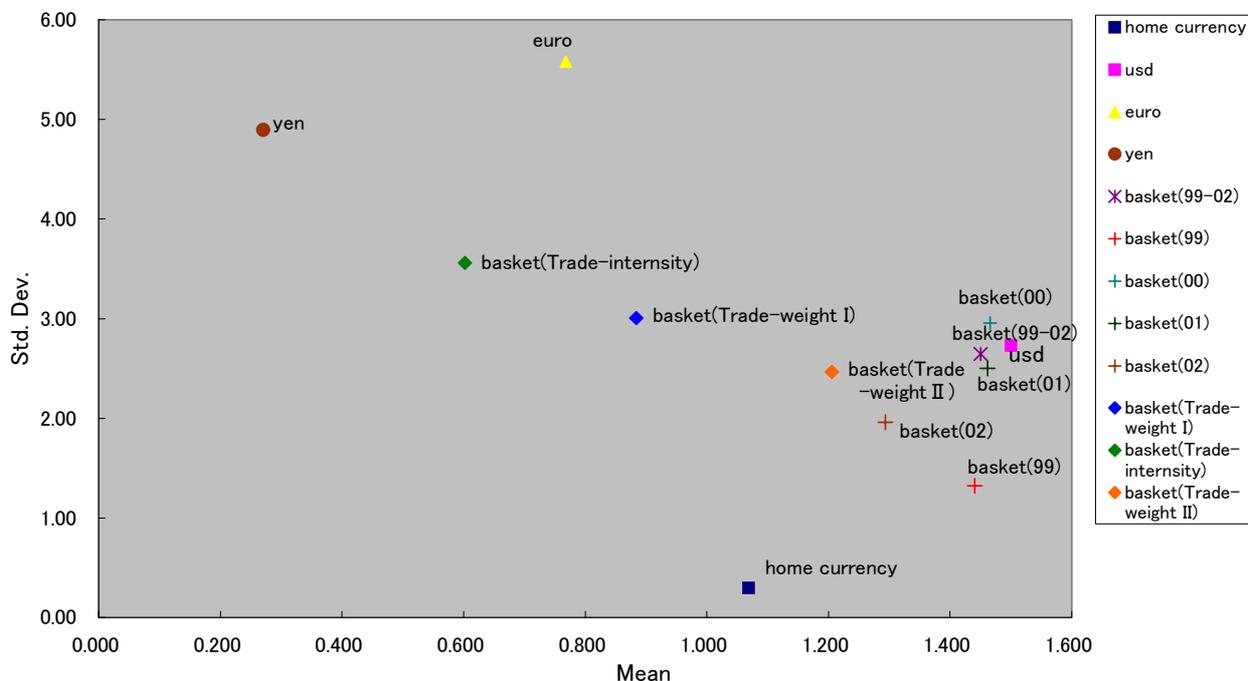


Table1-7 . 3month borrowing costs in East Asian Countries(%)

| Korea borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-------------------------|-----------|----------------------|---------|---------|--------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (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 | 16.805 | 16.176 | 15.793 |
| Min | 1999-2002 | 1.125 | -11.052 | -12.209 | -9.857 | -9.096 | -9.968 | -11.052 | -8.614 | -7.256 | -8.196 | -7.662 | -7.422 |
| Mean | 1999-2002 | 1.571 | 1.248 | 0.548 | -0.043 | 1.023 | 1.140 | 1.248 | 0.934 | 0.905 | 0.625 | 0.950 | 0.434 |
| Std. Dev. (%) | 1999-2002 | 0.283 | 4.557 | 7.224 | 4.988 | 4.162** | 4.386 | 4.557 | 3.990 | 4.295 | 4.588 | 4.336 | 4.061** |
| | 1999 | 0.167 | 3.280 | 5.312 | 8.090 | 3.689 | 3.434 | 3.280 | 3.943 | 4.007 | 4.963*** | 3.874 | 5.833*** |
| | 2000 | 0.045 | 3.885 | 6.576 | 3.628 | 3.794 | 3.886 | 3.885 | 3.683 | 4.042 | 4.334*** | 4.053 | 3.644 |
| | 2001 | 0.197 | 4.755 | 9.265 | 3.475 | 4.384 | 4.672 | 4.755 | 4.050** | 4.873 | 5.411*** | 4.917 | 3.741*** |
| | 2002 | 0.038 | 4.555 | 1.952 | 2.896 | 3.631 | 4.077 | 4.555 | 3.345 | 3.035*** | 2.054*** | 3.207*** | 2.069*** |

All are calculated by authors. Sample period is 1/1/1999 - 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPYen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Korea depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USDollar : JPYen : euro = 33.3 : 58.7 : 8.1 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

Figure 1-7. Mean & Std. Dev. of Borrowing Costs Korea

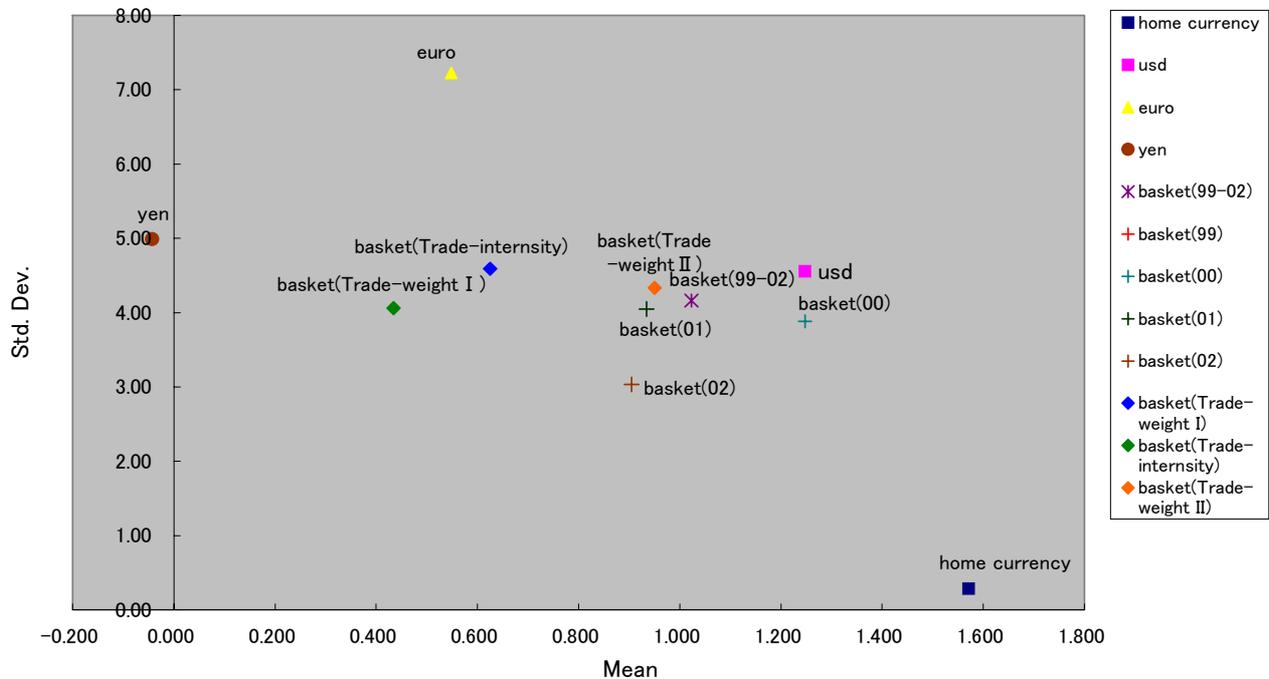


Table1-8 . 3month borrowing costs in East Asian Countries(%)

| Hong Kong borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-----------------------------|-----------|----------------------|-------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (3) | Trade- intensity (4) |
| Max | 1999-2002 | 1.871 | 1.679 | 14.750 | 17.897 | 1.679 | 1.679 | 1.679 | 1.679 | 1.679 | 9.043 | 4.541 | 11.668 |
| Min | 1999-2002 | 0.420 | 0.376 | -10.351 | -10.821 | 0.376 | 0.376 | 0.376 | 0.376 | 0.376 | -4.810 | -1.683 | -6.825 |
| Mean | 1999-2002 | 1.155 | 1.076 | 0.376 | -0.083 | 1.076 | 1.076 | 1.076 | 1.076 | 1.076 | 0.492 | 0.797 | 0.260 |
| Std. Dev. (%) | 1999-2002 | 0.459 | 0.439 | 5.461 | 5.520 | 0.439 | 0.439 | 0.439 | 0.439 | 0.439 | 2.809*** | 1.303*** | 3.697*** |
| | 1999 | 0.120 | 0.064 | 3.503 | 6.737 | 0.064 | 0.064 | 0.064 | 0.064 | 0.064 | 3.090*** | 1.503*** | 4.593*** |
| | 2000 | 0.082 | 0.068 | 3.963 | 2.344 | 0.068 | 0.068 | 0.068 | 0.068 | 0.068 | 1.316*** | 0.638*** | 1.349*** |
| | 2001 | 0.271 | 0.301 | 5.889 | 4.024 | 0.301 | 0.301 | 0.301 | 0.301 | 0.301 | 2.456*** | 1.188*** | 2.655*** |
| | 2002 | 0.042 | 0.042 | 4.733 | 6.125 | 0.042 | 0.042 | 0.042 | 0.042 | 0.042 | 3.361*** | 1.599*** | 4.395*** |

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

(1) The basket share in Hong Kong depends on the results of Hong Kong 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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USdollar : JPyen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in Hong Kong depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USdollar : JPyen : euro = 23.9 : 61.6 : 14.4 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Figure 1-8. Mean & Std. Dev. of Borrowing Costs
Hong Kong**

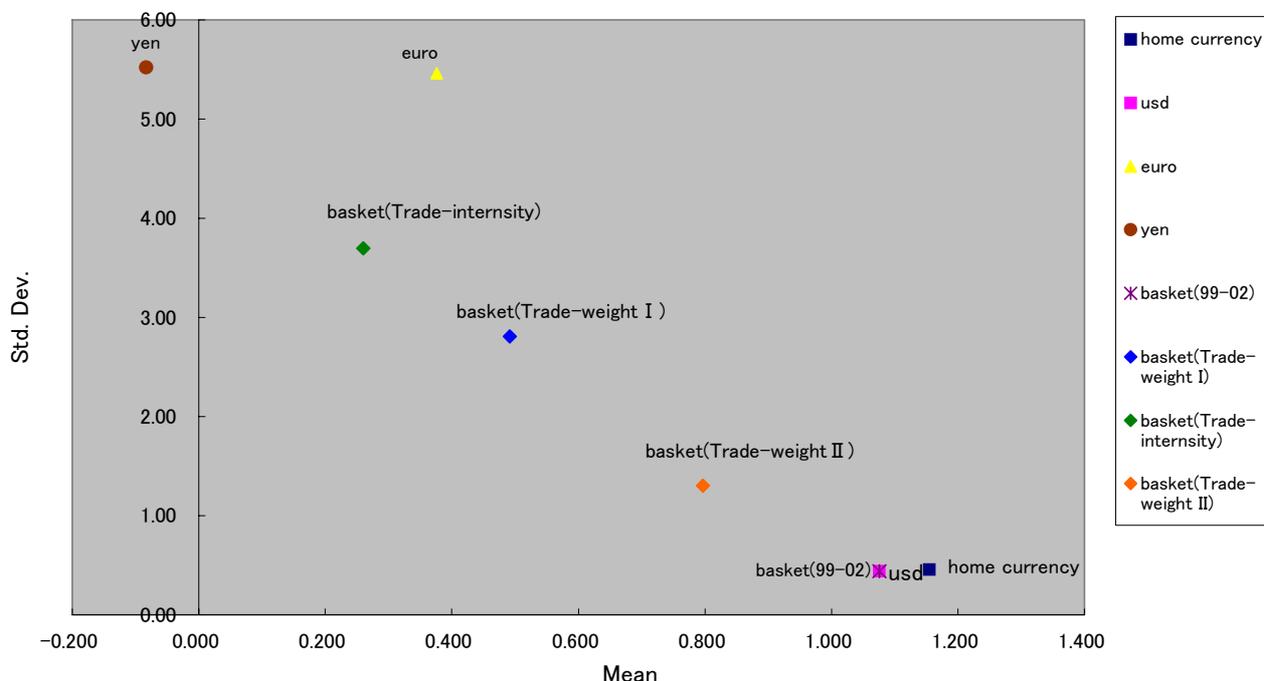


Table1-9 . 3month borrowing costs in East Asian Countries(%)

| China borrowing from | | Single currency type | | | | Basket type | | | | | | | |
|-------------------------|-----------|----------------------|-------|---------|---------|--|--------------------|--------------------|--------------------|--------------------|------------------------|-------------------------|-------------------------|
| | | home currency | usd | euro | yen | Estimated weights on 3major currencies based (1) | | | | | Trade based | | |
| | | | | | | weights in all period (1999- | weights in 1999 | weights in 2000 | weights in 2001 | weights in 2002 | Trade- weight I (2) | Trade- weight II (3) | Trade- intensity (4) |
| Max | 1999-2002 | 0.697 | 1.609 | 14.737 | 17.763 | 1.609 | 1.609 | 1.609 | 1.609 | 1.609 | 9.041 | 4.539 | 10.553 |
| Min | 1999-2002 | 0.428 | 0.281 | -10.377 | -10.813 | 0.281 | 0.281 | 0.281 | 0.281 | 0.281 | -4.861 | -1.735 | -6.075 |
| Mean | 1999-2002 | 0.508 | 1.031 | 0.333 | -0.128 | 1.031 | 1.031 | 1.031 | 1.031 | 1.031 | 0.447 | 0.752 | 0.312 |
| Std. Dev. (%) | 1999-2002 | 0.073 | 0.408 | 5.476 | 5.502 | 0.408 | 0.408 | 0.408 | 0.408 | 0.408 | 2.809*** | 1.299*** | 3.260*** |
| | 1999 | 0.100 | 0.052 | 3.470 | 6.706 | 0.052 | 0.052 | 0.052 | 0.052 | 0.052 | 3.060*** | 1.474*** | 4.055*** |
| | 2000 | 0.000 | 0.089 | 3.960 | 2.344 | 0.089 | 0.089 | 0.089 | 0.089 | 0.089 | 1.315*** | 0.640*** | 1.228*** |
| | 2001 | 0.000 | 0.293 | 5.879 | 4.021 | 0.293 | 0.293 | 0.293 | 0.293 | 0.293 | 2.450*** | 1.178*** | 2.323*** |
| | 2002 | 0.033 | 0.059 | 4.736 | 6.125 | 0.059 | 0.059 | 0.059 | 0.059 | 0.059 | 3.363*** | 1.601*** | 3.857*** |

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

(1) The basket share in China depends on the results of Chinese yuan'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 the regression model of Frankel and Wei (1994) and Shimizu (2003).

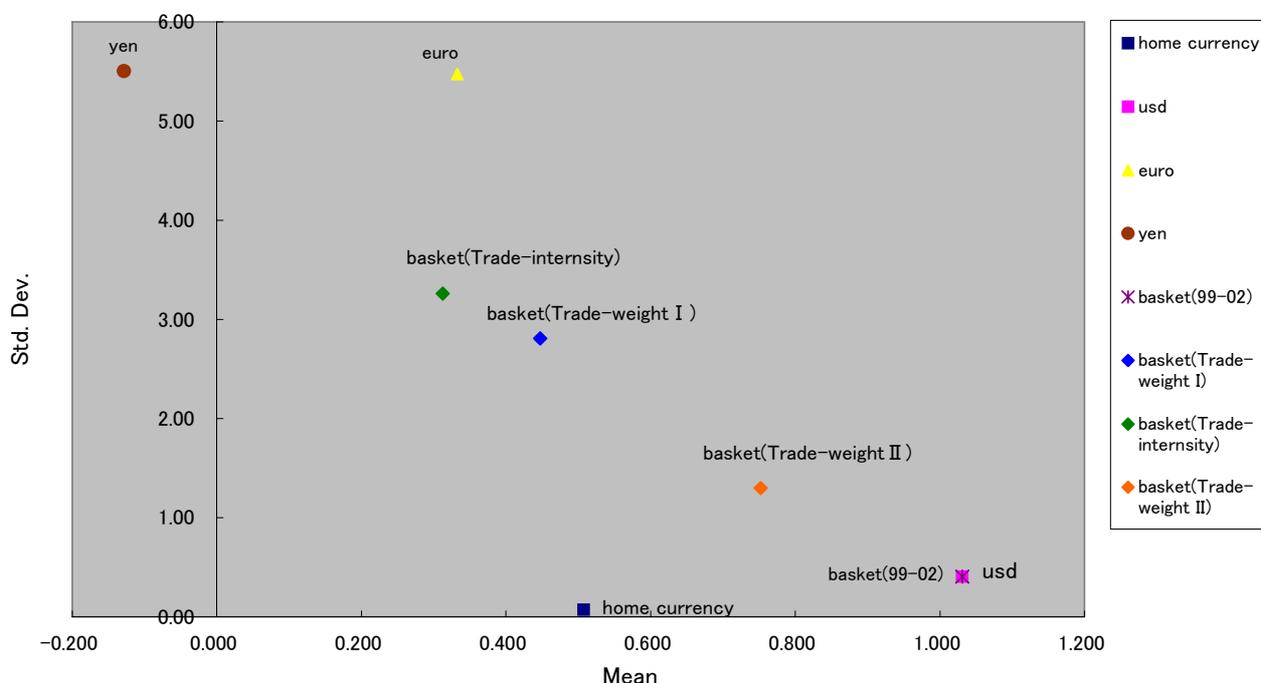
(2) The basket share of Trade-weight I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPyen : euro = 35.7 : 35.1 : 29.2.

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2000 and the basket share is USDollar : JPyen : euro = 69.3 : 16.7 : 14.0.

(4) The basket share of Trade-intensity in China depends on the results of our calculation (Appendix 1). Each Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the result of 2000 and the basket share is USDollar : JPyen : euro = 34.0 : 55.9 : 10.1 .

Asterisk shows the test result of which the variances of basket type borrowing costs are unequal to the variance of borrowing cost in terms of US dollar. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Figure 1-9. Mean & Std. Dev. of Borrowing Costs
China**



**Table 2-1. 3month investment returns in East Asian countries (%)
for US Investor**

| US Investor invest into | Single currency type | | | | | | | | | | | |
|----------------------------|----------------------|-----------------|-----------------------|-----------------------|-----------|-------------------|------------------|-------------------|-------------------|------------|------------------|--------------|
| | 3 Major Currencies | | | East Asian Currencies | | | | | | | | |
| | US dollar | euro | Japanese yen | Singapore dollar | Thai baht | Malaysian ringgit | Philippines peso | Indonesian rupiah | New Taiwan dollar | Korean won | Hong Kong dollar | Chinese yuan |
| max | 1.610 | 19.123 | 14.741 | 5.481 | 11.497 | 1.428 | 12.660 | 43.979 | 7.063 | 14.281 | 1.857 | 0.727 |
| min | 0.390 | -10.420 | -10.365 | -5.084 | -10.396 | 0.773 | -11.413 | -19.018 | -6.221 | -10.670 | 0.412 | 0.299 |
| mean | 1.034 | 0.849 | 0.327 | 0.266 | -0.061 | 0.886 | 0.221 | 4.491 | 0.673 | 1.549 | 1.112 | 0.509 |
| Std.Dev. | 0.408 | 5.523 | 5.474 | 2.121 | 3.654 | 0.138 | 3.946 | 12.936 | 2.638 | 4.332 | 0.426 | 0.080 |
| US Investor invest into | Basket type | | | | | | | | | | | |
| | Trade-weight based | | Trade-intensity based | | | | | | | | | |
| | Trade-weight I | Trade-weight II | Singapore | Thailand | Malaysia | Philippines | Indonesia | Taiwan | Korea | Hong Kong | China | |
| max | 9.135 | 4.588 | 11.610 | 12.388 | 12.549 | 11.436 | 14.524 | 13.484 | 11.778 | 12.241 | 11.312 | |
| min | -4.569 | -1.682 | -6.051 | -6.474 | -6.571 | -5.895 | -7.770 | -7.142 | -6.104 | -6.460 | -5.854 | |
| mean | 0.762 | 0.904 | 0.850 | 0.862 | 0.860 | 0.872 | 0.839 | 0.849 | 0.868 | 0.796 | 0.859 | |
| Std.Dev. | 2.798*** | 1.308*** | 3.376*** | 3.558*** | 3.608*** | 3.264 | 4.219*** | 3.900*** | 3.371*** | 3.540*** | 3.264*** | |

All are calculated by authors. Sample period is 1/1/1999 – 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 I and Trade-weight II as a common basket ratio. They depend on the calculation methods of Ogawa and Kawasaki (2003) and their basket shares are USdollar : JPyen : euro = 35.7 : 35.1 : 29.2 and 69.3 : 16.7 : 14.0, respectively. The Basket shares which depend on each East Asian country's trade-intensity are also added.

Asterisk shows the test of unequal of variance between investment returns into US dollar denominated bonds and investment returns into Trade-weight based basket bonds. Regarding the trade-intensity based basket bonds, we test the unequal of variance between the trade-intensity based basket bonds and investment returns into each of Asian currency denominated bonds. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Table 2-2. 3month investment returns in East Asian countries (%)
for Euro Area Investor**

| Euro Area Investor | Single currency type | | | | | | | | | | | |
|--------------------|----------------------|-----------------|-----------------------|-----------------------|-----------|-------------------|------------------|-------------------|-------------------|------------|------------------|--------------|
| | 3 Major Currencies | | | East Asian Currencies | | | | | | | | |
| | US dollar | euro | Japanese yen | Singapore dollar | Thai baht | Malaysian ringgit | Philippines peso | Indonesian rupiah | New Taiwan dollar | Korean won | Hong Kong dollar | Chinese yuan |
| max | 14.612 | 0.174 | 16.633 | 12.422 | 16.554 | 13.772 | 19.317 | 51.435 | 13.675 | 17.058 | 14.586 | 13.428 |
| min | -11.733 | 0.011 | -18.807 | -10.469 | -12.282 | -11.405 | -18.145 | -19.651 | -12.290 | -19.838 | -11.675 | -11.729 |
| mean | 1.957 | 0.050 | 0.682 | 1.099 | 0.771 | 1.795 | 1.092 | 5.315 | 1.554 | 2.465 | 2.030 | 1.414 |
| Std.Dev. | 5.587 | 0.044 | 6.328 | 4.476 | 5.439 | 5.455 | 6.225 | 13.398 | 5.627 | 6.945 | 5.625 | 5.418 |
| Euro Area Investor | Basket type | | | | | | | | | | | |
| | Trade-weight based | | Trade-intensity based | | | | | | | | | |
| | Trade-weight I | Trade-weight II | Singapore | Thailand | Malaysia | Philippines | Indonesia | Taiwan | Korea | Hong Kong | China | |
| max | 10.583 | 12.736 | 13.238 | 13.720 | 13.748 | 13.570 | 14.073 | 13.883 | 13.616 | 12.947 | 13.296 | |
| min | -9.892 | -10.032 | -13.907 | -14.626 | -14.703 | -14.185 | -15.631 | -15.124 | -14.336 | -13.854 | -13.874 | |
| mean | 1.214 | 1.615 | 1.113 | 1.085 | 1.073 | 1.153 | 0.932 | 1.005 | 1.128 | 1.024 | 1.142 | |
| Std.Dev. | 3.735*** | 4.591*** | 4.869** | 5.074** | 5.090** | 4.994*** | 5.314*** | 5.182** | 5.018*** | 4.789*** | 4.885*** | |

All are calculated by authors. Sample period is 1/1/1999 – 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 I and Trade-weight II as a common basket ratio. They depend on the calculation methods of Ogawa and Kawasaki (2003) and their basket shares are USdollar : JPyen : euro = 35.7 : 35.1 : 29.2 and 69.3 : 16.7 : 14.0, respectively. The Basket shares which depend on each East Asian country's trade-intensity are also added.

Asterisk shows the test of unequal of variance between investment returns into US dollar denominated bonds and investment returns into Trade-weight based basket bonds. Regarding the trade-intensity based basket bonds, we test the unequal of variance between the trade-intensity based basket bonds and investment returns into each of Asian currency denominated bonds. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

**Table 2-3. 3month investment returns in East Asian countries (%)
for Japanese Investor**

| Japanese Investor | Single currency type | | | | | | | | | | | |
|-------------------|----------------------|-----------------|-----------------------|-----------------------|-----------|-------------------|------------------|-------------------|-------------------|------------|------------------|--------------|
| | 3 Major Currencies | | | East Asian Currencies | | | | | | | | |
| | US dollar | euro | Japanese yen | Singapore dollar | Thai baht | Malaysian ringgit | Philippines peso | Indonesian rupiah | New Taiwan dollar | Korean won | Hong Kong dollar | Chinese yuan |
| max | 12.656 | 16.633 | 24.910 | 11.935 | 14.182 | 13.105 | 18.547 | 47.848 | 13.678 | 13.047 | 12.664 | 12.696 |
| min | -14.055 | -18.807 | -13.665 | -15.023 | -23.262 | -14.264 | -19.146 | -30.514 | -12.492 | -17.274 | -13.945 | -14.637 |
| mean | 1.519 | 0.682 | 0.722 | 0.673 | 0.407 | 1.364 | 0.735 | 4.829 | 1.090 | 1.904 | 1.592 | 0.985 |
| Std.Dev. | 5.528 | 6.328 | 6.604 | 4.518 | 6.413 | 5.461 | 7.336 | 12.829 | 5.016 | 4.821 | 5.510 | 5.433 |
| Japanese Investor | Basket type | | | | | | | | | | | |
| | Trade-weight based | | Trade-intensity based | | | | | | | | | |
| | Trade-weight I | Trade-weight II | Singapore | Thailand | Malaysia | Philippines | Indonesia | Taiwan | Korea | Hong Kong | China | |
| max | 11.367 | 11.584 | 6.477 | 5.580 | 5.475 | 6.179 | 4.217 | 4.900 | 5.973 | 6.434 | 6.545 | |
| min | -8.774 | -11.582 | -5.861 | -5.252 | -5.126 | -6.000 | -3.575 | -4.391 | -5.731 | -5.240 | -6.094 | |
| mean | 0.762 | 1.162 | 0.587 | 0.544 | 0.530 | 0.622 | 0.368 | 0.452 | 0.594 | 0.498 | 0.617 | |
| Std.Dev. | 3.453*** | 4.441*** | 2.258*** | 2.027*** | 1.978*** | 2.313*** | 1.394*** | 1.700*** | 2.210*** | 2.043*** | 2.346*** | |

All are calculated by authors. Sample period is 1/1/1999 – 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 I and Trade-weight II as a common basket ratio. They depend on the calculation methods of Ogawa and Kawasaki (2003) and their basket shares are USdollar : JPyen : euro = 35.7 : 35.1 : 29.2 and 69.3 : 16.7 : 14.0, respectively. The Basket shares which depend on each East Asian country's trade-intensity are also added.

Asterisk shows the test of unequal of variance between investment returns into US dollar denominated bonds and investment returns into Trade-weight based basket bonds. Regarding the trade-intensity based basket bonds, we test the unequal of variance between the trade-intensity based basket bonds and investment returns into each of Asian currency denominated bonds. We show ***, **, * for the significant level of 1%, 5%, 10%, respectively.

Figure 2-1. Mean and Std. Dev. of Investment Return for the US Investor

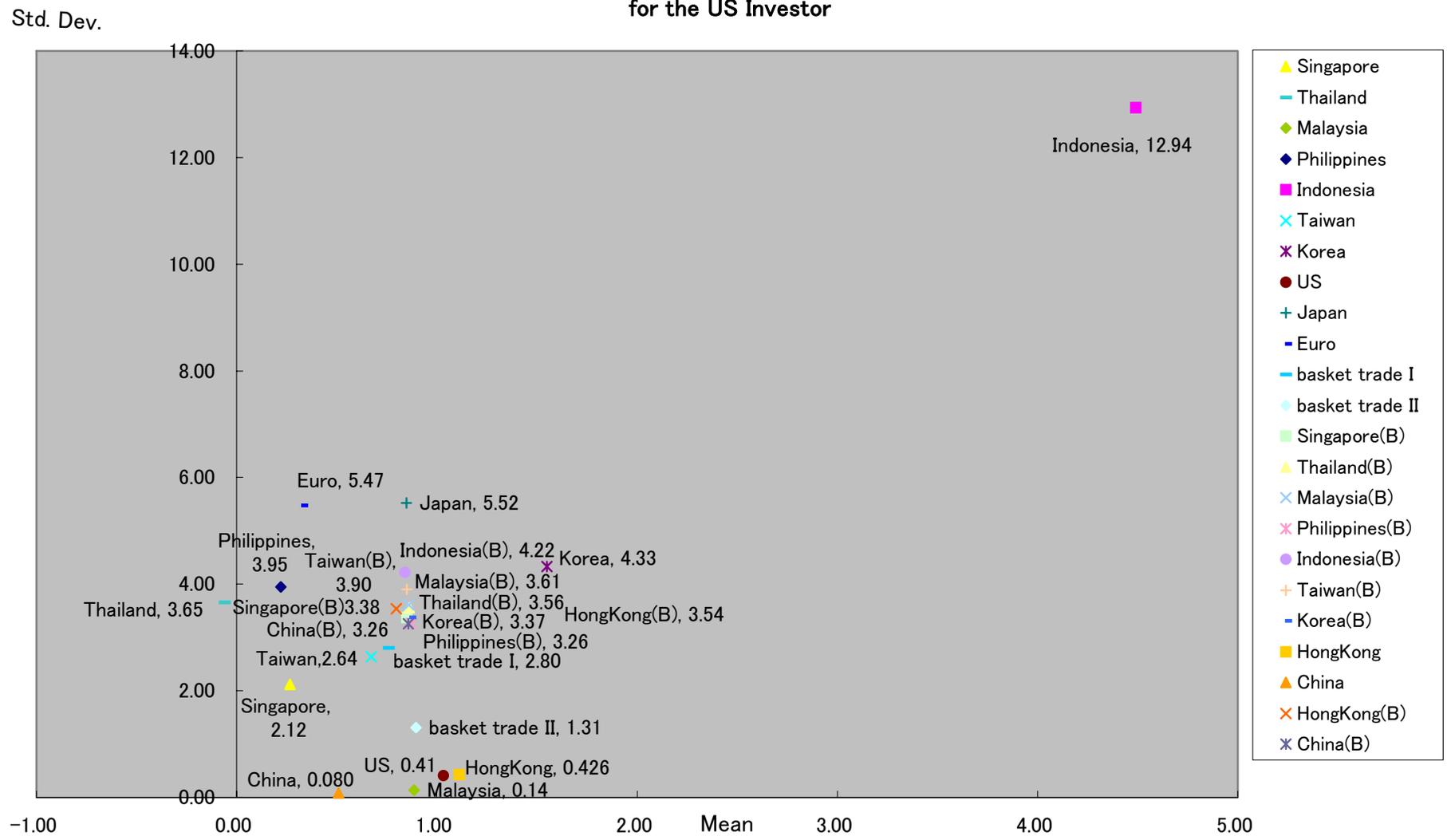


Figure 2-2. Mean and Std. Dev. of Investment Return for the Euro Area Investor

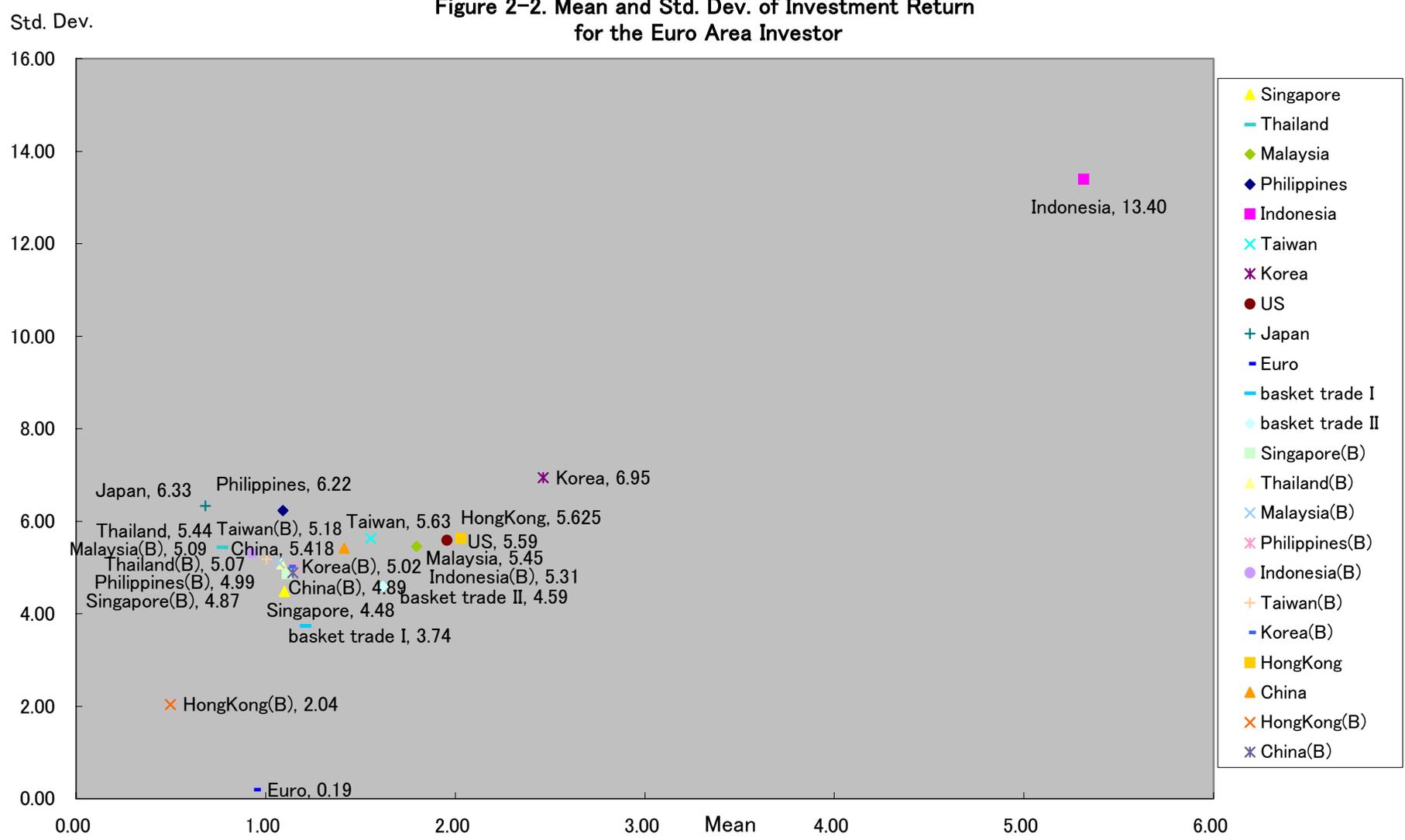
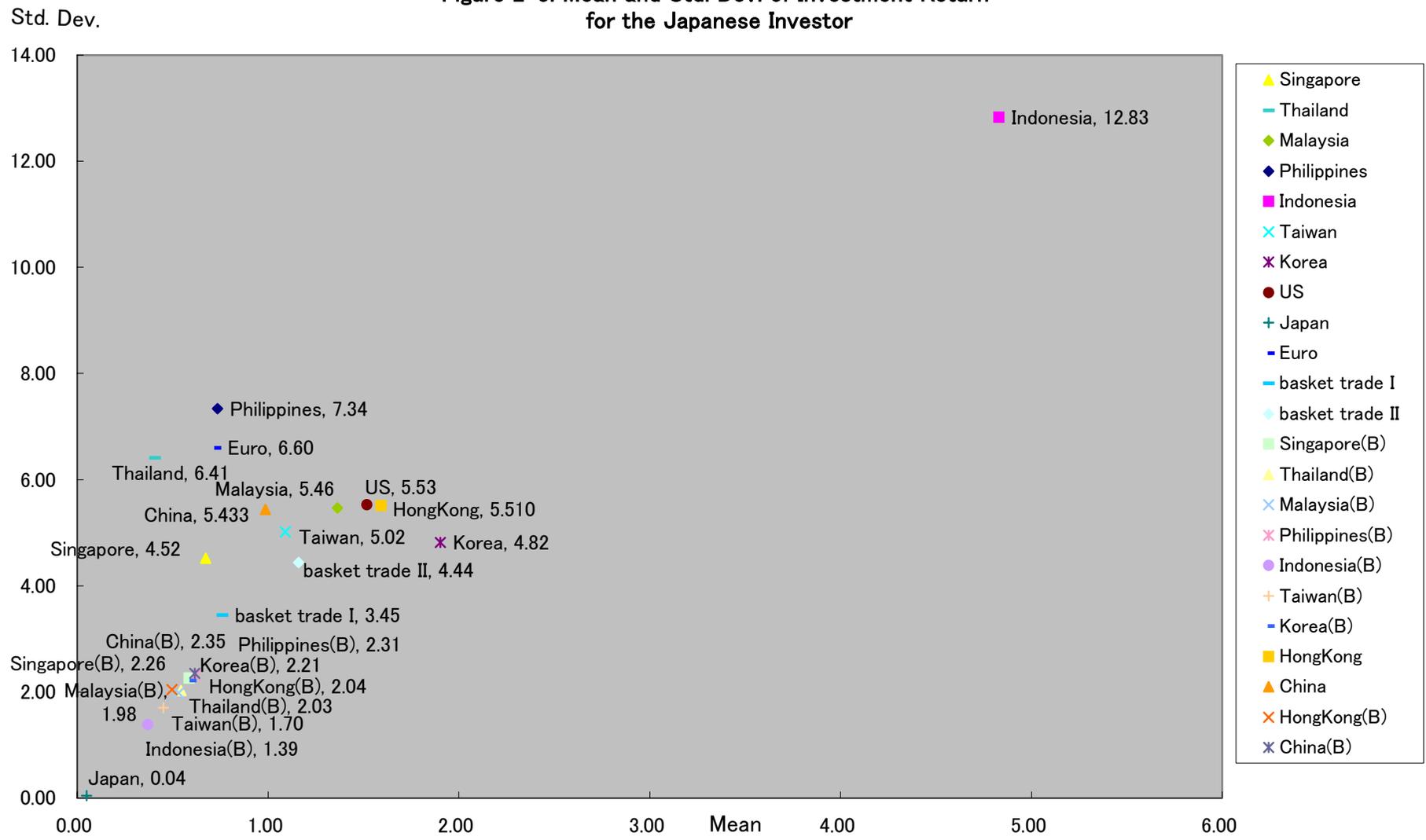


Figure 2-3. Mean and Std. Dev. of Investment Return for the Japanese Investor



**Table 3-1. Forward swap bid-ask spreads (% in transaction basis)
in 8 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 | USDollar | 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 |
| Thai baht | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 |
| Hong Kong dollar | USDollar | 0.0282 | 0.0282 | 0.0321 | 0.0683 | 0.0425 | 0.0683 | 0.0483 | 0.0354 | 0.0502 |
| | euro | 0.0690 | 0.0683 | 0.0680 | 0.1053 | 0.0888 | 0.1032 | 0.0872 | 0.0785 | 0.0856 |
| | JPyen | 0.0543 | 0.0543 | 0.0625 | 0.1110 | 0.0864 | 0.1151 | 0.0826 | 0.0703 | 0.0888 |
| | average | 0.0505 | 0.0503 | 0.0542 | 0.0949 | 0.0726 | 0.0955 | 0.0727 | 0.0614 | 0.0749 |
| euro | USDollar | 0.0408 | 0.0402 | 0.0362 | 0.0371 | 0.0463 | 0.0352 | 0.0389 | 0.0433 | 0.0357 |
| JP yen | USDollar | 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

Sources: All spot rates and forward rates are collected from Bloomberg Currency Composite pages and Prebon Yamane Asia Region pages on 13 Sept, 2002 and 6 Feb, 2003. Forward swap bid-ask spreads are calculated by bid and ask quotations on both spot and forward rates.

**Table 3-2. Forward swap bid-ask spreads (% in daily basis)
in 8 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 | USDollar | 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 |
| Thai baht | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 | USDollar | 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 |
| Hong Kong dollar | USDollar | 0.0009 | 0.0003 | 0.0002 | 0.0023 | 0.0005 | 0.0004 | 0.0016 | 0.0004 | 0.0003 |
| | euro | 0.0023 | 0.0008 | 0.0004 | 0.0035 | 0.0010 | 0.0006 | 0.0029 | 0.0009 | 0.0005 |
| | JPyen | 0.0018 | 0.0006 | 0.0003 | 0.0037 | 0.0009 | 0.0006 | 0.0028 | 0.0008 | 0.0005 |
| | average | 0.0017 | 0.0006 | 0.0003 | 0.0032 | 0.0008 | 0.0005 | 0.0024 | 0.0007 | 0.0004 |
| euro | USDollar | 0.0014 | 0.0004 | 0.0002 | 0.0012 | 0.0005 | 0.0002 | 0.0013 | 0.0005 | 0.0002 |
| JP yen | USDollar | 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

Sources: All spot rates and forward rates are collected from Bloomberg Currency Composite pages and Prebon Yamane Asia Region pages on 13 Sept, 2002 and 6 Feb, 2003. Forward swap bid-ask spreads are calculated by bid and ask quotations on both spot and forward rates.

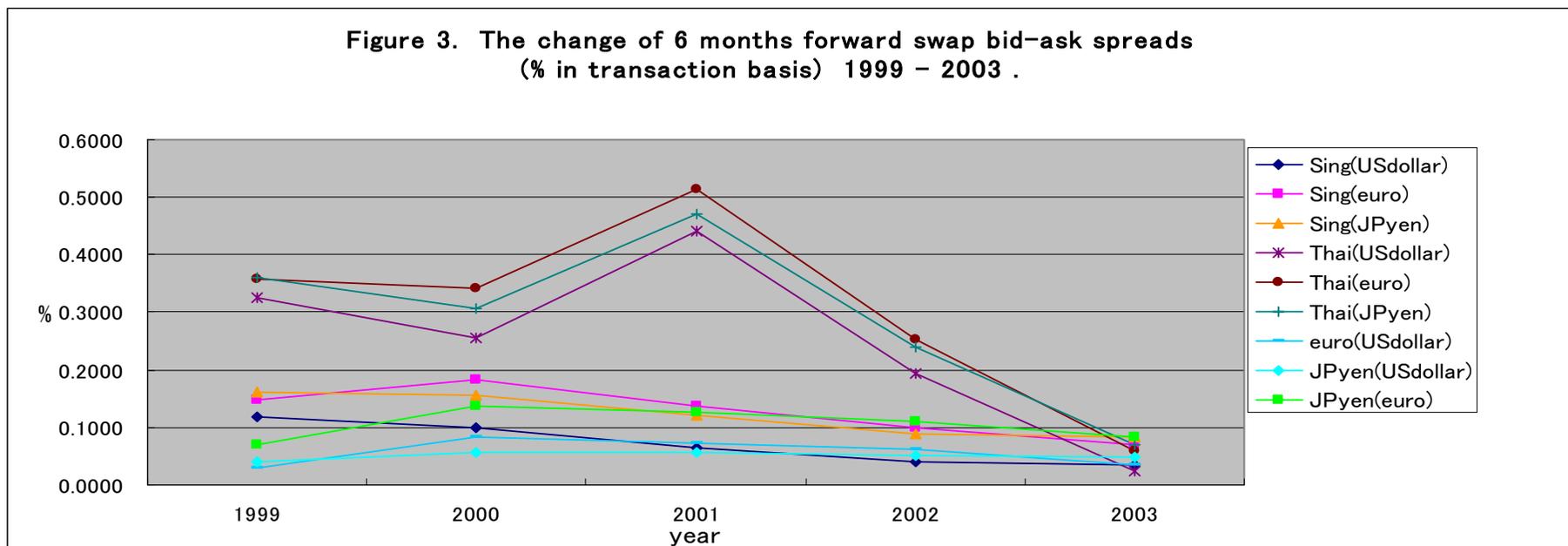
Table 4. The change of Forward swap bid-ask spreads (% in transaction basis) in 2 East Asian Currencies against 3 Major currencies

| currency | against | spreads (%) (sample day: June30, 1999) | | | spreads (%) (sample day: June30, 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 |
| Singapore dollar | US dollar | 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 |
| Thai baht | US dollar | 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 | US dollar | 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 | 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 | 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

Sources: All spot rates and forward rates are collected from Bloomberg Currency Composite pages. Forward swap bid-ask spreads are calculated by bid and ask quotations on both spot and forward rates.

Figure 3. The change of 6 months forward swap bid-ask spreads (% in transaction basis) 1999 - 2003 .



Appendix 1. Index of Trade Intensity in East Asia, 2000

| | China | Hong Kong | Indonesia | Japan | Korea | Malaysia | Philippines | Singapore | Taiwan | Thailand | US | EU |
|-------------|-------|-----------|-----------|-------|-------|----------|-------------|-----------|--------|----------|------|----|
| China | -- | | | | | | | | | | | |
| Hong Kong | 8.26 | -- | | | | | | | | | | |
| Indonesia | 1.06 | 1.03 | -- | | | | | | | | | |
| Japan | 2.12 | 1.75 | 3.60 | -- | | | | | | | | |
| Korea | 2.00 | 1.88 | 3.41 | 2.40 | -- | | | | | | | |
| Malaysia | 0.74 | 1.94 | 2.84 | 2.54 | 1.53 | -- | | | | | | |
| Philippines | 0.43 | 2.33 | 1.61 | 2.54 | 2.01 | 2.30 | -- | | | | | |
| Singapore | 0.97 | 2.74 | 1.79 | 1.88 | 1.43 | 11.21 | 3.43 | -- | | | | |
| Taiwan | 2.21 | 3.75 | 1.60 | 2.80 | 1.74 | 1.82 | 2.28 | 2.70 | -- | | | |
| Thailand | 1.00 | 1.73 | 2.59 | 2.97 | 1.05 | 3.00 | 2.31 | 4.00 | n.a. | -- | | |
| US | 1.29 | 0.68 | 0.87 | 1.62 | 1.36 | 1.17 | 1.58 | 1.03 | 1.43 | 1.15 | -- | |
| EU | 0.38 | 0.41 | 0.40 | 0.41 | 0.33 | 0.33 | 0.36 | 0.36 | 0.39 | 0.39 | 0.56 | -- |

Index of Trade Intensity are calculated by authors.

Source: IMF, Direction of Trade Statistics

Appendix 2. The patterns of Currency Basket Share(%)

| | Estimated weights on 3major currencies based (1) | | | | | | | | | | | | | | | Trade based weights | | | | | | | | | | | | | | | | |
|-------------|--|------|------|-----------------|------|------|-----------------|------|------|-----------------|------|------|-----------------|------|------|-----------------------|------|------|------------------------|------|------|------------------------|-----|------|------|------|------|------|------|------|------|------|
| | weights in all period (1999–2002) | | | weights in 1999 | | | weights in 2000 | | | weights in 2001 | | | weights in 2002 | | | Trade-weight I (2) | | | Trade-weight II (3) | | | Trade-intensity (4) | | | | | | | | | | |
| | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | euro | US\$ | JP¥ | 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 | | | | | | | | | | | 25.5 | 65.9 | 8.6 | | | | |
| 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 | 8.2 | | | |
| 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 | | | | | | | | | | | | | 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 | 35.7 | 35.1 | 29.2 | 69.3 | 16.7 | 14.0 | | | | | | | | 17.9 | 73.9 | 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 | | | | | | | | | | | | | | 31.0 | 60.6 | 8.4 | |
| 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 | |
| HongKong | 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 | | | | | | | | | | | | | | | 23.9 | 61.6 | 14.4 |
| China | 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 | | | | | | | | | | | | | | | 34.0 | 55.9 | 10.1 |

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 I depends on the calculation methods of Ogawa and Kawasaki (2003). Their traded weights are the share of total trade amount of ASEAN+4 (China, Hong Kong, Korea and Taiwan) against US, Japan and 12 Euro countries. We use the average share of annual results from 1990 to 2002. Data are from Directions of Trade (IMF).

(3) The basket share of Trade-weight II depends on the calculation methods of Ogawa and Kawasaki (2003). The difference of Trade-weight I and Trade-weight II is whether the trade share includes the trade amount of 9 sampled Asian countries against the rest of the world. Trade-weight II includes these trade data and puts the total amount of trade against the rest of the world into the US category. We use the average share of annual results from 1990 to 2002. All trade data except Taiwan are from Directions of Trade (IMF). The data of Taiwan are from National Statistics of Taiwan.

(4) The basket share of Trade-intensity depends on the results of Appendix 1. Each East Asian country's trade intensity is calculated by the method of Petri (1993). Here we use the results calculated by trade data as of 2000.