Asymmetric responses of East Asian currencies to the US dollar depreciation for reducing the US current account deficits+

Eiji Ogawa[a,*] , Takeshi Kudo[b]

[a] *Graduate School of Commerce and Management of Hitotsubashi University,*

Naka 2-1, Kunitachi, Tokyo, Japan

[b] *Faculty of Economics of Nagasaki University,*

Katafuchi 4-2-1, Nagasaki-shi, Nagasaki, Japan

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* Corresponding author. E-mail: ogawa.eiji@srv.cc.hit-u.ac.jp, Tel: +81-42-580-8859, fax: +81-42-580-8747.

Abstract

In this paper, we investigate responses of East Asian currencies to the US dollar depreciation in the near future. First, we show that a significant depreciation of the US dollar will be necessary in order to reduce the current account deficits. Second, we show that the responses of the East Asian currencies to a sudden and sharp depreciation of the US dollar will differ with countries because of the different degree of linkages of the East Asian currencies to the US dollar. Based on the above analyses, a regional coordination of the exchange rate policy is necessary to the East Asian countries to response appropriately to a possible depreciation of the US dollar in the future.

JEL classification: F32; F31; F47

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1. Introduction

The United States have been faced with the increasing current account deficits in the recent years. Its current account deficits were recorded over 6 percent of GDP in 2005. We remember that the current account deficits were over 3 percent of GDP in the mid of 1980s when the US dollar made a large depreciation after the Plaza Accord in September 1985. It is regarded that the recent current account deficits are going beyond a dangerous level by comparing the recent situation with that in the mid of 1980s.

Some researchers question whether the current account deficits of the United States are sustainable in the current level of the exchange rates of the US dollar because the current account deficits began to increase again and have reached to 6% of GDP[1]. Now, we might need the "Plaza Accord" once again. However, we have already observed the recent appreciations of the Euro, the Japanese yen, and some East Asian currencies which are floating against the US dollar, and the simultaneous depreciation of the other East Asian currencies, which are fixed with dollar, against the above currencies.

In this paper, we show that some depreciation of the US dollar against the other currencies is necessary in order to reduce the US current account deficits from the current level to the permissible range, say 2 or 3% of GDP. Then, we make estimation of the linkages between the East Asian currencies and the US dollar to point out that the US dollar depreciation will have asymmetric effects on the East Asian currencies[2].

This paper contains the following analyses. First, we estimate the vector

autoregression (VAR) models which contain the exchange rates of the US dollar and the current account components in the next section[3]. Second, we conduct the regressions *a la* Frankel and Wei (1994) to estimate linkages of the East Asian currencies to the US dollar with considering the effects of the infrequent revaluation in the section 3. Then we discuss the implications to the exchange rate regimes of the East Asian region. Based on the above analyses, we conclude this paper in the last section.

2. Effects of the US dollar depreciation shock on the US current account deficits

In this section, we investigate how impact depreciation of the US dollar would give on the current account deficits in the United States and how much depreciation of the US dollar is needed to reduce the current account deficits to a permissible level. First, we explain the methodology and the data used in our analysis, and then we implement preliminary analyses. After the process, we estimate the VAR models which are explained the first subsection. We show impulse responses to the exchange rate shocks to investigate impact of the US dollar depreciation to the US current account in the last subsection.

2.1 Methodology and the data

We simulate how much depreciation of the US dollar is needed for its current

account sustainability given estimated parameters of vector autoregression (VAR) models. Three VAR models are estimated in our analysis. The first model (Model 1) is a 2 variables VAR model which contains the exchange rate and the current account. The second model (Model 2) is a 3 variables VAR model which contains the exchange rate, trade balance, and factor income receipt from abroad from a viewpoint of international trade flows. The last model (Model 3) is a 3 variables VAR model which contains the exchange rate, saving-investment balances for the private and the public sectors from a viewpoint of domestic investment saving balance.

We use the following data. First, we use the log of the real effective exchange rate of the US dollar as one of the elements in the three VAR models. The real effective exchange rate data is taken from the Federal Reserve Board.

Second, the trade balance and the net income receipt from abroad to investigate the view of international trade by Mann (2002). These data are taken from the Table 1 in the quarterly International Transactions Accounts released by the Bureau of Economic Research (BEA).

Third, the data of the saving-investment balances of the private and public sectors is taken from the Table 4 in the National Income and Production Accounts (NIPA) by the BEA to investigate the view of domestic saving-investment view of Mann (2002). These data except for the exchange rate are normalized by the GDP which is taken from the Table 1 in the NIPA. The sample period of all data is from the first quarter of 1973 to the first quarter of 2006.

Table 1 shows the descriptive statistics of the variables used in the VAR analyses.

This table shows that the current account tend to deteriorate in the sample period from the differenced data, and that the greater part of the deterioration is attributed to the fall in the trade balance in the view of international trade, or the saving-investment balance of the private sector in the view of domestic saving-investment balance.

Figure 1 shows that the time series of the exchange rate (real effective exchange rate) and the current account of the United States. A large exchange rate swing is in the 1980s, and the current account deterioration is shown in the figure. Then the dollar appreciation and the current account deterioration simultaneously caused from 1996 to 2001, and the current account deficits have been rising after 2001 while the exchange rate has deprecated.

The current account can be decomposed to the trade balance, the net income receipt from abroad, and the unilateral current transfers, as shown in the figure 2. The trade balance has almost continuously deteriorated. The income receipt has been decreasing with a gentle slope, as the international investment position has been deteriorated[4]. The unilateral current transfers are stable except for the first quarter of 1991, when the US was received the military transfers on the Gulf war from the allies.

The Figure 3 shows the saving-investment balances of the private and the government sectors. The private sector has been excess saving almost all period till 1995, while the government has been excess investment. Though the government sector was excess saving around 2000, the both private sector and government are in excess investment in recent years.

2.2 Preliminary tests for the VAR models

Before we estimate the three VAR models, we test the stationarity of relevant variables by using the Augmented Dickey-Fuller (ADF) tests. The results are shown in Table 2. The null hypothesis of non-stationarity is not rejected for all of the variables, except for the saving-investment balance of the government sector, at 5% significance level.

Next, we test cointegration for the three VAR models by Johansen tests. The results are shown in Table 3. The null hypotheses of at least one cointegration equation are rejected for all models. These results suggest that the VAR estimation should be conducted with the differenced data.

2.3 VAR analyses

We estimate the three unrestricted VAR models in this analysis. The first VAR model (Model 1) is the two-variable VAR contains the exchange rate and the current account. In the second model (Model 2), we decompose the current account into the trade balance and the income receipt. On the other hand, from a viewpoint of the domestic investment saving balance, the third VAR model (Model 3) contains the exchange rate and the saving-investment balances for the private and the government sectors. The results of the lag order selection based on Akaike's information criteria (AIC) for the VAR models are shown in

the Table 4. The results of the optimal lag order of the first and second models are 1, while that of the third model is 2.

The estimates of the VAR models are shown in the Table 5. From the estimates, the current account in the first model, and the trade balance in the second model are negatively correlated with the lagged exchange rate, that is, the depreciation of the US dollar improves the current account or trade balance.

The saving-investment balance of government is also negatively correlated with the lagged exchange rates at 10% significance in the third model, while the saving-investment balance of the private sector is positively correlated though the estimates are not significant. After considering these effects jointly, we can get that the current account (equals the saving-investment balances of the private sector plus the government sector) is negatively correlated with lagged exchange rates.

2.4 Impulse responses to the exchange rate shocks

In this subsection, we show the impulse responses to the exchange rate shock based on the estimated VAR models in previous subsection. The impulse responses to the exchange rate shock in the first model are shown in the panel (a) of the Figure 4. If the exchange rate initially appreciates about 2% by the shock, the exchange rate will appreciate about 3%, and the current account will deteriorate about 0.07% of GDP after 20 quarters. Conversely, we can say that the 30% depreciation of the US dollar after 20 quarters of the initial shock

improves the current account in 0.7%.

This result strikes us because the large depreciation which equals to the depreciation after the Plaza Accord makes only the 0.7 percent improvement in the current account. This result means that we may need the largest depreciation in the history to make the US current account to the permissible level.

The impulse responses to the exchange rate shock in the second model are shown in the panel (b) of the Figure 4. If the exchange rate initially appreciates about 2% by the shock, the exchange rate will appreciate about 3%, the trade balance will deteriorate about 0.07%, and the income receipt will decrease about 0.01% of GDP after 20 quarters. The joint effect of the exchange rate shock on the current account is as same as in the first model.

The impulse responses to the exchange rate shock in the third model are shown in the panel (c) of the Figure 4. If the exchange rate initially appreciates about 2% by the shock, the exchange rate will appreciate about 3%, the saving-investment balance of the private sector will rise about 0.17% of GDP, while that of the government sector will fall about 0.23% of GDP. The joint effect of the exchange rate shock on the current account is also as same as in the first model.

We can say that it is inevitable for the US dollar to depreciate against other currencies including East Asian currencies, and that this conclusion is robust because we are able to get the same results from the different models, which are from the view of the international trade and the domestic saving-investment.

2.5 Alternative specifications

In this subsection, we investigate the alternative specifications. First, we set the lag length of the VAR 8 lags. The figure 5 shows the impulse responses to the exchange rate shock with 8 lags in the first model. This figure implies that the significant depreciation of the US dollar as in the period of the Plaza Accord makes the 3 percent improvement of the current account. The results of the other models are similar to the first model.

Second, we estimate the alternative specification including interest rate differentials in order to capture the international capital flows. The interest rate differential is the difference between the US (real) interest rate and the world (real) interest rate. We construct the real rate of interest of each country by using the money market rate minus the CPI inflation rate from the *International Financial Statistics*. The world interest rate is the weighted average of the rates of the major countries with the weights used in the real effective exchange rate reported by the Fed [5].

The unit-root of the constructed world interest rate is rejected by the Dickey-Fuller test. The estimates of the VAR are reported in the Table 6. The impulse responses are similar to the specifications without the interest rate differentials, except for the model 3 reported in the Figure 6. The impulse response of the IS balance of the private sector to the exchange rate shock is the opposite effect to the specification without interest rate differentials because the response of the private sector is partially from the effect of the exchange rate shock via the interest rate movements as shown in the Figure 7. However the conclusion with the total

effects on the current account does not differ from the specifications without the interest rate differentials.

3. Linkages of East Asian currencies to the US dollar

In this section, we estimate the linkages of the East Asian currencies to the US dollar to investigate the impact of the dollar depreciation to the East Asian economies. First, we explain the methodology of the estimation and the data used in the analysis. Second, we investigate the treatment of the only once revaluation in our analysis. And then, we show the results of our rolling regressions.

3.1 Methodology and the data

In this section, an empirical analysis is conducted to investigate the impact of the US dollar depreciation against other currencies on the East Asian economies. For this purpose, we employ the method of Frankel and Wei (1994) to analyze the linkages of the East Asian currencies to the US dollar.

Frankel and Wei (1994) used the following regression and high frequency (weekly or daily) data to investigate changes of the exchange rate regime in the short-run. A log difference of currency X in terms of the Swiss Franc is regressed on the log differences of the major currencies, which include the US dollar, the Euro, and the Japanese yen, in terms of

the Swiss Franc as the following equation:

$$\Delta \log X_t = \alpha_0 + \alpha_1 \cdot \Delta \log USD_t + \alpha_2 \cdot \Delta \log EURO_t + \alpha_3 \cdot \Delta \log JPY_t + \varepsilon_t \qquad (1)$$

where X: the exchange rate of an East Asian currency in terms of the Swiss Franc, USD: the exchange rate of the US dollar in terms of the Swiss Franc, $EURO$: the exchange rate of the Euro in terms of the Swiss Franc, JPY: the exchange rate of the Japanese yen in terms of the Swiss Franc, and ε: the disturbance term in the equation. If the country X adopts the fixed exchange rate regime with the US dollar, the coefficient α_1 should be equal to one[6].

The daily data of exchange rates used in our analysis are collected from the DataStream. Its sample period of the data covers from March 30, 2005 to August 3, 2006. The descriptive statistics of the data are shown in the Table 7. We employ the rolling regressions whose observations are fixed at 60, to capture the short or medium run changes in the linkage of the East Asian currencies to the US dollar. This sample length in the regressions corresponds to about 12 weeks or a quarter.

3.2 The Chinese yuan revaluation and its treatment

The Chinese yuan revaluation and the announcement of its exchange rate system reform was quite an event on the exchange rate regime in East Asia. On July 21, 2005, the monetary authority of China announced that the Chinese yuan was revalued in the range of 2% against the US dollar, and that the exchange rate regime was shifted from the dollar peg to the managed float with reference of a currency basket of the US dollar, the Euro, the

Japanese yen, and the Korean won (See Figure 8). The impact of this announcement quickly spread among East Asian countries. For example, the monetary authority of Malaysia followed the announcement of the Chinese exchange rate system reform immediately.

There is a point to note in our analysis. The estimates might be biased downward by a once revaluation (or devaluation) of the exchange rate against the US dollar, even if the exchange rate is fixed with the US dollar after the revaluation (or devaluation). So we employ the sharp revaluation (or devaluation) dummies in our regressions. The dummies are set if the change in the exchange rate against the US dollar is over 6 standard deviations from the mean. We estimate the following equation

$$\Delta \log X_t = \alpha_0 + \alpha_1 \cdot \Delta \log USD_t + \alpha_2 \cdot \Delta \log EURO_t + \alpha_3 \cdot \Delta \log JPY_t + \gamma \cdot Dummy_t + \varepsilon_t \qquad (2)$$

where $Dummy$: the dummy variable explained above. We focus on the coefficient of the US dollar α_1 to investigate the linkage of the East Asian currencies to the US dollar.

The sharp revaluations (or devaluations) of East Asian currencies are shown in Table 8. The revaluation of the Chinese yuan on July 21, 2005 may influence immediately some East Asian currencies, the Singapore dollar, the Thai baht, and the Brunei dollar.

3.3 Results of the rolling regressions

In this subsection, we show the results of our estimation. We focus on the coefficient of the US dollar α_1. The estimates of α_1 are shown in the Figure 9. The linkage of the Chinese Yuan to the US dollar began to fluctuate since July 21, 2005. The linkage of the

Malaysian ringgit to the US dollar also began to fluctuate since July 28, 2005. But the coefficients in the Chinese yuan and the Hong Kong dollar are significantly not different from a unity. This result means that the linkages of these currencies to the US dollar are still high after the revaluation.

The linkage of the Korean won and the Taiwan new dollar to the US dollar had a tendency to increase till the end of 2005, and the coefficients are stable from the beginning of 2006.

The coefficients of the US dollar α_1 in the ASEAN currencies including the Malaysian ringgit and excluding the Vietnamese dong had a tendency to increase till the end of 2005. But the coefficients of the US dollar α_1 begin to decrease recently. The linkage of the Vietnamese dong to the US dollar has been maintained.

As a whole, the linkages of the East Asian currencies to the US dollar tend to decrease recently though the level of linkages is still high in many countries. Especially, the Chinese yuan, the Hong Kong dollar, the Vietnamese dong still have very high linkages to the US dollar, while the Singapore dollar and the Brunei dollar began to decrease the linkages to the US dollar and its level is relatively low. The responses of the East Asian currencies to the sudden and sharp depreciation of the US dollar in near future will be asymmetric reflecting the difference in exchange rate policies among them.

4. Conclusion

In this paper, we investigate whether the US dollar depreciation is necessary to reduce the US current account deficits and how the depreciation of the US dollar influences the East Asian currencies.

First, this paper shows that a significant depreciation of the US dollar will be necessary in order to reduce the current account deficits. We obtain the robust results that the current account hardly responses to the exchange rate shock from both the views of international trade and the view of domestic saving-investment balance. Accordingly, a sharp depreciation of the US dollar is necessary in order to reduce the US current account deficits to a permissible level.[7]

Second, we show that the responses of the East Asian currencies to a sudden and sharp depreciation of the US dollar will differ with countries because the linkages of the East Asian currencies to the US dollar are different among the East Asian countries. From our analysis, the Chinese yuan, the Hong Kong dollar, the Vietnamese dong still have very high linkages to the US dollar while the Singapore dollar and the Brunei dollar began to decrease the linkages to the US dollar and its level is relatively low.

Based on the above analyses, a regional coordination of the exchange rate policy is necessary to the East Asian countries to response appropriately to a possible depreciation of the US dollar in the future[8]. The Chinese monetary authority announced its exchange rate system reform, which include adoption of a managed float system with reference to a currency basket on July 21, 2005. Implementation of the reform should make sense for the regional coordination because it is pointed out that a currency basket system is desirable for

East Asian countries. Moreover, the implementation might lead to solution of “coordination failure” in choosing exchange rate system among the East Asian countries.

Footnotes

[1] Kudo and Ogawa (2003) conclude that the US current account deficits are unsustainable from the three views suggested by Mann (2002) while Matsubayashi (2005) does not reject the hypothesis of the sustainability of the US current account deficits.

[2] Ogawa and Sakane (2006) identify the Chinese exchange rate policy after the announcement of the reform on July 21, 2005. Added to the Frankel and Wei (1994)'s regression, they employ the Kalman filtor method. Ohno and Fukuda (2003) use the high frequency (intra daily) data to exclude the correlated shocks among the currencies in the investigation.

[3] Ogawa and Kudo (2004) investigate some cases of the dollar fall against other currencies with VAR analysis, and conclude that the large dollar depreciation will be inevitable near future.

[4] The Bureau of Economic Research reported that the United States has shifted from the creditor to the debtor in 1986, in the case of the direct investment positions evaluated at current cost, or in 1989 at market value.

[5] The weights include only the major countries, the Euro area, Canada, Japan, United Kingdom, Switzerland, Australia, and Sweden, though all currencies are used in the previous section, because the data of the money market rate are not available in almost other countries in the sample period. Some missing values are excluded when we calculate the world interest rate as the followings, Canada (1973Q1-1974Q4), Switzerland (1973Q1-1975Q3), Ireland (1976Q1-1976Q3, 1978Q1), Spain (1973Q1-1973Q4), Finland

(1973Q1-1977Q4), Portugal (1973Q1-1980Q4), and Greece (1973Q1-1997Q4).

[6] Ohno and Fukuda (2003) point out that the coefficient of $\alpha_1 = 1$ does not mean the currency X pegged with the US dollar in the case that the shocks in the country X and in the US are correlated.

[7] Another candidate of the adjustment channel of the current account is the fiscal consolidation because the fiscal deficit is the element of so-called "twin deficits". Kim and Roubini (2003) estimate the structural VAR and conclude that the fiscal consolidation does not bring the reduction of the current account deficits because the correlation between the fiscal balance and current account is negative.

[8] Ogawa and Ito (2002) shows that the dollar peg in the East Asian countries is the result of the coordination falure in the choice of the exchange rate system among the East Asian countries. Ogawa and Shimizu (2005) suggest a criterion for the coordinated exchange rate policies, and estimate the deviation from the criterion of the exchange rate policies in the East Asia.

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Table 1: Descriptive Statistics

		Exchange rate(log)	Current account	Trade balance
Level	Mean	4.531		-1.897
	Std. Dev.	0.092		1.920
Differenced	Mean	0.000		-0.049
	Std. Dev.	0.022		0.377
		Income receipt(net)	IS balance (Private)	IS balance (Government)
Level	Mean	0.534		0.832
	Std. Dev.	0.370		2.400
Differenced	Mean	-0.005		-0.035
	Std. Dev.	0.145		0.847

1) The data are normalized by GDP, except for the data of exchange rate.

2) The sample period of the data is 1973Q1-2006Q1.

Table 2: Unit-root Tests (Dickey-Fuller Tests with Drift Term)

		Exchange rate(log)		Current account		Trade balance	
Level	Test Stat.	-1.785		-0.110		-0.013	
	P-value	0.387		0.945		0.955	
	Lag length	1		0		0	
Differenced	Test Stat.	-8.521	***	-11.272	***	-9.788	***
	P-value	0.000		0.000		0.000	
	Lag length	0		0		0	
		Income receipt(net)		IS balance (Private)		IS balance (Government)	
Level	Test Stat.	-1.287		-1.533		-2.896	**
	P-value	0.634		0.514		0.049	
	Lag length	1		0		3	
Differenced	Test Stat.	-17.006	***	-10.895	***	-6.277	***
	P-value	0.000		0.000		0.000	
	Lag length	0		0		1	

1) The data are normalized by GDP, except for the data of exchange rate.

2) The sample period of the data is 1973Q1-2006Q1.

3) The lag lengths are determined by the Akaike Information Criteria (AIC).

4) *, **, *** mean that the null hypotheses of unit-root are rejected at 10%, 5%, 1%.

Table 3: Cointegration Tests (Johansen Tests)

(a) Trace Test

Hypothesized # of CE(s)	Exchange rate, Current account	Critical Value(5%)	Exchange rate, Trade, Income	Exchange rate, IS(Private, Government)	Critical Value(5%)
0	9.353	15.41	19.737	24.408	29.68
1	1.359	3.76	8.455	9.358	15.41
2	-		1.274	0.883	3.76

(b) Maximum Eigenvalue Test

Hypothesized # of CE(s)	Exchange rate, Current account	Critical Value(5%)	Exchange rate, Trade, Income	Exchange rate, IS(Private, Government)	Critical Value(5%)
0	7.994	14.07	11.282	15.049	20.97
1	1.359	3.76	7.182	8.475	14.07
2	-		1.274	0.883	3.76

1) The data are normalized by GDP, except for the data of exchange rate.

2) The sample period of the data is 1973Q1-2006Q1.

3) The lag lengths are determined by the Akaike Information Criteria (AIC).

4) The curitical values are from Osterwald-Lenum (1992).

Table 4: The Lag-order Selection in VAR Models

Lags	Exchange rate, Current account	Exchange rate, Trade, Income	Exchange rate, IS(Private, Government)
0	-4.029	-5.513	-1.481
1	-4.084 *	-5.731 *	-1.517
2	-4.071	-5.667	-1.528 *
3	-4.067	-5.651	-1.495
4	-4.013	-5.543	-1.403
5	-4.001	-5.436	-1.410
6	-3.989	-5.396	-1.435
7	-4.022	-5.339	-1.398
8	-4.014	-5.307	-1.331

1) The data are normalized by GDP, except for the data of exchange rate.

2) The sample period of the data is 1973Q1-2006Q1.

3) The lag lengths are determined by the Akaike Information Criteria (AIC).

4) * means the optimal lags.

Table 5: The results of VAR Estimations

(a) Model 1: Exchange rate, and Current account

Dependent variable	Excl. Interest rate differentials	
	EXR	CA
EXR(-1)	0.312 ***	-2.732 *
	0.084	1.548
CA(-1)	0.007 *	-0.028
	0.005	0.089
Constant	0.000	-0.053
	0.002	0.033
Adj. R^2	0.088	0.009
AIC	-4.931	0.903
Lag length	1	
# of obs.	131	
log likelihood	270.730	

(b) Model 2: Exchange rate, Trade balance, and Income receipt

Dependent variable	Incl. Interest rate differentials		
	EXR	TB	IR
EXR(-1)	0.313 ***	-2.063 **	-0.466
	0.083	1.260	0.556
TB(-1)	0.002	0.120	-0.002
	0.006	0.087	0.039
IR(-1)	0.023 **	-0.285	-0.394 ***
	0.012	0.188	0.083
Constant	0.000	-0.042	-0.008
	0.002	0.027	0.012
Adj. R^2	0.091	0.033	0.133
AIC	-4.927	0.500	-1.134
Lag length	1		
# of obs.	131		
log likelihood	154.732		

(c) Model 3: Exchange rate, IS balance (Private), IS balance (Government)

Dependent variable	Incl. Interest rate differentials		
	EXR	PIS	GIS
EXR(-1)	0.230 **	0.832	-4.751 *
	0.089	3.754	2.955
EXR(-2)	0.121 *	2.722	-1.220
	0.090	3.786	2.980
PIS(-1)	0.005 *	0.010	-0.092
	0.003	0.135	0.107
PIS(-2)	0.005 *	0.019	-0.005
	0.003	0.137	0.108
GIS(-1)	0.006 *	-0.041	-0.061
	0.004	0.174	0.137
GIS(-2)	0.003	-0.190	0.198
	0.004	0.170	0.134
Constant	0.001	-0.044	-0.013
	0.002	0.076	0.060
Adj. R^2	0.074	-0.013	0.024
AIC	-4.908	2.579	2.100
Lag length		2	
# of obs.		130	
log likelihood		90.478	

1) The data are normalized by GDP, except for the data of exchange rate.

2) EXR: Log differenced exchange rate, CA: Differenced current account, TB: Differenced trade balance, IR: Differenced income receipt (net), PIS: Differenced IS balance (Private), GIS: Differenced IS balance (Government)

3) The sample period of the data is 1973Q1-2006Q1.

4) The lag lengths are determined by the Akaike Information Criteria (AIC).

5) *, **, *** mean that the null hypotheses of unit-root are rejected at 10%, 5%, 1%.

Table 6: The results of VAR Estimations with Interest Rate Differentials

(a) Model 1: Exchange rate, and Current account

Dependent variable	Incl. Interest rate differentials		
	EXR	CA	DIF
EXR(-1)	0.156 *	-2.249 *	-5.855 *
	0.092	1.189	2.999
CA(-1)	0.011	-0.016	-0.048
	0.007	0.090	0.354
DIF(-1)	0.004 **	0.019	0.884 ***
	0.002	0.012	0.052
Constant	0.000	-0.055	-0.002
	0.003	0.034	0.094
Adj. R^2	0.097	0.009	0.734
AIC	-4.191	0.909	2.888
Lag length		1	
# of obs.		130	
log likelihood		42.286	

(b) Model 2: Exchange rate, Trade balance, and Income receipt

Dependent variable	Incl. Interest rate differentials			
	EXR	TB	IR	DIF
EXR(-1)	0.174 *	-1.660 **	-0.551	-5.025 *
	0.094	0.680	0.492	2.797
TB(-1)	0.003	0.138 *	0.002	-0.059
	0.006	0.081	0.041	0.434
IR(-1)	0.038 ***	-0.309	-0.404 ***	1.039
	0.014	0.204	0.094	0.681
DIF(-1)	0.004 **	0.020	0.004	0.874 ***
	0.001	0.013	0.006	0.053
Constant	0.000	-0.044	-0.009	0.003
	0.003	0.027	0.010	0.097
Adj. R^2	0.104	0.035	0.134	0.737
AIC	-4.192	0.506	-1.128	2.881
Lag length		1		
# of obs.		130		
log likelihood		154.732		

(c) Model 3: Exchange rate, IS balance (Private), IS balance (Government)

Dependent variable	Incl. Interest rate differentials EXR		PIS		GIS		DIF	
EXR(-1)	0.145		0.255		-3.942	**	-5.348	*
	0.092		2.724		1.915		2.984	
EXR(-2)	-0.119		-1.296		1.441		1.193	
	0.086		2.096		1.824		2.306	
EXR(-3)	0.288	***	-0.022		0.262		-0.981	
	0.085		2.558		1.851		1.979	
PIS(-1)	0.006		-0.066		-0.031		-0.012	
	0.005		0.103		0.082		0.171	
PIS(-2)	0.009	*	-0.031		0.053		0.165	
	0.005		0.170		0.159		0.161	
PIS(-3)	0.003		-0.146		0.072		-0.018	
	0.006		0.154		0.085		0.198	
GIS(-1)	0.008		-0.091		-0.081		0.303	
	0.006		0.164		0.136		0.264	
GIS(-2)	0.010	**	-0.273		0.240	*	0.484	***
	0.005		0.196		0.141		0.174	
GIS(-3)	0.003		-0.070		0.130	**	-0.043	
	0.006		0.220		0.124		0.180	
DIF(-1)	0.004		-0.109		0.120	*	0.812	***
	0.002		0.084		0.059		0.091	
DIF(-2)	0.001		0.258	*	-0.137		-0.232	
	0.004		0.135		0.073		0.153	
DIF(-3)	-0.003		-0.051		-0.044		0.312	*
	0.003		0.096		0.080		0.167	
Constant	0.001		-0.069		0.001		-0.011	
	0.003		0.075		0.056		0.098	
Adj. R^2	0.116		0.037		0.056		0.742	
AIC	-4.142		2.579		2.118		2.853	
Lag length	3							
# of obs.	128							
log likelihood	-32.660							

1) The data are normalized by GDP, except for the data of exchange rate.

2) EXR: Log differenced exchange rate, CA: Differenced current account, TB: Differenced trade balance, IR: Differenced income receipt (net), PIS: Differenced IS balance (Private), GIS: Differenced IS balance (Government), DIF: Interest Rate Differential

3) The sample period of the data is 1973Q1-2005Q4.

4) The lag lengths are determined by the Akaike Information Criteria (AIC).

5) *, **, *** mean that the null hypotheses of unit-root are rejected at 10%, 5%, 1%.

Table 7: Descriptive Statistics

	HongKong Dollar	Taiwan New Dollar	Singapore Dollar	Korean Won	Chinese Yuan
Mean	-0.0001	0.0000	-0.0002	-0.0003	-0.0002
Std.Dev.	0.0060	0.0058	0.0051	0.0061	0.0059
	Thai Baht	Malaysian Ringgit	Philippine Peso	Indonesian Rupiah	
Mean	-0.0002	-0.0002	-0.0002	-0.0002	
Std.Dev.	0.0056	0.0065	0.0060	0.0090	
	Brunei Dollar	Cambodia Riel	Laos Kip	Myanmar Kyat	Vietnamese Dong
Mean	-0.0002	0.0001	0.0006	-0.0001	0.0000
Std.Dev.	0.0048	0.0073	0.0165	0.0059	0.0059
	US Dollar	Euro	Japanese Yen		
Mean	-0.0001	0.0000	0.0001		
Std.Dev.	0.0059	0.0017	0.0052		

1) The data of each currency are normalized by Swiss Franc.

2) The sample period of the data is from March 30, 2005 to August 2, 2006.

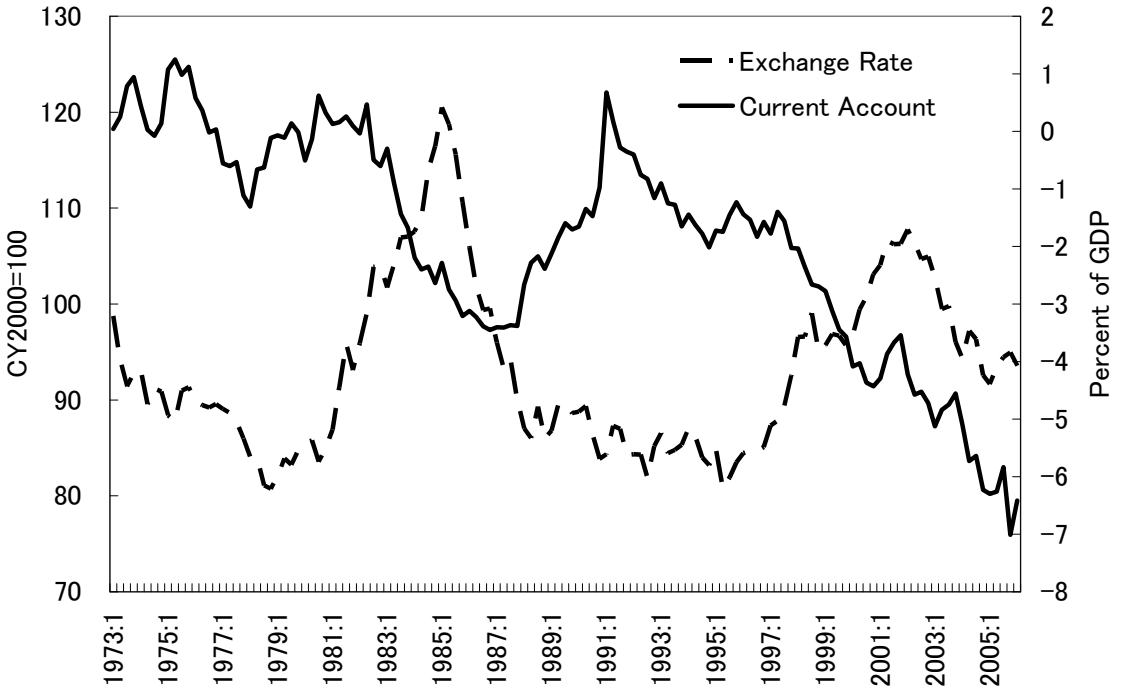
Table 8: Drastic Revaluations of East Asian Currencies against the US Dollar

	HongKong Dollar	Taiwan New Dollar	Singapore Dollar	Korean Won	Chinese Yuan
Date	2005/9/30 2005/10/3	NA	2005/7/21	NA	2005/7/21
	Thai Baht	Malaysian Ringgit	Philippine Peso	Indonesian Rupiah	
Date	2005/7/21	NA	NA	2005/8/29	
	Brunei Dollar	Cambodia Riel	Laos Kip	Myanmar Kyat	Vietnamese Dong
Date	2005/7/21	2005/4/5 2005/8/12	2005/4/14	2006/5/17	NA

1) The definition of the "drastic" revaluation is that the log-differenced exchange rate against US dollar changes over the 6 standard deviations from the mean.

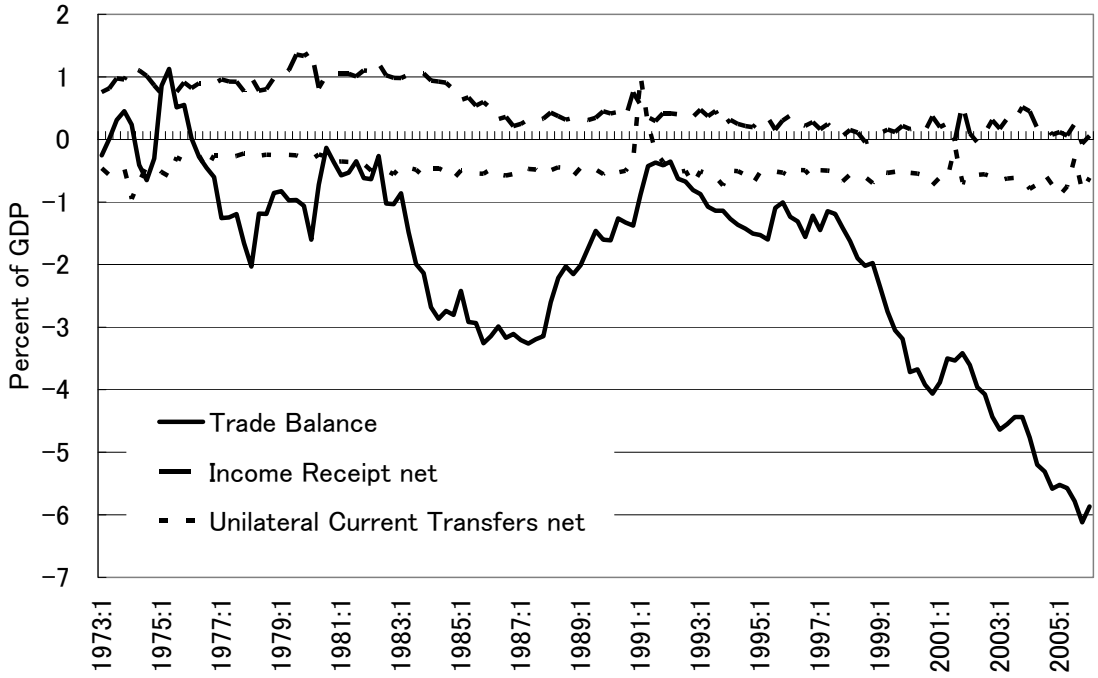
2) The sample period of the data is from March 30, 2005 to August 2, 2006.

Figure 1: US Current Account and the Real Effective Exchange Rate of the US dollar



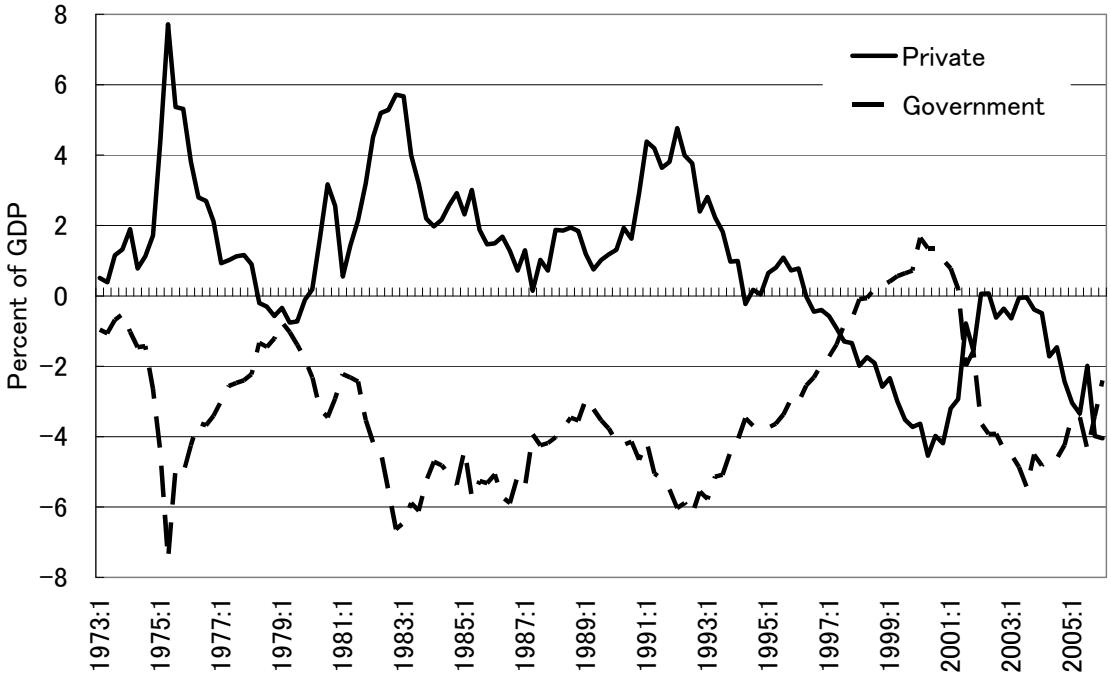
Data Source: Real Effective Exchange Rate (Federal Reserve Board of Governors)
Current Account (Bureau of Economic Analysis)

Figure 2: Decomposition of the US Current Account



Data Source: Bureau of Economic Analysis

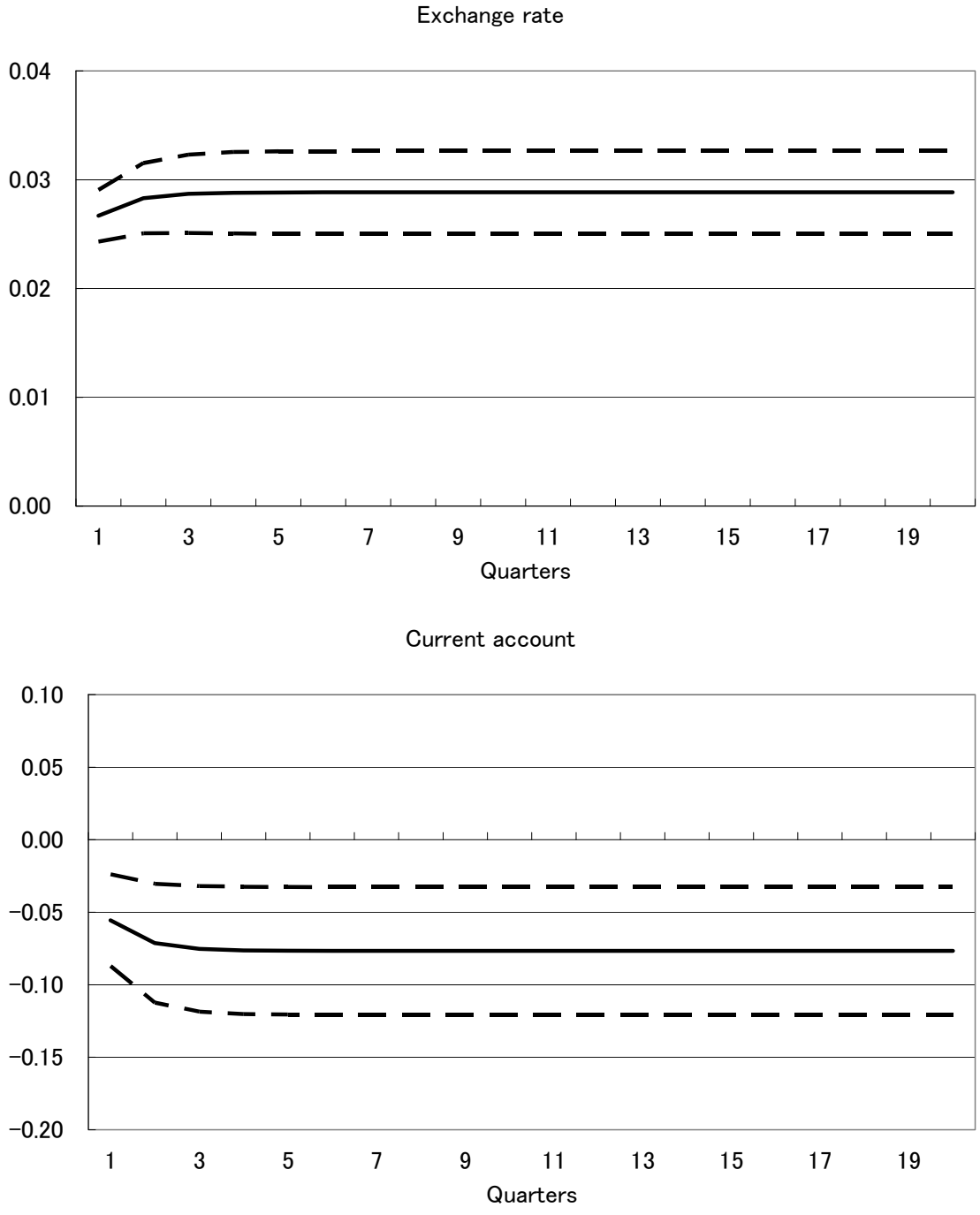
Figure 3: The US Saving-Investment Balance



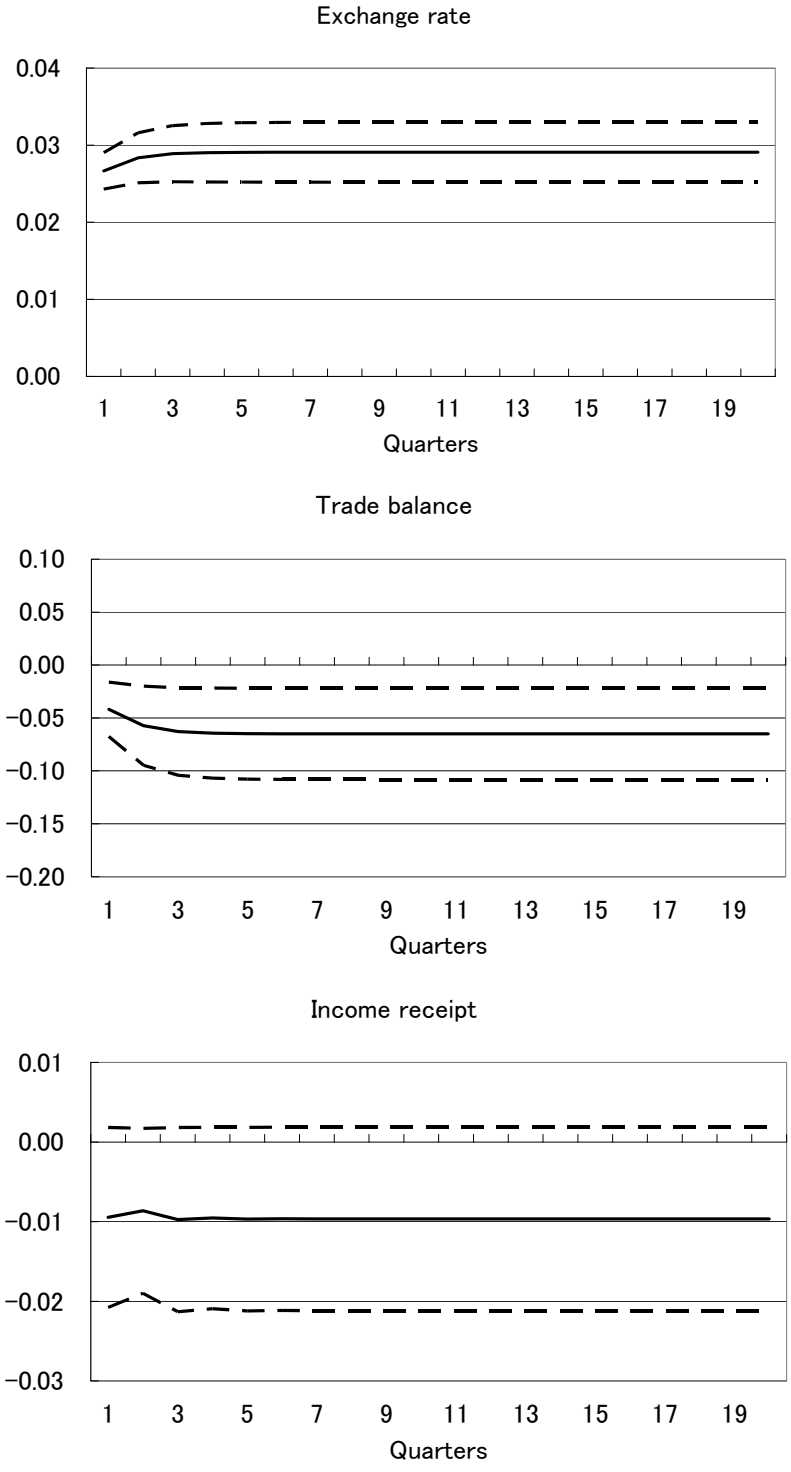
Data Source: Bureau of Economic Analysis

Figure 4: The Accumulated Impulse Responses to the Exchange Rate Shocks

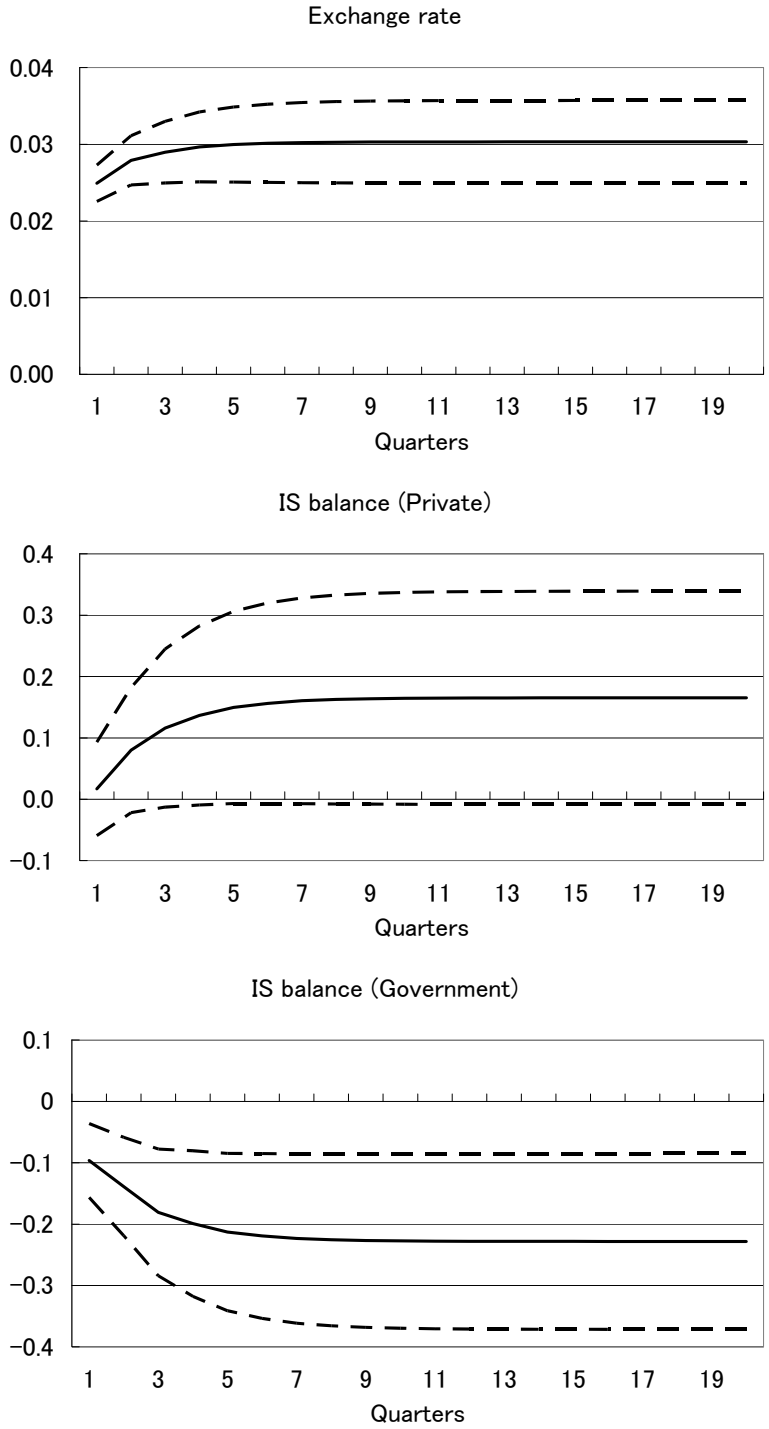
(a) Model 1: Exchange rate, and Current account



(b) Model 2: Exchange rate, Trade balance, and Income receipt



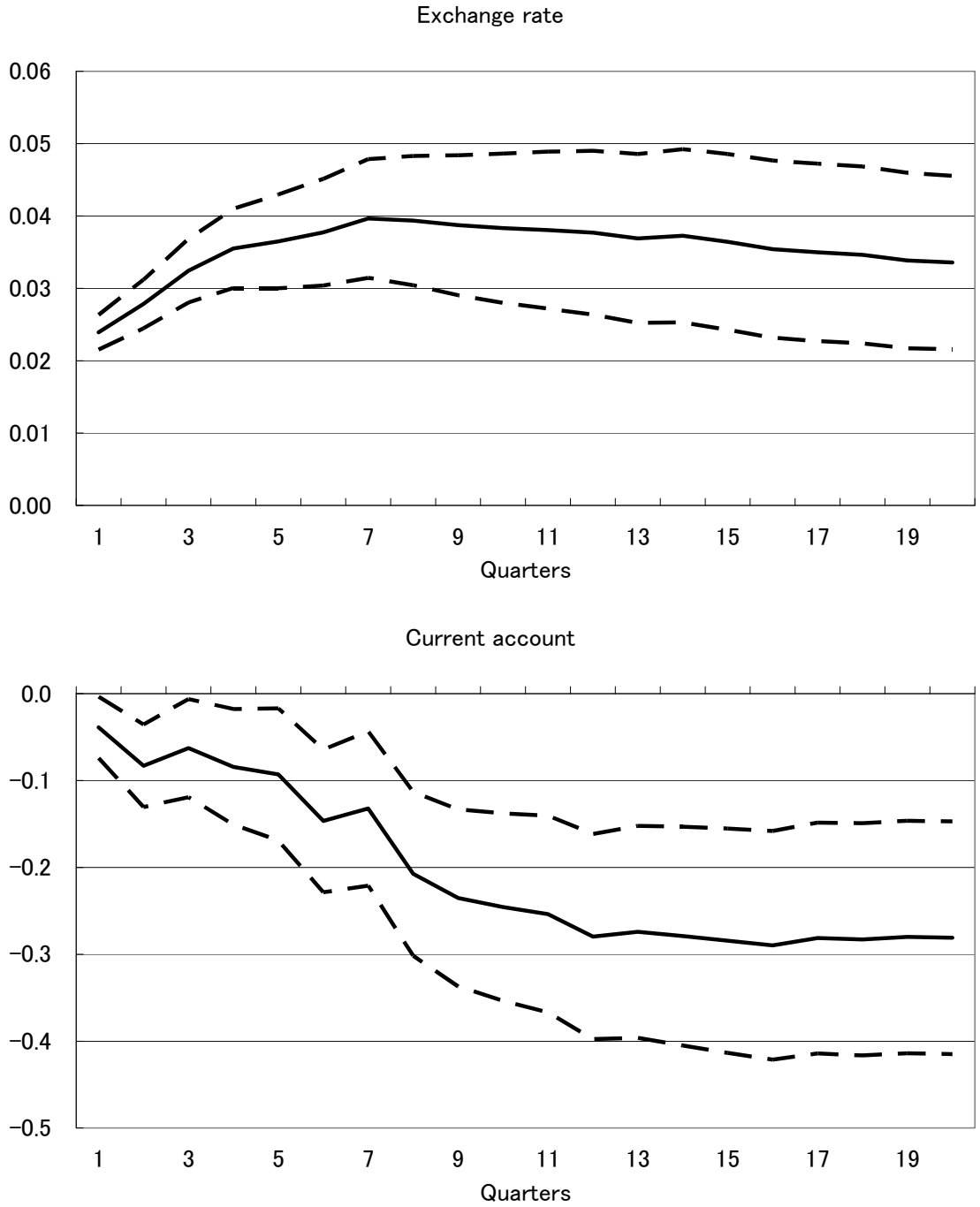
(c) Model 3: Exchange rate, IS balance (Private), IS balance (Government)



1) Impulse responses to the exchange rate shock are from the VAR model in the table 5.
2) The initial shock is normalized to one standard error.
3) The solid lines show the impulse responses, and the dashed lines show the one-standard deviation bands.

Figure 5: The Accumulated Impulse Responses to the Exchange Rate Shocks
(With 8 lags in the VAR)

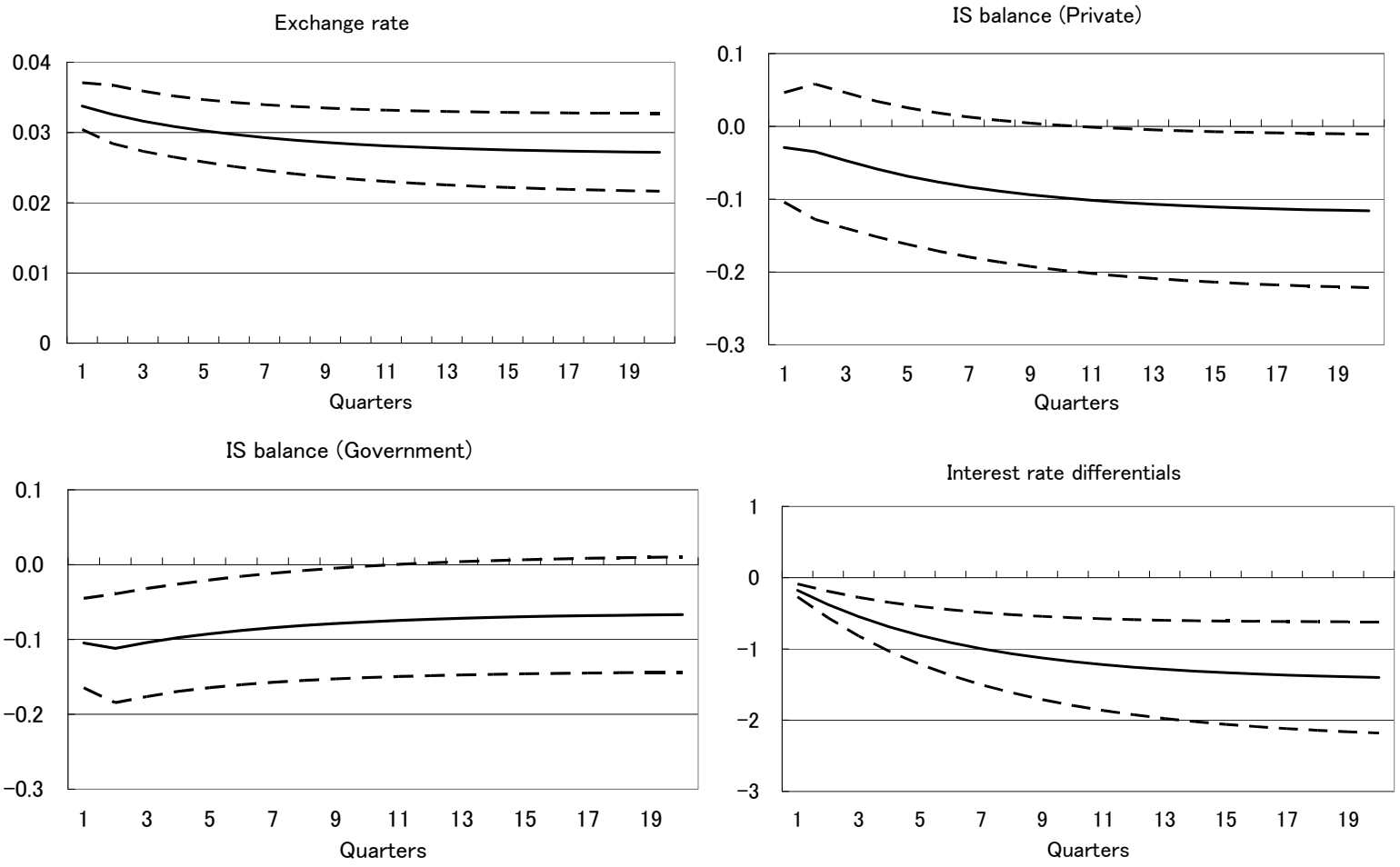
Model 1: Exchange rate, and Current account



1) Impulse responses to the exchange rate shock are from the VAR model with 8 lags.
2) The initial shock is normalized to one standard error.
3) The solid lines show the impulse responses, and the dashed lines show the one-standard deviation bands.

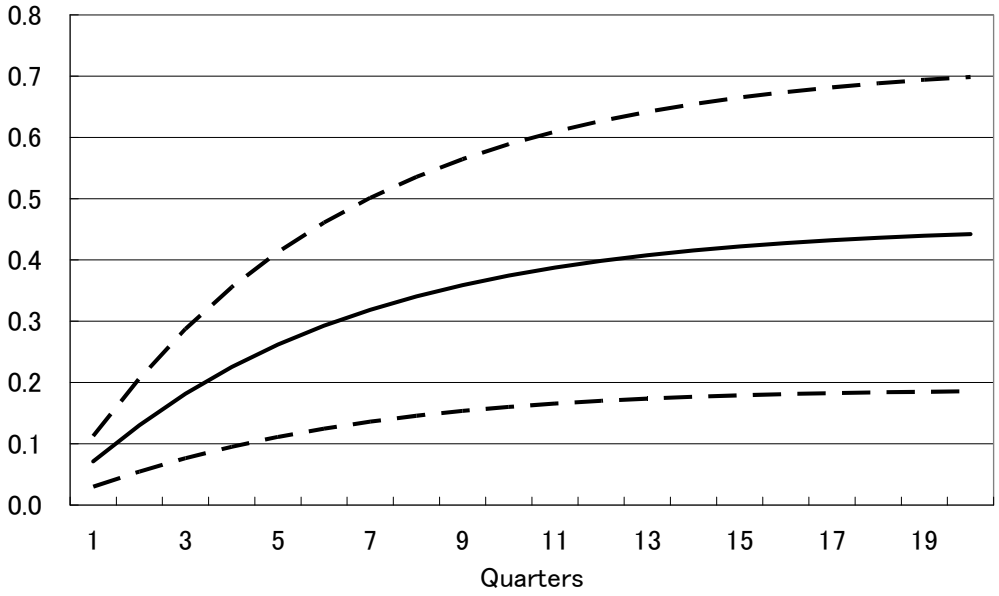
Figure 6: The Accumulated Impulse Responses to the Exchange Rate Shocks (With Interest Rate Differentials)

Model 3: Exchange rate, IS balance (Private), IS balance (Government)



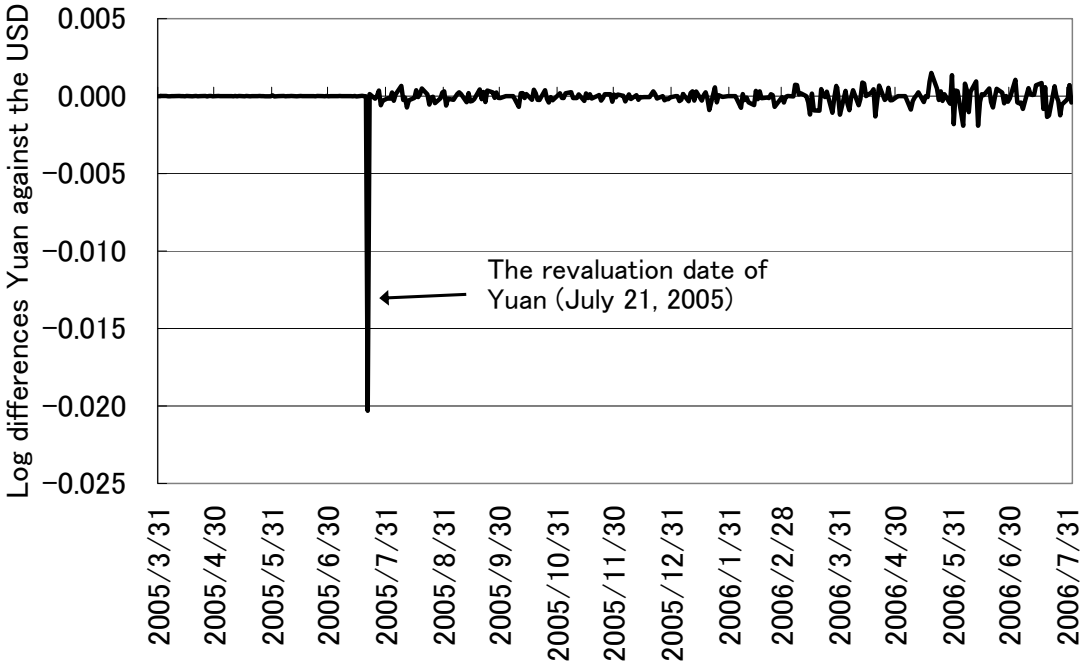
1) Impulse responses to the exchange rate shock are from the VAR model with in the Table 6.
2) The initial shock is normalized to one standard error.
3) The solid lines show the impulse responses, and the dashed lines show the one-standard deviation bands.

Figure 7: The Accumulated Impulse Response of the IS balance (private sector) to the interest rate differential shock



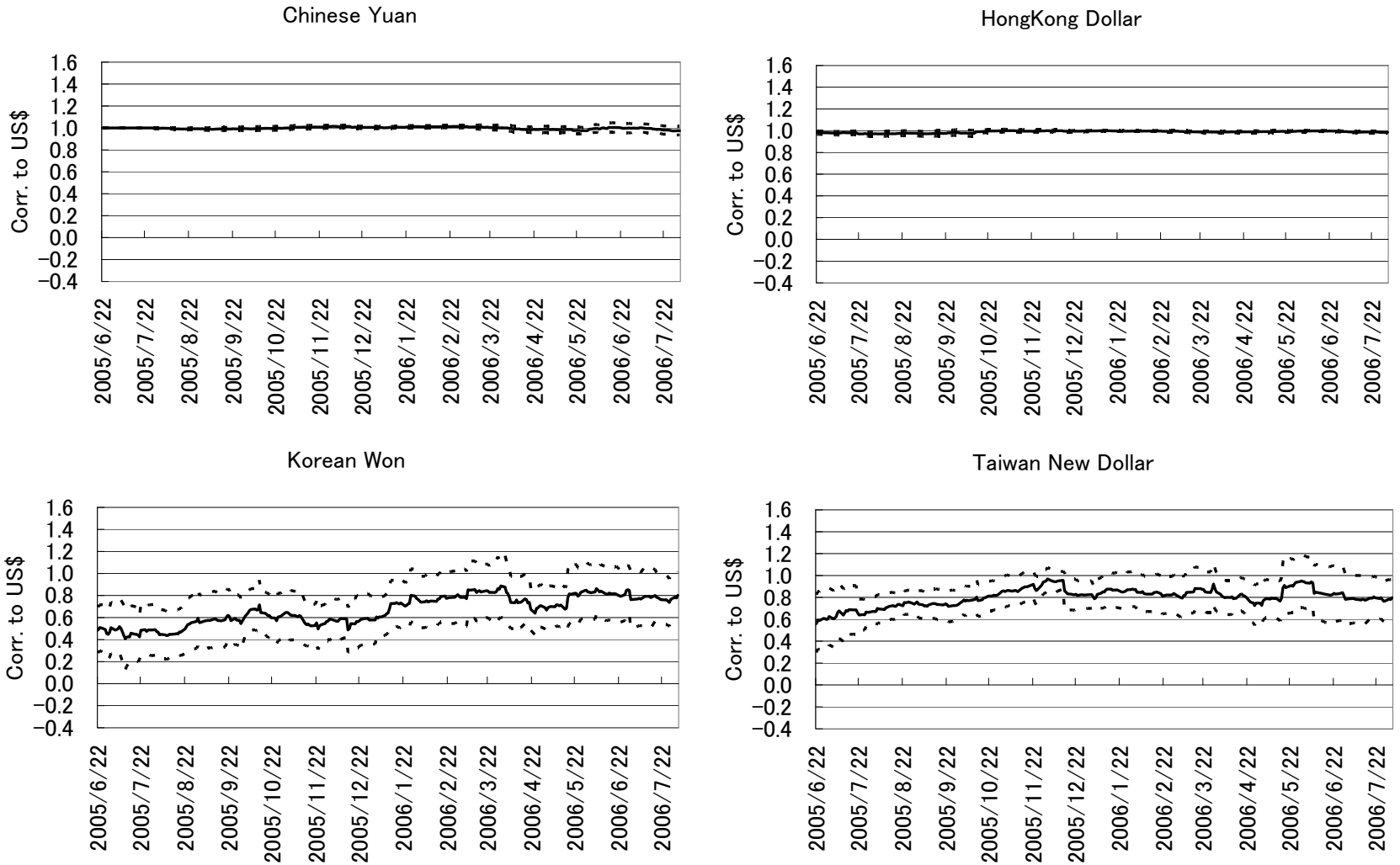
1) Impulse responses to the exchange rate shock are from the VAR model with in the Table 6.
2) The initial shock is normalized to one standard error.
3) The solid lines show the impulse responses, and the dashed lines show the one-standard deviation bands.

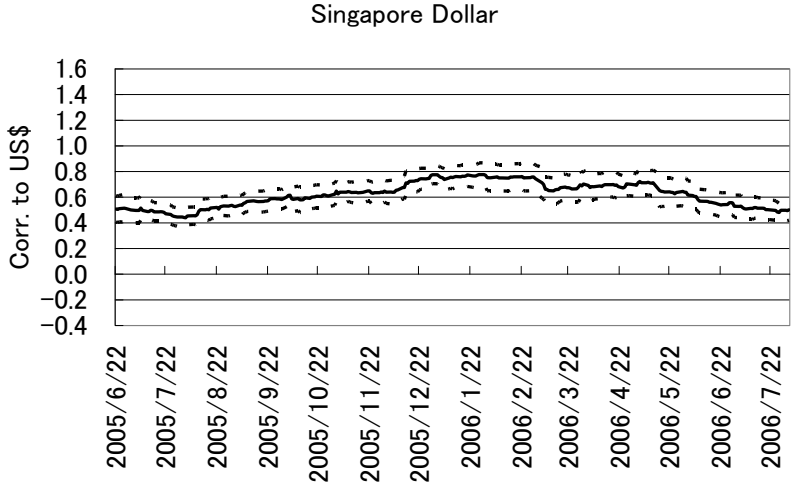
Figure 8: The Chinese yuan revaluation

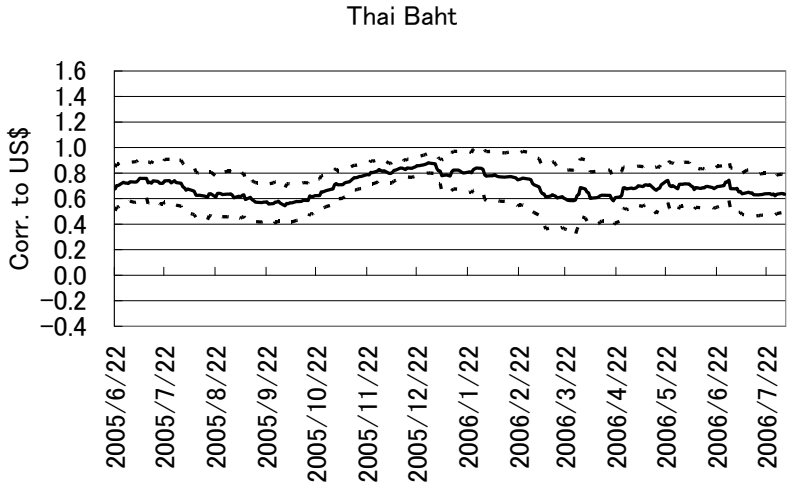


Data Source: The DataStream

Figure 9: Results of Rolling Regressions *a la* Frankel and Wei (1994)




Singapore Dollar
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
2006/2/22
2006/3/22
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Thai Baht
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
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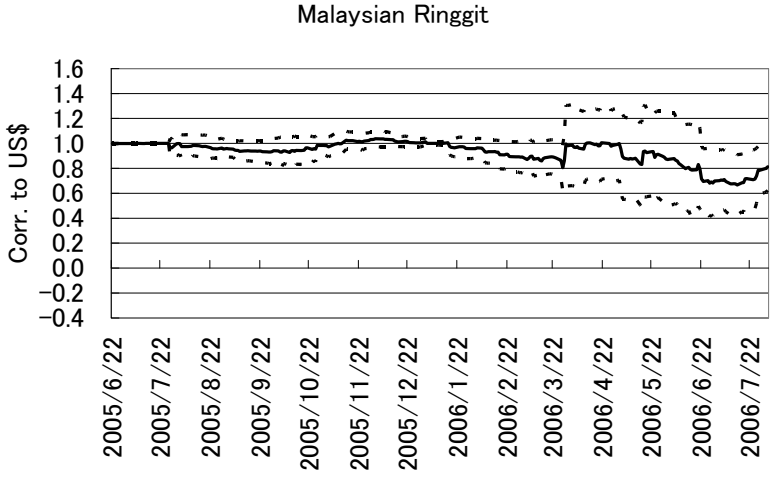
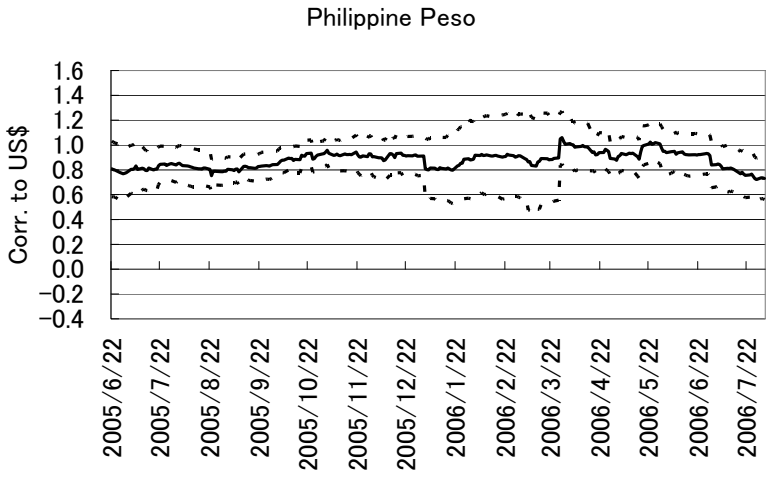
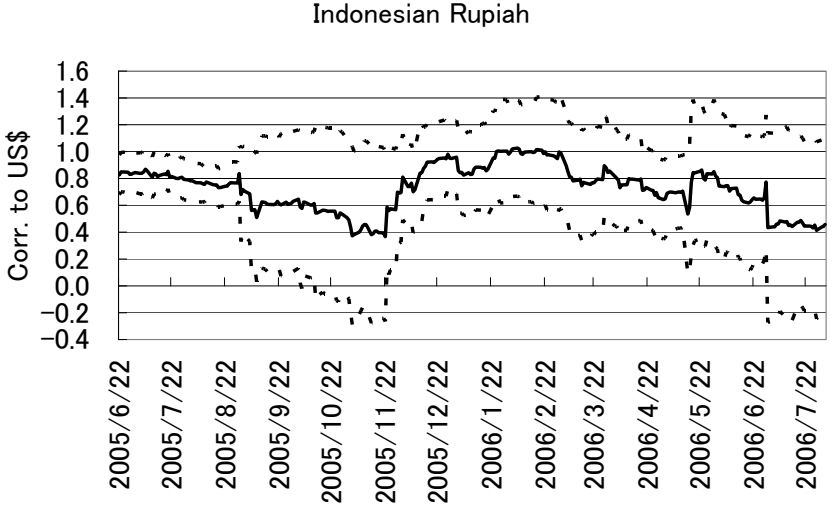
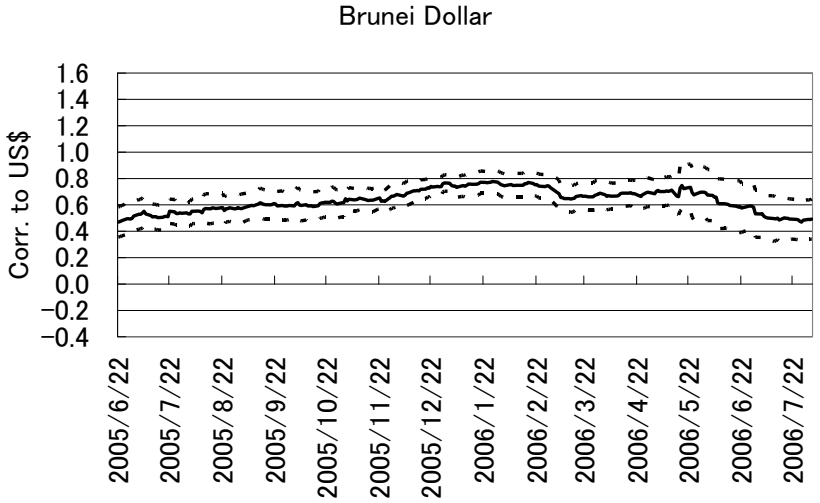
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Malaysian Ringgit
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
2006/2/22
2006/3/22
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Philippine Peso
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
2006/2/22
2006/3/22
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Indonesian Rupiah
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
2006/2/22
2006/3/22
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Brunei Dollar
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
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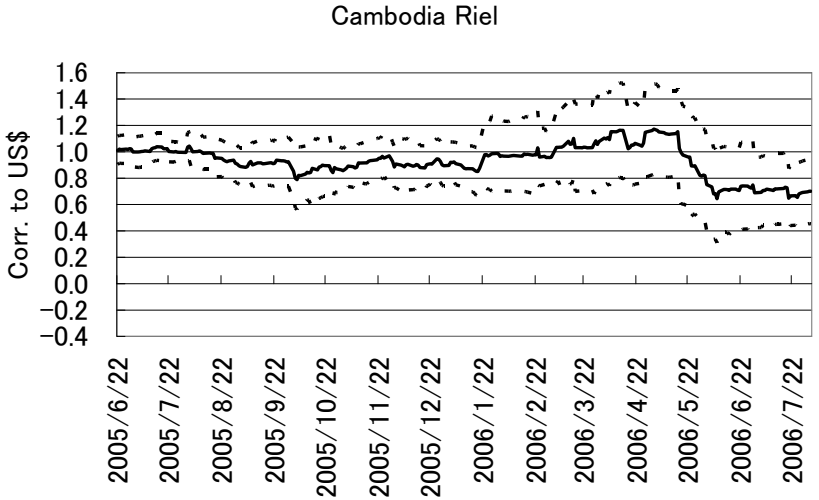
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Cambodia Riel
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
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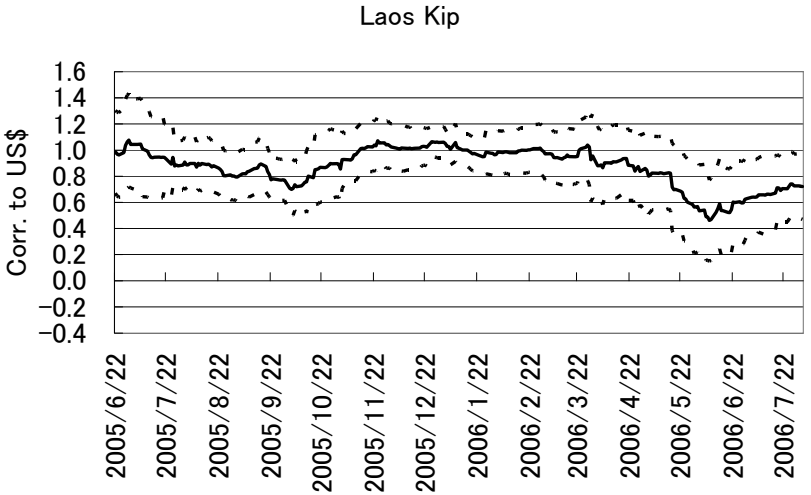
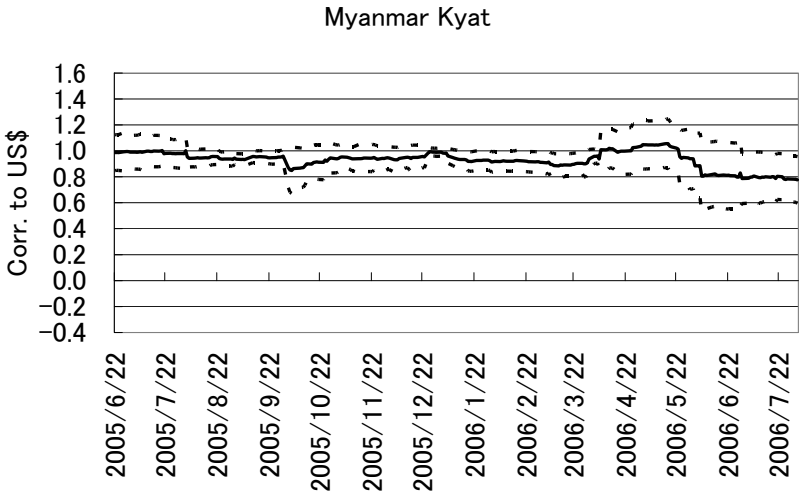
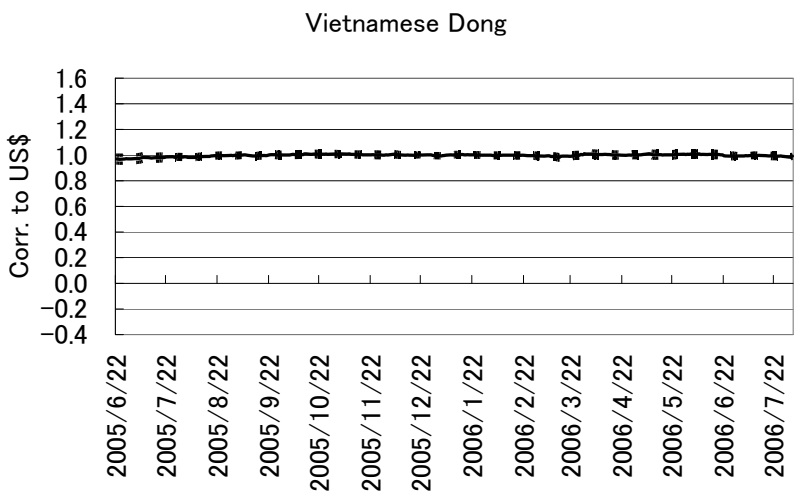
2006/4/22
2006/5/22
2006/6/22
2006/7/22


Laos Kip
Corr. to US$
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
2005/6/22
2005/7/22
2005/8/22
2005/9/22
2005/10/22
2005/11/22
2005/12/22
2006/1/22
2006/2/22
2006/3/22
2006/4/22
2006/5/22
2006/6/22
2006/7/22





1) These are the estimates of the linkages of the Asian currencies to the US dollar, which is estimated by the way described in the text.