



# Exchange Rate Regimes and Monetary Policy: Options for China and East Asia

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- Exchange Rate Policy in China
- AMU and Deviation Measurement for coordinated exchange rate policies.



# Theory I: relationship between the exchange rate & Monetary Policy

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- Choosing one exchange rate regime puts constraints on monetary policy, sometime severe, sometime moderate
- The fixed exchange rate regime implies that domestic monetary policy cannot pursue domestic price stability
- Monetary policy will influences on (pressures on) the exchange rate movements
- Pursuit of monetary policy inconsistent with the exchange rate regime will result in a collapse of the regime.



# Impossible Trinity: cannot have capital mobility, fixed exch rate & independent Monetary Policy

	Capital mobility	Fixed Exch rate	Independen t M policy
China	No	Yes	Yes
Korea, Thai, Singapore	Yes	No	Yes
Hong Kong	Yes	Yes	No

# Why impossible?

## Lessons from the Asian Crisis

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- Suppose (yes, yes, yes)
- Strong growth → Capital inflows → intervene to defend the peg
  - Sterilize (not to change the interest rate and domestic inflation) then more capital inflows with increasingly short-term
  - Unsterilize (so that inflow pressure will ease) then domestic inflation and bubble
- Either exit to appreciation or sudden reversal of the flow and currency crisis



# Theory II: Saving Investment Identity

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- Domestic Saving-Investment surpluses = Trade Surpluses:
  - $(S-I) + (T-G) = \text{Export} - \text{Import}$
- Any Surpluses/deficits in current account has corresponding capital flows
  - $(\text{Ex-Im}) = \text{Private Capital Outflows} + \text{Reserve accumulation}$



# Examples

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- $(S-I) + (T-G) = (EX-IM) = KOutflo + ResAcc$
- US    -            -            --            --            0
- Japan + + +    --            +            +            0
- China + +       -            +            --            + + +



# Implications of theory

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- Sudden government deficits result in current account deficits (twin deficits of the US)
- Decline in domestic spending result in current account surpluses and capital outflow (Japan)
- More capital inflows means more reserve accumulation (China)





# Theory III: Balassa-Samuelson

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- Empirical regularities:
  - When the economy is growing very fast (Japan in the 1960s and China now), innovations tend to occur tradable sectors relative to nontradable sectors
  - Relative prices change so that nontradable prices go up faster than tradable prices
  - Tradable prices have PPP with foreign countries
- Relevance to China: Inflation or nominal exchange rate appreciation



# Is the fixed exchange rate regime good for the country?

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- Foreign reserves will increase and decrease depending on current accounts and private capital flows (interventions are passive)
  - Unsustainable if reserves go to zero (not likely in China)
- Domestic monetary policy is at the mercy of FRB; the Interest rate cannot be much different from the US
  - Low interest rate → bubble
  - High interest rate → recession



# Timing of exit

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- When the economy is growing very fast (Japan in the 1960s and China now), innovations tend to occur tradable sectors relative to nontradable sectors



# If not peg, what else?

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- Review of the Exchange rate regimes in East Asia
- Important to recognize that East Asia depends on each other and influence on each other
- Chinese exchange rate policy has a large impact on East Asia



# A variety of exchange rate regimes in East Asia

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- Free (lightly managed) float: Japan, Korea, the Philippines, Singapore
- (Heavily) Managed float: Indonesia, Thailand, Cambodia, Lao, Vietnam
- Fixed: China, Malaysia
- Currency board: Hong Kong, Brunei
- Multiple Exchange Rates: Myanmar

# Recent linkages of East Asian currencies to US\$

Regression equation:

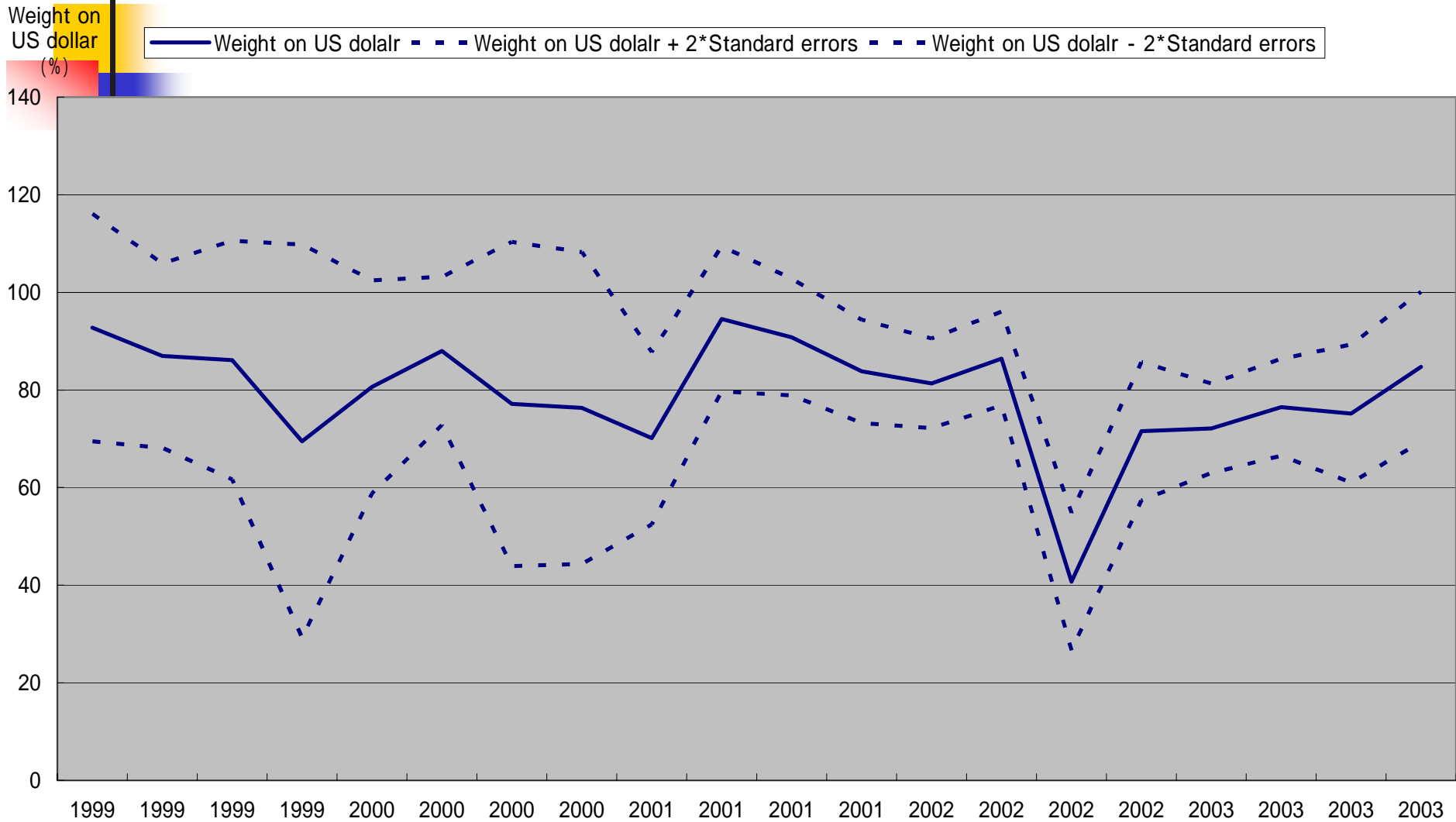
$$\Delta \log e^{\text{home}/SFR} = a_0 + a_1 \Delta \log e^{USD/SFR} + a_2 \Delta \log e^{JPY/SFR} + a_3 \Delta \log e^{euro/SFR} + \varepsilon_t$$

Use daily data to regress the equation for each quarter of the sample period from 1999 to 2003.

$a_1$  : linkages of home currency to the US\$ or weight on the US\$

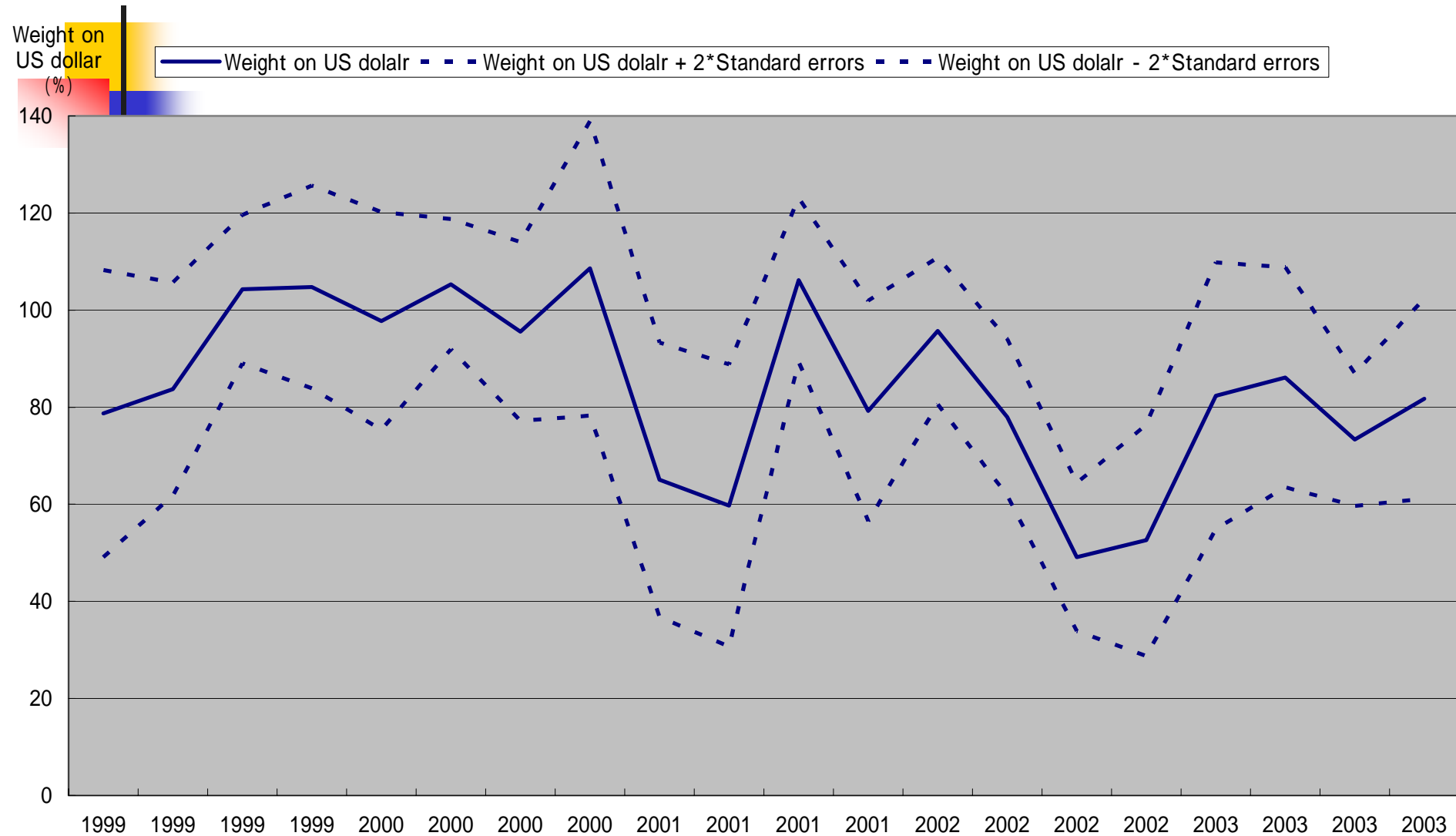
# Thai baht's linkage to US\$

Change of the Weight on US dollar - Thai baht, 1999.1Q-2003.4Q -



# Korean won's linkage to US\$

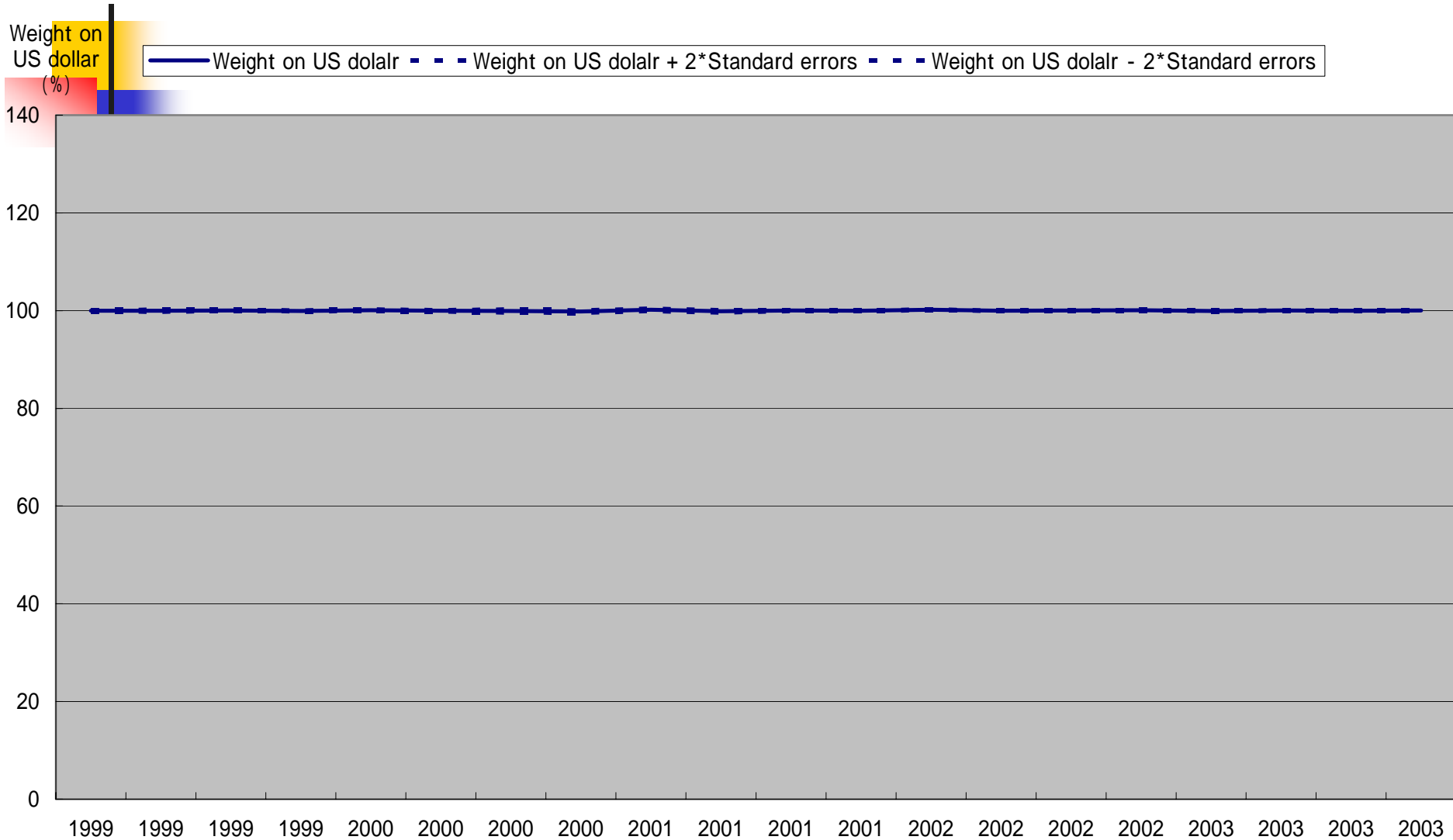
Change of the Weight on US dollar - Korean won, 1999.1Q-2003.4Q -





# Chinese yuan: weights on US\$

Change of the Weight on US dollar - Chinese Yuan, 1999.1Q-2003.4Q -





# Capital inflows have supported unsustainable US CA deficits

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- The US current account deficit was not sustainable from the perspectives based on both the domestic investment-saving relationships and the international trade flows.
- => The rapid growth in the current account deficit from the mid of 1990s together with the worsening international investment position has not satisfied the external “budget constraint” of the United States.
- The US current account deficit has been financed by the international capital inflows in the long run.
- => The balance of payments as a whole has been sustainable.



# Structural changes in the capital flows and the US CA deficits

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- If the recent changes in the capital inflows to the United States (the decreases in the capital inflows into the United States from European countries) were structural and persistent, the U.S. current account deficits might not be financed by the capital inflows any longer.
- It might cause unsustainability of the US current account and, in turn, depreciation of the US\$.



# Reaction to the US\$ depreciation

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- Two groups in terms of reaction to the US dollar depreciation in East Asia
  - (1) Free floating or managed floating: the currencies have appreciated against the US dollar
  - (2) Officially or unofficially dollar pegging: the currencies have been fixed against the US dollar. However, they have been depreciating the former group currencies.
- The latter group carry all of the stress from the depreciation of the US dollar to the former group.



# Chinese exchange rate system

- Adverse effects of the Chinese exchange rate system to the other East Asian countries' choice of the exchange rate system
- China should adopt more flexible system
- Intermediate system (**B**asket + **B**and + **C**rawling)
  1. Target a currency basket (US\$, JPY, euro) from a viewpoint of international trade partners and FDI
  2. Band can afford room for domestic monetary policy to the monetary authorities.
  3. Crawling should be consistent with the domestic monetary policy.



# AMU as a measurement for coordinated exchange rate policies

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- We propose a deviation measurement for coordinated exchange rate policies to enhance the monetary authorities' surveillance process.
- Estimate Asian Monetary Unit (AMU), a weighted average of the East Asian currencies.
- Calculate deviation indicators from benchmark rate for the estimated AMU.
- We can use the deviation indicators to identify how much each of the East Asian currencies deviates from the benchmark rate for each of East Asian currencies in terms of the AMU.



# Methodology to estimate the AMU

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- Member countries  
ASEAN10 + Japan, China and Korea
- Sampled period  
from January 1999 to November 2004
- To follow the methodology to  
calculate the ECU



# The basket weights of AMU

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- We try to use four different kinds of economic indicators.
  1. Trade volume
  2. Nominal GDP
  3. GDP measured at PPP
  4. International reserves (minus Gold)
- We choose the most stable AMU vis-à-vis the basket currency among them.



# Shares in the AMU weights and calculated AMU weights

Table 2. Indicators of AMU weights and calculated AMU weights (AMU vis-a-vis the basket currency\*)

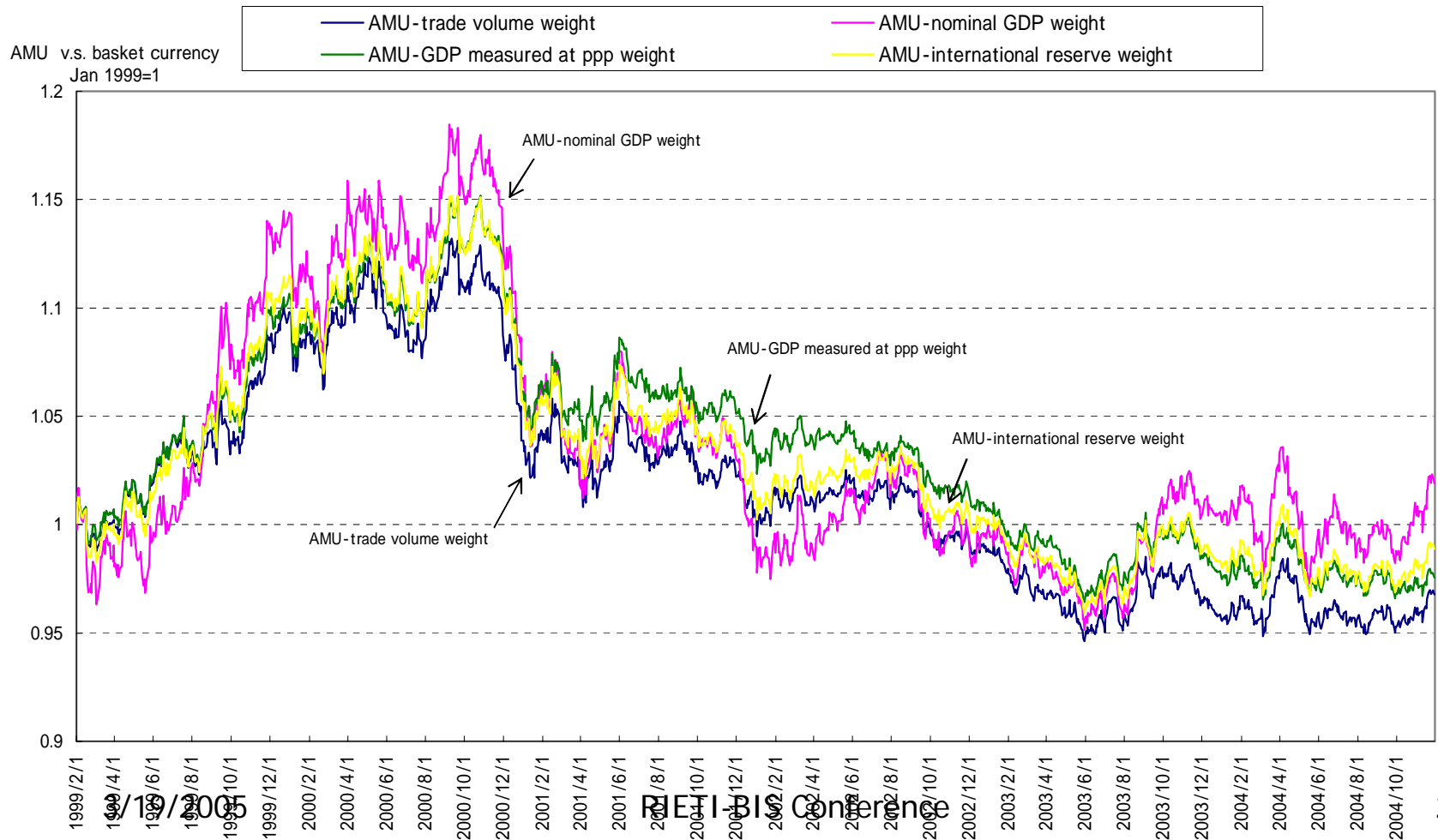
	BRUNEI \$	CAMBODIA RIEL	CHINESE YUAN	INDONESIAN RUPIAH	JAPANESE YEN	KOREAN WON	LAOS KIP	MALAYSIAN RINGGIT	MYANMAR KYAT	PHILIPPINE PESO	SINGAPORE \$	THAI BAHT	VIETNAMESE DONG
Exchange Rate currency units for 1basket currency* ave. of Jan 1999	1.7797	4065.79	8.7800	8974.89	120.07	1246.11	4457.56	4.0316	6.6309	40.7302	1.7800	38.9109	14726.17
< Indicators of AMU weights, % >													
Share of trade volume	0.29	0.33	14.22	3.38	26.94	11.35	0.18	11.91	0.58	5.69	15.88	7.04	2.20
Share of Nominal GDP	0.07	0.05	16.81	1.68	69.40	5.65	0.02	1.27	-	1.15	1.45	1.97	0.48
Share of GDP measured at PPP	0.04	0.15	47.06	4.51	32.45	5.68	0.06	1.61	-	2.52	0.90	3.42	1.60
Share of International Reserves	0.07	0.06	27.41	4.17	39.59	6.78	0.02	4.70	0.06	1.70	9.78	5.30	0.37
< AMU weights >													
Share of trade volume	0.0052	13.4707	1.2484	303.6043	32.3517	141.4752	8.1922	0.4802	0.0382	2.3161	0.2827	2.7391	323.7570
Share of Nominal GDP	0.0012	2.0832	1.4757	150.8786	83.3317	70.3876	1.0089	0.0513	0.0000	0.4675	0.0258	0.7666	70.5763
Share of GDP measured at PPP	0.0008	6.0301	4.1321	404.6478	38.9575	70.7321	2.6761	0.0650	0.0000	1.0276	0.0160	1.3300	235.8054
Share of International Reserves	0.0012	2.4205	2.4068	374.5547	47.5370	84.5175	0.9173	0.1893	0.0038	0.6905	0.1740	2.0609	54.1708

Notes: All figures are calculated by authors. Nominal GDP and International Reserves (minus Gold) data are from International Financial Statistics, IMF. All trade data are from Direction of Trade of IMF. GDP measured at ppp are from World Development Report, World Bank. All exchange rates are from Datastream. Indicators of AMU weights are calculated by the data in 1998.

\* The basket currency is composed by the US dollar and the euro. The basket weight is depend on the trade share of each country/area against 13 sampled East Asian countries. Each weights is 51.7% and 48.3% for the US dollar and the euro, respectively.

# Fluctuations in AMUs (vis-à-vis basket currency)

Figure 3. The estimated AMU vis-a-vis the basket currency Feb 1999-Nov 2004



# Choose the most stable AMU

Table 3. Fluctuation of estimated AMU vis-a-vis the basket currency\*

	Share of trade volume	Share of Nominal GDP	Share of GDP measured at PPP	Share of International Reserves
<level>				
max	1.1320	1.1847	1.1519	1.1520
min	0.9463	0.9516	0.9644	0.9590
average	1.0169	1.0345	1.0348	1.0306
std. dev.	0.0486	0.0566	0.0478	0.0481
<rate of change, %>				
max	1.2677	2.3127	1.2113	1.4524
min	-2.0006	-2.5231	-2.0024	-2.1157
average	-0.0021	0.0012	-0.0016	-0.0007
std. dev.	0.3173	0.4718	0.3106	0.3464

Notes: All figures are calculated by authors.

\* The basket currency is composed by the US dollar and the euro. The basket weight is depend on the trade share of each country/area against 13 sampled East Asian countries. Each weights is 51.7% and 48.3% for the US dollar and the euro, respectively.

# Measurement of the deviation indicators



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- We use the estimated AMUs with the weights based on
  - GDP measured at PPP
  - Trade volumeto measure the deviation of actual rate from a benchmark rate for 13 East Asian currencies.

# To choose the benchmark period for AMU

- In the benchmark period, the total current account of trade should be balanced, or more close to be balanced.

Table 4. Trade account (net) within 13 East Asian countries

	13 East Asian countries				
	1999	2000	2001	2002	2003
with Japan *	-32,065	-37,239	-23,997	-40,027	-55,724
within 13 East Asian countries	4,819	-6,562	1,953	12,289	27,727
with World Total	215,324	180,439	122,893	160,906	187,868

(unit: million of US dollar)

Notes: All figures are calculated by authors. Trade data are from Direction of Trade (IMF).

\* The figure of current account with Japan is the total amount of current account(net) with 12 East Asian countries.



# How to calculate the deviation indicator

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- Using the estimated AMU, we calculate the deviation indicator as follows:

benchmark rate : each currency's exchange rate vis-à-vis AMU at the benchmark period

actual exchange rate : exchange rate of each currency vis-à-vis AMU which fluctuates as the each currency actually move

Deviation Indicator (%)

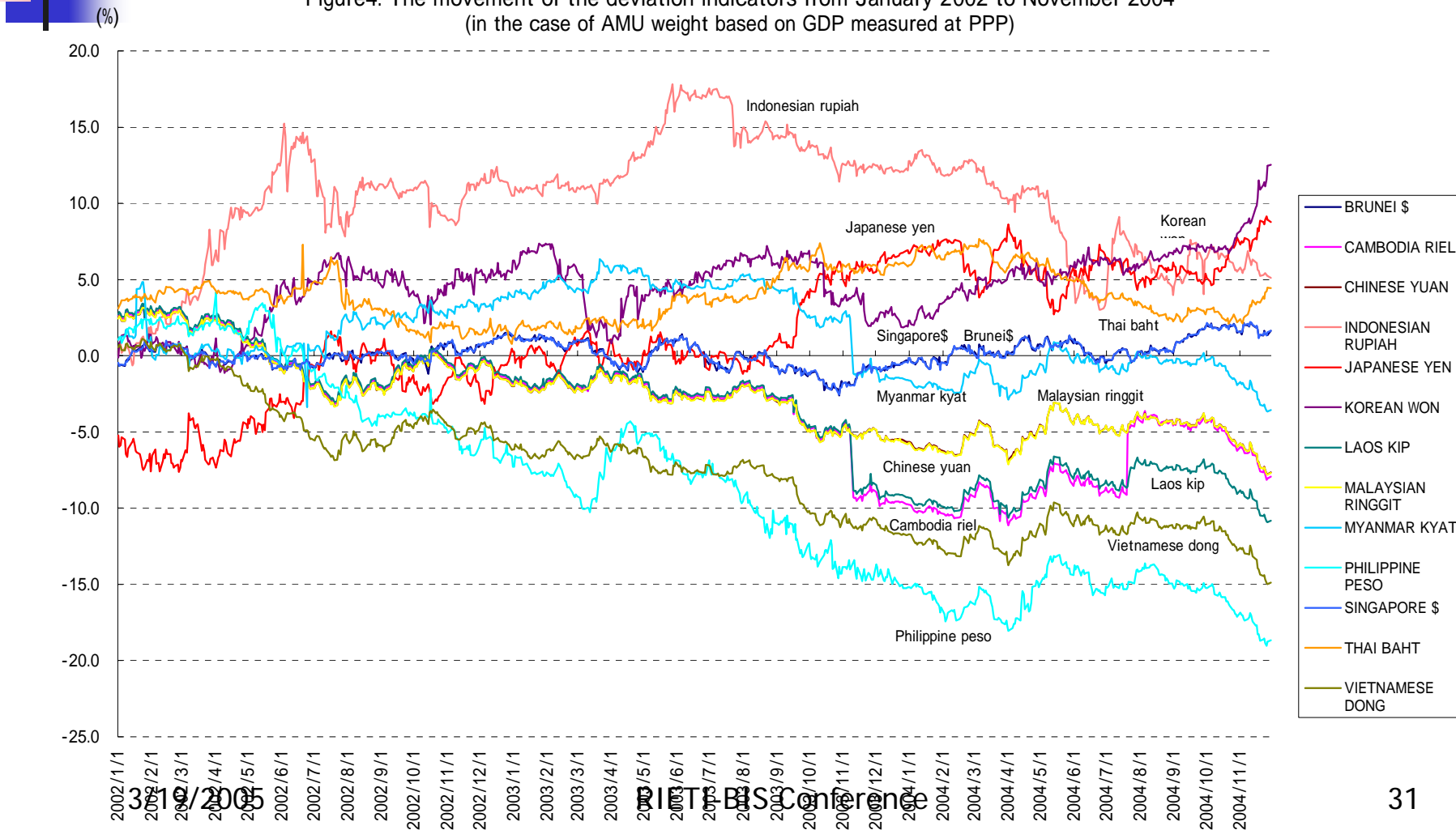
$$= \frac{\text{benchmark rate of a currency/AMU} - \text{actual exchange rate of a currency/AMU}}{\text{benchmark rate of a currency/AMU}} \times 100$$

(1)

# The deviation indicators

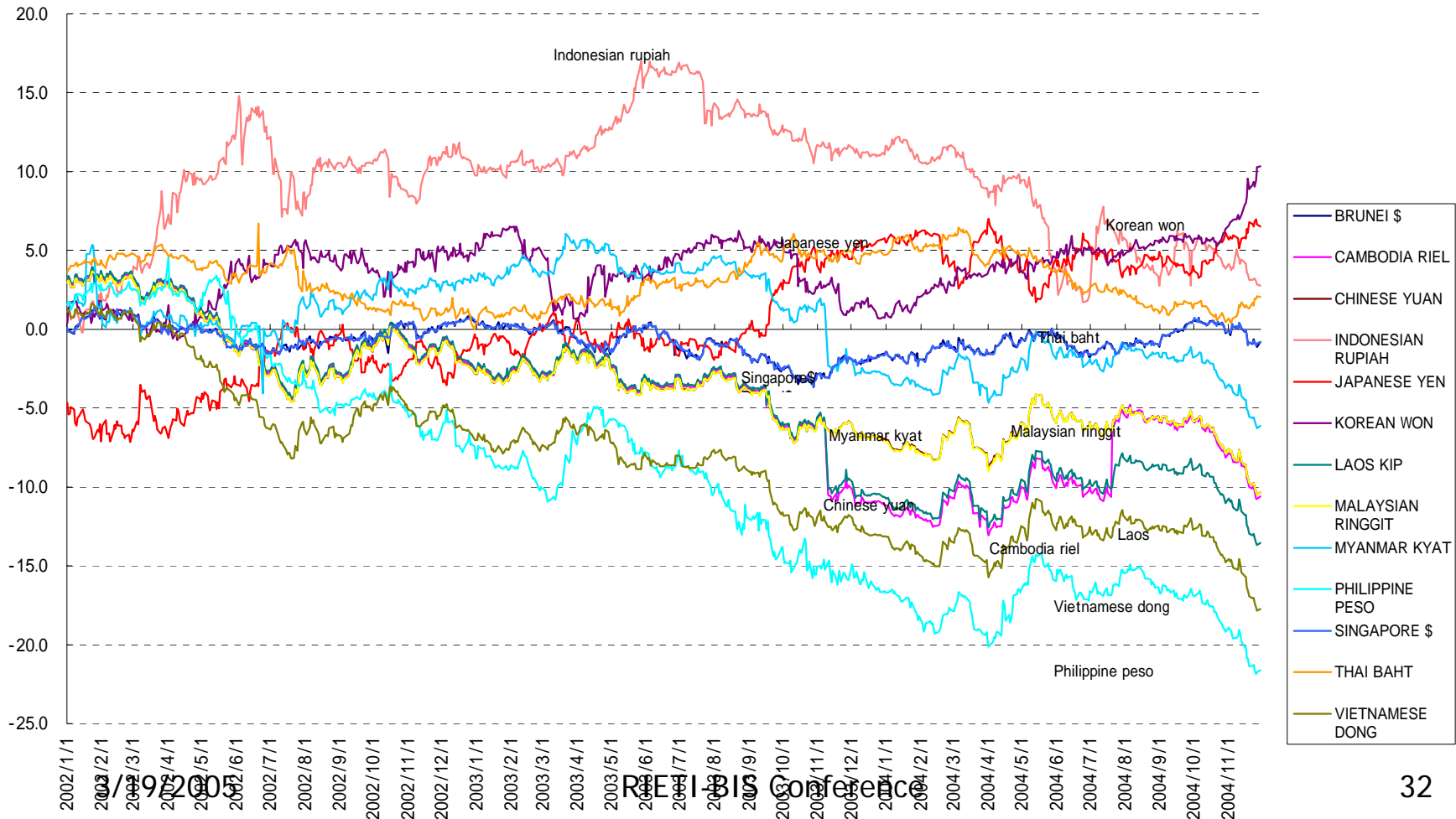
## in the case of AMU based on GDP measured at PPP

Figure4. The movement of the deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on GDP measured at PPP)



# The deviation indicators in the case of AMU based on trade volume

Figure 5. The movement of the deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on trade volume)





# Nominal and

# Real Deviation Indicators

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- We should take into account inflation rate differentials if we consider real effect of exchange rates on trade, FDI and real economic activities (real GDP).
- We calculate also deviation indicators in real terms by taking into account inflation rate differentials.

# How to calculate Real Deviation Indicator

- We define the real and nominal exchange rate as follows:

$$rex_i = nex_i \cdot \frac{P_{AMU}}{P_i}, \quad nex_i \equiv \frac{\text{currency}_i}{AMU} \quad (2)$$

where *rex* : real exchange rate , *nex* : nominal exchange rate

then in terms of rates of change,

$$rex_i = nex_i - \left( \frac{\dot{P}_i}{P_i} - \frac{\dot{P}_{AMU}}{P_{AMU}} \right) \quad (3)$$

- We can calculate real deviation indicator as follows:

$$\text{real deviation indicator}_i = \text{nominal deviation indicator}_i - \left( \frac{\dot{P}_{AMU}}{P_{AMU}} - \frac{\dot{P}_i}{P_i} \right) \quad (4)$$

- We use CPI data as both prices and the inflation rate.  
CPI of AMU: weighted CPI of member countries



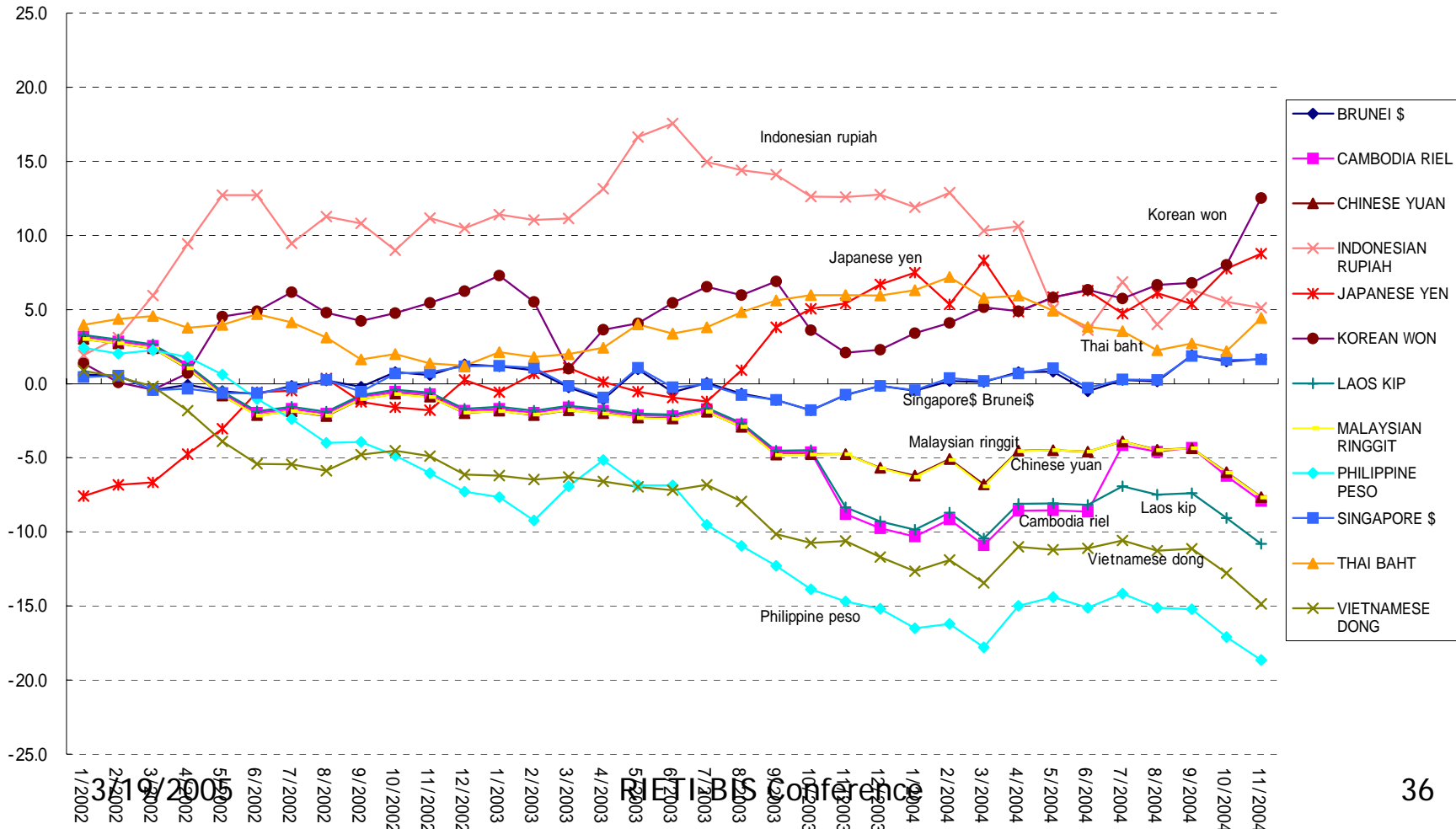
# The differences between nominal and real indicators

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- The inflation makes the related currency appreciate in real terms while deflation makes it depreciate in real terms.
- The Chinese yuan has the largest depreciating deviation in real terms in 6/2003 (5,6/2003 in AMU with trade volume) although it has not so largely depreciating deviation in nominal terms.
- The Japanese yen appreciates by nearly 5 percent in 2004 in nominal term although it stays around 0 or even depreciates in real terms due to deflation in Japanese economy.

# Nominal deviation indicator in the case of AMU based on GDP measured at PPP

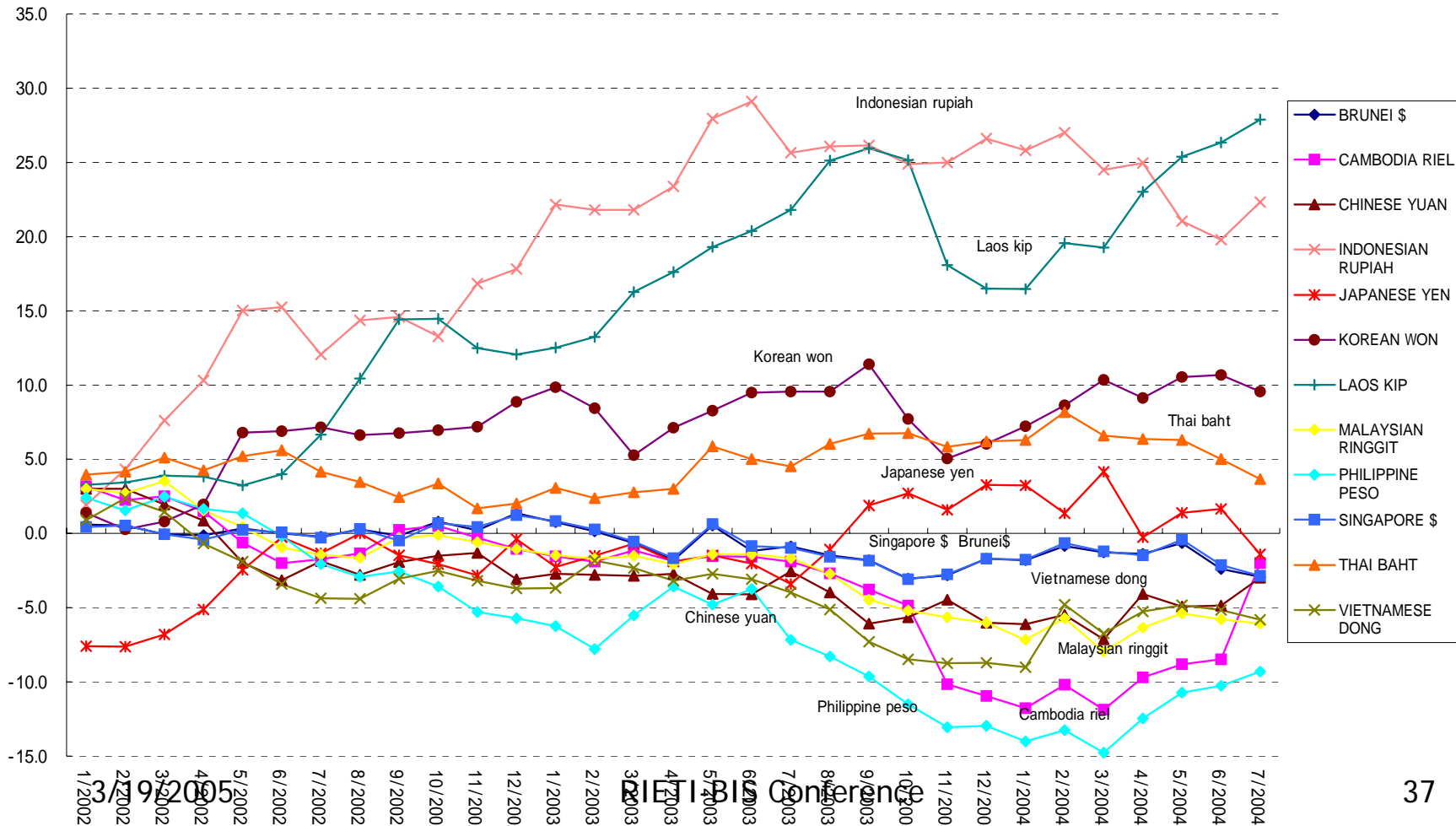
Figure6. The movement of nominal deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on GDP measured at PPP, monthly change)



# Real deviation indicator

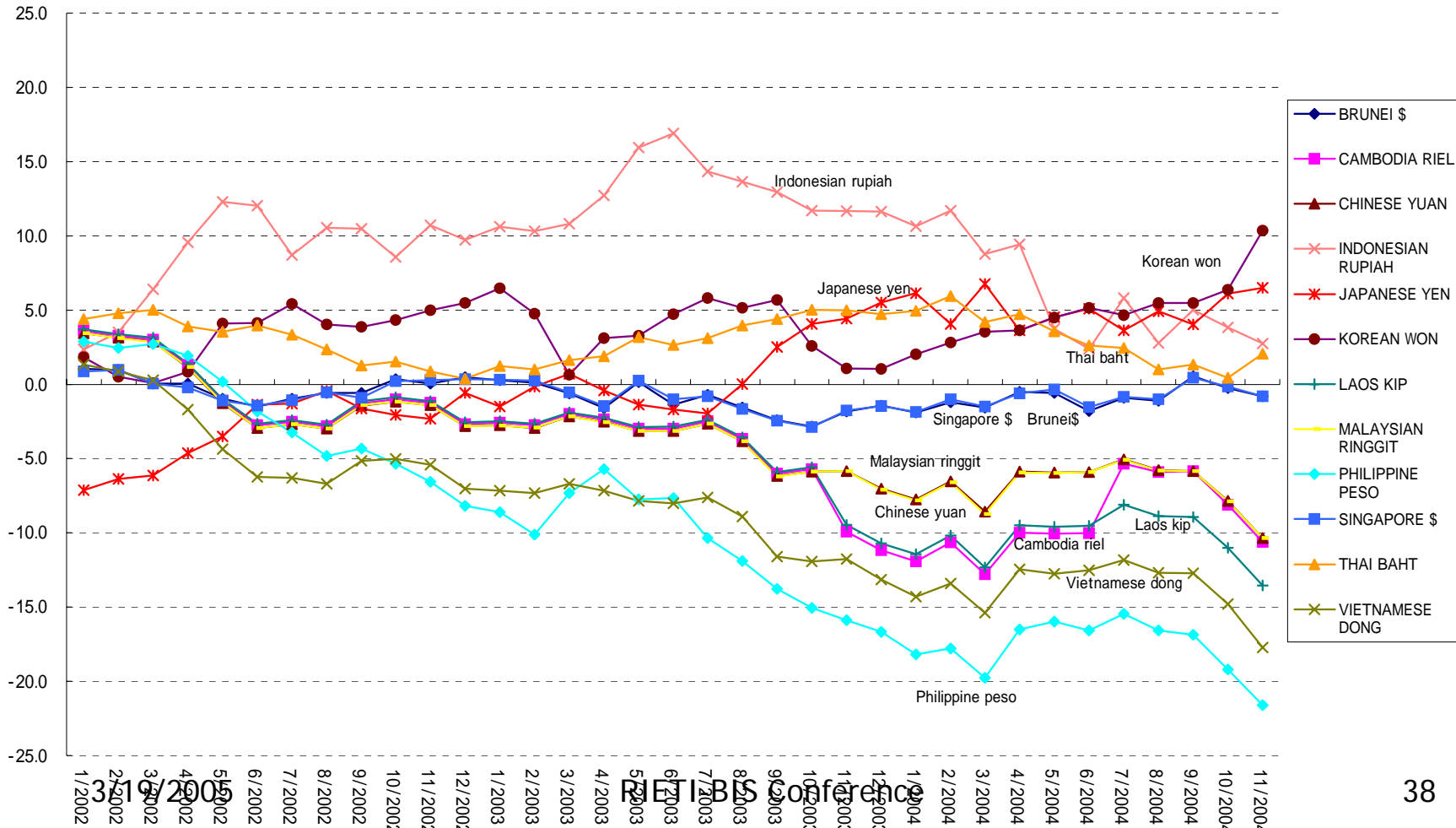
## in the case of AMU based on GDP measured at PPP

Figure 7. The movement of real deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on GDP measured at PPP, monthly change)



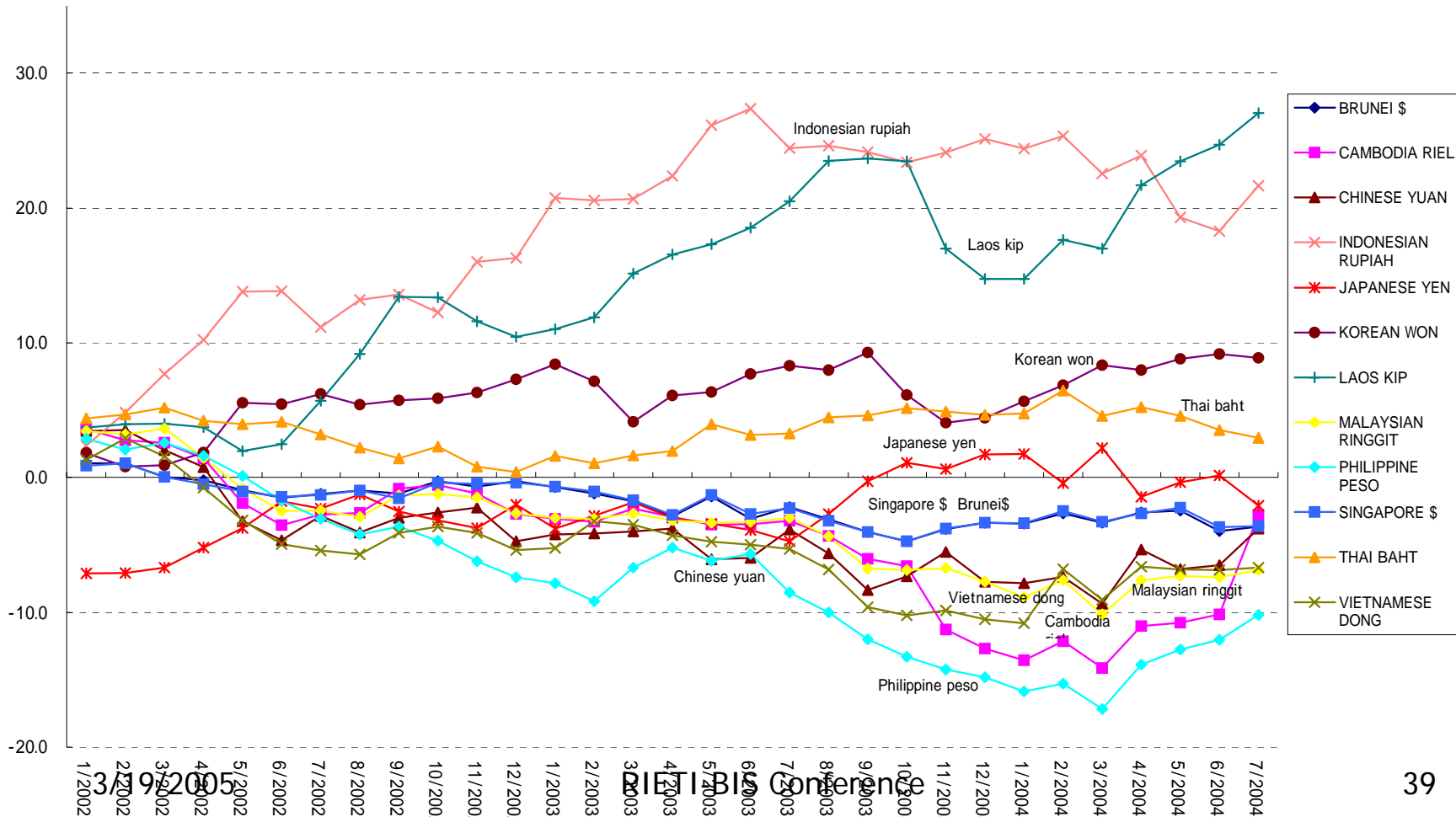
# Nominal deviation indicator in the case of AMU based on Trade weight

Figure8. The movement of nominal deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on trade volume, monthly change)



# Real deviation indicator in the case of AMU based on Trade weight

Figure9. The movement of real deviation indicators from January 2002 to November 2004  
(in the case of AMU weight based on trade volume, monthly change)





# Conclusion

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- The fixed exchange rate regime implies no independent monetary policy.
- When strong capital inflows occur, it is difficult to maintain the peg: Sterilizing intervention will maintain the interest rate but that encouraged more capital inflows; and unsterilized intervention will fuel domestic inflation.
- When the economy is growing very fast (Japan in the 1960s and China now), innovations tend to occur tradable sectors relative to nontradable sectors





# Conclusion

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- China should adopt more flexible system, an intermediate system (Basket + Band + Crawling)
- A variety of exchange rate system in East Asia cause misalignments among East Asian currencies.
- We propose a deviation measurement from the AMU for coordinated exchange rate policies to enhance the monetary authorities' surveillance process.