

The US Tech Pulse, stock prices, and exchange rate dynamics: Evidence from Asian developing countries

Akihiro Kubo

Osaka City University

Abstract (Aim)

- Empirically investigate
the economic relationship between the US and
Asian developing economies

during the post-crisis period
in Indonesia, Korea, the Philippines, Singapore
and Thailand

using a Vector Error Correction Model

Abstract (Conclusion)

- Based on the empirical results,
 - 1, the interdependence between the US and the Asian economies has intensified especially in IT(Information Tech) industry
 - 2, their stock markets are integrated
 - 3, the relationship between the domestic stock price and the exchange rate behavior is different

Different?

- Previous study for the pre-crisis period indicated that the relationship is positive in all the cases
- My study for the post-crisis period suggests that the relationship is negative in some cases (Indonesia, Korea, and Thailand)

Positive

Positive =

the domestic stock price rises while the exchange rate (domestic currency for a US dollar) appreciates

The appreciation is caused by the increase of the US imports = the increase of Asian exports. The increase of the Asian exports leads to its stock price rises.

Different?

- Previous study for the pre-crisis period indicated that the relationship is positive in all the cases
- My study for the post-crisis period suggests that the relationship is negative in some cases (Indonesia, Korea, and Thailand)

Negative

Negative =

the domestic stock price rises while the
exchange rate depreciates

Based on the portfolio-balance approach, the interpretation
is introduced.

Background (FDI and Trade)

- The IT (information technology) industry has become a central force in the US and world business cycle
- Large US IT firms have invested to domestic and foreign (East and Southeast Asian) IT companies
- In the East and Southeast Asia, the IT-related production and exports have been highly specialized and played an important role in their economic growth

Share of IT Products Exports

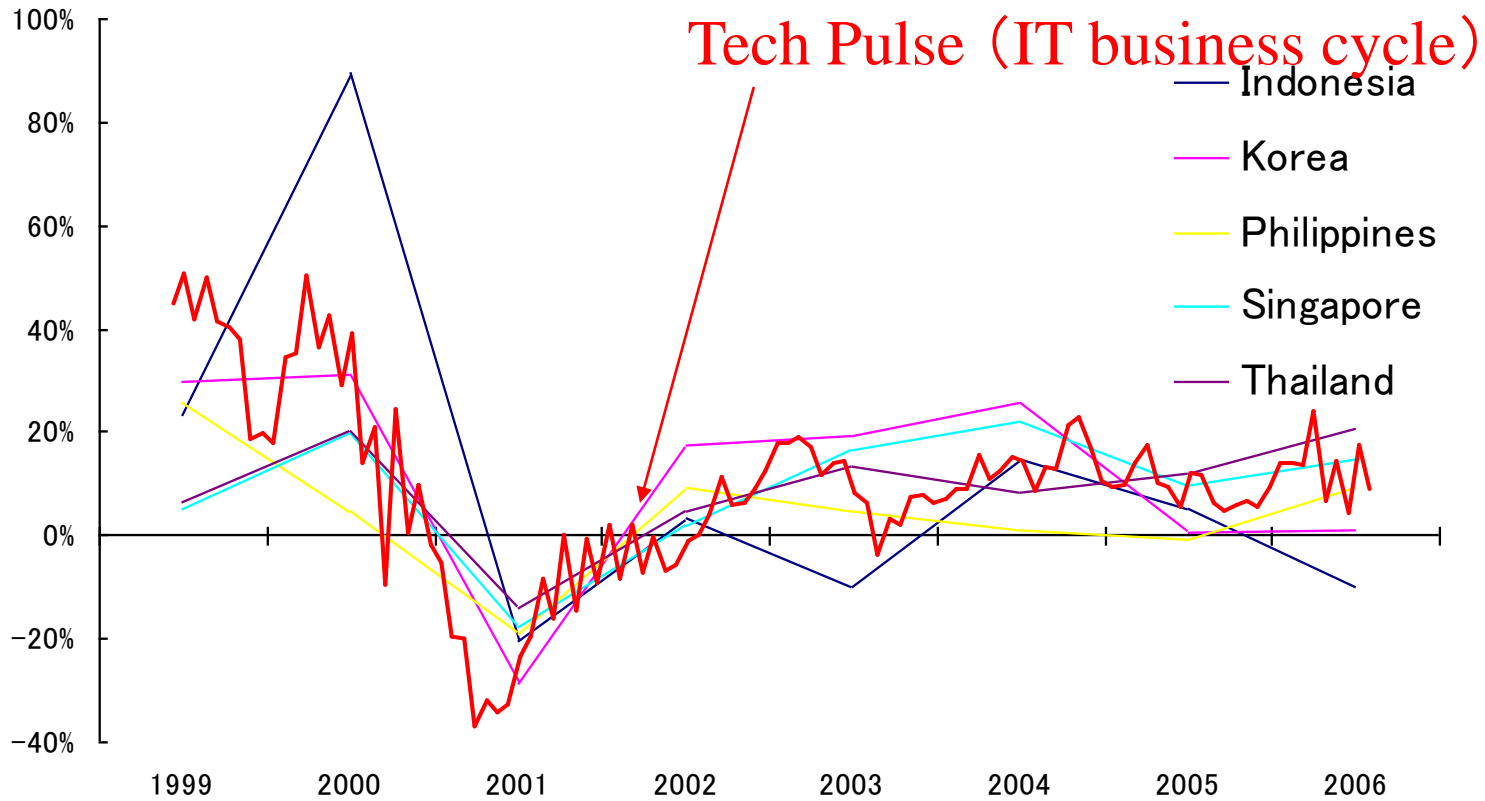
Table 1

The share of office machines and telecom equipment in the total merchandise exports (in percent)

	1990	1999	2000	2001	2002	2003	2004	2005	2006
Indonesia	0.5	6.1	11.7	10.5	10.8	9.1	9.1	7.9	6.0
Korea	22.1	29.7	29.9	29.4	32.2	34.9	32.5	29.1	25.7
Philippines	22.7	63.0	60.6	64.6	62.7	62.7	60.3	57.9	55.4
Singapore	36.5	52.8	53.7	50.7	50.2	48.0	48.0	44.3	43.4
Thailand	15.3	26.1	27.7	24.9	24.6	24.2	22.0	21.7	22.5

Source: WTO, International trade statistics

Real Economic Linkage

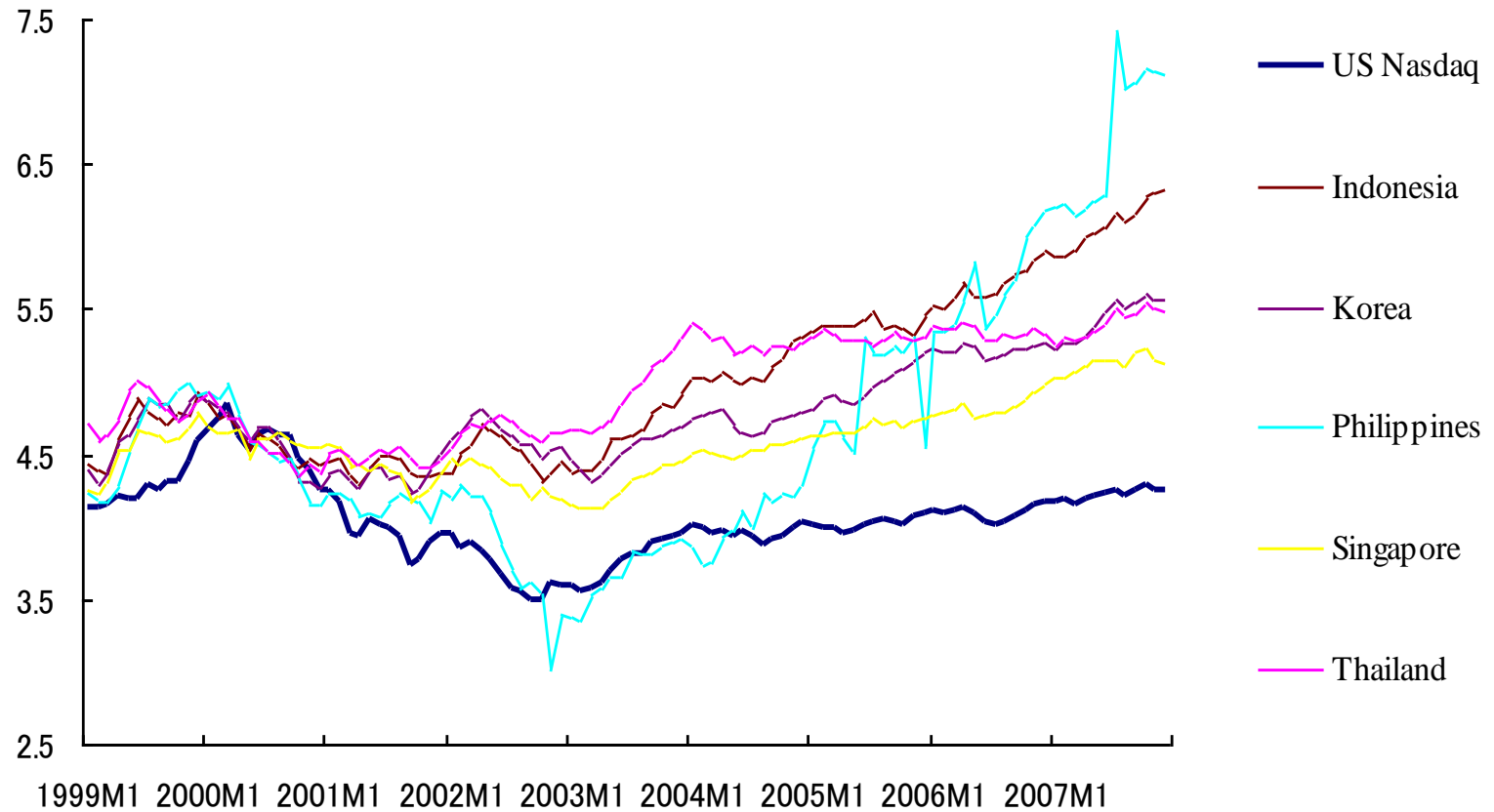


The value of the IT-related products exports (in annual rates) *Source: WTO*

Background (Stock market)

- The performance of the IT-related firms has played a leading role in the current economic growth
- The performance tends to rely heavily on equity finance
- The US IT business cycle \Rightarrow the US stock prices \Rightarrow the Asian stock prices

Financial Linkage



Background

- Between the US and the Asian economies, IT industry has strengthened
the real economic linkage through FDI and trade
& **the financial linkage** through stock markets
- The US IT business cycle also affects the exchange rate behavior => trade balance => stock price

Aim of Investigating

- Investigate whether the Asian domestic stock prices have long-run relationships with the US IT business cycle, the US stock prices, and the exchange rate movements

=> normalized cointegrating vector

- Investigate the effects of some economic shocks on the Asian stock prices

=> impulse response functions

Empirical Methodology and Data

- Model: Vector Error Correction Model
- Variables:
 - US Tech Pulse Index (TP)
 - Nasdaq stock price Index (P^{US})
 - Asian domestic stock price Index (P^{ADC})
 - bilateral spot exchange rate (E^{ADC})

Data (to be cont.)

- Sample period:

January 1999 – September 2007

the Philippines

January 1999 – December 2007

Indonesia, Korea, Singapore, Thailand

Cointegration Test Result

Table 2

Results of the Johansen's cointegration test

	lag (k)	Trace statistics for cointegrating rank (r)			
		$r = 0$	$r \leq 1$	$r \leq 2$	$r \leq 3$
A. the US tech pulse, the US Nasdaq stock price, domestic stock price, and the real exchange rate					
Indonesia	$k = 5$	<u>55.697**</u>	26.493	13.706	1.569
Korea	$k = 5$	<u>49.584**</u>	22.466	8.168	0.501
Philippines	$k = 4$	<u>51.548**</u>	19.782	8.333	0.398
Singapore	$k = 4$	44.410	23.892	9.465	0.011
Thailand	$k = 5$	<u>54.960**</u>	23.881	7.931	0.010
B. the US tech pulse, the US New York stock price, domestic stock price, and the real exchange rate					
Singapore	$k = 4$	<u>51.188**</u>	30.456**	10.370	0.096

** denotes the rejection of the null hypothesis at the 5% level of significance.

Long-Run Equilibrium Equation

$$P_t^{ADC} = b_0 + b_1 TP_t + b_2 P_t^{US} + b_3 E_t^{ADC}$$

Cointegration Vector

domestic currency **depreciates** ($E^{ADC} \uparrow$), and domestic stock price (P^{ADC}) **rises**(+) or **falls** (-) ?

Table 3

The long-run cointegrating vector: $P_t^{ADC} = b_0 + b_1 TP_t + b_2 P_t^{US} + b_3 E_t^{ADC}$

	b_0	b_1	b_2	b_3
Indonesia	-28.721	2.007	0.150	<u>0.854</u>
Korea	-119.306	4.351	0.241	<u>9.692</u>
Philippines	0.923	1.724	0.648	-5.436 Fall
Singapore	-3.475	0.567	0.525	-2.658 Fall
Thailand	-40.198	1.767	0.731	<u>5.331</u>

Stock Price =	US IT	US Stock	Exchange rate
---------------	-------	----------	---------------

Stock Price and Exchange Rate

- Positive Type (the Philippines; Singapore)
=> flow (standard economic) approach
 - Negative Type (Indonesia; Korea; Thailand)
=> portfolio-balance approach
- e.g., Which appreciation effects are significant,
the US dollar or the Korean Won?

Without the US Tech Pulse

Table 4
Results of the Johansen's cointegration test

	lag (k)	Trace statistics for cointegrating rank (r)		
		$r = 0$	$r \leq 1$	$r \leq 2$
A. the US Nasdaq stock price, domestic stock price, and the real exchange rate				
Indonesia	$k = 5$	29.179	11.679	0.074
Korea	$k = 2$	24.118	7.349	1.037
Philippines	$k = 2$	26.512	11.999	0.338
Thailand	$k = 2$	25.923	13.384	3.862**
B. the US New York stock price, domestic stock price and the real exchange rate				
Singapore	$k = 2$	23.910	10.633	0.105

** denotes the rejection of the null hypothesis at the 5% level of significance.

Concluding Remarks

- The economic relationship between the US and the Asian developing countries has intensified, especially in the IT industry
- All the stock markets are integrated with the US market
- The relationship between the domestic stock price and the exchange rate behavior is negative in some cases