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Economic Globalization and Inflation: The Case of the EMEAP Economies

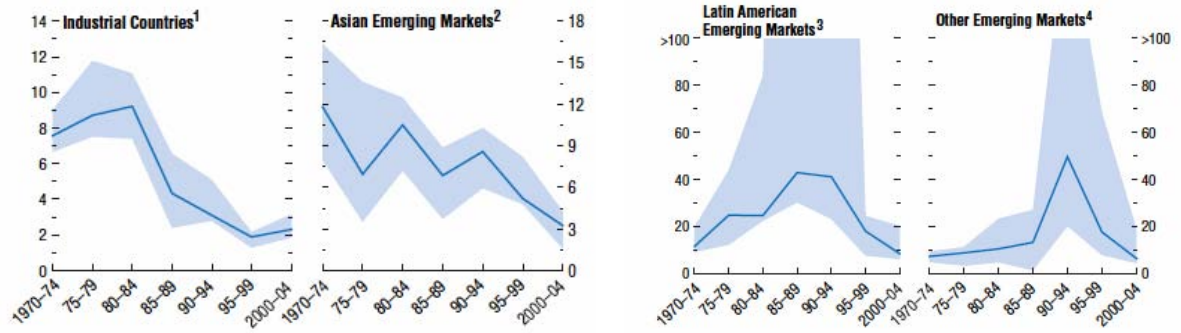
-- EMEAP Economist Workshop Background Note* --

(Takamatsu, Japan, June 25-27, 2007)

1. Introduction

- This note presents a few conceptual frameworks regarding the impact of economic globalization on inflation and discusses the case of the EMEAP economies based on some empirical analyses.
- Inflation rates began declining in developed countries in the mid-1980s, and in emerging countries 10 years later in the mid-1990s (see Figure 1). Excluding the influence of rising oil prices over the past few years, the EMEAP economies have also seen inflation rates decline (see Attachment 1 for CPI trends in individual EMEAP economies).

Figure 1: Inflation (Year-On-Year CPI)

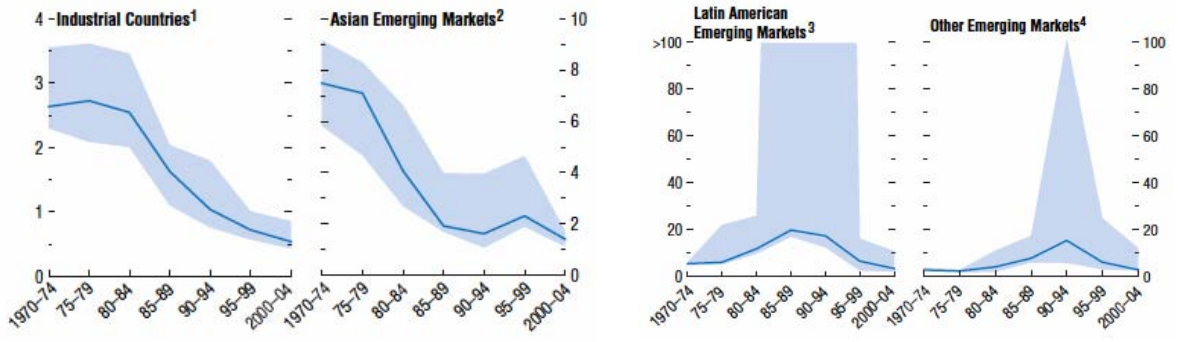


Source: IMF (2006)

Notes: 1. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, USA
2. China, India, Indonesia, Korea, Malaysia, Philippines, Thailand
3. Argentina, Brazil, Chile, Colombia, Dominica, Ecuador, Mexico, Peru, Venezuela
4. Czech Republic, Egypt, Hungary, Poland, Romania, Russia, South Africa, Turkey

- A decline in the volatility of CPI inflation rates is also observed globally (see Figure 2).

Figure 2: CPI Volatility (Standard Deviation of Year-On-Year CPI for Recent 5 Years)



Source: IMF (2006)
Note: Component countries of each figure are the same as Figure 1.

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** Views expressed in this paper are those of the authors and not those of the Bank of Japan.

2. Globalization and inflation

- In the long-term, domestic inflation is a monetary phenomenon that is ultimately determined by the central bank. Nonetheless, in the short- and medium-term, there are various factors that can offset inflation. In recent years, the impact of economic globalization has been one such factor in the spotlight.
- While there are various definitions of "economic globalization", IMF (2006) states that "... globalization is defined broadly as the acceleration in the pace of growth of international trade in goods, services, and financial assets relative to the rate of growth in domestic trade."[1] Globalization is also often discussed in conjunction with the integration of leading emerging economies, including high-growth China and India, into the global economy.
- It is difficult to quantitatively capture the overall impact that globalization has on inflation. For example, the integration of emerging economies into the global economy has complex, interconnecting and two-way impacts. On the one hand, (a) higher demand drives up prices for energy and raw materials, while on the other hand, (b) an influx of lower cost labor into the labor market drives prices downwards.
- IMF (2006), OECD (2006), and ECB (2006) indicate that the overall net impact of globalization on advanced economies' inflation is likely to have been negative as globalization works to restrain inflation. For example, IMF (2006) concludes that the direct impact of globalization on developed countries through the mechanism of import prices is generally very small, but it does note that around 2001-2002, falling import prices had a non-negligible effect on inflation rates. It also notes that in developed countries, globalization works to desensitize the inflation rate to a domestic output gap.
- OECD (2006) simultaneously considers a number of different globalization elements in its estimation (see Figure 3). According to its findings, the integration of emerging economies reduced year-on-year CPI growth rates by no more than 0.3% for the 2000-2005 period[2].

Figure 3: Impact of Globalization on OECD Country Inflation

Deviation from baseline

	Average inflation (%)	**Total deviation (% points)**	Impact other than commodities (% points)	Impact from commodities (% points)
OECD average	1.8	**0.0 — 0.2**	0.1 — 0.3	-0.1 — -0.1
Euro Area	2.1	**0.0 — 0.3**	0.2 — 0.3	-0.1 — -0.1
Canada	1.8	**0.0 — 0.1**	0.1 — 0.2	0.0 — 0.0
France	1.5	**0.0 — 0.3**	0.2 — 0.3	-0.1 — -0.1
Germany	1.4	**0.0 — 0.2**	0.2 — 0.3	-0.1 — -0.1
Italy	2.8	**0.0 — 0.1**	0.2 — 0.4	-0.1 — -0.2
Japan	-1.0	**0.1 — 0.2**	0.1 — 0.1	-0.1 — -0.1
UK	1.7	**0.0 — 0.2**	0.1 — 0.2	0.0 — -0.1
USA	2.2	**0.0 — 0.3**	0.2 — 0.3	-0.1 — -0.2

Source: OECD (2006)

[1] *right column, ll. 23-27, p. 97, IMF (2006)*

[2] In addition, ECB (2006) finds that imports from low-cost countries restrained the annual growth of eurozone import prices by about 2% between 1996 and 2005.

- Can a phenomenon such as globalization that drives down prices in developed countries also be observed in EMEAP economies? In order to answer this question, we will focus on three channels through which globalization affects inflation. These three channels are: (1) trade, (2) labor and capital markets (immigration, off-shoring, loss of wage bargaining power of labor unions, etc), and (3) increased sensitivity of national prices to global supply and demand. Of these, the first two are related to cost-driven inflation. Examples include the impact of import prices and productivity, mark-ups and competition on the goods and labor markets. On the other hand, the third is related to demand-driven inflation. Examples include the impact on domestic price movements of national production and an output gap.

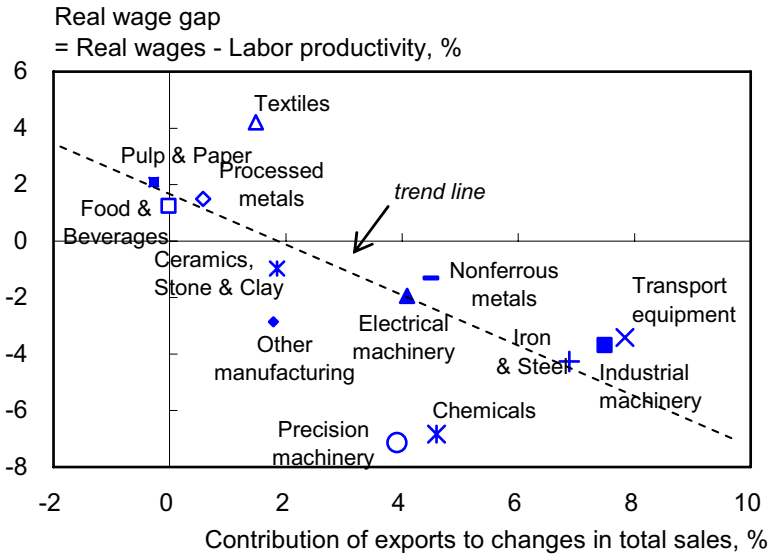
3. Impact via trade channels

(1) Conceptual Framework

- The impact of globalization on inflation via trade channels includes "direct import price effects" and "indirect competition enhancement effects".
- Direct import price effects would include, for example, the import penetration effect (relative price effect). As less-expensive imports flow into an economy, a decline in import prices drives down domestic prices. The greater the import share of the national economy, the more the domestic prices will be driven down.
- The indirect competition enhancement effects of trade refer to an increase in cheap imports from emerging economies promoting price competition in importing economies which reduces markups and increases productivity. This is a secondary spillover effect that contributes to lower prices in importing countries and causes the flattening of the Phillips curve[3].
- These supply shocks are not necessarily caused only by imports. Another example of the indirect competition enhancement effect would be an increase in productivity for manufacturers through exposure to global competition in their export markets. For example, we plotted the relationship between the real wage gap (real wages minus labor productivity) and export dependency across Japanese manufacturing sectors (see Figure 4 on the next page) and found that greater sector dependence on exports led to higher productivity, with a consequently lower real wage gap.

[3] An inflow of cheap imports increases the price elasticity of demand encountered by domestic enterprises, making it difficult for them to raise their prices. Taking the cost curve as a given, this results in a reduction of the markup rate, which flattens the Phillips curve.

Figure 4: Real Wage Gap and Export Dependency in Japan



- The impact of relative prices on general prices via trade channels, whether this is the import penetration effect or the competition enhancement effect, is considered a phenomenon observed only over the short-term in which price stickiness holds. This is because there are offset effects in the long-term. Even if prices decline for import goods and goods competing with them, over the long term there is an increase in real purchasing power that results in increased prices for other goods.
- With regard to the import penetration effect, the impact of cheap imports from emerging economies has been limited to the price of goods; there was little impact on the price of services. This is why the import penetration effect is termed a change in "relative prices" to distinguish it from a change in "general prices" that affects all goods and services. The impact on general prices of changes in relative prices is considered transitory and impermanent (Ball (2006), and IMF (2006)).
- The competition enhancement effect has a more sustained impact because the increasing competition resulting from an inflow of cheap imports will promote changes in productivity as enterprises invest in labor-savings, for example. Nonetheless, even competition enhancement does not permanently impact price-reduction.

(2) The case of EMEAP

- It is impossible to discuss the impact of globalization via trade channels on EMEAP economies without considering the augmented presence of the Chinese economy. As economic integration progresses in the region, China will potentially have a greater impact on EMEAP economies than on other regions. To illustrate this point, China's share of EMEAP-country imports is in the 10-20% range for all except Hong Kong; it is extremely large for Hong Kong, partly due to problems with how to account for re-exports (see Attachment 2).
- Mori and Oyama (2006) calculates the degree of relative-price reduction in six NIEs and ASEAN economies[4] which as trading partners are experiencing increases in imports from China as China's

[4] The six economies analyzed are: Korea, Hong Kong, Singapore, Thailand, Indonesia and Malaysia. The Philippines is excluded because of data constraints.

supply capacity grows.[5] More specifically, they identify trade goods included in the CPIs of individual NIEs and ASEAN economies where China has a large import share, and measure their degree of reaction to the "Chinese supply capacity" defined as the residual after controlling the variables of energy price and foreign exchange rates.

Figure 5: Impact on Relative Prices in Trading Partners from Increasing Chinese Capacity

	α		β		γ	***Const.* + γ**
KR	-0.033	(- 5.579)	0.052	(1.974)	1.024	**-0.141**
HK	-0.015	(- 2.442)	1.783	(2.049)	0.608	**-0.557**
SG	-0.062	(-12.929)	0.322	(6.152)	2.252	**1.087**
TH	-0.067	(- 5.918)	0.167	(2.747)	-1.106	**-2.271**
ID	0.048	(3.870)	0.123	(3.678)	-2.137	**-3.302**
MY	-0.012	(- 5.010)	0.100	(0.250)	-0.641	**-1.806**
Const.	-1.165	(-11.841)				

Notes: 1. Adjusted R^2: 0.704. Gray shaded figures indicate a significance level of 5% or greater. *t* values are shown in parentheses. "Constant term + γ" indicates "impact of Chinese supply capacity."

2. Estimation formula is as shown below.

(Formula)

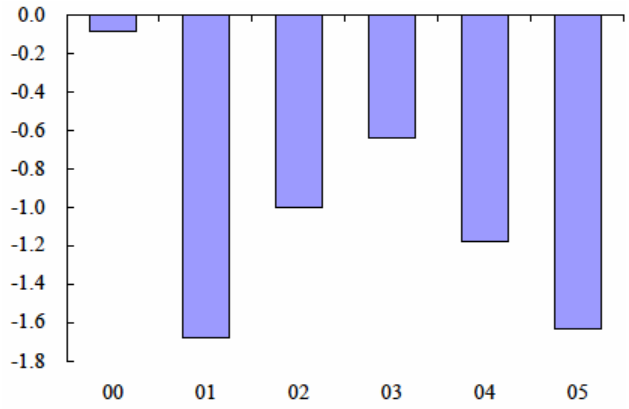
$$REP^i_t = \alpha^i WTI(-i)_t + \beta^i USD^i_t + \gamma^i + Const$$

Where, *REP*: Growth rate for relative prices of Chinese imports; *WTI*: Oil price (WTI) growth rate; *USD*: Each country's exchange rate against the dollar (USD / home currency) year-on-year growth rate; γ: Each country's fixed effect; *Const*: Constant term.

- Estimation results indicate that the "impact of Chinese supply capacity," which is expressed as the sum of the constant term and the fixed effect γ (the yellow-shaded portion of Figure 5), is negative for five economies, the only exception being Singapore. The conclusion is therefore that the expansion of Chinese supply capacity reduces relative prices for China-related goods and has a transitory downwards impact on the inflation rates of trading partners (importers). This downwards effect is estimated to have reduced relative prices for China-related goods in the six NIEs and ASEAN economies by a maximum of 1.6% (see Figure 6 on the next page).

[5] See also Kamada and Hirakata (2002) and Morimoto, Hirata and Kato (2003), which use structural VARs comprising inflation rates, real GDP growth rates and import penetration to show that the shock of expanding supply capacity in emerging countries reduces prices in developed countries.

Figure 6: Growth Rate for Relative Prices of China-Related Goods



4. Impact via labor and capital market channels

(1) Conceptual Framework

- As indicated by the labor share (see Figure 7), labor costs account for a high percentage of production in EMEAP economies, and changes in wage levels will therefore have a significant impact on inflation via the enterprise and household sectors.

Figure 7: Labor Share in EMEAP Economies (1990-2005 Average)

CH	KR	HK	SG	TH	MY	ID	PH	JP	US
0.66	0.68	0.32	0.44	0.55	0.48	0.39	0.77	0.61	0.35

Notes: 1. Labor share is calculated as "Employee compensation / Nominal GDP." It should be noted, however, that uniform data on employee compensation is not available from all EMEAP economies and in cases where data is unavailable, "wage x number of employees" is substituted. In such cases, wages and employees were based on figures found in the ILO's *Yearbook of Labour Statistics,* and in some figures are estimated by staff.

2. For Korea and Malaysia, figures are based on 1986-1990 data because of data availability.

- Direct effects from the labor and capital market channels would include, for example, immigration and off-shoring.
- Immigration from Country A to Country B results in a tighter labor market in Country A, which exerts upward pressure on wages and could eventually produce upwards pressure on prices. Conversely, Country B's labor market eases up, and the consequent decline in wages and worker purchasing power results in downwards pressure on prices. The unemployment pool provides a cushion so that this mechanism may not be explicitly observed, but such a "shock absorbing" effect does not last forever.
- Off-shoring refers to the transfer of one country's production to another country. The result is a contraction in the demand for labor in the home country which at least over the short term will produce downwards pressure on wages and eventually prices. Meanwhile, in the country where production was transferred, there will be short-term upwards pressure on wages and prices (ignoring existing unemployment). However, note that it is not necessarily clear how wages and prices are

determined because of the long-term changes that take place in the ratio of skilled to unskilled labor, which depends on the relative skill levels of the labor force.

(2) The case of EMEAP

- East Asia has enjoyed a steady, consistent inflow of funding through incoming direct investment. Broken down by region, investments in ASEAN peaked during the 1990s, while rapidly expanding in China, Hong Kong and Singapore during the same time period[6].

Figure 8: FDI in East Asian Economies

(Annual average, 100 million dollars)

	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005
Total	**41.2**	**103.9**	**397.0**	**1,045.5**	**1,036.9**
China	**10.0**	**28.5**	**225.3**	**410.6**	**549.4**
NIEs 3	**14.7**	**41.3**	**74.0**	**523.2**	**416.3**
Korea	1.2	8.0	10.2	58.4	46.1
Hong Kong	n.a.	n.a.	n.a.	337.6	234.0
Singapore	13.5	33.3	63.8	127.3	136.2
ASEAN 4	**16.6**	**34.1**	**97.7**	**111.6**	**71.3**
Thailand	2.8	11.9	18.7	46.0	26.1
Malaysia	10.8	11.3	45.4	40.1	29.6
Indonesia	2.4	6.0	23.4	8.4	7.5
Philippines	0.6	4.9	10.2	17.0	8.1

Notes: 1. NIEs 3 and total figures for the 1981-1995 periods do not include Hong Kong.

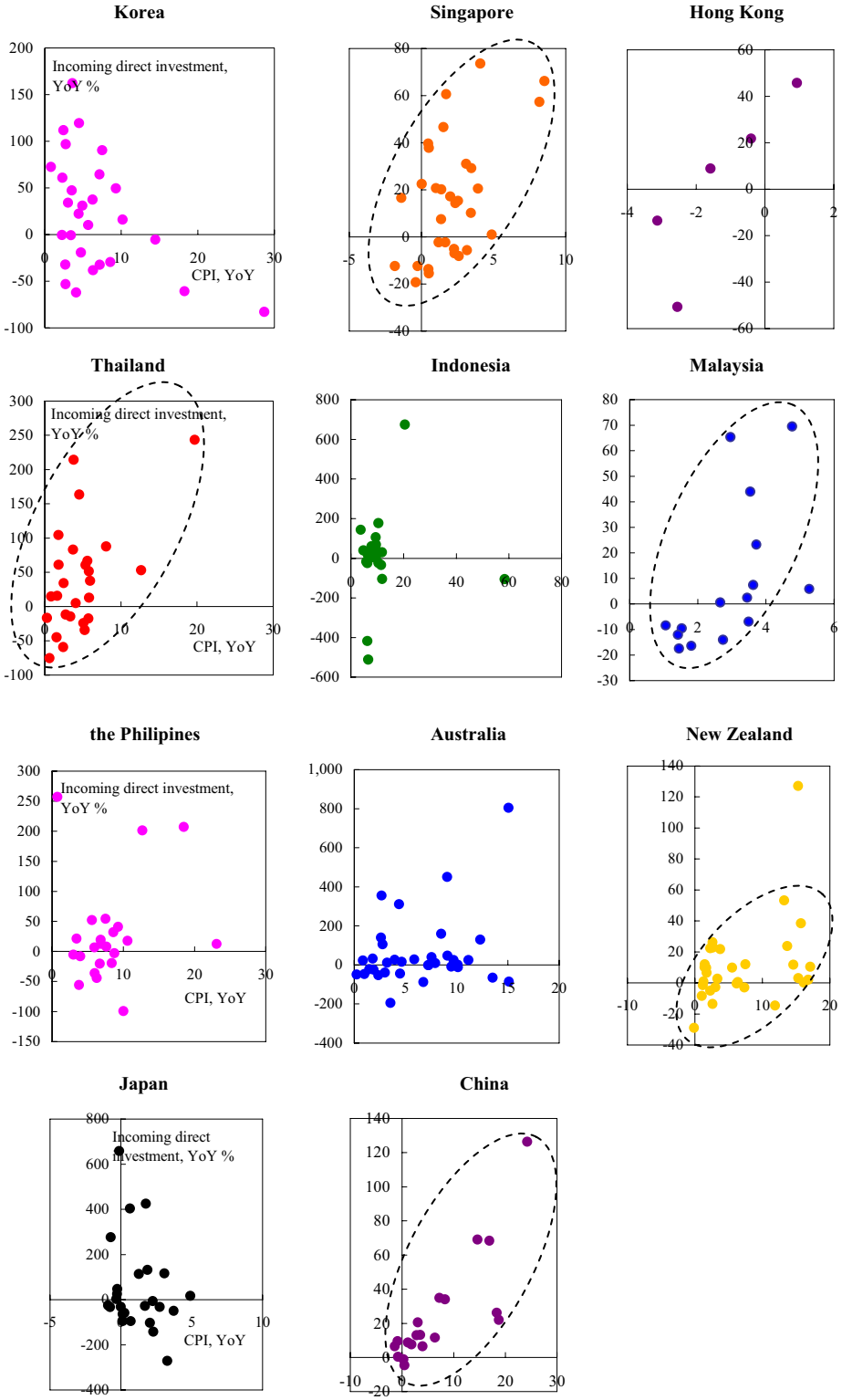
2. Chinese figures for the 1981-1985 periods are those of 1982-1985.

3. Hong Kong figures for the 1996-2000 periods are those of 1998-2000.

- One attempt to observe the impact of off-shoring is to observe the relationship between incoming direct investments and price growth rates (see Figure 9 on the next page). Overall, positive correlations were found for Singapore, Thailand, Malaysia, New Zealand and China.

[6] It should also be noted that this direct investment includes direct investments going to China via Hong Kong and Singapore. For example, according to the regional breakdown of FDI in China (National Bureau of Statistics of China, *China Statistics Summary 2006*), some 17.8 billion dollars of the approximately 55.0 billion dollars annual average FDI flowing into China during the 2001-2005 period came from Hong Kong, which is equivalent to 76% of the FDI received by Hong Kong during the same period (23.4 billion dollars). Quoted figures must therefore be heavily discounted to determine the actual scale of FDI. Still, the region as a whole has obviously continued to enjoy large amounts of investment.

Figure 9: Incoming Direct Investments and CPI



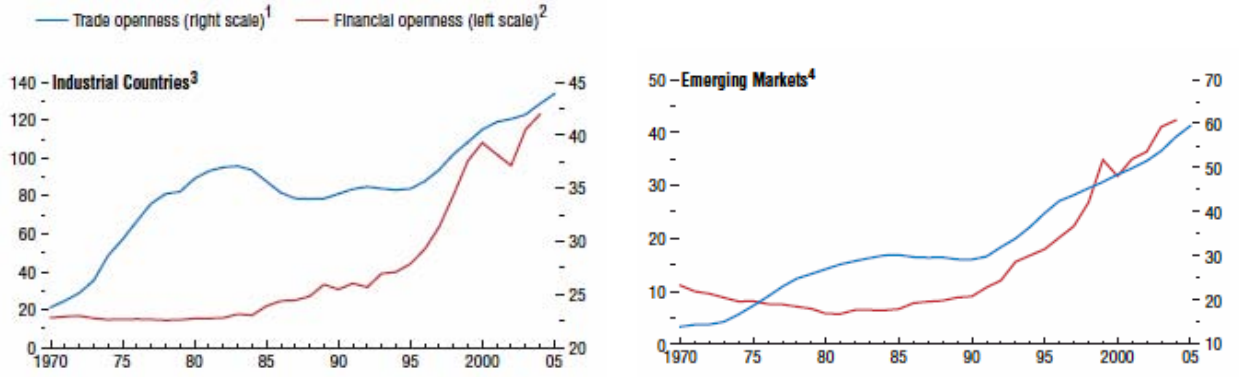
However, no clear positive correlation was observed for Korea, Indonesia, the Philippines, Australia or Japan. This may be because, for example in Indonesia and the Philippines, the unemployment pool acts as a cushion. Consequently, any tightening of the labor supply that would be caused by direct investments is offset and weakens the upwards pressure on wages. Perhaps in the case of Korea, Australia and some others, from a somewhat long-term perspective, changes in the ratio of skilled to unskilled labor could have been adjusted so there would be no clearly observable relationship with wages and prices.

5. Increased sensitivity of domestic inflation to global supply and demand

(1) Conceptual Framework

- Since the middle of the 1990s, openness to trade and finance has grown in both the developed and emerging countries to keep pace with the progress of globalization (see Figure 10). Openness trends for individual EMEAP economies are shown in Attachment 3.

Figure 10: Trade and Financial Openness



Source: IMF (2006)

Notes: 1. Trade openness = (Exports + Imports) / GDP x 100 (%)

2. Financial openness = (Foreign assets + Foreign liabilities) / GDP x 100 (%)

3. Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, UK, USA

4. Argentina, Brazil, Chile, China, Colombia, Czech Republic, Dominica, Ecuador, Egypt, Hungary, India, Indonesia, Korea, Malaysia, Mexico, Peru, Philippines, Poland, Romania, Russia, South Africa, Turkey, Venezuela.

- As economies become more open, the relationship between domestic inflation and the domestic output gap weakens and economies becomes more susceptible to the global output gap. IMF (2006) estimates that the sensitivity of developed-country inflation to output declined from 0.3 between 1960 in 1983 to 0.2 in 2004 (see Figure 11 on the next page).

Figure 11: Sensitivity of Developed-Country Inflation to Output

Estimation	(1)	(2)	(3)	(4)	(5)
c^i	0.010	0.013	0.011	0.010	0.012
ϕ	-0.091	---	-0.309	-0.105	-0.098
α^i	0.768	0.641	0.774	0.763	0.748
θ	-0.243	---	-0.232	-0.241	-0.275
β^i	0.223	0.312	0.217	0.237	0.201
γ	-2.711	-1.719	-1.915	-2.517	-1.737
λ	-0.309	-0.154	---	-0.225	---
-	---	---	0.481	---	---
χ	---	---	---	-0.233	---
Oil prices					
Current Period	0.032	---	0.026	0.032	---
Lag	0.020	---	0.021	0.020	---
Import prices x Import share					
Current Period	---	---	---	---	0.224
Lag	---	---	---	---	0.122
Time dummy	No	Yes	No	No	No
Output elasticity of inflation					
1960	**0.26**	**0.31**	**0.35**	**0.27**	**---**
1983	**0.27**	**0.31**	**0.24**	**0.27**	**0.19**
2004	**0.17**	**0.24**	**0.19**	**0.17**	**0.16**
Adj. R^2	0.823	---	0.812	0.817	0.726
Estimation period	1960-2004	1960-2004	1960-2004	1960-2004	1970-2004

Source: IMF (2006)

Notes: 1. Gray shaded figures indicate a significance level of 5% or greater. The inflation model was estimated for Australia, Canada, Germany, France, Italy, Japan, the United Kingdom, and the United States using the SUR estimator. Portions shaded in yellow indicate national averages weighted for PPP.

2: Estimation formula is as shown below.

(Formula)

$$\pi^i_t = c^i (1+ \varphi Credib^i_t)+ \alpha^i(1+ \theta Credib^i_t) \pi^i_{t-1}+ \beta^i(1+ \gamma Open^{DVi}_t +- \bar{\pi}^{DVi}_t + \chi Bargain^{DVi}_t)y^i_t+ \varepsilon^i_t$$

Where π is the inflation rate; *Credib* is the monetary policy credibility measure of Laxton and N'Diaye (2002); *Open* is trade openness; $\bar{\pi}$ is the average inflation level; *DV* is deviation from average; *Bargain* is the wage bargaining index of Elmeskov, Martin, and Scarpetta (1998) and Nicoletti and others (2001).

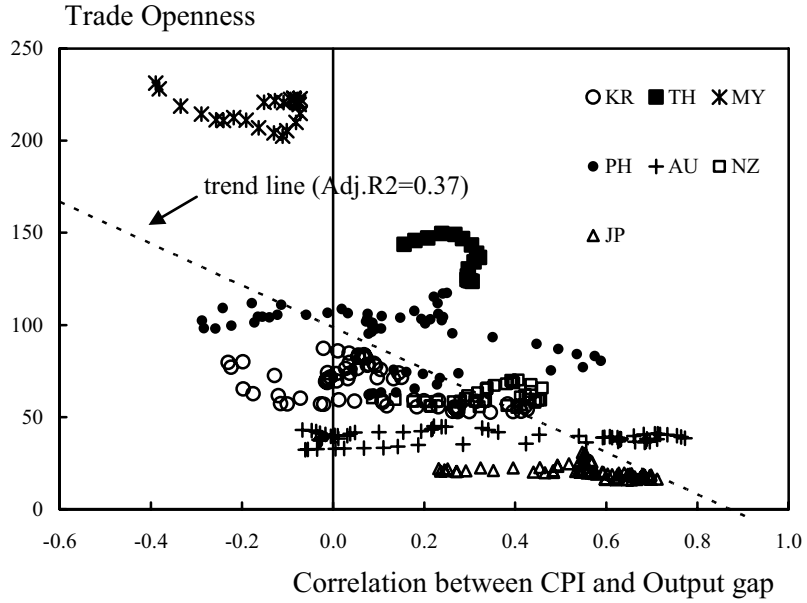
- On the other hand, empirical research is still ongoing with respect to the possible strengthening of the impact of the global output gap on domestic inflation and a clear conclusion has yet to be reached.
- Arguing that the impact of the global output gap has increased, IMF (2006) presents estimations indicating that globalization explains approximately half of the flattening of the Phillips curve. Likewise, Borio and Filardo (2006) demonstrate an increase in explanatory power in recent years when the global output gap is added as an explanatory variable for the Phillips curve. On the other

side of the argument are Kohn (2006) and Ball (2006) who provide an empirical criticism by demonstrating that the effect of the global output gap differs depending upon how domestic output gaps are weighted in calculating weighted averages. Ball (2006) goes on to argue that globalization has only flattened the US Phillips curve to 0.45 from 0.5 at maximum.

(2) The case of EMEAP

- Turning to the relationship between the "correlation between CPI and domestic output gap" and degree of openness in EMEAP economies, correlation is generally negative for most economies. Furthermore, at the same time, the higher the cross-country openness, the weaker the "relationship between CPI and the domestic output gap" (see Figure 12).

Figure 12: Degree of Openness and "Correlation between CPI and Domestic Output Gap" in EMEAP Economies



Notes: 1. Plotting 4 periods' moving average of trade openness (Exports + Imports) / GDP x 100 (%) on vertical axis, and correlation between CPI and Output gap on horizontal axis. Output gap is calculated as real GDP minus "potential GDP" (extracted using HP filter). Correlation between CPI and Output gap is estimated by rolling regression taking a 10-year sub-sample.

2. Hong Kong and Singapore are excluded from the graph because of their markedly higher degrees of openness and the slightly positive correlation between trade openness and CPI-Output gap. China is also excluded because there is no annual data on a GDP level.

6. Economic Globalization and Inflation: Issues for EMEAP Countries

- The majority view is that for developed countries, economic globalization works to restrain inflation, as can be seen from the estimation results published by IMF and OECD. This Note has examined three channels through which this is transmitted: 1) trade, 2) labor and capital markets and 3) increased sensitivity of domestic prices to global supply and demand. The question that must be addressed is how globalization influences inflation in EMEAP economies through these three channels.

- EMEAP economies have high degrees of trade openness (see Attachment 3), making it very likely that transmission through trade channels will lower domestic inflation rates (change in relative prices). In particular, for most EMEAP economies, IT goods account for a large portion of trade goods. This may indicate that the fierce competition in the IT goods sector, both in terms of technology innovation and in terms of price, may exert further downward pressure on EMEAP-economy inflation rates[7].
- EMEAP economies have a high degree of regional integration on both the economic and financial sides, as can be seen from the close trade relationships mediated by the supply chain for IT goods and the active inflows of direct investments to EMEAP economies. As a result, globalization may have a high degree of impact on domestic inflation rates through the channel of labor and capital markets.
- The EMEAP economies also neighbor China, whose presence has expanded dramatically in recent years, and this gives them stronger regional ties. This is yet another indication that globalization may have a more pronounced impact on inflation here than in other regions.
- In addition to the impact of globalization, the decline and stabilization of EMEAP economies' inflation rates may also be affected by other factors, especially improvements in monetary policy. Since the Asian currency crisis, most economies in the region have shifted the anchors for their macroeconomic management to price stability from foreign-exchange rate stability. It is conceivable that the emphasis on domestic prices in monetary policy under the new, more flexible foreign exchange rate regimes has contributed to improved inflationary performance.

Issues for Discussion

- **How much of the inflation restraint effect via trade channels can be observed in EMEAP economies? In addition to direct import price effects, how much of a constraint have indirect, competition enhancement effects been on domestic price growth rates?**
- **How much of an impact have indirect competition enhancement effects caused by immigration and off-shoring had on EMEAP economies?**
- **How much of a flattening of the Phillips curve has been observed in EMEAP economies? How much of a country's inflation is determined by the country's domestic output gap and how much by a global output gap?**
- **Aggregating the impacts from these various channels, how much of an impact has globalization had on inflation in EMEAP economies?**

[7] It is also likely that export and production volatility will increase as the share of IT products expands. This high volatility, primarily for IT goods, may be accelerated by trade relations within the economic sphere (= "multiplier effect"). If one can assume that higher production and export volatility increases the volatility of the output gap, then why, in such circumstances, has the volatility of inflation declined in EMEAP economies?

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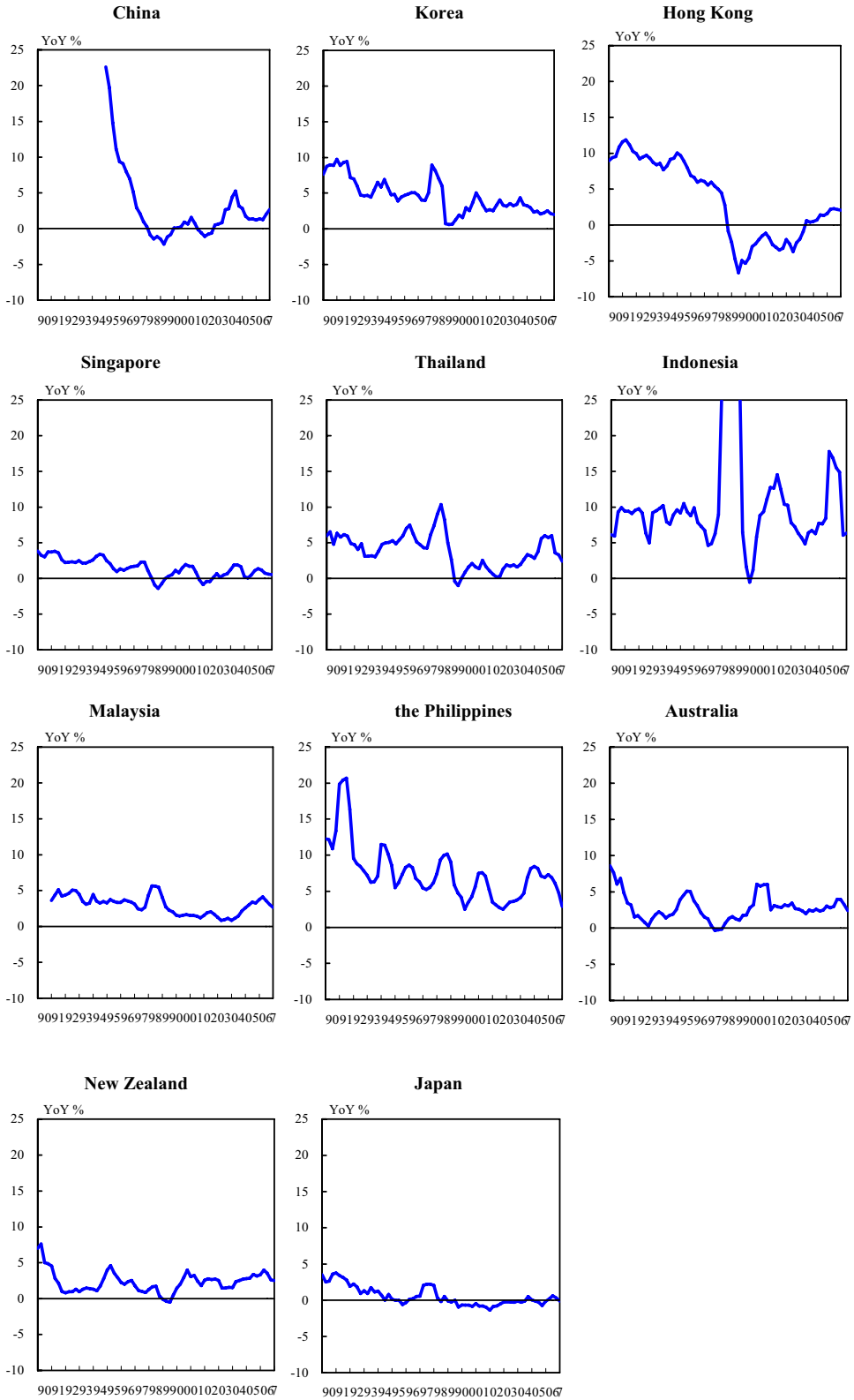
(Attachment 1)

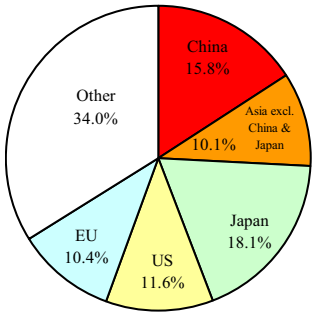
CPIs in EMEAP Economies



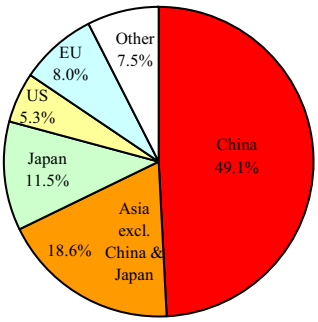
(Attachment 2)

China's Share of EMEAP-Economy Imports (2005-2006 Average *)

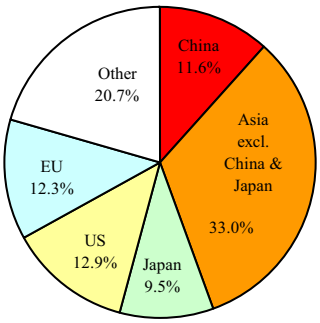
Korea



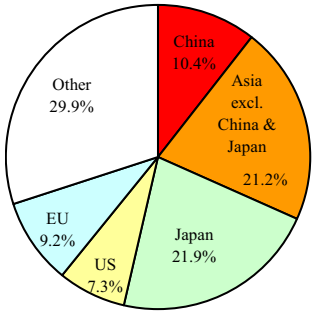
Hong Kong



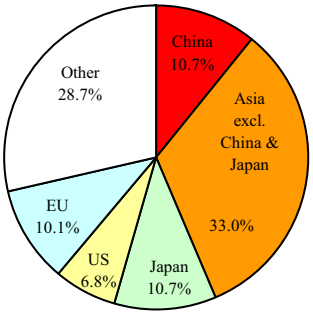
Singapore



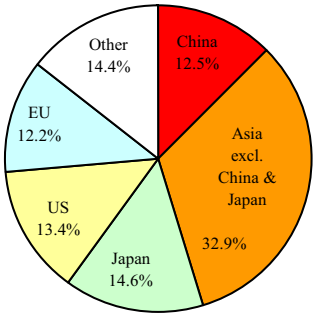
Thailand



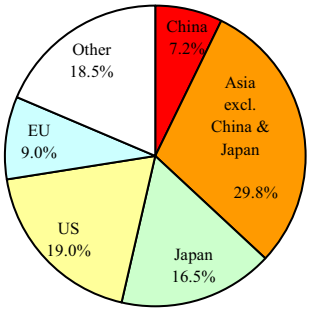
Indonesia



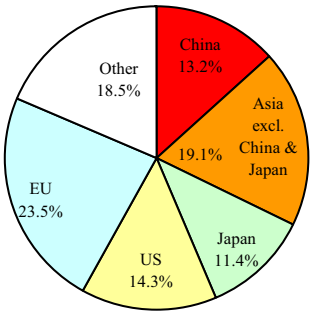
Malaysia



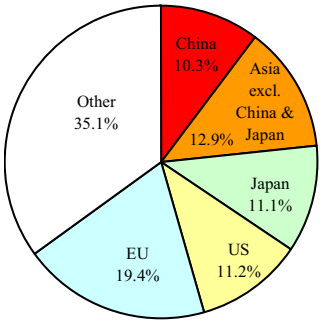
the Philippines



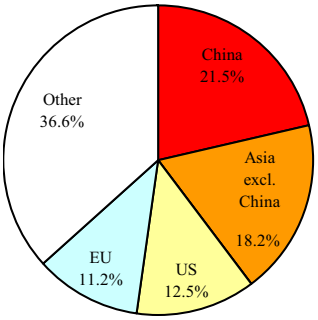
Australia



New Zealand



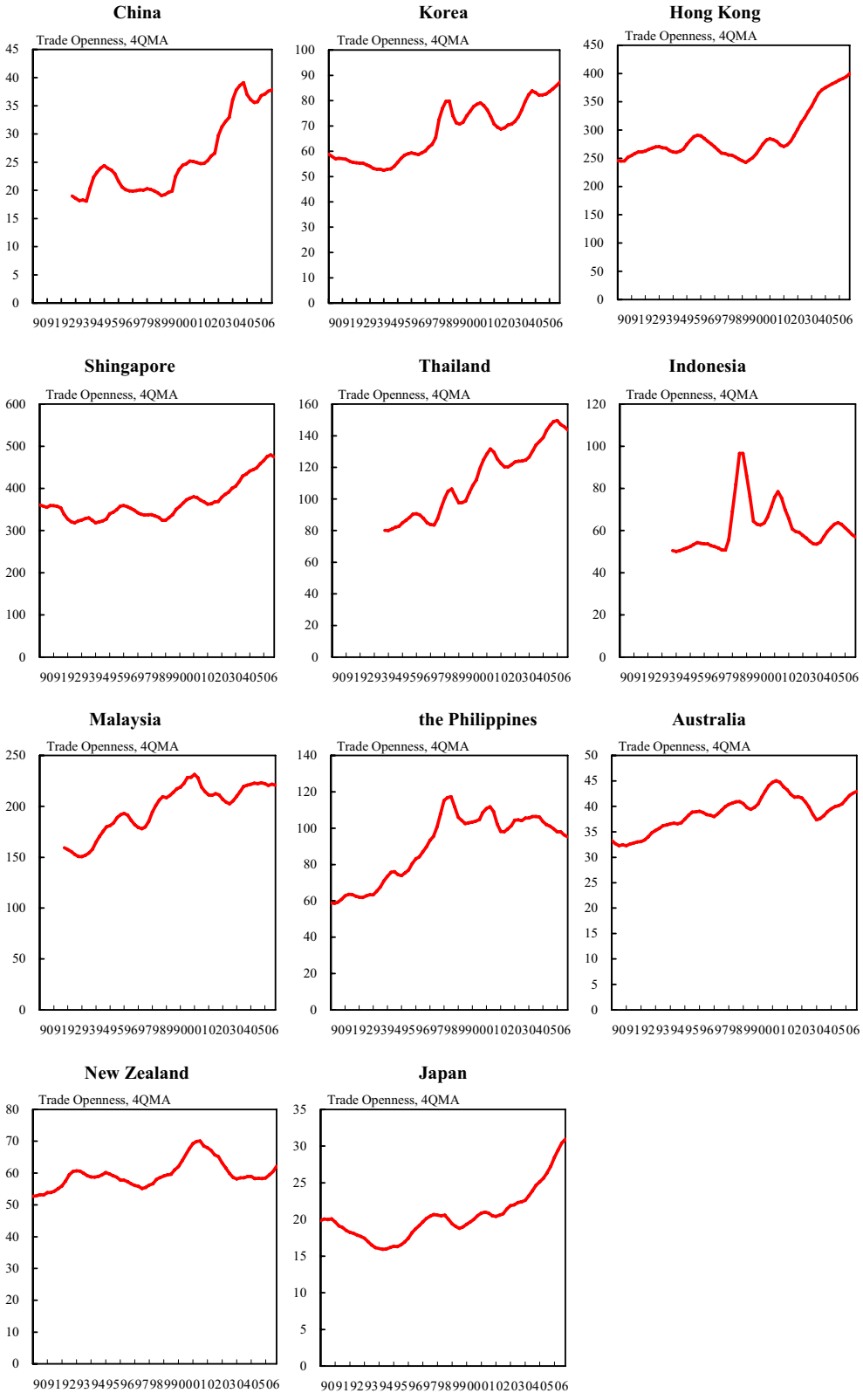
Japan



* Figures for Australia and New Zealand are averages of 2004 and 2005 data.

(Attachment 3)

Trade Openness of EMEAP Economies



Note: Trade Openness = (Exports + Imports) / Nominal GDP x 100 (%), 4 quarters moving average.