Center for Economic Policy Analysis

The Asian Crisis: Competing Explanations

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CEPA Working Paper Series III

International Capital Markets and the Future of Economic Policy
A Project Funded by the Ford Foundation

Working Paper No. 7

July 1998

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This paper was prepared for the meeting of the Ford Foundation project International Capital Markets and the Future of Economic Policy, Cambridge, April 16-17, 1998. We are indebted to the participants in the Oxford seminar on Financial Crises April 1998 for helpful comments and to other members of the Ford project. We also thank Catherine Downward for excellent research assistance.

1 INTRODUCTION: WHAT ARE THE PUZZLES ABOUT THE ASIAN CRISIS?

There are a number of puzzles about the Asian crisis but four main ones capture the key points of the debate so far. These are i) what caused the crisis, ii) why it wasn't forecast, iii) why it became such a rout and iv) why devaluations haven't benefited the economies more.

It still is not clear which combination of factors was most important in causing the crisis. This paper surveys several explanations and tries to adjudicate between them. It offers a composite explanation with features of several of the main hypotheses so far.

The Asian crisis differs from several previous currency crises in a number of fundamental respects. Since most early warning mechanisms were focussed on features which had been observed in past crises they failed to pick this one up. The key feature in this regard is the fact that the crisis was a private sector, not a public sector problem and that there was no significant public deficit or debt build-up in these cases. Further, the key private sector variable was investment growth, not consumption growth, so that widening current account surpluses were not seen as problematic (Ostry 1997)

Why the crisis became such a rout is a much more complex question and is probably explained by the conjunction of a number of necessary conditions for currency crisis. These combined with domestic financial fragility and with an element of "herding" behaviour in foreign capital and currency markets to create extreme devaluations of currencies and stock markets. In the "hybrid" explanation offered here this feature is captured by noting the conflict between the gains to competitiveness from devaluation and the losses from the increase in the debt burden which results. It is postulated that in the presence of large foreign exchange denominated debt, a greater devaluation is required so that export gains will be large enough to offset debt-burden losses.

Unlike the countries which were forced out of the ERM, the Asian countries have not (so far) benefited from their increased competitiveness and most forecasts are for low or negative growth over the next year. One reason for the failure to benefit from devaluations is the degree of intra-regional trade (see Tables 2 and 3) on which they depend and the fact that falling incomes in the region (and Japan) constrain their growth.

This may be exacerbated by possible supply bottlenecks on the domestic side since foreign currency debts will force bankruptcies (possibly of otherwise viable firms) and there may be a domestic credit crunch as some banks are closed and the survivors try to rebuild capital adequacy.

2 BACKGROUND - RAPID GROWTH AND TRADE

An essential feature of these crises is that they took place against a background of liberalisation of both domestic and international capital markets. Liberalisation in goods markets led to a high profitability of investment and an investment boom while liberalisation of the capital account both made available foreign sources of financing and changed the way it was intermediated. As Wyplosz (Wyplosz 1998) puts it "financial market liberalization is the best predictor of currency crisis".

The significance of developments in these economies for the whole world cannot be underestimated. The economic transformation experienced in East Asia from the 1950s to the 1990s is without precedent. East Asia has been the most rapidly growing region in the world: it has had two decades of double-digit economic growth rates. The share of measured global production accounted for by the economies of East Asia (defined here as Japan, Korea, China, Taiwan, Hong Kong and the Association of South East Asian Nations (ASEAN) economies) has more than doubled, to reach 21 per cent, while their share of merchandise trade has risen to a similar 22 per cent. As shown in Table 1, East Asia's share of the external trade of the current 15 EU economies rose from 6 per cent to 21 per cent between 1965 and 1995. East Asia's share of the external trade of the North American Free Trade Area (NAFTA) economies rose from 15 per cent to 42 per cent. Both NAFTA and the EU now trade more with East Asia than with each other. For the Asian economies meanwhile their internal trade has grown just as rapidly as their external trade so that the share of their intra-regional trade in their total trade increased from 37% in 1968 to 51% in 1995 (Anderson & Francois, 1997) which compares with North American intra-regional trade in 1995 of 36% and Western Europe 69%. The Asian

region is therefore, nearly as dependent on its regional partners as are European nations on theirs with consequences which will be noted below.

TABLE 1 **Inter-regional trade excluding intra-regional**

1965 (US$ billion)					
To **From**	**East Asia**	**NAFTA**	**EU**	**ROW**	**External Trade**
East Asia	0.0	3.8	2.1	3.8	9.7
NAFTA	3.8	0.0	10.3	10.9	24.9
EU	1.8	7.2	0.0	21.4	30.4
ROW	3.9	7.0	22.2	0.0	33.1
1965 (per cent)					
To	**East Asia**	**NAFTA**	**EU**	**ROW**	**External Trade**
From					
East Asia	0.0	39.6	21.3	39.1	100.0
NAFTA	15.1	0.0	41.2	43.7	100.0
EU	5.9	23.7	0.0	70.5	100.0
ROW	11.9	21.1	67.0	0.0	100.0
1995 (US$ billion)					
To	**East Asia**	**NAFTA**	**EU**	**ROW**	**External Trade**
From					
East Asia	0.0	318.1	190.2	180.5	688.8
NAFTA	196.0	0.0	138.3	127.8	462.1
EU	161.4	154.5	0.0	441.0	756.9
ROW	172.9	113.6	312.5	0.0	598.9
1995 (per cent)					
To	**East Asia**	**NAFTA**	**EU**	**ROW**	**External Trade**
From					
East Asia	0.0	46.2	27.6	26.2	100.0
NAFTA	42.4	0.0	29.9	27.7	100.0
EU	21.3	20.4	0.0	58.3	100.0
ROW	28.9	19.0	52.2	0.0	100.0

Source:

Tables 2 and 3 show the corresponding position for intra- and extra- regional trade over time.

TABLE 2
SHARE OF INTRA-REGIONAL TRADE IN EACH REGION'S
TRADE 1928 - 1995

(PER CENT)

	1928	1958	1968	1979	1990	1995
W EUROPE	51	53	63	66	72	69
E EUROPE & FSU	19	61	64	54	36	19
NTH AMERICA	25	32	37	30	32	36
LATIN AMERICA	11	17	19	20	15	21
ASIA	46	41	37	41	45	51
AFRICA	10	8	9	6	6	10
MIDDLE-EAST	5	12	8	6	8	8
WORLD	39	40	47	46	52	52

SOURCE: ANDERSON & FRANCOIS, 1997

TABLE 3
SHARES OF REGIONAL GDP TRADED
EXTRA-REGIONALLY
1928-1995
(PER CENT)

	1928	1958	1968	1979	1995
W EUROPE	17	16	13	16	15
N AMERICA & MEXICO	8	6	6	13	15
ASIA[a]	17	16	14	16	14 [b]
of which					
Developing Asia	22	19	20	28	34 [b]
WORLD	15	13	12	19	16 [b]

SOURCE: ANDERSON & FRANCOIS, 1997

NOTES: a Asia includes Australia and NZ plus Southwest Pacific Islands

b 1993

3 BROAD TYPES OF EXPLANATION

There are broadly three types of explanation (though Radelet and Sachs, 1998 divide them into five groups) which have been advanced so far for the causes of the crisis. Each of these incorporates some explanation of the boom which preceded the crises and then of the factors which contributed to the bust. Instead of surveying competing explanations of booms, followed by competing explanations of the crash the paper surveys the contributions by particular authors covering both boom and bust. The three main types of explanation are **supply side** stories which concentrate on aspects of investment behaviour in these economies; **financial structure** stories which put most of the blame on an asset price boom combined with financial mismanagement followed by a bank run type phenomenon and **macro mismanagement stories** which focus on the problem of inappropriate exchange rate policies and open capital markets.

3 a) Supply side

i) Diminishing Returns to Investment

Well before the signs of crisis in the SE Asian economies there had been a debate about their productivity growth record and whether there had been "too much" investment. (Krugman 1994) famously quoting the work of Alwyn Young (Young 1995) and Larry Lau (Kim and Lau 1994) likened their capital intensive growth to that of the Soviet Union. He pointed out that "if growth in East Asia has been primarily investment driven" then it was likely that "capital piling up there is beginning to yield diminishing returns". That interpretation is challenged by (among others) Radelet and Sachs (Radelet and Sachs 1997). Appendix Table 4 compares estimates of TFP growth in different studies of Asian growth. Most are consistent with the view that the contribution of capital growth has been significantly greater than TFP contribution although the pattern is more striking in some countries and time periods than others.

Sachs argues that the interpretation should be that "Good economic policies and a favourable economic structure raise the returns to capital and thereby stimulate rapid investments in capital. Without [these] ..the returns to capital would be much less, so that

capital accumulation would be much lower, and overall growth would be much slower as a result." However he agrees that "If. . . most …growth is the result of capital accumulation…growth will slow down as capital deepening takes place (that is, as the capital-labor ratio rises sharply in the economy) since capital deepening will be associated with a declining rate of return to new investments. This is in fact the case in East Asia: as capital accumulation has progressed, rates of return on capital have declined, suggesting that indeed both capital accumulation and growth will taper off in the future." But "This decline in profit rates is mitigated by two factors: 1) improvements in TFP (which thereby raise the marginal productivity of capital) and 2) a high substitutability of capital for labor in the basic production function.[1] Other authors simply take issue with the measures of output used (which do not account for quality improvements nor for declines in terms of trade which result from improved productivity) or with the types of production function and assumptions about the nature of technological progress (whether embodied or not) used in estimation.

It is still an open empirical question whether productivity growth, and returns to capital, have been low for some time, or have been high but falling. Krugman (1994) cited the evidence of capital *outflow* from the region as evidence that returns have been low (and would presumably claim capital inflow since the mid-1990s as evidence of a bubble). Radelet and Sachs (1997) cite OECD data that the "rate of return on capital in Korea declined gradually from around 22 percent in the mid 1980s to about 14 percent in 1994. In Singapore, a comparable indicator - the rates of return on US foreign direct investment - fell from 27 percent in the late 1980s to 19 percent in the mid-1990s. In Hong Kong and Taipei,China rates of return fell from around 21 percent to 15 percent. While these declines do confirm the neoclassical prediction of declining returns to investment, and are consistent with the rapid accumulation of capital documented by Young…the important point is that they are still well above the worldwide average returns on US foreign direct investment of 11 percent."

In the context of the present crisis (Krugman 1998) describes the problem as one of a short term boom "papering over the cracks" of fundamental problems in Asia. One must assume this means that despite low and falling rates of return to investment (the

Krugman story about TFP) capital flowed in to the region and domestic investment continued at high rates of growth in the manner of a bubble. When the boom subsequently broke the fundamental fissures open up. Radelet and Sachs dispute this notion. "The search for deeper explanations that attribute the entire massive contraction to the inevitable consequences of deep flaws in the Asian economies such as Asian crony capitalism seem to us to be misguided."

Regardless of interpretations of the TFP debate the difficulty is to explain why adjustment was not smooth and slow in a normal, neo-classical process. Krugman's Pangloss investment story may explain why investment boomed despite falling rates of return (although his explanation of the breaking of the cycle depends crucially on a dramatic change of regime as implicit guarantees are suddenly withdrawn) but the theory underlying his implied story about the interaction between the short term breaking of the bubble and a worsening of the long term trend diminishing returns (or that the breaking of the bubble "revealed" the longer term trend which had previously not been recognised), is not clear.

ii) Worsening terms of trade

Another variety of "supply side" story is one in which the China factor comes in to play. Here the idea is that the other Asian economies have gradually lost competitiveness in important standardised export commodities but that China had had an overvalued exchange rate and internal difficulties which held back competition. The resolution of those difficulties and the devaluation of the yuan in 1994 were equivalent to a negative productivity shock to the other Asian tigers (though the IMF (1997) notes that appropriately trade-weighted the shock of the yen depreciation was much larger). In a model incorporating expectations the impact of this is immediate and severe as expectations of growth are rapidly revised downward with a predictable impact on asset values and stock markets. The result is that previously valid lending for investment projects is now invalidated.

3 b) Financial structure

Immediately after the currency crises began to build momentum the favoured explanations used the well-developed currency crisis models. As the differences in the Asian experience from those in Europe and Latin America became better appreciated, attention focused elsewhere.

i) A first explanation by Krugman (1997) acknowledged in descriptive terms the role played by the collapse of asset prices in creating a solvency crisis but analytically still relied on currency crisis models. By early January 1998, Krugman's much cited internet paper (What happened to Asia?) claimed that the crises "had very little to do with currencies or even monetary issues per se. Nor…with traditional fiscal issues… Instead, it was mainly about bad banking and its consequences." These explanations try to capture some observed facts:

i) The build up of private bank debt.
ii) The development of bad loans.
iii) Different regulatory regimes.
iv) Some lack of transparency.
v) Some government guarantees leading to moral hazard.

As evidence in favour of this view, Krugman cites

- "the absence of the usual sources of currency stress, whether in the form of fiscal deficits or macroeconomic difficulties
- the pronounced boom-bust cycle in asset prices, prior to the currency crisis
- the severity of the crisis given a lack of strong adverse shocks, and the spread of the initial crisis to countries that seemed to have few economic links with the initial victim".

Krugman describes "Pangloss" investment in both capital assets and in land, as a result of implicit or explicit guarantees. Guarantees mean that investment in capital goes beyond the point where the expected return is equal to borrowing costs because investors ignore the possibility of bad outcomes. The result is "overinvestment" in capital or, in the case of assets in fixed supply (land), rising prices. In this story financial structure matters to the extent of providing guarantees. It is possible to think of a fixed exchange rate - in

this context - as a form of guarantee; and a regime of fixed-price non-flexible interest rates likewise.

The critical element in the bursting of the bubble is a change of regime. When guarantees are no longer available (either because one has been required and found too costly or because something else causes a reduction in returns and guarantees are withdrawn precisely because they will be needed i.e."endogenous" removal of guarantees) the Pangloss values collapse, banks become insolvent and this justifies, and intensifies, the drop in values. Although Krugman calls this a "self-fulfilling" financial crisis it is in fact close to an "efficient" bank run story in which collapsing bank solvency causes runs which result in collapsing bank liquidity. The Economist (10.1.98) correctly points out that the policy conclusions in Krugman's case would be i) the real problem lies with banks and their regulation ii) international capital mobility may not maximise economic efficiency if banks are guaranteed and under-regulated iii) there should be no bailout since the collapse of these bubbles was inevitable.

ii) Edison, Luangaram & Miller has similar features of liquidity crisis leading to insolvency crisis, exacerbating the falls in asset prices and resulting in a credit crunch with serious real consequences. In the style of Bernanke and Gertler and Kiyotaki and Moore, ELM show that once an asset price bubble has burst, credit-constrained borrowers who have used the asset as collateral for loans will be forced into sales of the assets which will further reduce their prices. The knock-on effects of these forced sales create the conditions for a magnified financial crisis. The initial downturn in ELM may be triggered either by falls in domestic asset prices or by currency devaluations which cause liquidity problems for borrowers with unhedged foreign exchange positions. The ultimate cause of the collapse, however, is still unidentified.

3 c) Macro-mismanagement and currency crisis models

As noted above early explanations of the Asian crisis, and the fundamental thinking of the IMF, were based on currency crisis models. This resulted in some debate about

whether first or second generation models were more apropriate and whether the crisis had elements of the self-fulfilling, sunspot models of Obstfeld.

It was quickly recognised that events did not mimic exactly the description of the first generation models which depended on excessive money-financed public sector deficits creating tension with fixed exchange rate regimes. Nevertheless, Krugman, (Oct 1997) argued that the insights of a non-self-fulfilling second generation crisis model were applicable. His point was that a tension between macro fundamentals (though not excessive money finance) and the exchange rate regime, was at the core. The IMF view, both official and private, (IMF, Dec 1997, Fischer, March 98, Mussa Feb 98) also has elements of this story as does Feldstein, March 77)

The key feature in these stories is some element of domestic "overheating" combined with an inability by governments to undertake appropriate policy tightening. The IMF WEO describes this in a narrative, rather than analytical, way giving four "causes" of the crisis

- high growth attracted large capital inflows which were difficult to absorb
- external factors created swings in competitiveness (capital was pushed out of low growth developed countries (Japan); depreciation of the yen and devaluation of the yuan)
- incompatible macro policies and exchange rate regime
- financial and structural weakness resulting from excessive regulation and too little competition in banking were revealed by the crisis (but were not an independent cause).

A number of authors now favour a version of a "self-fulfilling" crisis

i) A model by Wyplosz (1998), focusses on multiple equilibria. " For a while, self-fulfilling crises have been considered as a theoretical curiosity without practical relevance. The EMS crisis of 1992-93 has been seen as an example of self-fulfilling crisis. It has been argued (Eichengreen and Wyplosz (1993)) that attacks have been directed at countries such as France or Denmark because markets calculated that, given the current recession and rising unemployment, the authorities would not be willing to raise interest

rates to deter capital outflows, much as Italy and the UK did not resist for very long a few weeks before. Similarly once Mexico devalued its exchange rate in December 1994, the markets figured out that the new administration was not as committed as the previous one to the inherited exchange rate system (see Redelet et al. (1997)). Similarly, while Thailand is a case where fundamentals were wrong, and had been so for a while, the other South East Asian countries were not obvious candidates for a run on their currencies. When the attacks occurred, though, otherwise innocuous-looking foreign currency borrowings became a source of acute financial distress given the unrealistically low levels of the exchange rates. There is thus a possibility that a country may find itself in different equilibria. One of them, say the good one, is the initially prevailing one: the traditional economic fundamentals are compatible with the existing exchange rate and asset prices. Other equilibria are possible, with lower exchange rate and asset prices. There may exist many, indeed an infinity, of alternative "bad" equilibria." Further, he claims that "Fundamentally the Asian crisi does not represent a new phenomenon." But merely a conjunction of factors with a slightly different weighting from previous crises. Theoretical details of the nature of the multiple equilibria are not spelled out.

The advantage of this debate about macro mismanagement was that at least there was a more or less agreed method of informally examining some data to look at the consistency of the story. Krugman (1997), Eichengreen, Wyploscz and Rose (1995), Begg (1998) all provide examples of how such an approach proceeds. It has obvious disadvantages and is not a substitute for econometric studies of sources of currency crisis (Jeanne, 1997, Weber, 1997) but it does at least help to rule out some less likely stories.

4 EXAMING THE DATA

Wyplosz has succinctly summarized the current state of empirical work on characteristics of crises.

"Empirical work on the characteristics of crises has quickly developed over the last few years. From the studies of Eichengreen, Rose and Wyplosz (1995, 1996), Kaminsky, Lizondo and Reinhart (1997) Frankel and Rose (1996) and IMF (1997) it seems safe to draw a number of conclusions. First, currency crises are typically preceded by overvalued exchange rates, fast growth in domestic credit and current account deficits.

Second, there is no clear link between fiscal policy and crises. Third, crises are followed by exchange rate undervaluation, inflation, high interest rates and an improvement in the current account. Fourth, domestic asset prices do not fall ahead of the crisis; they are often high before, and quickly decline at the time of the crisis. Fifth, in the case of developing counties, crises tend to occur when interest rates in developed countries bottom up. Although not yet hard evidence, these stylized facts lend themselves to a number of tentative but important implications.

First financial market liberalization is the best predictor of currency crises. This has been true in Latin America in the 1980s, in Europe in the early 1990s and in Asia in 1997. The channels are capital inflows which pose delicate policy problems, exposure to currency risk, and heightened volatility."

In this section of the paper we present some of the basic building blocks of a story about how the crisis developed as a prelude to a simple informal model which captures some of the key empirical results.[2]

Appendix Tables 5 to 12 give country by country evidence on the period leading up to the crisis. There are a number of observations which are common to most of the countries but there are several important country differences. The main points are:

4 a) Domestic macroeconomic balance

- Real GNP growth had slowed modestly before the crisis in all countries but in the slowest growing (Philippines) was still 4.3%.
- Unemployment data, where available, do not show significant increases .
- No significant budget deficits are recorded in any country. Some had sizeable surpluses.
- There is no pattern of declining official reserves (in months of imports) in any country although there are significant cross-country differences in levels (and there is doubt about the quality of the data).
- Thus there is no evidence of the standard, "first generation" currency model tension between the governments' overexpansion of fiscal and monetary policy and the need to maintain the peg.

4b) Monetary policy and credit growth

- Patterns of money and credit growth vary across countries.
- Korea, Hong Kong and Singapore show money growth rates in line with the growth of nominal GDP (with moderate and falling inflation rates). Taiwan had brought growth down to rates in line with nominal GDP by 1995. Growth of domestic credit was higher in all countries and there was a rising trend in bank credit/GDP ratios (where data is available).
- Philippines, Malaysia and Indonesia had rates of money growth considerably higher than nominal GDP growth with relatively high levels of inflation in Philippines and Indonesia (Malaysian inflation figures may be distorted by inclusion of price controlled commodities). Domestic credit growth rates were also higher than Korea and Singapore.
- Thailand is mid-way between, with nominal money growth in line with GDP growth but growth of domestic credit much higher until a slowdown began in 1996 (before the crisis).

4c) Competitiveness and export performance

- There are some interesting consistencies across countries
- Current account balances had worsened in all the countries except Singapore but the degree of problem varied. The only country with a really large deficit was Thailand (-8%). Malaysia, at -6%, had reversed a worsening trend.
- The deficits were related to the growth of private investment, not private consumption (see WEO, Figure 4). Ostry, 1997, estimated that for the ASEAN countries (I, M, P, S, T) the actual current account deficits were fairly close to "optimal consumption-smoothing current account deficits" consistent with an increase in expectations of future growth. (Assuming that increases in investment would lead to increases in GDP growth, an assumption which now looks problematic).
- Competitiveness, measured by real exchange rates, had worsened in most countries but for many the amounts were small. The only countries where competitiveness had declined by more than 10% from 1990 were Indonesia, Philippines, and Hong Kong.

Singapore, Malaysia and Thailand were close to 10%. Korea and Taiwan had virtually no decline.

- Despite the varied competitiveness measures all countries had experienced declines in export revenues and in export market growth (see WEO, Figures 7 and 8).

This informal survey of the data suggests

- No single explanation of the domestic sources of the boom and bust will work in all countries. We can rule out public sector deficits and excess private consumption but beyond that it is hard to generalise (though we need more careful consideration of the investment behaviour in each). Some countries had more significant domestic monetary expansion than others, some had credit booms underway while some appear to have already pricked the credit boom before the external crisis began.
- But all countries were suffering from declines in export growth which do not appear consistently linked to falling competitiveness. Further research is needed to identify the source in each country but as a first approximation we consider this to be the equivalent of a profit (perhaps, productivity) shock in the export sector.

5 A COMBINED EXPLANATION

None of the analyses surveyed above seem complete in themselves and none seem satisfactorily to explain the range of experience in the region (unless one accepts a pure contagion story). It is still not clear from these analyses how to discriminate between fundamentally different processes in both the boom and bust stages. During the boom there are two interacting stories

- the boom starts in the real sector. This paper takes the view that this arose from the liberalisation experience which was common to all these countries.
- the boom is augmented in the financial sector
    - deregulation and competition cause banks to increase risky lending

- capital inflows increase this
- rational bubbles develop in asset markets (Kiyotaki and Moore) and collateralised lending causes further credit boom
- risky lending is made easier by lax governance and regulation of banks

During the downturn there are similarly two interacting stories

- The collapse begins in the real sector e.g. the return to investment falls because the marginal productivity of capital falls or real wages rise causing competitiveness to fall, or export volumes to fall.
- It is augumented in the domestic financial markets because the asset price bubble is burst and asset price deflation sets in. There is not yet a clear theory of the turning point.
- The downturn turns into a bust by interacting with external capital markets and causing a currency crisis.
- In a self-fulfilling story the expectation of currency depreciation triggers the process and when it happens the depreciation has to be very large (for reasons explained below).

Reliable empirical data to sort these issues out are not yet available but an informal model which captures some of the stylized facts is set out below.

6 A STORY

6. 1 The Basic Model, and the "quiescent period".

Suppose that in a variant of a single period, discrete-time model (e.g. Davies and Vines (1998)) an unanticipated shock to productivity in the economy occurs. Such shocks can come from diminishing physical returns to capital, rising real wages, or falling product prices. These shocks could be "neutralised" by a devalution of the currency (policy action).

The economy is initially in a fixed exchange rate regime. The government minimises a "political economy" loss function which is affected:

(i) negatively by shocks to profitability (from any of the above factors);

(ii) negatively by the costs of higher interest rates, (as a result, for example, of "profitablity foregone", and the weight of this factor in the loss function depends on "financial fragility")

(iii) negatively by the reputational costs of quitting the fixed exchange rate regime.

We consider, as do Ozkan and Sutherland (1994), and Davies and Vines (1998) that the only short-term alternative regime is a pure float.

The government is thus faced with a problem. A commitment to a fixed exchange rate rule avoids the costs of devaluation but at the same time prevents neutralisation of shocks to profitability. Given that any change of regime is irreversible, the government can calculate a value of the profitability shock above which the costs of staying in the regime (in terms of current output losses) are greater than the costs from quitting the fixed exchange rate system. The government minimises its loss function taking market expections as given.

One can also construct a negative relationship between the level of the depreciation expected by the market and the trigger point which would force the government to abandon the regime (i.e. the size of the productivity shock). This is because the greater is the expected depreciation, the higher must be the domestic interest rate to avoid it. Since higher interest rates have a detrimental effect on government welfare, a higher level of market depreciation expectations means that it takes a smaller shock to trigger a regime switch.

In an initial "quiescent period", expected depreciation is zero and the choice whether to stay in the fixed exchange rate regime merely depends on the relative sizes of the costs of both options.

6.2 Expectations of depreciation

If the private sector comes to expect depreciation, then commitment to a fixed exchange rate requires the government to accept the higher interest rates which this implies.

If expectations of depreciation are endogenous they will be based on two elements. Firstly, for a known distribution of the shock variable, the expected value of the shock (probability times size) must exceed the expected trigger point value in the government's calculation. Secondly, given that the expected trigger point is reached or surpassed, the extent of the depreciation must be calculated. Thus private agents are calculating the product of the probability of quitting the regime (which depends on the size of the shock) and the size of the depreciation if a quit takes place (which also depends on the size of the shock). This non-linearity gives the classic "multiple equilibrium" characteristic.

6.3 Equilibrium when depreciation comes to be expected

If equilibrium is the state-consistency condition, (as used in Ozkan and Sutherland (1994)) then, in equilibrium, the trigger point (i.e. the level of the profitability shock at which the government will quit the fixed exchange rate regime) must satisfy the joint condition that (i) the private sector expectations of the government's trigger point (and hence their depreciation expectations) are correct and (ii) the government's trigger point is optimal given these expectations on the part of the private sector.

In this kind of model there are a number of results which enrich the more conventional self-fulfilling crisis model results. The government is more likely to abandon the peg the lower is the cost of leaving the regime and the higher is the probability of a shock (standard results). In addition, however, abandonment is more likely the higher is the weight in the government's loss function on the interest cost of defending. This cost captures some elements of "financial fragility" since it will rise with such factors as maturity mismatch on financial institutions' balance sheets. Finally the defence is also less likely the larger will be the regime devaluation when the peg is abandoned. Thus if a large devaluation is needed to restore equilibrium (because, say, the needed export boost must be very large to offset the losses arising from the debt overhang of foreign-exchange-

dominated liabilities) then a smaller initial shock could trigger the change in expectations which brings on the crisis. These latter two features (the role of financial fragility and the added cost imposed by the debt overhang resulting from devaluation) are new features of our approach to currency crises.

CONCLUSIONS

It is still difficult to conclude which of the competing explanations is the most satisfactory and, therefore, what policy lessons should be drawn. If supply-side stories are correct then either short or long-term correction to "over-investment" is needed. The key policy questions are then: a) how to ensure bad projects, not good, are terminated and b) how to manage the contractionary period.

If financial structure stories are the main source of the crisis a different set of questions emerge. Why have some other financial crises happened even where "better" regulatory and disclosure regimes were in place (e.g. the US Savings & Loans, the Nordic banking crises etc.)? There is a growing literature on this question which needs to be applied to the Asian experience. What were the triggers (of both boom and bust)? Financial models explain the rout, but not the onset of the crisis. The major policy questions are how to restructure the banking sector to avoid "moral hazard" type lending and will this be sufficient to avoid future crises. The evidence (Alexander et al, 1997) suggests recurrence of crisis is quite common.

If macro-management/currency crisis explanations are most convincing then the major empirical question is whether the crises were of the self-fulfilling or alternatively the unsustainable macro policy type. If it was self-fulfilling the policy question is what can be done to "buy time" before market expectations can destabilize policy and are Tobin taxes or other forms of "sand-in-the-wheels" policies viable and useful?

ENDNOTES

[1] "...The second condition means that capital deepening (rising K/L) can take place without sharply reducing the profitability of new investments. Thus.TFP growth is not the only measure of the production function that should be examined. As important...is the elasticity of substitution between capital and labor. A high substitution elasticity signifies good prospects for continued profitable investments in future years."

[2] A technical appendix is available from the authors on request.

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APPENDIX: COUNTRY TABLES

TABLE 4 COMPARISONS OF TFP ESTIMATES FOR ASIA

Total Factor Productivity Results: Bosworth, Collins and Chen (average annual growth rates, percent)

		Contributions of Sources of Growth		
Regions/Period	**Output/worker**	Physical Capital	Education	Total Factor Productivity
Korea				
1960-1970	5.1	3.5	0.9	0.6
1970-1980	5.9	4.5	0.5	0.8
1980-1986	6.2	2.9	0.7	2.5
1986-1992	6.6	3.9	0.7	1.9
Singapore				
1960-1970	5.60	5.20	0.30	0.10
1970-1980	4.30	3.90	0.00	0.40
1980-1986	3.60	3.70	0.70	-0.80
1986-1992	7.40	2.60	0.60	4.00
Taiwan				
1960-1970	6.50	4.50	0.50	1.40
1970-1980	6.10	4.10	0.70	1.10
1980-1986	4.50	2.10	0.50	1.80
1986-1992	5.90	2.80	0.50	2.50
Average				
1960-1970	5.73	4.40	0.57	0.70
1970-1980	5.43	4.17	0.40	0.77
1980-1986	4.77	2.90	0.63	1.17
1986-1992	6.63	3.10	0.60	2.80
South East Asia				
1960-1970	3.25	2.18	0.35	0.70
1970-1980	4.03	2.73	0.33	0.90
1980-1986	1.05	2.30	0.60	-1.83
1986-1992	4.58	2.00	0.58	1.90
South Asia				
1960-1970	2.56	1.64	0.30	0.62
1970-1980	1.46	0.88	0.22	0.36
1980-1986	2.78	1.28	0.30	1.18
1986-1992	1.52	0.78	0.30	0.40
China				
1960-1970	1.70	0.00	0.40	1.30
1970-1980	3.20	1.90	0.50	0.80
1980-1986	7.10	2.50	0.40	4.00
1986-1992	6.20	3.10	0.50	2.50
Asia				
1960-1970	3.44	2.32	0.38	0.72
1970-1980	3.30	2.28	0.32	0.65
1980-1986	3.04	2.06	0.48	0.47
1986-1992	4.00	1.87	0.47	1.58

Source: Bosworth, Collins and Chen, 1995 cited in Radelet & Sachs, 1997

Total Factor Productivity Results: Rao & Lee
(average annual growth rates, percent)

		Contributions of Sources of Growth		
	Output	Capital	Labour	Total Factor Productivity
Singapore				
Economy-wide				
1966-1973	12.7	9.0	2.4	1.3
1976-1984	8.5	5.6	2.3	0.6
1987-1994	8.6	3.6	2.4	2.6
Manufacturing				
1976-1984	7.7	5.8	2.3	-0.4
1987-1994	10.0	4.5	2.3	3.2
Services				
1976-1984	8.7	5.5	2.3	0.9
1987-1994	8.1	3.4	2.5	2.2

Source: Rao & Lee, 1995 cited in Radelet & Sachs, 1997

Total Factor Productivity Results : Kim and Lau
(average annual growth rates, percent)

	Contributions of Sources of Growth			
	Output	Capital	Labor	**Technical** Progress
I. Meta-Production Function				
Hong Kong	7.8	3.7	1.3	2.7
Singapore	8.9	4.9	2.0	2.0
South Korea	8.6	5.8	1.6	1.2
Taiwan	8.7	6.3	1.1	1.3
Average of five* industrial countries	3.8	1.4	0.1	2.4
II. Conventional TFP Approach				
Hong Kong	7.8	4.3	1.4	2.1
Singapore	8.9	6.9	1.6	0.4
South Korea	8.6	7.9	1,2	-0.5
Taiwan	8.7	6.8	1.1	0.8
Average of five* industrial countries	3.8	2.3	0.2	1.3

*Five Industrial Countries are France, West Germany, Japan, United Kingdom and United States

Source: Kim & Lau, 1994 cited in Radelet & Sachs, 1997

Total Factor Productivity Results: Young

(average annual growth rates, percent)

Region/Period	Output	**Weighted** Capital	**Weighted** Labor	**Total Factor** Productivity
Hong Kong				
1961-1966	10.9	5.8	1.6	3.5
1966-1971	6.5	2.7	1.6	2.3
1971-1976	8.1	2.7	1.6	3.8
1976-1981	9.9	3.8	3.9	2.2
1981-1986	5.8	3.2	1.6	1.0
1986-1991	6.3	2.6	1.3	2.4
1966-1991	7.3	3.0	2.0	2.3
Singapore				
Economy:				
1966-1970	12.5	7.1	1.5	3.9
1970-1980	8.5	7.4	2.7	-1.6
1980-1990	6.8	4.4	3.1	-0.7
1966-1990	8.5	6.1	2.7	-0.3
Manufacturing				
1970-1990	8.5	6.7	2.8	-1.0
South Korea				
Economy- excluding agriculture				
1960-1966	7.7	2.3	4.8	0.6
1966-1970	14.4	6.4	6.9	1.0
1970-1975	9.6	4.2	3.5	1.8
1975-1980	9.4	5.8	3.5	0.1
1980-1985	8.7	3.0	3.3	2.4
1985-1990	10.9	3.1	5.1	2.7
1966-1990	10.4	4.4	4.4	1.7
Manufacturing				
1966-1990	14.1	7.4	3.9	2.9
Other Industry				
1966-1990	11.5	5.4	4.2	1.9
Services				
1966-1990	8.8	2.4	4.6	1.8
Taiwan				
Economy- excluding agriculture				
1966-1970	11.3	4.8	3.2	3.4
1970-1980	10.6	4.2	4.9	1.5
1980-1990	8.0	2.5	2.5	3.0
1966-1990	9.6	3.6	3.6	2.4
Manufacturing				
1966-1990	10.8	5.5	3.9	1.4
Other Industry				
1966-1990	8.8	3.9	3.8	1.2
Services				
1966-1990	9.1	2.3	3.4	3.4

Source: Young (1995) cited in Radelet & Sachs, 1997

Thailand

Table 5a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Inflation (% per annum)	5.7	4.1	3.4	5.1	5.8	5.9	5.6	9.5
Real GDP Growth (% per annum)	8.6	8.2	8.6	8.9	8.7	5.5	-0.4	n.a.
Current Account/GDP	-7.7	-5.7	-5.1	-5.6	-8.1	-8.1	-0.8	n.a.
Budget Surplus/GDP	4.2	2.6	2.1	2.0	2.6	1.6	-0.4	n.a.
Unemployment	3.5	3.6	2.6	2.6	1.7	1.5	3.5	n.a.
Total international reserves (bil. US$) /1	17.5	20.4	24.5	29.3	36.1	37.8	26.3	27.0
Official reserves/imports (in months)	5.0	5.2	5.5	5.5	5.3	5.4	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997*, Bank of Thailand
/1 Total reserves minus gold.

Table 5b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Nominal Money Growth /1	19.8	15.6	18.4	12.9	17.0	12.6	16.4	15.7
Nominal GDP Growth	13.8	12.9	12.0	14.5	15.4	9.8	5.0	n.a.
Domestic Credit Growth /2		18.7	21.2	27.6	23.7	13.8	28.0	17.9
Growth of Credit to the Private Sector	20.4	20.5	24.0	30.3	23.8	14.6	19.8	12.4
Bank Credit to Private Sector/GDP /3	67.7	72.2	80.0	91.0	97.6	101.9	116.3	n.a.
Deposit Rates								
nominal /4	13.7	8.9	8.6	8.5	11.6	10.3	10.5	12.3
real /5	8.0	4.8	5.2	3.4	5.8	4.4	4.9	2.8

Source: *IFS*, *World Economic Outlook 1997*, Bank of Thailand
/1 Annual % change in M2.
/2 Bank Credit to Private Sector is domestic money banks' claims on the private sector. Domestic money banks comprise resident domestic banks and branches of foreign banks (balances of branches abroad are excluded).
/3 1991 figure from *IFS*. Others from Bank of Thailand.
/4 Maximum rate offered by commercial banks on 3 to 6 month savings deposits.
/5 Calculated as nominal rate less inflation.

Table 5c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Jun-98
Nominal Exchange Rate (Baht/US$) /1	25.3	25.5	25.5	25.1	25.2	25.6	47.2	42.4
Inflation (% per annum)	5.7	4.1	3.4	5.1	5.8	5.9	5.6	10.7
Real Effective Exchange Rate /2	99.8	99.8	101.5	100.4	103.8	109.4	82.7	n.a
Industrial Productivity	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Growth of Nominal Export Values	21.0	16.1	14.5	17.5	24.2	3.3	25.7	n.a
Growth of Export Volumes /3	19.4	12.1	11.7	18.4	37.1	n.a	n.a	n.a
Exports/GDP	36.0	37.0	37.8	38.8	41.7	39.3	47.0	n.a
Growth in Exports/GDP	5.6	2.8	2.3	2.6	7.6	-5.9	19.7	n.a
Growth of Nominal Import Values	17.2	8.9	13.6	19.0	28.3	3.2	7.9	n.a
Growth of Import Volumes /3	8.7	7.4	11.2	16.3	n.a	n.a	n.a	n.a
Imports/GDP	42.5	41.0	41.6	43.2	48.0	45.1	46.4	n.a
Growth in Imports/GDP	1.9	-3.6	1.4	3.9	11.2	-6.0	2.7	n.a
Current Account/GDP	-7.7	-5.6	-5.0	-5.6	-8.0	-7.9	-3.9	n.a
Growth in Current Account/GDP	7.2	27.3	10.7	-12.0	-42.9	1.3	50.6	n.a

Source: *IFS* , *World Economic Outlook 1997* , OEF, Bank of Thailand

/1 Nominal Exchange Rate figures are as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

/3 Derived from indices of Volume of Exports and Volume of Imports (*IFS* lines 72 and 73 respectively).

Indonesia

Table 6a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Inflation (% per annum)	9.5	5.0	10.2	9.6	9.0	6.6	11.6	29.7
Real GDP Growth (% per annum)	8.9	7.2	7.3	7.5	8.2	8.0	5.0	n.a
Current Account/GDP	-3.4	-2.2	-1.5	-1.7	-3.3	-3.3	-2.9	n.a
Budget Surplus/GDP	--	-1.2	-0.7	--	0.8	1.4	2.0	n.a
Unemployment	2.6	2.7	2.8	4.4	7.2	4.9	n.a	n.a
Total international reserves (bil. US$) /1	9.3	10.4	11.3	12.1	13.7	18.3	16.6	16.3
Official reserves/imports (in months)	5.7	6.6	7.5	6.2	5.0	5.5	n.a	n.a

Source: *IFS*, *World Economic Outlook 1997,* Bank Indonesia, *Statistical Yearbook for Asia and the Pacific 1997* (UN).
/1 Total reserves minus gold.

Table 6b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Jan-98
Nominal Money Growth /1	17.5	19.8	20.2	20.0	27.2	27.2	23.2	n.a
Nominal GDP Growth	18.3	14.7	17.0	16.0	17.7	16.0	13.3	n.a
Domestic Credit Growth	18.9	14.1	21.0	22.9	21.7	22.7	n.a	n.a
Credit to the Private Sector	16.7	11.4	25.5	23.0	22.6	21.4	n.a	n.a
Bank Credit to Private Sector/GDP /2	50.3	49.5	48.9	51.9	53.5	55.4	62.0	n.a
Deposit Rates								
nominal /3	23.3	19.6	14.5	12.5	16.7	17.3	20.0	22.9
real /4	13.8	14.6	4.4	2.9	7.7	10.6	8.4	-6.8

Source: *IFS*, *World Economic Outlook 1997,* Bank Indonesia
/1 Annual % change in M2. Figures to 1996 from *IFS;* 1997 figure from Bank Indonesia.
/2 Bank Credit to Private Sector is domestic money banks' claims on the private sector where domestic money banks as of Dec. 1992 comprise all commercial banks (private national, state, regional government, foreign-owned, and joint-venture banks).
/3 Weighted average rate paid on three-month deposits at commercial banks.
/4 Calculated as nominal rate less inflation.

Indonesia

Table 6c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Nominal Exchange Rate (Rupiah/US$) /1	1992	2062	2110	2200	2308	2383	4650	8325
Inflation (% per annum)	9.5	5.0	10.2	9.6	9.0	6.6	11.6	39.1
Real Effective Exchange Rate /2	106.4	110.5	123.3	128.1	136.6	154.7	113.9	n.a
Industrial Productivity	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Growth of Nominal Export Values	19.85	22.7	15.5	14.8	18.0	15.0	n.a	n.a
Growth of Export Volumes /3	n.a	n.a	5.0	10.1	4.9	4.7	n.a	n.a
Exports/GDP	27.37	29.39	26.75	26.51	26.31	25.82	n.a	n.a
Growth in Exports/GDP	3.06	7.37	-8.97	-0.91	-0.75	-1.87	n.a	n.a
Growth of Nominal Import Values	20.47	14.60	11.44	23.69	29.61	13.00	n.a	n.a
Growth of Import Volumes /3	n.a	n.a	n.a	n.a	n.a	n.a	n.a	n.a
Imports/GDP	26.98	27.06	23.77	25.37	27.65	26.66	n.a	n.a
Growth in Imports/GDP	3.60	0.30	-12.18	6.72	8.99	-3.57	n.a	n.a
Current Account/GDP	-3.4	-2.2	-1.5	-1.7	-3.3	-3.3	-2.9	n.a
Growth in Current Account/GDP	-21.43	35.29	31.82	-13.33	-94.12	--	12.12	n.a

Source: *IFS*, *World Economic Outlook 1997*, OEF, Bank Indonesia

/1 Exchange rate value is as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

/3 Derived from indices of Volume of Exports and Volume of Imports (*IFS* lines 72 and 73 respectively).

Malaysia

Table 7a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Inflation (% per annum)	4.4	4.8	3.5	3.7	5.3	3.5	2.7	n.a.
Real GDP Growth (% per annum)	8.6	7.8	8.3	9.2	9.5	8.6	7.0	n.a.
Current Account/GDP	-8.8	-3.8	-4.8	-7.8	-10.0	-4.9	-5.8	n.a.
Budget Surplus/GDP	0.1	-3.5	-2.6	2.5	3.8	4.2	1.6	n.a.
Unemployment	4.3	3.7	3.0	2.9	2.8	2.5	n.a.	n.a.
Total International Reserves (bil. US$) /1	10.9	17.2	27.2	25.4	23.8	27.0	22.5	21.2
Official reserves/imports (in months)	3.3	4.7	6.2	4.5	3.3	n.a.	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997, Statistical Yearbook for Asia and the Pacific 1997* (UN).
/1 Total reserves minus gold.

Table 7b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Money Growth /1	16.9	29.2	26.6	12.7	20.0	25.3	17.5	8.9
Nominal GDP Growth	11.2	12.5	11.8	12.9	12.9	12.1	10.7	n.a.
Domestic Credit Growth	18.5	16.6	12.3	14.8	29.5	27.4	29.2	17.1
Growth in Credit to the Private Sector	20.6	11.2	11.6	15.3	30.5	25.7	26.8	18.2
Bank Credit to Private Sector/GDP /2	77.0	75.2	75.6	76.5	86.8	93.4	n.a.	n.a.
Deposit Rates								
nominal /3	7.2	n.a.	n.a.	n.a.	5.9	7.1	n.a.	n.a.
real /4	4.6	n.a.	n.a.	n.a.	2.5	3.6	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997*
/1 Annual % change in M2.
/2 Bank Credit to Private Sector is domestic money banks' claims on the private sector. Domestic money banks consolidates accounts of 38 commercial banks.
/3 Rate quoted for 3-month time deposits.
/4 Calculated as nominal rate less inflation.

Malaysia

Table 7c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Nominal Exchange Rate (Ringgit/US$) /1	2.7	2.6	2.7	2.6	2.5	2.5	3.9	3.6
Inflation (% per annum)	2.6	4.7	3.5	3.7	3.4	3.5	3.7	n.a.
Real Effective Exchange Rate /2	95.7	105.8	105.9	103.8	104.5	109.3	89.8	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	18.5	5.6	22.6	23.5	20.1	10.1	n.a.	n.a.
Growth of Export Volumes	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Exports/GDP	84.0	78.2	87.0	93.6	97.7	92.0	n.a.	n.a.
Growth in Exports/GDP	6.1	-4.7	11.2	7.6	4.4	-5.8	n.a.	n.a.
Growth of Nominal Import Values	27.7	-7.2	33.4	18.6	22.9	4.5	n.a.	n.a.
Growth of Import Volumes	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Imports/GDP	91.0	75.6	90.3	93.0	99.4	91.0	n.a.	n.a.
Growth in Imports/GDP	14.3	-16.9	19.4	3.0	6.9	-8.5	n.a.	n.a.
Current Account/GDP	-8.8	-3.8	-4.8	-7.8	-10.0	-4.9	-5.8	n.a.
Growth in Current Account/GDP	-319.0	57.2	-27.6	-62.5	-28.2	51.0	-18.4	n.a.

Source: *IFS* , *World Economic Outlook 1997* , OEF

/1 Exchange rate is as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

Philippines

Table 8a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Inflation (% per annum)	18.7	8.9	7.6	9.0	8.1	8.4	5.1	7.05
Real GDP Growth (% per annum)	-0.6	0.3	2.1	4.4	4.8	5.7	4.3	n.a.
Current Account/GDP	-2.3	-1.6	-5.5	-4.6	-4.4	-4.7	-4.5	n.a.
Budget Surplus/GDP	-2.1	-1.2	-1.6	-1.6	-1.4	-0.4	-0.9	n.a.
Unemployment	9.0	9.8	9.3	9.5	9.5	n.a.	n.a.	n.a.
Total international reserves (bil. US$) /1	3.2	4.4	4.7	6.0	6.4	10.0	7.3	n.a.
Official reserves/imports (in months)	2.8	3.1	2.7	2.8	2.3	n.a.	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997*

/1 Total reserves minus gold.

Table 8b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Jan-98
Nominal Money Growth /1	17.3	13.6	27.1	24.4	24.2	23.2	26.1	n.a.
Nominal GDP Growth	15.9	8.3	9.1	14.8	12.6	15.2	11.6	n.a.
Domestic Credit Growth	-2.6	17.6	131.2	19	31.3	40.3	30.82	n.a.
Growth in Credit to the Private Sector	7.3	25.4	39.6	26.5	45.2	48.7	28.79	n.a.
Bank Credit to Private Sector/GDP /2	17.8	20.4	26.4	29.1	37.5	48.4	55.9	n.a.
Deposit Rates								
nominal /3	18.8	14.3	9.6	10.5	8.4	9.7	10.2	15.6
real /4	0.1	5.4	2.0	1.5	0.3	1.3	5.1	8.5

Source: *IFS*, *World Economic Outlook 1997*

/1 Annual % change in M2.

/2 Bank Credit is Credit to the Private Sector from domestic money banks. Domestic money banks comprise commercial banks including rural banks accepting demand deposits.

/3 Time deposits of one year or more at domestic money banks.

/4 Calculated as nominal rate less inflation.

Philippines

Table 8c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Exchange Rate (Pesos/US$) /1	26.7	25.1	27.7	24.4	26.2	26.3	40.0	37.1
Inflation (% per annum)	18.7	8.9	7.6	9.0	8.1	8.4	5.1	7.1
Real Effective Exchange Rate /2	102.8	115.6	107.6	125.1	126.6	133.4	115.6	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	24.6	6.6	17.4	23.8	21.0	33.0	23.2	n.a.
Growth of Export Volumes /3	3.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Exports/GDP	29.6	29.1	31.4	33.8	36.4	42.0	46.3	n.a.
Growth in Exports/GDP	7.6	-1.6	7.7	7.9	7.5	15.4	10.4	n.a.
Growth of Nominal Import Values	13.4	13.1	27.6	15.8	23.9	35.0	19.9	n.a.
Growth of Import Volumes /3	2.0	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Imports/GDP	32.6	34.0	39.8	40.1	44.2	51.7	55.6	n.a.
Growth in Imports/GDP	-2.1	4.4	17.0	0.8	10.1	17.2	7.4	n.a.
Current Account/GDP	-2.3	-1.6	-5.5	-4.6	-4.4	-4.7	-4.5	n.a.
Growth in Current Account/GDP	62.3	30.4	-243.8	16.4	4.3	-6.8	4.3	n.a.

Source: *IFS*, *World Economic Outlook 1997*, OEF

/1 Exchange rate is as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

/3 Derived from indices of Volume of Exports and Volume of Imports (*IFS* lines 72 and 73 respectively).

Korea

Table 9a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Inflation (% per annum)	9.3	6.2	4.8	6.3	4.5	4.9	4.3	n.a.
Real GDP Growth (% per annum)	9.1	5.1	5.8	8.6	8.9	7.1	6.0	n.a.
Current Account/GDP	-3.0	-1.5	0.1	-1.2	-2.0	-4.9	-2.9	n.a.
Budget Surplus/GDP	-1.6	-2.6	-1.0	1.0	--	--	--	n.a.
Unemployment /1	2.3	2.4	2.8	2.4	2.0	1.9	2.6	n.a.
Total international reserves (bil. US$) /2	13.7	17.1	20.2	25.6	32.7	34.0	21.1	29.7
Official reserves/imports (in months)	1.8	2.2	2.5	2.6	2.5	2.3	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997*

/1 Total reserves minus gold.

/2 Unemployment figure for 1997 is as of end November.

Table 9b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Jan-98
Nominal Money Growth /1	21.9	14.9	16.6	18.7	15.6	15.8	14.1	n.a.
Nominal GDP Growth	20.6	11.4	11.1	14.5	15.0	10.8	8.0	n.a.
Domestic Credit Growth	22.4	11.7	12.7	18.4	14.7	19.4	23.3	n.a.
Growth of Credit to the Private Sector	20.1	11.5	13.3	19.5	15.6	19.8	21.5	n.a.
Bank Credit to Private Sector/GDP /2	52.8	53.3	54.2	56.8	57.0	61.8	69.8	n.a.
Deposit Rates								
nominal /3	10.0	10.0	8.6	8.5	8.8	7.5	10.8	15.9
real /4	0.7	3.8	3.8	2.2	4.4	2.6	6.5	n.a.

Source: *IFS*, *World Economic Outlook 1997*

/1 Annual % change in M2.

/2 Bank Credit to Private Sector is domestic money banks' claims on the private sector, where domestic money banks are commercial and specialized banks.

/3 Maximum guideline rate for time deposits of one year to less than two years at domestic money banks.

/4 Calculated as nominal rate less inflation.

Korea

Table 9c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Exchange Rate (Won/US$) /1	760.8	788.4	808.1	788.7	774.7	844.2	1695.8	1378.8
Inflation (% per annum)	9.3	6.2	4.8	6.3	4.5	4.9	4.3	n.a.
Real Effective Exchange Rate /2	96.6	93.0	92.8	93.2	98.5	98.6	77.2	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	13.6	14.3	12.6	17.9	26.3	8.5	27.6	n.a.
Growth of Export Volumes /3	9.9	8.4	6.7	14.9	23.9	19.8	24.9	n.a.
Exports/GDP	28.2	28.9	29.2	30.1	33.1	32.4	38.1	n.a.
Growth in Exports/GDP	-5.5	2.6	1.3	2.9	9.8	-2.1	17.8	n.a.
Growth of Nominal Import Values	21.4	8.8	7.1	22.6	27.3	18.2	15.2	n.a.
Growth of Import Volumes /3	16.7	2.0	6.4	21.6	21.2	12.6	1.5	n.a.
Imports/GDP	30.6	29.9	28.8	30.8	34.2	36.4	28.8	n.a.
Growth in Imports/GDP	1.0	-2.4	-3.6	7.0	10.6	6.7	6.7	n.a.
Current Account/GDP	-3.0	-1.5	0.1	-1.2	-2.0	-4.9	-2.9	n.a.
Growth in Current Account/GDP	-233.3	50.0	106.7	-1300.0	-66.7	-145.0	40.8	n.a.

Source: *IFS*, *World Economic Outlook 1997,* OEF

/1 Exchange rate is as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

/3 Derived from indices of Volume of Exports and Volume of Imports (*IFS* lines 72 and 73 respectively).

Singapore

Table 10a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Inflation (% per annum)	3.4	2.3	2.3	3.1	1.7	1.4	2.0	1.0
Real GDP Growth (% per annum)	7.3	6.2	10.4	10.5	8.8	7.0	7.2	n.a.
Current Account/GDP	11.2	11.3	7.4	17.1	16.9	15.0	14.0	n.a.
Budget Surplus/GDP	10.3	11.3	14.3	13.7	12.0	8.4	8.3	n.a.
Unemployment	1.9	2.7	2.7	2.6	2.7	n.a.	n.a.	n.a.
Total International Reserves (bil. US$) /1	34.1	39.9	48.4	58.2	68.7	76.8	74.4	74.6
Official reserves/imports (in months)	5.8	6.1	6.3	6.3	6.1	6.5	n.a.	n.a.

Source: *IFS*, *World Economic Outlook 1997,* Monetary Authority of Singapore, *Statistical Yearbook for Asia and the Pacific 1997* (UN).
/1 Total Reserves minus gold. 1997 figure as of end November.

Table 10b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Money Growth /1	12.4	8.9	8.5	14.4	8.5	9.8	10.3	9.4
Nominal GDP Growth	11.0	7.5	16.4	15.1	11.6	9.5	9.3	n.a.
Domestic Credit Growth	13.9	5.5	12.0	12.8	17.4	17.3	19.6	n.a.
Growth of Credit to the Private Sector	12.4	9.8	15.2	15.3	20.3	15.8	12.7	n.a.
Bank Credit to Private Sector/GDP /2	83.3	85.1	84.1	84.2	90.8	96.0	n.a.	n.a.
Deposit Rates								
nominal /3	4.6	2.9	2.3	3.0	3.5	3.4	3.5	5.2
real /4	1.2	0.6	0.0	-0.1	1.8	2.0	1.5	4.1

Source: *IFS*, *World Economic Outlook 1997,* Monetary Authority of Singapore
/1 Annual % change in M2.
/2 Bank Credit to Private Sector is domestic money banks claims on the private sector. Domestic money banks comprise commercial banks and discount houses.
/3 Time deposits of 3 months.
/4 Calculated as nominal rate less inflation.

Singapore

Table 10c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Exchange Rate (Sing.Dollar/US$) /1	1.63	1.64	1.61	1.46	1.41	1.40	1.68	1.61
Inflation (% per annum)	3.4	2.3	2.3	3.1	1.7	1.4	2.0	1.0
Real Effective Exchange Rate /2	105.2	106.1	108.1	113.2	114.8	118.6	119.4	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Export Volumes /3	13.0	8.8	17.9	29.0	15.5	6.0	7.0	n.a.
Exports/GDP	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth in Exports/GDP	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Import Values	55.2	-7.6	-0.4	116.0	15.9	-4.6	n.a.	n.a.
Growth of Import Volumes /3	7.0	6.5	20.2	14.6	12.7	6.2	8.0	n.a.
Imports/GDP	12.3	10.6	9.1	17.0	17.7	15.4	n.a.	n.a.
Growth in Imports/GDP	39.9	-14.1	-14.4	87.6	3.8	-12.9	n.a.	n.a.
Current Account/GDP	11.2	11.3	7.4	17.1	16.9	15.0	14.0	n.a.
Growth in Current Account/GDP	34.9	1.3	-34.8	131.1	-1.2	-11.2	-6.7	n.a.

Source: *IFS* , *World Economic Outlook 1997* , OEF, *Statistical Yearbook for Asia and the Pacific 1997* (UN).

/1 Nominal Exchange Rate figures are as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures are as of end period.

/3 Derived from indices of Volume of Exports and Volume of Imports (*IFS* lines 72 and 73 respectively).

Hong Kong

Table 11a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997
Inflation (% per annum)	11.6	9.3	8.5	8.1	8.7	6.0	6.5
Real GDP Growth (% per annum)	5.1	6.3	6.1	5.4	3.9	4.9	5.3
Current Account/GDP	7.1	5.7	7.4	1.6	-3.9	-1.3	-1.5
Budget Surplus/GDP	3.2	2.5	2.3	1.3	-0.3	2.2	4.2
Unemployment	1.8	2.0	2.0	1.9	3.2	2.8	n.a.
Total International Reserves (bil. US$)/1	28.9	35.3	43.0	49.3	55.4	63.8	63.4
Official reserves/imports (in months) /1	8.2	8.6	10.1	10.0	9.1	10.9	10.7

Source: *World Economic Outlook 1997*, Hong Kong Monetary Authority, *Statistical Yearbook for Asia and the Pacific 1997* (UN).

/1 Figures for 1993 reflect accounting policies adopted in 1994. Figures for 1991 and 1992 have not been restated.
1993 figures are as of end March. (HKMA)

Table 11b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Money Growth /1	n.a.	8.5	14.5	11.7	10.6	12.5	n.a.	n.a.
Nominal GDP Growth	14.8	16.6	15.2	12.6	7.3	9.9	11.3	n.a.
Domestic Credit Growth	n.a.	9.6	21.0	25.0	8.6	18.0	n.a.	n.a.
Growth of Credit to the Private Sector	n.a.	10.2	20.1	19.9	11.0	15.8	n.a.	n.a.
Bank Credit to Private Sector/GDP	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Deposit Rates								
nominal /2	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	8.5	8.9
real /3	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	2.0	n.a.

Source: *World Economic Outlook 1997*, Hong Kong Monetary Authority

/1 Annual % change in M2.

/2 Nominal rate of interest on time deposits of 12 months (not exceeding HK$10,000).

/3 Calculated as nominal rate less inflation.

Hong Kong

Table 11c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Exchange Rate (HK$/US$) /1	7.77	7.74	7.74	7.73	7.74	7.73	7.75	7.75
Inflation (% per annum)	11.6	9.3	8.5	8.1	8.7	6.0	6.5	n.a.
Real Effective Exchange Rate /2	111.2	118.1	122.5	132.6	135.3	142.4	159.1	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	18.5	20.2	13.2	11.8	15.1	4.8	n.a.	n.a.
Growth of Export Volumes	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Exports/GDP	138.7	143.0	140.6	139.5	149.7	142.6	n.a.	n.a.
Growth in Exports/GDP	3.3	3.1	-1.7	-0.7	7.3	-4.7	n.a.	n.a.
Growth of Nominal Import Values	20.5	21.5	11.7	16.7	18.8	3.1	n.a.	n.a.
Growth of Import Volumes	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Imports/GDP	132.1	137.6	133.6	138.3	153.2	143.6	n.a.	n.a.
Growth in Imports/GDP	5.0	4.2	-3.0	3.6	10.7	-6.2	n.a.	n.a.
Current Account/GDP	7.1	5.7	7.4	1.6	-3.9	-1.3	-1.5	n.a.
Growth in Current Account/GDP	n.a.	-19.7	29.8	-78.4	-343.8	66.7	-15.4	n.a.

Source: *World Economic Outlook 1997* , OEF, *Statistical Yearbook for Asia and the Pacific 1997* (UN).

/1 Nominal Exchange Rate figures are as of end period.

/2 Trade weighted relative CPI; 1990=100. Figures as of end period.

Taiwan

Table 12a: Macroeconomics

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Inflation (% per annum)	3.6	4.5	2.9	4.1	3.7	3.1	0.9	2.6
Real GDP Growth (% per annum)	7.6	6.8	6.3	6.5	6.0	5.7	6.7	n.a.
Current Account/GDP	6.7	3.8	3.0	2.6	1.9	5.2	4.2	n.a.
Budget Surplus/GDP	0.5	0.3	0.6	0.2	0.4	0.2	0.2	n.a.
Unemployment	1.5	1.5	1.5	1.6	1.8	2.6	n.a.	n.a.
Total International Reserves /1	82.4	82.3	83.6	92.5	90.3	88.0	83.5	83.6
Official reserves/imports (in months)	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

Source: *World Economic Outlook 1997,* Central Bank of China
/1 Total Reserves minus gold.

Table 12b: Monetary Policy

	1991	1992	1993	1994	1995	1996	1997	Q1 1998
Nominal Money Growth /1	19.4	19.1	15.4	15.1	9.4	9.1	8.0	8.3
Nominal GDP Growth	11.7	11.0	10.1	8.5	8.1	8.5	8.8	n.a.
Domestic Credit Growth /2	26.3	28.9	20.6	15.4	11.2	8.9	9.2	9.9
Growth of Credit to the Private Sector	21.2	28.7	19.3	16.2	10.0	6.0	8.9	9.7
Bank Credit to Private Sector/GDP	109.1	126.4	136.8	146.8	148.8	144.1	145.2	n.a.
Deposit Rates								
nominal	8.3	7.8	7.6	7.3	6.7	6.0	6.0	6.5
real	4.7	3.2	4.7	3.2	2.9	2.9	5.1	3.9

Source: *World Economic Outlook 1997* , Central Bank of China
/1 Annual % change in M2.
/2 Domestic credit figures from Central Bank of China (1992-Q1 1998 observations) consolidate the accounts of monetary institutions and the Postal Savings System. 1991 figures from *WEO.*
/3 Rates paid by banks on one-year deposits.
/4 Calculated as nominal rate less inflation.

Taiwan

Table 12c: Competitiveness

	1991	1992	1993	1994	1995	1996	1997	Mar-98
Nominal Exchange Rate (NT Dollars/US$) /1	25.7	25.4	26.6	26.2	27.3	27.5	32.6	32.9
Inflation (% per annum)	3.6	4.5	2.9	4.1	3.7	3.1	0.9	1.6
Real Effective Exchange Rate /2	98.8	104.4	97.7	96.3	94.6	96.8	90.6	n.a.
Industrial Productivity	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Growth of Nominal Export Values	13.2	1.5	12.2	8.2	19.5	8.0	10.7	n.a.
Growth of Export Volumes /3	10.9	4.0	3.9	6.1	5.7	5.2	7.1	n.a.
Exports/GDP	47.4	43.4	44.2	44.1	48.8	48.6	49.4	n.a.
Growth in Exports/GDP	1.4	-8.5	2.0	-0.3	10.6	-0.5	1.7	n.a.
Growth of Nominal Import Values	14.6	6.9	12.9	8.2	19.9	3.6	13.7	n.a.
Growth of Import Volumes /3	13.4	13.4	5.4	2.6	8.6	1.1	19.4	n.a.
Imports/GDP	42.9	41.3	42.4	42.2	46.8	44.7	46.7	n.a.
Growth in Imports/GDP	2.6	-3.7	2.6	-0.3	10.9	-4.5	4.6	n.a.
Current Account/GDP	6.7	3.8	3.0	2.6	1.9	5.2	4.2	n.a.
Growth in Current Account/GDP	0.0	-43.3	-21.1	-13.3	-26.9	173.7	-19.2	n.a.

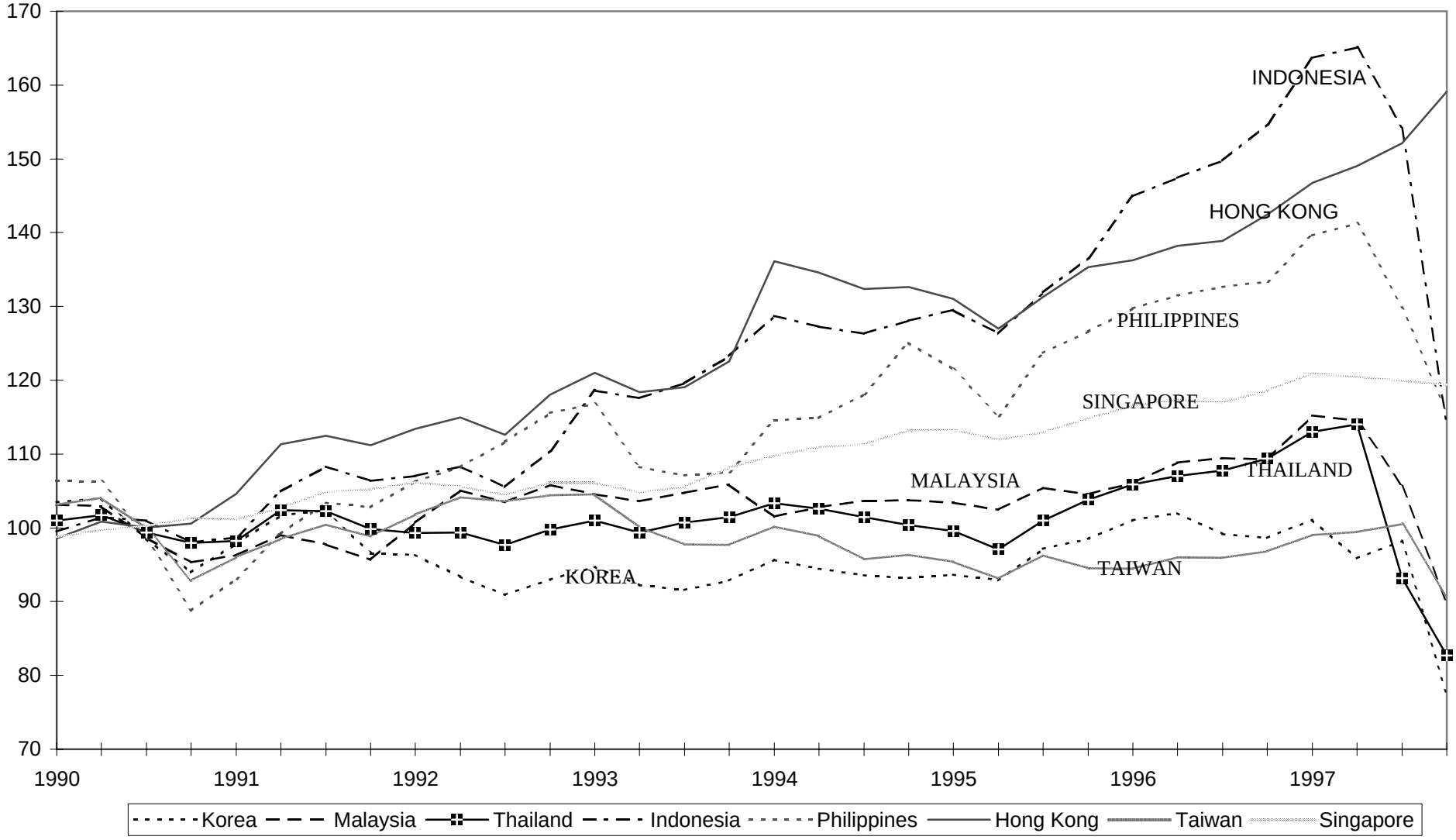
Source: *World Economic Outlook 1997* , OEF, Central Bank of China

/1 Nominal Exchange Rate figures are as of end period.

/2 Trade weighted relative CPI; 1990=100. Figure as of end period.

/3 Calculated from Volume of Export and Volume of Import (*IFS* lines 72 and 73 respectively). These trade indices are chain index numbers calculated from customs data (base year 1990=100).

REAL EFFECTIVE EXCHANGE RATES: ASIAN COUNTRIES (1990=100)



Source: OEF, Data to end 1997