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The Asian Currency Crisis - A Fait Accompli?

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- *A Fait Accompli ?*

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Abstract

This paper analyzes the East Asian Currency Crisis to examine what factors led to the crisis and the differential impact across countries. Empirical data of 7 Asian countries over the period 1990 – 1996 is examined. The sample of seven countries is divided into two categories; crisis countries and affected countries. Comparison of several economic indicators is made between these two categories to determine what factors led to the severe consequences in the crisis countries as opposed to affected countries, all of which were subject to contagion.

The crisis countries were found to have had aggressive growth policies that were fuelled by reflationary strategies; particularly rapid monetary growth and capital inflows. With higher relative inflation and repressed interest rates, exchange rate equilibrium as dictated by purchasing power and interest rate parities were out of line given pegged exchange rates. The currencies had become overvalued. The result being current account deficits that were financed by capital inflows, increasingly in the form of short term foreign currency denominated loans.

The combined impact of all of this had been to increase the crisis countries' vulnerability to a speculative attack and a resulting self-fulfilling crisis.

In the annals of Asian economic history, July 1997 is likely to go down as the month of infamy. What began as a speculative attack on the Thai Baht quickly spread as "Contagion" to the Philippines, Indonesia, South Korea and Malaysia. Singapore and Taiwan were affected too, but to a much lesser degree. Hong Kong – the citadel of Asian capitalism saw some spectacular attacks and an equally spectacular defense of the Hong Kong dollar. The quickness and the severity with which the currencies fell caught many by surprise. Within a three-month period (July – October 1997), the Baht had fallen close to 40%, the Philippine peso and the Ringgit by about 27% and the Indonesia Rupiah by 40% against the US Dollar. South Korea saw its Won fall almost 35% against the US Dollar in the same period.

What began as a speculative attack on currencies quickly turned into a stock market meltdown and triggered a regional banking crisis. Official reaction has gone from one of shock to anger and on to despair. Contagion and currency manipulation were pointed out as the culprits. Central banks began the crisis with valiant attempts at defending their currencies but quickly gave up and chose the alternative of floating their currency. Governments, outside of Thailand have chosen to blame the crisis on contagion. The contagion argument has been popular, particularly in official circles for it deflects attention from policy problems that there might have been. The contagion argument portrays the problem as one of a bystander caught in an avalanche caused by currency speculators. While the contagion argument is a plausible and relevant one, it ignores the many differences among the Asian economies that have suffered. Furthermore, the contagion argument glosses over the underlying macro economic weaknesses that were evident.

Objective and Motivation

The objective of this paper is to analyze the East Asian crisis to examine what factors led to the crisis and what lessons could be learnt for the future. What makes this crisis interesting is that it does not conform with the classic speculative attack models. In the models (notably; Krugman, 1979), the causal agents are usually profligate governments (large budget deficits), low growth rates, low savings, low investments and high inflation. None of these was the case of the East Asian countries. If anything, these countries, going into the crisis, had surplus budgets, had high savings rates, low inflation, high growth rates and very high investment rates. Still, despite these differences there were many similarities in the symptoms/indicators between the Asian countries and that of previous financial crises – notably Mexico.

With the exception of a handful of scholars (Krugman, Alwyn Young), the international finance community had by and large applauded the very policies that are now being criticized. Free marketers had pointed to the open markets and liberalizations that these countries had undertaken as the reasons for their success. Proponents of interventionist policies had cited the industrial policies, most notably that of South Korea's. Even Krugman's TFPG argument predicted only a slowdown in growth not a financial crash. So, what is it that caused the crisis? Was it irrational markets and bad equilibria or were there fundamental weaknesses in macro economic policies? This paper will argue that it was a combination of both and then some. The paper is divided into 6 sections. Section 2 below, provides a review of the relevant literature. Section 3, gives an overview of the Asian currency crisis while Section 4 examines indepth some of the key causal factors. The fifth section examines issues of Vulnerability, Herding Behaviour and Self-fulfilling crisis. The section also makes a comparison between the Mexican Peso crisis of 1995 and the current Asian one. The importance of multiple policy options in defending currencies is shown by comparing the case of Hong Kong with Malaysia. The final section, section 6, concludes.

Section 2.0

2.1: Literature Review

Economic models and theories of currency crises appear to have undergone an evolution over time. The first generation models, beginning with Krugman (1979), view currency crises as speculative attacks resulting from deteriorating fundamentals. When the underlying fundamentals are inconsistent with the pegged exchange rate a speculative attack results. The original model of pegged rates has been extended to include currency bands, crawling pegs etc..[1] Indicators of a potential attack would be excessive monetary growth, budget deficits, declining competitiveness, current account deficits and reserve losses. Though straight forward in implication, these models could not explain currency crises that took place even when there were no monetary excesses or budget deficits. This led to the development of a second generation of models which included the role of expectations and self fulfilling speculative attacks. Here, countries become vulnerable to attacks when their fundamentals have deteriorated to certain levels sufficient to trigger a speculative attack.

In seeking to explain currency crashes in the spirit of first generation models, Frankel & Kose (1996), examine annual data for 100 countries over the 20-year period 1971 to 1992. They examine 16 economic indicators encompassing four broad categories which they classify; Macroeconomic indicators, External variables, Debt composition and Foreign variables. Using an event-study methodology for a 3-year period before and after a crash, they analyze 117 currency crashes. They find that there were several common features of crash countries. These countries had high levels of debt, most of which was financed by commercial banks, on variable interest rates and of short term maturity. FDI inflows had significantly tapered off just before the crash but the slack had been taken up by short term capital inflows. Crashes were often preceded by rising interest rates in developed countries. Crash currencies were overvalued by at least

10%, international reserves were low and falling. Domestic credit growth had been rapidly increasing while output growth per capita had been falling. Though the countries had current account and budget deficits, these deficits were found to be shrinking just before the crash.[2]

Goldfajn and Valdes (1997) examine whether overvaluation and expectations are predictors of currency crises. Using a simple CPI adjusted measure of overvaluation, they find that overvaluations are good predictors of impending crisis. However, using survey data of expectations, they find that exchange rate expectations cannot predict crises. Forecasters had been surprised by crashes. This results are certainly contradictory. Rational traders/investors would incorporate the overvaluation in forming their expectations. Based on these contradicting results, the authors conclude that currency crises are largely unpredictable events.

Calvo and Mendoza (1996), argue that the Mexican Peso crisis of December 1994 is an example of a new kind of BOP crisis in an era of liberalized financial markets and global capital flows. They argue that contrary to classic models (first generation models), the Peso crisis did not have its roots in fiscal deficits nor imbalances in capital flows. Instead, the problem had its roots in 2 key areas. (1) imbalances in the *stock* of liquid financial assets versus gross reserves and (2) herding behavior that leads to self fulfilling attacks. An over expansion of central bank credit had led to large gaps between M2 measured in dollars and gross foreign reserves, additionally, there was also a large gap between outstanding amount of *short term* public debt and gross reserves. (Short term debt being approximately 3 times more). These had been financed with foreign capital inflows. Though the existence of such gaps need not necessarily set off a crisis, they certainly increase the vulnerability of the pegged exchange rate to exogenous shocks. Given the imbalances a sudden shock can quickly drain reserves and thereby make the fixed exchange rate unsustainable.

Given the rapid credit expansion, domestic banks were overexposed. In the event of a shock, the central bank would have to choose between raising interest rates to defend the peg which would mean allowing domestic banks to collapse or keep a lid on interest rates, safe the domestic banking sector and let the currency devalue. A falling currency would of course hurt the foreign investors who had financed the short term capital inflows.

In the event, it was expectations that the central bank would choose to save the banks and not the exchange rate that set off the massive outflows that caused the precipitous fall in the Peso. The authors argue that it was a self fulfilling attack within a framework of herding behavior on the part of investors.

Sachs, Tornell and Velasco (1996), explore why some emerging markets were hit by financial crisis in 1995 while others were not. They seek to find a set of fundamentals that could explain contagion. They argue that Mexico's crisis was one of a self-fulfilling speculative attack which then let to contagion in countries such as Argentina, Brazil and the Philippines. They test several hypothesis to examine why contagion affected some countries and not others. They show that while Mexico and the earlier mentioned countries were affected, others such as Malaysia, Thailand and Indonesia which had 'worse' fundamentals (larger current account deficits for example) were unaffected.

Analyzing data for 20 emerging markets, they argue that for contagion (and crisis) to happen there must have been some *'degree of previous misbehavior'*. Typically, this 'misbehavior' constituted three policy areas (I) having maintained an overvalued exchange rate (II) having had lending/domestic credit booms and (III) having low reserves relative to short term commitments of the central bank. Countries that had misbehaved in these three key areas were found to have suffered contagion while those that did not have these shortcomings suffer from minimal or short lived contagion. The authors argue that prudence in managing exchange rates and the banking systems appears to pay off in reduced vulnerability.

Despite larger capital inflows, the authors find that the Asian emerging countries seemed better able to absorb the inflows without substantial domestic inflation. They argue that these could be due to the better fiscal restraint of these countries.

In a similar vein, Otker and Pazarbastoglu (1997) in analyzing episodes of pressures on select ERM currencies suggest that speculative pressures are associated with a deterioration in economic fundamentals. Expansionary credit policies and widening government deficits appear to trigger speculative attacks and lead to increased probability of devaluations. However, they find that while consistent macroeconomic policies are necessary for maintaining pegs, they may not necessarily be sufficient.

Mc Kinnon & Pill (1998) use a Fisherian Model of the 'overborrowing syndrome' and compare the overborrowing episodes of the Asian Crisis countries with that of Mexico and Chile. They argue that while important similarities exist, the Asian crisis has been exacerbated by the unhedged foreign exchange positions of Asian banks. Overborrowing has serious macroeconomic costs and the authors argue that improving the institutional infrastructure of financial supervision is the only effective way of mitigating such costs.

Section 3.0: What Went Wrong in East Asia

In this section, we examine in depth the East Asian currency crisis. The analysis is carried out using annual data over the seven-year period 1990 to 1996.[3] A total of seven East Asian countries are studied. These being, Thailand, Indonesia, South Korea, Malaysia, Singapore, Hong Kong and Taiwan. In much of the analysis that follows; the sample of seven countries are divided into two categories; *crisis-countries* and *affected countries*. The first four countries which had the most severe impact are categorized as crisis countries while the latter three, for want of a better terminology – affected countries.[4] Except where otherwise stated, all data were derived from Datastream International.

The section is arranged as follows, we begin with a brief overview of the Mexican Peso crisis of 1995. This is done solely to provide perspective and to draw parallels between that crisis and the East Asian one. This is followed by an overview of factors leading to the crisis in Asia. We then examine in depth the 'causal' factors.

The Mexican Peso crisis; Asia's wakeup Call ?

The period leading up to the crisis in December 1994 had been a prosperous one for Mexico. The country had recovered from the 'lost decade' of the 1980's. The 1986 oil price collapse had been the last of a series of economic shocks that the country faced in the 1980's. In December 1987, the government had formulated an exchange rate based stabilization program. Aside from imposing monetary and fiscal discipline, the program undertook aggressive trade liberalization, deregulation and privatization of several public enterprises.

By 1988 the economy had recovered sharply. Over the six year period preceding the crisis, 1988 – 1994, GDP growth had been robust with consumption growing at 30% and investment growth 70%.[5] With such rapid growth in consumption and investment there clearly had to be a savings – investment gap. This gap was being financed with imports, which had grown 300%, M2 which increased more than 200% (both over the six years) and large capital inflows.

There were three consequent problems as a result of this. First, the current account deficit ballooned from $6 billion in 1989 to approximately $20 billion by 1993. (7% of GDP). Second, the even larger capital inflows meant that net reserves were increasing rapidly and given the crawling peg, domestic money supply had to increase. As a result inflation was being fueled. With the crawling peg not adjusting sufficiently to the inflation differential with the US; the Peso was gradually being overvalued. By 1994, the real exchange rate against the US$, was overvalued by about 35% in terms of relative CPI.

The third problem was that of a serious maturity mismatch. The capital inflows over the six years were roughly 25% in the form of FDI, another 25% or so in the form of stock market investment and the largest, 50% in the form of short term bond purchases (cetes). Part of the reason for the huge bias in short term instruments had to do with the central bank itself. In its efforts to sterilize the capital inflows, the central bank, in the absence of a well developed domestic bond market resorted to selling short term bonds. Yet, the money was being used to undertake long term infrastructural needs.

Though GDP growth had begun to taper in 1994, the government's fiscal balance was still in surplus. For the full year prior to the crisis, the government reported a fiscal surplus equivalent to about 1% of GDP. (As opposed to a 11% deficit in 1988). Reserves were at record levels. Still, the higher inflation and interest rate levels relative to the US, meant that the exchange rate was out of line. Despite widespread rumors that a devaluation was in the offing, the central bank held to its crawling peg schedule. The political problems preceding the 1994 presidential elections did not help matters. The markets were jittery. On Dec. 20, despite consistent previous denials, the central bank announced a 15% devaluation against the US$. The Peso was set at 4.0 against the Dollar.

Ironically, it was the devaluation itself that set off the crisis. It was felt that the devaluation was too little too late. As late as November 94, both M1 and M2 had been increasing rapidly. Following the August elections, the Mexican central bank had actually moved to reduce interest rates. Yet, any consideration of a devaluation was denied. So, when the announcement came, the government lost its credibility, and there was a loss of confidence. A massive capital outflow ensued. Since the earlier capital inflows had been mostly of a short term nature, it was easy to move funds out. What began initially with foreign investors and fund managers quickly led to Mexican citizens selling the Peso. A mere two days after announcing the devaluation, the government on Dec. 22 announced that it was allowing the Peso to float. The Peso plunged, interest rates soared, reserves were

quickly lost to even further capital outflows. Within the week, the Peso was at 5.3 against the Dollar. A 25% depreciation within a week.

The East Asian Crisis

East Asia'a financial crisis began with the speculative attack on the Thai Baht in May 97. Despite attempts by the central bank, the Thais were forced to float the Baht on 2nd July. Pressure built on the Ringgit and other regional currencies. A little over a week later, the Philippines was forced to float the Peso and in August the Indonesian Rupiah was also floated. All four currencies had been on pegged exchange rate regimes. By Feb. 98, the Ringgit and the Peso had lost close to 40%; the Baht 45%, the Won 50% and the Indonesian Rupiah some 75%. The Singapore dollar and the NTD had fallen approximately 17% while the HK$ had remained unchanged. For a region that had had the fastest growth rates and been dubbed "miracle" economies this was a bitter experience.

In what follows we begin with an overview of what led to the crisis and then examine in greater detail the main causal factors. Table 1 below shows nominal GDP growth over the 7 year period 1990 – 96 for our sample East Asian countries. Each of the crisis countries; Thailand, Indonesia, South Korea and Malaysia, has had double digit growth rates exceeding 11% in each year. The average annual growth for these countries is approximately 12.5%. In cumulative terms, each country has more than doubled its GDP in 1996 compared to 1990 levels. For the affected countries group; Singapore, Hong Kong and Taiwan growth had been slightly less. Average annual growth for these countries is a shade less than 10%. Note that Taiwan has had the slowest annual and cumulative growths while Indonesia the highest. In cumulative terms Indonesia had been growing more than twice that of Taiwan.

Table 1

1990 – 96 Nominal GDP Growth %

	Cumulative Compounded Growth	Compounded Annual Growth
Malaysia	116%	11.63%
Thailand	110.6%	11.22%
Indonesia	172.3%	15.4%
South Korea	117.4%	11.7%
Average		12.5%
Singapore	95.4%	10.04%
Hong Kong	105%	10.8%
Taiwan	73.6%	8.2%
Average		9.68%

Growth in East Asia had been very rapid since 1987. Following the recession of the mid 80s, GDP growth had steadily risen to peak in 1993. (See Table A1, Appendix). From 1995 there had actually been a slight dip in growth rates. Were these growth rates sustainable? If investment is what drives GDP growth, rapid GDP growth would require increased investment financing. Just as a company experiencing rapid sales growth would have constantly increasing funding requirements, investment expenditure has to be rapidly increasing to drive GDP growth.

Though we do not see much of a difference in growth rates between the group of crisis countries and affected countries, the key to understanding what made the difference in severity of crisis would be in *how the growth was financed*. As we will see later, there was a major difference between the two groups in financing growth. Aside from this, a number of unfavorable factors were impacting the region. Internally, the countries were facing infrastructural bottlenecks, wage pressures were rising and there was an overall reduction in competitiveness.

Externally, the opening up of countries like China, Vietnam, etc. were also working against the crisis countries. The computer hardware sector suffered a slump in western demand in 1995 causing serious problems within the region's critical electronics industry. Additionally, China's devaluation of the Renminbi by 33% in 1994, the weakening of the Yen in 1995/96 and Japan's prolonged descend into a downturn did not help matters. In the face of such constraints, it would have been prudent to have adopted a slower growth strategy. But it was not to be. Average growth for 1996 for the crisis countries was 12%.

The growth pump was being primed by three broad means; (1) rapid domestic monetary growth, (2) large current account deficits and (3) capital inflows. Each of these means had its accompanying problems. For example, the monetary growth led to inflationary pressures and artificially low interest rates. In the face of pegged exchange rates these were causing deviations. The currencies had all become overvalued. The combination of events and policy stance had set the exchange rates up for a fall. A number of warnings had been present. Following the Mexican crisis, regional currencies came under attack in early 1995. Successful defense by the central banks had maintained the pegs. The IMF it appears had also warned several countries in the region, particularly Thailand. Yet another signal was the slump in stock market indices. Thailand had seen heavy selling and a falling stock index as early as mid 1996. Still, what was surprising was the speed with which things unraveled with the speculative attack on the Baht in July 97.

Given the breadth of the crisis, it will be foolhardy to point to any one factor as the cause of the crisis. The differences in economic structure and profile even among the crisis countries cannot be ignored. Yet, there were many similarities among them. We now examine some of these commonalties and make the case for why they mattered.

Section 4

4.1: Monetary Policy: Rapid Expansion

Even a cursory observation of the fiscal and monetary data points to a clear contradiction. None of the countries in our sample had any serious fiscal deficits. On average, over the 7-year period all the governments have had fiscal surpluses. Where there are deficits they are infrequent and of insignificant size. Essentially, these governments have not in any way been profligate, if anything, strictly from a fiscal viewpoint, they have been prudent. The same however cannot be said of their monetary policies. Table 2 below shows the growth in Monetary Aggregates M1 and M2.

Table 2

1990 – 96; Nominal Monetary Growth %

Country		M1 Compounded Annual Growth (%)	Cumulative Growth (%)	M2 Compounded Growth (%)	Cumulative Growth (%)
Malaysia		13.7	145.6	15.5	174
Thailand		11.7	117	13.6	143.7
Indonesia		15.2	169	19.2	241
South Korea		13.9	148.6	14.6	160
	Average	*13.7*	*145*	*15.7*	*180*
Singapore		8.5	77	8.8	81
Hong Kong		10.6	102	11.1	109
Taiwan		4.9	39.6	12.3	125
	Average	*8.0*	*72.9*	*10.7*	*105*
United States		4.53		2.14	

The rapid growth in the monetary aggregates is clearly evident. In the case of M1, Taiwan has the lowest annual growth rate and the lowest cumulative growth. At the opposite end is Indonesia with 15.2% annual growth and 169% cumulative growth. (Recall from earlier that Indonesia had had the fastest GDP growth while Taiwan the lowest). As a group the affected countries have 8.0% average annual M1 growth compared to 13.7% for the crisis countries. Cumulative growth in M1 is 73% and 145% respectively. The crisis countries therefore have had approximately 71% higher annual growth of M1 and in excess of 100% higher cumulative growth relative to the affected countries group. M2 tells a similar

story. As a group, the crisis countries have had approximately 50% higher annual M2 growth and 71% higher cumulative growth.

What would the impact be of this much looser monetary policy? Table A2 in appendix shows real GDP growth for the sample countries. Comparing the real growth rates to monetary growth shows the extent of policy looseness. For the crisis countries, average annual growth in *both* M1 and M2 has been more than twice the *growth* in real GDP. When monetary growth is much faster than real GDP growth, the obvious result will be inflation. This is borne out in Table A5 of the Appendix. Crisis countries as a whole had an average inflation rate of 5.75% per year while the other group had 4.35%. These numbers however do not seem to reflect the much higher money supply aggregates for the crisis countries. There are two reasons for this. The first, has to do with Hong Kong's CPI numbers. Notice that at 7.2% annual inflation it is much higher than Singapore and Taiwan. This increases the average for the affected countries. Excluding Hong Kong, we get a realistic 3% CPI growth average for that group. A second reason, aside from problems of CPI measurement is probably the absorption argument. Sachs (1995), argues that absorption rates tend to be better in labor intensive as opposed to capital intensive economies.

4.2: Repressed Interest Rates

If nominal interest rates are positively correlated to inflation rates than they should reflect the inflation premiums. Yet, many economists have pointed out that one of key problems in East Asia has been repressed interest rates. Interest rates were said to have been kept artificially low – partly through official mandate and intervention and partly through rapid money supply growth. We have seen the growth in monetary aggregates, to see if interest rates have indeed been repressed

the following stylized technique is used. The absolute percentage change in nominal interest rate[6] is computed yearly. The average of this absolute percentage change for the 6 years is then determined. In an idealized situation, the average percentage change in nominal interest rate over the 6 years should equal the average annual inflation rate over the period. The results are shown in Table A6, Appendix. In all cases, nominal interest rates did not keep pace with inflation. As expected the deviation is highest for Indonesia, Korea and Thailand. Among affected countries Hong Kong again sticks out. It appears from these results that interest rates have indeed been lower than they should have been.

4.3: Rising Expectations and Asset Inflation

Consider the implications of our discussion thus far, when we have an environment of rapid GDP growth accompanied by rapid growth in money supply and repressed interest rates, it sets off dynamics that initiates a host of other problems. One would be rising expectations or even "irrational exuberance" in a boom time atmosphere. The problem here is that rising expectations can become self-fulfilling. If asset prices are determined as the present value of future cash flows discounted with adjustment for growth rates, it is easy to see how a

combination of rising expectations and repressed interest rates can set off a feeding frenzy. Suppose, cash flows from an investment increase at some rate g; then an asset's price would be given as;

$$P_o = \frac{CF_1}{k - g}$$

Where; P_o = Market price of asset.

  CF_1 = is the expected cash flow in the forthcoming period.

  k = cost of funds

  g = growth rate of future cash flow *(Note: Mathematically it can be shown that g will equal capital gains).*

Rising expectations could mean that cash flows in the immediate forthcoming period *and* subsequent periods are *expected* to increase. This means both CF_1 and g increase. If the stock of available investible funds is unchanged (assuming money supply is neutral), K, the cost of funds increases since there is increased competition for funds given rising expectations. This acts as an automatic stabilizer since the increases in CF_1 and g, will be offset or at least muted by the increase in K. Asset prices remain unchanged or at best, experience marginal increases. However, what would happen if money supply is rapidly increasing thereby increasing the available stock of investible funds? The result would be to keep K at the same rate or worse reduce the cost of funds. The overall impact would be steadily increasing prices. With realization of the previous period's capital gains (g), expectations rise even further, feeding on itself and we have an asset inflation or worse, the making of an asset bubble.

There are two related problems to asset price inflation. The first is that with rising capital gains returns, it mostly leads to overinvestment. Thus, the average investment to GDP ratio approximates 40% for the crisis countries. Aside from the fact that all these investments have to be financed, there is a more serious problem. This second problem is that of a misallocation of resources. Because asset inflation is more often isolated to certain sectors, particularly those that are malleable to speculative activity – such as the stock market and the real estate/property sectors, there is usually a misallocation of resources. Funds flow into these sectors attracted by the easy/quick returns. As these are non tradeables, the tradeables sector suffers. To a large extent the problems of East Asia have to do with asset inflation and overinvestment particularly in the real sector/property sector. The problem was most acute in Thailand and Indonesia and to a much lesser extent in Malaysia. In Korea, the problem appears not so much to have been speculative asset inflation but one of overinvestment in production capacity. Despite huge overhangs in capacity, the Chaebols invested heavily in additional capacity. This was in industries such as Autos, Iron & Steel, Cement, Chemicals, Semi Conductors etc. all of which already had excessive capacities. The idea was

to gain market share through the increased price competitiveness afforded by reaping scale economies.

Table A7 in Appendix provides some indication of the extent of overinvestment. The measure used is the Savings – Investment Gap. There is a marked difference in the S-I gaps of the crisis countries compared to affected countries. Whereas the latter group of countries shows strong positive gaps, the crisis countries with the exception of Indonesia which is marginally positive, all have negative gaps. Thailand, Malaysia and South Korea have had negative gaps in *everyone* of the seven years. With aggregate domestic savings averaging in excess of 30% of GDP, the negative gaps are *not* by any means the result of anaemic savings rates but clearly of overinvestment.

4.4: Credit Booms & Overextended Banking Sectors

The link from growth in monetary aggregates, (M1, M2) to investment growth works through bank credits. Average annual growth rate in bank credit to the private sector in the crisis countries has approximated 20%.[7] This compares with average M2 growth of 15.7% per year and GDP growth of 12.5%. As an order of magnitude, a 20% annual growth rate *doubles* the total outstanding loan amount every 3.8 years. Domestic credit growth over the 7 year period is shown in Table A8. Both Thailand and Indonesia have had annual average growth of 21% and 25%. Malaysia and South Korea have had slightly lower rates of 19.5% and 17.7% respectively. The result of such rapid credit growth in the crisis countries has been two fold. First, the banking sector has overextended and second, the corporate sector over leveraged. On the surface, it is hard to understand why hard nosed bankers and rational corporate treasurers would have allowed this to happen. The key is in the composition and type of loans created. Most of the loans it appears were of short term maturity and carried floating interest rates. Furthermore, they had largely been collateralized. Add to this the fact that there are implicit and explicit guarantees of bailouts and we can see why over lending makes sense to bankers.

From a banker's viewpoint a shorter term loan carries less credit risk. A floating rate loan eliminates all interest rate risk to the banker since he simply passes it on to the borrower. Additionally since the loan is collateralized he perceives little default risk. From a corporate treasurer's viewpoint such loans make sense for a number of reasons. Ideally, he should want longer term rather than short term loans to match the maturity of his investment projects which are typically medium to long term. However, in the absence of long term bond markets and infantile equity markets, the bank loans make sense. Though floating interest rates increase his exposure to interest rate movements, he is still better off in cost of fund terms. Since the cost of equity is almost always higher than the cost of debt, while rising interest rates would mean higher cost on the bank loan, the cost of equity would be even higher had he used equity financing instead.[8] Finally, when the assets he

provides the banker have been grossly overvalued because of asset inflation and second and third charges are possible on the same assets, the bank loan makes good sense.

When the above relationship continues for some time, overinvestment is the result. Companies faced with cheap and easy credit begin undertaking marginal projects. Project risk assessments get ignored. Companies become over leveraged since the proportion of their debt to equity becomes overbearing. In Korea for example, the average debt to equity ratio for the Chaebols just prior to the crisis was 400%.[9] Excessive leverage causes a number of problems to companies. It increases the volatility of company cash flows, increases break-even points[10] and magnifies earnings and losses. The net impact is to increase the vulnerability of the leveraged firm to even small reductions in revenue growth. When the corporate sector becomes vulnerable because of excess leverage, the banking system becomes vulnerable too.

As with most other things, when leverage gets beyond a certain point, it creates yet another problem; that of perverse incentives – or more commonly known as moral hazard. Decision makers in highly leveraged firms will have the incentive to take on consistently higher risk projects, even if the projects do not make economic sense. Since the equity stake is small, shareholders and their agents, the managers, face little financial loss (relative to the lenders) in the event of failure but stand to gain substantially as residual claimants if the project succeeds. It is this disproportionate distribution of returns that induces perverse incentives and aggravates the moral hazard problem. There is a flip side to this argument. Just as corporations stand to loose little in the event of investment failure, bankers too stand to lose little in the face of deposit guarantees by the government. Bankers therefore would have the incentive to lend even to risky projects partl because they have received collateral and partly because their depositors funds are "guaranteed".

Loose monetary policies aside, the problem of overextended banks has also to do with the way banking is conducted in East Asia. Asian bankers still appear to make loan decisions on the availability of collateral rather than the strength of project cash flows. The emphasis on collateral rather than cash flows is probably the best explanation why rational bankers seem so exposed to ill conceived projects. When bankers find safety in collateral rather than cash flows, there are no checks to asset price inflation and credit expansion.

What happens when we have a corporate sector that is highly leveraged, has interest rate exposure, faces serious maturity mismatches[11] and a banking sector that is over exposed to this same corporates? The result is twofold. First, we have a highly vulnerable economy and second, a vastly reduced number of options available to policy makers in the event of a crisis.

4.5: The Problem with Pegged Exchange Rates

Everyone of our sample countries have had some form of pegged exchange rate policy to the US dollar. Hong Kong has a currency board system with the HK Dollar at a fixed peg to the US dollar. The other countries have policies that peg their currency within narrow bands to the USD. The objective of pegged rates to the Dollar makes sense in that it keeps the domestic currency stable and thereby reduces the currency exposure of domestic importers and exporters, an important consideration for the sample countries all of which are reliant on foreign trade. However, pegged exchange rate systems require careful management to avoid problems. There are several problems associated with maintaining pegged rates and the difficult part is that they have an insidious way of creeping in unnoticed. A first problem is that a policy to maintain a peg reduces domestic policy flexibility – particularly monetary policy. To maintain a peg, domestic policies must be in line with those of the country to whose currency the domestic currency is being pegged. Deviations would put stress on the pegged rate. If policies have deviated sufficiently to cause underlying economic fundamentals to be very different, the pegged rate becomes vulnerable to a speculative attack.

A second problem is that, as a result of the peg, the domestic currency becomes over or undervalued against other currencies as the peg currency moves. With policy makers focusing attention on movements against the peg currency, appreciation/depreciation against the other currencies often do not get due attention. Overtime, the nation's competitiveness gets eroded and it shows up as Current Account and Balance of Payments problems.

A third and perhaps the most insidious form of problem is when the domestic currency gets to be overvalued in real terms eventhough the nominal exchange rate is at or near the peg rate (i.e. within the band). This typically happens when domestic policies have been much 'looser' than that of the pegged country. It is this kind of problem that increases a currency's vulnerability to attack.

All four of our crisis countries faced the abovenamed three problems. First, over the period 1995 – 1997, the US$ had appreciated gradually against other currencies. This had to do with strong economic fundamentals and low inflation rates in the US. As such the pegged currencies also appreciated against other currencies. This certainly affected the export competitiveness of these countries. Part of the increases in current account deficits were probably due to this currency appreciation. The second problem of deviating economic policies was also evident. The crisis countries, undertook policies that were far more expansionary than that of the US. This is particularly evident in the case of M2 growth. Recall from Table 2, that the average annual M2 growth for the seven year period for these countries was 15.5%. This compares with 2.14% for the US. This means that the annual difference in monetary growth is more than 7 times. Obviously with these levels of deviation, exchange rates had to change. However, the fact that nominal exchange rates were maintained near peg levels meant that real exchange rates became overvalued. This is accentuated further by deviations in inflation rates. Recall from Table A5 that the average annual inflation rates were 5.75% for crisis countries and 2.6% for the US. At these rates, Purchasing Power Parity would have required the Asian currencies to devalue. That they were pegged meant overvaluation. To determine the extent of exchange rate deviation from parity, real exchange rates were computed for each country. This was determined using the standard Purchasing Power Parity (PPP) equation as;

$$e^* = e_o \left[\frac{1 + i_h}{1 + i_f} \right]^t$$

e^* = The parity exchange rate for 1996.

e_o = Average exchange rate for 1990.

i_h = Average annual home country inflation for 1990 – 96.

i_f = Average annual inflation for US.

The % over or undervaluation was then computed as; $\left(e^* - \frac{e_o}{e_o} \right) \cdot 100$

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Table 3

Real Exchange Rate Overvaluation (%)
As at Dec. 1996

Malaysia	12.5%
Thailand	31.3%
Indonesia	75.1%
South Korea	35.4%
Singapore	(21.4)% undervalued
Hong Kong	28.07%
Taiwan	6.8%

Not surprisingly, everyone of the crisis countries' currencies have been overvalued by the PPP yardstick. The Ringgit has the least overvaluation while the Rupiah the highest. Both the Thai Baht and the Korean Won are overvalued in excess of 30%. The Singapore Dollar is *undervalued* by about 21% , while Taiwan's NTD marginally overvalued. Note that once again Hong Kong is different within the affected countries group. The HK Dollar is overvalued by some 28%.

4.6: Current Account Deficits & Capital Inflows

Current account deficits have been pointed out as one of the key reasons for the currency crisis. This issue is analyzed in Table A9 in Appendix. The table shows the current account deficit as percent of nominal GDP. Everyone of the crisis countries have had on average a current account deficit. For the year 1996, Thailand and South Korea have deficits of 8% and 6%, while Malaysia approximately 5%. In comparison, the average for the affected countries shows strong surpluses. Singapore has had the highest with an average 12% current account surplus for the 7-year period. Hong Kong had a 2% deficit in 1996 despite strong surpluses in the early 90s.

Based on our analysis thus far, the current account deficits should not be surprising. A number of reasons can be cited as causal factors. First and foremost is probably the high growth strategies of these countries. As mentioned earlier, the push for rapid GDP required heavy investment growth. From a theoretical viewpoint, a country is likely to run current account deficits if it has a savings – investment gap. Essentially, the savings – investment gap reflects the net imports needed to finance the gap. Slowing GDP growth to equate domestic savings to needed investments would reduce the current account deficit but a high growth strategy would increase it. Though East Asia is legendary for its high savings rate (approximately 30% of GDP), as pointed out earlier, Gross Investments as percent of GDP has averaged 40% in the 7-year period.

A second obvious reason for the deficit is the currency overvaluation. Overvalued currencies encourage imports by making imports cheaper relative to domestic prices and can act to discourage exports priced in foreign currency by making domestic currency proceeds less, relative to domestic prices. As a result of this distorted price signals, the net impact of a consistent overvaluation would be severe current account deficits.

In addition, the huge consumption boom that resulted from rising incomes and the heavy capital imports needed for investment projects were also contributory factors. A final factor has to do with the tradable/non-tradable sectors. As was argued earlier, much of the overinvestment flowed into areas such as property development, real estate and infrastructure. Unlike investments in tradables that increase production capacity and therefore export capacity, expansion in non-tradables does not. Yet, if such investments necessitate capital imports, current account deficits are likely.

The flip side of a current account deficit is a capital account surplus. Holding reserves constant, a current account deficit must be matched by a capital account surplus. What this implies is that; the net imports of the current account will have to be financed by foreign capital inflows. As such, all our crisis countries have had capital account surpluses; meaning strong capital inflows. Large capital inflows in itself is not a problem. It is the form and composition of the inflows that really matters. Inflows in the form of Foreign Direct Investment (FDI) are long term in nature and add to productive capacity. However, inflows in the form of Portfolio Investments or short term deposits/borrowing can be destabilizing. Tracing the composition of capital inflows from the mid 1980s on; shows an increased reliance on short term inflows. Though FDI inflows still constituted a major portion, short term inflows in the form of portfolio investments and borrowing were increasing. Tables A11, A12 and A13 of Appendix show the increased reliance on loans and the composition of these loans. In each case we see a gradual increase in total Foreign Loans both in absolute terms and as percent of GDP. Total foreign loans as a percentage of GDP approaches 40% for Thailand and exceeds 25% for Indonesia and South Korea. Malaysia's foreign loans stand at 22% of GDP as at December 1996. Table A13 shows the composition of these loans. Short term loans constitute more than two thirds of total loans for Korea. Thailand's exceeds 65% while Indonesia's is at 59%. Clearly, in all four cases, there has been a heavy reliance of short term inflows.

Though both portfolio and short term inflows constitute liabilities of a temporary nature for recipient countries, the latter involved an additional risk dimension, that of currency risk. In portfolio investments, foreign mutual funds in order to purchase equity instruments had first to convert their currency to domestic currency. Thus, the foreign mutual funds carried both the price risk and exchange rate risk. In the case of short term inflows however, it was largely the result of private sector borrowing. These were foreign currency denominated (largely US$) loans. With such US Dollar denominated loans, the borrowing corporations were faced with exchange rate risk in *addition* to their being leveraged. There was yet another, perhaps more dangerous dimension to these short term inflows. Domestic banks were also getting into the act. This was particularly evident in the case of Thailand and South Korea and to a lesser extent in Indonesia. Domestic banks were raising short term funds at variable interest rates at offshore financial centers and recycling them as local currency loans to domestic borrowers. The banks therefore were taking on the currency risk. Interestingly, neither the domestic corporations nor banks that were borrowing in foreign currency were hedging their exposure. It appears from post-crisis events that most of these loans were unhedged.

Why were rational bankers and corporate treasurers taking on such additional risks? It was not recklessness but in some ways quite rational behavior. There were a number of reasons for this reliance on unhedged foreign currency loans. The first and most important reason is probably the pegged exchange rate regime. Sustained periods of pegged exchange rates and success at maintaining the pegs, particularly during the period of contagion following the 1994 Mexican Peso crisis[12] meant that domestic borrowers were lulled into ignoring currency risk. Exchange rate risk did not seem a sufficiently large impediment to borrowing in foreign currency. Given past experience, with stable exchange rates, unhedged positions did not appear reckless.

Infantile domestic bond markets were yet another reason. Without well developed bond markets, it was difficult for large corporations and banks to raise long term

bond financing. With little choice for domestic funds, foreign borrowing was the result. In the face of all these, the central banks of the crisis countries appear to have been passive. A policy of benign neglect appears to have been the rule. Perhaps it was to prevent any crowding out if large loans were financed domestically. A third factor leading to excessive reliance on foreign currency debt had to do with financial liberalization that eroded the barriers between domestic money markets and the foreign exchange markets. As part of capital account liberalization, offshore financial systems were established. This made foreign currency loan origination that much easier. These offshore centers played a major role in the loan buildup. The best example being the Bangkok International Banking Facility (BIBF). Thai Banks used the facility to raise foreign currency loans which were then lent domestically as Baht loans. The rationale for Thai banks was that they were earning lucrative interest spreads. However, the huge currency exposure were being ignored by the banks. Finally, a contributing factor to the short term bias of the capital inflows was the sterilization attempts of the central banks. Without long term bond markets, sterilization of inflows had to be done with short term instruments. Recall that this is similar to the Mexican central bank sterilization which aggravated the short term habitat of the capital inflows.

Section 5.0

5.1: Vulnerability, Herd Behavior & Self Fulfilling Crises

Unlike the first generation (canonical) models that attempted to explain currency crises as arising solely from balance of payments problems or weak fundamentals, the later, second generation models also take into account psychological factors on the part of investors.   Particularly, herding behavior which could lead to self fulfilling currency crises. In perhaps the best proposition of these latter generation models, Calvo & Mendoza (1996) argue that the Mexican Peso crisis of 1995 was really a self fulfilling crisis that resulted from herding behavior of international investors. They go on to propose that such herding is rational even optimal, given constraints faced by large well diversified investors and the high degree of capital mobility.

Herding behavior refers to the propensity of investors to act as a pack.   That investors often act as a group and a single investor often does what he sees others doing has been long established in financial economics – particularly in the area of stock market behavior.   An entire school of thought of stock price behavior, the Technical Analysis or Chartist School is built on these principles of mass psychology.   To understand herding behavior in forex markets, we first need to understand the need for diversification.

Large investors, in order to reduce risk need to diversify across many assets. In this case across many currencies. Beginning with an investment concentrated on a single asset (currency), the investor derives diversification benefits as he spreads his investment across a broader array of currencies (assets). The diversification benefit, refers to the reduction in risk-that is, reduced volatility of returns for the same expected returns. As diversification is increased, total portfolio risk keeps falling – but only up to a point. Beyond a certain point further ***diversification does not*** reduce risk.[13] The empirical evidence from stocks is that this point of minimal portfolio risk can be reached with 20 to 30 stocks.[14] So, any further additions to

the portfolio beyond 20 stocks for example provides marginal benefits. What is interesting is that, given a universe of many stocks, the risk minimizing portfolio can be arrived at with *any* combination of 20 to 30 stocks. There is no unique combination of 20 stocks that leads to risk minimization. This has to do with the fact that the correlation between asset returns are typically within the +1.0 to –1.0 range.

The fact that only a limited number of assets is needed to reach this 'full diversification' and that this can be of any combination can explain herding behavior and the impact of such behavior on 'small countries' with open economies. From the viewpoint of an international fund manager, he knows he needs to diversify by holding currencies or assets denominated in various currencies. So, typically in addition to holding a core set of OECD currencies, he would need to hold some other currencies for the sake of diversification. However, given the wide array of available currencies and the fact that to be fully diversified he needs only a subset of the available currencies, he would be indifferent about which currency to include in his portfolio. Since, from a portfolio diversification viewpoint there is marginal difference between the currency of Country X versus that of Country Y, it does not pay for him to invest in the resources needed to understand in detail either country's economic fundamentals. Highly diversified international fund managers have neither the incentive nor inclination to acquire intimate details about developing country currencies. It is easier and a lot cheaper for them to merely follow what others are doing. Thus, if they see a few major funds moving into a currency, they too move in and vice-versa.

Aside from the logic of diversification, compensation is one other factor that perpetrates herding behavior. This happens because fund manager's performance is typically evaluated in comparison to some index or industry average. When they are being evaluated against their peers, conformity always pays.

5.2: Herding & Informational Asymmetries

When herding behavior happens within a framework of incomplete information or information asymmetries, the potential for an explosive self fulfilling crisis is that much more. Informational asymmetry refers to the imbalance in the information available to the parties in a transaction. For example, when a foreign fund manager receives less information than that known to a recipient government or corporation, an information asymmetry exists. This may be due to inadequate disclosure requirements or simply, a lack of transparency. However, as long as the fund manager sees others providing funds and there is an overall perception that their investments will yield good returns, this informational inadequacy is overlooked. Furthermore, the fund manager knows that in the event of potential problems he can quickly withdraw his funds. What risk does the fund manager face? Because his investment is highly liquid and mobile, he doesn't worry about expropriations the way FDI investors do. Fund managers also avoid countries that have a record of capital controls. Their real fear therefore is that of a currency devaluation. It is *perceptions* of an economy's underlying fundamentals and *expectations* about devaluations that hold the key to this balancing act between recipient economies and foreign fund managers. As underlying fundamentals begin to deteriorate, perceptions change. The problems of informational asymmetry become more apparent. The fund managers become susceptible to even minor events. They begin to worry about adverse selection problems.[15] With expectations of potential problems being formed, all that is needed for a self fulfilling crisis is an exogenous shock. In the case of Mexico it was the announcement of the ill conceived devaluation and in the case of Asia, Thailand's announcement to float the Baht. The decision to float followed the speculative attack on the Baht.

What links changing perceptions and expectations to a full blown self fulfilling crisis is *vulnerability*. Both the speculators, who initiate attacks on a currency and fund managers whose withdrawals cause capital flight are rational economic agents. Speculators in particular, know they have much to lose should their actions fail. They would not therefore initiate an attack unless they consider the

economy to be vulnerable and their probability of success greater than even. While there is no telling when a country has passed the threshold to become vulnerable, vulnerability becomes apparent when a country has reduced policy options because it has worked itself into a corner and the odds are heavily stacked against the Central Bank. As an example of this vulnerability, recall from Table A13, the proportion of short term debt to reserves for our crisis countries. Consider the following, as of December 1996 which was 6 to 7 months before the crisis, total foreign loans were almost twice total reserves for Thailand and thrice in the case of Korea. Almost two thirds of these loans were short term debt. The ultimate sign of vulnerability is probably the proportion of short term foreign debt to total reserves. As the above table showed, these were 118% for Thailand and 202.5% for Korea.

With numbers like these and informational asymmetries it is no surprise that fund managers would desert once a currency comes under speculative attack. Capital flight in the face of a speculative attack can overwhelm just about any defense.

5.3: Mexico 1995 and Asia 1997: What Were The Similarities

Sachs et al: (1996) in an indepth analysis of the contagion effect resulting from the Mexican crisis argue that contagion only affects countries that had "misbehaved" in the past. The authors point out that while several countries, particularly Argentina, Brazil and the Philippines were affected, others with *similarly weak indicators* did not. And as example of such countries, the authors had pointed to Thailand, Indonesia and Malaysia. Yet, two years later these same countries suffered their own crisis.

Our discussion thus far of the Asian crisis and the earlier overview of the Mexican crisis of 1994 point to several similarities. We now turn to an examination of the

many parallels between what happened in Mexico leading to the crisis and those of our Asian crisis countries. In both cases, the period preceding the crisis had been one of an economic boom but with growth rates tapering off just before the crisis. The rapid GDP growth in both Mexico and the Asian Crisis Countries had been financed with huge capital inflows, mostly in the form of foreign currency denominated loans. Most of these loans were also of a short term nature. The Savings-Investment gap that resulted from hyper-growth was also being financed by Current Account deficits. Relative to Mexico, the Asian crisis countries, with the exception of Korea were less reliant on short term debt but had worse current account deficits. In both cases, privatization, deregulation of the financial sector[16] and capital account liberalization had all taken place. Other common features were overvalued currencies due to pegged exchange rate system, and the resultant transfer of currency risks to domestic banks. Reserves were low compared to GDP and total foreign debt.

Though there was fiscal balance in both cases, there was also monetary policy looseness. Monetary growth had been rapid, credit booms and banking sector overexposure were also evident in both cases. To be sure, Mexico had political problems, the Chiapas revolution and political assassinations. These added to the uncertainties in the period leading to the crisis. Still, from an economic fundamentals viewpoint there were clearly too many similarities. Despite at least a two year headstart, the Asian countries seem to have chosen the same path. The lesson of Mexico 1995 appears to have been missed.

5.4: Hong Kong and Malaysia: The Importance of Policy Options

In this section, a comparison of underlying fundamentals and policy reaction between Hong Kong and Malaysia is carried out. The rationale for such a comparison is based on the many similarities between the two countries leading to the crisis but the varied reaction and degree of success in defending their respective currencies. If we evaluate the countries within each of the two groups; crisis versus affected, it is quite apparent that in the crisis group, Malaysia has the

best fundamentals overall and Hong Kong the worst within the affected countries group. Inter country comparison shows many similarities. For example, in the case of average growth in M1 and M2, both countries had similar numbers though it was slightly higher for Malaysia. The same could be said for Domestic Credit Growth and the Savings Investment Gap. Hong Kong had also had its share of asset inflation in the property sector. However, in areas like interest rate deviation and key currency market indicators like CPI growth and degree of overvaluation, Hong Kong had worse numbers relative to Malaysia. Hong Kong's average CPI growth of 6.4% is much higher than Malaysia's average 3.3%.

In the case of real exchange rate overvaluation, the Hong Kong Dollar's overvaluation of 28% is more than twice the overvaluation of the Ringgit at 12.5%. While it is true that Malaysia had much worse debt numbers and current account deficits, Hong Kong too recorded a 2% current account deficit in 1996 compared with 5% for Malaysia.

Based on these, one could reasonably state that while Hong Kong did have some strong points its numbers are not all that different from Malaysia's. At least not sufficiently different to warrant the huge disparity in currency movement. As of January 1998, the Ringgit had fallen to an all time low of 4.98 against the US Dollar, a depreciation in excess of 50%.[17] Yet, the Hong Kong Dollar had not budged from its pegged rate of 7.80. What accounts for this very different currency market outcomes? It surely was not for want of a speculative attack on the HK$. Hong Kong saw some of the most spectacular attacks on its currency. One might be tempted to argue that it was Hong Kong's currency board arrangement that let it hold on to the peg. But this would be ignoring the quite severe deviations in parity conditions. It is common knowledge that Hong Kong had allowed its interest rates and money supply to deviate from what was required to maintain parity with the US. As a result, the currency had become quite substantially overvalued (28%). Thus, the specie flow argument of a currency board system does not hold here. Clearly, Hong Kong's Dollar is not being backed 100%. In the face of such weaknesses, it is not surprising that the HK$

came under heavy attack. Yet, inspite of the fact that it is a lot more difficult to defend a single peg rate as opposed to a band, Hong Kong managed.

How did Hong Kong fare so differently from Malaysia? Hong Kong had two major advantages over Malaysia. First, it had a much larger arsenal – i.e. foreign reserves. At approximately US$75 billion, Hong Kong's reserves were almost 3 times that of Malaysia's at US$26 billion. Second, unlike Bank Negara, the Hong Kong Monetary Authority had much more policy flexibility going into the crisis. Between these two advantages, the latter was probably the more important one. In a world of 'virtual' money, foreign reserves, even large ones are no guarantee of successful defense. But when combined with the ability to adopt a wider range of policy options, a formidable defense can be put up.

Of the several options available to a central bank in defending its currency, the two most important ones are probably direct intervention and the ability to raise interest rates. When it comes to direct intervention, fortitude depends on the size of reserves but the ability to raise interest rates could quickly abate further attacks and therefore the need for continuing intervention.[18] The key is the ability to raise and *maintain* higher interest rates. The problem with raising and keeping interest rates high is that it quickly begins to hurt the real sector of the economy. At low levels of leverage the pain is bearable but when the overall economy has high levels of debt and the banking sector exposed, the interest rate option is not viable. The central bank faces a major tradeoff between saving the exchange rate and saving the domestic banking sector. If high interest rates could mean bank collapses and systemic risks, central banks will shy away from the interest rate option. The cost of maintaining the exchange rate appears too high.

If high debt levels in the economy reduces the available policy options, what happens if a good portion of the debt is foreign currency denominated? Then the central bank faces a potential lose-lose situation. Raising interest rates to maintain the exchange rate hurts leveraged firms and banks but the alternative of not raising rates and allowing the currency to depreciate *raises* home currency value of the

foreign debt and debt servicing requirements. So, having a leveraged economy with foreign currency debt really renders central banks impotent in the face of speculative attacks. The unfortunate part of all these is that speculators, being rational people can tell when a central bank will be forced to defend with one hand tied, by not being able to raise interest rates, and when the central bank is totally helpless because of foreign currency loans.

The severe fall in the Ringgit as opposed to the successful defense of the HK$ has to do with the fact that the Hong Kong Monetary Authority could and did use the interest rate option. They raised interest rates and kept it at very high levels for substantially longer than Bank Negara could. High leverage not only reduces the available policy options but precisely because it does so, increases vulnerability.

Section 6

Conclusion

Our discussion thus far has served to highlight the many differences in economic fundamentals between the crisis and affected countries. Clearly, there are several differences. Overall, the crisis countries have had aggressive growth policies that were fuelled by reflationary strategies – particularly rapid monetary growth and capital inflows. Monetary growth which was several times in excess of real sector growth coupled with repressed interest rates had led to asset inflation and increased allocation to non tradeables. The result had been current account deficits and domestic inflation. With higher relative inflation and repressed interest rates, exchange rate equilibrium as dictated by purchasing power and interest rate parities were out of line. With pegged exchange rates, the currencies had become overvalued, thereby worsening further the current account deficits. These were financed with capital inflows increasingly in the form of short term and foreign currency denominated debt. The combined impact of all of this had been to increase the crisis countries' vulnerability to a speculative attack and self fulfilling crisis.

Is there anything new about this crisis? None, if we go by the literature. The earlier cited empirical work by Frankel & Rose (1996), Whitt (1996) Calvo & Mendoza (1995) and Sachs et al (1996) all point to similar indicators. Sachs et al; argue that for contagion and crisis to happen; there must have been some 'degree of previous misbehavior' – particularly with regards to maintaining overvalued exchange rates, loose monetary policies and domestic credit booms. Clearly all three were evident in the crisis countries. Calvo & Mendoza (1996) show that it was expectations that the Mexican Central Bank would choose to save the banks and not the exchange rate that set off the massive capital outflows precipitating the Peso crisis. We saw that the Asian Central banks were caught in similar jeopardy given highly leveraged domestic economies. So, from an economic fundamentals viewpoint there appears to be nothing new about this crisis.

What can we learn from the crisis? Briefly, a number of important factors. First, to avoid crisis, one must reduce vulnerability. Reducing vulnerability means many things. Among others it means reducing growth if necessary, reduced reliance on foreign short term capital and most importantly keeping policy options open. A second important lesson would be that liberalization without proper preparation is disastrous. Banking and financial liberalization must be preceeded by prior placement of effective supervision and regulatory mechanisms. In this regard, aside from developing domestic bonds markets, the development of risk management tools would also be necessary. With adequate provision of risk management tools/markets, central banks need not take on the role of "hedging" on behalf of their countries.

A final important lesson would be the need on the part of policymakers to better understand how markets work and how markets could be used advantageously. In a world of 'fiat' currencies confidence is key and central bankers must realize that they cannot legislate confidence in their currencies. When markets are jittery, "the best antidote is more information"[19] not more assurances.

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Endnote:

[1] *See: Frankel & Kose 96, Goldfajn & Valdes 1997.*

[2] *In subsequent MLE regression analysis, the authors find current account and budget deficits to have low   predictive power and inappropriately signed.*

[3] *Where available, 1997 data are also use.*

[4] *The categorization is simply based on the extent of the respective country's currency devaluation until Jan 1998. (HK being the exception. Though the currency did not depreciate,*

it certainly saw massive attacks). This categorization would also conform with Frankel & Kose's classification of a 25% fall in currency as a crash. By this, our crisis countries would all have had a crash while the affected countries did not.

[5] *For an indepth analysis of the Mexican crisis; see; Joseph Witt Jr. (1996) and Calvo & Mendoza (1996).*

[6] *These were Annulized 90-day interest rates reported for the year in Datastream.*

[7] *Author's estimate based on several data sources.*

[8] *Cost of equity is always higher since equity holders carry more risk – eg. uncertain dividends, residual claims etc.. Cost of equity models determine cost on a risk premium approach.*

[9] *The Economist – Mar 7 – 15, 1998.*

[10] *Because interest expense is a fixed cost.*

[11] *A maturity mismatch is when long term needs have been financed with short term financing.*

[12] *See Ayub Ali, 1998.*

[13] *The portion of risk that has been diversified away is known in the literature, as unsystematic risk. The residual portion that cannot be diversified away is systematic risk.*

[14] *Ibbotson & Sinquefield (1982).*

[15] *Adverse selection refers to the possibility of making incorrect selection/decision in the face of inadequate information.*

[16] *In Mexico's case, as prerequisite for NAFTA.*

[17] *% Depreciation is computed as;* $\left[\left(e_o - e_1 \right) \Big/ e_1 \right] x100$

[18] *Raising interest rates, raises the cost of funds to speculators who have taken short positions in the currency.*

[19] *See: Ayub Ali (1998).*

APPENDIX

TABLE A 1
NOMINAL GDP GROWTH RATE (%)

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND		14%	12%	11%	13%	14%	9%	12%
INDONESIA		15%	13%	24%	15%	17%	16%	17%
SOUTH KOREA		18%	11%	10%	13%	14%	10%	13%
MALAYSIA		11%	14%	11%	14%	14%	13%	13%
		15%	13%	14%	14%	15%	12%	14%
AVERAGE								
SINGAPORE		10%	7%	15%	14%	11%	9%	11%
HONGKONG		14%	15%	14%	12%	6%	10%	12%
TAIWAN		11%	10%	10%	8%	8%	8%	9%
AVERAGE		12%	11%	13%	11%	8%	9%	

TABLE A 2
1990 - 96 REAL GDP GROWTH RATE (%)

	Average Annual Growth (%)
THAILAND	6.86
INDONESIA	6.22
SOUTH KOREA	6.31
MALAYSIA	7.33
AVERAGE	6.68
SINGAPORE	7.08
HONGKONG	4.6
TAIWAN	5.53
AVERAGE	5.74
UNITED STATES	1.75

TABLE A 3
ANNUAL M1 GROWTH RATE (%)

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND		13%	12%	17%	16%	11%	9%	13%
INDONESIA		10%	9%	-6%	52%	14%	20%	17%

SOUTH KOREA	31%	12%	17%	11%	18%	2%	15%
MALAYSIA	10%	10%	-15%	61%	10%	14%	15%
AVERAGE	16%	11%	3%	35%	13%	11%	
SINGAPORE	7%	12%	21%	2%	8%	6%	9%
HONGKONG	18%	19%	19%	-1%	3%	13%	12%
TAIWAN	6%	8%	12%	8%	-5%	4%	6%
AVERAGE	10%	13%	17%	3%	2%	8%	

TABLE A 4

ANNUAL M2 GROWTH RATE（%）

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND		18%	14%	17%	12%	16%	12%	15%
INDONESIA		16%	18%	20%	18%	24%	26%	20%
SOUTH KOREA		20%	14%	15%	17%	14%	15%	16%
MALAYSIA		12%	16%	17%	20%	15%	21%	17%
AVERAGE		17%	16%	17%	17%	17%	19%	
SINGAPORE		12%	9%	8%	13%	8%	9%	10%
HONGKONG		12%	10%	15%	12%	13%	11%	12%
TAIWAN		18%	17%	14%	14%	9%	9%	14%
AVERAGE		14%	12%	12%	13%	10%	10%	

TABLE A 5

ANNUAL CPI GROWTH RATE（%）

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND		5%	4%	4%	6%	6%	5%	5%
INDONESIA		9%	7%	9%	8%	9%	8%	8%
SOUTH KOREA		9%	6%	5%	6%	4%	5%	6%
MALAYSIA		4%	5%	3%	4%	3%	3%	4%
AVERAGE								5.75%
SINGAPORE		3%	2%	2%	3%	2%	1%	2%
HONGKONG		0%	6%	8%	8%	8%	6%	7.20%
TAIWAN		4%	4%	3%	4%	4%	3%	4%
AVERAGE								4.40%
UNITED STATES								2.60%

TABLE A 6

ABSOLUTE % CHANGE IN NOMINAL INTEREST RATES $(I_t - I_{t-1})$

	1991	1992	1993	1994	1995	1996	$E((I_t - I_{t-1}))$	$E((I_t - I_{t-1})/n)$	Mean C... Grow...
THAILAND	NA	NA	1.25	-0.75	4.50	-3.25	1.75	0.44	5.
INDONESIA	-0.31	-5.82	-4.10	3.60	1.07	-0.57	-6.13	-1.02	8.
SOUTH KOREA	NA	NA	NA	-3.30	3.30	-3.00	-3.00	-1.00	6.
MALAYSIA	1.20	0.40	-1.20	-2.80	1.80	0.90	0.30	0.05	4.
SINGAPORE	-1.21	-1.38	-0.20	1.36	-0.21	0.00	-1.64	-0.27	2.
HONGKONG	-3.94	0.25	-0.56	2.56	-0.43	-0.33	-2.45	-0.41	7.
TAIWAN	-1.20	0.20	-0.20	-0.86	-0.80	0.10	-2.70	-0.45	4.

TABLE A 7
SAVINGS - INVESTMENT GAP
(As % of GDP)

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND	(7.6)	(6.4)	(4.9)	(4.5)	(5.0)	(7.5)	(7.7)	(6.2)
INDONESIA	(0.4)	1.7	1.5	5.1	1.6	0.6	0.7	1.5
SOUTH KOREA	(1.0)	(2.5)	(1.5)	(0.8)	(1.1)	(1.5)	(3.5)	(1.7)
MALAYSIA	(3.3)	(8.0)	(4.7)	(5.3)	(7.3)	(9.5)	(5.5)	(6.2)
AVERAGE	(3.1)	(3.8)	(2.4)	(1.4)	(3.0)	(4.5)	(4.0)	(3.2)
SINGAPORE	12.3	12.1	11.7	9.9	16.2	16.7	13.6	13.2
HONGKONG	9.4	7.2	6.4	7.3	3.3	(0.1)	(0.7)	4.7
TAIWAN	6.9	7.3	4.6	4.0	4.2	5.1	7.0	5.6
AVERAGE	9.5	8.9	7.6	7.1	7.9	7.2	6.6	7.83

Source: IMF; World Econ. & Fin. Survey.

TABLE A 8
DOMESTIC CREDIT GROWTH (%)

	1990	1991	1992	1993	1994	1995	1996	Average
THAILAND	26.8	15.5	18	22.7	28.9	23.1	14	21.3
INDONESIA	58.3	18.9	14.1	21	22.9	21.7	22.7	25.7
SOUTH KOREA	24.8	22.4	11.7	12.7	18.4	14.7	19.4	17.7
MALAYSIA	18	18.5	16.6	12.3	14.8	29.5	27	19.5
AVERAGE	33.7	19.9	14.1	15.3	18.7	22.0	23.0	

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
SINGAPORE	12.3	13.9	5.5	12	12.8	17.4	17.3	13.0
HONGKONG	NA	NA	9.6	21	25	8.6	18	16.4
TAIWAN	17	26.3	28.5	19.8	16.5	10.6	10.1	18.4
AVERAGE	14.7	20.1	14.5	17.6	18.1	12.2	15.1	

Source: IMF; World Econ. & Fin. Survey.

TABLE A 9
CURRENT A/C DEFICIT AS A % OF GDP CURRENT)

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND	-9%	-8%	-6%	-5%	-6%	-8%	-8%	-7%
INDONESIA	-2%	-2%	-1%	-1%	-1%	-1%	-2%	-1%
SOUTH KOREA	-1%	-4%	-2%	0%	-1%	-3%	-6%	-2%
MALAYSIA	NA	NA	-4%	-5%	-6%	-10%	-5%	-6%
AVERAGE	-4%	-5%	-3%	-3%	-4%	-6%	-5%	
SINGAPORE	6%	8%	8%	9%	16%	17%	17%	12%
HONGKONG	8%	7%	5%	7%	1%	-4%	-2%	3%
TAIWAN	7%	7%	4%	3%	3%	2%	4%	4%
AVERAGE	7%	7%	6%	6%	7%	5%	6%	

TABLE A 10
FOREIGN RESERVES AS % OF GDP

	1990	1991	1992	1993	1994	1995	1996	AVERAGE
THAILAND	17%	19%	19%	20%	21%	22%	21%	20%
INDONESIA	14%	29%	48%	45%	38%	33%	30%	34%
SOUTH KOREA	8%	6%	7%	8%	8%	9%	9%	8%
MALAYSIA	20%	22%	26%	34%	44%	30%	27%	29%
AVERAGE	11%	15%	21%	22%	23%	18%	17%	22.75%

SINGAPORE	71%	74%	81%	83%	78%	80%	87%	79%
HONGKONG	33%	33%	35%	37%	38%	40%	41%	37%
TAIWAN	NA	NA	NA	36%	39%	35%	32%	36%
AVERAGE	37%	38%	42%	42%	40%	41%	44%	50.67%

Table A 11
TOTAL FOREIGN LOANS (US $ Mil.)

	Dec-94	Dec-95	Jun-96	Dec-96	Jun-96
THAILAND	43,879	62,818	69,409	70,147	69,382
INDONESIA	34,970	44,528	49,306	55,523	58,726
SOUTH KOREA	56,599	77,528	88,027	99,953	103,432
MALAYSIA	13,493	16,781	20,100	22,234	28,820

Source: BIS, Business Times.

Table A 12
TOTAL FOREIGN LOANS AS % OF GDP

	Dec-94	Dec-95	Dec-96
THAILAND	30.4	37.4	38.7
INDONESIA	19.8	22.1	24.5
SOUTH KOREA	18.6	22.1	25.7
MALAYSIA	18.6	19.2	22.4

Author's Computation

Table A 13
FINANCIAL POSITION (AS AT DEC. 96)

Short Term Loans (US$ Mil.)	Short Term Loans as % of Total	Foreign Loans as % of	Short Term Loans as as % of

		Foreign Loans	Reserves	Reserves
THAILAND	45,733	65.20%	181%	118%
INDONESIA	32,759	59.00%	81.60%	48.10%
SOUTH KOREA	67,468	67.50%	300%	202.50%
MALAYSIA	12,451	56.00%	83.90%	46.90%

Author's Computation