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What Factors Led to the Asian Financial Crisis: Were or Were not Asian Economics Sound?

Contents

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Abstract

This paper attempts to confront various theoretical and empirical approaches to the East Asian currency crisis in 1997, but also with emphasis on two recently dominated literature about East Asian financial crisis. One, strongly supported by Corsetti, et. al (1998) stresses fundamental weaknesses, particularly in the financial sector. The other explains the crisis as the problem of illiquidity and multiple equilibria or 'herd behaviour' [Radelet and Sachs, 1998]. These two controversial articles facilitate the main exchange of ideas about the evolution and causes of the collapse of these economies which were viewed initially as very successful on their way to development and integration with the global economy. An econometric probit analysis was done in order to establish the most important determinants of the currency crisis in East Asia. The results were mixed (the probit modelling turned out to be very sensitive to changes in sample size, introduction of new variables and brought up an important issue of causality, the solution of which, or at least limitation of the problem, requires an inclusion of lagged variables in the model), but at least it showed that this type of exercise without further sensitivity analysis could not support Radelet and Sachs' (1998) panic scenario of the Asian meltdown. If anything, it rather pointed to fundamental problems existing in these economies.

1. The Logic behind the Financial Crisis in Asia*

1.1. Introduction

In 1997, financial market turmoil in Southeast Asia gave rise to a financial crisis, a crisis that resulted in the economic downturn beyond it's previous expectations. Particularly sharp decline in economic activity was observed in Korea, Malaysia and Thailand [World Economic Outlook, IMF, 1998].

In January 1997, Hanbo Steel, a large Korean Chaebol collapsed, under a $6 billion debt – the first bankruptcy of a leading Korean conglomerate in decades. On February 5, 1997, the Thai Company Samprasong missed its payments on foreign debt. In early March 1997, Japanese officials announced that the interest rates might rise because of the depreciating yen. Although this never materialised, the announcement proved to be one of the first signs of the Asian Crisis. Continuing, on March the 10th- the Thai government said it would buy $3.9 billion in bad property debt from financial institutions, but then reneged on its promise. March 28th, Malaysian Central Bank restricted loans to property and stocks to head off a crisis (Nouriel Rubini web side).

The 20% devaluation of the Thailand baht on July 2 marked the official beginning of the Asian financial crisis. Then it quickly spread to other countries in Southeast Asia and Republic of Korea:

– July 11th, the Philippine Central Bank said it would allow the peso to move in a wider range against the dollar.

– July 14, the Malaysian Central Bank abandoned the defence of the ringgit.

– August 14, Indonesia abolished the managed system of exchange rate, allowing the currency to float.

– In November the epicentre of the crisis moved to Korea, the exchange rate was allowed to flow on the 16th December 1997.

Altogether, between June 1997 and the end of the year, the average currency devaluation in the five East Asian economies (Indonesia, Korea, Malaysia, the Philippines and Thailand) hardest hit by the crisis was 80%. But other countries in the region also did not avoid growing market pressures. In October 1997 the Taiwanese dollar was

devalued. From Taiwan the crisis spilled over to Hong Kong, Singapore and Japan. Asset bubbles burst and stock prices dropped sharply (from January to December 1997 they fell more than half; Ito, 1999).

The reason why once the Thai baht depreciated other countries also came under pressure was that the countries were viewed by investors as having similar fundamentals, including banking system problems and appreciating exchange rate (recent studies point trade links as the possible channel through which the currency crises spread [Park and Song, 1998]. According to Park and Song (1998), not only common deteriorations in underlying fundamentals contributed to the spillover effects of the Thai crisis, but also creditors panic played an important role. Nevertheless, in the five countries discussed below just two (Malaysia and Korea) were found to be victim of financial panic (macroeconomic similarities however were not ruled out).

The Asian crisis has begun once again, and even more intensely, the debate about the origins of the crisis and behaviour of investors at the onset of financial turmoil. Why did such extraordinary economies with impressive macro-economic performance and prudent fiscal policies, suffer from such a severe economic collapse, a collapse with the ferocity that nobody foresaw? There are two competing explanations for the causes of the Asian crisis: *fundamentals versus panic schools of financial crises*.

Basing their arguments on Krugman's (1979) seminal work on a fundamentals approach, Corsetti, et al. (1998) as well as Goldstein (1998), Krugman (1998) and Mishkin (1999) stand in favour of a fundamentals explanation for the causes of the Asian financial crisis. Economic fundamentals in a given country are defined as a set of macroeconomic indicators, which usually reflect economic performance. The fundamentals interpretation of the crisis focuses on the persistent weaknesses existing in these fundamentals as well as on inconsistent domestic policies. That is, a crisis occurs when the economy is in a state of distress, accompanied by a deteriorating current account, a growth slowdown or even recession, the bursting stock and real estate price bubbles plus short-term debt reaching a dangerous level. However, because macro-economic indicators like high inflation, fiscal imbalance, high stock of government debt, low rates of growth, were not present in Asia, Corsetii, et al. (1998) argue that using a purely classical fundamental [1] model as the cause of the financial crisis in Asia, paints a misleading picture about the real situation of so-called 'Asian Tigers'. It can be concluded from their work that the canonical models [Krugman, 1979; Flood and Garber, 1984], together with more sophisticated '*second*

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[1] Classical models include the first and second-generation models of financial crisis. The underlying theory will be briefly discussed in the first chapter.

generation' ones [Obstfeld, 1986; 1994], do not fully explain the situation in Asia. But even though, the standard currency models are not powerful enough to explain the origins of the crisis, Corsetti, et al. (1998) insist that the main reason lies in weak fundamentals of Asian economies. They suggest a scheme that, while revisiting the classical models, brings forward new elements of particular relevance for the analysis of the 1997–98 events. Their model identifies the problem of '*moral hazard*' as the common source of overinvestment, excessive external borrowing and a current account deficit. Continuing, Corsetti, et al. (1998) highlight a number of country-specific and global factors which determined the current account imbalances observed in Asia. They claim that the key to interpretation of the events leading to Asian meltdown lies in corporate, banking and financial sector weaknesses operated in the region.

Others [Radelet and Sachs, 1998; Stiglitz, 1998b] argue that Asia fell victim to a financial panic when negative sentiments became self-fulfilling. According to self-fulfilling models, pegged exchange rate system can collapse even in countries with sound market fundamentals. These models emphasise the idea that the regime of fixed exchange rates that is not perfectly credible is in nature unstable and subject to the sudden change in market sentiments. The panic interpretation points out the self-fulfilling expectation and herding behaviour in international capital markets as the root cause of the crisis. If people think the economy will get worse, then they take short positions in that country's currency, and the economy does get worse. One version of this argument interprets Asia's crisis [Radelet and Sachs, 1998] as a classic illiquidity-insolvency bank run model [Diamond and Dybvig, 1983 cited in Radelet and Sachs, 1998]. Which story applies more to Asia?

As can be seen, there is a lot of controversy about the origin of financial crises in Asia among researchers. The debate is far from settled. The East Asian crisis differs from previous developing country crises – such as the Mexican peso collapse in 1994 or the debt crisis of the 1980s – in that private sector financial decisions were the main source of difficulties. Public sector borrowing played a minor role. Because of the Asian economic miracle nobody really believed that in fact it would eventually collapse. Yet, there were some warning flags a year or two before the Thai crisis. One of them was the current account deficits of Southeast Asian countries which were as high as those of Latin America in 1994, but everybody expected the longer-term slowdown in growth to emerge only gradually [Krugman, 1998]. Nevertheless Asian 'illness' turned out to be harder than Latin America was. But Latin America, apart from the IMF support, had a strong United States to act both as purchaser and benefactor

– buying the region's exports once its currency had depreciated and speeding financial assistance by both direct and indirect means. This role in Southeast Asia was left for Japan. However, Japan, being part of the region's currency problems could not act as a regional locomotive. As Radelet and Sachs (1998), if the IMF rescue programs had provided the required immediate help, then perhaps the negative effects of the financial turmoil would not have been so dramatic. Instead the IMF had imposed conditionality on offered loans, which was not appropriate at that time. Besides, the great amount ($22 billion of the funds for Indonesia and $22 billion for Korea) of emergency lending offered between August–December 1997 to Thailand, Korea and Indonesia was available as '*second line of defence*' funds from individual governments. This type of loan has little probability of being available early in the program [Radelet and Sachs, 1998]. An implementation of structural reforms takes time, so it cannot restore the creditors' confidence immediately, whenever the need arises. What is more, traditional macro-economic stabilisation program (monetary and fiscal tightening plus the credit restrictions insisted by the IMF) could not work in the Asian case, simply because these economies were suffering from a dual crisis: banking and currency. Higher interest rates indeed can attract escaping capital, but they also increase a burden of enterprises. Yet, high interest rates are essential to prevent a depreciating currency. The consequent costs for the economy from lower exchange rate could be more severe than the costs from the higher interest rate.

The scope of this work is not to investigate and assess the position of the IMF in the crisis or to look for reasons why currency crises in Asia were regional. It rather attempts to confront various theoretical and empirical approaches to the Asian currency crisis, but also with emphasis on the two propositions (deteriorating fundamentals versus self-fulfilling prophecy) by Corsetti, at el. (1998) and Radelet and Sachs (1998) as already mentioned. This basically will be covered in chapter I of this paper. Chapter II will explore further the causes of the East Asia meltdown, focusing on those most relevant to the central question of this work: '*What factors led to the Asian financial crisis*?' Chapter III will consist of an empirical element, which analyses and demonstrates the sensitivity of the probit model. From the results of an econometric probit analysis, it will be shown that it is inadequate and inconclusive (without further investigation) to use such a model to explain the panic or structural weaknesses which led 'Tiger' economies to the financial turmoil. This chapter will also include a short debate between proponents and opponents of the panic/ fundamental scenario of the Asian crash. The last chapter will conclude and summarise.

1.2. The Theoretical Framework

The new character of the Asian crisis, the fact that it does not match exactly the model posited by classical currency crisis scheme, should not cause economists to overlook the many insights into the logic of crisis offered by traditional explanatory models (the Russian 1998 crisis being a good example here). One more time it only proves that every currency crisis tends to be followed by new currency crisis model thus demonstrating investors' and researchers lack of understanding of the problem [Rodrik, 1998].

These models of currency crises fall into two broad categories, called '*first generation*' and '*second generation*' models. The canonical 'first generation' crisis models [Salant and Henderson, 1978; Krugman, 1979; Flood and Garber, 1984] show how fundamentally inconsistent domestic policies lead an economy toward a currency crisis. A currency crisis in a country with a fixed exchange rate is caused by an excessively large budget deficit. To finance this deficit the government prints money. The expansionary policy is inconsistent with the long- term maintenance of the fixed rate and limited to the stock of foreign exchange reserves. Eventually, the international reserves that serve as a buffer between the fixed-exchange rate policy and the expansionary domestic credit policy are driven down to zero and the exchange – rate policy is abandoned. The analysis does not focus on predicting whether or not the currency will collapse, because eventually it certainly will, but on the timing of the speculative attack on the currency. Speculators, who foresee the jump in exchange rate, sell domestic currency just before the exhaustion of reserves – and in so doing advance the date of that exhaustion. As a result the exchange rate need not to jump at the time of the attack. According to Salant and Henderson (1978) in Krugman (1979), attack would take place at precisely the time prices need not to jump – when the change in money supply due to the attack is exactly balanced by the change in money demand due to the interest rate effect of the policy change to a sustainable regime. In other words, because at the date of collapse money demand falls discretely, since the rate of inflation is growing from zero to some positive number, in order that the exchange rate is fixed instead of rising discretely, money supply must also fall discretely. As Krugman (1996a) stresses, this standard model despite its many simplifications (i.e. its basic version does not assume that reserves losses can be sterilised, what was the case in Asia), demonstrates that the sharp character of runs on a currency need not to be due to investors irrationality or market manipulations. It can just be the result of the situation in which holding a currency become unattractive once its price is no longer stabilised. '*First generation*'

models express an inconsistency between domestic and exchange rate policy, the dilemma often faced by developing countries. Proponents of the fixed exchange rates holds the view that the adoption of such a regime imposes a degree of financial discipline that would be absent under a flexible regime. By discouraging recourse to inflationary finance, a fixed regime would facilitate the attainment of price stability. Advocates of greater exchange rate flexibility maintain that financial discipline, if absent, is unlikely to be instilled by the adoption of a fixed exchange rate. Instead, as the above model shows, the announcement of a fixed exchange rate would result in financial crisis followed by devaluation, introducing high degree of instability into the behaviour of the real exchange rate.

In '*second generation*' models currency crises can occur even when macroeconomic policies are consistent with a fixed exchange rate policy. In contrast to 'first generation' models here governments are more rational and instead of simply printing money try to condition fiscal policy on the balance of payments, calculating costs and benefits of retaining the peg. The benefits of defending the parity can include reduced inflationary pressure and stable environment for trade and investment. Expenses will involve the growth in unemployment rate, or will arise from required higher interest rates. Higher interest rates may increase financial cost for the government or weaken the banking system.

Self-fulfilling expectations and multiple equilibria play an important role in these models. Crisis may also develop without changes in economic fundamentals. Here economic policies are not predetermined but they respond in a discretionary way to changes in the economy. Economic agents take this relationship into account in forming their expectations. At the same time the expectations and actions undertaken by these agents affect some variables to which economic policies actually respond.

As in Krugman (1996a), Obstfeld (1994) emphasised that fixed rate will be costly to defend if people expected in the past that it would be depreciated now. For example, labour unions might demand higher wages, which would leave the country's industry non-competitive at the given exchange rate. In this situation, concern about devaluation becomes a self-fulfilling prophecy. The government though fully prepared to maintain the exchange rate for a long time has no choice but abandon it, because of a speculative attack that made defending the parity too expensive. The important implication from '*second generation*' models is that it may be impossible to predict exchange rate crisis (however, Krugman, 1996b gives an example when it may not be a case; this will be explored in the third chapter).

The fundamentalist interpretation of Asia's crisis is closely related to the '*first generation*' of currency models. It is often perceived as a '*third generation*' type of

model [Krugman, 1998 cited in IMF, 1997], or the resurrection of 'first generation' models with new fundamentals [Dooley, 1997 cited in IMF, 1997]. In particular Corsetti, et al. (1998) focus on a '*moral hazard*' problem, originating in '*asymmetric information*' [2], where the implicit and explicit government guarantees to failing banks implied a large fiscal burden to the Asian governments. '*Moral hazard*' basically refers to a belief of western banks that Asian banks and large companies were effectively guaranteed by their governments, so loans were offered to these institutions because of the future bailout interventions. '*Moral hazard*' also includes a situation where some borrowers believe in their protection against future punishment. Unfortunately, when the undertaken project fails, this is not a borrower but a lender who suffers the loss. In results, in Asia, weakly regulated private financial institutions had a strong incentive to engage in excessively risky investments, with low expected returns as long as in Krugman (1998: 3) '*fat right tail*' – a situation where the owner of an intermediary undertakes an investment which can bring him high returns if he succeeds, but also can cause heavy losses if this investment fails. Incorrect credit analysis by western banks, Asian banks and borrowers finally brought the emerging Asian economies down.

Corsetti, et al. (1998) base their analysis on the recent empirical and theoretical work in which the banking and currency crises seem to occur almost simultaneously (known in the literature as the '*twin crises*'; i.e. Kaminsky and Reinhart, 1995; 1998). The combination of this kind of dual problem usually appears to have more devastating effects on the real economy than just currency crises alone, according to Kaminsky and Reinhart (1995; 1998).

Miskhin (1999), for example, recognises two ways in which problems in the banking sector can lead to a financial crisis in emerging market countries like those in East Asia. First, the deterioration in the balance sheets of banking firms can lead them to restrict their lending in order to improve their capital ratios or can even lead to a full-scale banking crisis, which forces many banks into insolvency. In this case the ability of the banking sector to make loans is strongly limited. Second, the deterioration in bank balance sheet can trigger a currency crisis because it becomes very difficult for the central bank to defend its currency against a speculative attack. When interest rates are raised in order to defend domestic currency, it puts an additional pressure on the banking system. This happens because of the maturity mismatch (banks usually are borrowing short and lending long) and banks' exposure

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[2] The other problem refers to adverse selection. This is a situation, where it becomes virtually impossible to 'screen' properly a quality of the loan demander. Because this is usually a high-risk firm, which seeks for loans, in result, many profitable projects are not undertaken. For details see Mishkin (1996).

to the credit risk whenever the economy becomes fragile and vulnerable. Weak banking systems increase speculative incentives to attack the currency. An attack can be triggered by many factors, one of which is a large current account deficit. Moreover, as Miskhin (1996) points out, if devaluation occurs, the position of banks could be weakened further if a large share of their liabilities is denominated in a foreign currency. The proportion of non-performing bank loans increases, raising the concern about the fundamental soundness of the banking sector, which in turn further undermines investors' confidence. From the asset side, the banks' balance sheet may worsen, because borrowers may be unable to pay off their debt.

The panic interpretation of the crisis, on the other hand, is derived from the '*second generation*' models. The classic and most sophisticated example of the panic story is represented by the model of a run on a bank [Diamond and Dybvig, 1983; mentioned by Radelet and Sachs,1998] whose solvency is in doubt. In this model, an illiquid but otherwise solvent bank suffers because of depositors' panic. Panic, or put in another way run, occurs not because depositors' think that bank made bad investment, but because other depositors are withdrawing their money. An illiquid borrower lacks in cash to repay current debt servicing obligations, even though it has the net worth to repay the debt in the long run. To prevent such a destructive bank run, this is when a central bank should provide liquid funds by acting as a lender of the last resort. Economic fundamentals are unimportant in this interpretation. What matters is the maturity structure and currency denomination of external and internal debt. If, for instance, a large proportion of a country's debt is denominated in foreign currency and is of a short maturity, as it was much in Asia, the risk of a crisis arises. As in Radelet and Sachs (1998) the illiquidity-insolvency model is one of two main approaches to explain '*herd behaviour*' (the other involves asymmetric information, see Mishkin, 1991 or Stiglitz and Weiss, 1981), that is cases where creditors behave as a mass rather then rational individuals. In short, '*everyone sells because everyone else is selling*' [Krugman, 1999: 149]. It is profit maximising to behave as others do. But this also causes an overreaction about national economic prospects. In result, the country's currency may be subject to an unjustified by economic fundamentals selling agitation.

One point should be made here not to get muddled, i.e. the problem of '*asymmetric information*' portrayed by '*moral hazard*' and '*adverse selection*'. Corsetti, et al. (1998), as seen above, use moral hazard to emphasise that financial crisis in Asia was caused by weak fundamentals. Radelet and Sachs (1998) on the other hand, treat '*asymmetric information*' as a tool to explain '*herd behaviour*'. Is there any inconsistency in a proper understanding of this theoretical framework? Obviously not. '*Asymmetric*

information' indeed can lead to multiple equilibria and liquidity difficulties caused by financial pessimism of investors [Krugman, 1998]. If Corsetti, et al. (1998) are right then fundamental problems, in particular in financial sector, are responsible for the Asian crash. The reason for this is that banks play a special role in overcoming the problem of '*asymmetric information*'. Once the banking system collapses the problem gets worse [Mishkin, 1999]. But if Corsetti, et al. (1998) are wrong and these are Radelet and Sachs (1998) who win the battle, then, because of the herding and resulting credit crunch, even good investments in Asia lost their chance to succeed. Possibly, if the IMF had provided international help, Asian economies could be rescued. But what if banks themselves were involved in moral hazard because of profitable collateral given the existence of the asset price bubble? Is the self-fulfilling panic justifiable any more?

Broad classifications behind reasons which caused the Asian financial crisis are questionable and therefore rather conventional, since as pointed out, weak fundamentals not only trigger the crisis within '*first generation*' theoretical framework but also within the '*second generation*' one. The same problem arises when one takes into consideration '*asymmetric information*' theoretical scheme. Then again both, fundamentals and self-confirming pessimism can be responsible for the crisis.

2. What Caused the Asian Financial and Currency Crisis?

Probably each of the models presented above partially contributes to explaining the 1997 financial crash in Asia. The problem lies in degree. It is clear that turnaround of capital inflow equalling to US$105 billion, which is more than 10 percent of combined GDP of five crisis economies (Korea, Indonesia, Malaysia, Thailand and the Philippines), the shift from an inflow of US$93 billion in 1996 to an estimated outflow of US$12 billion in 1997 [Rodrik, 1998; Institute of International Finance, 1998] had to have a panic element involved. Thus, the question asked here should be: was the panic socially irrational occurring in the macro-economically sound environment, or was the crisis triggered because fundamentals turned out to be too weak to be sustainable? To find the answer (if possible?) it is necessary to link up banking crisis, the currency crisis and corporate crisis.

The East Asian crisis differs from previous financial crises in developing countries in several ways. First, private decisions were the main source of difficulties, public borrowing played the minor role and the inflation was relatively low compared to

most other developing countries. What is more, Asian economies prior to the financial turmoil enjoyed high rates of savings as well as investments (what in the beginning of 1990s resulted in high rate of growth of these economies) and were running fiscal surpluses, whereas fiscal deficits were main factors responsible for the financial crises in 1980s.

Table 2-1. Overall Government Fiscal Balance (% of GDP)

	Indonesia	Malaysia	Philippines	Thailand	Korea
1995	2.2	0.9	0.5	2.9	0.3
1996	1.2	0.7	0.3	2.3	-0.1

Source: Radelet and Sachs (1998)

Table 2-2. Gross National Savings (% of GDP)

	Indonesia	Malaysia	Philippines	Thailand	Korea
1996	27.5	37.81	19.35	33.22	33.6

Source: Corsetti, at al. (1998)

Table 2-3. Investment Rates (% of GDP)

	Indonesia	Malaysia	Philippines	Thailand	Korea
1995	31.93	43.50	22.22	41.61	37.05
1996	41.54	41.54	24.02	41.73	38.42
1997	31.60	42.84	24.84	34.99	34.97

Source: Corsetti, at al. (1998)

Table 2-4. Inflation Rates

	Indonesia	Malaysia	Philippines	Thailand	Korea
1995	8.95	5.28	8.11	5.69	4.41
1996	6.64	3.56	8.41	5.85	4.96
1997	11.62	2.66	5.01	5.61	4.54

Source: Corsetti, at al. (1998)

But despite this apparently fine and healthy looking environment, there were some pressing problems that caused the Asian economies to become increasingly vulnerable during the 1990s. The most acute, apart from large current account deficits, overvaluation of real exchange rates and falling competitiveness, lay probably in the financial sector. Here distorted incentives (corruption), poorly managed financial liberalisation and lack of adequate supervision encouraged excessive risk taking, in particular in maturity and currency mismatches. Enormous capital inflow

led to the rate of investment which together with falling rate of growth and high rate of savings caused an excess capacity and overproduction of Asian economies. Meanwhile, underdeveloped and weak financial sector caused misallocation of this investment and a build-up of non-performing loans.

2.1. Capital Inflow

It is usually the successful economy, which offers high rates of return that attracts foreign capital. But this capital is also typically leveraged up by the domestic banking system and can lead to the boom in supply of credit and an asset bubble. Crisis occurs when the domestic imbalance leads to a large current account deficit.

Financial crises of 1990s differ from those of 1980s in the character of capital flows. As private capital flows surged during the 1990s, official capital flows declined sharply. In 1970–1981, official flows to emerging markets reached 49.5 percent of total flows, however, this share dropped to 9.5 percent in 1990–1996 [IMF, 1998]. According to the World Bank 1997 Report, between 1994 and 1996 net private capital inflows as a share of GDP increased in Malaysia by 7 percentage points, in Indonesia 6 percentage points, and 5 percentage points in Philippines. Only in Thailand did this share remained relatively stable, but also noticeably high – 15 percent over the three years. Ito (1999) shows that net private capital flows to emerging markets increased seven-times from 1990 to 1996. In 1990, total capital flows reached almost 30 billion dollars. Two thirds went to Asia and one third to Latin America. In 1993, this amount increased up to 140 billion dollars. At that time, both Asia and Latin America received about 40 percent. Such large capital inflows were an effect of diversification of portfolios by industrial countries' investors. Strong economic performance, good prospects for the future reflected in narrowing risk premia for emerging markets bonds between 1996 and 1997, and cyclical downturn in international interest rates in the early 1990s, created a friendly environment for investors [BIS- 67th Annual Report].

Table 2-5. Net Private Capital Flows to Asia (India, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan and Thailand) and Mexico in billion of US dollars

	1993	1994	1995	1996
Asia	34.0	26.8	37.6	35.4
Mexico	30.3	10.3	-13.2	13.5

Source: Bank for International Settlements – 67th Annual Report (1997)

As discussed in Ito (1999), majority of these investments in Asia took the form of FDI in 1990s. Nevertheless, the short-term foreign capital in Asia was substantial (the share of FDI and portfolio flows to emerging markets in total net private flows over 1990–1996 reached 40 percent and 39 respectively; IMF 1998). Portfolio assets, bonds and bank borrowing were large enough to cause balance of payments surpluses [Corsetti, et al. 1998].

At the same time, ASEAN-5 (Indonesia, Korea, Malaysia, the Philippines, Thailand) economies enjoyed high rate of domestic savings (on average more than 30% of GDP), which was itself probably enough to finance significant amount of investments in growing Asia. Howell (1998) claims that the 'sustainable' level of total investment should lie between 18 percent and 27 percent of GDP annually. The fact (see data above) is that only the Philippines fell in this range. The rest of the four crisis economies exceeded the upper limit. Such an aggressive investment boom had a great chance to be misdirected. Therefore, additional short- term capital flows just increased the fragility of these emerging markets. Capital flows to Asia in 1996, prior to the crisis, continued to be strong thanks to flows from Europe and US (because of Yen depreciation, flows from Japan were lower), despite the worsening financial environment. This can be read as continuing creditworthiness of the region [Radelet and Sachs, 1998]. Yet, it mostly took the form of short-term, interbank loans, easy to withdraw and formally guaranteed in the interbank market [Asian Development Outlook, 1999]. When the crisis erupted in July 1997, private capital fled from Thailand, Indonesia, the Philippines and Korea. Net portfolio investment declined sharply and became negative in 1997 for the first time since 1990 [Ito, 1999]. The '*virtuous cycle*' turned into the '*vicious circle*':

'*Capital outflow made the currency to depreciate; depreciation made the real economy and the banking sector weaker; weak economies made investors' pessimistic; and pessimism encouraged further capital outflows*' [Ito, 1999: 10].

2.2. Exchange Rate Appreciation

During the episodes of surge capital inflows [Thailand and Malaysia themselves received inflows higher than 10 percent of GDP; Ito, 1999], some Asian countries became concerned about such adverse effects like appreciating exchange rate. In 1990s, relative to the 1988–92 average, real exchange rates were appreciating in the Philippines (18%), Malaysia (13%), Thailand (5%) and Indonesia (5%). The real appreciation was especially rapid after 1994 due to strong US dollar at that time. The

only exception was Korea, where despite a 27 percentage drop in terms of trade in the three years prior to September 1997 real exchange rate remained pretty stable [World Bank, 1998].

To maintain the parity and avoid excessive monetary expansion, the East Asian economies sterilised (at least partially) the inflow by accumulating foreign exchange reserves. The growth of foreign reserves between 1990 and 1996 was 127 percent in Korea, 144 percent in Indonesia, 176 percent in Malaysia, 985 percent in Philippines and 183 percent in Thailand [Corsetti, et al. 1998]. According to the Bank for International Settlements – 67th Annual Report, more than half of these inflows was absorbed in this way. At the same time, current account deficit in Korea and Thailand was accelerating even faster (increase in demand, drop in export).

The practice of sterilised intervention is always questionable. It entailed high domestic interest rates (World Bank 1998 estimation shows, that in 1996 short-term money market interest rates in Thailand were 400 basis points higher than comparable U.S. rates), thus driving a large wedge between domestic and international interest rates. This attracts foreign capital even more. From the domestic side, it gives additional incentive for companies to borrow unhedged, short-term funds from abroad. It can also encourage inappropriate policy responses in order to reduce costs of potential fiscal expenses of sterilised foreign exchange intervention, including restriction on financial market. Volatility of the economy increases. Thus '*sterilised intervention can do little, if anything, to break the link between monetary policy and the exchange rate*' [Obstfeld and Rogoff, 1995: 76].

But why in Asia was fixed or fixed but adjustable exchange rate system adopted? Certainly this question raises the scope for another work, but at least inflation, the most plausible argument in favour of fixed exchange rate, was not a concern in Asia. If the domestic currency had been allowed to float, capital inflows would have caused appreciation rather than accumulation of reserves.

Even if the capital inflows to Southeast Asia were mostly responsible for the exchange rate appreciation, other factors also played a significant role. The 1990s were marked by the deep stagnation of the Japan economy. Japanese yen depreciated sharply during 1996–1997 [World Bank, 1998]. Because Asian countries' currencies were linked to the dollar, it put additional pressure on the exchange rates. Nevertheless the overall magnitude of real exchange rate appreciation (up to 15% over the 1995–1997 period) was lower than the one, which led Mexico in 1994 to the financial collapse [Sachs and Radelet ,1998; Corsetti, et al. 1998; World Bank, 1998].

2.3 Collapse of the Export Growth

Asian economic boom was partly based on the export promotion strategy. Export revenues were growing by an average of 18 percent a year in dollar terms. But the export growth began to slow down in the mid-1990s and drop remarkably in 1996. Appreciating exchange rate (aggravated by both the strong American dollar and surge capital inflow) contributed to the lower export growth relatively to the growth from the first half of 1990s and the growth rate of world trade as a whole.

The role of China in the declining export was also substantial. This is because two-fifths of the total trade of emerging Asia was within the Asian economic zone [Howell, 1999]. China, suffering from the common overproduction problem could not be a consumer of the ASEAN-5's production any more. Radelet and Sachs (1998) position on this is that China's export drop in 1996 limited its overall rise in the world market share and therefore influenced Southeast Asian's export collapse only partially. But the fact still remains that, in Thailand, in the year proceeding June 1997, export revenues rose just 1 percent [World Bank, 1998]. In Korea, in 1996 export grew only by 4 percent compared to 30 percent in 1995. Malaysia also fell a victim of the export slowdown from 26 percent in 1995 to 6 percent in 1996. Indonesia was able to sustain the same rate of growth in 1996 as it was in 1995, but still below the 1990–1992 average. The only exception was the Philippines, where the export growth was 19 percent in 1996 [Radelet and Sachs, 1998].

The plunge in export growth worsened a current account deficit and limited the ability to service unhedged, short-term debt thus exacerbating macroeconomic fundamentals. Foreign investors became reluctant to extend new loans because cost of borrowing offshore also went up. At best the accelerating current account deficit was financed with short-term currency borrowing. By the end of the 1997, short-term liabilities exceeded their holdings of foreign reserves in Thailand, Indonesia and Korea [Park and Song, 1998]. The vulnerability of Asian countries to the crisis was growing.

2.4. Current and Capital Account Problems

Capital inflows to Southeast Asia generated strong upward pressure not only on the exchange rate, but also on domestic demand. Given the size of these inflows and budget surpluses, governments were reluctant, or it was simply impractical, to offset the rise in domestic demand by fiscal contraction. The current account deficit rose:

Table 2-6. Current and capital account, minus indicate deficit (% of GDP)

	Current account			Capital account		
	1995	1996	1997	1995	1996	1997
Korea	-1.86	-4.75	-1.85	3.78	4.93	-2.07
Indonesia	-4.27	-3.41	-3.62	5.07	4.77	-2.80
Malaysia	**-9.83**	-5.89	-4.85	8.74	14.60	2.80
Philippines	-5.06	-5.86	-5.23	7.16	13.60	7.90
Thailand	-9.00	-9.18	-2.35	13.30	10.7	**-11.00**

Source of data: International Financial Statistics of the IMF; Internet sources: Nouriel Rubini web side

The literature usually considers a current account deficit in excess of 5 percent of GDP as a warning signal [Corsetti, et al. 1998] of its sustainability. The threat is even greater when the deficit is financed by '*hot money*' that can be easily reversed. Although the current deficits in Southeast Asia exceeded the dangerous level, the recent studies [Yoshitoni and Ohno, 1999] stress the large capital account surpluses as factors more related to the crisis. It is rather reasonable, since it is the capital inflow, which creates pressures, rather than current account per se.

The magnitude of the crisis and its duration on a scale unknown earlier led Yoshitoni and Ohno (1999) to look at the problem from a new perspective, which they call '*the capital account crisis*'. According to this theoretical framework, it was the capital account surplus, which drove current account deficit in Asia. Deteriorating current account prior to the crisis was in major part the result of the excessive capital inflows and therefore could not be the causative factor in the crisis. The chronology of this type of crisis goes as follows. From the external side, there is an excessive net capital inflow, which exceeds underlying current account deficit resulting in overall balance of payments surplus. The probability of the crisis increases together with the composition of this inflow, which is in large portion short-term and denominated in foreign currency. When capital inflows continue in its magnitude, the excess capacity (overproduction) of the economy causes the asset price bubbles in stock and real estate. Then doubts about sustainability of the accelerating current account deficit given the underlying fundamentals arise. Finally the bubble bursts. The capital reversal results in the balance of payments deficit, given the increased current account deficit. Foreign reserves are exhausted, exchange rate is abandoned. Internally, it is a banking crisis and resulting credit contraction, which cause problems. As the exchange rate depreciates, the balance sheets of financial institution with unhedged foreign-currency debt are seriously damaged. '*Twin crises*' reinforce each other through the balance sheet effect. The effect on the real economy is devastating.

This proposal by Yoshitoni and Ohno (1999) is worthy of consideration in the context of Southeast Asia because of Park and Song's (1998) finding. In opposition to Corsetti, et al. (1998), they show by plotting the ratio of the current account deficit (surplus) to GDP against the ratio of net capital inflow to GDP, that investment in the crises Asia, to the large extent, were driven by the enormous capital inflows and not by the implicit or explicit government guarantees ('*moral hazard*') in order to promote domestic investment to sustain high growth rates. This exercise was repeated twice for two different time periods: 1981–1989 and 1990–1995. During 1981–1989 the capital inflows were controlled in Asia, whereby Park and Song expected high correlation between net capital inflows and net private investments or net foreign savings. This is connected to the fact that when the current account is in deficit (CA= S-I; so when I>S, CA<0), authorities, in order to sustain the fixed exchange rate, would discourage surge increase in net flows (and vice-versa in the case of the current account surplus). Because in the 1990s, together with financial liberalisation, most of the Asian countries were able to borrow from the international capital markets the correlation was not expected. Obviously monetary authorities could sustain stability in the domestic financial market by using international reserves, but this is limited to the level of these reserves. Thus, in absolute values the current account deficit/ surplus would be closely correlated with net capital flows. Park and Song prediction was found to be supported by the data. Link to this, the causality proposed by Yoshitoni and Ohno (1999), which run from the capital account to the current account, brings an important voice in the debate on the interpretation of the financial crisis that hit the Asian economies in the process of their integration to the global market.

2.5. Financial Sector Fragility and Credit Contraction

But can and should the process of financial globalisation be stopped given the high capital mobility? Definitely not. Given the uneven distribution of savings and investment opportunities and thus its contribution to the economic growth, there is a need for international financial market. But still, it becomes important to consider how the macroeconomic and financial risk created by surge and potentially volatile capital flows can be best managed. Sound macroeconomic performance and policies are not questionable, but as the Asian 1997 crisis has shown, a robust financial sector is also highly required. According to Kaminsky and Reinhart (1995; 1998), banking sector problems typically precede a currency crisis. Another '*vicious circle*' spins: financial liberalisation precedes a banking crisis; a banking crisis precedes a currency crisis, which deepens the banking crisis even more.

For many years, most Asian economies kept their capital account closed. Foreign borrowing and capital inflows were controlled. It insulated domestic markets from external shocks. The situation changed during the 1990s, when the international financial market was de facto and de iure opened. Because of the dollar domination of the country's currency basket and the narrow band within which the Thai baht was allowed to float, the perceived risk of exchange rate losses caused by devaluation was rather small. This led to the dramatic increase in foreign borrowing by both banks and firms. In addition, borrowing from abroad was at about half the price of borrowing domestically [Wade, 1998]. Asian Development Outlook 1999 shows that while Asian companies maintained their strong bias towards the debt financing, foreign debt financing became increasingly important:

Table 2-7. Corporate Debt Composition, 1996 (in percent)

	Foreign debt		Domestic debt	
	Short term	**Long term**	**Short term**	**Long term**
Indonesia	20.5	19.6	31.4	28.5
Korea	29.4	17.0	27.7	25.8
Malaysia	32.1	11.0	35.7	21.2
Philippines	19.7	21.3	25.5	33.5
Thailand	29.6	12.3	32.0	26.1

Source: Asian Development Outlook, 1999

The World Bank (1998) reports, that between 1991 and 1996 overall borrowing doubled in Malaysia and Thailand and grew by one third in Korea. In contrast to Mexico, which relied strongly on securities, the main channel of rising these funds was through bank borrowing:

Table 2-8. Bank Credit to the Private Sector (percent of GDP)

	1980	1995
Indonesia	8.1	49.1
Korea	36.2	55.7
Malaysia	33.1	76.9
Philippines	37.9	39.3
Thailand	27.5	88.7
Memorandum items		
Mexico	12.8	33.6
United States	62.1	63.3

Source: BIS- 67th Annual Report

Liberalisation of the financial sector and the capital account opening is always dangerous in the presence of nascent and badly regulated banks that are able to borrow abroad. The danger increases if a financial sector is bank-based and when the corporate sector has high debt-to-equity ratio [Wade, 1998]. Whenever there are shocks to the economy (external or internal), which cause the currency to depreciate, balance sheets of enterprises worsen, often to the extent that companies become insolvent. In fact, it is what was happening in developing Asia. The intermediation role of the banking system and its appropriate ability to price the credit risk was weakened by inadequate supervision, relatively lax regulations, low capital adequacy rations, lack of adequate insurance schemes, often corruption and government direct lending. In Indonesia, for instance:

"The economy's vulnerability to financial collapse can be traced to the mid-1980s, when Indonesia opened the banking industry to competition but never put modern regulation in place. 'It's as if the Government had got rid of the policeman at every corner, but didn't bother to put up stop signs or lights', suggested [an economist at the University of Indonesia]. The traffic moved faster, but was prone to accidents" [Wade, 1998: 11].

As stressed above, when the capital controls were lifted, Asian economies became highly indebted. The debt was mostly dollar denominated and short-term. On the other hand, their assets were denominated in local currencies and were of longer maturity (currency and maturity mismatch). Once acute devaluation of the currencies occurred, the balance sheets of enterprises and banks were destroyed. With debt denominated in foreign currency devaluation of domestic currency led to the higher debt burden. Highly leveraged firms with insufficient cash flow were not able to meet their obligation any longer, thus also eroded the asset side of financial intermediaries. When banks started to call in short-term loans, it put additional pressure on the domestic enterprises, causing many to go bankrupt. Sinking corporations led to the further deterioration in banks' balance sheets and weakened their capital base.

Even if the above scenario can support the panic proponents of the Asian meltdown, it also shows the financial fragility caused by high intermediation from savers to investors via banks. Another aspect of this issue is the structure of the debt contracts. Most industrialised countries have their debt mostly denominated in home currency and of the long duration [Mishkin, 1999]. In the situation of devaluation, it is really unlikely that they would ever repeat Indonesian experience, where foreign-denominated debt increased four-fold once rupiah was devalued. Besides, the question to be asked is, how much of this investment had real chance to succeed and thus bring the future revenues if loans were rolled over?

Table 2-9. Liquidity and Currency Mismatches as of June 1997

	Short- term debt to international reserves (ratio)	Short- term debt to total debt (percentage)	Broad money to international reserves (ratio)
Indonesia	1.6	24	6.2
Korea	3.0	67	6.2
Malaysia	0.6	39	4.0
Philippines	0.7	19	4.9
Thailand	1.1	46	4.9

Source: World Bank (1998); Goldstein and Hawkins (1998); IMF, International Financial Statistic

Table 2-10. Debt-to-Equity Ratio of the Corporate Sector, 1996

	Debt-to- equity ratio	
	Mean	Median
Indonesia	1.88	1.83
Korea	3.55	3.25
Malaysia	1.18	0.9
Philippines	1.29	0.93
Thailand	2.36	1.85

Source: Asian Development Outlook, 1999

As indicated before the share of investment in GDP in 1990s rose in emerging Asia. Nevertheless, GDP growth rates remained roughly constant or were even falling. According to the World Bank (1998), high capital spending led to the overcapacity in many sectors, as these countries were pushing investments hoping to build up market share both domestically and abroad. The quality of an extraordinarily high rate of investments in Southeast Asia can be assessed using an incremental capital-output ratio (ICOR), which compares investments to changes in GDP. The higher the ratio the lower is the efficiency of investment. In 1990s the ICOR was systematically growing in Asia. As in the World Bank 1998 report, ICORs in Korea, Thailand, increased sharply, from 3 to 5 and more, indicating falling profitability of investments.

2.6. Asset Price Bubble

Relatively easy availability of credit in Asia helped not only to finance the region's fast growth, but also fuelled investment in increasingly poor and risky assets. The lack

of the capacity to cope with the rapid expansion of domestic credit translated into stock market bubbles. Usually, as the financial system is liberalised in developing countries, the following asset price cycle is observed. Banks, because of increased demand, extend their loans for the purchase of equities and real estate. The increased lending towards equities and property fuels the overall lending, as this type of loan serves banks as a good collateral while its price is rising. In such situation movements in assets prices can affect the health of an entire financial system. As the value of assets is appreciating, both borrowing and lending continue to increase. Competition between financial intermediaries drives the profit margin down, just as the risk is higher. Finally, the price bubble burst, when the property price exceeds the future returns from this investment. The timing of the event is, however, unknown due to difficulties in describing the adequate rate of discount and uncertainty about future returns.

In some countries in Asia, especially in Thailand, a great part of new investment went exactly to real estate and property sector [Krugman, 1998; Corsetii, et al. 1998]. In other, financial resources were directed toward narrowly specialised industries such as electronics or large, prestigious projects (infrastructure) of unclear returns [Asian Development Outlook, 1998]. This worsened the balance sheet of financial institutions. As Asian Development Outlook (1998) reports, in 1996, in Korea, 20 of the largest 30 Korean conglomerates had rates of return below the cost of invested capital. In the first months of 1997, 7 out of this 30, were effectively bankrupt. The return on equity in Indonesia, Malaysia and Thailand declined between 1992 and 1996 to below money market interest rates, according to the World Bank (1998), meaning that there was no compensation for the risk of investing in the Asian economies. Although the stock market price bubble was not so strongly exposed in Asia, growing pressures in real estates market were clearly more evident (Table 2-11).

BIS (1997) also provides evidence that property-price boom in emerging markets (in particular in Asia) had been much more intense than in the larger industrial economies. The percentage numbers provided by the BIS report show that the average increase in real prices in the property sector during the upswing period exceeded 20 percent annually in Asia, compared with about 10 percent in industrial economies. Even after considering that it was the process of industrialisation, which creates the strong demand for properties, in the end, together with non-stop private capital inflows, it created an excess supply and asset price bubbles. In early 1997 there was a slowdown in new bank loans towards the property investments, but the capitalisation of interest on increasing non-performing loans (NPLs) added to the volume of bank loans [BIS 67th Annual Report, 1997], thus increasing vulnerability of the banking sector to the crisis.

Table 2-11. Stock Market Prices Index (property sector in brackets)

	1990	1991	1992	1993	1994	1995	1996	1997
Indonesia	417.0	247.0	247.0	588.0	469.0	513.0	637.0	401.0
	(n.a.)	(119)	(66)	(214)	(140)	(112)	(143)	(40)
Korea	696.0	610.0	866.0	866.0	1027.0	882.0	651.0	376.0
	(n.a)	(n.a)	(n.a)	(n.a)	(n.a)	(n.a)	(n.a)	(n.a)
Malaysia	505.0	556.0	643.0	1275.0	971.0	995.0	1237.0	594.0
	(113)	(113)	(126)	(369)	(240)	(199)	(294)	(64)
Philippines	651.0	1151.0	1256.0	3196.0	2785.0	2594.0	3170.0	1869.0
	(32)	(34)	(39)	(81)	(80)	(87)	(119)	(59)
Thailand	612.0	711.0	893.0	1682.0	1360.0	1280.0	831.0	372.0
	(74)	(82)	(168)	(367)	(232)	(192)	(99)	(7)

Source: Corsetti, et al. (1998)

High level of non-performing loans reflected an overall low-transparency of investments in Southeast Asia. In 1997, according to Jardine Fleming [1997 BIS Annual Report], the maximum NPLs to total loans ratio in Indonesia, Malaysia, the Philippines and Thailand were 16.8, 15.6, 13.4 and 19.3 respectively. However, these numbers in 1998 increased to above 25.0 for Indonesia and Thailand and were between 12.0 and 25.0 in Malaysia and between 10.0 and 25.0 in Philippines. The dangerous level of non-performing loans in Asia varies remarkably across different studies. Private sector's estimates consider the share of non-performing loans in total bank loans between 15 and 35 percent as a 'warning flag', the signal of extreme bank difficulties in emerging Asia [Goldstein, 1999].

3. An Empirical Investigation

This chapter studies factors associated with the emergence of the Asian crisis using a simple probit econometric model. The goal of this study is to identify whether the onset of the crisis in East Asia was the result of the unsustainable deterioration in macro/ micro-fundamentals or caused by financial panic (however, it does not investigate the 'moral hazard' element in the Asian collapse scenario). Because of the controversy among researchers and dubious empirical results, this exercise was done in purpose to check the robustness of the probit analysis. Basically the probit estimation repeats the one done by Radelet and Sachs (1998), who do the probit analysis using alternative risk indicators in predicting the onset of financial crises in emerging markets to explore various hypotheses

about Asian collapse. On the basis of it, they diminish the role of current account deficit, exchange rate appreciation and the long-term debt, usually considered to be the most pronounced indicators in the onset of the financial crisis caused by the weak fundamentals. However, Park and Song (1998) show, also by estimating the simple probit model but using the smaller sample, that both current account deficit and overvalued exchange rate did matter in the onset of the Asian crisis. Indeed, this points out the existence of some fundamental problems in emerging Asia. But despite this finding, presented final results are inconclusive. This is because Park and Song also included another variable – the ratio of foreign reserves and short-term liabilities plus import – which was found to be significant. This would support the argument that the crisis was rather of a panic type, resulting from liquidity not solvency problems.

Radelet and Sachs' position on the role of real asset price bubble, the number of bad investments, the change in international conditions such as the fall in export, or depreciation of the yen against the dollar, is that they were not powerful enough to trigger the crisis. They do admit that there were growing weaknesses in the Asian economies in the early 1990s, which relates, among others, to inadequately planned financial liberalisation, resulting in establishing many new banks and finance companies lacking adequate supervision and capitalisation that increased economic vulnerability. This combined with the big capital inflow could cause fragility of the financial sector, but according to Radelet and Sachs, it was a self-fulfilling pessimism that made the major contribution to the onset of the meltdown of East Asian economies. They defend their view on the basis of the unanticipated character of the crisis and the continuing high level of capital inflow to these economies until the very brink of the crisis.

The first argument can easily be refuted when linked to Krugman's (1996b) paper. In accordance with it, the market can anticipate the possibility of the crises even if these are of self-fulfilling type. Krugman makes an assumption that the traditional trade-off between the cost of maintaining the exchange rate and the cost of abandoning it is predictably deteriorating. Then, because at some future date the country would be likely to devalue even in the absence of speculative attack, speculators would certainly try to get out of the currency ahead of devaluation. In doing so, they would worsen the government's trade-off, leading to earlier devaluation.

Some investors, as soon as they realise this, they would try to get out still earlier to be ahead of others. The final result will be the collapsing fixed exchange rate well before the fundamentals would appear to make devaluation necessary. As Krugman stresses, this scenario is like a '*first generation*' model where the crisis is provoked by the inconsistency of government policies, which make the long run maintenance of the fixed rate impossible. In this sense crisis is driven by economic fundamentals. Because

of inevitable eventual abandonment of a currency peg and perfectly informed investors a speculative attack on a currency will occur at the earliest date at which such an attack could succeed. Profits are competed away by attempts to anticipate the crisis.

The second argument given by Radelet and Sachs (1998) on the continuing level of capital inflows until the flotation of the baht in July 1997 does not hold, if referred to the '*moral hazard*' problem stressed by Corsetti, et al. (1998) as well as Krugman (1998). In the light of this scenario, capital continues to flow because of the guaranteed government's bail-outs. It is also important to remember (see Chapter II) that before the very brink of the Asian collapse flowing capital was to the great extent short-term, or using again market speculators' terminology – '*hot money*' was flowing into the region. This rather points to the perceived fragility not the confidence of investors about 'Tiger' economies.

Radelet and Sachs position on the important role of the high ratio of short-term debt to foreign reserves in triggering a financial crisis is that this ratio could be sustainable as long as foreign creditors were willing to roll over their loans. Obviously, borrowing from abroad may not be dangerous for sustainability of the economy if it finances new investments rather than consumption (countries which invest a lot usually grow fast), which was the case in Asia; but the investment boom was confined to the non-traded sector [Corsetti, et al. 1998]. The contribution of this investment to future trade surpluses was then limited to its indirect impact on the productivity of the trade sector.

As discussed in chapter two, the quality of many new investments in Asia can be at least questionable. However, Radelet and Sachs (1998) suggest that there was no sharp deterioration in loans' quality throughout the early 1990s, but this should be rather linked to the fact that NPLs are not easy to identify and usually are not reported. For instance, in Thailand, banks were allowed to wait for up to two years before reporting non-performing loans [Claesens and Glaessne, 1997 in Griffith-Jones, et al. 1998]. Yoshitomi and Ohno (1998) also stress that one should distinguish between NPLs arising from micro-level mismanagement and NPLs created by macro-instability. The latter will include enormous exposure to the currency and maturity mismatches and in the normal situation will not be reported. Even if Radelet and Sachs (1998) claim that NPLs were not responsible for the financial crisis in Asia, Corsetii, et al. (1998) by regressing the crisis index on the set of indexes of financial fragility (one of the proxies used to measure a weakness of the banking system, is the stock of NPLs as a share of total assets in 1996), external imbalances, official reserves adequacy and fundamental performance, found statistical significance of non-performing loans in the onset of the crisis. In addition to this, evidence on decreasing efficiency of the investment projects, given by the incremental capital-output ratio (ICOR) was found to be significant. With

the exception of Indonesia and the Philippines, this indicator was increasing, thus showing falling returns from the investment [Corsetti, et al. 1998].

Did investors perceive growing risk in Asia? Radelet and Sachs (1998) claim that they did not. Whereby, the credit line was opened not because of their belief in governments' bail-outs, but it was consistent with the expectation of rapid growth and high profitability of the region. This scenario undermines the role played by the '*moral hazard*' in triggering the Asian crisis. One source, which Radelet and Sachs (1998) base their statement on, is the BIS 1997 Annual Report, which shows that the spread on new bonds issued by the emerging countries fell in the 1990s. Yet the same report points out that the similar decline in spreads on US junk bonds was observed. This fact rather facilitated greater liquidity, an increased demand for risk and hence lower spread in the international capital markets, than the improvement in the access of emerging markets to capital markets. In addition, spreads were declining mostly in lower-risk credit categories but not for the high-risk borrowers, rated in lower classes where they remained high.

3.1. The Empirical Specification

As pointed out above, in the debate about panic versus weak fundamentals dubious results were obtained by Park and Song (1998) and Radelet and Sachs (1998), although the same econometric methodology was used. It was interesting to repeat the exercise in order to be able to establish how sensitive and thus not robust is the probit estimation. Because Radelet and Sachs (1998) use the probit analysis to find the support for their theory about the panic character of the Asian crisis and because Park and Song (1998) could not really agree with it, the main purpose of the model estimated here was to be able to get as close as possible to the Radelet and Sachs (1998) model. By doing so one should expect to get similar results. Because there are some omitted variables in the Radelet and Sachs (1998) estimation, variables which could serve as a support for fundamentalists, or be in favour of the panic scenario, they were also incorporated into the model (i.e., stock prices, growth rates of GDP).

3.2. The Model

The estimated binary probit model uses a panel of annual data spanning 1994 through 1998 for 19 emerging markets. This sample is short of three countries (Hungary, Taiwan

and Zimbabwe) comparing to Radelet and Sachs (1998) analysis, subject to the data availability, but consists of an additional year, 1998. The event of interest is a financial crisis in a given country. The dependent variable takes the form of a dummy variable, which equals one when the country fell into the crisis and zero otherwise. There are nine countries in the sample which did not experience a crisis in the period under consideration, therefore serving as a control group: Brazil, Chile, Columbia, India, Jordan, Peru, Poland, Russia, South Africa and Sri Lanka. Following Radelet and Sachs (1998), a financial crisis is defined as an abrupt shift from the capital inflows to the capital outflows between the year t-1 and the year t. The only exception is the case of Mexico where 1994 and 1995 were checked as the date of event. The reason why both years were tried instead of just 1995 as in Radelet and Sachs (1998), is the fact that it was the 1994 devaluation which gave rise to a run on peso and the panic in the market. Besides, the March 1994 assassination of the presidential candidate Colosio dried up a significant part of the capital inflow. In 1995 growth was returning to the region while inflation was declining [Edwards, 1997]. Because the estimation setting 1994 as a crisis year was found to be more significant, all robustness analysis was consistent with this choice. However, this finding shows how sensitive is the probit estimation and thus very limited. Also, it points out on the importance of inclusion of lagged variables in the estimation whenever the crisis starts in the beginning of the year (as Radelet and Sachs marked the Mexico collapse).

The potential criticism of the description of the crisis indicator adopted by Radelet and Sachs (and followed in the estimation below), is that when they check for an explanatory variable, the ratio of short-term capital inflow to GDP, they allow the explained and explanatory variables to move together. In this case short-term capital inflow will always be found statistically significant. In order to check the association of this indicator (as well as others) with the onset of a crisis, it is important to include lagged variables as regressors in the model. The other possibility is to construct an index of the speculative market pressure [as Eichengreen, et al. 1996], which will be a weighted average of exchange rate changes, reserve changes and interest rate changes (the reason for combining these three variables lies in the possibility to meet excess demand for foreign exchange through several channels, i.e., rising interest rates) as the dependent variable. Then, the financial crisis will be defined as an extreme value of this index (deviation from the sample mean).

The sample includes 10 cases, which are set to one (Russia joined the crisis group because the 1998 year was included): Mexico, Turkey and Venezuela in 1994, Argentina in 1995, Indonesia, Korea, Malaysia, the Philippines and Thailand in 1997 and Russia in 1998. Whenever the crisis occurred the country was dropped from the sample. As in

Radelet and Sachs (1998), it was assumed that the reversal from the inflows to the outflows could occur only once in the sample. This was also done to avoid feedback effects influencing the behaviour of some explanatory variables. For instance, a current account deficit could turn into the surplus when the capital outflows are reflected in the capital account deficit. In total there are 76 observations compared to the 78 of Radelet and Sachs (1998).

The benchmark regression contains six independent variables: ratios of the short and total debt to foreign reserves, ratios of capital account, short term capital inflows and banking claims on the private sector to GDP and real exchange rate appreciation. Only one – corruption – is missing comparing to the Radelet and Sachs' 1998) estimation (again a consequence of limited data availability). Results obtained are, however, different and will be presented and discussed below. In order to check the sensitivity of the probit analysis to this scheme, different sets of independent variables were also tried. No more than nine variables could be included at the same time. This is because explanatory variables were lagged up to one year and then due to the short time period the model seemed to be overparametarised.

Independent variables were chosen on the basis of the previous studies on currency and banking crises, as well as some theoretical suggestions [Kaminsky, et al. 1998; Eichengreen, et al. 1996; Sachs, at al. 1996]. Because of the 'twin' nature of the Asian crisis not only macroeconomic variables, but also some financial variables were tried plus the contagion dummy. The latter variable was defined as the proportion of the sample hit by the crisis and was found to be insignificant.

3.3. Choice of Independent Variables

Debt profile:

– Ratio of short-term foreign debt to foreign reserves (in percent) – high value of this variable suggests that country becomes more vulnerable to the crisis. A crisis would be more consistent with liquidity problems whenever creditors refuse to roll over the debt.

– Ratio of total debt to foreign reserves (in percent) – high value of this ratio should also increase the fragility of the economy, but the possible crisis would be more of the insolvency type.

–These two variables were included in the model following the Radelet and Sachs (1998) suggestion in order to establish what triggered the financial crisis in Asia: panic or problems in fundamentals.

Current account:

– Ratio of the current account to GDP (in percent) – large ratio of a current account deficit (above 5% of GDP) was a warning signal in the previous episodes of financial crisis. It is a common sign of unsustainable macroeconomic policies.

– Real exchange rate appreciation – according to many empirical studies [Sachs, et al. 1996; Kaminsky, et al. 1998; Flood and Marion, 1998] real exchange rate overvaluation is closely associated with financial crisis. The real exchange rate is derived from a nominal exchange rate index, adjusted for relative consumer prices. An increase in the index reflects an appreciation. To avoid the bias towards the American dollar (since Asian economies were effectively pegged to this currency, appreciation of the dollar in mid-1990s against the Japanese yen would affect Asian currencies) and to allow for the comparison with a wider group of countries, real effective exchange rate (an index of the period average exchange rate of the currency in question to a weighted geometric average of exchange rate for the currencies of selected countries and the Euro Area) was used. Whenever data was not available, market rates were used. The estimation was done in the first differences of natural logarithms.

Radelet and Sachs (1998) included both variables.

Capital account:

– Ratio of capital account to GDP (in percent) – Radelet and Sachs (1998) argue that capital account may be more important than the current account itself, since capital inflows are blamed to be a key component of the crisis (however, they do not report the result). This is also consistent with the Yoshitoni and Ohno (1999) 'capital account crisis' theoretical framework.

– Ratio of the short-term capital flows to GDP (negative sign indicates outflow) – according to the theory and empirical work surge short-term capital inflow increase probability of the crisis.

Also included by Radelet and Sachs (1998).

Financial:

– Ratio of banking claims on private sector to GDP (in percent) – countries with a rapid build – up of bank credit would have a more fragile banking system and greater probability of bad loans and, thus, greater vulnerability to a crisis. The higher the ratio, the greater the risk of the crisis. Explicitly, this ratio may also indicate the quality of loans.

– Currency mismatch – calculated as the ratio of banking system net foreign liabilities to domestic assets (in percent) – the higher is this ratio, the more banking sector is vulnerable to shocks such as domestic currency depreciation. Devaluation increases the

value of bank's liabilities, but at the same time there is no simultaneous rise in bank's assets.

The first of the above variables was also included in regression by Radelet and Sachs (1998). However, the second one was not tried. Both financial indicators were tried in the model presented below.

Real sector:

– Growth rate of GDP per capita – currency crises are believed [Kaminsky and Reinhart, 1998] to occur as the economy enters a recession following a prolonged boom in economic activity fuelled by credit expansion, capital inflows and accompanied by an overvalued currency. Because growth rates in Southeast Asia were slowing down prior to the crisis, this variable was also tried.

– Ratio of investment to GDP – Southeast Asian countries generally showed a rapid rise in domestic investment prior to the crisis often exceeding the 'safe' level, as in Howell (1998).

– ICOR – incremental capital-output ratio, which compares investment to changes in GDP. Since Asian countries are blamed for the misallocated investment, a high value of this variable should represent a low efficiency of investment. Because of the high rate of banks' credit to the private sector, it would put an additional pressure on the banking sector in the situation of the credit crunch in the onset of the crisis, i.e. because of bankruptcies.

None of these variables was tried in the probit analysis done by Radelet and Sachs (1998).

Fiscal:

– Ratio of budget deficit to GDP (in percent) – countries with large budget deficits are more vulnerable to the crisis. All crises of 1980s took place because of fiscal problems. Also the recent crisis in Russia is a standard, 'first generation' theoretical framework example.

The above variable was also not included in the Radelet and Sachs' 1998 analysis.

Others:

– Contagion dummy – proportion of the sample hit by the crisis. The variable was inserted in the regression in order to check if the crisis in one country could trigger the crisis in another.

Some other variables were tried here: the ratio of M2 to foreign reserves (usually seen as a good predictor of the crisis, especially the one of panic type, related to the

sudden capital outflows), inflation, domestic deposit interest rates as well as interest rates differential. These together with a contagion dummy variable did not bring significant results and thus will not be presented below. Stock market prices were included in the model, but because of the data availability the behaviour of this variable was checked only for crisis economies. It's performance was moderate (significant at the 10% level) therefore results won't be shown either. Of course, this is not a complete list of potential indicators of the Asian crisis. In particular, terms of trade shocks (caused by the dollar appreciation) were not incorporated in the probit analysis, nor were some political variables, but this was constrained by data availability.

3.4. Data Source

The main source of data was the 'International Financial Statistics' (IFS), International Monetary Fund (IMF). When the data was missing other sources were used. The data on short-term debt and total debt was taken from 'World Development Indicators', The World Bank (WB) and 'Global Development Finance', WB. The IMF, WB and the Bank for International Settlements (BIS) provided the most recent data on these variables on line. The data on real effective exchange rate, as well as on current account partially comes from Corsetti, et al. (1998), partially from IFS, IMF.

3.5. Empirical Results

The main finding of the binary probit analysis is rather ambiguous. The results are not very reliable, because of the high sensitivity of this model to the sample size as well as to the changes in the explanatory variables included. The benchmark regression, which was run in order to compare with the benchmark regression of Radelet and Sachs (1998), gave different results. Obviously, there are a few differences between the models. Among them there is a difference in computing some variables (the real exchange rate appreciation), the corruption variable is missing, the sample is smaller (but just three countries are omitted), the data sources may be different. But overall the differences are not that significant and thus one would expect that results obtained would be consistent. Nevertheless, this is not the case.

Table 3-1. Probit Maximum Likelihood Estimation (63 observations used for estimation)

Dependent variable is **CRISIS**									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.002	-.002	-.0025	.89E-3	.89E-3	.79E-3	-3.13 [.003]	-3.21 [.002]	**-3.22 [.002]**
Short-term debt/reserves	.007	.0076	.0072	.0025	.0025	.0025	2.85 [.006]	2.92 [.005]	**2.86 [.006]**
Claims on the private sector/GDP	.006	.006		.0061	.0062		0.97 [.334]	.975 [.333]	
Short term capital inflow/GDP	-.184	-.194	-.196	.069	.070	.070	-2.63 [.011]	-2.77 [.007]	**-2.79 [.007]**
Current account deficit/GDP	.181	.186	.132	.086	.087	.062	2.08 [.042]	2.14 [.036]	**2.11 [.039]**
Real exchange rate	-.006			.454			-0.42 [.675]		
	(I)			(II)			(III)		
Goodness of fit	0.90			0.90			0.88		
Pseudo-R-Squared	0.62			0.61			0.60		
Akaike information criterion	-22.21			-21.64			-21.11		

The table presented above shows three regressions, which were run in order to check the robustness of the first one. However, when the insignificant variables were dropped the results of the first specification did not change. Real exchange rate overvaluation is usually blamed for the increased vulnerability to the crisis (i.e. Mexico 1994). Unexpectedly, this coefficient appeared to be statistically insignificant and was not of the expected sign (the rise in the index indicates appreciation). As in Radelet and Sachs (1998), the coefficient was also close to zero. Possibly the result could be improved if the real exchange rate appreciation would be defined as the deviation from the trend. Considering short time period under consideration and the available annual data this exercise was not done here.

As can be seen, a current account was clearly associated with the onset of the crisis. In all three columns the estimated coefficients were of the correct sign (negative sign indicates deficit, so the larger is the deficit the higher is the probability of the crisis) and were significant at the 5% level. It supports Corsetti, et al. (1998) and Park and Song (1998), who do find that current account deficit was an important indicator of the financial crisis. Also, to some extent, significance of the current account variable favours the argument that weak fundamentals were responsible for the Asian collapse. The short-term debt variable was also of the expected sign and was significant at the 5% level. The higher is the short- term debt in relation to foreign reserves, the more likely is the crisis. As was discussed above, the crisis would be more of the panic type, where the country looses its liquidity whenever creditors refuse to roll-over the debt. This result is consistent with the one of Radelet and Sachs (1998). But in opposition to them the magnitude of the total debt turned out to be even more significant. The negative sign was connected to the fact that the total debt incorporates the long-term debt. Though not presented here, the ratio of the long term debt and reserves was also tried and was also found to be statistically more significant than the short- term debt. I agree with Radelet and Sachs (1998) that the importance of the stock of the short- term debt in the onset of the Asian meltdown would suggest that these crises were rather crises of liquidity not solvency. Yet, the significance of the long-term debt and the negative value of its coefficient can be interpreted as the reluctance of creditors to serve with long-term loans (the smaller the long-term debt, the higher the likelihood of the financial crisis). This depends on how investors perceive a given economy. Whenever they think it is vulnerable to sudden, external or/and internal shocks, they would be reluctant to provide long-term loans. If government's ability to keep on its promises is questionable it may also influence investors' decisions. In this situation, when the crisis erupts, it becomes impossible to convert the short-term debt into the long-term loan. In the light of it, Asian economies would be rather

victims of important structural weaknesses that eventually triggered the economic slump.

The above interpretation of the long-term debt variable raises the issue of causation: did investors perceive the fragility of the economy and was that why they did not invest money for longer period, or was it the crisis itself which discouraged creditors to roll-over their loans? To limit the problem lagged variables should be included in the probit modelling.

Rapid credit expansion was not associated with the onset of the crisis. The coefficient was of the correct positive sign, but remained insignificant even when the exchange rate variable was excluded from the regression. These results were similar to those of Park and Song (1998), who also failed to establish a significant statistical relationship between the credit boom and the onset of financial crisis [but different from those of Radelet and Sachs, 1998].

Short-term capital inflow was significant at the 5% level and had an expected negative sign. Whenever the country experienced a capital outflows this was marked by the negative sign in a data, so when the surge inflow was reversed, it triggered the crisis. The sharper the outflow, the higher the likelihood of the crisis. Capital inflow was statistically even more significant than the current account deficit prior to the financial crisis. This can support the '*capital account crisis*' of Yoshitoni and Ohno's (1999) framework and show the new character of the Asian crisis. But high statistical significance of the capital inflow variable can be attributed to its movement (together) with the dependent variable, as already pointed out. However, when the regression was lagged up to one year, this variable was still significant.

When the capital account variable was tried (Table 3-2) in the model instead of the current account, it turned out to be slightly less important than the current account itself (the third regression, Table 3-2). The negative coefficient relates to the fact that when the capital account converts into the deficit, the probability of the crash increases. The capital inflow this time, however, lost its 5% significance and became significant at the 10% level. This is because short-term capital inflow is already incorporated in the capital account surplus. When short-term capital inflow was dropped (the fourth regression, Table 3-2), capital account became highly significant, more than the current account. This finding is also consistent with the Yoshitoni and Ohno's argument, that it was the enormous capital account surplus which finally led to the financial collapse once investors started to pull out their money from Asian emerging markets.

Table 3-2. Probit Maximum Likelihood Estimation (63 observations used for estimation)

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.002	-.002	-.002	.87E-3	.88E-3	.81E-3	-3.06 [.003]	-3.13 [.003]	-3.19 [.002]
Short-term debt/reserves	.006	.006	.006	.002	.002	.002	2.54 [.014]	2.59 [.012]	2.59 [.012]
Claims on the private sector/GDP	.003	.003		.005	.005		.630 [.531]	.605 [.547]	
Short term capital inflow/GDP	-.107	-.011	-.128	-.083	-.084	.083	-1.28 [.204]	-1.47 [.114]	-1.53 [.130]
Capital account deficit/GDP	-.114	-181	-.129	.075	.074	.063	-1.96 [.054]	-1.98 [.052]	-2.03 [.047]
Real exchange rate	-.190			.459			-0.415 [.680]		
	(I)			(II)			(III)		
Goodness of fit	.9047			.904			.873		
Pseudo-R-Squared	.6291			.617			.613		
Akaike information criterion	-22.19			-21.74			-20.89		

(IV)			
	Coefficient	Standard error	T-Ratio[prob.]
Total debt/Reserves	-.002	.72E-3	**-3.12 [.003]**
Short-term debt/Reserves	.005	.002	**2.46 [.017]**
Capital Account/Reserves	-.184	.048	**-3.76 [.000]**
Goodness of fit	.9047		
Pseudo-R-Squared	.579		
Akaike	-21.38		

The overall probit estimation suggests the existence of fundamental problems in the crisis economies examined rather than their vulnerability to a financial panic only. This is connected to the fact that the current account turned out to be significant in the first model (original, Table 3-1) in all three run regressions. Indeed, the exchange rate appreciation showed no significance, but it should be read with a certain amount of caution due to difficulties in measurement of this variable (the roots of Mexico 1994 collapse lay mainly in the large appreciation of the real exchange rate!). The next variable (relevant for financial panic), ratio of short-term debt to reserves, was found to be important in the onset of these crises, but the total stock of debt (also long-term) was even more significant. Obviously, further analysis is needed here. This could include, for instance, a decomposition of this debt in order to establish the status of particular creditors (IMF's, World Bank's loans). Countries like Russia, with high budget deficits, are likely to have a larger portion of official loans in proportion to total debt, comparing to Southeast Asian countries where the budgets were mostly balanced. Linked to this, the low fraction of total debt to reserves should be read not as the reluctance of private investors to lend money long, but simply because of small official loans. Then a possible crisis could be rather interpreted as financial panic caused by the reluctance of investors to roll-over their loans.

Radelet and Sachs's (1998) empirical investigation led to a different conclusion: self-fulfilling prophecy rather than a fundamental problem was responsible for the Asian 1997 crash. This is why further analysis was carried on in order to check the robustness of the results obtained. The sensitivity analysis utilised the additional, variables described already. In the benchmark (original) regression the financial variable indicating the credit expansion was found not to be significant. Thus, the proposition about financial sector instability caused by the credit boom in Asia subject to inappropriate risk managing, was not confirmed in this empirical investigation. Therefore, apart from macro-economic variables, one micro-economic was also incorporated into the model. Then the '*general to specific*' approach was applied. In this regard several regressions were run. The variables which were always set in the model were: the ratio of short-term debt to reserves, the ratio of total debt to reserves, the ratio of the short-term capital inflow to GDP, the ratio of current account to GDP, the exchange rate appreciation and the ratio of banking claims on the private sector to GDP [basically these of Radelet and Sachs, 1998]. In the end, there were only two variables which did not change their behaviour comparing to the original regression. These were short-term capital inflow (significant at the 5% level) and real exchange rate appreciation (always insignificant), even when one period lags were tried.

Table 3-3. Probit Maximum Likelihood Estimation (62 observations used for estimation)

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.002	-.002	-.002	.001	.001	.001	-2.31 [.024]	-2.41 [.019]	-2.41 [.019]
Short-term debt/reserves	.007	.007	.007	.002	.002	.002	2.66 [.010]	2.75 [.008]	2.68 [.010]
Claims on the private sector/GDP	.013	.013	.012	.008	.008	.008	1.49 [.140]	1.538 [.130]	1.47 [.146]
Short term capital inflow/GDP	-.192	-.201	-.209	.080	.080	.079	-2.38 [.021]	-2.50 [.015]	-2.62 [.011]
Current account deficit/GDP	.058	.070		.101	.101		.576 [.566]	.687 [.495]	
Real exchange rate	-.698			1.712			-.407 [.685]		
The growth rate of GDP	-.229	-.227		.115	.111		-1.993 [.051]	-2.03 [.046]	
Budget deficit/ GDP	.085	.086		.115	.116		.736 [.465]	.736 [.465]	
	(I)			(II)			(III)		
Goodness of fit	.903			.903			.887		
Pseudo-R-Squared	.696			.686			.683		
Akike information criterion	-21.02			-20.37			-19.62		

Table 3-3. cont

Dependent variable is CRISIS			
Regressor	Coefficient	Standard error	T-ratio[prob.]
(IV)			
Total debt/Reserves	-.003	.001	**-2.96 [.004]**
Short-term debt/Reserves	.007	.002	**2.68 [.009]**
Short term capital inflow/GDP	-.221	.078	**-2.82 [.007]**
The growth rate of GDP	-.266	.099	**-2.67 [.010]**
Claims on the private sector/GDP	.014	.008	**1.81 [.075]**
Goodness of fit	.870		
Pseudo-R-Squared	.677		
Akaike	-18.84		

The inclusion of just two new variables (Table 3-3), the growth rate of GDP and the ratio of the budget deficit to GDP, changed the previous result. The current account variable was no longer significant in the onset of the financial crisis. Banks' claims on the private sector were still of the expected positive sign, but now were statistically significant at the 10% level. This is consistent with the hypothesis that liberalisation of the financial system in the environment of weak regulations and inadequate bank supervision can cause damaging problems, financial crisis being one of them. The credit expansion itself is not a problem, but when it involves excessive risk taking, it may result in large loans losses in the future.

Capital inflow, short-term debt and total debt variables were again significant at the 5% level (with total debt being more strongly associated with the crisis). The performance of new added variables was as follows. The budget deficit was not statistically associated with the onset of a crisis, but the growth rate of GDP was (the lower the growth the more likely the crisis) and was significant at the 5% level. The fact that the growth variable was statistically important supports rather the fundamentalist proponents of the Asian meltdown.

But checking for just contemporaneous variables as regressors can be misleading. This is because they may not be really exogenous and thus can fail to serve as the early warning signals (the causality issue). The slowdown in the growth rate of GDP just before the currency crisis, for instance, may be a result of the credit contractions caused by banking difficulties, which usually precede currency crises [Kaminsky and Reinhart, 1995; 1998] and not be a result of problems laying in the real side of the economy. This was the reason (apart from the problem with defining the dependent/ crisis variable) for lagging the regression up to one year, as will be shown in the Table 3-4.

After considering one year lags, the only variables associated with crises were: short-term capital inflow (outflow), the growth rate of GDP and finally the ratio of budget deficit to GDP, all being of expected sign and significant at the 5% level. Variables like short-term debt, total debt and claims on the private sector were relevant at the onset of currency crises anymore. This time however, association of short-term debt with a crisis was statistically more important than the total debt, nevertheless, both were insignificant (regression IV, Table 3-4). What is surprising is the budget deficit, previously not associated with the crisis, now found to be strongly significant. One possible explanation of this piece of evidence can be that just before the eruption of the crisis, governments started to offset an excess demand by fiscal contractions. But considering the sensitivity of the probit modelling, it can be also the effect of the change in the sample size. Overall, results show again that examined crises tended to emerge when the macroeconomic environment was weak; the GDP

Table 3-4. Probit Maximum Likelihood Estimation (47 observations used for estimation)

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.002	-.002	-.001	.001	.001	.001	-1.08 [.286]	-1.130 [.265]	-1.20 [.236]
Short-term debt/reserves	.007	.007	.007	.005	.005	.004	1.29 [.202]	1.36 [.180]	1.45 [.153]
Claims on the private sector/GDP	.010	.010	.010	.010	.010	.010	1.01 [.315]	1.01 [.315]	.99 [.326]
Short term capital inflow/GDP	-.262	-.270	-.248	.150	.149	.117	-1.74 [.089]	-1.81 [.078]	-2.11 [.041]
Current account deficit/GDP	-.043	-.036		.142	.143		-.302 [.764]	-.253 [.801]	
Real exchange rate	-1.14			2.914			-.394 [.695]		
The growth rate of GDP	-.309	-.320	-.297	.156	.160	.137	-1.98 [.055]	-1.99 [.053]	-2.16 [.036]
Budget deficit/ GDP	.347	.378	.383	.223	.236	.235	1.55 [.128]	1.59 [.118]	1.62 [.111]
	(I)			(II)			(III)		
Goodness of fit	.872			.872			.893		
Pseudo-R-Squared	.743			.765			.734		
Akaike information criterion	-23.76			-22.08			-20.19		

Table 3-4. cont.

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(IV)	(V)	(VI)	(IV)	(V)	(VI)	(IV)	(V)	(VI)
Total debt/Reserves	-.001			.001			-.843 [.404]		
Short-term debt/Reserves	.006	.002		.004	.002		1.34 [.187]	1.15 [.256]	
Short term capital inflow/GDP	-.253	-.206	-.203	.123	.100	.093	-2.05 [.046]	-2.04 [.047]	**-2.17 [.035]**
The growth rate of GDP	-.229	-.245	-.184	.106	.098	.067	-2.15 [.037]	-2.48 [.017]	**-2.75 [.009]**
Budget deficit/ GDP	.457	.478	.371	.234	.219	.171	1.94 [.058]	2.18 [.035]	**2.15 [.036]**
Goodness of fit	.893			.872			.872		
Pseudo-R-Squared	.720			.708			.691		
Akaike	-14.11			-14.20			-14.09		

Table 3-5. Probit Maximum Likelihood Estimation (63 observations used for estimation)

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.002	-.003	-.003	.001	001	.001	-2.90 [.005]	-3.01 [.004]	**-2.96 [.004]**
Short-term debt/reserves	.007	.007	.007	.002	.002	.002	2.65 [.010]	2.74 [.008]	**2.68 [.009]**
Claims on the private sector/GDP	.010	.015	.014	.008	.008	.008	1.83 [.073]	1.89 [.063]	**1.81 [.075]**
Short-term capital inflow/GDP	-.205	-.214	-.1965	.079	.078	.070	-2.58 [.012]	-2.72 [.009]	**-2.82 [.007]**
Current account deficit/GDP	.051	.061		.102	.101		.503 [.616]	.601 [.550]	
Real exchange rate	-.588			.102			.503 [.616]		
The growth rate of GDP	-.233	-.233	-.266	.116	.111	.099	-2.00 [.050]	-2.08 [.041]	**-2.67 [.010]**
	(I)			(II)			(III)		
Goodness of fit	.903			.903			.870		
Pseudo-R-Squared	.690			.682			.677		
Akaike information criterion	-20.30			-19.65			-18.84		

growth variable remained strongly significant even when lagged one period. However, when only a growth variable was added to the original regression, particular variables performed differently (Table 3-5).

Now, both short-term debt and total-debt were significant at the 5% level and as in the benchmark regression, total-debt was more strongly associated with the crisis. Again short-term capital inflow as well as the growth rate of GDP were highly related to the crisis variable (5% level). The credit boom represented by the claims on the private sector variable, was of the expected positive sign and was significant at the 10% level. When one-year lags were included (not presented here) short-term debt performance deteriorated and became significant at the 10% level. Possible explanation of this result is that just prior to the crisis the short-term debt usually increases compared to the previous year as investors perceive the fragility of the economy and become reluctant to provide long-term loans. Remaining variables performed in the similar way. Summarising, final results of this model portray the scenario where capital outflow was a symptom of underlying fundamental problems like slowdown in the growth rate of GDP and credit expansion combined with excessive risk taking.

In the next probit estimation (Table 3-6), a new financial variable was added – a currency mismatch. This was done because of the inconclusive behaviour of the claims variable when different sets of explanatory variables were tried (in the original regression, Table 3-1, it was statistically insignificant, then turned to be significant at the 10% level, Tables 3-3; 3-5). Thereafter, again '*general to specific*' methodology was applied. This time, the sample size was smaller compared to the previous one, due to data availability. Fifty-seven observations were used. Apart from the set of variables inserted in the original regression, the performance of the following was checked: the ratio of budget deficit to GDP, the growth rate of GDP and the currency mismatch.

The results obtained look similar to results presented in the model where, apart from the growth rate of GDP, budget deficit was included (Table 3-3). When variables were lagged, their behaviour was also similar: short-term capital inflows, the ratio of budget deficit to GDP and the growth rate of GDP were the ones which mattered in the onset of the crisis (significant at 5% level). The currency mismatch was not statistically associated with the crisis. Firstly, this may be because the data availability was constrained. Secondly, it may be because data on currency mismatches in the banking sector do not capture direct corporate sector borrowing from foreign creditors. But when the sharp devaluation occurs, the collapsing enterprises put an additional pressure on domestic banks' balance sheet from the asset side. Bearing in mind high indebtedness of the corporate sector in Asia, this could influence obtained result.

Table 3-6. Probit Maximum Likelihood Estimation (57 observation used for estimation)

Dependent variable is CRISIS									
Regressor	Coefficient			Standard error			T-ratio[prob.]		
	(I)	(II)	(III)	(I)	(II)	(III)	(I)	(II)	(III)
Total debt/reserves	-.0026	-0027	-.0023	.001	.001	.001	-1.90 [.063]	-2.10 [.041]	-2.08 [.042]
Short-term debt/reserves	.006	.006	.005	.003	.003	.003	1.80 [.007]	1.79 [.079]	1.72 [.090]
Claims on the private sector/GDP	.014	.014	.014	.010	.009	.009	1.40 [.166]	1.54 [.129]	1.50 [.139]
Short-term capital inflow/GDP	-.269	-.277	-.254	.123	.121	.106	-2.17 [.034]	-2.27 [.027]	-2.39 [.020]
Current account deficit/GDP	.110	.111		.145	.148		.758 [.452]	.750 [.456]	
Real exchange rate	-7.33	-7.45	-8.80	7.25	7.15	6.71	-1.01 [.317]	-1.04 [.303]	-1.31 [.196]
The growth rate of GDP	-228	-.230	-.289	.140	.142	.123	-1.62 [.111]	-1.62 [.111]	-2.34 [.023]
Budget deficit/ GDP	.023			.118			.201 [.841]		
Foreign liabilities/domestic assets (currency mismatch)	.072	.074	.051	.060	.060	.048	1.19 [.238]	1.23 [.222]	1.06 [.293]
	(I)			(II)			(III)		
Goodness of fit	.859			.859			.877		
Pseudo-R-Squared	.704			.703			.695		
Akaike information criterion	-20.67			-19.69			-19.01		

Table 3-6. cont.

Dependent variable is CRISIS						
Regressor	Coefficient		Standard error		T-ratio[prob.]	
	(IV)	(V)	(IV)	(V)	(IV)	(V)
Total debt/Reserves	-.002	-.003	.001	.001	-2.17 [.035]	**-2.89 [.006]**
Short-term debt/Reserves	.005	.007	.003	.002	1.84 [.071]	**2.63 [.011]**
Short-term capital inflow/GDP	-.203	-.220	.082	.078	-2.45 [.018]	**-2.81 [.007]**
The growth rate of GDP	-.270	-.262	.110	.101	-2.44 [.018]	**-2.58 [.012]**
Claims on the private sector/GDP	.015	.014	.008	.008	1.77 [.082]	**1.75 [.085]**
	(IV)			(V)		
Goodness of fit	.877			.859		
Pseudo-R-Squared	.680			.650		
Akaike	-18.62			-18.82		

Because of the earlier suggestion about excessive investment in Southeast Asia, some of them being risky and of low quality, variables like an incremental capital-output ratio (ICOR) and a ratio of investment to GDP were also tried (as suggested by Howell, 1999, investments which are mounting as high as 40% of GDP have low probability of being sustainable). This, however, did not bring any expected results and this is why it won't be presented. Both variables were of negative signs and of no statistical importance.

The negative sign of the ICOR variable can be explained by the fact, that when the level of GDP was lower in the following year than in the given, the ratio of the investment to changes in GDP had a negative sign. The failure of its statistical performance, on the other hand, can be related to the high sensitivity of the probit model, but also can be judge by the economic theory. An ICOR variable is influenced not only by poor quality and misallocated investment, but also by other factors like structural changes, capital deepening, a business cycle (an ICOR rise during a slowdown of the economy and fall during a recovery). In this case high value of this variable would not necessarily indicate falling efficiency of investments. It can be connected to some of these factors. As suggested by the World Bank (1998), in this situation, one should probably calculate an ICOR as five years moving averages to reduce cyclical effects.

The negative sign of the investment variable can be possibly connected to the fact that it is often the economic downturn (recession) which triggers the crisis. Then the new character of the Asian financial crisis (in the great part related to overproduction problem) could be undermining by the presence of other crisis economies (suffering from negative cyclical effects) in the sample. Thus, it is possible that over-capacity of Asian economies could not show up in the regression.

So far, it seems to be highly improper to make any conclusions about the financial crisis in Southeast Asia on the basis of the probit estimation. The behaviour of particular crisis indicators shows a great sensitivity to the introduction of new variables as well as changes in the sample size. The lack of consistency in their performance raises the question, whether it is really possible to infer anything about the variables responsible for triggering financial and currency crises by probit modelling. Another question considers the classification of the Asian crisis to any existing theoretical framework using this type of econometric methodology. In the discussion on panic versus fundamentals, everybody can find some support consistent with their own belief about the collapse of 'Asian Tigers'. In the benchmark regression the performance of the current account deficit, a macroeconomic variable that points to fundamental instability, was strong, then after adding some more variables it disappeared. Again, the result of the investigation about the credit growth and its

influence in triggering a crisis is dubious. As the theory suggests and some empirical research [i.e. Kaminsky and Reinhart, 1998] show, banking sector problems in emerging markets are usually preceded by a strong credit expansion. However, the credit variable failed to be a good predictor in the original regression, it was significant at the 10% level when other models were tried (even after inclusion of lags).

The lack of robustness of the estimates only confirms the argument that not all financial crises can be lumped in one model. The problem with the probit modelling, apart from few degrees of freedom, is that it treats all crises as uniform events. But reasons underlying each crisis are different. The behaviour of the budget deficit variable can be a good example here. When thinking about the latest Russian crash, the statistical importance of the fiscal imbalance is justifiable, but if the Asian case is in mind, then this result is rather peculiar (as a remainder, all Asian economies were enjoying budget surpluses).

Even if the overall quality of the binary probit model is satisfactory (for example, the goodness of fit for every run regression is quite high, in most cases above 0.8), it cannot itself be used as a helpful device to identify roots of the crisis in a particular country. To be able to make any inference, at least further sensitivity analysis alongside the probit modelling or different types of econometric estimations are highly recommended. Using a binary probit model with only contemporaneous variables as regressors brings the problem of causality. This is because the performance of the explanatory variables may be influenced by the crisis itself. Therefore, the behaviour of lagged variables should be tested. Because of the definition of the crisis variable adopted by Radelet and Sachs (1998) and followed in this empirical investigation, lagged regressors can also, to some extent, limit this issue. Nevertheless, possibly the extreme value (deviation from the sample mean) of an index of the market pressure would be a more reliable description of the dependent variable.

Also, as the Mexican case has shown, whenever the crisis starts at the beginning of the year (Radelet and Sachs set 1995 as the crisis year for Mexico) one should consider the previous year as the starting date.

4. Conclusions

Financial crises are not new phenomena, nor are they historical events. Looking at the past experience of 1980s, the 'Tequila' effect of Mexico's 1994 overvalued exchange rate, ERM 1992 crises, 1997 Asian collapse and finally the recent Russian and Brazilian

crashes, it seems that still there is a lot to be learned. The interesting point is that currency and financial crises can hit economies, which are viewed as very successful in implementing their development strategies. But it is also the truth that the same success reflected in the high growth rates in Asian emerging markets painted a misleading picture and masked important structural weaknesses existing there, which eventually triggered the economic slump. In the world where high capital mobility is an unavoidable fact, economic fundamentals cannot be constrained just to macro-economic indicators like moderate inflation rates or fiscal balance. Prudent financial sector is highly recommended. In the process of integration into the global market, small and open economy becomes especially vulnerable to external and internal shocks. Given the beneficial role of capital flows to developing countries (know-how, technology, access to the world market), they should not and probably cannot be stopped. But liberalisation of both the domestic financial system and capital account requires strong regulatory and supervisory framework. This is because financial markets, contrary to markets of goods and services, operate with a great dosage of uncertainty and failures. As the Asian crisis showed, fundamentals also include healthy corporate sector: '...*the shorter the maturity of debt, the higher the debt-equity ratio, and the weaker the financial system, the greater are instability of beliefs and induced disturbances to the economy*' [Stiglitz, 1998b: 15].

Considering that Southeast Asian problems in both financial and corporate sectors were intensified by the build up of short-term, unhedged debt (BIS reports that at the end of 1996 foreign currency debt with the maturity of less than two years was equal 120% of foreign exchange reserves in Thailand and nearly 200% of reserves in both Indonesia and Korea), the argument that Asian economies suffered mostly from fundamental problems looks justifiable. Rodrik (1998) argues that sharp reversals of capital flows are to the great extend the result of changes in fundamentals, such as external shocks or policy mistakes. The fact that there were no dramatic and sudden changes in fundamentals in Asia could stress rather the irrational pessimism of lenders. But how sudden the change has to be to spark off the crisis? Isn't it, that the 'bubble' in an economy is built up systematically until it finally burst? Of course, the increased vulnerability does not necessarily mean that crisis would erupt, yet when it does it can be perfectly rational concerning underlying fundamentals.

In 'Tiger Asia' too many assumptions were made and too many things taken for granted. Fixed or fixed but adjustable exchange rates led banks and corporations to believe that there was no punishment for borrowing in dollars to buy local currency assets. These institutions simply felt protected against possible devaluation. Thus the currency mismatch was growing (as discussed in chapter II, borrowing from abroad was much cheaper than at home). Real estate investments were made on the base of beliefs

that demand for these assets would continue to soar. Yet, when over-capacity caused prices to fall, the value of banks' collateral decreased sharply exacerbating the asset side of their balance sheet. Non-performing loans were growing.

This is true that, budgets were balanced in Asia, inflation rates were low, real exchange rates were not as much appreciated as in Mexico, credit-rating agencies did not downgrade their assessment of the region until after the onset of the crisis (these agencies are rather reluctant to respond to every signal they receive), but do these factors really let us to say that this crisis was nothing more than a financial panic?

Econometric investigation, as the previous chapter has shown, did not really help to answer the question if the havoc wreaked in Asia was due to unjustifiable withdrawal of investors' confidence or was caused by deteriorating fundamentals. If anything, it rather pointed to the latter than the former. The benchmark regression, which was run in order to compare with the benchmark regression of Radelet and Sachs (1998) brought different results and suggested an existence of fundamental problems in the countries examined (a current account variable insignificant in Radelet and Sachs' (1998) was found to be significant at the 5% level, short-term debt was statistically associated with the crisis as in Radelet and Sachs, but in opposition to their finding total debt was important even more). But in general, the probit model was found to be very sensitive on introduction of new variables as well as changes in sample size.

The only crisis indicators, which showed a great amount of consistency, even when lags were tried, were growth rates of GDP, an exchange rate appreciation and capital inflow variable (when the surge capital inflow was reversed it triggered the crisis). The statistical importance of the growth variable supports fundamentalist proponents, but insignificance of the exchange rate appreciation favours rather the panic story. The significance of the capital inflow in sparking off the crisis can to some extent be explained by the Yoshitoni and Ohno's (1999) '*capital account crisis*' framework, which states that deteriorating current account prior to the crisis was in major part a result of the excessive capital flows to Asia. In order to check causality definitely further investigation is needed. Because mixed results were obtained in the probit modelling, it raises the question if this type of exercise could support Radelet and Sachs' (1998) panic scenario of the Asian meltdown?

As the estimation has shown, because of the causality problem, sensitivity analysis involving lagged variables is strongly required and recommended. Also, one should take into consideration changes in defining the crisis variable. This is in order to prevent the independent variable(s) from moving together with the dependent one. Otherwise, the statistical significance of the short-term capital inflow indicator as well as its interpretation in the light of different theories of financial crisis losses its powerful meaning.

After taking into account factors underlying Asian economies, it is hard to say that these economies were sound. Wade (1998) states that high corporate debt is not an unusual feature in countries, which are on their development path and it should be sustainable given the high level of savings. But how effective were investments made in Asia? Why was debt denominated in dollars not in local currencies as in most industrialised countries? Besides, did Southeast Asia need to invest so much to achieve high rates of growth (as Stiglitz, 1998b points out, the causality is still unknown)? The sharply deteriorating indicator of quality of investments (ICOR), together with extremely high rates of these investments in proportion to GDP, indicate that profitability was falling (in addition, growth rates were falling). Indeed, the capital was flowing to Asia because of friendly looking environment (strong economic performance, narrowing risk premia, cyclical downturn in international interest rates) driving up investments [Park and Song, 1998], but a lot of them were misdirected and risky. In the end, it created an overheating pressures in external imbalance and led to the increase in property and stock prices.

Is then too much of capital not so good? The Asian example seems to confirm this hypothesis. Obviously, the risk increases if the economy liberalises its capital account rather, let's say, 'blindly'. What does it mean? It means that capital is allowed to flow freely but the banking system actually lacks adequate supervision, which in turn causes an inappropriate pricing of the credit risk. The danger of potential insolvency/illiquidity rises if the entire financial sector is bank-based and when the corporate sector has high debt-to-equity ratio [Wade, 1998].

The other aspect is the composition of these flows. If they are in large proportion short-term (but used to finance long-term projects) and denominated in foreign currency, they can create severe problems for the economy once reversed. Implosive financial crises and its long lasting effects arise exactly from maturity and currency mismatches of the debt. As the exchange rate depreciates, the balance sheets of financial institutions and enterprises with unhedged foreign-currency debt are seriously damaged. '*Twin crises*' reinforce each other.

Some trends in literature [Park and Song, 1998; Yoshitoni and Ohno, 1999; Wade, 1998] downgrade the role played by the '*moral hazard*' in the Asian 1997 crisis. According to these studies capital was flowing into the region because of perceived good prospects of these economies. Yet, these studies do not attempt to look at the problem from many levels. Wade states that financial system was destabilised by the badly done liberalisation, but he does not assess the efficiency of investments. Park and Song's empirical research explains only the correlation between capital inflows and domestic investments. However, they do admit that a great share of investments went to the

property and real estate sector. The significance of the 'moral hazard' in the Asian financial crisis still needs to be tested empirically, but if the problem exist, adverse effects on the real economy, once crisis erupts are amplified:

'A financial crisis is a non-linear disruption to financial markets in which adverse selection and moral hazard problems become much worse, so that financial markets are unable to efficiently channel funds to those who have the most productive investment opportunities' [Mishkin, 1996 cited in Griffith-Jones, et al. 1998: 17].

Even if there are still a lot of questions, which need to be answered (the empirical investigation of '*capital account crisis*' proposed by Yoshitoni and Ohno, 1999; the response of the IMF to the crisis), it is really hard to say that Southeast Asian economies were sound and that the whole region in mid-1990s did not become increasingly vulnerable to the crisis. The IMF immediate help could just postpone it for a while. But even then, it would not change the fact that serious structural weaknesses existed and the remedy for the crisis was not only to provide with liquidity, but also to encourage implementation of certain reforms. This is true that currency crises have something in common with the theory of chaos and the harder people try to model it, the less they succeed. But also as Krugman (1999) said '...*a sufficiently credible currency will never be attacked, and a sufficiently incredible one will always come under fire*.'

References

Berg, A., and C. Paltillo (1998). "Are Currency Crises Predictable?". IMF Working Paper 154, http://www.imf.org/

Bank For International Settlements Annual Report 1997, 97-117.

Caprio, G., and D. Klingebiel (1997). "Bank Insolvency: Bad Luck, Bad Policy or Bad Banking?" World Bank, Annual Report 1997.

Corsetti, et al. (1998). "What Caused the Asian Currency and Financial Crisis? Part I: Macroeconomic Review", NBER Working Paper No. 6833, http://www.nber.org/papers or http://www.stern.nyu.edu/~nrubini/asia

Corsetti, et al. (1998). "What Caused the Asian Currency and Financial Crisis? Part II: The Policy Debate". NBER Working Paper No. 6833, http://www.nber.org/papers or http://www.stern.nyu.edu/~nrubini/asia

Corsetti, et al. (1998). "Paper Tigers? A Model of Asian Crisis". NBER Working Paper No. 6783, http://www.nber.org/papers or http://www.stern.nyu.edu/~nrubini/asia

Demirguc-Kunt, A., and E. Detragiache (1997). "The Determinants of Banking Crises: Evidence from Developed and Developing Countries". IMF Staff Papers, http://www.imf.org/

Edwards, S. (1997). "The Mexican Peso Crisis: How Much did We Know? When did We Know It?". NBER Working Papers No. 6334, http://www.nber.org/papers

Eichengreen, B., A. K. Rose and Ch. Wyplosz (1996). "Contagious Currency Crises". NBER Working Paper No 5681, http://www.nber.org/papers

Emerging Markets in the New International Financial System: Implications of the Asian Crisis (1997). International Monetary Found, 59-80.

'East Asia's financial crisis: causes, evolution, and prospects' (1998). Global Development Finance; Analysis and Summary Tables, Washington DC: The World Bank.

Flood, R. P. and P. Garber (1984). "Collapsing Exchange Rate Regimes: Some Linear Examples". Journal of International Economics, Vol. 17, 1-13.

Flood, R. and N. Marion (1998). "Perspectives on the Recent Currency crisis Literature". NBER Working Paper No. 6380, http://www.nber.org/papers

Global Development Finance, Washington, DC; The World Bank, data collection.

Goldstein, M. (1998). "Origins of the Crisis". The Asian Financial Crisis: Causes, Cures, and Systemic Implications, Institute for International Economies, Washington, DC, 9-23.

Griffith-Jones, S. et al. (1998). "The East Asian Financial Crisis: A Reflection on its Causes, Consequences, And Policy Implications". Institute of Development Studies (IDS) Discussion Paper 367.

Griffith-Jones, S. (1998). "How to Protect Developing Countries from Volatility of Capital Flows?". Paper presented at the East Asia Crisis Workshop at the IDS, http:/www.ids.ac.uk/ids/research/sgj3.pdf

Griffith-Jones, S. (1998). "Can Currency Crises be Prevented or Better Managed?". [in:] Jan Joost Tennissen (ed.), The Hague, FONDAD.

Howell, M. J. (1998). "Asia's 'Victorian' Crisis". Paper presented at the East Asia Crisis Workshop at the IDS, http://www.ids.ac.uk/ids/research/howell.pdf

International Financial Statistics, Washington, DC:The World Bank, data collection.

Ito, T. (1999). "Capital Flows in Asia". NBER Working Paper No. 7134, http://www.nber.org/papers

Kaminsky, G. L. and C. M. Reinhart (1995; 1998). "The Twin Crises: The Causes of Banking and Balance of Payments Problems". Washington: Board of Governors of Federal Reserve System, International Finance Discussion Paper, No. 544.

Kaminsky, G. L., S. Lizondo and C. M. Reinhart (1998). "Leading Indicators of Currency Crises". IMF Staff Paper No.1.

Krugman, P. (1979). "Model of Balance of Payments Crises". Journal of Money, Credit and Banking No11, 311-325.

Krugman, P. (1996a). "Currency Crises". http://web.mit.edu/Krugman/www

Krugman, P, (1996b). "Are Currency Crises Self-Fulfilling?". Paper prepared for the NEBR Macro Annual Conference.

Krugman, P. (1998). "What happened to Asia". http://www.mit.edu/Krugman/www

Krugman, P. (1999). "The Accidental Theorist". Penguin books.

Mishkin, F. S. (1991). "Asymmetric Information and Financial Crises: A historical Perspective". In Hubbard, R. G., (ed.), Financial Markets and Financial Crises, Chicago: University of Chicago Press. 69-108.

Mishkin, F. S. (1999). "Lessons from the Asian Crisis". NBER Working Paper No. 7102, http://www.nber.org/papers

Obstfeld, M. (1986). "Rational and self- fulfilling balance of payments crises". American Economic Review No 76: 676-681.

Obstfeld, M. (1994). "The Logic of Currency Crises". Cohiers Economiques et Monetaires, No 43.

Obstfeld, M. and K. Rogoff (1995). "The Mirage of Fixed Exchange Rate". Journal of Economic Perspectives, Vol. 9, No. 4, Fall 1995, 73-96.

Park, Young Chul, and Song, Chi-Young (1998). "The East Asian Financial Crisis: A Year Later". Paper presented at the East Asia Crisis Workshop at the IDS, http://www.ids.ac.uk/ids/research/parksong.pdf

Radelet, S. and J. Sachs (1998). "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects". Harvard Institute for International Development, available at: http://www.stern.nyu.edu/~nrubini/asia

Rodrik, D. (1998). "Who needs capital- account convertibility?". http://www.nber.org/~drodrik

Sachs, J. (1996). "Financial Crises in Emerging Markets. The Lessons From 1995". Brookings Papers on Economic Activity: 1, Brookings Institution, 147-215.

Stiglitz, J. and A. Weiss (1981). "Credit Rationing in Markets with Imperfect Information". American Economic Review No 71, 393-410.

Stiglitz, J. (1998a). "Boats, planes and capital flows". Personal view in the Financial Times, March 25 1998, p.32.

Stiglitz, J. (1998b). "The role of international financial institutions in the current global economy". Address to the Chicago Council on Foreign Relations, February 27 1998, Chicago, http://www.worldbank.org/html/extme/jssp022798.html

"The financial crisis in Asia". Asian Development Outlook 1999, 21-42.

Wade, R. (1998). "From Miracle to Meltdown; Vulnerabilities, Moral Hazard, Panic and Debt Deflation in Asian Crisis". Russell Sage Foundation, http://wwwepn.org/sage/

World Development Indicators, Washington, DC: The World Bank, data collection.

Yoshitomi, M., and Ohno (1999). "Capital-Account Crisis and Credit Contraction. The New Nature of Crisis Requires New Policy Responses". ADB Institute Working Paper Series No. 2, 1-30.

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