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17

Currency Crises and the East Asian Financial Crisis

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17.1 Introduction

The 1990s and early part of this century were characterized by a number of currency and financial crises. The turmoil started with major speculative attacks against the European Monetary System in 1992–93 which led to devaluations of the pound sterling and the Italian lira (see Chapter 16), followed by the Mexican crisis of December 1994; then, starting with the Thai baht devaluation on 2 July 1997, the so called East Asian financial crisis is generally agreed to have started. The Asian crisis was characterized by major economic and financial turmoil in many of the East Asian economies with large falls in the values of their currencies, stockmarkets and property prices. The crisis continued into 1998, a year in which there were very significant falls in output

in many of these previously fast-growing economies. Fortunately, there was a sharp recovery of those economies in 1999 and 2000 by which time the crisis was largely over.

The Asian financial crisis was swiftly followed by other crises such as the Russian default on its debt in August 1998, and the collapse of the hedge fund Long-Term Capital Management in late September 1998. Other noticeable crises have followed: in January 1999 the Brazilian real was forced to devalue and eventually to float, and it quickly depreciated a further 35%; in January 2001 there was a major banking crisis in Turkey leading to the floating of the Turkish lira; and, more spectacularly, in December 2001 Argentina declared a default on its external debt and had to abandon its currency board on 7 January 2002 with a devaluation from 1 peso to 1.4 pesos, swiftly followed by a dramatic fall in the Argentinian peso to a low of 3.75 pesos per dollar by the end of October 2002.

These periodic crises have stimulated a great deal of theoretical and empirical literature that looks at the causes of currency and financial crises, and in this chapter we look at some of the theoretical models that have been developed to analyse such crises. In particular, we look at what have been termed first, second and third-generation models of currency crises, explaining some of their basic features and differences. We also briefly mention some of the other models that have been developed. We then concentrate on the causes and details surrounding the East Asian financial crisis which was one of the most significant events to confront the international financial community in the last 40 years. We focus attention on eight of the countries most directly involved in the crisis, namely Hong Kong, Indonesia, Philippines, South Korea, Singapore, Malaysia, Taiwan and Thailand, and as such exclude any detailed analysis of other countries affected by the crisis such as China and India. A great deal of money can be made by predicting crises in advance of them happening, and early warning of such crises may help policy-makers avert them; we conclude the chapter by looking at some of the recent literature that attempts to find what economic and financial indicators may be useful to predict currency and financial crises.

17.2 First-generation models of currency crises

First-generation models refer to a strand of literature that builds upon an article by Krugman (1979) and which has been extended and developed in various directions; see for example Flood and Garber (1984). In his article, Krugman assumed that a government operates a fixed exchange rate and runs a budget deficit financed by the government selling bonds in exchange for money from the central bank; that is, its fiscal deficits are financed by domestic credit expansion. However, this increases the supply of money and puts downward pressure on the interest rate leading to capital outflows and pressure for a devaluation of the currency. As such, it is necessary for the central bank to defend the currency by using its foreign exchange reserves. At a certain point, the reserves reach a critically low level and a speculative attack is made on the currency forcing a devaluation. In the so-called 'first generation models of speculative currency attacks' there is a fundamental inconsistency between the fiscal (and with it monetary) policy pursued by the government and the commitment to a fixed exchange rate which is spotted by speculators and precipitates a speculative attack.

The assumptions of the Krugman (1979) model are: perfect competition in the

economy; domestic and foreign goods are perfect substitutes; perfect capital mobility and uncovered interest parity holds at all times; and also that purchasing power parity holds. In the Krugman model money demand is assumed to be fixed at some constant value and the exchange rate is assumed to be fixed so that $\dot{s} = 0$, where \dot{s} is the rate of change of the exchange rate. A final important feature of the model is that once the fixed exchange rate regime breaks down, the new regime that replaces it is a fully floating exchange rate regime.

The first assumption is that the money market is kept in continual equilibrium, that is:

$$md_t = \bar{m}s_t \quad (17.1)$$

where md_t is the log of money demand, and $\bar{m}s_t$ is the log of the fixed money supply.

The demand for real money balance is assumed to be inversely related to the domestic interest rate:

$$md_t - p = -\sigma r \quad (17.2)$$

where p is the log of the domestic price level and r is the domestic interest rate.

The log of the money supply is given by a log linearization of the domestic credit and foreign exchange reserves:

$$\bar{m}s_t = D + R \quad (17.3)$$

where D is the log of domestic credit and R is the log of the reserve component of the monetary base. (note equation (17.3) is strictly true only in *levels* but is an acceptable log-linearization approximation in the literature).

The domestic credit is assumed to expand at a constant rate per annum $\dot{D} = \mu$, where \dot{D} is the rate of change of domestic credit; the increase in domestic credit is assumed to come about because of the government printing money to buy domestic bonds that are being sold to finance its fiscal deficit.

The exchange rate is assumed to follow PPP so that:

$$s = p - p^* \quad (17.4)$$

where s is the log of the exchange rate defined as domestic currency units per unit of foreign currency, p is the log of the domestic price level and p^* is the log of the foreign price level.

Uncovered interest parity is assumed to hold at all times so:

$$r = r^* + E\dot{s} \quad (17.5)$$

where r is the domestic interest rate, r^* is the foreign interest rate and $E\dot{s}$ is the expected rate of depreciation of the domestic currency.

Since money demand is a constant, any increase in domestic credit will as in the monetary model lead to a fall in reserves of an equivalent amount, which implies that the rate of fall of reserves \dot{R} is the same as the rate of increase of domestic credit; that is:

$$\dot{R} = -\mu \tag{17.6}$$

Finally, assuming the exchange rate is fixed at \bar{s} and $E\dot{s} = 0$, the foreign interest rate at $r^* = r$ and the foreign price level is fixed at p^* we can substitute equations (17.1) to (17.3) and (17.5) into equation (17.4) to obtain:

$$\bar{s} = R + D - p^* + \sigma r^* \tag{17.7}$$

Since we assume that p^* and r^* are fixed, increases in domestic credit lead to equivalent falls in foreign exchange reserves and there is no change in the money supply. It is quite clear that if foreign exchange reserves are falling at the same rate that domestic credit is expanding, at some point they will reach a critically low level. It is not a foregone conclusion that a speculative attack will necessarily follow a decline in the reserves; however, if the central bank announces that once reserves hit a certain level they will abandon the fixed exchange rate then a speculative attack is a foregone conclusion. The interesting thing is that speculators will not wait until the reserves reach the critically low level before mounting the speculative attack since this would imply a large capital loss at that point. Rational speculators will launch the speculative attack before the critical level of reserves is met. Flood and Garber (1984) have shown that the speculative attack will occur when the rate of exchange that would occur if the currency were floating (the so-called shadow exchange rate) is equal to the fixed exchange rate and that the speculative attack will completely drain the foreign exchange reserves of the central bank. The dynamics of the speculative attack are illustrated in Figure 17.1.

In Figure 17.1(a) it can be seen that the money supply is fixed at the level $M1$ at time $t1$, domestic credit is expanding at a rate $\dot{D} = \mu$ and the reserves are falling by a like amount at the rate $\dot{R} = -\mu$ with the money supply remaining constant. The shadow exchange rate in Figure 17.1(b) starts at an overvalued level $S1$ but would, if

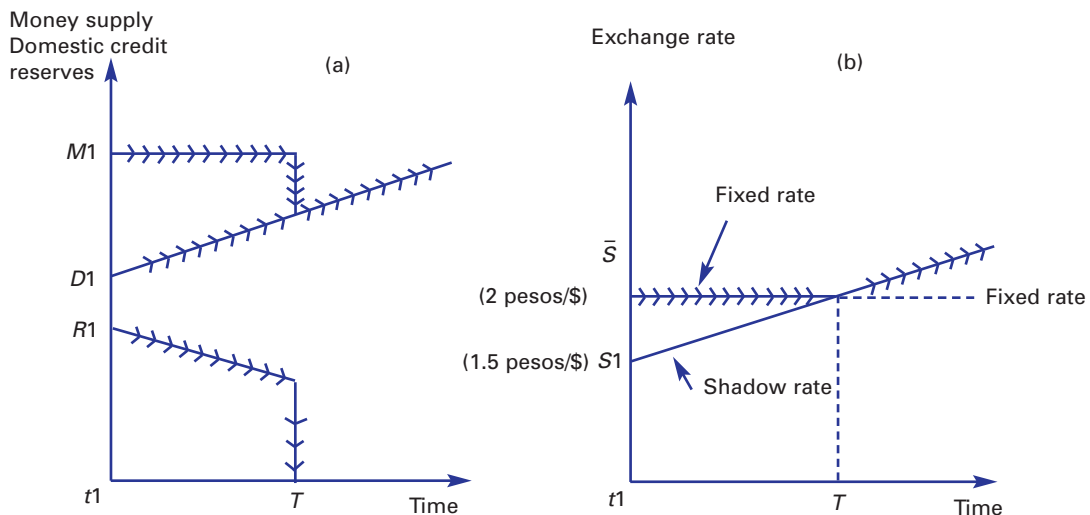


Figure 17.1 The dynamics of a speculative attack in first-generation models

the exchange rate were floating, depreciate at a rate $\dot{s} = \mu$ in line with the rate of increase of domestic credit. While the fixed exchange rate of the peso per dollar is undervalued at, say, 2 pesos per dollar compared to the shadow exchange rate, say 1.5 pesos per dollar, it is possible to maintain a fixed exchange rate without any problems since there is no prospect of a capital gain for speculators. However, once the shadow exchange rate moves above the fixed exchange rate making the latter overvalued at time T , for example 2.01 pesos/\$1, a speculative attack is inevitable as it pays speculators to sell unlimited quantities of domestic currency (pesos) to buy the foreign currency (dollars); the authorities' foreign exchange reserves will be exhausted and the currency is forced to float. It should be noted that at the precise time of the speculative attack there is an increase in the domestic interest rate to compensate investors for the fact that after the speculative attack the exchange rate is expected to depreciate at the rate μ , in line with the expansion of domestic credit, this follows from the UIP condition. The timing of the attack is such that there is no discrete jump in the exchange rate as this would imply large capital loss for speculators at that point, but since the inevitable breakdown of the fixed parity is foreseen in advance this would be inconsistent with an efficient market and therefore can be ruled out.

At the time of the speculative attack the reserves are exhausted and fall by an amount dR (negative), hence, there is a discrete fall in the money supply of a like amount dms (negative). There is also a rise in the domestic interest rate given by μ (since this is the rate at which the currency is expected to depreciate in line with the growth of domestic credit) so that r becomes $r + \mu$. Inserting this into the money demand equation (17.2) means there is a fall in money demand given by $dmd = -\sigma\mu$. Since the money market is kept in continual equilibrium the fall in the money supply equals the fall in money demand, so that:

$$dR = -\sigma \mu \quad (17.8)$$

Since before the speculative attack reserves were falling at the rate μ , if the initial stock of reserves is given by $R1$ and the time from the base period to the attack is given by T , then the level of reserves just prior to the attack must be $R1 - \mu T$ (positive) which must be equal to the fall in reserves that occurs at the time of the attack $-dR$ (positive since dR is negative). That is:

$$R1 - \mu T = -dR \quad (17.9)$$

Substituting (17.8) into (17.9) and rearranging to solve for the timing of the speculative attack T , we find:

$$T = \frac{(R1 - \sigma\mu)}{\mu} \quad (17.10)$$

That is, the timing of the speculative attack is greater (that is, delayed) the higher the initial level of reserves $R1$ and the lower the rate of expansion of domestic credit μ . This condition makes sound intuitive economic sense the higher the level of reserves the greater the ability of the authorities to resist a speculative attack and the lower the rate of domestic credit expansion of domestic credit the slower the drain on the reserves from domestic credit expansion.

There have been several criticisms of the first generation models amongst which:

- 1 It is unclear why the level of foreign exchange reserves should be so crucial to the timing of a speculative attack, since governments could always resist an attack on their currencies by other means such as raising the domestic interest rate. If they raise interest rates sufficiently this will lead to potential losses for speculators that have borrowed large amounts of the domestic currency so as to sell it in the foreign exchange market.
- 2 It is not at all clear why a government that is committed to a fixed exchange rate regime would wish to pursue a policy of printing money to finance its fiscal deficit that it knows will ultimately lead to a speculative attack on its currency. In the real world, it is likely that governments are far smarter than assumed in the first-generation models and they look at the costs and benefits of maintaining a fixed exchange rate system and keep the option of allowing their currency to float prior to a speculative attack.
- 3 There was also an empirical problem in that some of the recent crises were not characterized by large fiscal deficits that had been monetarized as assumed in the first-generation models. There had been no secular change in the fundamentals prior to the ERM crises in 1992–93 as predicted by the first-generation models, and the ERM crises were largely unforeseen. In addition, as we shall see, most of the Asian economies were running fiscal surpluses prior to the outbreak of their crises.
- 4 A further empirical problem is that in some of the recent crises there was not a secular fall in the foreign exchange reserves as predicted by the first-generation models. In the Asian economies heavy capital inflows in the years prior to the outbreak of the crises had meant that foreign exchange reserves had been increasing as central banks sold their currencies to buy US dollars to offset the excess demand for their currencies from capital inflows. As we shall see, it was in fact an abrupt change from capital inflows to capital outflows that led to the currency and financial crises in these economies.

17.3 Second-generation models of currency crises

Due to the deficiencies of the first-generation models in explaining currency crises, in particular the speculative attack on the ERM that occurred in 1992–93, a new generation of models emerged in the 1990s (see for example Obstfeld, 1994 and 1996, and Jeanne, 1997, which offered an alternative explanation of currency crises). Two key features of the second-generation models are that governments are assumed to be much smarter than in the first-generation models; that is, they continually evaluate the pros and cons of maintaining a fixed exchange rate, and the linkage between macro fundamentals and the timing of speculative attacks is much weaker than in the first-generation models. In fact some authors such as Rangvid (2001) contend that the key distinction between first and second-generation models is that in the latter the government seeks to minimize some sort of loss function, for instance deviations of output or inflation rates from their desired levels. In the second-generation models, a devaluation is seen as an optimal response by the government to speculative pressures against the currency. The second-generation models allow for the possibility that the private sector anticipating a devaluation can increase the costs to the devaluing government of not devaluing such that it becomes rational for the government to

devalue. In such models, there is the possibility of *multiple equilibria*; that is, if private agents' expectations of devaluation are low then the costs of maintaining a fixed exchange rate are low and hence the government of the country will not devalue. On the other hand, if private agents' expectations of devaluation are high then the costs of maintaining a fixed exchange rate are high and the government accordingly has a higher incentive to devalue. In such models, private agents' expectations can become self-fulfilling in the sense that if there is an exogenous shock to their expectations such that they move from a low risk of devaluation to a high risk of devaluation, then the probability of a devaluation will rise accordingly. There are usually three key components to the second-generation models:

- 1 Government preferences – in second-generation models the costs and benefits to the authorities of maintaining a fixed exchange rate are continually reviewed and modelled. The authorities are assumed to attach some weight to exchange rate stability and some weight to a real variable such as output stability or the rate of unemployment.

For example a possible loss function is:

$$L = (y_t - y^*)^2 + w (s_{t+1} - s_t)^2$$

where y_t is the log of current level of output, y^* is the log of desired level of output, s_{t+1} is the log of exchange rate one period hence, s_t is the log of exchange rate today, and w is a weighting parameter.

Here the idea is that the government attaches some importance to stability of output and some importance to stability of the exchange rate. A link between changes in the exchange rate and deviations of output can then be introduced. For instance, a sudden increase in expectations of a devaluation might lead to higher wage demands (since the price level will rise following a devaluation) and a rise in real wages in the short term which leads to a fall in output below the desired level.

- 2 Specification of the real variable – different second-generation models specify different real variables that are affected by an expected devaluation; this may be the level of output, the level of unemployment or the real level of public debt. An expected devaluation will likely lead to a fall in output (due to wage rises in anticipation of devaluation) or a rise in unemployment (for example by raising interest rates to compensate for the risk of a devaluation) or the cost of servicing the public debt (since an expected devaluation will raise the required interest rate).
- 3 There is a fixed cost to devaluation – the second-generation models assume that if a government is forced to devalue then there will be a given cost to it, and this cost might be seen as a loss of political prestige due to a failure to carry out the stated fixed exchange rate policy or a loss of economic credibility.

In second-generation models, some sort of shock comes along to alter private agents' expectations of a devaluation. If the shock is small then the costs of maintaining the fixed exchange rate will be relatively small and it is likely that the authorities will be able to continue with the fixed exchange rate regime. If, however, the shock is relatively large and private agents' expectations of the size of a potential devaluation become quite large this increases the cost to the government of maintaining the fixed exchange rate; for example the loss of output will rise making it more likely that the government will decide to abandon the fixed exchange rate. One of the key features of

second-generation models is the more the expectation of a devaluation the more the cost to the government of maintaining the fixed exchange rate and the higher the actual devaluation that is required. For instance, if agents expect a high rate of devaluation they will then put in high wage demands which leads to a high loss of output; hence, it will pay the government to enact a large devaluation to ensure that realized prices rise by a large amount and that real wages remain constant, so minimizing the loss of output that occurs. The subsequent switch to floating will also permit the authorities to engage in a monetary expansion to cure high levels of unemployment.

Another key feature of second-generation models is that there can be sudden switches in private agents' expectations concerning a devaluation without any apparent change in the economic fundamentals. An economy with sound fundamentals and low expectations of a devaluation can suddenly be exposed to a speculative attack and a high probability of devaluation simply because of a sudden change in private agents' expectations of a devaluation without any significant change in macro fundamentals. It is, however, important to note that an increase in private agents' expectations of a devaluation will not necessarily lead to an actual devaluation in the second-generation models. The government is continually monitoring the costs and benefits of the devaluation and if, for instance, the fixed costs of devaluation are relatively high then the government may decide it is best not to devalue, whereas if the fixed costs of devaluation are relatively low the government might decide to devalue. Nonetheless, the probability of a devaluation in the second-generation models is affected by the state of the fundamentals. If the fundamentals are very bad (for example unemployment is very high) then a devaluation is more likely than when the fundamentals are good (for example unemployment is low), since private agents' rational expectations of the government adopting a devaluation increase when unemployment is high than when it is low.

While the second-generation models have provided some new insights and in particular assume much smarter governments than in first-generation models, there remain several problems which they do not satisfactorily deal with. In particular, the reason why private agents should switch expectations from a low state of probability of devaluation to a high probability is not clear. In addition, the precise state of financial markets prior to the outbreak of the crisis is not fully considered in the second-generation models.

17.4 Third-generation and other models of currency and financial crises

In addition to the first and second-generation models, in an attempt to properly explain the Asian financial crises, so-called third-generation models of currency crises have been developed. Indeed, there have been an extensive range of other models designed to explain financial and currency crises. The third-generation models were developed because it was noted that there had not been severe fiscal problems in the Asian economies prior to the outbreak of the crises as one might have expected from the first-generation models. In addition, there were also no significant monetary expansions after the crisis as might have been expected from the second-generation models. The third-generation models vary greatly in their assumptions, but have a common theme that financial crises (rather than currency crises *per se*) can be caused by a 'moral hazard' problem. Such a problem exists when the existence of an insurance policy

makes the insured-against event more likely to occur than if no such insurance policy existed (see Box 17.1 for a simple example of moral hazard).

Box 17.1

Moral hazard and how a government bailout guarantee can turn a bad investment into a good one

The third-generation financial crisis models focus attention on the problem of 'moral hazard', whereby explicit or even perceived government guarantees to bail out investors can make the probability of such bailouts more likely to occur than if no such explicit/implicit guarantees existed. Consider the following simple numerical example; an investment project requires an investment of \$80 million and will generate a profit of \$40 million with a probability of 40% and a loss of \$40 million with a probability of 60%. The expected return from the project is therefore negative since $[(\$40 \text{ million} \times 0.4) + (-\$40 \text{ million} \times 0.6)] = -\8 million . Clearly this investment does not make economic sense and will not therefore be undertaken and will not require any government rescue package. Imagine, however, that a government keen to see the investment go ahead guarantees investors that if the project does not work they will be bailed out by the taxpayer so as not to make any losses on their investment. In this case, the expected return on the project becomes positive since $[(\$40 \text{ million} \times 0.4) + (\$0 \text{ million} \times 0.6)] = +\16 million or a 20% return on the \$80 million investment. Assume now that the expected rate of return is sufficiently high that the investment takes place, there is now a 60% chance that taxpayers will end up having to stump up \$40 million if the project goes wrong. The existence of the bailout package makes a bailout more probable (60%) than if no such bailout promise existed (0%), this is the essence of the problem of moral hazard.

Models such as Akerlof and Romer (1994), Burnside *et al.* (2001), Dooley (2000), McKinnon and Pill (1996), Corsetti *et al.* (1999), Edison *et al.* (1998) and Krugman (1998) argue that a crucial role in the occurrence of a financial/currency crises is played when private agents perceive financial intermediaries' liabilities as having an implicit government guarantee. This enables financial intermediaries in the country to borrow money at relatively low rates of interest and then lend it out in highly risky investments, for example, leading to property and stockmarket bubbles and even outright fraud. When things go wrong agents know/assume that the government will come along to bail out the affected banks. Krugman (1998) has characterized this mentality as 'to play a game of heads I win, tails the taxpayer loses'. As asset prices rise, the lending looks to be sound but eventually the asset bubbles burst and a vicious circle comes into play as the proportion of non-performing loans rises and asset prices decline. Once the bubble appears to be bursting, it can also trigger a large capital outflow from the country and a collapse of the exchange rate of the country involved.

In addition to the models discussed there have been numerous other models designed to explain why financial crises occur. Blanchard and Watson (1982) emphasize the importance of 'rational' financial bubbles, where economic agents continue to buy what are perceived to be overvalued financial assets (or even real assets such as property) in the belief that the prospective capital gain from a continuation of the upward trend will more than compensate for the risk of a sudden collapse. Of course,

an eventual collapse does occur resulting in large capital losses for those caught out near the top of the bubble. Other models such as Radlett and Sachs (1998) emphasize the role of financial panic which usually happens out of the blue; an important element of such models is that otherwise solvent borrowers face a liquidity squeeze when short-term liabilities exceed their short-term assets. Another model is that of Sachs (1995) who discusses the role of disorderly workouts in financial crises. A disorderly workout occurs when there is a lack of coordination between creditors who decide to individually withdraw funds from the distressed borrower. The lack of coordination between borrowers may be based on the fact that local bankruptcy laws are absent or ineffective. Another model worthy of mention where current account deficits financed by capital inflows can provoke a crisis is that of Rigobon (1998); excessive optimism leads to massive capital inflows that are suddenly and abruptly reversed when a shock hits the system. In Rigobon's model, to the extent that economic growth fuels unrealistic expectations about long-run economic growth prospects, it can be accompanied by overinvestment, excessive reliance on foreign capital and insufficient monitoring of domestic investments.

Other models emphasize the role of contagion behaviour on the part of investors. Fratzcher's (2003) paper is interesting in this respect. Defining contagion as 'the transmission of a crisis to a particular country due to its real and financial interdependence with countries that are already experiencing a crisis' (p. 110), Fratzcher argues that contagion provides an adequate description of both the Asian crisis of 1997/8 and Latin American crisis of 1994. In the paper, it is proximity of a country to another country under speculative attack that triggers the contagion. Various forms of *financial interdependence* can exist such as cross-border holdings between banks and financial institutions within a region and a common creditor to banks in a region, and should the common creditor withdraw from the region then all the countries in the region will be affected. In addition, *real interdependence* can exist via bilateral trade flows or trade competition between countries so that a crisis in one country might lead to a fall in exports of another or a devaluation of one currency necessitates a devaluation of another currency to maintain its competitive position. Fratzcher finds that the degree of trade linkages and competition in the Asian region was high, as was the degree of financial integration (for example as measured by correlations of their stockmarkets and competition between banks), Fratzcher finds that the degree of interdependence is very much related to their regional proximity to one another. For instance, the Asian economies have much higher degrees of financial and real linkages between each other than with Latin America, and likewise Latin American economies have much higher degrees of financial and real linkages between themselves than with Asia. Fratzcher finds that the main linkage through which contagion is likely to have spread is the financial linkage which is significant in most cases, whereas the real linkages, while important, are generally speaking less significant. In particular, the study shows that bank contagion, the withdrawal of funds and refusal of banks to roll over their loans to the region may have been very significant explanations of the crisis.

Baig and Goldfajn (1999) examine stockmarket, foreign exchange, interest rates and sovereign spreads using high-frequency data and find that correlations between the East Asian economies increased during the crisis as well as their sensitivity to both good and bad news in the other economies, all of which supports the idea of contagion being significant in the crisis. A paper by Caramazza *et al.* (2004) finds a significant role played by financial contagion in the Mexican, Asian and Russian crises, particularly through the common creditor route.

Some theories use herd behaviour as an explanation of currency and financial crises. For example, Calvo (1996) and Calvo and Mendoza (2000) argue that emerging markets are particularly susceptible to a herd mentality on the part of investors. Investors find it costly and potentially risky to examine the state of each economy when there are signs of problems, and so it becomes optimal for them to pull out of a group of related markets simultaneously when they spot signs of nervousness in just one of them. Likewise, Masson (1998) argues that investor psychology can play a role – a small trigger can lead to investors collectively losing confidence and collectively perceiving a higher risk of holding investment in a set of countries. This then leads investors to follow each other and simultaneously pull their funds out of a region causing financial and economic distress to the region. The foregoing overview of the literature is deliberately selective but nonetheless provides us with a useful toolkit with which to study the East Asian financial crisis.

17.5 The run-up to the Asian crisis

One of the most fascinating things about the Asian financial meltdown is that it was largely unforeseen, and there is plenty of anecdotal evidence for this. The IMF in its *World Economic Outlook* publication of April 1997 predicted strong, albeit marginally slower, economic growth of over 5% for Asia in 1998 (excluding India and Japan); there were some expressions of concern about Indonesia but no real alarm bells seemed to have been ringing at the IMF. Also it seems that international investors remained confident as net capital flows continued into the region right up until the crisis broke; only in Thailand and Korea did capital flows begin to dry up somewhat earlier in 1996. In addition, Cline and Barnes (1997) show the spread between Asian dollar-denominated debt and that on US Treasury bonds was actually falling between mid-1995 and mid-1997 contrary to what one would expect if market participants were expecting a crisis. Furthermore, Standard and Poor's and Moody's sovereign credit ratings remained largely unchanged in the year preceding the outbreak of the crisis and the eventual downgrades happened only three to five months after the crisis had broken out! In addition, many stockmarkets in the region were reaching new peaks as late as July 1997, which indicates that market participants were not forecasting the likely extent of the fall of the markets that subsequently occurred. Finally, currency forecasts by investment banks in the region did not predict any significant moves in exchange rates.

17.6 The macroeconomic fundamentals

The fact that the crisis was largely unforeseen is consistent with the hypothesis that the economic fundamentals, while deteriorating in the run-up to the crisis, were not of a significant enough measure to justify the crisis. To advance this hypothesis a bit further we need to look at the economic performance of the economies in the run-up to the crisis. First, we look at the economic growth rates, second their inflation rates and finally we examine their current account positions. We then proceed to look at what we regard as the key to the crisis which was the excessive lending to the region which fuelled asset bubbles (see for example Sarno and Taylor (1999) who detect asset bubbles in all the affected economies, the inevitable bursting of which then led to a

Table 17.1 Economic growth rates in selected Asian economies

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1990	3.4	7.2	9.0	9.0	3.0	9.7	5.4	11.2
1991	5.6	7.0	9.5	9.2	-0.6	6.4	7.6	8.6
1992	6.6	6.5	8.9	5.4	0.3	6.7	7.5	8.1
1993	6.4	6.5	9.9	5.5	2.1	12.3	7.0	8.3
1994	5.5	7.5	9.2	8.5	4.4	11.4	7.1	9.0
1995	3.9	8.2	9.8	9.2	4.7	8.0	6.4	9.2
1996	4.3	7.8	10.0	7.0	5.8	8.1	6.1	5.9
1997	4.1	4.7	7.3	4.7	5.2	8.6	6.7	-1.4
1998	-5.0	-13.1	-7.4	-6.9	-0.6	-0.1	4.6	-10.5
1999	3.4	0.8	6.1	9.5	3.4	6.9	5.4	4.4
2000	10.1	4.9	8.9	8.5	4.0	9.7	5.9	4.7
2001	0.5	3.5	0.3	3.8	3.4	-1.9	-2.2	2.2
2002	1.9	3.6	4.1	7.0	5.5	2.2	3.6	5.3
2003	3.2	4.5	5.3	3.1	4.9	1.1	3.2	6.9
2004	7.1	6.4	5.7	2.7	5.4	2.5	2.5	5.1

Source: National Statistics Offices.

large degree of panic on the part of foreign banks and investors who decided *en masse* to pull funds out of the region). Once the property and stockmarket bubbles burst, there was a significant deterioration in the quality of the asset side of banks' balance sheets in the region as witnessed by a significant increase in their non-performing loans.

Table 17.1 shows that economic growth rates in the Asian economies were extremely high in the run-up to the crisis, with real growth rates in the region of 6–9%; only the Philippines was suffering from low economic growth in the early 1990s, but from 1996 even it was growing at over 5%. High rates of economic growth are generally speaking a good thing unless they are fuelled by excessive debt and/or deterioration in the external accounts of a country. It is quite possible that the prolonged period of economic prosperity sowed the seeds of its own destruction in that it led economic agents to have unduly optimistic expectations for the future. In the case of Asia this may well have been the case; terms like the 'Asian miracle' had become part of the domestic and international perception of Asia. With respect to the stockmarkets and the property sector the high rates of economic growth may have led to unwarranted extrapolative expectations and to some extent prices were driven up by expectations of further price rises rather than a more realistic appraisal of the relevant economic fundamentals.

Inflation rates

The inflation rate can play a significant part in economic crises especially if the exchange rate is fixed, since higher domestic inflation relative to foreign inflation can cause an appreciation of the real exchange rate and the inflation rate itself can be taken as a sign of economic mismanagement. However, there is relatively little evidence (Table 17.2) that inflation was a significant factor in the run-up to the crisis. Given the strong economic growth in the region inflation was surprisingly benign,

Table 17.2 Inflation rates in selected Asian economies

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1990	10.3	7.8	2.6	8.6	13.2	3.5	4.1	5.9
1991	11.2	9.4	4.4	9.3	18.5	3.4	3.6	5.7
1992	9.6	7.5	4.7	6.3	8.6	2.3	3.4	4.1
1993	8.8	9.7	3.5	4.8	6.9	2.3	4.6	3.4
1994	8.8	8.5	3.7	6.2	8.4	3.1	2.6	5.1
1995	9.0	9.4	3.5	4.4	8.0	1.7	4.6	5.8
1996	6.4	8.0	3.5	5.0	9.0	1.4	2.5	5.8
1997	5.8	6.2	2.7	4.4	5.9	2.0	0.3	5.6
1998	2.9	58.4	5.3	7.5	9.7	-0.3	2.1	8.1
1999	-4.0	20.5	2.7	0.8	6.7	0	0.1	0.3
2000	-3.7	3.7	1.5	2.2	4.4	1.4	1.7	1.6
2001	-1.6	11.5	1.4	4.1	6.1	1.0	-5.5	1.6
2002	-3.0	11.9	1.8	2.7	3.0	-0.4	0.8	0.6
2003	-2.6	6.6	1.1	3.6	3.0	0.5	-0.1	1.8
2004	-0.4	6.2	1.5	3.6	5.5	1.7	2.3	2.8

Source: National Statistics Offices.

although there may well have been some masking of the underlying inflation due to the existence of price controls in Malaysia and Indonesia.

The inflation rate is more likely to lead to real exchange rate appreciation so undermining the competitiveness of countries when a country has a fixed exchange rate. In Asia the exchange rate policies varied in their degree of fixity with regard to the US dollar. Thailand, Malaysia, Hong Kong and the Philippines had more or less fixed parities, while Korea and Thailand had less rigid crawling peg systems whereby the exchange rate was adjusted on occasion to maintain external competitiveness. Indonesia had a policy of targeting the real exchange rate allowing its currency to depreciate to the extent that its inflation rate was higher than that of its trading partners.

Table 17.3 shows the value of the real exchange rate in the countries in the run-up to the crisis. What is clear is that four of the currencies – the Hong Kong dollar, the Malaysian ringgit, the Indonesian rupiah and the Philippines dollar – all appreciated in real terms prior to the crisis, and as such might have been vulnerable to a speculative attack. However, the picture is not uniform since four of the currencies had depreciated in real terms, so there is little evidence that real exchange rate appreciation played any significant role in the crisis by providing speculators with the prospect of a discrete fall in some of the Asian currencies. It seems that by 1997 only Hong Kong, the Philippines and Singapore were potentially vulnerable, while real exchange rates in the other six countries were not significantly different from those in 1991 or had depreciated in real terms.

The current account

The role of current account imbalances in provoking financial crises appears in numerous models such as Dornbusch *et al.* (1995), Mishkin (1996), Roubini and Wachtel (1998) and Sachs *et al.* (1996). Lawrence Summers presciently noted in *The*

Table 17.3 Real effective exchange rate (average of year)

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1991	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1992	103.0	97.5	106.9	92.9	110.6	101.9	103.9	98.4
1993	106.4	97.2	108.0	89.1	110.3	102.8	96.4	95.8
1994	109.6	96.6	103.8	89.2	116.1	106.7	94.5	95.9
1995	112.2	95.6	103.7	89.7	119.1	108.4	90.0	95.4
1996	112.9	101.2	108.6	92.0	129.6	112.2	93.9	96.3
1997	125.8	92.6	107.1	85.6	128.9	114.4	93.5	96.8
1998	132.1	42.9	85.1	62.6	105.4	110.0	82.6	79.4
1999	121.0	60.4	87.5	71.5	114.6	103.1	83.0	81.2
2000	117.3	56.6	89.7	78.3	106.9	103.4	88.1	77.7
2001	122.8	52.7	94.6	73.8	101.7	104.2	81.0	74.4
2002	113.8	83.7	94.7	78.2	102.1	101.2	78.4	75.6
2003	101.2	69.0	87.1	79.9	91.8	97.0	73.2	74.5
2004	94.2	66.2	84.6	83.6	87.6	96.0	72.7	74.0

Source: dbresearch.com.

Economist (23 December 1996) that ‘close attention should be paid to any current account deficit in excess of 5% of GDP, particularly if it is financed in a way that could lead to rapid reversals’. It is noticeable that a number of Asian economies were becoming more vulnerable in this regard as shown in **Table 17.4**.

The table shows that many of the countries were experiencing large or deteriorating current account deficits as a percentage of their GDP in the 1990s and in the run-up to the crisis in 1997. This was especially the case for Thailand, Malaysia, the Philippines and Korea. In the case of Thailand it was running at an unsustainable rate

Table 17.4 Current account surplus/deficit as % of GDP

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1990	8.9	-1.6	-2.0	0.9	-6.1	8.5	6.5	-8.5
1991	7.1	-1.5	-8.5	-3.0	-2.3	11.3	6.8	-7.7
1992	5.7	-0.1	-3.7	-1.4	-1.9	11.9	4.2	-5.6
1993	7.4	-0.3	-4.5	0.1	-5.6	7.2	3.1	-5.1
1994	1.6	-1.1	-6.1	-1.1	-4.6	16.1	2.7	-5.6
1995	-3.9	-2.4	-9.7	-1.8	-2.7	17.8	2.1	-8.1
1996	-1.1	-1.8	-4.4	-4.4	-4.8	13.9	4.0	-6.7
1997	-3.2	-1.5	-5.9	-1.7	-5.4	18.8	2.5	-2.0
1998	2.4	4.7	13.1	12.5	2.4	24.1	1.3	12.7
1999	6.5	3.1	16.5	5.5	9.5	18.4	2.9	10.2
2000	4.3	4.5	9.5	2.4	8.4	14.3	2.9	7.6
2001	6.1	4.2	8.1	1.7	1.8	16.8	6.4	5.4
2002	7.7	4.4	7.5	1.1	5.5	17.7	9.1	5.5
2003	9.7	3.8	12.7	2.0	4.0	29.2	10.1	5.6
2004	8.2	1.2	8.9	4.4	4.2	26.1	6.6	4.4

Source: National Statistics Offices.

of over 8% of GDP a year in 1995 and 6.7% in 1996. In the case of Hong Kong large surpluses were being run up until 1994 but thereafter there was a significant deterioration in the run-up to the crisis. Nonetheless, the picture is far from uniform; for example, Singapore had large surpluses which actually steadily increased in the 1990s, and likewise Taiwan also remained in surplus throughout the 1990s. To some extent given the high economic growth rates some weakness in the current account was to be expected. Interestingly, what may have been more significant as an early-warning signal was that the deterioration in the current accounts in the immediate run-up to the crisis from 1994 to 1996 coincided with a slowdown in economic growth rates over that period (with the notable exception of Malaysia). As we shall see later, there was some weak linkage between the size of the current account deficit and the fall in the nominal exchange rate that subsequently occurred.

Economics makes a distinction between current account deficits due to domestic investment being greater than domestic savings and/or government taxes exceeding government tax revenues. Generally speaking, where a current account deficit is caused by high domestic investment then the current account deficit is usually regarded as less worrying than in the case where it is caused by low savings, which is suggestive of a consumption boom. One has to be careful, however, because even if investment is higher than domestic savings, this investment needs to be productive. Also it needs to give a sufficient boost to the traded sector to improve the future current account performance of the economy. To the extent that the investment is directed to the non-traded sector, for example the property sector, then it may not help improve the current account in the longer run. It is instructive to look at the government finances and the private-sector balances in this regard; **Table 17.5** shows the government fiscal balances as a percentage of GDP and **Table 17.6** shows the excess of private investment over private savings as a percentage of GDP.

From **Table 17.5** it becomes apparent that it is very difficult to argue that the cause of the crisis lay in the pursuit of imprudent fiscal policies. Most governments were

Table 17.5 Government fiscal balances (% of GDP)

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1990	-0.9	na	-2.9	-0.7	-4.6	9.7	-	4.6
1991	0.6	na	-1.0	-1.6	-1.5	10.2	-7.9	4.7
1992	2.8	1.3	0	-0.5	-1.8	6.9	-5.5	2.8
1993	2.1	-1.0	0.8	0.6	-2.0	8.2	-5.1	2.1
1994	1.1	0.4	2.9	0.3	-2.0	8.5	-3.7	1.9
1995	-0.3	1.2	1.5	0.3	-1.3	7.8	-4.5	2.9
1996	2.2	1.0	1.5	0.2	-0.1	6.8	-5.3	2.3
1997	6.1	-0.7	2.8	-1.4	-1.3	3.3	-3.9	-0.9
1998	-2.3	-5.3	-1.4	-3.9	-2.9	0.6	-3.4	-2.5
1999	0.8	-1.6	-2.8	-2.5	-3.1	3.3	-6.0	-3.4
2000	-0.4	-1.1	-5.8	-1.4	-4.3	2.5	-4.7	-2.9
2001	-5.0	-3.2	-5.5	-1.7	-4.1	-1.7	-6.7	-2.9
2002	-4.9	-1.7	-5.6	0.7	-5.3	0.1	-4.4	-2.6
2003	-3.1	-1.9	-5.6	0.2	-4.4	-1.1	-2.9	-2.3
2004	-3.1	-1.9	-5.3	-0.9	-4.3	-0.4	-3.3	-1.6

Source: dbresearch.com.

Table 17.6 Domestic savings less domestic investment (% of GDP)

	Hong Kong	Indonesia	Malaysia	Korea	Phillipines	Singapore	Taiwan	Thailand
1990	8.0	–	–4.9	0.2	–10.7	18.2	–	–3.9
1991	7.7	–	–9.5	–4.6	–3.8	21.5	–1.1	–4.0
1992	8.5	1.2	–3.7	–1.9	–3.7	18.8	–1.3	–2.8
1993	9.5	–1.3	–3.7	0.7	–7.6	15.4	–2.0	–3.0
1994	2.7	–0.7	–3.2	–0.8	–6.6	24.6	–1.0	–3.7
1995	–4.2	–1.2	–8.2	–1.5	–4.0	25.6	–2.4	–5.2
1996	1.1	–0.8	–2.9	–4.2	–4.9	21.7	–1.3	–4.4
1997	2.9	–2.2	–3.1	–3.1	–6.7	22.1	–1.4	–2.9
1998	0.1	–0.6	11.7	8.6	–0.5	24.7	–2.1	10.2
1999	7.3	1.5	13.7	3.0	6.4	21.7	–2.1	6.8
2000	3.9	3.4	3.7	1.0	4.1	16.8	–1.8	4.7
2001	1.1	1.0	2.6	0	–2.3	15.1	–0.3	2.5
2002	2.8	2.7	1.9	1.8	0.2	17.8	4.7	2.9
2003	6.6	1.9	7.1	2.2	–0.4	28.1	7.2	3.3
2004	5.1	–0.7	3.6	3.5	–0.1	25.2	3.3	2.8

Source: dbresearch.com.

running fiscal surpluses and only in Taiwan was the size of its fiscal deficits significant, and even then it was actually being reduced in the run-up to the crisis. Hence, *prima facie*, the evidence suggests that there was not a significant fiscal root to the crisis. However, one has to be careful; in an influential paper, Burnside, Eichenbaum and Rebelo (2001) argue that the size of fiscal deficits/surpluses masked the potential dangers to public debt levels of implicit bailout guarantees.

What is more apparent from **Table 17.6** is that in many of the economies there was an excess of private investment over private savings, which ominously widened prior to the crisis. Only in Singapore was there a persistent large excess of private savings over private investment. Hence, the net capital inflows into the Asian economies were driven primarily by the fact that private investment was exceeding private savings in the region.

It is worthwhile considering also whether the exceptionally high rates of investment throughout the 1990s of over 30% of GDP in most of these countries were sustainable, even in the case of the Philippines and Taiwan the rates were in the 20–25% range. Although the official figures may overstate actual investment by including in certain instances elements of consumption, there is some evidence presented by Corsetti *et al.* (1998) that such investment was beginning to become less productive in the run-up to the economic crisis (1993–96) compared to the earlier period (1987–93). In the case of Korea, some 20 of the 30 largest conglomerates had rates of return on capital below their costs of capital, and seven of them were close to bankrupt. Indeed, in Korea the 1996 debt/equity ratio of the top 30 *chaebols* was estimated to be in excess of 300% in the run-up to the crisis, with some of them having debt–equity ratios as high as 3,000%.

Table 17.7 shows some interesting data concerning capital flows into the Asian region in the run-up and during the crisis. There were high net capital inflows into the region right up until the crisis broke in mid-1997. It is important to note that many of the capital inflows were of a short-term nature, but by the end of 1996 the

Table 17.7 International bank and securities financing of five Asian economies (\$ billions)

1990–95 (Average)	1996	1997 (Q1+Q2)	1997 (Q3)	1997 (Q4)	1998 (Q1+Q2)	1998 (Q3)	1998 (Q4)
28	56	49	–39	–96	–96	–59	–43

Note: The five countries are Indonesia, Korea, Malaysia, Philippines and Thailand.

Source: Bank for International Settlements.

share of short-term debt to total debt was typically above 50% in the region. Indeed, the ratio of short-term liabilities to foreign exchange reserves was above 100% in the cases of Korea, Thailand and Indonesia. It was the sudden and dramatic reversal of these flows that lay at the root of the crisis that then ensued. Our analysis of the macro fundamentals suggests that a sudden reversal could not have been easily predicted from the macro data, and we thus need to investigate in more detail the background to the crisis and make some attempt to account for the sudden withdrawal of foreign capital.

17.7 The role of external factors in the crisis

There can be little doubt that a number external factors also played an important background role to the economic crisis:

- 1 Following the collapse of its property and stockmarket bubbles at the end of the 1980s, Japan spent most of the 1990s in economic recession. Interest rates were kept at very low levels and this encouraged a capital outflow from Japan into the Southeast Asian economies enabling them to finance excessive investment projects with relative ease.
- 2 Some argue that a loss in the cost-competitiveness of the Asian economies can be traced back to a 50% devaluation of the Chinese renminbi in 1994. However, this has been disputed by authors such as Edison *et al.* (1999) who argue that many business transactions were carried out at the new parity long before the actual devaluation occurred.
- 3 Financial deregulation had attracted large foreign banks to invest heavily in the region. International banks believed that their loans were effectively underpinned by the governments in the region thus leading to a moral hazard problem. The belief that loans were guaranteed either by the governments or by the potential for IMF bailout packages may have contributed to a climate of excessive lending that ultimately made a crisis more likely to occur than if the perceived insurance schemes had not been in place.
- 4 In April 1997 the Japanese government imposed a consumption tax that is widely credited with leading to an abrupt decline in consumer expenditure in Japan. This in turn had a noticeable impact on the exports of its Asian trading partners. The tax was also widely credited with stalling Japan's fragile economic recovery.
- 5 From mid-1995 onwards there was a sharp effective appreciation of the US dollar in relation to the Japanese and European currencies, which led to a deterioration

in the competitiveness of those Asian economies that had pegged their currencies to the US dollar. Given the lags between exchange rate effects and trade this began to impact upon their export performance in 1996/97.

A combination of the above factors meant that the Asian economies were vulnerable to changes in market sentiment. Before we proceed to examine the factors that were of more immediate concern in causing this change in sentiment we need to examine the crucial role of the financial sector in the crisis. In particular, we need to examine the linkage between the capital flows outlined in **Table 17.7** and the expansion of domestic credit that fuelled the stockmarket and property boom in the region in the run-up to the crisis.

17.8 The role of the financial system

The role of the banking system in financial crises in emerging economies has been noted in a number of studies such as Kaminsky and Reinhart (1997) and Goldfajn and Rodrigo (1997). The occurrence of financial crises has often occurred with a lag following a period of financial liberalization. For instance, Jeffrey Sachs in the *Financial Times* (18 September 1997) has argued that:

Throughout . . . South East Asia banks have been deregulated and privatized in recent years, allowing them much greater latitude to borrow from abroad. Banks and near-banks such as Thailand's now notorious financial trusts – become intermediaries for channelling foreign capital into the domestic economy. The trouble is that the newly liberalized banks and near-banks often operate under highly distorted incentives. Under-capitalized banks have incentives to borrow abroad and invest domestically with reckless abandon. If the lending works out, the bankers make money. If the lending fails, the depositors and creditors stand to lose money, but the bank owners bear little risk themselves because they have little capital tied up in the bank. Even the depositors and the foreign creditors may be secure from risk, if the government bails them out in the case of bank failure.

The pivotal role of the banking system and its relationship with the government and the corporate structure in the East Asian crisis is perhaps far more important to an understanding of the economic crisis than any deterioration in the macroeconomic fundamentals. The governments in the Southeast Asian economies had tried to foster high rates of economic growth and they applied political pressure on domestic banks to lend to corporations and on the corporations themselves to undertake heavy investment programmes to achieve this. To induce firms to undertake such investment programmes governments provided direct subsidies, tax concessions and in many cases public guarantees. More importantly, state-run banks were directed to extend credit to corporations largely without a proper evaluation of the risk–return nature of the investment being undertaken. The domestic banks obtained easy finance from a mixture of domestic residents and from foreign banks and investors who thought that their loans were effectively guaranteed by the governments of the Southeast Asian economies.

It is also important to appreciate in this context that the Asian banking system suffered from many weaknesses (see Mishkin, 1999), including lax supervision, weak

regulation, insufficient skills in the regulatory bodies, low capital adequacy ratios, poor project selection schemes and even corruption in lending practices. The banks used inadequate credit-scoring mechanisms and were subject to political manipulation in their lending criteria resulting in credit being extended to firms without any proper regard to profitability. This resulted in non-performing loans (NPLs) taking up an ever-increasing proportion of their loan book. In addition, governments were heavily enmeshed in the corporate culture with political favouritism, a history of government 'bailouts' of failing firms and little real concern for profitability. This severe structural weakness in the Asian banking systems meant that the foreign capital inflows were not efficiently intermediated.

Given the generally underdeveloped nature of the bond and equity markets in the Southeast Asian countries, the banks have a very significant role in the Asian financial systems. For example, in Indonesia the banks were responsible for around two-thirds of corporate finance, while the stockmarket provided only a third in the run-up to the crisis. Most capital inflows were therefore intermediated one way or another by local banks. It was when the loans intermediated by local banks and financial houses started to become non-performing that foreigners became eager to pull their money out of the region. As **Table 17.8** shows, NPLs were particularly high in the countries most heavily affected by the crisis, namely Indonesia, Malaysia, Korea and Thailand.

One of the major impetuses for the foreign capital inflows into Asia was the financial liberalization that took place in the 1990s. The flows of capital were also encouraged by fixing exchange rate parities *vis-à-vis* the US dollar, which lowered the perceived exchange risk premium on investment in these countries. It seems that international banks believed that should their lending go sour, they would either be bailed out by the local government or obtain an indirect bailout due through IMF involvement in the event of any problems in the region. Such beliefs were to some extent fostered by declarations such as those made by the Indonesian Finance Ministry which announced in 1994 that it would not permit a state bank to default and the government supported 'forced' mergers in instances where a private bank was in trouble. McKinnon and Pill (1996) argue that international banks in the run-up to the crisis had lent huge amounts of funds to the region's domestic banks with little

Table 17.8 Estimates of non-performing loans and non-performing credits

	Non-performing bank loans (% of all loans)		Non-performing credits % GDP, 1997
	End of 1996	End of 1997	
Hong Kong	3	1	3.6
Indonesia	13	15	9.7
Malaysia	10	15	18.7
Korea	8	30	25.7
Philippines	14	7	6.5
Singapore	4	4	4.9
Taiwan	4	na	6.0
Thailand	13	36	35.1

Source: Burnside *et al.* (2001).

Table 17.9 Bank lending to the private sector (% of GDP)

	1991	1992	1993	1994	1995	1996	1997
Hong Kong	142	134	140	149	155	162	174
Indonesia	50	50	50	52	54	55	69
Korea	53	53	54	57	57	62	70
Malaysia	75	75	74	75	85	93	107
Philippines	18	20	26	29	38	50	56
Singapore	83	85	84	84	91	96	100
Taiwan	109	126	137	147	149	146	146
Thailand	67	72	80	91	98	102	116

Sources: Various.

regard to any detailed risk-assessment. Evidence of a lending boom fuelled by foreign capital inflows is documented in Corsetti *et al.* (1998), and **Table 17.9** shows a significant upward movement in bank lending to the private sector in all of the countries studied.

In all the countries under study we can see that there was a significant increase in bank lending to the private sector as a percentage of GDP, and the fact that GDP was rising strongly in this period must also be borne in mind. In the three countries where the lending boom was the greatest – namely the Philippines, Thailand and Malaysia – it is noteworthy that these were the countries most hard hit by the crisis in 1997.

That a great deal of the inflow of funds helped fuel a stock and property market boom in the East Asian economies is not really in dispute. As **Tables 17.10** and **17.11** reveal there was a significant rise in both the overall stockmarket indices and an even more marked increase in the value of the property sector of the index in all of the economies during the period 1991 to 1996 which seems to have started to come to an end in 1997. The concentration of foreign loans to the property sector and the financing of speculation in the equity markets meant the banking systems were particularly vulnerable to any asset deflation.

That there was an asset and property bubble in these economies cannot be easily refuted – see for example Sarno and Taylor (1999). The Hong Kong market quadrupled in 1990–96, the Indonesia and Philippine markets rose by over 250% and speculation drove property and land values to unsustainable levels.

17.9 The immediate causes of the crisis

It is not completely clear what was the spark that ignited the crisis. The first major corporate failure took place in Korea in January 1997, when Hanbo Steel collapsed under the weight of \$6 billion of debts; it was soon followed by Sammi Steel and Kia Motors. The collapse of these companies meant problems for the local merchant banks that had either borrowed significantly from foreign banks to finance lending to these companies or who had provided guarantees to foreign investors that had made direct loans to the companies.

Pressure on the Thai baht had begun to emerge at the back end of 1996 fostered by

Table 17.10 Stockmarket indices (end of year)

	Hong Kong (Hang Seng)	Indonesia (Jakarta composite)	Malaysia (Kuala Lumpur composite)	Korea (KOSPI)	Philippines (Manilla composite)	Singapore (Times straight)	Taiwan (composite)	Thailand (SET)
1990	3025	417	505	696	653	947	4530	612
1991	4297	247	556	610	1154	1214	4600	711
1992	5512	274	643	678	1272	1240	3327	888
1993	11888	588	1275	866	3241	2086	6070	1682
1994	8191	469	1210	1027	2785	1853	7124	1360
1995	10073	513	995	882	2594	1917	5173	1280
1996	13451	673	1237	651	3170	1991	6933	831
1997	10722	396	594	376	1869	1507	8187	372
1998	10488	398	586	562	1968	1392	6418	355
1999	16962	676	812	1028	2142	2479	8488	481
2000	15095	416	679	504	1494	1926	4739	269
2001	11397	392	969	963	1169	1623	5551	303
2002	9321	424	646	627	1018	1341	4452	356
2003	12575	691	793	810	1442	1764	5890	772
2004	14230	1000	907	895	1822	2066	6139	668

Notes: (a) KOSPI stands for Korean Stock Price Index, and SET is the Stock Exchange Thailand index. (b) The figures are the end of year closing prices of the indices.

Table 17.11 Stockmarket highs and lows

	Date of 1997 high	Stock index	Date of 1998 low	Stock index	% decline from 1997 high to 1998 low
Hong Kong	7/8/97	16,673	13/8/98	6,660	60%
Indonesia	7/7/97	738	21/9/98	256	65%
Korea	17/6/97	792	16/6/98	280	65%
Malaysia	25/2/97	1,271	11/9/98	262	79%
Philippines	3/2/97	3,447	11/9/98	1,082	69%
Singapore	17/2/97	2,129	4/9/98	805	62%
Taiwan	31/7/97	10,066	3/9/98	6,251	38%
Thailand	22/1/97	858	4/9/98	207	76%

Notes: (a) The above indices are based on closing prices of the index (not intra-day high/lows). (b) Note in three countries the pre-crisis peaks were recorded before 1997; Korea (8 Nov. 1994) 1,138; Singapore (5 Feb. 1996) 2,163; Thailand (5 Jan. 1994) 1,753. (c) Note that in the case of Taiwan the ultimate low for the index was 3,811 recorded on 15 Jan. 2001.

concern about its large current account deficit and increasing reliance on short-term foreign capital. In addition the Thai stockmarket had begun a steep decline as early as February 1996; the market fell over 30% in 1996 and a further 30% by mid-1997. The Korean market fell 26% in 1996 and the Malaysian market began to decline in February 1996, but other markets did not show any sign of weakness right up to July/August 1997 (see **Table 17.11**). Pressure had been mounting on the Thai baht as early as July 1996 when, following the collapse of the Bangkok Bank of Commerce, there had been a large injection of liquidity into the financial system by the Bank of Thailand. In February 1997, Samprasong Land (a Thai property company) missed debt payments due to foreign creditors and in so doing signalled the start of a collapse in the local property market and serious trouble for local finance companies with heavy loan exposure to property companies. While the Bank of Thailand committed some \$8 billion of loans to assist financial institutions facing difficulty, this proved insufficient to deal with the magnitude of the debts. The pressures on the financial system continued through to 14 May 1997, when the Thai stockmarket fell nearly 7%, and on 19 June following the resignation of the Finance Minister, a staunch supporter of the currency peg, the stockmarket fell nearly 11% in a single day. In a bid to save the Thai baht from devaluation the Bank of Thailand engaged in substantial forward purchases of the baht representing a massive drain on its foreign exchange reserves. The battle to save the baht from devaluation ultimately proved unsuccessful when, following the withdrawal of support from the Thai authorities, Finance One (a major finance company) announced that it would not be able to meet payments to foreign or domestic creditors. This announcement came as a major shock to foreign creditors and led to such a massive withdrawal of funds that the baht was forced to devalue on 2 July 1997.

The Thai devaluation then seems to have triggered international investors' concerns about the entire region. A successful speculative attack was launched against the Philippines peso which was forced to float on 11 July. The crisis soon spread to Malaysia where the property sector had been experiencing a speculative bubble. Local banks had lent significant sums of money to fuel speculative equity and real-estate investments and the party started to come to an end in March 1997 when the central

bank announced restrictions on lending for real estate and property purposes. The announcement came as a shock to foreign investors and led to a sharp drop in the Malaysian Stock Exchange which had a heavy weighting to the property and financial sector. The speculative pressure against the ringgit came to a crescendo following the Philippine devaluation, and the ringgit was forced to float on 14 July. The Malaysian Prime Minister Mahathir Mohammed launched a vitriolic attack against 'rogue speculators' and introduced controls on capital outflows and against the short-selling of equities and the ringgit in the forward exchange market.

The contagion element of the crisis is perhaps best illustrated by the case of Indonesia. Although Indonesia had many weaknesses such as a poorly regulated financial system, 'crony capitalism' characterized by political nepotism and a persistent current account deficit, things were not that bad either. Indonesia had avoided any major corporate bankruptcies, the government had been running fiscal surpluses and the exposure of the commercial banking system to foreign creditors at around 6% of GDP was well below that of other countries in the region, although corporate debts to foreign creditors were fairly significant. Despite this, the rupiah came under intense speculative pressure and was forced to float on 14 August 1997. The resulting depreciation of the rupiah, combined with a rise in interest rates designed to protect the rupiah, resulted in Indonesia being dragged into the crisis, and September to December saw a plunge into a severe crisis situation in Indonesia. Although a letter of intent was signed with the IMF on 31 October that secured a \$40 billion support package it had little impact on the crisis, and in November the Indonesian stockmarket fell some 20%. The illness of President Suharto in December only added to the crisis atmosphere and by the beginning of 1998 Indonesia had become the investment pariah of the region.

Political instability in the region also played a background role in the crisis; there were major cabinet reshuffles in Thailand; the Malaysian Prime Minister Mahathir Mohammed attacked 'rogue speculators'; and elections in Indonesia, combined with the ill-health of its President Suharto and his unpredictable policies, combined with presidential elections in Korea, all added to the sense of political and economic instability in the region.

In November 1997 the Hong Kong dollar came under intense speculative attack, since speculators felt its peg to the US dollar was no longer sustainable given the other devaluations that had occurred within the region. Thereafter, for the best part of a year it seems that there was a continual battle between the Hong Kong Monetary Authority (HKMA) and speculators over the sustainability of the Hong Kong dollar peg. Speculators simultaneously shorted the Hang Seng index and sold the Hong Kong dollar forward. The bet proved very lucrative for the speculators since the HKMA was forced to raise interest rates to defend the Hong Kong dollar parity, which depressed the Hong Kong property and stockmarket. The battle between the speculators and the HKMA was only finally resolved in October 1998 when the HKMA started to buy shares to boost the Hang Seng index.

By November 1997 South Korea had been dragged into the crisis and speculative attacks were launched against the Korean won, and even a Korean rescue package with the IMF announced on 21 November failed to end the speculative pressure, as the terms of the deal which included tax rises and spending cuts were viewed by the markets as likely to worsen the plight of the economy. Rumours also surfaced in December that Korea would declare a debt moratorium and on 11 December the Korean markets suffered significant declines following a Moody's downgrade of its

foreign-currency-denominated bonds. For a while Japan also became a subject of concern following the closure on 24 November of the fourth-largest securities house Yamaichi Securities, and on 19 December foodstuff trader Toshoku filed for bankruptcy leading to concerns that more would follow. Indonesia added to the sense of panic by renegeing on promised structural reforms.

By mid-January 1998, somewhat calmer markets returned on the news that international banks had agreed to roll-over much of Korea's short-term debt, and on 19 January Indonesia's agreement to a tough IMF package was also welcomed. However, once again the calm was short-lived as Indonesia started to flirt with the idea of introducing a currency board and the IMF made it clear that it was not going to support the Indonesian plans to peg the rupiah to the dollar. From February up until the end of May, markets did not stage a comeback nor did they collapse, rallying somewhat on the announcement of trade surpluses in Thailand (13 March) and tumbling on news of unrest and looting in Indonesia which eventually led to the resignation of President Suharto in May 1998.

17.10 An analysis of the crisis

Mishkin (1999) argues that the weak position of the Asian banking system with regard to the increasing percentage of non-performing loans (NPLs) when combined with their fixed exchange rate systems made speculative attacks far more likely to succeed. When banks' balance sheets are weak, speculators know that central banks' attempts to defend the currency via interest rate hikes are likely to fail since they increase the percentage of NPLs and weaken still further the banks' balance sheets eventually making devaluation inevitable. In 1996 it has been estimated that NPLs as a proportion of total lending was 8% in Korea, 13% in Indonesia, 10% in Malaysia, 14% in the Philippines, 13% in Thailand and 4% each in Singapore and Taiwan and 3% in Hong Kong. Exposure to the property market was particularly high in Hong Kong, Malaysia, Singapore and Thailand, whilst in Korea and Indonesia most of the bank exposure was to manufacturing companies. For instance, in 1996 the Malaysian banking system's exposure to the property and equity sector was some 42.6%, while exposure to the manufacturing sector was around 21%. Once the crisis got under way it had a dramatic impact on the proportion of NPLs, which reached an estimated high of over 30% in Korea and Thailand at the peak of the crisis.

Once devaluations and drops in property prices and stockmarkets got under way in the region, the crisis took on a life of its own. The devaluations meant large foreign exchange losses for domestic banks and firms whose liabilities to foreign banks were largely unhedged since they had believed in their government's pledges to maintain fixed exchange rates. The drop in property and equity prices also caused substantial losses and outright defaults by many property companies and those playing the markets with margin accounts. In sum, local banks were hit simultaneously on many fronts – the withdrawal of foreign funds, substantial foreign exchange losses, a sharp rise in the percentage of non-performing loans and losses on equity holdings. The resulting rapid rise in the proportion of non-performing loans further accelerated the withdrawal of foreign funds which in turn led to further falls in the local currencies, property sector prices and stockmarkets, so completing the vicious circle. The erosion of the banking system's capital bases due to all of these factors severely constrained their ability to lend to even solvent companies in the midst of the crisis.

The withdrawal of foreign capital also meant a severe liquidity crisis. The liquidity squeeze forced up local interest rates and meant that local firms had considerable difficulty in obtaining finance just when they needed it to cover their foreign exchange losses and service higher debt payments. The rise in NPLs of the local banking systems made foreign banks even more reluctant to roll-over any loans. There can be little doubt that this reluctance was reinforced by the absence of any effective local bankruptcy laws and concerns that local lenders would receive preferential treatment as compared to foreign creditors.

It is also apparent there was very little discrimination made between the various countries in the region as international banks and foreign investors (including mutual funds) decided *en masse* to pull funds out of the region. The crisis was thus characterized by contagion and herding behaviour on the part of foreign investors and banks, and there were many ways in which the so-called contagion effect came into play during the Asian crisis. As we have mentioned in section 17.4, when one currency was devalued it raised questions about the sustainability and credibility of other fixed parities within the region. The competitive advantage conferred to the devaluing country also raised the prospect of a slowdown in the export growth of competitor countries so calling into question other exchange rate pegs. Similarly as capital was pulled out of one country so forcing it to raise its interest rate, this had the effect of forcing up the interest rates in competing countries. When local companies get into difficulty it is generally the case that domestic banks recall loans lent to foreign businesses in the region first, so spreading the credit squeeze across borders. Furthermore, a downturn in the local economy directly impacts on the exports of other countries in the region.

There also seems to have been a problem of imperfect information; foreign investors faced with insufficient information were unable to distinguish the bad from the not so bad countries and so reacted in a fairly uniform manner by removing capital from all of them. The role of speculators including hedge funds in foreign exchange crises cannot be underestimated; having made a great deal of money by successfully betting against the Thai baht it was only natural for speculators to switch their attention to testing the sustainability of other currency pegs in the region.

It is important to understand that it was not just US and European banks that scaled back their lending to the region. In particular, Japanese banks who were facing further erosion to their already weak capital bases as a result of losses from their Asian exposure decided to call in many of their loans to the region. Similarly, Korean banks that were faced with extensive problems due to their exposure to the heavily indebted *chaebols* started to call in loans they had extended to the rest of Asia. The attempt by speculators to force a devaluation of the Hong Kong dollar led to the raising of interest rates by the HKMA, and apart from placing pressure on the already beleaguered Hong Kong stockmarket and property sector by raising the interest payable on deposits, some Hong Kong banks were forced to recall loans they had made to the rest of Asia.

In retrospect, there were also policy errors conducted by the local governments that probably exacerbated the crisis. For example, the Thai authorities might have been better off allowing the baht to float freely rather than exhausting their foreign exchange reserves trying to defend the parity. Both the Thai and Korean authorities initially spent huge amounts of money trying to keep afloat companies that were clearly headed for liquidation. In the case of Thailand the authorities' refusal in late June 1997 to save Finance One contrary to previous promises brought into question the credibility of all their other guarantees. Indeed, it can be plausibly argued that the

Table 17.12 Currency declines in the crisis and parities at the start of 2005 (domestic currency units per US dollar)

	1 July 1997	1998 low (date)	% decline	3 Jan 2005
Hong Kong dollar	7.7455	7.734 (30/6/98)	0.1	7.7779
Indonesia rupiah	2431	15200 (16/6/98)	84.0	9278
Korea won	886	1806 (9/1/98)	50.9	1037
Malaysia ringgit	2.5240	4.6805 (8/1/98)	46.1	3.7995
Philippines peso	26.35	44.55 (23/9/98)	40.9	56.11
Singapore dollar	1.4296	1.79 (12/1/98)	20.2	1.6393
Taiwan dollar	27.78	34.83 (31/8/98)	20.2	31.83
Thailand baht	24.35	53.55 (29/1/98)	54.5	38.88

Notes: (a) The percentage decline is measured by comparing 98 low with original exchange rate prevailing at 1 July 1997.

Source: Globalfindata.com.

renegeing on the commitment to save Finance One was the crucial match that ignited the Asian crisis. The existence of ‘crony capitalism’ was seen to be in play in Indonesia where IMF and state funds were directed at trying to save the business interests of President Suharto’s relatives. The early imposition in August 1997 by the Malaysian and Thai authorities of foreign exchange controls once the crisis began only heightened the desire of foreign investors to get out of the region and probably contributed to subsequent downgrades by the credit-rating agencies.

The currencies that fell most during the crisis (Table 17.12) were currencies of countries with the largest current-account deficits. The Hong Kong dollar parity was successfully defended by the HKMA against speculative attacks throughout the crisis. Most noticeably, the two surplus countries, Singapore and Taiwan witnessed their currencies fall by relatively modest amounts of around 25%; indeed during the crisis the decline of the last two currencies was far more orderly. Hence, there is some evidence that there was a link between current accounts and the exchange rate turmoil.

17.11 The IMF handling of the crisis

Once the crisis was under way economic agents were generally very keen to exit the region and the initial IMF plans were signed but not adhered to by the governments. This was particularly the case in Indonesia where the Suharto regime ignored virtually all of its commitments and only reversed policy once the rupiah went into freefall. Likewise, initially the IMF package for Korea was only grudgingly accepted, and in Thailand it was only the onset of a new government that was committed to economic reform that finally stabilized the baht. The overall IMF programme to the region had a number of objectives:

- 1 Prevention of default on the part of the Asian countries.
- 2 Prevention of a freefall in their exchange rates.
- 3 Prevention of the emergence of inflation.

- 4 Maintenance of sound fiscal discipline.
- 5 Restoration of investor confidence in the region.
- 6 Structural reform of the financial sector and banking system.
- 7 Structural reform of the corporate sector, in particular the ending of so-called 'crony capitalism'.
- 8 Rebuilding of foreign exchange reserves.
- 9 Limiting the decline of output.

The key instruments used by the IMF to achieve these objectives were:

- **Bank closures.** The IMF was very keen to ensure that the least-viable banks were closed down. Those banks that remained open were expected to restore their capital ratios to above the 8% required by the Basle Accord. In Thailand some 58 out of 91 finance companies were suspended of which over 55 were eventually liquidated. In its agreement with the IMF the Thai banks were expected to have a capital adequacy ratio of 10% by the end of 1997 and 12% by 2001. Similarly, in Korea 14 out of 30 merchant banks were suspended in a move designed to restore confidence in the banking system. In the case of Indonesia the IMF insisted on the closure of some 16 banks. The IMF policy focused on closing down the banks with the highest proportion of non performing loans.
- **Fiscal discipline.** The IMF regarded the maintenance of fiscal discipline as crucial to the successful management of the crisis. In its programme for Thailand it stated that 'Fiscal policy is the key to the overall credibility of the programme'. In its initial packages it required that the Asian economies actually run budget surpluses equivalent to 1% of GDP. The IMF viewed the maintenance of fiscal discipline as crucial since government funds would be needed to assist in the eventual recapitalization of the banking systems, restoring foreign confidence and helping to improve the balance of payments position of the deficit countries.
- **Monetary discipline.** As is typical of IMF packages, limits were set on the creation of domestic credit, and interest rates were raised in an attempt to reduce capital outflows and relieve pressures on the currencies. The IMF recognized that the higher interest rates would harm the corporate sector in the economies but judged that the benefits from exchange rate stability would more than offset this. For instance, the Deputy Managing Director Shigemitsu Sugisaki on 30 January 1998 stated:

We know that higher interest rates are likely to hurt the corporate sector, but an appreciation of the currency that follows a tightening of monetary conditions would greatly benefit those corporations indebted in foreign currency. There is no alternative in the short term. A relaxation of monetary policy would only lead to further depreciations of the currencies.

- **Structural reform of the banking and corporate sector.** While IMF programmes are usually concentrated on ensuring the pursuit of fiscal and monetary restraint on the part of the crisis country, they are usually limited with regard to financial sector and corporate reform. However, in the Asian crisis this was not the case; the IMF believed that in the longer term there was a need to reform the banking and corporate structure in the Asian economies by a more radical policy of restructuring and liberalization, which involved the closing of numerous banks, reducing

tariffs, reducing state aid and the opening-up of the region to foreign direct investment in the economies. As Michel Camdessus, the Managing Director of the IMF, emphasized:

In view of the nature of the crisis, these programmes had to go far beyond addressing the major fiscal, monetary or external balances. Their aim is to strengthen financial systems, improve governance and transparency, restore economic competitiveness, and modernize the legal and regulatory environment.

17.12 An evaluation of the IMF programmes

Authors such as Radlett and Sachs (1998) have criticized the IMF programmes as being unduly harsh and indeed exacerbating the crisis, the policy on bank closures coming in for particular criticism. They argue that the requirements to close many of the banks added to the credit squeeze on the private sector, created a sense of panic on the part of international investors and led to a series of bank runs as local residents sought to safeguard their savings. For instance, by the end of November 1997 two-thirds of Indonesian banks had suffered a run on their deposits. The policy of recapitalization is also harshly criticized; they argue that the raising of capital adequacy ratios greatly and unnecessarily added to the credit crunch on the corporate sector. However, in the IMF's defence it regarded structural reform as absolutely essential since problems in the banking sector lay at the heart of the crisis. The IMF also believed that without structural reform, the chance of restoring foreign confidence and capital flows back to the region would remain low. Moreover, the major bank runs that had occurred in Indonesia were not repeated on anything like the same scale in Thailand and Korea.

The fiscal and monetary programmes have also come in for quite a lot of criticism, most notably from the Nobel Prize-winning economist Joseph Stiglitz (2002), who has argued that the tough fiscal discipline combined with higher interest rates meant that the contraction in economic output was greater than would otherwise have been the case. As we have seen, at the time of the crisis the Asian economies were actually running fiscal surpluses or relatively small deficits and their national debt to GDP ratios were also not excessively high. However, as noted previously the IMF believed that fiscal restraint was essential, partly as a corrective mechanism for helping the current account to return to surplus and partly as a means of preventing further wastage of scarce government resources on low marginal return projects. The containment of government expenditure was regarded as particularly important, given that public funds would be needed to recapitalize and restructure the banking systems.

On the monetary front the rise in interest rates which should in theory have helped strengthen the currencies did not succeed in doing so. The currencies in fact depreciated even more heavily following the initial IMF packages, despite the steep rise in interest rates and the exchange rate targets set. It appears to be the case that the squeeze on local companies and the increase in non-performing loans on the books of the banking system probably added to the sense of crisis and may have further exacerbated the withdrawal of foreign capital. However, this argument is not as clear-cut as it seems; if the countries had not raised their interest rates, it may well have been the case that their currencies would have depreciated even more than they did, which

would have exacerbated the losses for domestic banks and companies that had unhedged foreign currency debts. Furthermore, larger falls in the currencies of the region could well have led to hyperinflation and even more disruption to economic activity than actually occurred.

While there is no doubt that the initial IMF policy programmes were quite tough, the policies became somewhat softer as the extent of the economic downturn in the Asian economies became evident. For example, the original Indonesian package negotiated in October 1997 required Indonesia to run budget surpluses equivalent to 1% of GDP in the fiscal years 1997/98 and 1998/99, but a subsequent agreement reached in June 1998 permitted the government to run a budget deficit of up to 8.5% of GDP.

The moral hazard problem is a recurrent theme with respect to IMF interventions; the argument being that IMF bailouts actually make crises more likely than if the IMF did not intervene. However, this argument should clearly not be taken too far, since in most economic crises investors are probably not expecting an IMF intervention when investing their funds. Indeed, most investors would probably be very reluctant to lend funds if they felt that there was a reasonable chance that the country might need to seek emergency assistance from the Fund in the near future. Furthermore, during crises most investors do end up losing substantially – in the Asian crisis it is estimated that foreign investors in the bond and equity markets in the affected countries lost in the region of 50–80% of their capital as the value of their investments in the region plummeted. In addition, the idea that governments will be more inclined to pursue imprudent policies knowing that the IMF will likely come to the rescue cannot be taken too seriously. Anecdotal evidence suggests that most governments are extremely reluctant to go to the IMF as it is taken as a clear sign of economic policy failure and usually results in the government falling or failing to get re-elected. It is also important to bear in mind here that if there was no IMF to act as a lender of last resort, then there would be a significant danger of even greater panic. The IMF programmes and loans also act as an institutional buffer to limit potential contagion effects. In the absence of the IMF the risk of even greater regional dislocations, disorderly markets and possibly a more significant global financial crisis has to be considered.

17.13 The crisis and post-crisis performance of the economies

As can be seen in **Table 17.1** there were very significant falls in economic output in many of the crisis-hit countries during 1998, with real GDP falling 13.1% in Indonesia, 10.5% in Thailand, 7.4% in Malaysia and 6.9% in Korea. These output falls were dramatic, especially as these economies had been used to growing at the rate of 5–8% per year. However, fortunately, the slump in economic activity proved to be relatively short-lived and during 1999 and 2000 the economies rebounded strongly, although their growth rates during the first few years of the new century having generally been significantly lower than in the early 1990s. What is also clear from **Table 17.4** is that there was a dramatic improvement in their current accounts during 1998, but this was driven primarily by a massive fall in imports induced by the dramatic fall in output in the afflicted economies, and the effects of the large exchange rate depreciations which encouraged exports and made imports more expensive. In general it seems that the real depreciations of the effective exchange rates that have occurred in all the economies since 1997 has led to an improved current account

position in all the economies post-1997 compared to the current account deficits in the run up to the crisis.

The fiscal situation, however, seems to have undergone a significant deterioration as shown in **Table 17.5**; fiscal surpluses of the early to mid-1990s have since been replaced by fiscal deficits in most of the economies. These fiscal deficits have come about partly because of the costs of the crisis itself in terms of bailout of some of the financial institutions and companies, repayment of loans to international institutions, the increased unemployment and also the slower economic growth rates the economies have experienced since the crisis. In addition, the savings and investment data depicted in **Table 17.6** – which changed quite dramatically during the crisis as savings rose and investment collapsed – seem to have undergone a marked change compared to the pre-crisis era with savings rates generally higher and investment rates somewhat lower than before the crisis.

In sum, the output effects of the crises were quite dramatic but the recession itself, while sharp, was relatively short-lived. There does, however, appear to have been a more significant change in some of the crucial economic relationships in these economies, most noticeably the improved current account balances and deterioration in the fiscal balances, meaning that private savings and investment relationship seems to have undergone a quite significant change due to higher savings and lower investment rates than before the crisis. The depreciation of the real effective exchange rates of the economies has made them significantly more competitive in 2004 than in 1997.

17.14 Early-warning systems

Given the number of currency and financial crises that have occurred in recent years, economists, policy-makers and market participants have been keen for different reasons to develop early-warning systems (EWSs) that may be useful in predicting the timing and probability of a financial crisis; Kaminsky, Lizondo and Reinhart (1998) is one of the pioneering papers in this respect. The aim of an early-warning system is to look at various economic and financial indicators for signs prior to outbreak that a crisis is highly likely to occur in the near future (say within 12–18 months). Ideally, of course, an EWS as well as detecting potential crises should avoid giving out false signals, that is predict a crisis when one does not in fact occur. An EWS would be useful for financial market participants in that it would give them a chance to reduce their potential risk exposure (and of course take speculative positions!) and also provide useful information to policy markets who, forewarned of a crisis, could be expected to take preemptive measures to prevent an actual outbreak of a crisis.

The Kaminsky *et al.* (1998) paper uses a ‘signal’ approach to devising an early-warning system. This involves looking at a selection of various economic and financial indicators that may exhibit unusual behaviour prior to the outbreak of a crisis; each time an indicator exceeds a predetermined threshold a signal is generated predicting a crisis. It is essential that the thresholds are not set too low or the EWS will generate too many false signals, that is predict a currency crisis when no crisis occurs. On the other hand, the thresholds should not be set so high that too few signals are generated and the EWS fails to predict a crisis when a crisis actually occurs. The aim of an EWS is to predict a currency crisis within one to two years of the actual crisis occurring. A signal can be considered useful on the basis of three alternative metrics: (1) its

probability of predicting a crisis (the higher its success rate the better), (2) the length of time in advance of a crisis that it predicts a crisis (the more in advance the better), and (3) the persistence with which it predicts a crisis (the more often it warns of a crisis that actually occurs the better). The following matrix can be used to evaluate the usefulness of a variable in predicting a crisis:

	Crisis (with 24 months)	No crisis (within 24 months)
Signal was issued	<i>A</i>	<i>B</i>
No signal was issued	<i>C</i>	<i>D</i>

where *A* is the number of months in which the indicator predicts a crisis and a crisis subsequently occurs, *B* is the number of months the signal provides a false signal of a forthcoming crisis, *C* is the number of months the indicator fails to produce a signal and a crisis occurs, and *D* is the number of months the indicator produces a no signal and no crisis occurs. A good indicator is one that has lots of *A* and *D* observations and relatively few *C* and *B* observations. A useful measure is the ratio $A/(A + C)$ which shows the number of good signals that the indicator issued as a percentage of the total number of signals that it could have produced, since a good indicator will have a relatively high percentage of predicting a crisis when a crisis actually occurs.

In their paper, which is essentially empirical in nature, Kaminsky *et al.* look at a variety of potential indicators of a currency crisis informed partly by the literature on speculative attacks. For instance, the first-generation models predict that the level of the money supply relative to the level of foreign exchange reserves, the size of fiscal deficits and also of current account deficits can provide useful early-warning signals, whilst the second-generation models argue that deviations of output below trend or high levels of unemployment or high levels of public debt may be useful indicators since they weaken the resolve of the authorities to defend a fixed exchange rate parity. The paper also reviews a large range of studies that have looked at numerous currency crises covering both developed and developing countries, and at a huge range of potentially useful indicators.

Kaminsky *et al.* in surveying the literature of currency crises place variables into one of six categories: (1) the external sector, (2) the financial sector, (3) the real sector, (4) public finances, (5) institutional and structural variables, and (6) political variables. A variable is only considered to have some usefulness if the ratio of false to good signals that it generates is below unity. In their empirical analysis, Kaminsky *et al.* find that output levels, deviations of the real exchange rate from trend, banking crises indicators, exports, the ratio of broad money supply to reserves, the inflation rate and equity prices provide useful EWS signals. More surprisingly, current account deficits, fiscal deficits and the differential in real interest rates between the domestic and foreign economies do not provide useful signals for the EWS. Kaminsky *et al.* conclude that a good system needs to consider a variety of economic and financial variables.

We should perhaps not expect too much from an EWS, since no two crises are exactly alike and the economic, financial and political variables which provoke a crisis can vary greatly and interact with each other in often unpredictable ways. Just as a butterfly flapping its wings can provoke a hurricane in another part of the world in chaos theory, so too can a minor event provoke a full-grown speculative crisis which was largely unforeseeable. In addition, Flood and Marion (1999) make the point that currency crises are in practice largely unforeseen by market participants, and they are unforeseen because macro and financial fundamentals are not indicating an

impending crisis as seems to have been the case in Asia, hence an EWS based on such indicators is likely to have only a limited success rate. As they put it, ‘. . . the more unpredictable the crises, the less likely they are to be significantly correlated with the information variables selected as possible crises determinants. Moreover, if the potential determinants of currency crises differ across countries and across time, panel regressions that look for consistent patterns may perform poorly’ (p. 18).

17.15 Conclusions

Our interpretation of the Asian financial crisis has been informed by a mixture of the three generations of currency crisis models. There are, however, reasons to believe that none of these models alone is sufficient to explain the crisis, although elements of each were to a greater or lesser extent present during the crisis. For instance, the devaluation of many of the currencies was preceded by current account deficits and a depletion of the foreign exchange reserves of the Asian countries, which is a characteristic of the Krugman model, but the necessary fiscal deficits in the Krugman model were not evident. It is probably fair to say that the second-generation models do somewhat better than the first-generation models at explaining the Asian financial crisis. Indeed, Krugman (1999, pp. 8–9) has acknowledged as much, ‘I hereby capitulate. I cannot see any way to make sense of the contagion of 1997–1998 without supposing the existence of multiple equilibria.’ Likewise, Masson (1998, p. 6) states, ‘the fact that the optimistic view about East Asian economies prevailed for so long (in the face of some reports of banking sector problems), the rapidity of the change of view, and the suddenness and severity of the resulting crises all argue in favour of the multiple equilibria story.’ There is also no doubt that there was an explosion of risky lending to the region prior to the crisis and many of the foreign banks that lent to domestic banks and companies in the region felt that there were explicit or implicit government guarantees on their loans which led to the ‘moral hazard’ problem which is a characteristic of the third-generation models. While it can be disputed whether the bubbles in the local property and stockmarkets were rational or irrational, the proposition that bubbles were present cannot be easily refuted. Finally, the withdrawal of foreign capital when the crisis arrived was both sudden, disorderly and characterized by a high degree of panic which is characteristic of the Sachs (1995) model.

We have argued that although there were signs of a deterioration in the macroeconomic fundamentals, these were not of a sufficiently large order to explain the magnitude of the financial crisis that subsequently erupted. Far more significant in explaining the crisis was the lax lending by the local banking systems fuelled by excessive speculative foreign capital inflows to the region. Much of the foreign capital was used in either unproductive investments or to fuel an unsustainable boom in asset prices, most notably in stockmarket and property valuations. The need to reestablish fair values for property and equity prices then triggered the crisis by undermining the quality of the loan portfolio of the domestic banks. The magnitude of the financial crisis that followed can then also partly be explained in the context of contagion theory and herding behaviour, particularly on the part of foreign banks and international investors exposed to the region. Some of the blame for the magnitude of the crisis can also be apportioned to policy errors by the affected national governments and the initial IMF response.

A central contention of this chapter is that the Asian financial crisis was predominantly a financial crisis caused by excessive foreign-financed credit expansion which resulted in unsustainable asset bubbles rather than any significant macroeconomic weaknesses in the Asian economies. The resulting financial crisis would have been far less severe if international investors had rolled over their loans and not all tried to exit simultaneously from the region. Once this happened, a self-reinforcing crisis was set in motion. As Radlett and Sachs (1998) have put it, 'A combination of panic on the part of the international investment community, policy mistakes at the onset of the crisis by Asian governments, and poorly designed international rescue programs have led to a much deeper fall in (otherwise viable) output than was necessary or desirable.'

In the context of the recent crises it is worth bearing in mind that many of them have been regional in nature. One can think of the Latin American debt crises of the 1980s, the ERM crisis of 1992–93 and the East Asian financial crises of 1997/98. Research by Glick and Rose (1999) suggests that there may be good reasons for crises to become regional in character. Firstly, the economies often compete with one another in international trade so that a devaluation of one country's currency will give it a competitive advantage over other countries, and this may then mean speculators will target the other countries' currencies adversely affected by the initial devaluation. Secondly, devaluations are often followed by recessions which slow down intra-regional trade and growth making other currencies in the region ripe for speculative attack. Their empirical estimates show that trade linkages between the country that is initially subjected to a speculative attack and its trading partners is a statistically significant explanatory variable in regional currency crises. Nevertheless there is mounting empirical evidence (see for example Fratzcher, 2003) that financial linkages between countries are perhaps more important in explaining contagion and regional currency crises.

A recurring theme in financial crises is that extensive dependence on foreign capital leaves a country especially vulnerable since foreign banks are less likely to be willing to renew lines of credit in the event of a crisis than domestic banks. The question of whether the imposition of capital controls on the outflow of capital during a crisis can help to mitigate the crisis is very controversial. The main argument in favour of controls on the outflow of capital is that it would enable the authorities to get away with a lower domestic interest rate than would otherwise be the case, and limiting the sales of the domestic currency would help restrict the depreciation of the local currency which in turn would restrict foreign exchange losses and the risk of uncontrolled inflation. Authors such as Krugman (1998b) have argued that China was largely able to ride out the Asian crisis because the yuan was inconvertible. Economic theory gives little guidance on the subject, since in a second-best world the addition of a further distortion such as capital controls may or may not raise economic welfare. There are, of course, longer-term adverse consequences from deploying capital controls, such as inefficiency, the potential for a misallocation of capital and lower economic growth, but it is not too clear that these outweigh the short-term benefits in times of economic crisis especially when many of the capital movements are driven by panic and contagion effects. However, even during a crisis the imposition of capital controls may not always be beneficial. Once one country imposes capital controls this can lead to foreign investors accelerating capital flight from other countries before they too decide to impose controls. Indeed, capital might be pulled out of otherwise sound emerging market economies so that the crisis is amplified. Some commentators have suggested that the imposition of capital controls by Malaysia in August 1998 may have been a factor in spreading the Asian crisis to Latin America.

The Asian crisis certainly did show that the speed and sequencing of capital account liberalization is an important issue. Capital account liberalization as had occurred in the region needs to be done gradually and be accompanied by strong supervision of the domestic banking system and indeed the corporate sector aimed at avoiding a build-up excessive short-term foreign liabilities on the part of domestic banks and the domestic corporate sector.

The signs of financial and economic recovery that started in 1999 in the East Asian economies may be taken as evidence that the 1997–98 financial crisis was an overreaction on the part of market participants. The speed and size of the recovery has been partly achieved by a return of confidence induced by the adoption of more realistic IMF programmes and a recognition by market participants that the deterioration in economic fundamentals was not of a sufficient magnitude to warrant the fall in currency and asset prices that actually occurred. Indeed, with the benefit of hindsight the exaggerated currency depreciations and falls in equity markets created an excellent buying opportunity for foreign investors seeking to gain exposure to the region.

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