

# The Role of External Shocks in the Asian Financial Crisis

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**W**HAT CAUSED THE FINANCIAL CRISIS THAT STRUCK A NUMBER OF EAST ASIAN ECONOMIES IN 1997? THERE ARE TWO COMMON INTERPRETATIONS. ONE EMPHASIZES INTERNAL PROBLEMS IN THE COUNTRIES AFFECTED, MAINLY FRAGILITY IN THEIR FINANCIAL SECTORS RESULTING FROM LAX GOVERNMENT REGULATION AND OVERRELIANCE ON GOVERNMENT GUARANTEES. THE OTHER ARGUES THAT FRAGILITY IN THE INTERNATIONAL CAPITAL MARKETS IS THE PROBLEM: IN THIS INTERPRETATION, A MODEST LIQUIDITY PROBLEM IN ONE COUNTRY (THAILAND) TRIGGERED A FINANCIAL PANIC THAT SPREAD TO ENCOMPASS A NUMBER OF COUNTRIES IN THE REGION AND IMPOSED ENORMOUS ECONOMIC COSTS ON THEM ALL.

This article examines a third possibility, that the near-simultaneous crises in so many East Asian countries were set off by some external shock that hit all these countries at the same time. Exports are very important for these countries, and in the several years prior to the crisis three shocks occurred that had the potential to cut into their export performance: the 1994 devaluation by China, the severe recession in Japan, and the sharp rise of the dollar in foreign exchange markets that began in 1995.

The first external shock discussed is China's devaluation of 1994. Because China has become an important competitor in export markets such as the United States in recent years, a large Chinese devaluation had the potential to boost China's exports at the expense of exports from the crisis countries. However, as discussed later in this article, the 35 percent devaluation of 1994 applied to the official exchange rate, and most of China's

trade was actually being conducted at a different exchange rate that was largely market-determined. Hence, the effective size of the devaluation was much smaller than its apparent size. The small real (inflation-adjusted) size and the timing of the devaluation (several years before the crisis hit) make it unlikely to have been the trigger that set off the Asian financial crisis.

The second external shock examined is Japan's recent recession, the most severe and prolonged downturn that country has had since World War II. By cutting Japan's imports from its East Asian neighbors, Japan's recession has contributed to their economic problems, but the timing of the Japanese recession, which began in early 1991, seems wrong for it to have been the trigger that set off the Asian financial crisis.

The third candidate shock is the sharp rise of the dollar in foreign exchange markets. Between early 1995

and early 1997, just before the Asian financial crisis broke out, the dollar rose considerably; versus the Japanese yen the dollar's rise was close to 50 percent. Changes in the value of the dollar had a direct effect on the economies at the center of the Asian financial crisis because all those countries were tying their own exchange rates fairly closely to the dollar. When the dollar rose, the currencies of the crisis countries rose along with it. Such currency appreciation often has a dampening effect on exports, and recent research indicates that slowdowns in export growth are often a harbinger of exchange rate and financial crises.<sup>1</sup> This shock was probably a significant factor in precipitating the crisis.

The first section of this article provides background on the chronology of the early months of the Asian financial crisis, along with discussion of the two common interpretations of its cause—one that highlights financial fragility within the countries affected and another that focuses on weaknesses in international capital markets that allegedly caused a minor problem in one country to engulf many of its neighbors.

The article then turns to the three external shocks that are less often cited as causes for the crisis, discussing first the Chinese devaluation of 1994, then the Japanese recession, and finally the sharp appreciation of the dollar in the two years just prior to the onset of the crisis.

## Background

In 1997 a number of East Asian economies had financial and exchange rate crises. Five countries—Thailand, South Korea, Malaysia, Indonesia, and the Philippines—all suffered sharp exchange rate declines, and Hong Kong's exchange rate came under severe pressure. Singapore and Taiwan avoided full-scale crises but did allow their exchange rates to drop modestly.

The first country hit was Thailand, where problems at financial institutions set off a crisis of confidence that on July 2 led the government to abandon its exchange rate peg, thereby allowing its currency to drop sharply in value. The crisis then spread quickly. By the end of August, the currencies of three of Thailand's neighbors, Malaysia, Indonesia, and the Philippines, had all been devalued substantially.

The crisis continued to deepen despite approval in August by the International Monetary Fund (IMF) of an emergency loan package intended to help Thailand. Under pressure themselves, Taiwan and Singapore allowed their currencies to decline modestly during September and October but managed to avoid full-blown financial crises. Meanwhile, Hong Kong's exchange rate peg to the dollar came under severe pressure but was

maintained, though its interest rates soared and its stock market plunged. Also during this period, Indonesia negotiated an emergency loan package with the IMF.

The final domino to fall during 1997 was South Korea, whose currency dropped 25 percent in November. Korea had the largest economy among those in crisis, and the collapse of its currency peg contributed to further downward slides of several of the other crisis currencies despite (in the cases of Thailand and Indonesia) the assistance of the IMF.

What could have caused such a widespread crisis to hit so many different countries over such a short period?

One interpretation is that internal problems common to all the affected countries made them vulnerable to crisis. Models of exchange rate crisis in the tradition of Krugman (1979) highlight unsustainable budget deficits as the source of exchange rate crises, but the East Asian countries did not have this particular problem. None of the five main crisis countries (Thailand, South Korea,

Malaysia, Indonesia, and the Philippines) had large budget deficits during the three years prior to the crisis, and most actually had surpluses (Corsetti, Pesenti, and Roubini 1998, table 13).

Frankel (1998), Goldstein (1998), Stiglitz (1998), and Corsetti, Pesenti, and Roubini (1998) argue that internal weaknesses in the financial systems of these countries, such as lax banking regulation, excessive leverage, and "crony capitalism," led to excessive investment in certain industries, including real estate. When markets recognized that much of this investment would not pay off, many foreign as well as domestic investors rushed to shift their funds out of the region. The resulting pressure on banking systems and exchange rate pegs soon turned into a major financial crisis.

Certainly there were cases of weak regulation and unsound lending to friends or relatives of high government officials in some of these countries, but this explanation of the 1997 crisis has a couple of weaknesses. For one thing, lax regulation and crony capitalism did not develop suddenly at the beginning of or just before the crisis; they were long-standing and well-known features of these economies. Nevertheless, most of these

**One possible cause of the near-simultaneous crises in so many East Asian countries is that some external shock hit all these countries at the same time.**

1. Kaminsky, Lizondo, and Reinhart (1998) report that the best indicators of a coming currency crisis include exports, the real exchange rate, the ratio of broad money to international reserves, output, and equity prices.

economies weathered the various shocks of the 1980s and early 1990s, including the Mexican financial meltdown at the end of 1994, without having a major financial crisis.<sup>2</sup>

Another weakness of this argument is that the data on bank lending do not clearly show excessive lending in many of the crisis countries during the years prior to 1997. Why would excessive lending be a concern? Sachs, Tornell, and Velasco (1996), writing before the Asian financial crisis, find that, empirically, lending booms tend to precede banking and currency crises. In their view, sharp increases in lending to the private sector, measured as a percentage of gross domestic product (GDP), are worrisome because they are likely to be

associated with declines in average loan quality.

What happened to lending in the Asian crisis countries? Corsetti, Pesenti, and Roubini (1998) provide data on growth in lending to the private sector by central banks and deposit money banks. In all these countries, lending did grow faster than nominal GDP during the years prior to the crisis, resulting in a rise in the ratio of loans to GDP, but in several

cases the rises were modest relative to other countries that have had financial crises. For comparison, during the four years preceding the financial crisis that hit Mexico and to a lesser extent Argentina in late 1994 and early 1995, the ratio of loans to GDP rose 116 percent in Mexico and 57 percent in Argentina. Over the longer period from 1990 to 1996, only two of the Asian countries had similarly large increases in this ratio: the Philippines, with 152 percent, and Thailand, the first country to fall into crisis, with 51 percent. Other Asian countries had much smaller increases in this ratio: Malaysia (27 percent), Korea (17 percent), Indonesia (12 percent), and Hong Kong (9 percent).<sup>3</sup> Moreover, lending in the Philippines may not have been excessive, considering that its ratio of loans to GDP started from a low base in 1990 and was still lower than in any of the other crisis countries in 1996. Accordingly, Thailand was arguably the only clear-cut case of excessive lending.

An alternative explanation focuses on weaknesses in the international financial system. From this perspective, the problems in Asia were a case of financial panic and contagion by international lenders who suddenly refused to extend short-term loans to solvent borrowers. Radelet and Sachs (1998) and Chang and Velasco (1998) compare the Asian situation to a bank run in the

Diamond-Dybvig (1983) model (a widely used model of banking panics): with international short-term debts exceeding short-term assets and no effective international lender of last resort, the loss of creditor confidence resulted in a financial crash in much of the region, with severe consequences for the economies involved.<sup>4</sup>

International capital flows changed dramatically around the time of the crash. According to the Institute for International Finance, private capital flows for the five hardest-hit countries (Korea, Malaysia, Indonesia, Thailand, and the Philippines) reversed direction, going from an inflow of \$93 billion in 1996 to an outflow of \$12 billion in the crisis year of 1997, for a total swing of \$105 billion. About three-fourths of the swing (\$77 billion) was accounted for by commercial bank lending (Radelet and Sachs 1998, 5). The sudden turnaround in capital flows was a huge economic shock for these economies, equaling 11 percent of their combined GDP.

What accounts for the regional character of the crisis? One possibility is some type of contagion that occurs regionally. Radelet and Sachs (1998) suggest a type of contagion in which creditors operating with limited information assumed that if one country in East Asia revealed previously hidden financial difficulty, then the other countries in the region were likely to have hidden problems also. In Thailand, concerns of foreign investors about the financial stability of the largest finance company were for a time brushed off by promises of a bailout, if necessary, by the Thai government or central bank, but just before devaluing the Thai currency in 1997 the government reneged on those promises (Corsetti, Pesenti, and Roubini 1998, 55–56). A few weeks later it was revealed that Thailand's usable foreign exchange reserves were far smaller than previously reported because more than half of the publicly reported reserves had already been committed in swap contracts made in an attempt to defend the Thai currency prior to its devaluation ("International . . ." 1997). Radelet and Sachs suggest that these revelations about Thailand led investors to doubt the credibility of not only the Thai government but its neighbors as well, thereby setting off a regionwide financial panic.

Glick and Rose (1998) argue that trade linkages provide a channel for contagion and that they tend to be strong within geographic regions such as East Asia. In this interpretation, devaluation by one country gains it a temporary competitive advantage over its trading partners. Because trade volumes tend to decline with distance, a devaluing country's closest neighbors are likely to suffer the most and hence are most likely to either devalue on their own (in order to negate the first devaluing country's advantage) or be hit by a speculative attack. Accordingly, contagion is likely to show a regional pattern.

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In the finance literature, contagion is often interpreted as a sharp increase in cross-market correlation during a period of turmoil. The empirical evidence for the East Asian crisis is mixed. Baig and Goldfajn (1998) construct dummy variables to represent good and bad news. They find that news in one crisis country affects exchange rates and stock markets in the others, suggesting contagion. However, Forbes and Rigobon (1998) find that after adjusting to remove bias in ordinary correlation coefficients, cross-country stock market correlations were not significantly higher during the crisis than they were before, suggesting interdependence but no contagion.

In short, the explanations for the Asian financial crisis that emphasize internal financial weaknesses in the crisis countries or systemic fragility of the international financial system may help clarify why the crisis spread and deepened after it was under way, but they are somewhat weak in explaining why it occurred when it did and not several years earlier. After all, lax financial regulation was present in these countries years before their crash, and to those who emphasize systemic fragility in the international financial system, that fragility was demonstrated several years before the Asian crash, during the Mexican crisis that began in late 1994.

An alternative possibility is that a common external shock affected all the Asian crisis countries in a similar way.<sup>5</sup> Prior to the crisis, most of these countries had compiled a long and enviable record of rapid growth and apparent financial stability. They were part of the “East Asian Miracle,” in which their region grew substantially faster than any other region of the world for a period of more than twenty years.<sup>6</sup> From 1965 to 1989 GDP per capita grew more than 4 percent per year in Hong Kong, Korea, Thailand, Malaysia, and Indonesia (Page 1994, 222).

An important aspect of the East Asian miracle was rapid growth of exports. As discussed by Page (1994, 254–56), over the past several decades exports from these countries, especially manufactured exports, rose much faster than world or developing-country exports, resulting in substantial gains in market share for the East Asian countries. Moreover, the external sector became very important in these countries. As shown in Table 1,

the size of the international trade sector, measured by the average of the export/GDP ratio and the import/GDP ratio, was substantially larger in the crisis countries than in such countries as the United States, Japan, Argentina, or Brazil. The importance of international trade in the crisis countries made them potentially vulnerable to any shock that slowed their export growth substantially.

In the early 1990s inflows of foreign capital became important sources of finance in these economies. The inflows were attracted by a number of factors, including the strong growth of exports and GDP in East Asia that provided ample investment opportunities, financial liberalization that made it easier for foreigners to invest, and the region’s reputation for political and economic stability. Capital inflows to the region rose from an average of 1.4 percent of GDP during the 1986–90 period to 6.7 percent during the years from 1990 to 1996, with Thailand’s inflow rising to 10.3 percent (Radelet and Sachs 1998, 8). Any shock that induced a large drop in capital inflows had the potential to create serious financial problems for the countries in the region.

In any event, after many years of extraordinary growth, a number of the East Asian economies were hit by financial and exchange rate woes during 1997 that quickly produced severe economic recessions. Were there any external shocks prior to the crisis that could have set it off by slowing export growth or dampening the profitability of foreign investment?

Three candidate external shocks have been mentioned most often in discussions of the crisis: China’s devaluation of 1994, the severe Japanese recession that began early in the decade, and the sharp appreciation of the dollar, especially in relation to the Japanese yen, from the spring of 1995 to mid-1997.

**In one perspective, the problems in Asia were a case of financial panic and contagion by international lenders who suddenly refused to extend short-term loans to solvent borrowers.**

2. *The main exceptions were Hong Kong and the Philippines. According to Balassa and Williamson (1987), the Hong Kong crisis of 1983 was set off by fears of absorption by China. The Philippines had severe political and economic turmoil in the mid-1980s when the Marcos regime ended.*
3. *Moreover, according to Corsetti, Pesenti, and Roubini (1998), data on lending by nonbank intermediaries do not alter the picture noticeably except in the case of Thailand, which looks even worse than the data in the text indicate because of very rapid growth of lending by finance and securities companies.*
4. *Within individual countries, the central bank can act as the lender of last resort, meaning that during a bank panic the central bank can create additional money and lend it to banks facing heavy withdrawals. However, in the international realm there is no lender of last resort that can make unlimited emergency loans to countries hit by massive capital outflows.*
5. *Glick and Rose (1998, 4) note that it is difficult to distinguish empirically between common shocks and contagion.*
6. *An overview of the East Asian miracle is given in Page (1994).*

TABLE 1 Importance of International Trade for Various Countries, 1996

Country	Average of Exports, Imports as a Percent of GDP
Thailand	32.6
South Korea	28.4
Malaysia	74.8
Indonesia	20.7
Philippines	31.7
Argentina	7.8
Brazil	6.5
Mexico	28.1
Japan	8.3
United States	9.3

Source: International Monetary Fund (1998b). Numbers were calculated using the formula  $[(X + M)/2]/GDP$ .

### China's Devaluation

China devalued its currency by an apparently large 35 percent at the beginning of 1994. This event has been cited by Makin (1997) and Bergsten (1997) as one of the events leading to the Asian financial crisis three years later.<sup>7</sup> Because China has become an important competitor for the crisis countries in export markets such as the United States in recent years, a large devaluation by China has the potential to improve that country's competitiveness and so boost its exports significantly at the expense of exports from the crisis countries. However, as discussed in the careful analysis of Fernald, Edison, and Loungani (1998), the 1994 devaluation probably had little real economic significance, for the following reason.

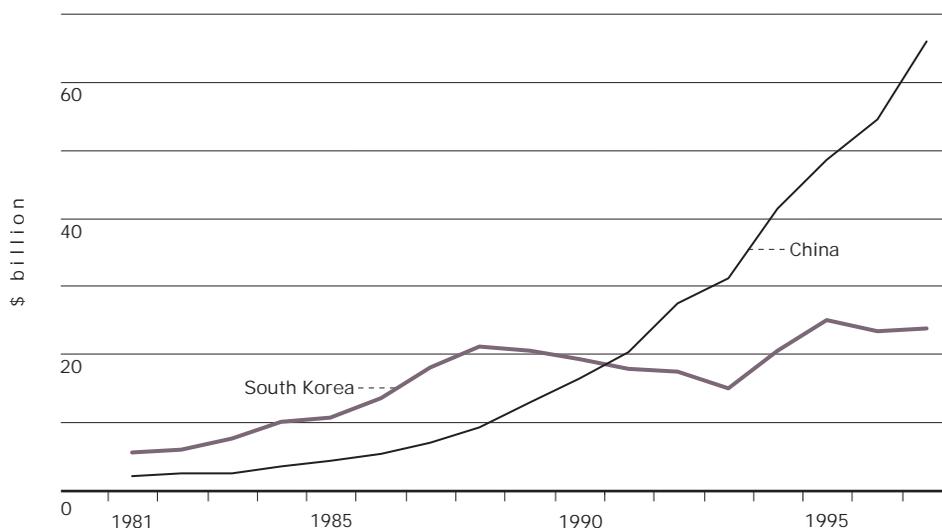
Until 1994 China had two exchange rates, an official rate that was pegged by the government and a floating or swap-market rate determined largely by market forces. Only a fraction (about one-fifth) of export receipts was converted to Chinese currency at the official rate while the remaining portion was converted at the floating rate. When the devaluation occurred, only the official rate was changed (by about 35 percent), making it equal to the floating rate that prevailed at that time. The separate official rate was then phased out, leaving all foreign exchange transactions to be conducted at the floating rate. Fernald, Edison, and Loungani calculate that the effective devaluation was a modest 7 percent. In addition, in real terms—that is, adjusting for the inflation differential between China and its major trading

partners—this devaluation was soon offset by the effects of rapid inflation in China. Indeed, Fernald, Edison, and Loungani report that in real terms China's exchange rate actually appreciated fairly steadily from mid-1993 through 1997.

While the Chinese devaluation of 1994 should not have had an important effect in triggering the East Asian crisis of 1997, the explosive growth of China's exports in recent years may have been a contributing factor. In the early years of the East Asian miracle, China, for political reasons, had very little trade with the outside world, especially the United States. As a result, the small economies of East Asia were able to pursue an export-oriented growth strategy without having to compete with China in their major export markets.

Beginning about two decades ago, the Chinese government began encouraging greater openness to international trade, and eventually it became a major competitor with its small East Asian neighbors, particularly in producing less technologically sophisticated products such as apparel and footwear. U.S. import data provide a simple gauge of China's dramatic opening to trade. During much of the 1980s, U.S. imports from South Korea, the largest of the East Asian crisis economies, were two to three times as large as those from China; but, as shown in Chart 1, the gap narrowed late in the decade, and in 1991 U.S. imports from China outstripped those from Korea for the first time. China's exports to the United States continued to soar in the ensuing years while Korea's stagnated. By 1996, just

CHART 1 U.S. Imports from South Korea and P.R. China



Source: International Monetary Fund (1998a)

before the crisis developed, U.S. imports from China were more than double those from Korea. Barring a return of major political constraints on China's international trade, that country seems likely to continue to be an important competitor for its small East Asian neighbors for the foreseeable future.

### Japan's Recession

A second candidate is the severe and prolonged Japanese recession.<sup>8</sup> For most of the period since World War II, Japan's economy grew significantly faster than any other major industrialized country, and Japan became a major market for exports from its East Asian neighbors. In recent years Japan has been one of the two most important destinations for exports for all the East Asian crisis countries (along with the United States).

The Japanese economy went into recession in 1991 and as of early 1999 had yet to show any substantial recovery. Prior to 1991 the Japanese economy had grown for a decade and a half at an average rate of 4 percent per year, well above the U.S. rate of 2.9 percent per year during this period. The last major Japanese recession had occurred in the mid-1970s, after the oil price shock of 1973, and had lasted about two years. Most other major industrialized countries had a recession in the mid-1970s and another in the early 1980s.

Part of the explanation for the prolonged Japanese recession in the 1990s may be the bursting of a specula-

tive bubble. In the late 1980s, as discussed in Ito (1996), Japan appears to have experienced a speculative bubble in the markets for stocks and real estate. During a speculative bubble, an asset's price rises today in anticipation of further price rises tomorrow, not in response to changes in the fundamental source of the asset's value. For stocks and real estate, dividends and rents are very important sources of value, yet during the expansionary phase of Japan's bubble in the late 1980s, the prices of both stocks and real estate rose sharply relative to the underlying dividends and rents. According to Ito, the cost of housing roughly doubled over a two-year period (1986–87).

The bubble began to burst in early 1990, when stock prices began their first sustained decline in decades. Land prices began to decline somewhat later, just before the overall economy slipped into recession in early 1991. The ensuing asset-price declines were substantial. By the summer of 1992 stock prices were down more than 50 percent from their peak. Land prices did not fall quite as sharply as stock prices, but they had not risen as much in the late 1980s, either.

Attempting to revive economic growth, Japan's central bank reduced nominal interest rates to close to zero, and the government implemented a series of stimulative fiscal packages. Nevertheless, the economy has remained weak, with growth averaging only 1.7 percent per year from 1991 to 1997, less than half the 4 percent rate that had prevailed previously.

7. The Chinese devaluation is also mentioned as a source of significant loss of competitiveness for other Asian countries in Corsetti, Pesenti, and Roubini (1998, 31).

8. Corsetti, Pesenti, and Roubini (1998, 30–31) describe the prolonged Japanese recession as a significant factor that slowed the growth of exports by other Asian countries. Makin (1997) also mentions the Japanese recession in his discussion.



Source: Board of Governors of the Federal Reserve System

The prolonged sluggishness of the Japanese economy inhibited exports from its East Asian neighbors to Japan and may have contributed to their financial disaster, but there are reasons to think it was not a critical factor. One reason for doubt is its timing: the Japanese recession began in early 1991, quite a few years before the Asian financial crisis hit. Another reason to think the Japanese recession had a limited effect is that a large amount of Japan's imports from its neighbors consists of components incorporated into products ultimately sold in third countries, notably the United States. In such cases, aggregate demand conditions in the United States should be more important than demand conditions in Japan.

In any event, Japanese imports from most of the crisis countries show very strong growth during 1994 and 1995, suggesting that some factor other than the weakness of the Japanese economy was having a major impact on Japanese imports. The most obvious possibility is the changes in exchange rates between the yen and the crisis currencies that were occurring during this period and that were heavily affected by the external shock of dollar appreciation.

### Dollar Appreciation

The third external shock that may have contributed to the Asian financial crisis is the sharp appreciation of the dollar that began in 1995, especially its appreciation vis-à-vis the Japanese yen. Several authors mention the appreciation of the dollar as a factor leading to the crisis, including Makin (1997), Bergsten (1997), Corsetti, Pesenti, and Roubini (1998), and Radelet and Sachs (1998). The dollar's value had the

potential to affect the Asian crisis currencies because, as is discussed further below, all the crisis countries appear to have tied their own currencies fairly closely to the dollar in the years before the crisis. As a consequence, if the dollar appreciated versus the yen or the European currencies, the currencies of the crisis countries also would appreciate, and in many cases by roughly the same amount. Such appreciation had the potential to induce a significant slowdown in the important export sectors of the crisis countries.

As shown in Chart 2, the dollar weakened in 1993 and 1994, briefly reaching a low point close to 80 yen per dollar in the spring of 1995. As the U.S. economic expansion gained strength in the following months while Japan's economy stumbled, the dollar turned around and rose substantially. By early 1997 the dollar's value had surpassed 120 yen per dollar, completely reversing the declines of 1993 to early 1995.

As the dollar rose relative to the yen in the months before the crisis, the currencies of the crisis countries rose in comparison with the yen also. In some cases the crisis countries followed the dollar very closely. In others the link was looser because they used a basket peg but still gave the dollar very substantial weight.

In a basket peg, a country ties its exchange rate not to a single foreign currency but to a "basket" of two or more currencies. For example, suppose a country intervened in the foreign exchange markets to make ten units of its currency always have a value equal to \$1 U.S. plus 100 Japanese yen. Doing so would make the value of its currency a weighted average of the values of the dollar and the yen. If the value of the dollar rose relative to the yen, the basket-pegging currency would rise ver-

sus the yen also but by a smaller amount than the dollar, the exact amount depending on the weights of the two currencies in the basket.

A simple numerical example may help to clarify how a basket peg works. Suppose Korea chose to peg its currency (the won) to a basket of two currencies, giving 60 percent weight to the U.S. dollar and 40 percent to the Japanese yen. Movements of the won relative to an outside currency, such as the Swiss franc, would then be a weighted average of movements of the dollar and yen exchange rates with the franc. If the dollar appreciated 20 percent versus the franc while the yen appreciated 10 percent against that same currency, Korea's exchange rate with the franc would also appreciate, by 16 percent  $[(20 \times 0.6) + (10 \times 0.4)]$ . Moreover, whenever the components of the basket moved in a nonuniform fashion, Korea's exchange rates with the components would change as well. In this example, the basket peg would result in depreciation of the won in relation to the dollar of roughly 4 percent and appreciation of the won against the yen of roughly 6 percent.

Some of the East Asian countries used a basket peg during the 1980s and early 1990s, but they chose not to reveal the weights publicly (Park and Park 1991; Frankel and Wei 1994). Nevertheless, it is possible to estimate the implicit weights using the method described in Frankel and Wei (1994).

The weights can be estimated by regressing changes in the exchange rate being analyzed (for example, the Korean won) onto changes in the exchange rates that are possible components of the currency basket. Table 2 contains results using weekly (Friday) data from 1993 to 1996 for Hong Kong, Korea, Thailand, Malaysia, Indonesia, and the Philippines. Three currencies are included as possible components of the currency baskets: the U.S. dollar, the Japanese yen, and the German mark. A constant term was also included to pick up any trend appreciation or depreciation in the level of the currency under analysis. The procedure requires that all the exchange rates be measured relative to a common numeraire: Table 2 uses the Swiss franc for this purpose, as did Frankel and Wei.<sup>9</sup> Separate estimates are provided for the 1993–94 and 1995–96 periods to check for the possibility that the weights were not constant throughout the sample period.

Hong Kong was included as a benchmark because of its policy of pegging solely to the U.S. dollar. Hong Kong has a currency board instead of an ordinary central bank, meaning that the currency board maintains reserves of U.S. dollars sufficient to redeem virtually all its notes at any time at the official rate of 7.8 Hong Kong

dollars per U.S. dollar. In the results for Hong Kong in Table 2, the estimated coefficient on the U.S. dollar is very close to one in both periods, implying that when the dollar moves vis-à-vis the Swiss franc, the Hong Kong dollar moves in the same direction and by almost exactly the same amount. The estimated coefficients on the Japanese yen and German mark are small and not statistically different from zero, as would be expected if those currencies had zero weight in Hong Kong's basket. The estimated constant term is essentially zero, implying no long-term trend of appreciation or depreciation of the Hong Kong dollar.

The results for the other countries demonstrate that while they did not shadow the dollar quite as closely as Hong Kong did, in every case the weight on the dollar is far larger than the weights on the yen and the mark. The weight on the dollar is always at least 0.8, implying that when the dollar moves 10 percent against the Swiss franc, the Asian currencies typically move in the

same direction and by at least 8 percent. Indonesia and the Philippines followed the dollar especially closely. The dollar's coefficient in their equations is never significantly different from one, and in no case do they have a weight on either the yen or the mark that is significantly different from zero.

Three countries provide evidence of pegging to a basket of more than one currency. In the Korean equation for 1995–96, about 90 percent of the weight is on the dollar, but a statistically significant 10 percent falls on the Japanese yen. The Korean results for 1995–96 may reflect a change in Korea's exchange rate policy. In the first part of the sample period (1993–94), the coefficient on the yen is negative but not statistically significant. For earlier years (1979–92), Frankel and Wei also find no consistent evidence that Korea was giving significant weight to the yen.

The Malaysian results for 1995–96 show significant coefficients on both the dollar and the yen but not on the mark. The coefficient on the dollar is far larger than the one on the yen, and their sum is noticeably larger than one. If the equation is reestimated, leaving out the German mark and restricting the sum of the weights to be

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9. Frankel and Wei also tried the IMF's Special Drawing Right (a special international money used only by central banks) as numeraire and got similar results to those with the Swiss franc.

TABLE 2 Estimated Weights in Currency Baskets of East Asian Countries, 1993–96

	Constant	Dollar	Yen	German Mark
Hong Kong				
1993–94	0.0000 (0.00)	0.978 (141.10)	-0.003 (-0.428)	0.023 (1.83)
1995–96	0.0000 (0.04)	0.998 (183.44)	-0.002 (-0.28)	0.004 (0.39)
South Korea				
1993–94	-0.0000 (-0.24)	1.017 (55.55)	-0.031 (-1.75)	-0.008 (-0.24)
1995–96	0.0005 (1.23)	0.896 (23.43)	0.098 (2.44)	0.034 (0.43)
Thailand				
1993–94	0.0001 (1.15)	0.823 (82.66)	0.110 (11.29)	0.053 (2.90)
1995–96	0.0001 (0.35)	0.869 (53.23)	0.097 (5.69)	0.037 (1.11)
Malaysia				
1993–94	-0.0001 (-0.24)	0.917 (14.47)	-0.041 (-0.66)	0.086 (0.75)
1995–96	-0.0003 (-1.06)	0.892 (31.16)	0.161 (5.38)	0.013 (0.22)
Indonesia				
1993–94	0.0005 (1.22)	0.968 (22.21)	-0.018 (-0.42)	0.118 (1.48)
1995–96	0.0007 (2.51)	0.984 (36.55)	0.019 (0.68)	0.029 (0.53)
Philippines				
1993–94	-0.0000 (-0.03)	0.952 (11.27)	-0.030 (-0.36)	0.151 (0.98)
1995–96	0.0007 (2.26)	1.053 (34.53)	0.028 (0.89)	-0.025 (-0.40)

Note: Estimated using weekly (Friday) data. All exchange rates were expressed in terms of Swiss francs. T-statistics are given in parentheses below the coefficients.

Source: Author's calculations using data from Haver Analytics

one, the resulting coefficient on the dollar is 0.875 while the yen's coefficient is 0.125. However, the results for 1993–94 show insignificant coefficients on both the yen and the mark. As for earlier years, Frankel and Wei report that the yen and the mark had small but significant coefficients during much of the period from 1987 to 1992.

In the results for Thailand, once again the dollar has by far the largest weight, while the yen has a significant coefficient of about 0.1 in both parts of the sample period. In addition, there is evidence that the deutsche mark was included in Thailand's basket. The mark has a significant coefficient of about 0.05 in 1993–94 while in 1995–96 it has a coefficient of about 0.04 (but no longer statistically significant). Frankel and Wei find similar weights for both

the yen and mark during 1991–92 but not before. This evidence suggests that Thailand began using a basket of all three currencies around the beginning of this decade.

What were the consequences for the East Asian countries of their policy of tying their currencies so closely to the dollar? When the dollar began appreciating from its low in the spring of 1995, the various East Asian currencies appreciated along with it.

As shown in Table 3, in nominal terms the dollar appreciated 50.1 percent versus the yen in the two years following its low point of April 1995 and rose 23.9 percent versus the German mark. The dollar rose only 16.2 percent relative to the Korean won during this period, implying (as shown in columns 3–6 of the table) that the won

TABLE 3 Bilateral Exchange Rate Changes, April 1995–April 1997 (percent)

	Appreciation vs. the U.S. Dollar		Appreciation vs. the Japanese Yen		Appreciation vs. the German Mark	
	Nominal	Real	Nominal	Real	Nominal	Real
South Korea	-16.2	-12.4	29.2	37.9	6.6	13.0
Malaysia	-1.0	-0.0	48.7	54.8	22.7	26.9
Thailand	-6.1	-3.2	41.5	54.4	16.8	26.6
Indonesia	-9.2	-1.5	37.5	52.7	13.5	25.2
Philippines	-1.3	8.2	48.1	68.8	22.3	38.4
Japan	-50.1	-54.9				
Germany	-23.9	-27.0				

Source: International Monetary Fund (1998b). Real exchange rates were calculated using consumer prices. Negative numbers indicate depreciation.

appreciated substantially versus the yen and the mark. The other four crisis countries followed the dollar more closely than Korea, resulting in even larger appreciations for their currencies relative to the yen and the mark. In real terms the other four crisis countries all appreciated more than 50 percent versus Japan and more than 25 percent versus Germany.

The appreciation versus the German mark gains added importance because of the European Monetary System (EMS). During the period covered by Table 3, a number of European currencies such as the French franc and Dutch guilder were linked fairly closely to the German mark in the EMS. Therefore, when the dollar and the East Asian currencies appreciated against the German mark, they simultaneously appreciated against other members of the EMS by similar amounts.

The nominal appreciation of the East Asian currencies against the Japanese yen and many European currencies was not offset by price declines in East Asia. Indeed, during 1995 and 1996, inflation in most of East Asia was higher than in Japan or Europe, meaning that (as shown in Table 3) the real exchange rates of East Asia with Japan and much of Europe appreciated even more than did their nominal exchange rates with those areas. Such appreciation usually tends to reduce the competitiveness of the appreciating country's exports by raising their prices as measured in the importing country's currency, leading eventually to a slowdown or even a downturn in export sales, along with a widening current account deficit. Moreover, recent research by Kaminsky, Lizondo, and Reinhart (1998) indicates that the behavior of exports is one of the better leading indicators of currency crises.

A substantial slowdown in exports did indeed occur for most of the East Asian countries in their trade with Japan and Europe prior to the financial crisis of 1997. Chart 3 shows annual data on the growth of exports by various East Asian countries to three main destinations: Japan, the main EMS countries, and the United States. Consider the case of Thailand: during 1994 and 1995 its exports to Japan grew over 20 percent per year, probably in part as a lagged effect of the dollar's depreciation from 1993 to early 1995. In 1996, however, the effects of the dollar's turnaround began to show up, as export growth to Japan plummeted to only 1 percent. Thailand's exports to Europe also slowed in 1996 though not as dramatically as its exports to Japan. Korea suffered a more severe reversal than Thailand. Its exports to both Japan and the EMS grew an average of over 20 percent per year in 1994 and 1995, but in 1996 exports to Japan actually fell 8 percent, and exports to the EMS fell even more, by 13 percent.

What about exports to the United States? One might think that East Asian trade with the United States would be unaffected by dollar movements because by tying their currencies so closely to the dollar the East Asian countries ensured that their nominal (and real) exchange rates moved very little relative to the dollar even as they moved sharply versus the yen and the mark. However, there could still be important indirect effects because in many instances East Asian exports to the United States compete against exports from other countries, especially Japan. When the dollar appreciated against the yen but remained little changed against other East Asian currencies, prices of Japanese goods sold in the United States tended to fall relative to prices of East Asian exports.

**CHART 3**  
**Growth Rate of Exports from Crisis Countries to Japan, European Monetary System Countries, and the United States**



Source: Data were obtained from the IMF's *Direction of Trade Statistics* and were measured originally in terms of U.S. dollars. For purposes of the chart, the EMS consisted of six countries: Germany, France, Italy, the Netherlands, Belgium, and Luxembourg. The actual numbers were taken from the import section of the country pages for the United States, Japan, and the various EMS countries because these data tend to be more accurate than data on exports.

Chart 3 suggests that the indirect effects of dollar appreciation were quite important. Thailand, Korea, and Malaysia all showed dramatic slowdowns in growth of exports to the United States in 1996, whereas all three countries had strong growth in exports during the previous two years. Korea again showed the most dramatic reversal: its exports to the United States rose an average of nearly 30 percent per year during 1994–95 but fell more than 6 percent in 1996.

The other two crisis countries, Indonesia and the Philippines, show a somewhat different pattern. Indonesia had only a modest slowdown in export growth to the United States, Japan, and the EMS in 1996. The Philippines's export growth to the EMS actually picked up modestly in 1996 while falling modestly relative to the United States and Japan. The different pattern for Indonesia may be attributable to the importance of oil in its exports: all the other crisis countries, as well as Japan, the United States, and the EMS countries, are oil importers that pose little competitive threat to the Indonesian oil industry.

In the early part of 1997, the dollar continued to appreciate and pull currencies of the crisis countries upward until July, when Thailand's currency peg collapsed. Over the next few months the currencies of Indonesia, Malaysia, the Philippines, and Korea also fell substantially vis-à-vis the dollar (as well as in relation to the yen and the EMS currencies). As long as these devaluations were not offset by inflation in the crisis countries, they should have tended to stimulate their exports. However, the crisis itself reportedly had some negative effects on their exports because of the disruption of ordinary trade finance. For example, if an assembly plant in Thailand sends most of its output to the United States but is dependent on imports of critical components from Japan, disruption of trade finance that cuts off the flow of components from Japan will halt its exports to the United States.

Accordingly, the export data for the crisis countries for 1997 reflect several influences, including lagged effects of earlier currency appreciation, the immediate effects of the devaluations of 1997, and the effects of the financial crisis associated with the devaluations. In part because of sluggish economic conditions in Japan during 1997, exports to that country were even weaker than in the year before for all five crisis countries. Growth of exports to the United States rebounded somewhat after the weakness of 1996 for all the crisis countries except Malaysia but not back to the high growth rates of 1994–95. Growth rates of exports to the EMS were mixed, returning to the strong rates of 1994–95 for Indonesia

and Malaysia, rebounding less strongly for Korea and Thailand, and slowing sharply for the Philippines.

While exchange rate appreciation has been mentioned as a factor in the East Asian crisis by many authors, its importance has often been downplayed. Radelet and Sachs (1998, 14–15) and Chang and Velasco (1998) report that while trade-weighted indexes of the real exchange rate for the crisis countries show some appreciation prior to Thailand's devaluation, the extent of appreciation was not particularly large relative to Mexico's prior to its crisis of 1994–95 or several other Latin American countries' during the 1990s. However, the East Asian countries simply may be more sensitive to exchange rate changes, especially changes in the yen-dollar rate, than the Latin American countries. As shown in Table 1, such sensitivity is likely considering that international trade is much more important for the East Asian countries than for Argentina and Brazil, two of the

countries mentioned by Radelet and Sachs. Moreover, as discussed above, export growth slowed substantially in most of the crisis countries in the year before the crisis hit, probably in large part because of the sharp appreciation of the dollar that began in the spring of 1995.

The crisis countries could have reduced their vulnerability to swings in the value of the dollar by pegging to baskets that gave less weight to the dollar than the ones they chose. All of these countries do a major part of their trade with the United States, Japan, and the EMS countries, but none does more than half its trade with the United States alone.

Relying in part on the literature on optimal currency pegs, Williamson (1991) recommends a basket peg using trade weights for small countries with diversified trade patterns.<sup>10</sup> In the specific case of Korea, Park and Park suggest that a basket peg might be the best policy, and Black (1996) calculates that weights of 39 percent for the dollar, 36 percent for the yen, and 25 percent for the mark (the key currency in the EMS) would minimize fluctuations in the foreign currency value of the balance of trade. Having a diversified basket peg would result in not only less depreciation

**Export growth to the United States, Japan, and the EMS countries slowed substantially for most of the crisis countries soon after the dollar began rising.**

10. Williamson (1982) provides a useful survey of the literature on optimal currency pegs.

during periods of dollar weakness but also less appreciation during periods when the dollar rises sharply, such as from 1995 to 1997.

### Conclusion

**W**ithin a few months in late 1997, a number of East Asian countries, most of which had previously had an enviable record of years of rapid growth and apparent financial stability, were hit by financial and exchange rate crises. Much of the literature on this episode has emphasized either internal financial weaknesses that were common to all the affected countries or a process of contagion that, once started, spread a crisis that might have been confined to one or two countries. This article has explored an alternative possibility: that some external shock common to all these countries triggered the wave of crises. The Chinese devaluation of 1994 and the prolonged Japanese recession are sometimes cited as factors leading to the crises, but they were probably only minor contributors. However,

the sharp swings in the value of the dollar may have had a major impact.

For the years before the crisis, estimates of basket weights indicate that all the crisis countries were tying their currencies closely to the dollar by giving the dollar heavy weight, implying that when the dollar rose sharply against the currency of Japan in 1996 and early 1997, their competitive position was weakened substantially. Export data are consistent with this inference because export growth to the United States, Japan, and the EMS countries slowed substantially for most of the crisis countries soon after the dollar began rising.

In the future, these countries might find it advantageous to peg their exchange rates to a diversified basket of currencies rather than putting so much weight on the U.S. dollar. A diversified basket would help ensure that their exports to their three largest developed-country customers (the United States, Japan, and the euro area, which is the successor to the EMS) would not all drop off simultaneously.

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