

INDONESIA'S ECONOMIC CRISIS: CONTAGION AND FUNDAMENTALS

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The severe and unanticipated economic downturn in Indonesia mirrored the regional economic fallout following the 1997 financial crisis. Although it is likely that the crisis in neighboring countries had an adverse impact on Indonesia, the issue has so far received little attention. This paper examines whether contagion from the economic crisis in Thailand triggered the crisis in Indonesia. Evidence of such a contagion is revealed, and the contagion was possibly exacerbated by increasing imbalances in the Indonesian economy. The paper also examines the channels through which the economic difficulties of Thailand might have been transmitted to Indonesia. Investors' behavior, rather than real links, is identified as one important channel for the contagion.

I. INTRODUCTION

INDONESIA was the far worst affected economy in the Asian crisis, with the severity of its crisis coming as a surprise to many observers. In fact, very few predicted the crisis in Indonesia even after the devaluation of the Thai baht in July 1997.¹ On the contrary, it was widely argued that the crisis would pass without much effect because of Indonesia's sound macroeconomic fundamentals. Indonesia enjoyed the highest economic growth in Southeast Asia, low inflation, a relatively modest current account deficit, rapid export growth and growing international currency reserves. In retrospect, it seems clear that such views were erroneous. This raises the question of why the crisis in Indonesia was so severe and, according to several observers, far more severe than can be attributed to macroeconomic imbalances.²

One factor that might have been important for the Indonesian crisis is contagion from other countries. Contagion here refers to the spread of economic difficulties

¹ For instance, the World Bank Director for Indonesia stated at the beginning of the crisis that he would be very surprised if Indonesia would require a similar support package as Thailand received (Lindblad 1997, p. 7).

² A number of previous studies suggested that the Indonesian crisis could not be explained by macroeconomic imbalances alone. See, for instance, McLeod (1997), Furman and Stiglitz (1998), Radelet and Sachs (1998), Kenward (1999), and Hill (2000).

across countries and often manifests itself as a comovement of, for instance, exchange rates and stock prices. Contagion has in recent years received increased attention among academic economists and policymakers. The reason is that a number of economic crises during the 1990s were characterized by economic difficulties in one country, followed by similar problems in other countries within the same region. For example, the ERM crisis in 1992–93 began in Finland but spread quickly to several other European countries. Similarly, the peso crisis originated in Mexico but did ultimately permeate most parts of Latin America. Finally, the economic difficulties in Asia began when the Thai government was forced to abandon the currency peg and allow the baht to float on July 2, 1997. The devaluation raised concerns about the economic outlook and exchange rate arrangements in neighboring countries. Subsequently, capital outflows triggered the depreciation of their currencies and propelled several Asian economies into recession.

There is an obvious geographical context in the Asian crisis, which might suggest that contagion did indeed take place. However, the specific causes and channels of this contagion are still largely unexplored. The aim of this paper is to shed further light on the determinants of the Indonesian economic crisis with a special focus on the role of contagion. We restrict our study to economic determinants although we recognize the importance of political considerations, such as the uncertainty surrounding President Suharto's health and successor and the lack of transparency in government-business links.³

The first issue we address is whether the economic crisis in Indonesia was caused by the crisis in Thailand. In other words, was there contagion from Thailand to Indonesia? Several earlier studies suggested that such a contagion took place during the Asian crisis (e.g., Baig and Goldfajn [1999], Cerra and Saxena [2000]). These studies used standard correlations between markets in different countries to examine the contagion. We provide new statistical results on contagion using a different method, the adjusted correlation method, which compensates for heteroscedasticity that may have biased previous studies.

Although contagion can be responsible for spreading economic difficulties between countries, it seems likely that there was some domestic economic imbalance prior to the contagion. In other words, countries with strong economic fundamentals may, presumably, have remained relatively unscathed by economic problems besetting other parts of the region. The second objective of this study is, therefore, to examine Indonesia's vulnerability to contagion prior to the crisis.

Finally, given the presence of contagion from Thailand to Indonesia, we also examine the channels through which such difficulties could have been transmitted. There are several possibilities, such as trade links, competitive devaluations, and common foreign lenders.

³ See Haggard (2000) for a discussion of the political determinants of the Asian Crisis.

II. CONTAGION

Contagion might occur for a host of different reasons, and could be divided into two categories (see Table I). Firstly, fundamental links are related to normal interdependence across countries. When two countries are interdependent, shocks will be transmitted from one country to another because of their real and financial linkages. Calvo and Reinhart (1996) defined this phenomenon as a “fundamentals-based contagion” while Masson (1999) referred to it as “spillovers” rather than contagion. The second category is related to the behavior of financial markets, such as financial panic, herd behavior, loss of confidence, and increased risk aversion.

1. *Fundamental links across countries*

Fundamental links can be divided into real and financial links. The former include common shocks, trade links, and competitive devaluations. For example, shocks to interest rates, aggregate demand, commodity prices, or the exchange rates of major currencies, can put pressure on several countries at the same time. Moreover, a crisis will reduce imports and, accordingly, exports of trade partners, which might facilitate the spread of a crisis across countries. Finally, if a country is forced to depreciate its currency due to an economic crisis, other countries may face deteriorating competitiveness that can trigger difficulties in their economies.

Financial links are related to trade links. An economic crisis is likely to decrease a country's outflow of trade credits and capital. There is an obvious risk that the decrease will lead to a spread of the crisis if these types of financial flows are important for the recipient country.

2. *Investor behavior*

Investors can cause contagion in the event of, for instance, liquidity problems and information asymmetries. In addition, changes in the rules of the game on international financial markets can result in contagion by making investors change their behavior (Dornbusch, Park, and Claessens 2000).

TABLE I
SOME DIFFERENT CAUSES OF CONTAGION

1. Fundamental links	Common shocks Trade links Competitive devaluation Financial links
2. Investors' behavior	Liquidity problems Information asymmetries Changes in the rules of the game

Starting with liquidity problems, declines in equity prices during a crisis may induce international investors to incur capital losses. These losses may force the investors to sell off assets in other countries to improve their liquidity position, and thereby spreading the economic difficulties. Accordingly, when banks experience a decline in the loan quality in one country, they may face incentives to reduce their overall risk by reducing exposures in other countries, particularly in high-risk countries and in those related to the country of origin (Dornbusch, Park, and Claessens 2000).

Moreover, a financial crisis in one country may lead investors to reassess other countries' economic fundamentals. Information asymmetries may then induce investors to withdraw their investments to avoid further losses, and thereby result in contagion. The larger the uncertainty, the more prone are foreign investors to shift their investments to safer markets. The uncertainty may be related to economic fundamentals as well as the effectiveness of policies and reforms (Arias and Rigobon 1999). Goldstein (1998) describes this phenomenon as a "wake up call hypothesis"; a crisis in one country can serve as a wake up call for international investors to reevaluate investments within the whole region.

Finally, changes in the rules of international financial transactions can result in contagion. Dornbusch, Park, and Claessens (2000) give two examples: the harsher treatment of foreign private creditors during the Russian crisis and the increased uncertainty surrounding the role of international lenders such as the IMF. This type of change affects the risk incurred by foreign lenders and might result in the withdrawal of investments.

3. *Vulnerability*

It is reasonable to assume that the risk of contagion depends on macroeconomic imbalances; countries with sound economic fundamentals are less likely to be affected by a regional crisis. Strong fundamentals imply, for instance, less uncertainty for foreign investors and less vulnerability to a fall in government revenues or export revenues. A study conducted by the IMF confirms the importance of economic fundamentals and shows that several countries affected by financial crises during the 1990s shared similar weaknesses (IMF 1999). In particular, real effective exchange rate appreciation, high current account deficit, and large short-term debts have been identified as important factors associated with a regional crisis.

III. DID INDONESIA FACE CONTAGION?

1. *Definition*

We use a common definition of contagion, namely, contagion occurs when cross-country correlation coefficients in exchange rates and stock markets increase dur-

ing the crisis period relative to correlations during the tranquil period.⁴ The definition is rather restrictive since the existence of contagion is only concluded if the correlation coefficients increase. A high but not increasing correlation is described as normal economic interdependence rather than contagion, but the results could be similar, in that economic difficulties may spread across countries. It might therefore be desirable to look at the size of the correlation coefficients as well as the increase in the correlation coefficients.

We define the tranquil period as that between January 1, 1996 and July 1, 1997. The crisis period is defined as that beginning on July 2, 1997, when the Thai baht was devalued, and ending on September 30, 1998 when it was considered that investors' confidence started to recover (Corsetti, Pesenti, and Roubini 1998).

2. Data and measurements

Exchange rates and stock market data from Indonesia, Thailand, and Malaysia were included in the empirical analysis. The data for Thailand were included because it was the first country to experience the crisis, while Malaysia may have been a conduit whose economic difficulties, originating from Thailand, subsequently flowed to Indonesia. We used daily exchange rates between the U.S. dollar and the Thai baht, Malaysian ringgit, and Indonesian rupiah. The daily fluctuations in the exchange rate of country i in day t were defined as:

$$ER_{i,t} = \ln(E_{i,t} / E_{i,t-1}), \quad (1)$$

where ER is the exchange rate fluctuation and E is the exchange rate. A logarithmic form was used to remove first-order serial correlation.

Stock market indices for Thailand, Malaysia, and Indonesia were used to investigate the contagion between the stock markets. We used the Jakarta Composite Index (JCI) for Indonesia, the Bangkok S.E.T. (Stock Exchange of Thailand) index, and the Kuala Lumpur Composite Index (KLCI) for Malaysia.⁵ The stock market's rate of return in country i in day t was defined as:

$$R_{i,t} = \ln(P_{i,t} / P_{i,t-1}), \quad (2)$$

where R is the return in local currency, and P is the stock market price index. However, one drawback with equation (2) is that it does not control for the possible effect of exchange rate movements on the stock market. One reason why this could occur is that foreign investors may withdraw their investments when a currency starts to depreciate. Lee and Kim (1993) suggest an adjustment for exchange rate fluctuations, where the rate of return is defined as:

⁴ See the World Bank web site on "Contagion of Financial Crises": <http://www1.worldbank.org/economicpolicy/managing%20volatility/contagion/>.

⁵ Data on exchange rates and stock markets have been provided by the DataStream data set.

$$DR_{i,t} = \ln(P_{i,t} / P_{i,t-1}) - \ln(E_{i,t} / E_{i,t-1}), \quad (3)$$

where DR is the dollar-denominated return and E is the exchange rate.

3. Statistical methodology

Most studies on contagion compare standard correlation coefficients before and during a crisis. Contagion is considered to occur when the increase in the correlation coefficient is statistically significant. One methodological problem is that stock and currency markets generally become more volatile during a crisis, which often results in heteroscedasticity and a biased estimate of the standard correlation coefficient. Unadjusted correlation coefficients may then lead to the wrong conclusion that contagion occurred during the crisis. We therefore use the adjusted correlation method, developed by Forbes and Rigobon (1999), to compensate for heteroscedasticity:

$$\rho_i = \frac{\rho_i^u}{\sqrt{1 + \delta_i [1 - (\rho_i^u)^2]}}, \quad (4)$$

where

ρ_i = adjusted correlation coefficient,

ρ_i^u = unadjusted correlation coefficient, and

δ_i = relative increase in the conditional variance;

$$\delta_i = \frac{\sigma_{xx}^h}{\sigma_{xx}^l} - 1, \quad (5)$$

where

σ_{xx}^h = standard deviation during the high volatility period and

σ_{xx}^l = standard deviation during the low volatility period.

We test the hypothesis that the correlation coefficient during the tranquil period is higher than or equal to the correlation coefficient during the crisis period. The standard test requires that the coefficients are normally distributed, an assumption that is unlikely to be verified, but Fisher's "z" transformation provides a solution:⁶

$$z = \frac{1}{2} \ln \frac{1 + \rho}{1 - \rho}, \quad (6)$$

where z is normally distributed with the variance:

$$\sigma^2(z) \approx \frac{1}{n - 3}. \quad (7)$$

The significance test for changes in the correlation is defined as:

$$d = \frac{z_0 - z_1}{\sqrt{1/(n_0 - 3) + 1/(n_1 - 3)}}. \quad (8)$$

⁶ See, e.g., Morrison (1990).

TABLE II
CONTAGION IN THE CURRENCY AND STOCK MARKETS (ADJUSTED CORRELATION COEFFICIENTS)

Period	Exchange Rates			Stock Market		
	Thailand-Indonesia	Malaysia-Indonesia	Thailand-Malaysia	Thailand-Indonesia	Malaysia-Indonesia	Thailand-Malaysia
Tranquil	0.02	0.12	0.14	0.25	0.26	0.08
Crisis	0.19	0.14	0.31	0.29	0.07	0.09
Statistically significant	-2.26**	-0.37	-2.29**	-0.54	2.55**	-0.14

** Significant at a 5 per cent level.

4. Results

Table II shows the adjusted correlation coefficients before and during the crisis. All of the coefficients increase during the crisis, with the exception of the large decline in the stock market correlation between Indonesia and Malaysia. The increase in the correlation coefficients in the exchange rates between Thailand and Indonesia, and between Thailand and Malaysia, appears to be especially high.

A significance test is shown in the last row of Table II. A negative and statistically significant coefficient means that there is evidence of contagion. The increases in cross-market correlation coefficients between the Thai and Indonesian exchange rate and between the Thai and Malaysian exchange rate are statistically significant. Hence, the results suggest that the difficulties in Thailand were transmitted to the Indonesian and Malaysian currency markets.

There are no signs of contagion in the stock markets since the increases in correlation coefficients are not statistically significant. In fact, there is a statistically significant decrease in the correlation coefficient between the Malaysian and the Indonesian stock markets. One plausible explanation for the decrease is the implementation of the Malaysian capital controls in late August and early September 1998.

There can, as previously argued, be a negative effect on Indonesia even without contagion. In other words, if there was already a high degree of interdependence, then it is likely that a crisis in Thailand would have an adverse effect on Indonesia even if the correlation coefficients (interdependence) did not increase. The correlation coefficient between the Thai and Indonesian stock markets is relatively high. Hence, it seems reasonable to assume that the collapse of the Thai stock market exerted some adverse effect on Indonesia.

Finally, there are no signs that economic difficulties in Thailand were first transmitted to Malaysia and, subsequently, from Malaysia to Indonesia. The correlation coefficients between Malaysia and Indonesia are low and any increase is statistically insignificant.

IV. INDONESIA'S VULNERABILITY TO CONTAGION

The previous section suggested that the crisis spread from Thailand to Indonesia. We have also argued that this type of contagion is likely to have required some existing economic imbalances. It is important to stress that the economic imbalances in themselves may not be sufficient to induce a crisis, a view echoed in several studies related to Indonesia.⁷ Indeed, it is possible that in the years of robust regional growth, accompanied by a strong export demand and large capital inflows, such economic imbalances are of little importance. However, in combination with severe regional economic turbulence they might have become an important factor that contributed to the onset of the crisis. Continuing with this theme, we examine whether Indonesia was vulnerable to contagion by comparing macroeconomic indicators between Indonesia and other ASEAN-5 countries. The focus will be on the variables suggested in previous studies as being important determinants of a financial crisis.

One important factor is whether an appreciation of the real effective exchange rate (REER) occurred prior to the crisis, as this could indicate that there was a misalignment in the exchange rate. The figures in Table III show the REER appreciation in the ASEAN-5. The REER in Indonesia was stable between 1990 and 1995 and, despite a small appreciation in 1996, there did not seem to be any more serious exchange rate misalignment. The Indonesian appreciation of 5 per cent was lower than that in other ASEAN-5 countries.

Capital inflows and the exchange rate regime determine the REER. Before the crisis, Indonesia had a managed exchange rate regime; the Central Bank allowed the exchange rate to float within a band around a target, which was set against a basket of major currencies. The exact composition of the basket was not disclosed, but the U.S. dollar dominated. Although Indonesia widened the exchange rate intervention band from 0.5 per cent in 1992 to 8 per cent in 1996, fluctuations in the nominal exchange rate were limited to around 4 per cent annually, indicating that the Central Bank was able to control the exchange rate movements.

The stable Indonesian exchange rate appealed to foreign investors and led to a large increase in capital inflows as shown in Table IV. Thailand, Malaysia, and the Philippines also experienced high levels of capital inflows prior to the crisis, whereas Singapore had a capital outflow. Increased capital inflows to Indonesia may have contributed to the slight REER appreciation in 1996.

Hence, the exchange rate regime worked relatively well with a stable or even depreciating U.S. dollar, but the regional currencies appreciated slightly together with the U.S. dollar in 1996. Perhaps more importantly, the appreciation was ac-

⁷ See the references in footnote 2.

TABLE III
NOMINAL AND REAL EXCHANGE RATES, 1990-97

Country	Changes in Nominal Exchange Rates against U.S. Dollar ^a (%)			Real Effective Exchange Rates ^b (1990 = 100)		
	Average 1990-95	1996	1997	1995	1996	1997
Indonesia	4	4	24	100	105	62
Thailand	-1	2	24	107	112	76
Malaysia	-1	0	12	102	108	85
Singapore	-5	-1	5	113	118	114
Philippines	3	2	12	110	117	90

Source: IMF (2000).

^a A negative sign denotes an appreciation of the currency.

^b An increase denotes an appreciation of the real effective exchange rate.

TABLE IV
SELECTED MACROECONOMIC INDICATORS, 1990-97

Country	(%)								
	Capital Inflows as a Share of GDP			Export Growth			Current Account Deficits as a Share of GDP		
	Average 1990-95	1996	1997	Average 1990-95	1996	1997	Average 1990-95	1996	1997
Indonesia	3	5	-2	13	10	7	-2	-3	-2
Thailand	10	9	-10	19	-1	3	-7	-8	-2
Malaysia	11	7	1	20	6	1	-6	-5	-5
Singapore	-1	-7	-9	18	6	0	12	15	18
Philippines	6	10	2	15	17	23	-4	-5	-5

Sources: IMF (2000); IMF, *Direction of Trade Statistics Yearbook*, various issues.

accompanied by the entry of new competitors such as China, Vietnam, and India; countries which liberalized their economies in the 1990s and which became successful exporters of goods that were also produced in the ASEAN-5. As shown in Table IV, export growth decreased for all the countries except for the Philippines in 1996. Indonesia's export growth decreased from an average of 13 per cent between 1990 and 1995 to 10 per cent in 1996, which was a lower decline than in most of the remaining ASEAN-5 countries.

The slowdown in export growth aggravated the existing trade imbalances, fueling larger current account deficits in the region. As shown in Table IV, all the countries with the exception of Singapore experienced current account deficits during the 1990s. For Indonesia, despite the real effective exchange rate appreciation, new competitors, and an oversupply of certain important export goods, the current

TABLE V
NOMINAL AND REAL INTEREST RATES, 1990–97

Country	Nominal and Real Interest Rates, 1990–97 (%)								
	Nominal Interest Rates			Real Interest Rates			Real Interest Rates Adjusted for Exchange Rate Movements		
	Average 1990–95	1996	1997	Average 1990–95	1996	1997	Average 1990–95	1996	1997
Indonesia	17	17	20	9	9	13	8	8	–9
Thailand	11	10	11	6	5	5	6	4	–18
Malaysia	6	7	8	2	4	5	3	2	–9
Singapore	3	3	3	1	2	1	4	–1	–7
Philippines	14	10	10	3	1	4	6	3	–7

Sources: IMF (2000).

account deficit remained at a relatively stable 2.5 per cent of GDP between 1990 and 1996.⁸

Hence, the exchange rate appreciation was modest in Indonesia, which led to a smaller current account deficit than in many other countries in the region. However, not only the size of the current account deficit is important but also how it is financed. Long-term capital inflows, such as foreign direct investment (FDI), are relatively stable and tend to remain in a country once they have been introduced. On the contrary, a high level of short-term debts increases the vulnerability to shifts in investors' willingness to facilitate capital as well as to changes in the exchange rates. High Indonesian interest rates encouraged short-term capital inflows (Table V). The government who wanted to curb an overheating economy raised the interest rates. However, the short-term capital inflows limited the effectiveness of tight monetary policy. In other words, an assumptive restrictive economic policy through high interest rates failed since capital inflows increased the domestic liquidity and thereby the economic activity. Another important determinant of the large short-term capital inflows to Indonesia was the deliberate attempt to limit the reliance on FDI. In contrast to Malaysia, which had financed its current account deficit mainly through FDI, Indonesia preferred to meet its capital requirement by lending from foreign banks, mainly for political reasons. In the past, Indonesia had considered FDI with deep suspicion. There was a widespread belief that mines, factories, and banks should remain in domestic hands (Winters 1996). This desire to secure domestic ownership can be traced back to the rule of President Sukarno and his campaign against NEKOLIM—neocolonialists, colonialists, and imperialists. Although liberalization of foreign ownership restrictions was introduced in the mid-1980s—

⁸ Current account deficits are typically considered to be large if they are above 5 per cent of GDP (Chang and Velasco 1998; Corsetti, Pesenti, and Roubini 1999; Edwards 1999).

TABLE VI
EXTERNAL DEBT INDICATORS, 1990–97

Country	FDI Inflows as a Share of GDP (%)		Public Short-Term Foreign Debts as a Share of GDP (%)			Ratio of Public Short-Term Foreign Debts to International Reserves		
	Average 1990–95	1996	Average 1990–95	1996	1997	Average 1990–95	1996	1997
Indonesia	1.4	2.8	11.5	14.2	16.7	1.6	1.8	2.2
Thailand	1.7	1.5	16.5	20.7	23.2	0.8	1.0	1.3
Malaysia	7.3	8.0	6.9	11.0	14.9	0.2	0.4	0.7
Singapore	10.2	10.1	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Philippines	1.6	1.8	9.3	9.6	14.4	1.7	0.8	1.6

Sources: World Bank (1999) and IMF (2000).

forced through by declining oil prices—it is fair to state that the FDI regime has been restrictive compared to, for instance, in Malaysia and Singapore.⁹ The relatively small share of FDI in Indonesia and the relatively large share of short-term debts are illustrated in Table VI. It should be noticed that the table shows short-term public debts, since figures on short-term private debts are difficult to obtain. This understates the importance of short-term debts in Indonesia since a large part of the capital inflow was attributable to private firms and banks.

Accordingly, high short-term debts to international reserves increases the risk for a country of not fulfilling its debt payments in the event of a creditor run. In Indonesia, the ratio of short-term external debts to international reserves was high, particularly compared to other countries in the region in 1996.

Another related indicator of financial fragility is the ratio of M2 to international reserves.¹⁰ If a currency crisis or financial panic occurs, all the liquid money assets could potentially be converted into foreign exchange. The ratio between M2 and international reserves was critically high in all the countries before the crisis, with the exception of Singapore (see Table VII). Indonesia had a particularly high ratio of 6.5, which was among the highest in the ASEAN-5. Again, the interest rate differential with the outside world is likely to have been one important determinant of capital inflows and high liquidity.

⁹ The liberal FDI regime in Malaysia and Singapore was also politically determined. Malaysia adopted it after the introduction of the *bumiputera* policies (economic policies favoring ethnic Malays), which meant that domestic capitalists, mainly ethnic Chinese, were less willing to make long-term investments (Drabble 2000, Chap. 12). Singapore adopted a liberal FDI regime after independence in 1965 as the government attempted to reduce its reliance on the local Chinese business community, which was considered to be too close to leftist interest groups (Huff 1994, p. 357).

¹⁰ M2 or broad money supply includes money (the sum of currencies outside banks and demand deposits other than those of central banks) plus quasi-money (time deposits, saving deposits, and foreign currency deposits other than those of central banks).

TABLE VII
RATIO OF M2 TO INTERNATIONAL RESERVES, 1990–97

Country	Average 1990–95	1996	1997
Indonesia	6.2	6.5	7.2
Thailand	4.0	3.9	5.3
Malaysia	2.6	3.4	4.7
Singapore	1.1	1.0	1.2
Philippines	6.8	4.5	7.0

Source: IMF (2000).

Note: M2 or broad money supply includes money (the sum of currencies outside banks and demand deposits other than those of central banks) plus quasi-money (time deposits, saving deposits, and foreign currency deposits other than those of central banks).

From the analysis presented above, we observed that a combination of various macroeconomic imbalances increased Indonesia's vulnerability to contagion. However, we also noticed that many economic fundamentals appeared to be sounder in Indonesia than in other regional economies. The main exceptions were the relatively high share of short-term debts and the high liquidity.¹¹

V. CHANNELS OF CONTAGION FROM THAILAND TO INDONESIA

Our statistical analysis indicated that Indonesia did experience contagion from Thailand. Moreover, macroeconomic imbalances might have contributed to the aggravation of Indonesia's susceptibility to contagion. We continue our discussion by exploring some possible channels through which contagion from Thailand to Indonesia took place.

1. *Fundamental links*

Common exogenous shocks could have put pressure on both the Thai baht and Indonesian rupiah. The appreciation of the U.S. dollar is, presumably, the most likely candidate for such a shock. As mentioned previously, the exchange rates in Thailand and Indonesia appreciated in 1996. However, the appreciation was relatively modest and is, in our view, not likely to have been an important determinant of the Indonesian crisis.

Trade links might also have facilitated the contagion if declining economic activity and imports in Thailand decreased Indonesia's exports. However, trade links seem an unlikely conduit of contagion; trade between Thailand and Indonesia was negligible compared with Indonesia's exports to Japan and the United States (Table

¹¹ See Hill (2000) for a similar conclusion.

TABLE VIII
SHARE OF INDONESIAN EXPORTS TO SELECTED COUNTRIES, 1991-97

(%)			
Year	Thailand	U.S.A.	Japan
1991-95	1	14	31
1996	2	14	26
1997	2	14	24

Source: IMF, *Direction of Trade Statistics Yearbook*, 1998.

TABLE IX
EXPORTS BY SECTOR IN 1997: SHARE OF TOTAL EXPORTS

(%)		
Sector	Indonesia	Thailand
Agriculture	9	9
Mining (oil and gas)	25	2
Manufacturing	66	89
Food, beverage & tobacco	6	13
Textiles	12	13
Wood products	9	1
Paper products	3	1
Chemicals	8	9
Nonmetal mining	1	1
Basic metal	2	1
Metal manufacturing	12	44
Other manufacturing	14	6

Source: United Nations (1999).

VIII). Hence, it is highly unlikely that the decline in Thai imports caused the crisis in Indonesia.

Another trade-related issue is that Indonesia might have been forced to devalue the rupiah to restore its competitiveness if Thailand and Indonesia competed in similar markets. From Table IX, we observe that mining and manufactured goods were the main Indonesian exports, whereas Thailand exported mainly manufactured goods. Moreover, even within manufacturing exports, Indonesia had a rather diversified structure, whereas Thai exports were concentrated on metal products. These figures show that Indonesia and Thailand, by and large, competed in different export markets. Hence, it seems unlikely that Indonesia needed to devalue the rupiah to restore its competitiveness against Thailand. A competitive devaluation can be eliminated as a channel for contagion.¹²

¹² For a similar conclusion see Alba et al. (1999).

TABLE X
CURRENCY COMPOSITION OF THE DEBT IN INDONESIA AND THAILAND, 1990–96

Year	Indonesia			Thailand		
	Japanese Yen	U.S. Dollar	Multiple Currency	Japanese Yen	U.S. Dollar	Multiple Currency
1990–95	36	20	27	47	21	22
1996	35	24	25	45	32	18
1997	33	27	23	39	46	11

Source: World Bank (1999).

2. *Investors' behavior*

One determinant of the crisis could have been a common creditor, a country with a large share of lending in the region. Table X shows that Japan was a major lender to Thailand and Indonesia: Japan accounted for 45 per cent of total foreign debt in Thailand and 35 per cent in Indonesia.¹³ Japan had been in an economic recession since 1991 and the recession worsened in early 1997. The Japanese banking sector was severely hurt by the recession and many banks experienced capital losses and were required to rebalance their loan portfolios. As a consequence, Japanese banks began to recall loan portfolios in Southeast Asia to meet an 8 per cent capital adequacy ratio (Corsetti, Pesenti, and Roubini 1998). Hence, the Japanese banks were the first ones to pull out of Southeast Asia and the process started before the financial crisis (Kaminsky and Reinhart 2000). This withdrawal of investments is likely to have exacerbated economic conditions in Indonesia and Thailand.

In addition, imperfect information may have led investors to consider that Indonesia and Thailand had similar problems, causing them to withdraw their Indonesian funds. Moreover, although Indonesia had better macroeconomic fundamentals than Thailand, the low ratios of international reserves to short-term debts or to broad money supply (M2) were troublesome features of the economy. Thus, a crisis in Thailand could have acted as a wake up call for international investors to reassess Indonesia's macroeconomic performance.¹⁴

Finally, changes in the international financial markets could have facilitated the contagion. The International Monetary Fund's first recommendation during the Asian crisis was to shut down the operation of numerous financial institutions in Thailand and Indonesia. In Thailand, the authorities suspended sixteen finance companies in June 1997 and another forty-two in August 1997. All except two were closed permanently in December 1997. A similar measure was taken in Indonesia where six-

¹³ Due to data limitation, we assumed that debts in Japanese yen originated from Japanese banks.

¹⁴ In addition, the increased political instability after the crisis was also an important factor contributing to foreign investors' unease in Indonesia.

teen banks were closed in November 1997 and another seven in January 1998. The IMF's recommendation to close insolvent financial institutions, not realizing that there was no depositors' insurance in Indonesia, sent a signal to investors and depositors elsewhere that there was not enough international support to protect their investments. This resulted in panic and a bank run, which continued until January 1998 when the Indonesian authorities announced a depositor guarantee.

To conclude, a common lender, asymmetric information, and changes in the international financial architecture all seem likely to have contributed to the capital outflows from Indonesia. Both international and domestic investors withdrew investments, resulting in a massive withdrawal of capital from Indonesia: U.S.\$9.6 billion in the last quarter of 1997 and U.S.\$7.8 billion in 1998.

VI. CONCLUSIONS

The Indonesian crisis has received much interest due to its depth and because it was not anticipated. Although it has been widely recognized that the Thai crisis was important for the Indonesian turbulence, there has been a limited number of more formal studies on contagion. Our results suggest that contagion from Thailand acted as a trigger for the Indonesian crisis. Growing financial instability was one reason why Indonesia was vulnerable to this contagion. Although the macroeconomic imbalances alone would not be sufficient to explain the crisis, they were part of a package which—combined with growing regional turbulence, a current account deficit financed by short-term capital inflows and a high liquid monetary base—resulted in a sudden reversal in domestic and international investor sentiment toward the Indonesian economy.

We also examined how the economic difficulties were transmitted from Thailand to Indonesia. Investors' behavior, rather than real links, seems to have facilitated the contagion. For instance, liquidity problems facing Japanese banks forced them to withdraw from Southeast Asia. The initial crisis in Thailand made the situation even worse for Indonesia since it forced the banks to sell off assets to recover losses in Thailand. Furthermore, the crisis in Thailand acted as a wake up call for international investors to reassess Indonesia's economic performance. In addition, it seems clear that political factors, such as the uncertainty surrounding the presidential succession, exacerbated investors' nervousness toward Indonesia. Finally, the Thai and Indonesian governments, upon the recommendation of the IMF, moved swiftly to close insolvent financial institutions. This, which quite likely sent a signal to investors and depositors that no lender of last resort would bail out the banks, fuelled financial panic and a bank run.

The main lesson from the Indonesian crisis is that relatively small macroeconomic imbalances can generate large economic difficulties if they are combined with regional turbulence. The increased role of international capital has increased

the likelihood of regional difficulties, since economic crises typically spread across borders through changing international investor sentiment.

REFERENCES

- Alba, Pedro et al. 1999. "Volatility and Contagion in a Financially Integrated World: Lessons from East Asia's Recent Experience." In *Asia Pacific Financial Deregulation*, ed. Gordon de Brouwer and Wisarn Pupphavesa. New York: Routledge.
- Arias, Eduardo Fernandez, and Roberto Rigobon. 1999. "Financial Contagion in Emerging Markets." In *Wanted: World Financial Stability*, ed. Eduardo Fernandez Arias and Ricardo Hausmann. Washington, D.C.: Inter-American Development Bank.
- Baig, Taimur, and Ilan Goldfajn. 1999. "Financial Market Contagion in the Asian Crisis," *IMF Staff Papers* 46, no. 2: 167–95.
- Calvo, Sara, and Carmen M. Reinhart. 1996. "Capital Flows to Latin America: Is There Evidence of Contagion Effects?" In *Private Capital Flows to Emerging Markets after the Mexican Crisis*, ed. Guillermo A. Calvo, Morris Goldstein, and Eduard Hochreiter. Washington, D.C.: Institute for International Economics.
- Cerra, Valerie, and Sweta Chaman Saxena. 2000. *Contagion, Monsoons, and Domestic Turmoil in Indonesia: A Case Study in the Asian Currency Crisis*. IMF Working Paper WP/00/60. Washington, D.C.: International Monetary Fund.
- Chang, Roberto, and Andres Velasco. 1998. *The Asian Liquidity Crisis*. NBER Working Paper no. 6796. Cambridge, Mass.: National Bureau of Economic Research.
- Corsetti, Giancarlo; Paolo Pesenti; and Nouriel Roubini (1999), "What Caused the Asian Currency and Financial Crisis?" *Japan and the World Economy* 11, no. 3: 305–73.
- Drabble, John H. 2000. *An Economic History of Malaysia, c. 1800–1990: The Transition to Modern Economic Growth*. Basingstoke, Hampshire: Macmillan.
- Dornbusch, Rudiger; Yung Chul Park; and Stijn Claessens. 2000. "Contagion: How it spreads and How It Can Be Stopped?" Paper presented at the joint ADB, IMF, and World Bank conference on "International Financial Contagion: How It Spreads and How It Can Be Stopped," February 3–4, Washington, D.C. Available from <http://www1.worldbank.org/economicpolicy/managing%20volatility/contagion/>.
- Edwards, Sebastian. 1999. "On Crisis Prevention: Lessons from Mexico and East Asia," NBER Working Paper No. 7233. Washington, D.C.:
- Forbes, Kristin, and Roberto Rigobon. 1999. *No Contagion, Only Interdependence: Measuring Stock Market Co-movements*. NBER Working Paper no. 7267. Cambridge, Mass.: National Bureau of Economic Research.
- Furman, Jason, and Joseph E. Stiglitz (1998), "Economic Crises: Evidence and Insights from East Asia," *Brookings Papers on Economic Activity*, no. 2: 1–135.
- Goldstein, Morris (1998), *The Asian Financial Crisis; Causes, Cures, and Systemic Implications*. Policy Analyses in International Economics 55. Washington D.C.: Institute for International Economics,
- Haggard, Stephan. 2000. *The Political Economy of the Asian Financial Crisis*. Washington D.C.: Institute for International Economics.
- Hill, Hal. 2000. "Indonesia: The Strange and Sudden Death of a Tiger Economy," *Oxford Development Studies* 28, no. 2: 117–39.
- Huff, W. G.. 1994. *The Economic Growth of Singapore: Trade and Development in the Twentieth Century*. Cambridge: Cambridge University Press.

- International Monetary Fund (IMF). Various issues. *Direction of Trade Statistics Yearbook*. Washington, D.C.: International Monetary Fund.
- . 1999. *World Economic Outlook: International Financial Contagion*. Washington, D.C.: International Monetary Fund.
- . 2000. "International Financial Statistics." CD-ROM. Washington, D.C.: International Monetary Fund.
- Kaminsky, Graciela L., and Carmen M. Reinhart. 2000. "The Center and the Periphery: Tales of Financial Turmoil." Paper presented at the joint ADB, IMF, and World Bank conference on "International Financial Contagion: How It Spreads and How It Can Be Stopped," February 3–4, Washington, D.C. Washington, D.C. Available from <http://www1.worldbank.org/economicpolicy/managing%20volatility/contagion/>.
- Kenward, Lloyd R. 1999. "Assessing Vulnerability to Financial Crisis: Evidence from Indonesia." *Bulletin of Indonesian Economic Studies* 35, no. 3: 71–95.
- Lee, Sang Bin, and Kwang Jung Kim. 1993. "Does the October 1987 Crash Strengthen the Co-movement among National Stock Markets?" *Review of Financial Economics* 3, no. 1/2: 89–102.
- Lindblad, Thomas J. 1997. "Survey of Recent Developments." *Bulletin of Indonesian Economic Studies* 33, no. 3: 3–33.
- Masson, Paul. 1999. *Multiple Equilibria, Contagion, and the Emerging Market Crises*. IMF Working Paper WP/99/164. Washington, D.C.: International Monetary Fund.
- McLeod, Ross H. 1997. "Postscript to the Survey of Recent Developments: On Causes and Cures for the Rupiah Crisis." *Bulletin of Indonesian Economic Studies* 33, no. 3: 35–52.
- Morrison, Donald F. 1990. *Multivariate Statistical Methods*. 3d. ed. New York: McGraw-Hill.
- Radelet, Steven, and Jeffrey D. Sachs. 1998. "The East Asian Financial Crisis: Diagnosis, Remedies, Prospects." *Brookings Papers on Economic Activity*, no. 1: 1–74.
- United Nations. 1999. *1997 International Trade Statistics Yearbook*. Vol. 1, Trade by Country. New York: United Nations.
- Winters, Jeffrey A. 1996. *Power in Motion: Capital Mobility and the Indonesian State*. Ithaca, N.Y.: Cornell University Press.
- World Bank. 1999. *Global Development Finance, 1999*. 2 vols. Washington D.C.: World Bank.