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Adjustments after Speculative Attacks in Latin America and Asia: A Tale of Two Regions?

Guillermo E. Perry
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CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The paper analyzes the adjustment process in the aftermath of speculative attacks against the currencies of six countries—Argentina, Brazil, Mexico, Indonesia, Korea, and Thailand. Even though the Mexican and Argentine crises of 1995, and the Brazilian adjustment after October 1997, were certainly costly, the Asian crises of 1997 were deeper and the recovery of the real economy was slower. The paper relies on rank-correlation analysis, and economic indexing and growth decomposition techniques to evaluate the explanatory power of several hypotheses of why the recessions in Asia were more severe. The paper concludes that the large size of short-term external debt relative to GDP, the higher incidence of leverage and currency mismatches, the higher rates of investment, plus the regional character of the Asian crisis and the high export similarity across the Asian economies contributed to the deeper economic downturn. However, with rising regional trade and financial development, the aftermath of future speculative attacks in Latin America may look more like the recent East Asian tales of adjustment. The paper draws policy implications for reducing the costs of the macroeconomic adjustment after currency crises.

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I INTRODUCTION

NUMEROUS ARTICLES HAVE BEEN WRITTEN about the causes of financial crises in emerging markets, especially the Mexican and Argentine crises of 1995 and the East Asian crises of 1997.[1] Much less attention has been devoted to the effectiveness of alternative policy responses and the ensuing process of recovery of the real economy, although Radelet and Sachs (1998), Furman and Stiglitz (1998), Krugman (1998b), and Corden (1998) reflect an emerging uneasiness with contractionary macroeconomic policy responses to the Asian crises.

This paper analyzes the adjustment process in the aftermath of speculative attacks in six countries—Argentina, Brazil, Mexico, Indonesia, Korea, and Thailand. As implied by the title, the main question to be addressed is whether the tales of adjustment in these Latin American and Asian economies were similar. This comparison is interesting for several reasons. The six countries came under the aegis of adjustment programs supported by international financial institutions, and the associated policy prescriptions have been at the center of attention.[2] Of the six cases, one is an example of a "successful" defense of the currency (Argentina 1995), while another (Brazil after October 1997) is an example of a temporarily successful defense followed by an incomplete adjustment program. The others experienced dramatic currency devaluations. This small sample of episodes of adjustment also offers variety in the magnitude of the ensuing economic decline. Even though the Mexican and Argentine crises of 1995, and even the Brazilian adjustment after the October 1997 attack against its currency, were certainly costly, the Asian crises have been

deeper and the recovery of the real economy has been slower.

There are several plausible explanations of the different depths and speed of recovery in Latin America and East Asia. We conclude that some initial conditions, such as the larger size of short-term external debt relative to Gross Domestic Product (GDP), the higher incidence of leverage and currency mismatches, the higher rates of investment (which tend to fall to a greater extent than consumption during crises), plus the regional character of the Asian crises (including the recession and financial crisis in Japan), and the higher similarity of their export structures contributed to the deeper economic downturn and the relatively slower recovery in Asia. These factors may also explain why traditional recipes for recovering confidence, such as tight monetary policies (and/or a contained devaluation), were less effective in Asia than in Latin America in terms of rebuilding investor confidence and bringing a speedy recovery of the real economy. With rising regional trade integration and rising financial integration and development in Latin America, it is possible that the aftermath of future speculative attacks in the region will look more like the recent East Asian experiences. The policy implications are that sound institutions for maintaining a healthy financial system (i.e., that prevent excessive credit growth, asset-price bubbles, and currency mismatches) and to improve corporate governance, prudent debt (and exchange rate) management, and establishing liquidity cushions are necessary both to diminish the likelihood of future speculative attacks *and* to reduce the costs of such crises in the future.

II CHANNELS of TRANSMISSION of a SPECULATIVE ATTACK ONTO the REAL ECONOMY

IN THEORY, CURRENCY DEVALUATIONS NEED NOT be contractionary, although the historical experience in Latin America seems to indicate that they are contractionary in the short run.[3] In practice, speculative attacks and devaluations are often associated with increases in nominal and real interest rates in the short run. The increase in the costs of borrowing dampen investment and interest-sensitive consumption, and may have additional adverse effects through its effect on the domestic financial sector.

Calvo (1998b) identifies two channels through which the real economy can be affected. The first channel is a Keynesian effect, where contractions of aggregate demand in the presence of sticky prices are translated into declines of output and employment. The other channel is the "Fisherian" channel, alluding to the early contributions of Irving Fisher to the theory of interest. The central tenet of Fisher's theory was that the "rate of return over cost" of capital (what Keynes called the "marginal efficiency of capital") has to be higher than the interest rate in order for economic agents to undertake productive investments. A speculative attack against a currency could have limited effects on domestic nominal interest rates, especially when the authorities do not defend the exchange rate. However, when the prices of nontradables fall, the ex-post real interest rate rises, rendering investment unprofitable. A further aggravating consideration is that the Fisherian channel affects the financial sector, which may lead to declines in credit availability or even credit crunches.[4]

A currency devaluation can ameliorate the Keynesian contractionary effects by improving the

competitiveness of domestic tradable goods and services. It may reduce Fisherian effects by raising the marginal product of investments and reducing real interest rates through its effect on the domestic price level. However, if the domestic financial and/or corporate sectors have significant liabilities denominated in dollars, the currency devaluation may actually exacerbate the Fisherian effects by raising the needed marginal productivity of capital required to service a given stock of liabilities. Currency devaluations may also have negative repercussions in the context of dynamic inflationary expectations and wage indexation. Since the domestic price level is determined by a weighted average of nontradable and tradable prices, currency devaluations can lead to higher expected rates of inflation. Moreover, if nominal wages are indexed to the general price level, then nominal wages will rise proportionally to the currency devaluation, the exact magnitude depending on the share of domestic absorption dedicated to tradable goods.[5] This means that a devaluation can be followed by immediate wage and price hikes affecting the nontradable sector. In the extreme case, the nominal devaluation will lead to immediate increases in nontradable prices, thus maintaining a constant real exchange rate (RER) and negating the competitiveness effect of the devaluation.

The positive effects of a nominal devaluation can be partially or wholly overtaken by the negative effects of financial distress whenever firms in the nontradables sector and financial institutions have high unhedged foreign currency liabilities. In turn, the severity of the resulting real interest rate increase will depend both on the sensitivity of investment and durable-goods consumption to interest rates and on the degree of leverage (debt/equity ratios of corporates) and the health of the financial sector, which will determine to what extent interest rate increases result in financial distress and credit crunches.

The effects of devaluations and interest rate hikes do not end with these Keynesian and Fisherian effects; there are also neo-Keynesian effects. First, a devaluation reduces the stock of wealth, either due to the resulting increase in the price level and/or by raising the domestic currency value of foreign liabilities. This wealth reduction effect can lead to a decline in aggregate consumption and/or investment. Second, interest rate hikes raise the value of the liabilities of indebted banks and corporations, thus reducing their net worth. Consequently, private sector creditworthiness and investment decline.

Regarding policy responses, contractionary monetary and fiscal policies can raise the confidence of international investors, reducing capital outflows. Tight monetary policies tend to raise the returns of domestic assets, but they also tend to increase domestic financial distress and dampen domestic investment, both of which reduce the expected returns from investing in domestic firms. Tight fiscal policy can also have contradictory effects on the confidence of international investors. On the one hand, it reduces the public sector's borrowing requirements, which may lead to a lower perceived risk of default, and sends a signal to the market that the fiscal authorities will contribute to the anti-inflation effort. On the other hand, tight fiscal policy contributes to the fall in domestic aggregate demand. The net effect of macro policy responses, therefore, is a subject for empirical research, and it may depend on country-specific conditions.

Before proceeding to the analysis of the factors that may have determined the magnitude of the economic downturn in Latin America and Asia, we assess the process of adjustment in our six case studies.

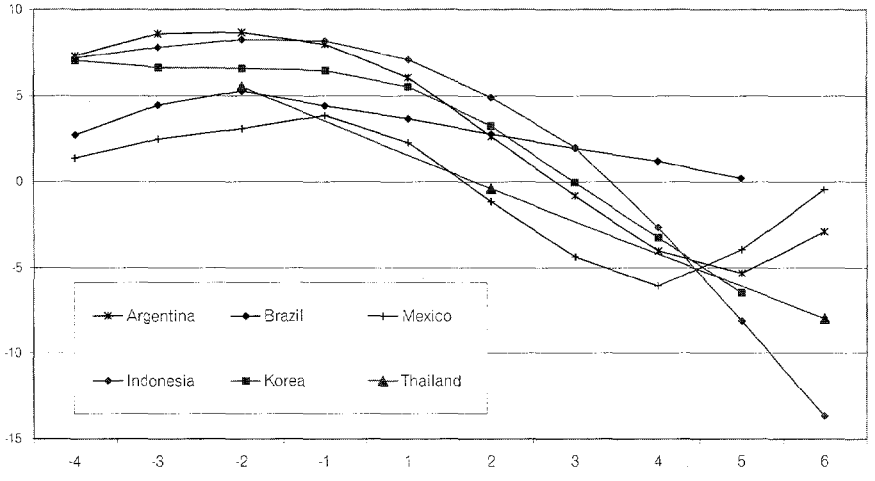
THE AFTERMATH of the LATIN AMERICAN AND ASIAN CRISES: THE CRISES WERE DEEPER and the RECOVERIES SLOWER in ASIA

FIGURE 1A SHOWS THE GDP GROWTH RATES BASED on four-quarter moving averages, while Figure 1b shows the year-on-year quarterly growth rates.[6] From Figure 1a, it is clear that the ex-ante growth rates in Argentina were comparable to those of Indonesia, and a bit higher than Korea's. However, both Mexico and Brazil were growing at significantly lower rates than the other cases. Argentina and Mexico initiated their recoveries by quarters four and five, while the Asian economies continued their economic decline. In the case of Brazil, as of the fifth quarter (1998Q4), the economic decline had been continuous but moderate relative to the other countries. Figure 1b shows that Mexico experienced the fastest decline, in the sense that its year-on-year quarterly growth rate was the lowest in quarters one and two (1995Q1-Q2), but its recovery began by quarter three. In contrast, Indonesia's GDP decline began with a significant lag, and the precipitous decline began in earnest by quarter three (1998Q1). Argentina and Korea followed similar paths up to quarter four (1995Q4 and 1998Q3, respectively), but Argentina's recovery was much more dramatic thereafter.

Further evidence of the deeper economic downturn in Asia relative to the Latin American cases is provided by Figure 2, which shows an index of the difference between the average monthly growth rate of industrial production in the year preceding the crises minus the actual year-on-year monthly growth rates of the same variable in the aftermath of the crises.[7] Korea's and Thailand's growth of industrial production began to recover after 8–9 months, at about the same time as in Mexico and Argentina, but after experiencing a deeper decline. For Indonesia, the available information does not show a recovery yet. Brazil experienced the least dramatic change in the growth of industrial production.

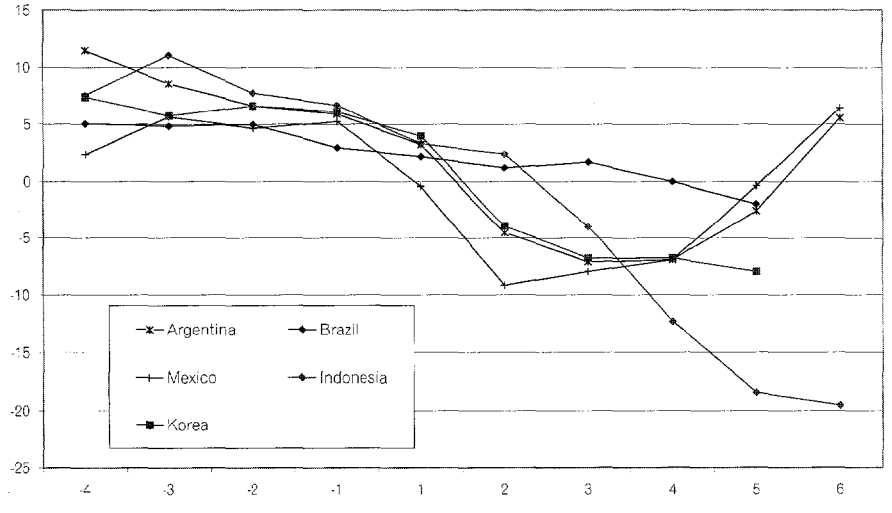
Overall, then, quarterly GDP and monthly industrial production growth rates show that the Asian economies experienced deeper economic declines, since their growth rates fell to negative rates unseen in the Latin American cases. Moreover, Argentina and Mexico experienced speedy recoveries by the fifth quarter after their episodes of speculative attacks.

Figure 1a.
Average Quarterly GDP Growth Rate



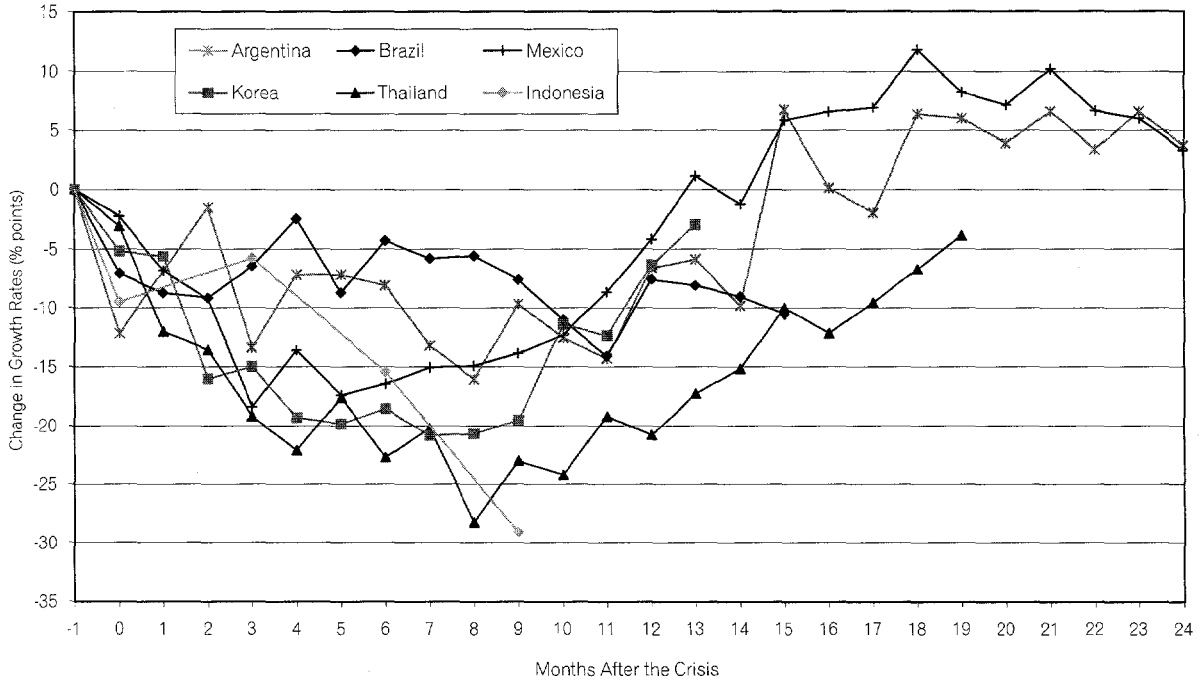
Sources: Central Banks and Ministries of Finance.

Figure 1b.
Year-on-Year Quarterly GDP Growth Rate



Sources: Central Banks and Ministries of Finance.

Figure 2.
Decline in Growth of Industrial Production
(growth averaged in the 12 months leading to crisis minus actual year-on-year monthly growth)



Sources: Argentina: INDEC; Brazil: IBGE; Mexico: INEGI; Indonesia: Bank of Indonesia and BPS (Statistical Agency); Korea: Bank of Korea; Thailand: Bank of Thailand.

IV WHY WERE the CRISES DEEPER and the RECOVERIES SLOWER in ASIA?

THE FOLLOWING SUBSECTIONS ATTEMPT TO ANSWER this question. In the first place, we evaluate whether the magnitude of the speculative pressures or the extent of the reversal in current account balance can explain why some countries suffered greater economic declines than others. Subsequently, we look at the potential role played by macroeconomic policies, the initial financial structure, the initial composition of aggregate demand, and exports. Each subsection includes a suggestive (although certainly not definitive) analysis of the correlations between the country rankings of economic decline and the country rankings of the relevant explanatory variables. These rankings and the procedures for deriving them are explained in Appendix B.

WAS IT BECAUSE THE SPECULATIVE PRESSURES OR THE EXTERNAL ADJUSTMENTS WERE STRONGER?

Measures of speculative pressures

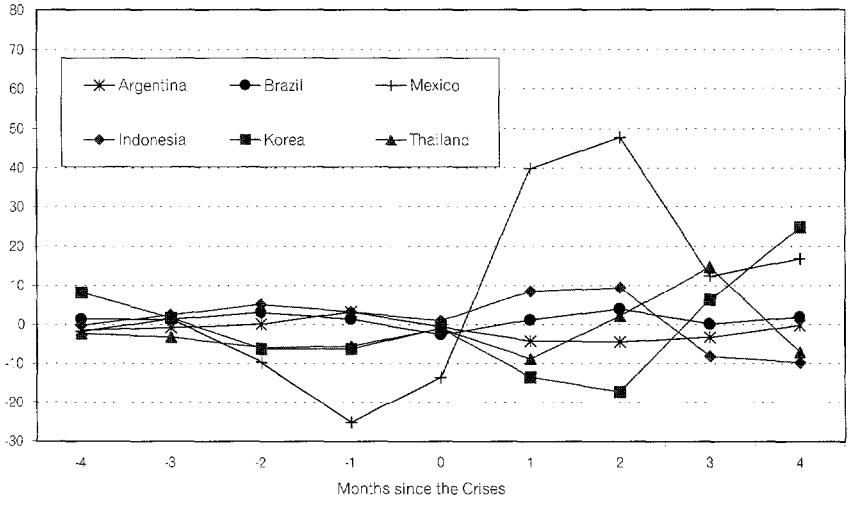
A measure of the magnitude of speculative pressures is necessary to answer this particular question. Eichengreen, et al. (1996) use an indicator of speculative pressures that consists of a weighted average of changes in the stock of international reserves, nominal exchange rates, and domestic interest rates.[8] An important consideration in the construction of such an index of speculative pressure (ISP) is the criteria used for weighing each component.[9]

The main purpose of using the ISP here is to measure the magnitude of the speculative pressures on Mexico and Argentina (around December 22, 1994), Brazil (around October 22,

1997), Thailand and Indonesia (around July 2, 1998), and Korea (around Oct. 22, 1997). Given the various choices available for constructing such indicators, we chose to rely on two sets of indicators. One (ISP1) is constructed with the standard deviation of the variables (divided by their sum) as the corresponding weight. The other index (ISP2) is constructed by giving equal weight to each variable, which would then purely reflect the impact of the changes in the three variables.

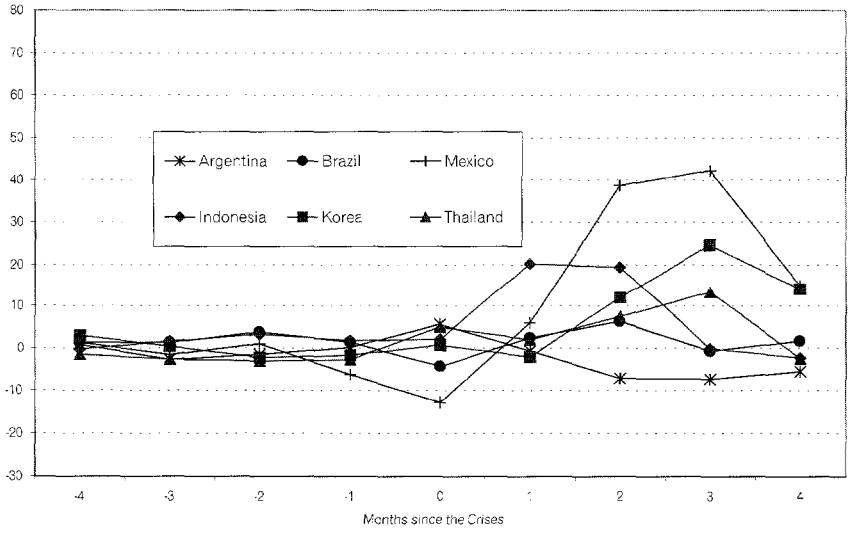
Figure 3a shows the evolution of the ISP1, and Figure 3b shows the evolution of the ISP2. This evidence shows that the speculative pressure on Mexico's currency was of comparable-to-greater magnitude than that faced by the Asian economies. But the Asian economies were definitely harder hit than Argentina in 1995.[10]

Figure 3a.
Index of Speculative Pressure 1



Source: Authors' calculations based on data from IMF, International Finance Statistics.

Figure 3b.
Index of Speculative Pressure 2



Source: Based on data from IMF, International Finance Statistics.

The degree of speculation against a currency may not necessarily lead to a greater external and/or domestic adjustment in the medium term. Hence, we also look at the resulting reversal of the current account and primary trade balance after one year as an indicator of the magnitude of the external adjustment required by the sudden stop of capital inflows.

External adjustments and measures of "sacrifice"

Table 1 contains the relevant information. The first column shows the periods corresponding to the growth rates used in the second column.[11] The third and fourth columns show the change in the current account (CAB) and primary trade (TB) balances of the balance of payments as a share of the ex-ante GDP in U.S. dollars. The change in the CAB variable is useful because the turnaround in the CAB is associated with reversals in net capital inflows, plus the difference in the change in reserves. The TB is a measure of the net resource transfer to the rest of the world; a surplus represents a net transfer to the outside.

Thailand and Korea had the largest reversals in the CAB and TB, followed by Mexico. Argentina experienced the smallest reversal of the CAB, while Brazil experienced the smallest reversal in the primary trade balance. It seems, therefore, that Thailand and Korea experienced the largest swings in net capital inflows and in net resource transfers. It is possible, therefore, that, at least in these two cases, the severity of the domestic economic adjustment was due to the high magnitude of the reversal in capital inflows. One possible explanation of the larger reversals in Thailand and Korea is their very high share of short-term inflows relative to total flows, which is reflected in the large shares of foreign claims maturing in less than a year as a share of total foreign claims as reported by the Bank for International Settlements.[12]

Large external adjustments can result from exogenous reversals in capital flows, but they can also be driven by domestic adjustments in the level and composition of aggregate demand (i.e., the demand for tradable versus nontradables). The fourth and fifth columns of Table 1 show the ratio of the ex-post GDP growth rate divided by the change in the CAB or TB (as a percentage of the initial GDP in U.S. dollars). Indonesia is clearly the case where the domestic sacrifice was the largest relative to its external adjustment. Argentina is a distant second, while Thailand and Mexico share the third and fourth spots. The high domestic sacrifice relative to the external adjustment of Argentina could be explained by its lack of

Table 1.
Sacrifice Ratios

	Period after the attack	GDP Growth (%)	Change in CAB/GDP (%)	Change in TB/GDP (%)	*% GDP Growth/* Change CAB[1]	*% GDP Growth/* Change TB[2]
Argentina	1995	-4.02	2.19	2.15	-1.84	-1.87
Mexico	1995	-6.22	6.67	6.70	-0.93	-0.93
Brazil	1997 Q4–1998 Q3	1.22	-0.25	0.41	-4.87	3.00
Indonesia	1997 Q4–1998 Q3	-8.13	2.89	6.24	-2.81	-1.30
Korea	1998	-6.50	11.20	8.52	-0.58	-0.76
Thailand	1998	-8.00	9.44	2.16	-0.85	-3.71

[1]The Sacrifice Ratios are computed as follows: g / [(CAB1 - CAB0) / GDP0] , where g is the GDP growth, CAB1 and CAB0 are the Current Account Balance for the year ending at the quarter indicated, and GDP0 corresponds to the GDP in US dollars for the four quarters right before the crisis.
[2]Same as in 1. except that the TB stands for the Trade Balance.
Sources: International Monetary Fund, International Financial Statistics, Bank of Korea, Bank of Indonesia, Bank of Thailand, Bank of Brazil, Ministry of Finance of Argentina.

adjustment of its exchange rate. In contrast, Brazil seems to have experienced the smallest domestic sacrifice relative to its (also low) external adjustments, but this small sacrifice is probably the result of a rise in consumption that, paradoxically, may be a symptom of the lack of credibility of the adjustment program (see below).

In synthesis, the Asian economies experienced either the largest external adjustments (Thailand and Korea) or the largest relative domestic sacrifice (Indonesia). Hence, in the former two cases the slow economic recovery in the aftermath of the speculative attacks is likely to be associated with higher external adjustments, which were perhaps associated with harsh punishment inflicted by international capital flows. In turn, it is possible that the imposed external adjustments were related to the incidence of short-term foreign liabilities. In the case of Indonesia, it is more likely that the severe economic downturn was due to the effects of either policy responses or to the impact of the high interest rates and exchange-rate depreciation on the profitability of domestic investment and national wealth.

Figures 4a and 4b show the extent to which the rankings of the ISP1 and change in the CAB/Y

Figure 4a.
ISP1 and Economic Decline Rankings
(D1=1.7)

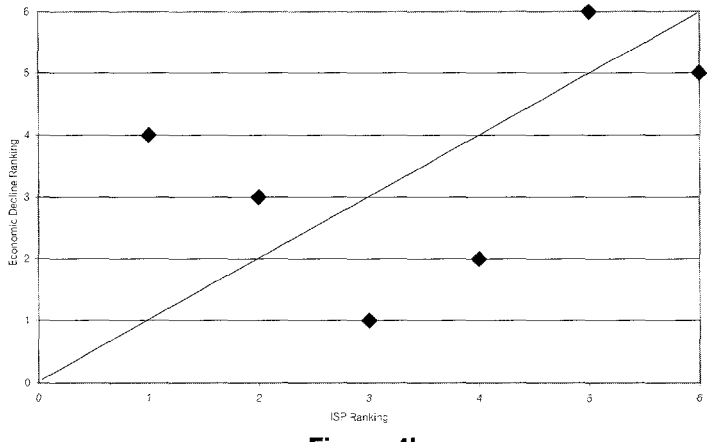
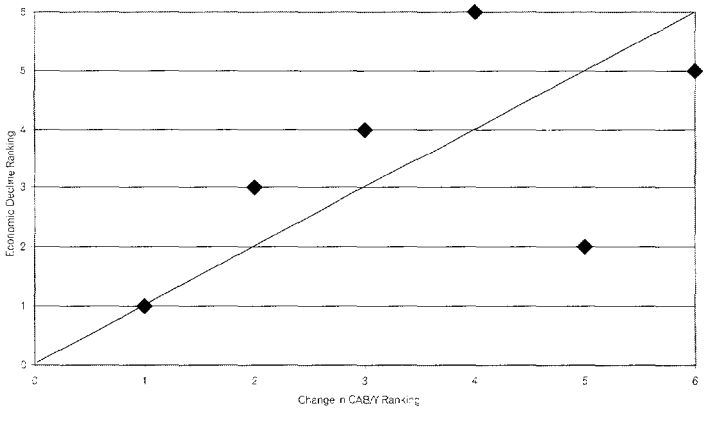


Figure 4b.
Change in CAB/Y and Economic Decline Rankings
(D1=1.3)

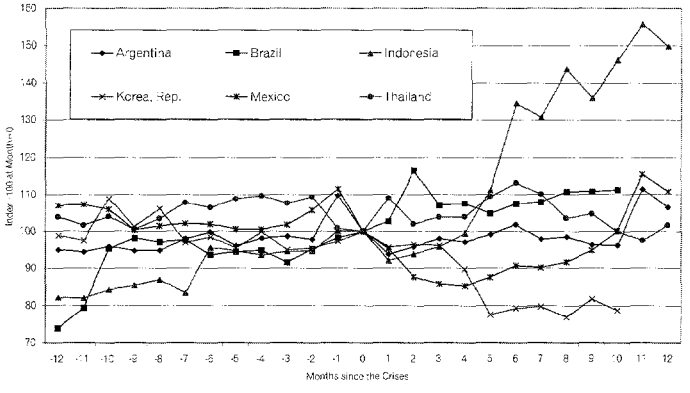


help explain the rankings of economic decline. The deviation index (DI) of the rank correlation based on the ISP1 and the CAB reversal are 1.7 and 1.3, respectively. Whether these DIs are low or high has to be assessed in comparison to the explanatory power of other plausible hypotheses.

WAS IT BECAUSE MONETARY AND FISCAL POLICY RESPONSES WERE STRONGER?

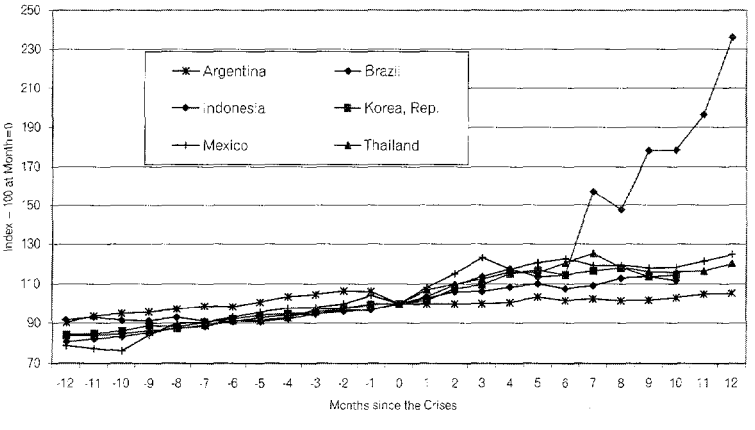
In this section we describe the monetary and fiscal policies implemented in our case studies and assess

Figure 5.
Real M1
(deflated with CPI)



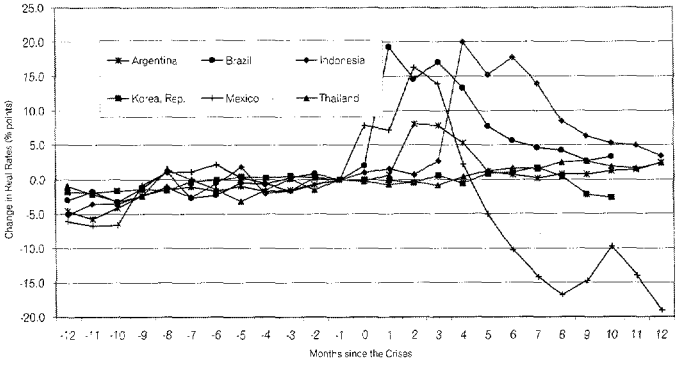
Source: Based on data from the IMF (International Monetary Fund), International Financial Statistics.

Figure 6.
Real Domestic Credit
(deflated with CPI)



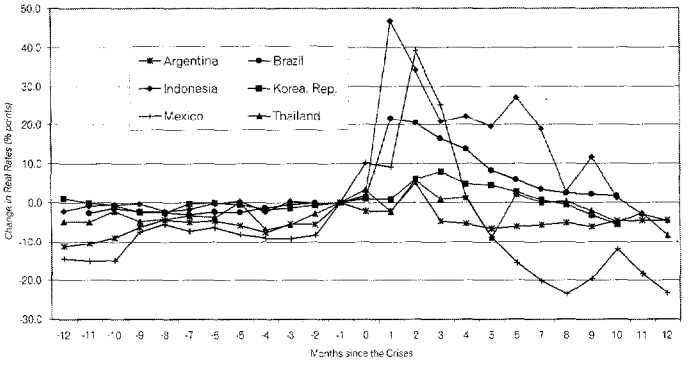
Source: Based on data from IMF (International Monetary Fund), International Financial Statistics.

Figure 7.
Change in Real Deposit Rate Relative to the Level Before the Crises
(deflated using annualized monthly change in CPI)



Source: Based on data from IMF (International Monetary Fund), International Financial Statistics.

Figure 8.
Change in Real Money Market Rate Relative to the Level Before the Crises
(deflated using annualized monthly change in CPI)



Source: Based on data from IMF (International Monetary Fund), International Financial Statistics.

the extent to which the "tightness" of these policies can explain why some countries suffered more than others.

Monetary policies

Figures 5 through 8 show the evolution of monetary variables before and after our six episodes of speculative attacks. In some cases, monetary contraction was especially important, as in Korea, where real M1 levels fell 20 percent below the level it had at the beginning of its crisis, as illustrated in Figure 5. However, Indonesia experienced a significant increase in real M1. A similar pattern can be depicted from the evolution of real domestic credit. Figure 6 shows that the two cases that experienced the smallest domestic credit expansion were Argentina, followed by Brazil. The most salient case is Indonesia, where a year after the crisis real domestic credit had more than

doubled. We should be cautious about our interpretation of this evidence, because it is possible that the rise in the *demand* for liquidity was greater in Indonesia and in the other Asian episodes than in Latin America.[13]

However, a similar conclusion emerges from looking at the evolution of real interest rates. Two different real interest rates are considered in Figures 7 and 8 to analyze developments in both deposit and liquidity markets. Figure 7 clearly shows Indonesia, Brazil, and Mexico on top of the ranking in terms of the rise in real deposit interest rates during months 1–3. Real deposit rates rose dramatically in Indonesia by month 4, when the change in its rate reached the levels seen in Brazil during the earlier months. Mexico and, to a lesser extent, Korea experienced real deposit rates that were below their precrisis levels at some point during the 12 months following their crises. The changes in the real money market interest rates, taken as a measure of the liquidity of the financial systems, tell a similarly ambiguous story. Figure 8 shows that, of the Asian cases, only Indonesia had a more pronounced and persistent increase in the real money market rate than the Latin American cases, although the behavior of Brazilian rates was very similar to Indonesia's in the sense of their gradual decline.

Figure 9 shows the relationship between the economic decline and "tight" money rankings—the DI is 3.2. The main conclusion from this section, therefore, is that monetary policy was not clearly tighter in the Asian crises than in the Latin American cases. The extent to which the recessions following the crises were deeper, and their consequences longer lasting, is probably related to other factors, some of which are discussed below.

Fiscal policies

Table 2 shows the primary fiscal deficits as a share of GDP during the years before and after each episode. Table 3 presents a measure of "fiscal effort," defined as the change in the primary balance as a share of the initial GDP. The negative numbers reflect declines in primary fiscal balances. Indonesia experienced by far the greatest deterioration of its primary fiscal accounts,

Figure 9.
Tight Money and Economic Decline Rankings
(DI=3.2)

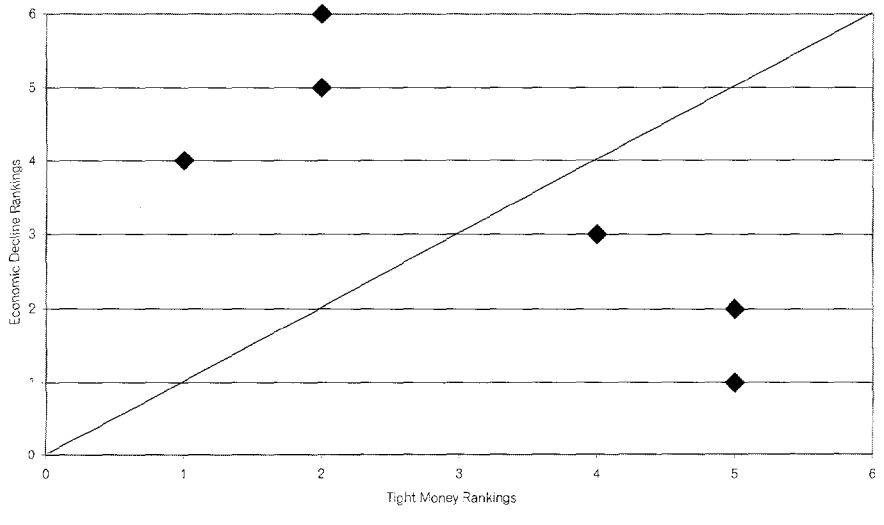


Table 2.
Fiscal Policy Before and After the Crises
(primary fiscal balance as a % of GDP)

	Before the Crisis	*After the Crisis*
Argentina	0.10	-0.91
Brazil	0.57	-1.23
Mexico	-2.10	-4.70
Indonesia[a,b]	12.05	-2.14
Korea[b]	5.52	1.62
Thailand[b,c]	-2.10	-2.80

[a]Since the fiscal year for Indonesia begins in April, the data before the crisis corresponds to the period April 1996-March 1997, and the data after the crisis to the period April 1997–March 1998.
[b]Central government only, not including local governments.
[c]The data before the crisis correspond to overall 1997, and after the crisis correspond to an estimation for 1998 made by IMF staff.

Table 3.
Fiscal Policy After the Crises

	Fiscal Effort	*Fiscal Impulse*
Argentina	-0.98	0.10
Brazil	-1.88	2.15
Mexico	-2.31	0.89
Indonesia	-13.99	12.64
Korea	-3.95	2.40
Thailand	-0.39	-1.00

Fiscal Effort = [Primary Fiscal Balance (t) - Primary Fiscal Balance (t-1)] / GDP (t-1)
Fiscal Impulse = Growth of GDP * (Gov. Revenues/GDP) - Fiscal Effort
Source: Based on national and fiscal accounts data at constant local prices.

followed by Korea. Thailand, in contrast, was the country with the least expansionary change in the primary fiscal account.

It is significant that in all cases the primary fiscal accounts deteriorated. This phenomenon may be due to the impact of the so-called automatic stabilizers of the fiscal accounts, that is, the declines in economic activity reduce public revenue (see Price and Chouraqui 1983). As mentioned, we use the following measure of fiscal effort:

$$(1) \qquad \textit{Fiscal Effort} = (PFB_t - PFB_{t-1})/Y_{t-1}$$

The primary fiscal balance (PFB) at time t is the inflation-adjusted PFB, which makes it comparable in terms of purchasing power to the PFB at time t-1.

With a simple accounting exercise we can derive the "fiscal impulse," or the portion of the deterioration of the primary fiscal account that was not due to the decline in GDP. The numerator in equation (1) is equal to the change in public revenues (t) minus the change in expenditures (G):

$$(2) \qquad (PFB_t - PFB_{t-1})/Y_{t-1} = (\Delta T_t - \Delta G_t)/Y_{t-1}$$

Here we can introduce two simplifying assumptions: Let G be determined by exogenous spending policies, while T depends on the revenue rate t—also determined by exogenous policy choices—and on the level of real income, Y:

$$(3) \qquad (PFB_t - PFB_{t-1})/Y_{t-1} = ((t_tY_t - t_{t-1}Y_{t-1}) - \Delta G_t)/Y_{t-1}$$

In turn, the change in revenues can be decomposed as follows:

$$(4) \qquad t_tY_t - t_{t-1}Y_{t-1} = t_t\Delta Y + Y_{t-1}\Delta t$$

Equation (4) can then be substituted into (3):

$$(5)\ (PFB_t - PFB_{t-1})/Y_{t-1} = ((t_t\Delta Y + Y_{t-1}\Delta t) - \Delta G_t)/Y_{t-1}$$

The concept of fiscal impulse is meant to capture the portion of the change in the primary balance that was not due to the change in income Y. In other words, a portion of the right-hand side of equation (5) contains the (negative of the) fiscal impulse (FI), which is due to changes in the revenue rate t minus the change in expenditures G, relative to the ex-ante GDP:

$$(6)\qquad -FI = (Y_{t-1}\Delta t - \Delta G_t)/Y_{t-1}$$

Therefore, equation (5) can be rewritten as follows:

$$(7)\qquad (PFB_t - PFB_{t-1})/Y_{t-1} = -FI_t + (t_t\Delta Y)/Y_{t-1}$$

Our measure of FI can be derived by adjusting our measure of fiscal effort by subtracting it from the product of the ex-post revenue rate (t_t) multiplied by the *real* growth rate as follows:

$$(8)\qquad FI_t = [(t_t\Delta Y)/Y_{t-1}] - [(PFB_t - PFB_{t-1})/Y_{t-1}]$$

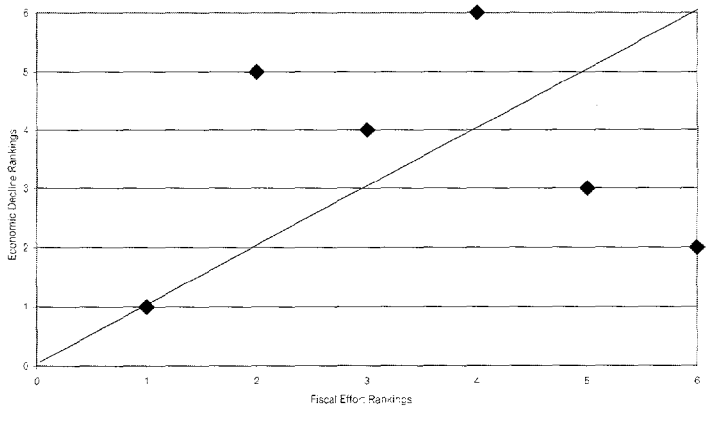
The second column in Table 3 shows our estimates of fiscal impulse. Indonesia was by far the country that implemented the most expansionary fiscal policy. Only Thailand had a contractionary fiscal stance, while Argentina's was virtually neutral. As in the realm of monetary policy, therefore, the Asian countries, especially Indonesia, do not seem to have "suffered" from tighter fiscal policies more than the Latin American countries.

Figure 10 shows the relationships between the economic decline rankings and the country rankings of fiscal impulse. While the DI of 2.0 is lower than the one for "tight" money, it is still comparatively high.

WAS IT BECAUSE INITIAL CONDITIONS AMPLIFIED THE IMPACT OF SPECULATIVE PRESSURES AND POLICY RESPONSES?

It is clearly difficult to explain why the Asian cases suffered a faster and deeper economic decline than the Latin American cases based on indicators of their policy responses. However, the effect of

Figure 10.
Fiscal Impulse and Economic Decline Rankings
(DI=2.0)



Source: Based on official data from central banks and ministries of finance.

monetary and fiscal policies on the real economy depends on initial conditions, including the financial structure and the composition of demand.[14] The following subsections address these issues.

Did the initial financial structure play a role?

The size (and speed of recent growth) of the domestic financial sectors and the structure of domestic financial assets and liabilities may be crucial elements in determining the magnitude of the economic decline in the aftermath of speculative attacks.[15] Table 4 shows the initial level of factors that may determine the magnitude of negative Fisherian and net worth effects of currency devaluations and interest-rate increases. The first variable is the net foreign liability (NFL) positions of the banking systems as a share of GDP. This evidence indicates that only Thailand in July 1997 had a significantly higher net foreign liability position than Argentina and Mexico before December 1994 and higher than Brazil in July 1997. However, it is well known that much of the foreign currency exposures acquired by Indonesia, for example, were held primarily by the nonbanking private sector.[16] In the case of Thailand, the net foreign liabilities accumulated by its banking system exceeded 21 percent of its GDP. This means that a 50 percent devaluation would have led to an increase in the net foreign liabilities of its banking system in excess of 10 percent of GDP (assuming that the GDP stays constant). Table 4 also shows the outstanding foreign loans to the private sector (as reported by the Bank for International Settlements) as a share of GDP for each country prior to the crises. Again, Thailand clearly faced the prospects of significantly larger negative effects from nominal devaluations. Indonesia and Korea also had significantly higher foreign loans (FL) relative to the size of their economies than the three Latin American cases. In addition, as mentioned earlier, the Asian economies had higher shares of short-term debt (with a maturity of one year or less) than the Latin American economies. In general, the potential for harmful effects emanating from currency devaluations was significantly higher in the Asian markets than in Latin America.[17]

Table 4.
Initial Financial Structure

	NFL/GDP (%)	*PrvtL/GDP* (%)	*STL/GDP* (%)	*PSC/GDP* (%)	*Private Credit Growth* (%)
Argentina	2.1	7.8	6.2	17.1	29.4
Brazil	4.4	6.5	5.2	30.7	0.0
Mexico	4.0	9.8	7.5	7.6	46.1
Indonesia	2.3	20.3	13.5	49.8	53.9
Korea	1.9	17.4	12.4	60.5	29.0
Thailand	21.7	36.4	24.6	95.6	34.2

NFL/GDP = Net Foreign Liabilities of the banking system divided by Gross Domestic Product
PrvtL/GDP = Private loans (claims as reported by the BIS) divided by Gross Domestic Product
STL/GDP = Short-term foreign liabilities divided by GDP
PSC/GDP= Private Sector Credit divided by Gross Domestic Product
Private Credit Growth= cumulative growth of total credit to private sector at constant local prices during 24 months prior to the crises

Observations for NFL: Argentina and Mexico: average for November 1994; Brazil and Korea: average for September 1997; Indonesia and Thailand: Average for June 1997. STL is as of end-June of year indicated, except for the STL/GDP ratios for Brazil, Indonesia, Korea, and Thailand, where data as of end-June 1997 were used.

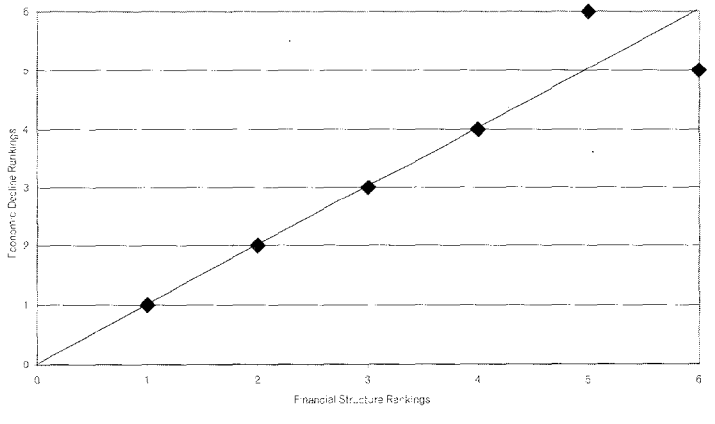
Sources: IMF (International Monetary Fund), International Financial Statistics; PrvtL from BIS.

The effects of interest-rate increases depend on the extent of leverage in an economy. When corporations are highly indebted and their debt-to-equity ratios are high, an increase in interest rates can be catastrophic. The firms' creditors, including domestic banks, can either attempt to absorb the shock themselves, which would be reflected in deteriorating capital and liquidity to liabilities ratios, or they can pass on the increased costs of borrowing to their clients. If their corporate clients already have high debt-to-equity ratios, their capacities to pay back more expensive credit will deteriorate further, and the quality of the banks' loan portfolios will also deteriorate. World Bank (1998) showed that while the incidence of leverage varied across industries and across countries in East Asia, Indonesia, Korea, and Thailand had some of the highest average corporate debt-equity ratios in the world during 1988–96.[18] Due to data limitations concerning comparable debt-to-equity ratios of firms in our sample of countries, we rely on a macroeconomic proxy, namely, the incidence of credit to the private sector, to assess the extent to which these factors could have played a role in determining the magnitude of the ex-post economic decline.

The evidence concerning the initial incidence of private sector credit presented in Table 4 portrays dramatic differences between the Latin American and Asian cases. The negative effects of a given interest-rate hike in Asia would have naturally resulted in greater negative consequences for the real economy than in the Latin American countries.[19]

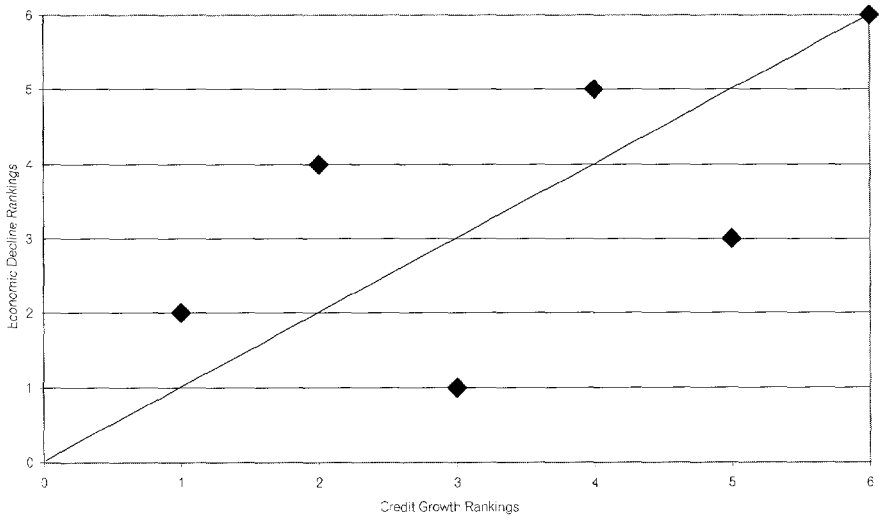
Another factor that may explain the negative effects of high interest rates is the *quality* of credit to the private sector. In principle, this factor can be assessed by looking at the initial share of nonperforming loans of the banking system. In practice, however, this type of information is not strictly comparable across countries. For these reasons, we look at the evolution of real credit to the private sector in the 24 months preceding the crisis episodes. The underlying assumption is that the quality of credit to the private sector tends to deteriorate when it grows too fast. The last column of Table 4 shows the

Figure 11a.
Financial Structure and Economic Decline Rankings
(DI=0.3)



Source: Authors' calculations.

Figure 11b.
Ex-ante Credit Growth and Economic Decline Rankings
(DI=1.3)



Source: Authors' calculations.

accumulated growth rate of inflation-adjusted credit to the private sector in each case. It is striking that Brazil had an accumulated growth rate of credit to the private sector of zero during the two years leading to its episode of speculative pressure. The other five economies experienced a substantial growth of real credit, led by Indonesia and Mexico.

Figures 11a and 11b show the correlation between the rankings derived from our financial structure and ex-ante credit growth indicators and the rankings of economic decline. The DIs are 0.3 and 1.3, respectively. Hence the initial financial structure seems to be an important explanation of why the Asian economies suffered greater economic declines than the Latin American countries.

Did the initial composition of demand play a role?

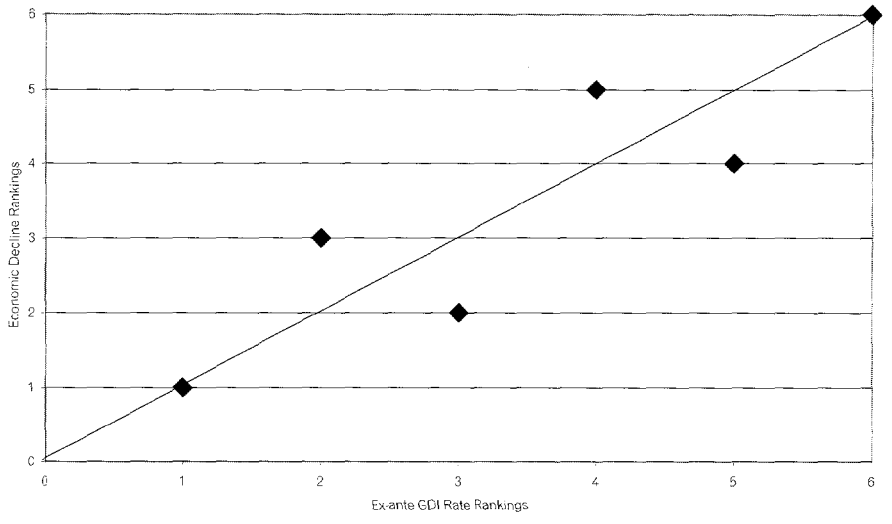
High investment rates, combined with the high responsiveness of investment to crisis situations, are also important explanations of the deep Asian recessions. Figure 12 shows the rank-correlation of the relationship between ex-ante investment rates and the subsequent economic decline—the DI is only 0.7.

A simple accounting exercise reveals the relationship between ex-ante investment and consumption shares and income growth:

$$(9) \qquad \Delta Y_t/Y_{t-1} = (C_{t-1}/Y_{t-1}) \bullet \Delta C_t/C_{t-1} + (I_{t-1}/Y_{t-1}) \bullet \Delta I_t/I_{t-1} + X_{t-1}/Y_{t-1} \bullet \Delta X_t/X_{t-1} - (M_{t-1}/Y_{t-1}) \bullet \Delta M_t/M_{t-1}$$

If the fall in consumption during crisis episodes were of similar magnitude (in terms of the percent change) to the fall in investment, then it would be difficult to assert that higher ex-ante investment rates (I/Y) explain the deeper downturn in Asian countries.[20] But Table 5 shows that in all of our cases, gross domestic investment fell more than consumption. Since the Asian economies initially had higher investment rates, a given percent fall of investment accounted for larger shares of the decline in GDP. In fact, the

Figure 12.
Ex-ante GDI Rate and Economic Decline Rankings
(DI=0.7)



Source: Authors' calculations.

contribution of consumption was only larger in the case of Argentina, where consumption declined by 5.8 percent, but its share of GDP ex-ante was 0.84, thus contributing -4.9 percent to its fall in GDP.

In Brazil, investment declined by 3 percent, but consumption rose by a similar 3.2 percent, and imports (not shown in Table 4) rose by 8.3 percent. This combination of declining investment with rising consumption and imports is symptomatic of an adjustment program that lacks credibility. When adjustment policies and a rigid exchange-rate regime are not consistent, economic agents will tend to increase their consumption, especially imports, in anticipation of the fall of the currency. Combined with the evidence discussed below concerning the rise of inflationary inertia in Brazil (Figure 15b) and the fact that fiscal policy in Brazil was expansionary in the aftermath of the attack of October 1997 (Table 3), it is clear that the Brazilian predicament of 1999 is partly due to the failure to implement a credible adjustment program during 1998.

Table 5.
Decomposition of GDP Growth Rates after Speculative Attacks

	Argentina	*Brazil*	*Mexico*	*Indonesia*	*Korea*	*Thailand*
Ex-post GDP Growth (%)	-4.02	1.22	-6.22	-8.13	-5.91	-8.00
Ex-ante GDI Rate	0.23	0.21	0.22	0.34	0.32	0.35
Ex-post GDI Growth (%)	-15.97	-3.00	-34.95	-29.17	-55.04	-39.00
Contribution of Investment (%)	**-3.64**	**-0.64**	**-7.77**	**-9.83**	**-17.78**	**-13.61**
Ex-ante GDC Rate	0.84	0.81	0.83	0.69	0.63	0.62
Ex-post GDC Growth (%)	-5.78	2.39	-8.44	0.37	-11.04	-10.49
Contribution of Consumption (%)	**-4.86**	**1.94**	**-6.99**	**0.25**	**-6.91**	**-6.56**
Contribution of Net Exports	**4.48**	**-0.09**	**8.54**	**1.45**	**18.77**	**12.17**

Source: Based on Data from Ministries of Finance and Central Banks.

The main lesson from this analysis is that the initial composition of demand seems to have played a crucial role in determining the extent of the economic decline after the speculative attacks. In particular, given the high sensitivity of investment to uncertainty, high initial rates of investment tend to be associated with harsher economic declines.

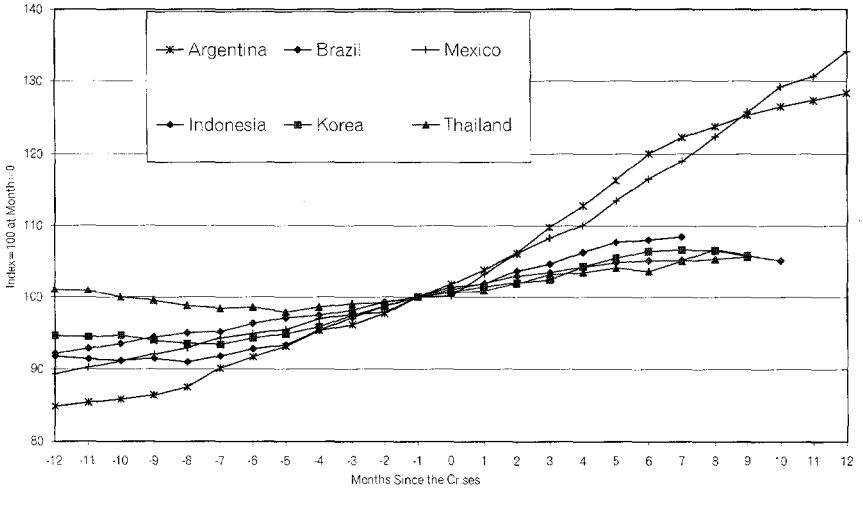
DID LOW EXPORT RESPONSE PLAY A ROLE? WHY DID IT HAPPEN?

The slower recovery in Asia can be partially explained by the relatively lackluster response of merchandise exports (Figure 13). Figure 14 shows the relation between the (low) export growth and the economic decline rankings; the DI is 0.7, which is quite low. But, why did export volumes grow so slowly in the Asian economies? The lackluster merchandise export performance could be a result of the severe foreign liquidity constraints faced by Asian producers in the aftermath of the crises. However, given the evidence presented concerning real interest rates and trends in monetary aggregates, it is more likely that other factors played a role. A Keynesian analysis leads us to focus on inflation dynamics, as does the consideration of inflationary expectations and wage indexation, because these are factors likely to affect the success of currency devaluations in terms of producing real exchange rate variations. In the following paragraphs we look at relevant evidence about the extent to which our cases suffered from inflation inertia and assess the "success" of the currency devaluations in Asia and Mexico. In turn, we look at the evidence concerning the role of regional integration and export similarity.

Inflation dynamics and the effects of exchange-rate variations

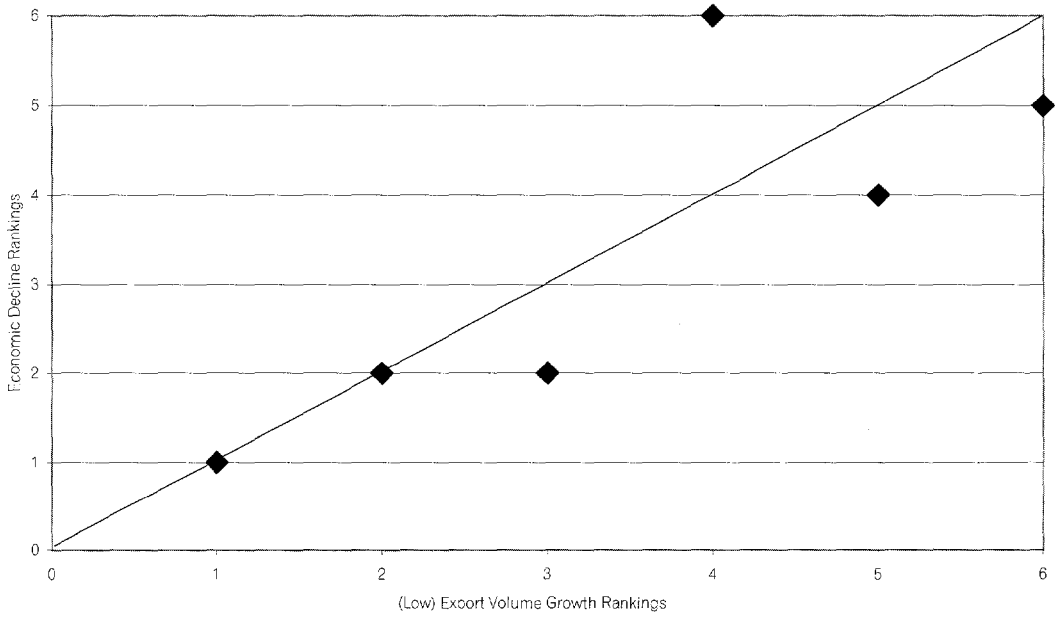
Obstfeld (1995) uses simple inflation autocorrelations to examine whether inflation persistence (or inertia), which can be caused by either credibility problems and/or contract indexation

Figure 13.
Index of Exports Volume
(12-month moving average)



Source: Based on International Financial Statistics data, IMF.

Figure 14.
(Low) Export Volume Growth and Economic Decline Rankings
(DI=0.8)



Source: Authors' calculations.

schemes, tended to be higher in industrial countries with flexible exchange-rate regimes than in those with fixed exchange rates. For our purposes, countries with high inflationary inertia can be expected to gain less from nominal exchange-rate adjustments, since domestic prices will probably catch up quickly afterwards, thus nullifying the potentially expansionary "switching" effect of the devaluation.

The estimation of the extent of inflationary inertia can be done using Ordinary Least Squares, assuming that the true inflationary process in these economies is a random walk with a drift:

$$(10) \qquad \pi_t = \alpha + \pi_{t-1} + \varepsilon_t,$$

where the true value of α is not zero, and ε_t is normally distributed with mean zero. In other words, we model inflation dynamics assuming that contemporaneous disturbances affect the time trend of the level of inflation. For example, consider disturbances ε_t (perhaps a devaluation) that raises the consumer price level at t=1 and another that raises it at t=2. In this case, the inflation level at t=2 would be:

$$(11) \qquad \pi_2 = \pi_0 + 2\alpha + \varepsilon_1 + \varepsilon_2,$$

Of course, the extent to which a disturbance , t affects the level of inflation in subsequent periods will vary across countries. The actual regression equation to be estimated is:

$$(12) \qquad \pi_t = \hat{\alpha} + \hat{\beta}\pi_{t-1},$$

where $\hat{\alpha}$ is the estimated drift coefficient and $\hat{\beta}$ is the estimated autocorrelation or inflation inertia coefficient. The main point, however, is that a currency depreciation at time t can affect subsequent levels of inflation; the greater this effect,

the less likely that such a depreciation will produce a real depreciation.

Figures 15a through 15f show the recursively estimated coefficients of the constant (drift) on the left-hand side graphs and the autocorrelation (inertia) coefficient for the one-year lag estimates on the right-hand side graphs.[21] The recursive estimation technique allows us to examine whether the drift and autocorrelation coefficients were stable over time. Argentina (in Figure 15a) shows stable coefficients throughout the period; the drift is zero and the autocorrelation is steady at about 0.25. Brazil (in Figure 15b) shows a rising drift coefficient until mid-1995, followed by a rapid decline reflecting the success of the Real Plan in reducing the level of inflation. Brazil also seems to have experienced a significant rise in inflationary inertia, which is reflected in the rise of the autocorrelation coefficient from a significantly negative point estimate in mid-1995 to about 0.40 in 1998, although it seems to be statistically significant only after early 1997. Mexico (in Figure 15c) had a stable and statistically significant drift coefficient of about 0.005 (or 0.5 percent monthly inflation) until early 1998, when it experienced a sudden upward trend that was probably due to the inflationary consequences of the nominal depreciations experienced after the Asian crises. Mexico's inflationary inertia was statistically significant and positive beginning in 1994, and steadily climbed to about 0.35 in late 1997. In 1998, Mexico's inflationary inertia became statistically insignificant. Indonesia (in Figure 15d) shows a lower inflation drift but a steadily rising degree of inflation inertia that was near 0.35 by late 1996, continuing to climb thereafter, including the period after the currency crises in Asia. Korea (in Figure 15e) shows a sudden jump in the drift in early 1995, but an autocorrelation coefficient near zero beginning at that point. Thailand (in Figure 15f) shows a relatively stable drift (at 0.002) and autocorrelation coefficients (at 0.4) throughout the period. This evidence indicates that even when the levels of inflation were lower in Asia on the eve of the crises, by late 1996 Indonesia and Thailand actually had high degrees of inflation inertia. This is certainly the case for Brazil and, to a lesser extent, Mexico. Only Korea seems to have had significantly lower inflationary inertia than the Latin economies and, based on this evidence, could have benefited from nominal exchange-rate devaluation if other factors had not been present.

An index proposed by Goldfajn and Gupta (1998) can be used to assess the extent to which the real exchange rate devaluations were brought about by the nominal devaluations: Let the nominal depreciation success index, $S = \%\Delta NEER / \%\Delta REER$, where NEER is the nominal effective exchange rate and REER is the real effective exchange rate. If $S > 1$, then the real depreciation was brought about by a combination of nominal devaluation plus some domestic inflation greater than foreign inflation. If $S < 1$, then real depreciation was brought about by nominal devaluation plus some domestic *deflation*, and $S=0$ when the nominal devaluation is zero. $S < 0$ when the nominal and real exchange rates move in opposite directions. For example, when the nominal exchange depreciates, but domestic inflation is greater than foreign inflation by a margin larger than the nominal depreciation, the real effective exchange rate appreciates and S acquires a negative value.

Figure 16 shows the evolution of S, each observation being measured with respect to the level of NEER and REER in month zero. It is clear that our three Asian economies experienced nominal devaluations that effectively brought about real exchange rate depreciations, as reflected in their S values near 1. In contrast, Mexico experienced nominal depreciations that were diluted by high domestic inflation relative to foreign inflation.

Figures 15a-f.
Recursive Inflation Drift and Inertia

Figure 15a.
Argentina

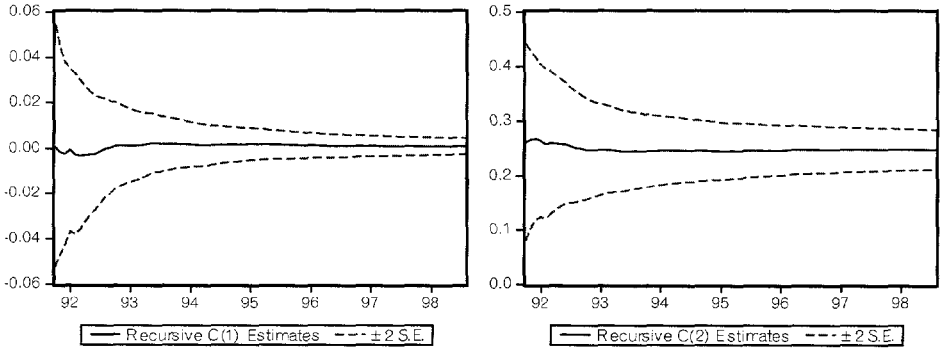


Figure 15b.
Brazil

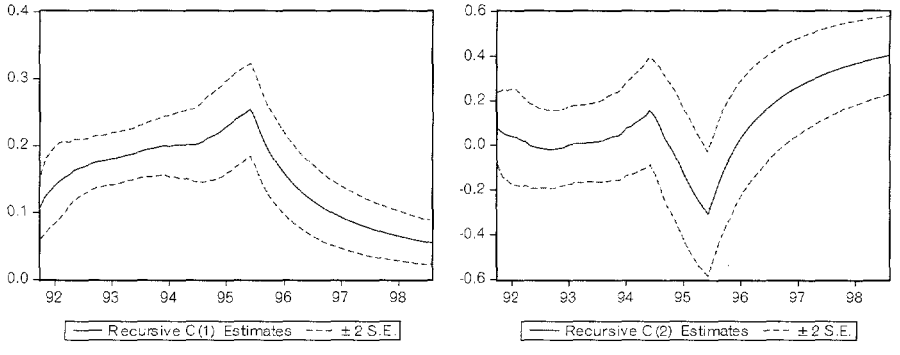


Figure 15c.
Mexico

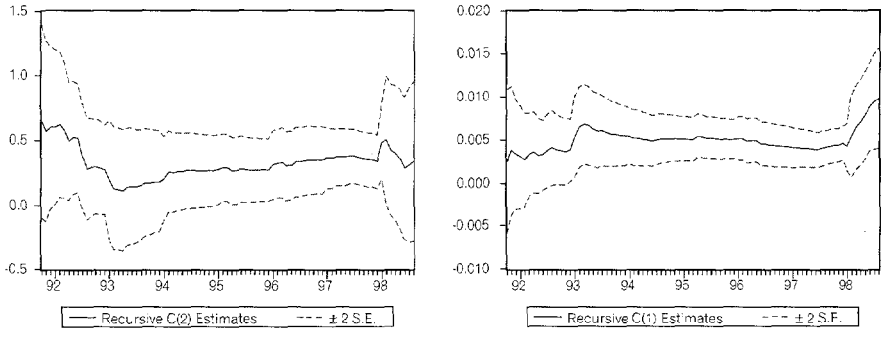


Figure 15d.
Indonesia

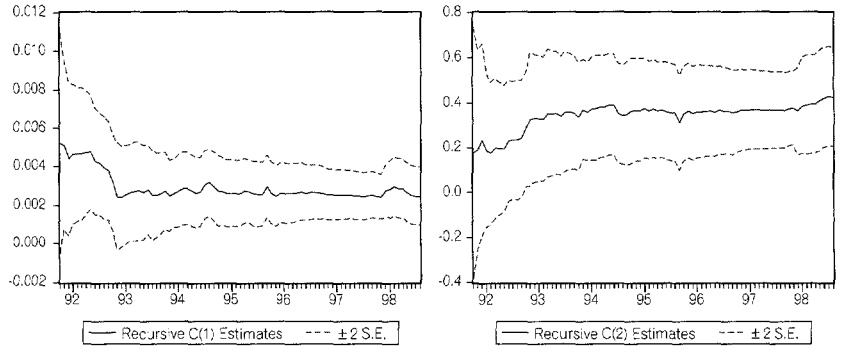


Figure 15e.
Korea

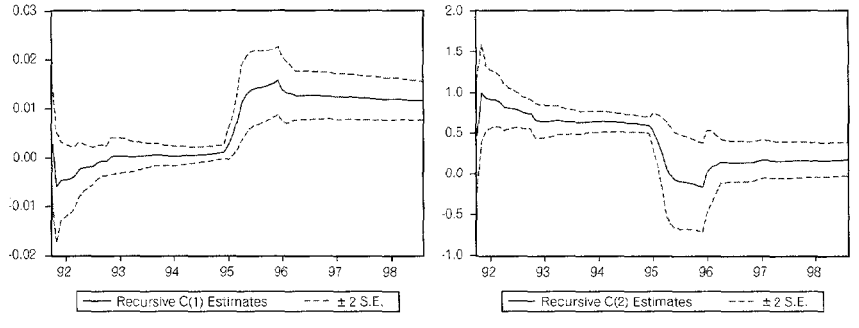
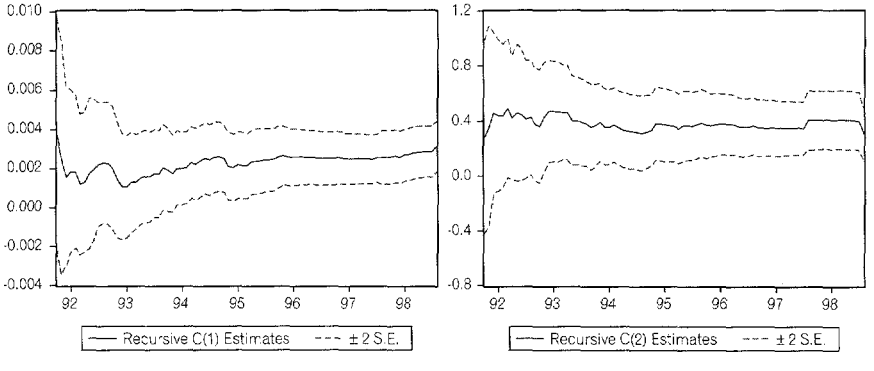
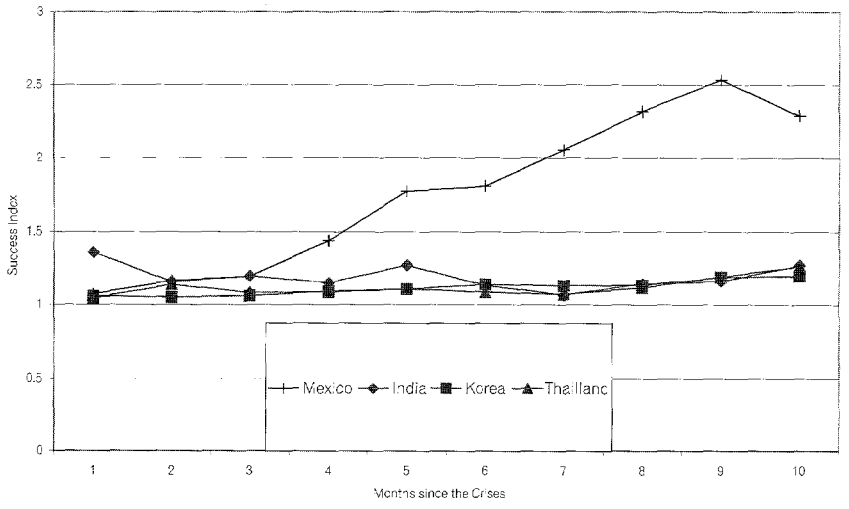


Figure 15f.
Thailand



Source: Based on consumer price index (CPI) data from the IMF, International Financial Statistics.

Figure 16.
Index of the "Success" of Nominal Exchange-Rate Variations



Source: Based on data from IMF, International Financial Statistics.

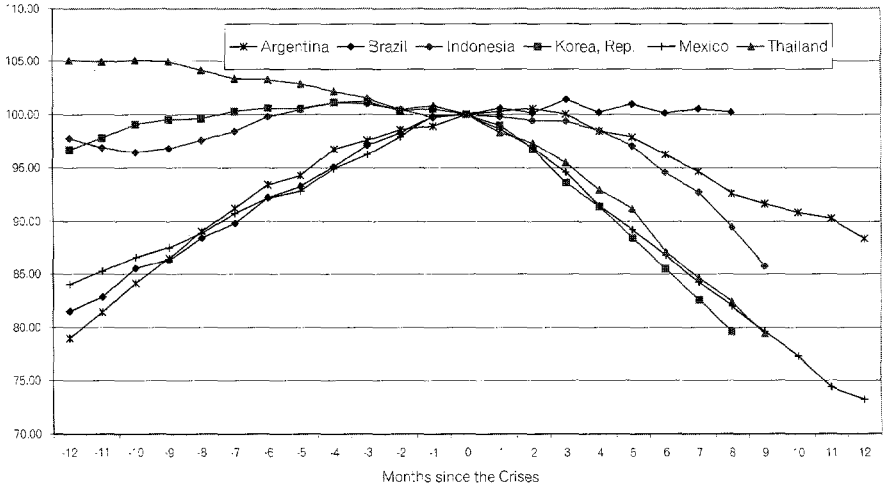
From a Keynesian viewpoint, the nominal devaluations in Asia should have had significant absorption "switching" effects benefiting domestic tradable industries. If the devaluations had negative effects, it was probably due to Fisherian and net wealth effects affecting the creditworthiness of private agents who were highly indebted in foreign currency. Another possibility is that the devaluations had negative neo-Keynesian effects acting through the depletion of net worth. The "success" of the nominal depreciations in the three Asian cases probably reflects the effects of their deep recessions that helped contain domestic inflation, in spite of the high inertial coefficients of Indonesia and Thailand.

The impact of contractions in domestic aggregate demand can be assessed by looking at the declines in import volumes.[22] Figure 17 shows that all countries experienced dramatic downturns in their volume of merchandise imports. Of the cases experiencing currency devaluations (Mexico and the three Asian economies), Indonesia had the slowest downturn in import volume, which should shed some doubt on arguments that emphasize the role of Keynesian demand contraction effects in the case of Indonesia. At least for this case, it is likely that supply-side factors, perhaps driven by negative Fisherian and/or net worth effects, predominated in the adjustment process.

The role of regional integration and export similarity

The low export response might be a consequence of the regional character of the East Asian crises, including the economic and financial distress in Japan. The regional character of the crises can be further analyzed by looking at the regional structure of merchandise exports and the similarity of export products in both groups of countries. Tables 6 and 7 show the share of total merchandise exports that go to relevant regional markets. As can be seen, Asia was highly integrated prior to the eruption of the crises under study. Latin American exports are more concentrated in the Western Hemisphere, including the United States.

Figure 17.
Index of Imports Volume
(12-month moving average)



Source: Based on data from IMF, International Financial Statistics.

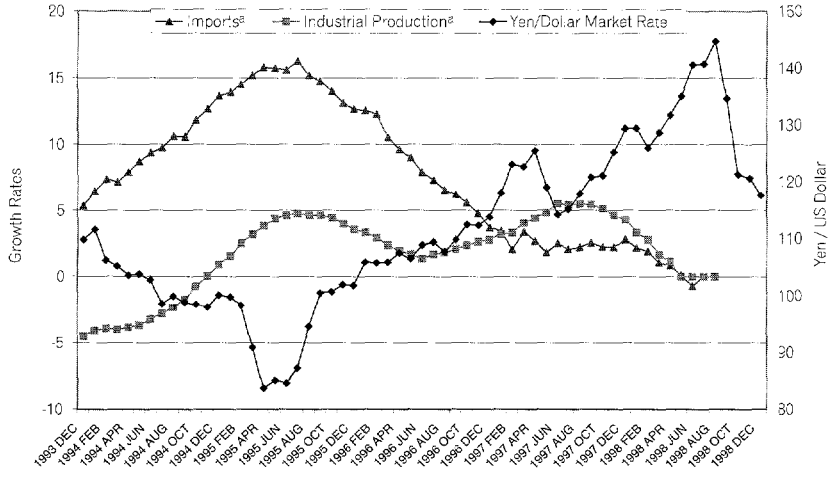
In this respect the role played by Japan in the period leading to the crises and during the recovery of the Asian economies was crucial. Figure 18 shows the evolution of the yen–dollar exchange rate, and a moving average of Japanese industrial production and import volumes. It is clear from this picture that the appreciation of the yen relative to the dollar during 1994–95 was associated with rising import volumes and rising industrial production in Japan. After mid-1995, the yen began to depreciate relative to the dollar, industrial production began to stagnate, and import volumes began a dramatic decline, which continued in the aftermath of the East Asian crises of the second half of 1997.

Another contributing factor to the slow recovery of Asian merchandise exports was that the products exported by these economies tend to be similar to those produced by their regional partners. We can assess the "similarity" of export structures across countries by calculating Finger-Kreinin export similarity indexes as follows:

$$(13) \qquad XS\,(ab, w) = \Sigma_i \, minimum\,[X_i\,(a\,w), X_i\,(b\,w)]\},$$

where XS is the export similarity index, a and b are two countries, with w representing the "world," and X_i (aw or b w) is the share of product i in country a or b's exports to the world. The index is constructed by taking the sum of the minimum shares of overlapping exports to the world between any two pairs of countries. Table 8 shows the average XS for each region. Average export similarity was higher in Asia than in Latin America, and it is likely that the real exchange-rate devaluations of the Asian economies were partly frustrated by the fact that they were exporting similar products, and thus the potential gains in export competitiveness relative to their major export markets were smaller than that implied by the depreciation of their real effective exchange rates.[23]

Figure 18.
Japan: Nominal Exchange Rate, and Growth Rates of Import Volume and Industrial Production



[a]12-month moving average of growth.
Source: Based on data from IMF (International Monetary Fund), International Financial Statistics.

Table 6.
Intraregional Trade in the Americas
(percent of total exports, average 1990-1996)

	United States	*7 LAC Countries*	*Total*
Argentina	11	31	42
Brazil	20	15	35
Chile	17	14	31
Colombia	39	15	54
Mexico	81	3	84
Peru	21	13	34
Venezuela	53	11	64
United States	–	13	13

Source: Based on data from IMF (International Monetary Fund), Direction of Trade Statistics.

Table 7.
Intraregional Trade in Asia
(percent of total exports, average 1990-1996)

	Japan	*5 Crisis Countries[a]*	*Rest of Asia's LDCs*	*Total*
Indonesia	33	10	19	62
Korea	15	11	19	44
Malaysia	14	6	38	58
Philippines	18	7	14	39
Thailand	17	6	23	46
Japan	-	16	22	38

[a]Inconesia, Korea, Malaysia, Philippines, and Thailand.

Source: Based on data from IMF (International Monetary Fund), Direction of Trade Statistics.

Table 8.
Average Export Similarity Indexes[a]

	Asia 5[b]	*LAC 7[c]*
Asia 5[b]	0.36	0.21
LAC 7[c]	–	0.22
Japan	0.31	0.19
China	0.39	0.24

[a]Based on Finger and Kreinin (1979). Calculations performed using data on the composition of total exports (at the 4–digit level) from the U.N. Comtrade database for the period 1990–96.
[b]Indonesia, Korea, Malaysia, Philipoines, and Thailand.
[c]Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

V CONCLUSIONS and POLICY IMPLICATIONS

THE FACT THAT RECENT LATIN AMERICAN CRISES have been followed by relatively quick recoveries should not be a justification for inaction; even the recent Latin American crises have been terribly costly in terms of declines in GDP and industrial production. In the future it is likely that Latin American adjustments after speculative attacks will more resemble those of Asia in 1997–98 than previous Latin American crises, due to several reasons. As is well known, capital flows, including short-term loans and equity investments, have been rising sharply since the early 1990s, and they will probably continue to do so. Second, the privatization of domestic banking systems and the end of high inflation have also been associated with increases in the size of banking and financial markets relative to GDP. This part of the story is well known, but the interested reader can examine the evidence presented in chapter 2 of Burki and Perry (1997). Thus, unless adequate safeguards are put in place, one can expect both higher debt-to-equity ratios, currency exposures, and large stocks of short-term debt held by the private sector in the future.

In Perry and Lederman (1998) we concluded that sound institutions and incentives limiting the extent of currency mismatches, excessive leverage, credit growth, and stocks of short-term debt were key policy areas for preventing speculative attacks. The evidence reviewed in this paper, especially the realization that the size and structure of financial systems and high ratios of short-term debt to GDP seem to be key determinants of the magnitude of the economic decline after crises, reinforces those

conclusions, as such institutions and policies are also necessary to reduce the costs associated with the postcrisis adjustment process. Sound financial and corporate governance institutions, flexible exchange rates, and prudential regulations on short-term capital inflows, in addition to strong macro fundamentals and prudent public debt management, would buy significant insurance against the likelihood and potential cost of financial crises.

Purchasing the right to tap liquidity cushions in times of distress (like the Argentines have done since 1995) can also be an important instrument to reduce both the likelihood of a speculative attack and enhance the credibility of tight monetary policies aimed at defending the value of the national currency. In effect, the availability of liquid lines of credit from abroad can be viewed as additional international reserves that can be tapped in the context of a speculative attack. In turn, these additional reserves provide additional time for monetary authorities to maintain a vigorous defense of the exchange rate, assuming, of course, that the domestic financial system can withstand a period of high real interest rates. High (remunerated) liquidity reserve requirements on bank deposits would also help reduce the likelihood and eventual cost of capital flow reversals.

The main conclusion about monetary and fiscal policy responses to speculative attacks is that there may be difficult tradeoffs during a crisis. We found that monetary and fiscal policies in Asia were not necessarily tighter than in the Latin American cases in the aftermath of the speculative attacks. However, macro policy responses should consider that certain initial conditions seem to be key determinants of the magnitude of the economic recessions after speculative attacks. Therefore, it is quite likely that macro policies in Asia should have been less contractionary than they actually were. Table 9 summarizes our main policy recommendations in this area:

1. Inflation inertia and recent histories of high inflation may indicate that policymakers should be cautious about excessive exchange-rate devaluations, which can lead to an outburst of inflation. In such cases, other things being equal, there is a stronger case for interest rate defenses of the currency.

2. On the other hand, if the initial financial structure is characterized by a high incidence of leverage, and there are moderate foreign currency exposures and a previous history of price stability, it is preferable not to undertake overly restrictive monetary and fiscal policies, thus letting the exchange rate depreciate accordingly.

3. If, on the contrary, an economy has high foreign currency exposures but low levels of leverage, then policymakers should be concerned about dramatic currency devaluations. Therefore, under these conditions, tight macro policies are appropriate.

4. The worst scenario is one where domestic leverage is high combined with high, unhedged foreign currency exposures, because in this type of situation both high interest rates and currency depreciations have severe Fisherian and net worth effects on the real economy. Thus, any necessary institutional reforms should be made to prevent the emergence of this combination of factors in the first place.

5. Finally, higher initial rates of investment may also require laxer macro policies to maintain real interest rates at more-moderate levels, other things being equal.

It is also more likely that Latin American economies in the future will experience financial crises with a regional character, due both to increased financial and trade integration. Figure 19 shows, for example, that the share of Argentine and Brazilian merchandise exports going to Latin American markets, including themselves, has been rising steadily since the early 1990s. Mexico is slightly different, due primarily to its preexisting high dependence on the U.S. market. Also,

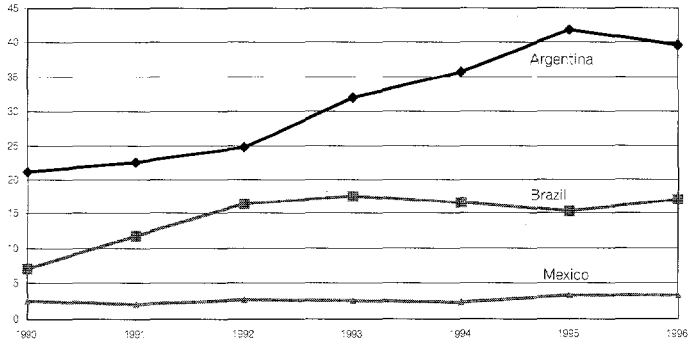
Table 9.
Summary of Policy Recommendations

Initial Conditions	*Tight Monetary Policy Recommended*	*Tight Fiscal Policy Recommended*
Recent high inflation	Yes	Yes
High inflation inertia	Yes	Yes
High domestic leverage	No	No
High foreign currency exposures	Yes	Yes
High domestic and foreign liabilities	Difficult tradeoffs	Difficult tradeoffs
Low capitalization and/or liquidity reserves of the banking system	No	No
High investment rates	No	No

Calderón, et al. (1998), show that fluctuations in Latin American industrial production seem to have an increasing correlation with variations in economic activity in developed economies. This is a likely result of the process of trade liberalization and financial integration that has progressed quickly during the 1990s.

When countries face regional crises, the policy responses should be coordinated. If regional partners share similar economic and financial characteristics, all countries are likely to benefit from undertaking similar macro policies. Moreover, they are likely to benefit from regionally coordinated policy responses because if all countries respond to their crises with expansionary monetary and fiscal policies in isolation from the others, they may find that the extent of currency depreciation will be larger than intended. In other words, the extent of nominal exchange-rate depreciation for each country necessary to achieve a given adjustment of the real effective exchange rate will be less if the corresponding fiscal and monetary expansions are coordinated.

Figure 19.
Intraregional Trade in Latin America, 1990–1996
(exports to LAC7[a] as a % of total exports)



[a]LAC7 = Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela

Source: Calderón, et al. (1998), based on data from IMF, Direction of Trade Statistics.

APPENDIX A.

Speculative Attacks and Macro-Policy Dilemmas: An Illustration Using a Textbook Keynesian Model with Exchange-Rate Expectations

There has been a recent resurgence of interest in textbook Keynesian macroeconomic policy analysis (Corden 1998, Krugman 1998a, Frankel 1997). We find it useful to analyze the effects of speculative attacks using a simple model presented in Krugman and Obstfeld (1994), which incorporates exchange-rate expectations into the traditional Mundell-Fleming analysis.

We begin by specifying the equilibrium condition in the goods and services market:

$$(1) \qquad D\,(RER,\ Y\text{-}t(Y),\ r - \pi) = C\,(Y\text{-}t(Y),\ r - \pi) + I\,(r - \pi) + CA\,(RER,\ Y\text{-}t(Y),\ r - \pi),$$

where D is aggregate demand, expressed as a function of the real exchange rate, disposable income (Y-t(Y)), and the real interest rate (r-π). Note that the tax bill, t, is also a function of income, Y.

In an open economy with perfect capital mobility, the nominal exchange rate is determined by the covered interest rate parity condition:

$$(2) \qquad E = E^e/(1 + r - r^*),$$

where E^e is the expected future nominal exchange rate, and r^* is the world interest rate.

The domestic inflation can be determined by a variety of functions. To introduce the roles of exchange-rate expectations and wages, we can model the expected rate of inflation π^e as follows:

$$(3) \qquad \pi^e = a\,\pi^e_N + (1\text{-}a)\,\pi^e_T,$$

where π^e_N stands for the expected rate of nontradable inflation and T for tradables, and a is the share of domestic consumption dedicated to nontradables.

Assuming that nontradable inflation is determined by the rate of change of nominal wages (w) and by the extent of excess aggregate demand relative to the full-employment income (Y^*),

$$(4) \qquad \pi^e_N = w + b(D - Y^*),$$

where b is the slope of the aggregate supply curve in the price-quantity space. Assuming that expected tradable inflation is equal to the expected rate of nominal depreciations (e),

$$(5) \qquad \pi^e_T = e,$$

and by substituting equations (4) and (5) into equation (3), we see that domestic inflation is determined by:

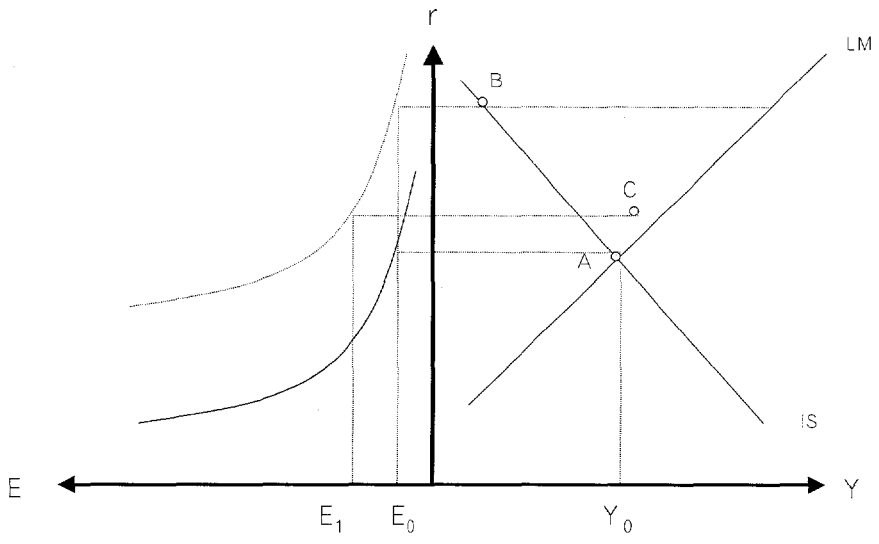
$$(6) \qquad \pi^e = aw + ab(D - Y^*) + (1\text{-}a)\,e$$

In the goods market equilibrium, income equals demand. Also, since $RER = EP^*/P$, we can substitute equation (2) into equation (1), and also by substituting (6) into (3) and then into (1), income is determined by the following function:

$$(7) \qquad Y = D\,[E^e P^*/\{P(1+r-r^*)\},\ Y\text{-}t(Y),\ r\text{-}aw\text{-}ab(D\text{-}Y^*)\text{-}(1\text{-}a)e\,]$$

In the money market, the demand for liquidity, L, is a function of the income, Y, and the nominal interest rate, r. While the nominal money supply, Ms, is assumed to be exogenous (determined by policy), the real money supply is simply the ratio of Ms to domestic prices, P:

Figure A1.
An Illustration of Policy Dilemmas in a Textbook Keynesian Model with Exchange-rate Expectations



(8) $Ms/P = L(Y, r)$

Diagrammatically, we have an extended Mundell-Fleming model, where the domestic interest rate (or the nominal spot exchange rate) is determined in the foreign exchange market. Figure A1 shows the foreign exchange market on the left side, and the traditional IS-LM schedules on the right side. A speculative attack is then represented by an exogenous increase in E^e, which is illustrated here as an upward shift of the equilibrium foreign exchange schedule. After this happens the national economic authorities have several options. First, they can intervene in the foreign exchange market, which, assuming no sterilization, results in a decline in Ms. This is illustrated by the leftward shift of the LM schedule until the domestic interest rate equals the world interest rate plus the expected rate of depreciation of the currency at point B. This is the equivalent of a tight monetary policy aiming to defend the currency. The idea is that the rise in E^e is thought to be temporary, and thus the defense of the currency and showing a willingness to defend it eventually eliminate the expectations of devaluation. When this happens, the LM curve can return to its original position after the attack ends.

Alternatively, the authorities could let the exchange rate go. If the RER changes, the demand for home-produced goods and services rises, as per equation 7. Ignoring the effects of this policy on w and on π^e (as per equation 6), the IS curve would shift to the right, while the equilibrium r falls as E approaches E^e. Once we consider the fact that such a policy would raise P — a once-and-for-all increase, since we are ignoring equation 6 — we would reach a point such as C, which would result in lower domestic interest rates (both nominal and real) and a slight expansion of income.

When we consider the inflation dynamics specified in equation 6, we see that the expected rate of inflation would rise, depending on how this policy affects the rate of growth of nominal wages (w) and the extent of excess demand for home-produced goods. If π^e rises then domestic inflation would rise in tandem with expectations, diluting the real exchange-rate depreciation. When this happens, it is possible that E^e may rise again, especially in cases where the original increase in E^e had been caused by a perceived overvaluation of the real exchange rate. In the extreme case there would actually be no change in the RER, with rising inflation resulting in a decline of the real money supply, leading to a point B, despite the nominal devaluation. That is, the IS would not shift, because the RER did not change, but the LM shifts to the left as a consequence of the rise in domestic prices. Finally, an increase in the demand for liquidity for a given range of Y could arise as a consequence of financial distress, which would also lead to an upward shift of the LM curve. This illustration helps to shed some light on why it is likely that increases in domestic interest rates may be associated with both successful and unsuccessful speculative attacks against emerging market currencies.

APPENDIX B.

A Suggestive Rank-Correlation Analysis

Throughout this paper we have attempted to evaluate whether the performance of simple macroeconomic indicators can explain why one set of countries experienced a more severe economic decline than another set of countries. There is one explanation that we can discard at the outset: Since the nominal devaluations in Asia were more successful than in Latin America in terms of producing real exchange-rate variations, we cannot conclude that inflation inertia in Asia (which was high in Indonesia and Thailand) was an important explanation of the deeper economic downturn experienced by these economies. To summarize our findings, we look at the extent to which the country rankings produced by our "explanatory" variables conform to the country rankings of economic decline, which are shown in Table B1. The following paragraphs explain these country rankings.

ECONOMIC DECLINE RANKINGS

The first task in this exercise is to rank our cases according to the magnitude of the economic decline. For this purpose, we would like to capture both the speed of the decline and the overall decline after a given period of time. These rankings, therefore, were constructed from two rankings. First, based on the evidence presented in Figure 2, each country was ranked by how low the average index of the decline in the growth rate of IP was during the 12 months after the crises. Second, based on the evidence presented in Figure 1a, each country was ranked by the magnitude of the percentage decline of GDP during the first year after the crisis.[24] These two rankings were then averaged, and the economic decline ranking was calculated by ranking the resulting averages. The country that was ranked the highest in terms of the average of the two previous rankings was the country with the fastest and deepest fall in economic activity.

COUNTRY RANKINGS: EXPLANATORY VARIABLES

Indexes of Speculative Pressure. Each country was ranked according to the average levels of the ISP1 during months 0-4, based on the evidence presented in Figure 3a.

Change in CAB/Y. Each country was ranked according to the magnitude of the change in the CAB relative to GDP, based on the data presented in Table 1. The country with the highest change in CAB relative GDP received the first ranking.

Fiscal Impulse. Countries were ranked according to the magnitude of the fiscal impulse as presented in Table 3, with the country with the smallest fiscal impulse receiving a ranking of "1".

Tight Money. Each country was ranked according to the level of the real M1 and credit indexes at month 12, and according to real deposit and money market interest rate indexes at month 3. These four rankings were then averaged, and the final ranking was derived from these averages. The country with the lowest M1-credit indexes received a one, and the country with the highest real interest rate indexes received a "1".

Financial Structure. Based on the information provided in Table 2 (concerning the incidence of foreign liabilities relative to GDP, net foreign asset positions of the banking systems over GDP, the incidence of short-term foreign liabilities, and the ratio of credit to private sector over

Table B1.
Country Rankings

	Economic Decline	*ISP 1*	*Fiscal Impulse*	*Tight Money*	*Financial Structure*	*Ex-ante Credit Growth*	*Change in CAB/DP*	*Ex-ante Investment Rate*	*Exports Volume*
Argentina	5	6	2	2	6	4	6	4	6
Brazil	6	2	4	2	5	6	4	6	4
Mexico	4	1	3	1	4	2	3	5	5
Indonesia	2	3	6	5	2	1	5	3	2
Korea	3	5	5	4	3	5	2	2	3
Thailand	1	4	1	5	1	3	1	1	1

Source: Author's calculations

GDP), each country was ranked according the magnitude of these indicators. These rankings were averaged, and a new set of rankings was derived from the latter.

Ex-ante Credit Growth. Countries were ranked according to the ex-ante cumulative growth rate of real credit to the private sector as reported in Table 2. The country with the highest index was ranked number "1".

Low Growth of Export Volume Rankings. Countries were simply ranked according to the level of the index of export volume at month 7, as presented in Figure 4. The country with the lowest index was ranked number 1.

Initial Composition of Demand. Countries were ranked according to their ratios of Gross Domestic Investment over GDP in the year (or four quarters) immediately preceding the crises.

The rank-correlation analysis can be done with boxes with 45 degree lines that show how closely the rankings of each one of the possible explanatory variables match the rankings of economic decline. Each figure presented in the text is accompanied by a DI that is the average of the deviations from the 45 degree line; the higher the DI the lesser the explanatory power of a particular set of variables.

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NOTES

[1] Among the many analyses of the causes of the Asian crises, see Corsetti, et al. (1998), Radelet and Sachs (1998), and Perry and Lederman (1998). Corsetti, et al. argue that the Asian crises were caused by weaknesses in Asian "fundamentals," while Radelet and Sachs place greater emphasis on the instability of international capital flows. Perry and Lederman emphasize the interaction between a perverse incentive structure affecting domestic private agents and the partial (and ill-sequenced) liberalization of (volatile) international capital flows. The three studies emphasize the important role played by rollover or liquidity risks, usually reflected in high ratios of short-term external debt over reserves.

[2] Brazil accepted an IMF adjustment program in November 1998, but not immediately after its currency was attacked in October 1997.

[3] See, for example, chapter 8 in Edwards (1989).

[4] According to Ding, et al. (1998), a "credit slowdown" can be defined as a decline in credit growth, and a "credit crunch" implies a reduction of credit availability for a given range of interest rates.

[5] See Appendix A for a simple formalization of these arguments.

[6] In both graphs, quarter number 1 corresponds to the quarter immediately following the currency crises; that is, 1995Q1 for Argentina and Mexico, 1997Q3 for Thailand and Indonesia, and 1997Q4 for Brazil and Korea. The estimates are based on quarterly GDP data at constant domestic prices. For Thailand, we use annual GDP growth rates in Figure 1a only, due to the lack of quarterly data. For Korea, the series is based on actual quarterly observations through 1998Q3 (i.e., through quarter number 4 in Figures 1a and 1b), but the observation for 1998Q4 is based on preliminary estimates provided by World Bank staff in December 1998.

[7] Indonesia's data are quarterly.

[8] The extent of speculative pressure against a currency must be reflected in nominal depreciations, and/or declines in reserves and/or increases in domestic interest rates.

[9] Corsetti, et al. (1998), use a weighted average of only the change in reserves and nominal exchange rates due to (1) fears about the comparability of interest-rate data across countries, and (2) nominal interest rates are often affected by sterilization operations, thus concealing some of the effects of speculative pressures. Frankel (1997) argues that in a simple textbook model of an open economy with less-than-perfect capital mobility, sterilization operations do not affect the domestic interest rate when the source of the original disturbance was a change in international interest rates. Our estimates of speculative pressure without interest rates were very similar to the others.

[10] Argentina's low ISP may be due to the fact that they do not include changes in the reserves or dollar deposits of the banking system.

[11] We use 1997Q4-1998Q3 for Indonesia due to the delayed response of its GDP growth rate. For Korea we use 1998 for similar reasons. For Thailand, we use 1998 due to the lack of quarterly data.

[12] Table 2 shows the initial share of short-term debt relative to GDP for our six cases. As an example, consider two countries. One has a CAB deficit of 100 dollars, which is fully financed by short-term inflows; the other has a deficit of the same size, but all of it is financed by loans maturing after one year. Both countries experience a sudden stop of capital inflows, whereby the 100 dollars of inflows suddenly go to zero. In the case of the first country with short-term debt flows, the

CAB would have to move to a surplus of 100 dollars if it does not want to declare a moratorium on its debt payments. The second country would only need to have a CAB of zero, because no debt payments would be due the year following the crisis. Hence, while it is true that for a given sudden stop of capital inflows, the composition of the inflows does not affect the magnitude of the internal adjustment, the composition can influence the magnitude of the current account reversal.

[13] This is a common problem of studies that have attempted to evaluate the usefulness of "tight" monetary policies in crisis situations. Kraay (1998) is an example of an econometric study of many episodes of speculative attacks that attempts to show that "tight" money is neither a necessary nor a sufficient condition to defend an exchange-rate parity. But the author relies on crude definitions of tight money: increases in the discount rate and reductions in the growth rate of domestic credit. The former is imperfect because it is not the only monetary policy instrument, and the latter is a weak proxy because it is possible to observe increases in credit growth with simultaneous increases in market-determined interest rates.

[14] Another important initial condition may be the recent history of inflation. Based on 13 episodes of temporarily high rates (i.e., when rates rose more than 10 percentage points for at least 5 days), Furman and Stiglitz (1998) conclude that interest-rate defenses tend to be more successful in high inflation countries than in low inflation situations. Furman and Stiglitz suggest that high interest rates signal the authorities' willingness to contain inflation, but this positive effect is only relevant for economies with recent inflation problems. It should be noted that in general, but especially in cases with high inflation rates, the effectiveness of monetary policy cannot be judged in isolation, because it is likely that the fiscal policies implemented or announced during speculative attacks can either reinforce or weaken the signaling effects of the monetary stance. The lack of consideration of the accompanying policy announcements has been a major weakness of econometric studies such as Kraay (1998).

[15] There is some econometric evidence to support this proposition. Goldfajn and Gupta (1998) analyze the effectiveness of tight monetary policy in the aftermath of currency crises for 80 countries between January 1980 and January 1998. They find that tight monetary policy (i.e., raising interest rates) increases significantly the probability of reversing a real exchange-rate undervaluation through nominal appreciation rather than through higher inflation. However, they also find that in economies with weak banking sectors (i.e., countries that simultaneously faced a banking crisis) the opposite result holds: tight monetary policies and high interest rates reduce the probability of a reversal through the nominal exchange rate, and inflation becomes the endogenous mechanism that eventually returns the real exchange rate to equilibrium. Thus, high interest rates help defend a currency only if the banking sector is strong enough, say, in terms of capital and/or liquidity provisions, to absorb deteriorating loan portfolios.

[16] See Perry and Lederman (1998).

[17] A more detailed microeconomic analysis would be required to ascertain the types of firms (i.e., tradable versus nontradable sectors) that were responsible for the foreign liabilities. An industrial survey of Thailand conducted by Dollar and Hallward-Driemeier (1998), however, shows that a large portion of short-term foreign liabilities were held by financial companies with loans issued to nonexport firms.

[18] See Claessens, Djankov, and Lang (1998).

[19] World Bank (1998) and Perry and Lederman (1998) argue that the buildup of leverage by the private sector in Asia was associated with weak corporate governance and financial institutions.

[20] Again, Calvo (1998a) points out that a given percent reduction in consumption can be more contractionary than an equivalent fall in

investment when consumption is more intensive in nontradables (or more labor-intensive).

[21] As far as we know, Edwards (1996, 1998) was the first to use recursive estimates of inflationary inertia, but he controls for the influence of "excess" money supply.

[22] It is possible, however, that merchandise import volumes do not decline in the face of major declines in domestic demand when the adjustment is translated into declines in the prices of imports.

[23] The fact that the Asian economies are more integrated and their exports more similar than is the case in LAC is consistent with the findings of Calderón, et al. (1998), who show that the correlation of growth rates of industrial production within Asia are higher than within LAC.

[24] Due to the slow response of GDP growth in Indonesia and Korea, we use their growth rates after five quarters.

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