



ASIAN DEVELOPMENT BANK
Economics and Development Resource Center

CONTAGION: HOW THE ASIAN CRISIS SPREAD

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Foreword

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INTRODUCTION

The Asian financial crisis has spread from Thailand to other East Asian countries and even to Russia and Latin America, despite major differences among the affected countries. Contagion is the general term for this tendency of financial upheavals to move rapidly across borders. This is not the first time contagion has cropped up—Latin America suffered from a bout following the Mexican peso devaluation of 1994-1995, and international financial panics have occurred sporadically over the past 100 years.

Economists do not have a fully satisfactory account of contagion, but there is some agreement on the channels of transmission and sources of vulnerability. This paper presents current views on contagion and attempts to identify patterns in recent episodes. It begins by analyzing the mechanics of an attack on the currency—the central event in a contemporary emerging market financial crisis. It describes current thinking about the channels of contagion and the conditions that make countries vulnerable to the affliction. Finally, the note compares Asia in 1997 with Latin America in 1994-1995.

In an economy with a fixed exchange rate, an increasing current account deficit or a large expiring debt load is likely to cause a drop in foreign reserves. If investors believe foreign reserves are too low for the central bank to maintain the exchange rate, they may sell local currency assets for dollars to be safe, or even borrow local currency in hopes of paying it back later at a cheaper rate—an operation known as selling short. If the central bank runs out of reserves it must let the currency float. When this happens the currency usually falls much further than fundamentals seem to warrant. The shock from the currency slide may subject other countries to a strong blast of contagion.

Trade links are the most direct channel of contagion. When one country devalues its currency in response to an attack, there is a negative impact on the current account balances of its trading partners, making them in turn more vulnerable. Financial markets are also major avenues for contagion. Panic sales of assets in an

afflicted country lead investors to take money out of erstwhile healthy markets to cover their losses. And a financial panic in one country may change some investors' beliefs about the financial health of a country with apparently similar characteristics, causing other investors to withdraw capital for fear of a run on the central bank.

Contagion associated with the Asian financial crisis of 1997-1998 has been more virulent than the Tequila effect of the 1994-1995 Mexican peso crisis. In part, that is because the United States had a powerful incentive to cover expiring Mexican obligations, making the US Treasury effectively a lender of last resort for Mexico. The much lower levels of financial leverage in Latin economies compared with Asia also acted as a shock absorber during Tequila, allowing central banks to raise interest rates to foil speculators without shutting off domestic credit. In many cases—most notably in Argentina—Latin governments responded to attacks more decisively than their Asian counterparts, giving confidence to the markets.

CURRENCY CRISES AND SPECULATIVE ATTACKS

The central event in the Mexican peso crisis of 1994-1995, and again in the Thai crisis of 1997, was a rapid depreciation from a fixed exchange rate. To understand contagion, it is useful to know the main dynamics of currency crises.

To maintain a specific exchange rate, a government (in most cases, the central bank) must stand willing to buy or sell its own currency in exchange for gold or foreign currency at the fixed rate. That means the government must maintain a stock of foreign reserves—usually US dollars. If reserves are exhausted because too much of the domestic currency is presented for redemption to the central bank, the government loses its ability to set the exchange rate. The rate then floats, generally depreciating rapidly, and often sliding past the level where it would have traded if it had never been fixed initially.

The evolution of the reserve stock is determined by two basic quantities: the current account and the capital account. If the current account (essentially equal to exports minus imports minus

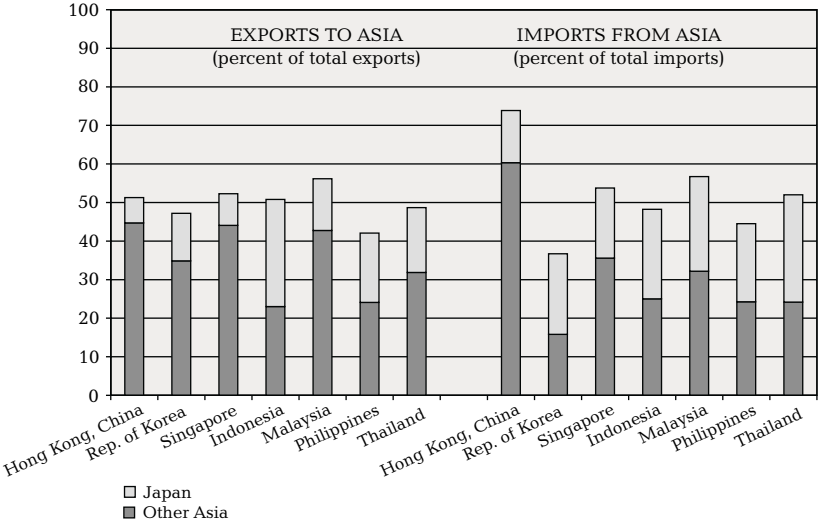
interest payments on the country's foreign debt) is in surplus, reserves will increase, all else being equal. But the capital account, which consists primarily of financial flows, also affects reserves. Inflows of foreign investment, or foreign purchases of equities, increase reserves. Also debt inflows—in the form of foreign currency borrowed by private corporations or by the government—will increase the reserve stock. The problem is that many capital inflows—sales of equity, domestic debt instruments, or dollar-denominated short-term debt—can reverse quickly.

Fixed exchange rate regimes get into trouble when reserves start to fall—most often because of a large current account deficit, a drop in foreign investment, or lenders' reduced willingness to roll over the country's debts. If investors think the reserve decline will continue, they may decide to sell their assets now to redeem them for dollars at the fixed rate, before the currency depreciates. That accelerates reserve loss. Other traders may see a chance to profit from a depreciation by borrowing the local currency and changing the proceeds into dollars now, in the hope of repaying their newly acquired local currency debts cheaply when the exchange rate drops (known as taking a short position, or shorting the currency).

Sales of domestic currency in the expectation of a depreciation—or even in order to provoke one—constitute a speculative attack. Thailand was the target of a series of speculative attacks before it finally let the baht float in July 1997. Brazil experienced a severe speculative attack in October 1997, but maintained its peg by adopting textbook defensive measures. To shore up the capital account, it doubled domestic interest rates. That raised the return for investors keeping their money in domestic currency and made it more expensive to borrow funds to short the currency. The interest rate increase also reduced import demand by slowing down the economy. In addition, the government introduced an emergency deficit reduction package. That was intended to reduce Brazil's demand for overseas savings, thereby contracting the current account deficit.

Although it is possible for contagion to spread in the absence of a nominal depreciation, the more severe episodes of contagion in emerging markets typically involve fear of depreciation, as was the case in Brazil.

Figure 1: Asian Trade as a Percentage of Total Trade, 1996



Source: IMF, *Direction of Trade Statistics* (1998).

CHANNELS OF CONTAGION

Distinguishing among the channels of contagion can be hazardous. In an emerging market selloff many channels seem to be working at once, particularly when new information hits the market. Nevertheless it is useful to identify the different ways by which contagion can spread. It is also worth recognizing that sometimes what appears to be contagion is just separate markets reacting to a common external shock—for example, to the 1994 rise in US interest rates, or to the oil price increases of the 1970s.

Trade Links

Trade links provide a natural channel for financial contagion. Consider the Thai devaluation. Last year’s fall in the baht made Thai exports cheaper to foreign buyers. For countries such as Indonesia that compete in export markets with Thailand, that means foreign demand for exports falls as importers in the US and Japan switch to the now-cheaper Thai goods. Lower exports imply an increase in

Indonesia's current account deficit—a financing gap that Indonesia must make up by borrowing more overseas. If foreign investors are unwilling to expand Indonesia's implicit line of credit, Indonesia must cover the financing gap out of its foreign reserves. But a reduction in reserves leaves Indonesia with fewer dollars to defend the rupiah, which reduces confidence in the currency and makes Indonesia an easier target for currency traders betting on a rupiah devaluation.

The baht's devaluation also raises the cost of imports in Thailand, which reduces Thai imports from (for example) Laos. That raises the Lao current account deficit and puts pressure on the Lao currency. Also, because the Thai devaluation was accompanied by a Thai recession, Thai import demand fell by even more than the devaluation alone would suggest, reinforcing the contagion effect.

Of course, even though Thai exports did not rise immediately after the baht devaluation, Indonesia was quickly affected. From the perspective of financial markets, it is not actually necessary for Thai exports to rise. It is sufficient for investors to expect that they will rise, which will cause prices for Indonesia's exports to fall, increasing Indonesia's trade deficit. Investors who expect the Indonesian currency to depreciate rapidly in the future will sell rupiah that they hold, or even sell rupiah short (see "Currency Crises" above for an account of selling short), right now. Those sales can precipitate a sudden devaluation right away.

Financial Channels

Liquidity Effects

Even when trade links to the crisis country are insignificant, contagion may spread through financial channels. That occurred in October 1997 when US investors in emerging market mutual funds sold their shares in response to falling markets in Asia. Fund managers in turn sold appreciated Latin American stocks to meet redemption orders rather than selling depreciated Asian shares. In Latin America's relatively thin markets, the impact of such actions by foreign asset managers can be dramatic.

Global investors within crisis countries also spread bear markets. In December 1997, as Republic of Korea (henceforth

Korea) came under attack, Korean investors liquidated holdings of Latin American Eurobonds in order to cover their dollar obligations. As prices on Brazilian and Argentine dollar-denominated bonds fell, Brazilian banks that had purchased the bonds on borrowed funds were forced to sell Brazilian local currency denominated assets for dollars, reducing the Brazilian Central Bank's stock of foreign reserves and making Brazil a target for attack. These episodes show how a sudden drop in liquidity brought about by falling prices for one kind of asset may induce a fire sale of other assets, even with no change in fundamentals.

Financial Volatility

Volatility is another possible source of financial contagion. IMF economist Pierre-Richard Agénor (1997) has developed a model of contagion in which an increase in financial volatility—of the kind that accompanies a crisis anywhere—leads to an increase in lending rates worldwide. That happens because rising volatility reduces the payments lenders receive in the worst states of the world, but does not raise returns when things go well. Lenders raise interest rates to compensate for the resulting drop in expected return, which reduces the total amount of capital supplied worldwide. As capital sources dry up, borrower countries are harder pressed to roll over their debts, which increases uncertainty.

Bandwagon Effects

Reflecting the experience of the Asian and peso crises, economists have developed models of self-fulfilling expectations that explain the seemingly irrational behavior observed in currency crises. Much of that behavior does not appear to be fully explained by direct trade or financial channels. One simple story is that even investors without liquidity problems become less willing to lend after a currency collapse. For example, after the sudden depreciation of the Mexican peso, still-sound foreign banks became disinclined to lend to Argentina. Investors who already held Argentine assets worried about being repaid and pulled money out of the country. To prevent the sudden depreciation of the currency, the government raised short-term interest rates from 10% to 35%, thereby prompting a year-long recession.

But why should events in Mexico make investors apprehensive about Argentina? Conceivably, investors treated the Mexican crisis as new information about countries that seemed similar to Mexico, and lowered their estimates of the chance of repayment on Argentine debt. As a result, even investors who did not change their views about Argentina itself may have been perfectly rational to sell Argentine assets. It could make sense for one investor to sell if he thought other investors would sell, since a large enough wave of selling would force the Argentine Central Bank to abandon its defense of the currency, which would reduce the dollar value of his assets.

Current explanations of contagion often focus on cases where markets may stabilize at one of two or more possible levels. In such situations, the rational choice may be to follow the market, instead of doing what seems warranted by macroeconomic fundamentals. Argentina appeared fairly strong in 1995, as did Korea in 1997. But an investor who held on to Argentine or Korean assets through the ensuing crises probably lived to regret it.

SIGNS OF VULNERABILITY

Contagion presupposes vulnerability in countries that catch the disease. Some countries are never attacked. In some cases, such as in Argentina; Mexico; and Taipei, China after the onset of the Asian crisis, investors begin selling assets, then realize that the chances of devaluation are low and reverse course. Or the central bank can stage an unexpectedly strong response to attack, as in Brazil last November. Of course, as implied above, if investor sentiment is strongly negative, even countries that seem only slightly vulnerable—for example, Korea last year—may be overwhelmed by capital outflows. The following are major indicators of vulnerability.

Exchange Rate Regime

A fixed rate or tightly managed float generally leaves a country more vulnerable to attack than a free float. For traders, that is because a currency peg creates the possibility of a misalignment between the pegged rate and the rate that would prevail without

central bank intervention (see "Currency Crises" above). If macroeconomic fundamentals deteriorate and the central bank's reserves fall, the chances of a forced depreciation increase. That raises the expected gains to a short sale, which makes the exchange rate a profitable target for traders. But with a floating rate any deterioration in fundamentals is priced into daily currency movements, reducing the possible gains to traders of attacking the currency.

Current Account Deficit

The higher the current account deficit, the more capital the government or private firms must borrow or obtain through foreign investment to cover import payments. A sudden increase in the current account deficit, as occurred in Korea in 1996, is therefore a sign of vulnerability. One rule of thumb is to regard a current account deficit over 5% of GDP as a danger sign, but that number is arbitrary. Whether a given current account deficit is in the danger zone also depends on the share of investment goods in imports, the causes of the deficit, and other factors. A high or increasing external debt stock (resulting from past deficits) also indicates vulnerability, since a higher debt entails higher required interest payments.

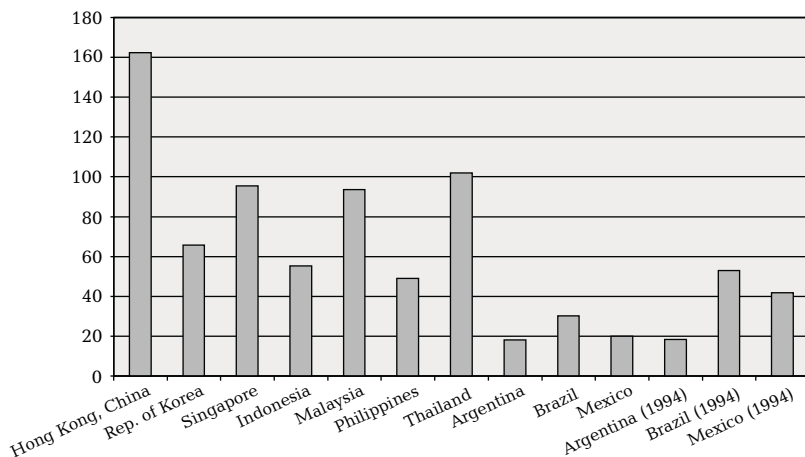
Budget Deficit

A government budget deficit represents national dissavings. Since the current account deficit is equal to the difference between national savings and investment, an increase in the budget deficit—particularly in a fixed exchange rate regime—usually prompts a deterioration in the current account. Danger levels for the budget deficit vary considerably, depending in part on the government's reputation and the stage of the business cycle.

Financial Sector Credit to the Private Sector

The higher the level of bank credit to the private sector (for example, above 100% of GDP), the larger the ratio of bad loans to GDP if interest rates rise sharply. High levels of domestic bank lending therefore act as a constraint on the central bank's ability to raise interest rates in the event of an attack on the currency, since the government may be unwilling to provoke large-scale defaults. This was one of Thailand's problems in responding to attacks on the baht (see Figure 2).

Figure 2: Net Domestic Credit to Private Sector, 1996
(percent of GDP)



Source: IMF, *International Financial Statistics* (1998).

Short-term Debt

Even when a country is close to current account balance, as Korea was in 1997, high levels of short-term debt (usually defined as debt maturing within a year), create vulnerability, since lenders may suddenly decide to stop rolling over loans. A short-term debt stock in excess of reserves is a danger sign.

Forward Sales

Central banks may sell dollar contracts in forward or futures markets in order to bolster the domestic currency. These trades often have the effect of reducing the level of reserves available to resist an attack, or raising the stakes if an attack occurs. Indonesia, Korea, and Thailand all fell into this trap.

Exchange Guarantees

Central banks may also undertake a variety of market operations, such as sales of domestic bonds with an exchange rate guarantee, that have the effect of limiting the government's freedom

to respond in the event of an attack. The prime example is Mexico's sale of dollar-linked bonds (called *tesobonos*) prior to the 1994 peso crisis.

Asset Price Inflation

Economies that have experienced large increases in asset prices—especially real estate and equity prices—may be particularly vulnerable. In part, that is because investors may feel those prices have further to fall. Large increases in real estate prices may be an indication that investments to date have not been allocated productively.

WHY WAS THE ASIAN FLU WORSE THAN THE TEQUILA EFFECT?

The question has been raised why the fallout from the Mexican crisis was milder than the Asian crisis. In fact, trade and financial channels spread contagion during the Mexican peso crisis, just as they did in the Asian crisis two years later. Spreads on Latin dollar-denominated bonds over US Treasuries (the most widely used indicator of country risk) shot up the end of 1994 to 1,500 basis points or more, implying almost certain default. Argentina, Brazil, and other countries in the region drastically tightened monetary policy, and Argentina, as noted above, fell into a severe but brief recession. Nevertheless the extent of the crisis was relatively limited. Some partial explanations follow.

Impact of Debt Servicing Shortfall Reduced by US Support for Mexico

Mexico's proximity to the United States and the Clinton administration's commitment to NAFTA made the United States effectively a lender of last resort to Mexico. That reduced potential liquidity problems in the region. Creditors' worries about the likelihood of repayment on Mexican debts were assuaged, allowing spreads on Mexican and other Latin bonds to compress fairly rapidly. Despite the IMF's commitment to Indonesia, Korea, and Thailand it appears East Asia lacks a similar lender of last resort.

Healthy Financial System—Low Ratio of Domestic Credit to GDP in Latin America

Domestic credit to the private sector was about 20% of GDP in Argentina, 40% of GDP in Mexico, and 50% in Brazil, at the time of the Tequila crisis. That ratio was about 100% for Malaysia, Singapore, and Thailand, and 60% for Korea, when the Asian crisis hit (see Figure 2). Central banks in Latin America therefore had room to raise interest rates without precipitating a wave of defaults.

Market Credibility Enhanced by Decisive Action

Argentina made it clear from the beginning of the Tequila crisis that it would contract monetary policy as far as necessary to defend the dollar peg, whatever the cost in unemployment. Mexico tightened monetary policy, floated the peso, and moved quickly to take over the bad foreign currency debts of its private firms. By contrast some Asian countries tried to defer the pain of reform.

Capital Controls

Argentina imposes virtually no capital controls, but Chile restricts short-term capital inflows, while Brazil imposes several different restrictions on inflows and outflows. In 1995, and again in 1997, anecdotal evidence suggests that Brazilian and Chilean controls may have slowed down speculative flows.

REFERENCES

- Agenor, P.R., 1997. Contagion and Volatility with Imperfect Credit Markets. IMF Working Paper. International Monetary Fund.
- International Monetary Fund, 1998. *Direction of Trade Statistics*. Washington D.C.
- _____, 1998. *International Financial Statistics*. Washington, D.C.

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