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The 35 Most Tumultuous Years in Monetary History: Shocks, the Transfer Problem, and Financial Trauma

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The past 35 years have been the most tumultuous in international monetary history. Nearly one hundred national banking systems collapsed, many more than in any comparable previous period. The range of movement in market exchange rates and the extent of the deviations of market exchange rates from real exchange rates—the magnitude of "overshooting" and "undershooting"—have been larger than in any previous period. Similarly, the variability in the ratios of trade balances to GDPs has been larger than in any previous period. There were massive asset price bubbles in Japan; in Sweden and two of its Nordic neighbors; in Thailand, Malaysia, and several other countries in Southeast Asia; and finally in the United States.

These events—the failures of national banking systems, the large swings in market exchange rates, the large variability in flows of national saving across national boundaries, and the bubbles in asset prices—were systematically related.

This essay applies an analysis based on the transfer problem process that links changes in the cross-border flows of funds, changes in the foreign exchange values of national currencies, changes in the prices of financial securities and real estate in countries that experience inflows of foreign funds, and prolonged economic booms to explain why there was so much financial trauma. A central question is whether the financial trauma resulted because the shocks were larger than in previous periods, or whether the impact of a shock of a given magnitude on prices of currencies and prices of securities and other assets was larger because of difference in the institutional structures and especially the absence of parities for national currencies. [JEL H87, N10, N20]

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The past 35 years have been the most tumultuous in international monetary history. The banking systems in one hundred countries—including Japan, Mexico, Finland, Sweden, Republic of Korea, Thailand, Russia, and Brazil—collapsed in one of three waves; the first wave began in 1982 and involved Mexico, Brazil, Argentina, and many other developing countries. The second wave began in 1990 and included Japan, Sweden, and several other Nordic countries. The third wave began in 1997 and involved Thailand and its neighbors in South Asia, as well as Russia in August 1998. The combined loan losses of the banks in some of these countries ranged from 30 to 40 percent of their governments' annual budgets. The range of movement in the foreign exchange value of national currencies has been larger than at any previous time. Moreover, the deviations of market exchange rates from real exchange rates—the extent of "overshooting" and "undershooting"—have been greater than in any previous period. Since the late 1990s the inflation rates in the United States and in the countries that share the euro have been similar and low, and yet the price of the euro in terms of the U.S. dollar has varied by nearly 50 percent. The deviations of market exchange rates from real exchange rates for many of the emerging market countries have been much larger than when these countries' currencies were pegged.

There have been more asset price bubbles[1] than in any previous period. The bubble in real estate and in stocks in Japan in the 1980s was the "mother of all asset price bubbles" as measured by both the increase in the ratio of household wealth to GDP and the increase in the value of Tobin's Q. The bubbles in real estate and in stocks in Finland, Norway, and Sweden in the second half of the 1980s were much larger than these countries had ever experienced before. There were bubbles in real estate and in stocks in Thailand, Indonesia, Malaysia, and several nearby countries in the first half of the 1990s. The United States experienced a bubble in stock prices that began a year or two before Chairman Greenspan's remark about "irrational exuberance" and continued until 2000; the increase in the Q ratio for U.S. stocks in the 1990s was much greater than in the 1920s.

The collapses of national banking systems, the asset price bubbles, and the scope of overshooting and undershooting of currencies in the foreign exchange market were systematically related. The extensive range of movement in the values of national currencies in the foreign exchange market and the scope of overshooting and undershooting resulted from the large variability in cross-border flows of money and the sudden reversal in the direction of these flows. The bubbles in real estate and in stocks in Tokyo in the second half of the 1980s were a unique Japanese event (although the United States encouraged the financial liberalization that contributed significantly to the bubbles). The other asset price bubbles were systemat-

[1]This paper applies the term "bubble" to a pattern of cash flows that cannot be sustained for an indefinite period. A bubble in the real estate market involves a rate of increase in real estate prices in excess of the interest rate on the funds borrowed to finance the purchase of real estate. Similarly, a bubble in the international money market involves a rate of increase in a country's external indebtedness in excess of the interest rate on the country's indebtedness. A bubble in the stock market involves a rate of increase in stock prices that far exceeds the rate of growth of corporate profits.

ically related to the bubbles in Japan in two ways. The bubbles in the Nordic countries resulted from the coincidence of the liberalization of financial regulations in Tokyo that permitted Japanese banks to rapidly expand the number of their foreign branches at a time when Finland, Norway, and Sweden were liberalizing the regulations that had limited the ability of their domestic banks to borrow abroad. The bubbles in Thailand and the other Asian countries in the mid-1990s followed from the implosion of the bubbles in Japan and from the monies that sloshed to these countries from Tokyo, while the bubble in U.S. stocks in the second half of the 1990s gathered momentum from the inflow of funds from the Asian countries that followed the implosion of their bubbles.

The failure of the banks and other financial institutions resulted from large losses that were incurred by the borrowers in individual countries both when the asset price bubbles imploded and when their national currencies depreciated sharply in the foreign exchange market. In the preshock years, these countries had experienced sustained inflows of savings that led to both the real appreciation of their currencies and the increase in the prices of securities traded in the country.

The booms that resulted from the inflow of money from abroad may have clouded recognition that the magnitude of these inflows was not sustainable. As long as the inflow of foreign funds increased, the scope of overshooting increased, and the countries developed increasingly large trade deficits. The inference from the national income accounting identity is that their domestic economies adjusted to the increases in the inflows of funds by some combination of increased domestic investment, increased domestic consumption (which meant that domestic savings rates declined), and governments' increased fiscal deficits. Most countries experienced economic booms when the inflow of foreign saving was increasing, and usually the governments' fiscal deficits declined (unless the inflow of money from abroad was a direct response to increases in government borrowing). The primary adjustment to the increase in the inflow of funds was greater household consumption; this mechanism—increases in asset prices leading to increases in household wealth—continued until the decline in domestic savings matched the increase in the inflow of funds. The economic booms resulted primarily from the increase in consumption spending in response to the increase in household wealth and secondarily from the increase in investment spending.

The cross-border cash flows had a "good news"/"bad news" flavor. The cash inflows in the "good-news period" were not sustainable; some of the borrowers obtained all of the cash needed to pay the interest on outstanding loans from new loans. An adjustment was necessary to reduce the growth rate of indebtedness relative to the growth rate of GDP. A decline in the inflow of funds to a country would result in a decline in the value of its currency in the foreign exchange market, which triggered the realization that the borrower's indebtedness was too large.

The reversal of the pattern of cross-border flows and the depreciation of the currency in the "bad-news period" often led the currency to undershoot its long-run equilibrium value as the structures of imports and of exports adjusted to the change in the relationship between domestic and foreign prices. The large depreciation of the currencies was the trigger for massive revaluation losses on loans denominated in foreign currencies.

This paper seeks to explain why the past 35 years have been so tumultuous. One of the major questions is why the cross-border capital flows that led to the deviations of the prices of currencies and of securities from their long-run equilibrium values persisted for such extended periods. Were the shocks in the past 35 years larger than the shocks in previous periods, or did the shocks of a given magnitude have a greater impact on prices of securities because the adjustment process when currencies are not pegged differs from the process when currencies are pegged?

This paper summarizes six national episodes that led to large changes in prices of currencies and of assets and large loan losses for different groups of investors and lenders. It also reviews the operation of the transfer problem in response to shocks both when currencies are pegged and when they are floating.

I. Six Traumatic Financial Episodes

The six countries reviewed in this section experienced economic booms; five of the six countries received increasingly large flows of funds from abroad. (The sixth country is Japan; its current account surplus declined as its economic boom gathered momentum.) One of the major questions is whether the booms in these countries were like magnets that attracted funds from abroad, or whether the inflows of funds were an autonomous factor that contributed significantly to the economic booms. An explanation is needed for the mechanism that linked the increase in the inflow of funds to the booms.

The first episode reviewed is the surge in loans from major international banks to governments and to government-owned firms in Mexico and other developing countries that began in 1972. For the next 10 years, bank loans to these borrowers increased at an average annual rate of 30 percent; the indebtedness of the borrowers increased at an annual rate of 20 percent. These countries developed increasingly large current account deficits, and the ratios of their current account deficits to their GDPs increased.

In 1982 the price of the U.S. dollar increased by 60 to 70 percent in terms of the Mexico peso, the Brazilian cruzeiro, the Argentine peso, and the currencies of 15 other developing countries.

In terms of the stylized textbook model that distinguishes between countries as young debtors and mature debtors and young creditors and mature creditors, these developing countries were young debtors with trade deficits and current account deficits; they obtained the funds to pay the interest on their external indebtedness from their foreign creditors. (An analogy can be made between the external accounts of these countries and the fiscal balance of a government; a government with a primary fiscal deficit borrows all of the money necessary to pay the interest on its outstanding indebtedness.) The cash flows were not sustainable; the implication was that eventually these countries would evolve into mature debtors with trade surpluses that would provide part of the cash necessary to pay the investment income to their foreign creditors. This inevitable transition from trade deficits to trade surpluses almost certainly would have involved real depreciation of the borrowers' currencies.

Several different explanations have been offered for why the major international banks were so eager to increase their loans to Mexico and the other developing countries. One story was that the banks were "recycling petrodollars"; thus, the deposits of some major oil-exporting countries in the major international banks were increasing rapidly, and the story line is that the banks scrambled to find attractive borrowers. A second is that Mexico and other developing countries were growing rapidly, so their debt-servicing capacity was increasing even as their external indebtedness was increasing. A third is that banks headquartered in various European countries and in Japan wanted to increase their share of the market for bank loans in what traditionally had been the turf of U.S. banks in Latin America, and that U.S. banks responded by setting the terms of the loans to maintain their market shares. A fourth is that U.S. banks wanted to increase their assets more rapidly than they could in their traditional local and regional domestic markets; in effect, they wanted to circumvent the domestic regulations that limited the growth rates of their deposits.

The growth rate of bank loans slowed when U.S. interest rates surged at the end of 1979. Borrowers in the developing countries more or less immediately seemed overextended as measured by the ratios of their external indebtedness to their GDPs and their debt-service payments to their export earnings. Because the lenders would no longer increase their loans to the borrowers, the borrowers did not have the cash to pay the interest on their indebtedness, and their currencies depreciated sharply.

The second episode involves the surge in the prices of real estate and stocks in Japan in the 1980s, which led to surges in the ratio of household wealth to GDP and in the Q ratios of Japanese firms. Real estate prices in Japan had been increasing throughout the 1950s, 1960s, and 1970s; real estate and stocks were the major asset classes with positive real rates of returns. Financial regulations kept interest rates paid to household savers below the inflation rate; the real rates of return on virtually all debt instruments were negative.

The bubble in Japanese asset prices followed financial liberalization. One motive for financial deregulation was that industrial firms no longer needed access to credit on preferential terms, and another was that the U.S. government was leaning on the Japanese government to open up its financial market to foreign firms. Financial deregulation enabled Japanese banks to rapidly increase their real estate loans to compensate for the decline in the growth rate of loans from industrial firms.

Real estate companies in the 1980s then accounted for a relatively large share of the market value of stocks traded on the Tokyo Stock Exchange; as real estate prices increased, so did the value of their assets. These companies are like mutual funds, and so the market value of their stocks increased as the value of the real estate in their portfolios increased. The boom in real estate prices led to a rapid increase in the activity and market value of construction firms. The Japanese banks owned large amounts of real estate and stocks; as the prices of real estate and stocks increased, the value of bank capital increased. The increase in the value of bank capital meant that the banks could expand their loans quickly. Industrial firms recognized that the profits from owning real estate and stocks were much higher than the profits from making steel and autos, and so they borrowed to buy real estate.

Japan boomed; it was "Japan as Number One," the Beginning of the Pacific century. Japan seemed to have a perpetual-motion machine. Bank loans were based on the value of real estate as collateral, and as the value of collateral increased, the owners of the stocks and real estate borrowed even more so they could buy more real estate and more stocks.

Many of the purchasers of real estate, especially in the last several years of the 1980s, had a "negative carry," meaning their interest payments on the money borrowed were larger than the net rental income; similarly, the interest rate on the money borrowed to buy stocks was larger than the dividend income. These borrowers obtained the money needed to pay the interest on new bank loans.

The bubble in asset prices in Japan had several external impacts. Japanese foreign investment surged; in the first half of the 1980s Japanese real estate companies bought U.S. and European real estate. Japanese banks rapidly expanded their foreign branches; these branches in turn rapidly increased their loans as they sought to generate the interest income that would lead to the level of revenues that would cover their costs.

In January 1990 the incoming governor of the Bank of Japan instructed the banks to limit the growth rates of their real estate loans to the growth rates of their total loans. Some real estate investors were no longer able to get the funds to pay the interest on their outstanding loans from the banks in the form of new loans, and they became distress sellers. Real estate prices began to decline, and the bubble popped.

The third episode involves the bubble in real estate prices and stock prices in Finland, Norway, and Sweden in the second half of the 1980s, about the same time as the asset prices were frothing in Japan. The increase in stock prices in Finland and Sweden in the 1980s was more rapid than the contemporary increase in the stock prices in Japan. The causal aspect of this coincidence was that the exchange controls that limited the Japanese purchases of foreign securities were removed at about the same time as were the controls that limited the foreign borrowing by the banks headquartered in these Nordic countries. Finland and Sweden developed larger current account deficits in response to the inflow of funds. The hypothesis is that the branches of Japanese banks in London and other offshore centers were eager to grow their loans to cover their fixed costs; they were "price cutters" in the markets for loans and charged smaller markups over the costs of funds than other banks. Stock prices declined in these three Nordic countries at the same time that stock prices declined in Japan.

The fourth episode centers on the Mexican financial renaissance in the early 1990s, which involved an aggressive policy of privatization, macrostabilization, and liberalization to prepare Mexico for entry into the North American Free Trade Association. The overhang of bank loans that had been in default throughout the 1980s had been funded into Brady bonds. The flow of foreign funds to Mexico accelerated; the Mexican peso appreciated in real terms even as it depreciated in nominal terms because of the much higher inflation rate in Mexico than in the United States. The macrostabilization policy that brought the inflation rate down from 130 percent to less than 10 percent involved very high nominal and real interest rates, which attracted funds from U.S. money market funds. Foreign firms established subsidiaries in Mexico to serve as supply platforms for the U.S. and Canadian

markets. Foreign firms began to acquire some of the newly privatized Mexican firms. Mexico's current account deficit increased to 7 percent of its GDP in 1994. Mexican stock prices doubled during this period. Mexico's external debt was 60 percent of its GDP; the cash to make the interest payments to the foreign creditors was obtained from the inflow of new foreign funds.

In 1994 the flow of foreign funds to Mexico stalled in response to several political incidents in a year of presidential transition. Analysts believed that the peso was overvalued, perhaps by 15 or 20 percent. The Bank of Mexico lost the capacity to support the peso in the foreign exchange market, and the currency lost more than half of its value in three months. Mexican stock prices fell sharply, and the banks—which had been privatized a year or two earlier—failed.

The fifth episode involves the asset price bubble in Bangkok, Kuala Lumpur, Jakarta, Hong Kong SAR, and several other countries in the region. The implosion of the bubble in Japan led to an increase in the flow of funds from Japan. The Japanese yen appreciated in response to the surge in export growth (the export supply function was shifting to the right) that followed from the sharp decline in the realized rate of economic growth. Japanese firms responded to the real appreciation and the decline in profitability on exports by increasing their investments in productive capacity in China and other nearby countries, primarily to serve established export markets in China, Thailand, Malaysia, and the other countries in Southeast Asia. The Japanese economy was being "hollowed out" in response to the real appreciation of the yen, much as the U.S. economy had been hollowed out by the real appreciation of the U.S. dollar in the first half of the 1980s. The Japanese banks followed the Japanese firms in their investments in South Asia.

The World Bank published *The East Asian Miracle* in 1992. Stock prices in most of the countries in the region doubled in 1993. Even though the ratios of savings to GDP in these countries were high, the flow of funds to these countries surged and the ratios of their trade deficits to their GDPs increased. The countries were young debtors; they obtained the funds to pay the interest on their indebtedness from their creditors.

Then the large losses on the rapidly expanded consumer loans in Thailand at the end of 1996 led to a sharp decline in the inflow of foreign saving. The Thai decision to stop supporting the baht in the foreign exchange market at the beginning of July 1997 triggered the contagion effect, and the flow of funds to the other Asian countries slowed or was reversed. The depreciation of the Asian currencies led to a remarkable reversal in their trade balances, and a counterpart was an increase in the U.S. trade deficit of $150 billion.

The sixth episode involves the bubble in U.S. stocks in the second half of the 1990s. Between 1982 and 1992, U.S. stock prices increased in every year but one and were four times higher in the latter year than in the former year; stock prices increased again in 1993. Then the United States began a remarkable economic expansion; the inflation rate, the unemployment rate, and the fiscal deficit declined. In December 1996, when Chairman Greenspan commented on "irrational exuberance," the Dow Jones Industrial Average was at 6,600 and the Nasdaq was at 1,300. The U.S. current account deficit was 1.4 percent of U.S. GDP, and the U.S. fiscal deficit was 0.8 percent of U.S. GDP.

The financial meltdown in Asia in 1997 led to a surge in the U.S. current account deficit from $196 billion in 1997 to $343 billion in 1999, about 1 and ½ percent of U.S. GDP. The Federal Reserve eased credit in the second half of 1998 in response to the financial debacle in Russia and the collapse of Long-Term Capital Management, then the largest U.S. hedge fund; the Fed provided more liquidity in 1999 in anticipation of the Y2K problem. U.S. stock prices increased rapidly in 1998 and again in 1999; there was a great deal of attention paid to information technology, the computer revolution, and the dot-coms. The increase in the value of stocks traded on the Nasdaq was much more rapid relative to the value of stocks traded on the New York Stock Exchange. The United States developed its largest-ever fiscal surplus and its largest-ever trade deficit.

One of the stylized facts common to these episodes is that there is a strong association between asset price bubbles and economic booms. These bubbles led to increases in both investment spending and consumption spending, increases in imports relative to exports, the appreciation of the currencies of the affected countries, and a reduction of fiscal deficits (except in cases such as Mexico in the 1970s, when increases in exports of securities resulted from the increase in fiscal deficits). Another stylized fact is that there is a strong association between the increase in the flow of funds to a country and the appreciation of its currency. A third stylized fact is the association between the increase in the flow of funds to a country and the increase in the growth rate of its GDP. A fourth stylized fact is the association between the increase in the flow of funds to a country and the increases in the prices of securities denominated in that country's currency.

Overshooting was the endemic response to the increase in the flow of savings to a country, and undershooting was the inevitable sequel, either because a sharp change in the environment led to a severe reversal of expectations, or because the lagged response in the goods market led to an increase in competitiveness from the real depreciation. The transition from overshooting to undershooting was especially sharp in the three episodes that involved the developing/emerging market countries.

The pattern of cash flows in each of these episodes was nonsustainable; by definition, whenever there is a bubble the pattern of cash flows is nonsustainable. The real estate bubbles in Japan, the Nordic countries, and Thailand and the other Asian countries involved a nonsustainable pattern of cash flows from bank lenders. The stock market bubbles in the United States and in Japan and the other countries trapped investors who were basing the estimates of anticipated rates on return on their extrapolation of past increases of stock prices or on the projection of sales rather than on the basis of the growth of corporate earnings. Investors in U.S. stocks might have been hunting for the next Microsoft or the next Dell; the likelihood that these stocks as a group could evolve to mirror these great successes was extremely low because it implied a surge in the ratio of corporate profits to GDP to a level much higher than had ever been seen.

II. Financial Trauma and the Transfer Problem

Keynes popularized the transfer problem with his view that the level of reparations imposed on Germany by France and other U.S. allies after World War I was

unrealistic in terms of the German capacity and willingness to pay and the French reluctance to make adjustments so the reparation payments could be effected if Germany had been willing to pay. Keynes highlighted the distinction between the financial transfer of money and the real transfer of goods. The Treaty of Versailles obliged the German government to make increasingly large annual payments for 42 years; it was as if the German government had transferred postdated checks denominated in the French franc to the French government.

Each year the French government would cash the appropriate check on its maturity date, and the German government would be obliged to come up with gold or French francs to ensure that the check would not bounce. At a minimum, Germany would have to achieve a current account surplus or a capital account surplus so it could obtain the appropriate amount of French francs. The German government first would have to increase taxes to obtain the German marks that it would then use to buy U.S. dollars or French francs from the German exporters. The French government could use the French francs obtained from the Germans to reduce the domestic and international debt it had incurred during World War I, or it could reduce domestic taxes.

One of Keynes's points was that the likelihood that the German government would be able to obtain all of the cash necessary to pay the reparations by borrowing in international financial markets was low, because Germany's indebtedness would increase too rapidly relative to its GDP. Germany would have to earn the U.S. dollars from a current account surplus. Keynes's prescient view was that the German government would be unable or unwilling to increase domestic taxes and adjust its economy to produce the appropriately sized trade surplus.

Assume, however, that the German government had been willing and able to make the appropriate domestic adjustments to produce the needed trade surplus, which can be viewed as the necessary condition for the successful payment of reparations. The sufficient condition is that France would have to adjust its economy to produce the matching trade deficit.

The analysis of the transfer problem in the German-French context can be viewed when both currencies are pegged to gold or to some other international reserve asset and when both currencies are floating. Assume initially that both the German mark and the French franc had parities in terms of gold. In this case, all of the real transfer would have to be effected by the combination of a decline in demand in Germany that would lead to an excess supply of goods and an increase in demand in France that would lead to an excess demand for goods. To get the French francs necessary to honor the maturing check, the German government would sell the marks collected from its fiscal surplus to the French firms that wanted to buy German goods. The French government would use these French francs either to repay its domestic and foreign debt or to finance government expenditures. French GDP would have to increase by an amount sufficiently large so that the French current account deficit would match the amount of the cash paid by the German government. Undershooting and overshooting would occur only to the extent that the price level declined in Germany in response to excess supply and increased in France in response to excess demand.

Assume now that both the German mark and the French franc were floating in the foreign exchange market. The German government would raise taxes and then

sell the marks obtained from its fiscal surplus in the foreign exchange market to buy French francs that it would use to buy the maturing postdated check. Germany would develop a trade surplus as a result of the real depreciation of the German mark. France would develop a trade deficit as a result of the real appreciation of the French franc. The price of tradable goods in Germany would increase relative to the price of nontradable goods, and there would be a shift of productive resources to the tradable-goods sector from the nontradable-goods sector. Conversely, in France, the price of tradable goods would decline, and there would be a shift of productive resources from the tradable-goods sector to the nontradable-goods sector.

The decline in German GDP would be smaller when the mark was floating than when it was pegged because a substantial part of the adjustment required to produce the appropriate trade surplus would occur as a result of the decline in the German price level relative to the French price level. Similarly, the required increase in French GDP would be smaller when the franc was floating because part of the adjustment necessary to effect the required French trade deficit surplus would occur as a result of the real depreciation of the German mark.

The larger the change in relative prices as a result of the change in the exchange rate, the smaller the increase in unemployment in Germany. The labor supply might decline in Germany with a decline in the real wage rate since the increase in income taxes would impose a large wedge between production and income.

At the end of the reparations period, the German mark would appreciate in the foreign exchange market, and the French franc would depreciate. In retrospect, the German mark would have undershot, and the French franc would have overshot.

The model of the transfer payments process can be used to analyze the impacts of period-to-period variations in autonomous flow of funds from one country to another on the foreign exchange value of their currencies and on their economies. Adjustments must occur in the capital-importing countries so the transfer of goods that is the counterpart of the transfer of money occurs. The insight from the national income accounting identity is that the transfer of money must induce some combination of an increase in business investment, an increase in household consumption (whose counterpart is a decline in the household saving rate), and an increase in the fiscal deficit.

Assume first an autonomous increase in the foreign demand for Mexican peso securities, much like the increase in foreign demand for Mexican government IOUs in the 1970s. These loans almost exclusively were to the Mexican government and to government-owned firms; in effect, these were nonmarket transactions tailored by the borrowers to match the preferences of the lenders. Mexico would generate an increase in its current account deficit as Mexican borrowers took the U.S. dollars received from the loans to the foreign exchange market to buy pesos. The peso would appreciate in nominal terms and in real terms as long as the period-to-period purchases of pesos were increasing. If these purchases remained unchanged from one period to the next, the foreign exchange value of the peso would remain unchanged. Overshooting would increase as long as the volume of bank loans was increasing more rapidly than the interest rate on these loans. The real transfer that was the counterpart of the financial transfer would be brought about in part by the real appreciation of the peso and in part by the increase in the growth rate of income in Mexico. Mexican GDP would increase

despite the real appreciation of the peso because of the increase in the government's domestic expenditures.

Mexico was a young debtor country; its indebtedness was increasing at a rate in excess of the interest rate on the borrowed foreign money. (The annual increases in the indebtedness of Mexico and the other developing countries in the 1970s were several times larger than their annual interest payments on their external indebtedness. If the increase in their interest payments had matched the increase in their international indebtedness, the peso would not have appreciated in real terms.) In effect, Mexico and these other developing countries were involved in a Ponzi-like pattern of cash flows: all of the cash needed to pay the interest on the increase in their international debt came from an increase in loans from international banks.

The surge in foreign investment in Mexico in the 1990s involved purchases of securities and productive assets by mutual funds and by pension funds that were seeking high rates of return and by U.S. and foreign firms that were seeking lower-cost supply sources for the North American market. Some of these securities were those issued by what had been government-owned firms as they were privatized, some were purchased from private investors, and some were purchased from the Bank of Mexico as it sterilized part of the inflow of dollars by issuing its own liabilities. Stock prices in Mexico more than doubled between 1992 and 1994. The Mexican economy was booming, and the growth rate of GDP was much above trend. Mexico's current account deficit increased from 5 percent of GDP in 1991 to 7 percent of GDP in 1994.

Much as in the 1970s, Mexico was a young debtor country, and the money to pay the investment income to foreign creditors came from new capital inflows. At some stage it was inevitable that Mexico would realize a trade surplus so it would earn part of the money necessary to pay the interest to its foreign creditors.

The prelude to the Asian Financial Crisis that began with the devaluation of the Thai baht in July 1997 was a remarkable asset price bubble that extended across a group of highly diverse countries—Thailand, Malaysia, Indonesia, Hong Kong SAR, China, Singapore, Taiwan Province of China, and, to a lesser extent, the Philippines and Russia. The common feature was that real estate prices and stock prices increased together much as in Japan in the 1980s; the increase in real estate prices boosted stock prices. A number of these countries experienced an increase in the inflows of funds, evidenced by the increase in their current account deficits or a reduction in their current account surpluses. Stock prices in most of these countries doubled in 1993.

The implosion of the asset price bubble in the Asian countries led to a remarkable turnabout in their trade balances as a result of the real depreciation of their currencies and its mirror image—the real appreciation of the U.S. dollar. The counterpart of the turnabout in the trade balances of the Asian countries was that the annual U.S. trade deficit increased by $150 billion. The mirror of the increase in the U.S. trade deficit was an increase in the flow of foreign funds to the United States; part of this flow consisted of the repayment of bank loans and part involved an increase in foreign purchases of U.S. dollar securities.

The transfer problem process involved adjustments in the U.S. economy that would induce an increase in the U.S. demand for imports. These adjustments would have to induce a decline in the U.S. savings rate that complemented the increase in the inflow of savings from abroad (adjusted for changes in U.S. business

investment and changes in the U.S. fiscal deficit). Part of the increase in the U.S. demand for imports resulted from the price effect, the real appreciation of the U.S. dollar; by itself, the increase in U.S. trade deficit should have had a contractive impact on U.S. GDP. Part of the increase in the U.S. demand for imports resulted from the income effect and the increase in U.S. domestic spending triggered by the wealth effect that resulted from the increase in U.S. stock prices.

American sellers of U.S. securities to those moving funds to the United States from other countries had only two possible uses for the money they received from these sales—they could buy other U.S. securities and real assets from other Americans, and they could buy consumption goods. These other Americans in turn would buy other U.S. securities from still other Americans, at ever-increasing stock prices. As stock prices increased and household wealth increased, and more and more households came closer to achieving their wealth objectives, they would increase their consumption expenditures—their savings from current income would decline. U.S. security prices would continue to increase until the mirror of the increase in spending nurtured by these wealth gains matched the increase in the flow of funds to the United States from other countries.

One of the stylized facts is that the countries that experienced an increase in the inflow of funds from abroad experienced economic booms; domestic spending surged despite the increase in the spending on imports and the increase in the trade deficit. A second stylized fact is that the countries that experienced an increase in the inflow of funds from abroad and the induced economic booms almost always experienced a decline in their fiscal deficits, unless the increase in the inflow of funds from abroad was an induced response to the increase in the government's fiscal deficit.

The behavioral response to the increase in the inflow of funds from abroad is that either business investment increases or household savings decline. Both are likely to happen. Since household consumption usually is four or five times larger than business investment, the reduction in household saving is likely to be much larger in absolute terms than the increase in business investment. The households that sell the securities to foreign residents can increase their consumption expenditures, or they can purchase other securities from other domestic residents; these other domestic residents have the same problem of what do to do with the cash received from the sale of securities. The cash is like the proverbial hot potato passed from resident to resident at ever-increasing asset prices. The prices of securities increase until the decline in domestic savings matches the increase in the inflow of cross-border funds. In effect, the domestic savings rate declines as the increase in the prices of securities leads to increases in household wealth and consumption spending.

Two questions remain. The first concerns the fact that there has been more financial trauma in the past 35 years than in any previous period. Does the increase in trauma reflect that the shocks have been greater than in previous periods, or is it because of changes in the institutional structure, and in particular because central banks have not pegged their currencies in the foreign exchange market? The second question is the following: Why have lenders, investors, and borrowers positioned themselves on a nonsustainable trajectory of cash flows?

The a priori answer to the first question follows from the basic distinction between monetary shocks that affect the inflation rate and the anticipated inflation rate and structural shocks that affect the prices of individual products but not the

aggregate price level. The oil price shocks of the 1970s and the 1980s are prototypical structural shocks. ("Dutch disease" is a generic term for structural shocks; episodes of Dutch disease seem greater when currencies have been floating.) Monetary shocks inevitably are greater when currencies are floating, since the primary major motive for not pegging the currency is that central banks can follow independent monetary policies because their choice of an interest rate or of a money supply growth rate would not then be constrained by the need to maintain the contractual parity for their currencies. (One of the basic arguments advanced by the proponents of floating exchange rates is that if central banks are not constrained by the need to adhere to a parity, they will be better able to adopt a monetary policy that leads to a more or less constant growth rate of their money supplies. In fact, the variability in the rates of money supply growth has been larger when currencies have been floating than when they have been pegged.) The changes in monetary policies in turn affect investor views of the anticipated inflation rates and anticipated spot exchange rates. Thus, the exercise of monetary freedom has led to larger changes in cross-border capital flows because it leads to larger changes in the anticipated spot exchange rates; changes in the anticipated spot exchange rates trigger large capital flows because they introduce a deviation between the anticipated and current spot exchange rates and domestic and foreign interest rates. These deviations are inevitable when monetary policy changes because of lags in the changes of interest rates and in the current spot exchange rates.

At the conceptual level, the distinction between monetary shocks and structural shocks is clear. At the empirical level, it is less obvious whether a particular shock should be considered monetary or structural. The first oil price shock at the time of the Yom Kippur War is viewed as a structural shock because the Saudis embargoed shipments of oil to the United States and the Netherlands. This embargo led to a rearrangement in destinations of oil exports from Saudi Arabia and not to a decline in the volume of its oil exports. In the early 1970s most commodity prices were increasing as a result of excess global demand. The second oil price shock resulted from a sharp decline in oil supplies as a result of the Iraqi invasion of Iran, even though the shock occurred in a period of accelerating inflation. The implication is that the first oil price shock might not have occurred if currencies had been pegged, because excess demand would have been less extensive. The second oil price shock was independent of the monetary environment; if currencies had been pegged at the time of this shock, then one or several large oil-importing countries would have been forced to devalue their currencies.

A comparison can be made between the impacts of an autonomous change in the cross-border flow of funds when currencies are pegged and when they are floating. When currencies are pegged, the increase in this cross-border flow has no impact on the foreign exchange value of the country's currency; its impact on the country's economy depends on the scope of central bank sterilization of the inflows of funds.

When currencies are not pegged, the immediate impact of the increase in the cross-border flow of funds is that the countries' currencies appreciate. This appreciation tends to dampen inflationary pressures, so the central banks that are pursuing a policy of inflation-targeting or price-level targeting can delay any credit tightening measures. Moreover, favorable movement in the terms of trade leads to an increase in the GDPs in the countries as long as their currencies are appreciating.

This initial autonomous cross-border flow of funds induces two types of "coattail-riding" behavior that lead to an increase in capital flows. One type is by momentum traders in foreign exchange, who follow the maxim that "the trend is my friend." They buy and go long in a currency when it is appreciating, and they sell and go short in the same currency when it is depreciating. Some of these traders are proprietary traders in major financial institutions; they hold their positions for a few minutes or several hours and rarely overnight. Momentum traders might also transact when currencies are pegged, but the volume of their transactions would be much smaller. Overall, the volume of capital flows from these momentum traders is small because few of them hold positions for extended periods.

The second type of induced cross-border capital flow is by investors who are attracted to the increases in the price of securities during economic booms induced by the inflow of foreign savings. When stock prices in Tokyo were increasing by 30 percent a year in the late 1980s, the managers of global equity index funds were obliged to buy Japanese equities in response to the increase in the ratio of the market value of Japanese equities to the market value of global equities. When stock prices declined in Tokyo, the global equity index funds sold some of their Japanese equities. A similar statement can be made about the foreign demand for equities of Thailand and the other Asian countries in the early 1990s, and about the foreign demand for U.S. stocks in the second half of the 1990s.

The boom results from the wealth effect that comes into play as the invisible hand induces adjustments so that the real transfer can be effected. This boom induces a second-order capital flow; one example is the European purchases of U.S. stocks and U.S. firms during the last several years of the 1990s. When currencies are pegged, the wealth effect is much smaller or nonexistent; in effect, the central bank acts as a buffer between the inflow of cross-border funds and the asset markets in the capital-importing country.

The economic booms in the countries that experienced increases in the inflows of foreign savings attracted more savings from other countries, and the real appreciation of a country's currency dampened the increase in inflationary pressures associated with the boom and delayed any credit-tightening measures.

The second question is why investors who were taking on the cross-border risks failed to see that the pattern of cash flows was not sustainable, and, similarly, why the investors who were involved in domestic asset price bubbles did not realize that they were involved in a nonsustainable financial process. It is axiomatic that the pattern of cash flows in asset price bubbles like those in Japan, the Nordic countries, the Asian countries, and the United States were not sustainable; the supply of greater fools is finite. It is also axiomatic that the pattern of cross-border flows to young debtor countries, like the flows to Mexico, was not sustainable; at some stage these countries must evolve into mature debtors, and that change is likely to involve a real depreciation.

The explanation for the sequence of asset price bubbles is that the flow of savings to Thailand and the other Asian countries induced by the implosion of the bubble in Japan contributed significantly to their economic miracle and attracted more foreign capital. Similarly, the implosion of the bubbles in these Asian countries led to a real appreciation of the U.S. dollar and contributed significantly to the new American economy of the late 1990s.

III. Conclusion

The past 35 years have been the most tumultuous in monetary history. There were four major asset price bubbles: first in Japan in the second half of the 1980s, at about the same time in three of the Nordic countries, subsequently in Thailand and its neighbors in the mid-1990s, and finally in the United States from the mid-1990s to the end of the decade. The range of movement in the foreign exchange value of the national currencies was much larger than in any previous period; similarly, the scope of overshooting and undershooting of national currencies was much greater, and the variability in the ratio of the trade balance to the GDP was much larger than ever before. One hundred national banking systems collapsed as a result of loan losses incurred primarily after the sharp real depreciations of the national currencies and also following the loan losses incurred after the implosions of asset price bubbles.

These remarkable developments were systematically related. Many countries experienced extensive periods of inflows of funds from abroad, which led to the real appreciation of their currencies. Moreover, with the exception of Japan, each of the countries that had an asset price bubble also received increasing amounts of funds from abroad before the bubble imploded. Overshooting resulted from an increase in the inflow of funds and was an inevitable consequence of the operation of the transfer problem mechanism as cross-border financial flows induced adjustments to effect the real transfer of goods.

One of the major questions in these episodes involves the identification of domestic adjustments to the increase in the inflow of funds so the real transfer of goods could be effected; the possible domestic adjustments include an increase in business investment, an increase in the fiscal deficit, and an increase in household consumption. By itself, the real appreciation associated with an increase in the inflow of funds should have led to a reduction in the rate of economic growth as the trade deficit increased or the trade surplus declined. Instead, the countries whose currencies appreciated in nominal and real terms almost always experienced an increase in their rates of economic growth, and many had economic booms, captured by monikers like "The East Asian Miracle," "Japan as Number One," and "The New American Economy." The fiscal deficits of the governments in these countries generally declined during these periods of increasing economic prosperity; the major exception was that the fiscal deficits in Mexico and the other developing countries increased in the 1970s as governments in these countries increased the amounts borrowed from the major international banks.

The stylized fact is that there was a strong association between the real appreciation of a country's currency and the increase in the prices of securities traded in the country as it experienced an inflow of funds. In a large number of these episodes—several of the Nordic countries in the second half of the 1980s, Mexico in the early 1990s, Thailand and the other Asian countries in the early and mid-1990s, and the United States in the second half of the 1990s—the increase in the inflow of funds induced an increase in domestic asset prices as part of the adjustment process, which necessitated a compensating decline in domestic saving. The domestic residents who sold securities to those who were moving funds into the country used nearly all of their cash receipts to buy other securities from other domestic residents at ever-increasing prices. As asset prices increased and more and more households achieved

or came closer to their wealth objectives, these households reduced their domestic savings. Domestic asset prices continued to increase until the decline in domestic savings more or less matched the increase in the inflow of funds from abroad (that is, adjusted for changes in domestic investment and in the fiscal balance).

A second stylized fact is that there was an extended period when the borrowers paid the interest on their debt with some of the cash obtained from the lenders. This pattern of Ponzi-like finance was evident in each of the asset price bubbles, and it was also evident in the pattern of cross-border flows of funds to Mexico and the other developing countries in the 1970s and again to this same group of countries in the early 1990s. In terms of the textbook model of the investment cycle, these countries initially were young debtors; at some stage they would make the transition to mature debtors, because they would need trade surpluses so they could earn some of the cash needed to pay the interest to their foreign creditors. The most likely adjustment to achieve these trade surpluses is that their currencies would depreciate, which implied a transition from overshooting to undershooting. When developing/emerging market countries have made this transition, they almost always have encountered a financial debacle: the sharp depreciations have led to large loan losses for borrowers that had debt denominated in a foreign currency.

There are two complementary explanations for why the monetary turbulence of the past 35 years has been so much greater than in any previous period. The first is that currencies of many countries have not been pegged, and so the central banks in these countries have had much more freedom to follow independent monetary policies; floating exchange rates are largely about monetary independence. The changes in monetary policy have led to much larger changes in current and anticipated inflation rates, and hence in anticipated spot exchange rates. These larger changes in anticipated spot exchange rates opened up attractive arbitrage opportunities and induced investors to move funds from one country to another.

Moreover, an autonomous capital flow of a given amount has a much bigger impact on a country that experiences the inflow of funds when currencies are not pegged because this autonomous flow induces two other types of complementary flows—one by momentum-oriented foreign exchange traders who are employed by major international banks, large investment banks, hedge funds, and some specialized trading firms. The revenues and the profits of these firms have soared as the range of movement of currency values has increased. The second type of flow is by investors attracted by the increases in stock prices in the countries that experience an inflow of funds, investors who follow a global index fund approach pursue a follow-the-leader approach and accentuate the increase in the cross-border flow of funds and the increase in stock prices. Thus, these inflows prolong the economic boom and attract more capital.

The growth rates in the countries that experienced an increase in their current account deficits might have been expected to decline as domestic residents increased their spending on imports as a result of the real appreciation of their currencies. But the stylized fact is that the growth rates accelerated as the trade deficits increased. The transfer problem centers on adjustments in the economy of the country that receives the increase in the flow of saving from abroad so the transfer of real resources can be effected. If the currency is pegged, the financial transfer by private parties may be partly or even fully offset by the central bank's transfer of

accumulated international reserve assets. By definition, the foreign exchange value of the country's currency remains unchanged, and the impact on asset prices is likely to be smaller (perhaps much smaller) because there will be far less of a wealth effect. When a currency is floating, there is no such buffer, and the increase in the inflow of private saving immediately begins to induce changes in relative prices and relative incomes to effect the real transfer. One aspect of the adjustment process in the country that received an increase in the flow of saving from abroad is that either domestic investment or household consumption must have increased. Both could have increased, but since household consumption is so much larger than private investment, much of the adjustment involved increases in household consumption. In effect, foreign saving displaced domestic saving. The adjustment mechanism was that the domestic residents who sold securities to foreign residents used virtually all of their receipts to buy other securities from other domestic residents, who in turn used virtually all of their receipts to buy other securities from other domestic residents, and so forth. To a modest extent, some of the receipts from the sale of securities were used to buy consumption goods. In effect, most of the cash received from the initial sale of securities to foreign residents was like the proverbial hot potato and transferred among domestic residents at higher and higher prices for securities. As the prices of securities increased, more and more household savers achieved their wealth targets, and as these targets were realized, they increased their spending relative to their incomes. In effect, the prices of securities continued to increase until the decline in domestic saving more or less matched the increase in the inflow of saving from abroad.

One of the puzzling questions is why the lenders did not realize they were on a slippery slope and that the value of their claims would diminish when the flow of funds to a particular group of borrowers slowed. Some may have realized this and reduced their exposures to these groups of vulnerable borrowers. Others may have realized they were on the slope but concluded they would be able to reduce their exposures because the nonsustainable pattern of cash flows would be sustained for an extended period—which had the effect of sustaining the process and delaying the inevitable adjustment. Some may have had a "this time it's different" view. And some may have been ignorant of Ponzi finance.

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