NBER WORKING PAPER SERIES

REAL VERSUS PSEUDO-INTERNATIONAL SYSTEMIC RISK: SOME LESSONS FROM HISTORY

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Working Paper 5371

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
December 1995

This paper was prepared for the Third Conference on Pacific Basin Business, Economics and Finance, held at the National Central Library, Taipei, Taiwan, August 8-9, 1995. This paper is part of NBER's research program in Monetary Economics. Any opinions expressed are those of the authors and not those of the National Bureau of Economic Research.

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ABSTRACT

This paper considers the meaning of domestic and international systemic risk. It examines scenarios that have been adduced as creating systemic risk both within countries and among them. It distinguishes between the concepts of real and pseudo-systemic risk. We examine the history of episodes commonly viewed either as financial crises or as evidencing systemic risk to glean lessons for today. We also present some statistical evidence on possible recent systemic risk linkages between the stock markets of emerging countries. The paper concludes with a discussion of the lessons yielded by the record.

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1. Introduction

Many argue that shocks to the financial system in one part of the world are likely to spill over to other countries -- in turn creating instability for the real economy. Consequently, some argue the need for improved international supervision over financial institutions and markets as well as increased co-ordination of policies among countries; others make the case for an international lender of last resort or for creation of an international bankruptcy court. This paper considers the meaning of domestic and international systemic risk. It examines scenarios that have been adduced as creating systemic risk both within countries and among them. It distinguishes between the concepts of real and pseudo-systemic risk. We examine the history of episodes commonly viewed either as financial crises or as evidencing systemic risk to glean lessons for today. We also present some statistical evidence on possible recent systemic risk linkages between the stock markets of emerging countries. The paper concludes with a discussion of the lessons yielded by the record.

We define systemic risk as a situation where shocks to one part of the financial system lead to shocks elsewhere, in turn impinging on the stability of the real economy, unless offset by intervention by the monetary authorities. The definition holds both within countries and among countries. It is similar to the term financial crises.[1]

A financial crisis occurs in two scenarios, each of which creates a scramble for means of payment: (1) a contagious banking panic when the public

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[1] According to Davis (1992) p. 117, systemic risk describes a disturbance in financial markets which entails unanticipated changes in prices and quantities in credit or asset markets. This leads to a danger of failure of financial firms, and in turn threatens to spread so as to disrupt the payments mechanism and capacity of the financial system to allocate capital. Davis views a financial crisis as different because it leads to "macroeconomic depression, widespread financial collapse, and dysfunction of the payment system."

attempts to convert deposits into currency; (2) a stock market crash that leads to fears that loans will be unobtainable at any price. Without intervention by the monetary authorities -- through open market operations or liberal discount window lending -- the real economy will be impacted by a decline in the money supply, by impairment of the payments system, and by the interruption of bank lending. International financial crises occur when shocks to the banking system in one country are transmitted to another, or when stock market crashes are linked among countries -- in either case leading to an impairment of the payments mechanism.

Shocks, which produce falling asset prices and wealth losses to particular sectors of the economy or industries without impinging on the payments mechanism, we view as pseudo-financial crises. Such events are examples of financial distress. They include collapsing land booms, bursting bubbles in various markets including exchange rates, the failure of an important nonfinancial firm, and sovereign debt crises. These events often occur as part of a general disinflation or deflation (Schwartz 1988).

In an international context, the distinction between pseudo and real is related to, although not the same as, Krugman's (1991) distinction between currency crises and contagion crises. A currency crisis involves a speculative attack by rational investors on a currency of a country pursuing unsustainable monetary and fiscal policies. It can lead to inflation, with no change in policies, or to deflation and depression, when the country responds by adopting contractionary policies. A contagion crisis occurs when investors (for rational or irrational reasons) scramble to convert nominal or tangible assets into cash. In this paper we focus primarily on contagion crises although as we discuss below it is possible that the two can be linked.

The recent literature is less concerned than it was in earlier times with contagious banking panics as the key source of systemic risk. The reason is that now depositors, rather than demanding cash, will shift their funds from a bank they perceive to be unsound to one they perceive to be sound. This reflects universal recognition of the role of the lender of last resort in allaying panics, the widespread adoption of deposit insurance, and improved banking supervision.

New sources of threat to the payment system are recognized: (1) the growth of international banking, which allows disturbances in foreign banking systems to impinge directly on the domestic banking system or to affect the domestic payments system through the clearing mechanism (Saunders 1987); (2) financial innovation and securitization which have led to a relative decline in traditional bank lending in favor of off-balance-sheet activities and, as some argue, a weakening of bank balance sheets, making them more susceptible to shocks (Goldstein and Folkerts-Landau 1993); (3) increasing integration of world capital markets. This development is thought to increase systemic risk because shocks are transmitted more rapidly among countries, because asset prices are believed to be increasingly more volatile, and because monetary control is weakened (Goldstein 1994; Mussa and Goldstein 1993); (4) the development of international payments clearing systems outside the control of domestic monetary authorities. Because standards are not uniform and because settlement may not be based on payments finality, offshore settlement can be a source of systemic risk to the payments system of the country whose currency is used for international settlement, in the event of a default which requires the unwinding of previous settlements (Padoa-Schioppa and Saccomani 1994; Folkerts-Landau 1991); (5) the widespread use of over-the-counter (OTC)

derivatives, which, it is argued, may have increased systemic risk because they are an opaque instrument, speculative activity in which is difficult to monitor (Goldstein and Folkerts-Landau 1993); (6) tighter linkages among stock markets and the proliferation of emerging country funds.

We argue that the distinction between real and pseudo-systemic risk holds for the new perceived sources of risk as well as it does for the old. The new and the old represent pseudo-systemic risk, which is another way of saying that many ventures will prove uneconomic and result in losses. Wealth losses are not synonymous with real systemic risk. They can be dealt with by bankruptcy proceedings and reorganization in both the financial and real sectors.

Much of our discussion is basically concerned with the channels of transmission of shocks among countries. This needs to be distinguished from contagion. With transmission, fundamentals in different countries are linked through the current and capital accounts of the balance of payments. With contagion, shocks are linked independent of the fundamentals. Contagion can be a source of systemic risk if it impinges on the payments system and is not dealt with by the monetary authorities.

Section 2 briefly surveys recent theoretical approaches to financial crises and systemic risk, both domestic and international, and then considers recent institutional developments believed to have heightened systemic risk. Section 3 examines a few episodes of real financial crisis and systemic risk that occurred before World War II and since then a large number of episodes of pseudo-systemic risk. Section 4 presents some statistical evidence related to possible systemic risk based on the comovements of stock prices in different emerging markets, suggesting possible contagion spillovers from the U.S. to

emerging markets but not the reverse. Section 5 concludes with a discussion of the lessons from the record.

2. Systemic Risk: Old and New Approaches

As background to the study of the sources of international systemic risk we briefly review the leading theoretical approaches. We first consider two traditional rival approaches to the subject of financial crises and systemic risk and their international spread -- the monetarist approach, which identifies financial crises with banking panics that either produce or aggravate the effects of monetary contraction, and the financial fragility approach, which regards financial crises as an essential part of the upper turning point of the business cycle, as a necessary consequence of the excesses of the previous boom. We then present two recent influential theoretical approaches based on rational expectations -- the random withdrawals theory, which treats banking instability as inevitable, and the asymmetric information approach, which treats systemic risk as an inherent part of an information failure. Both these approaches are essentially concerned with domestic financial crises. Another approach deals with psychological linkages affecting international crises.

2.1 The Monetarist Approach

The monetarist approach of Friedman and Schwartz (1963) and Cagan (1965) identifies financial crises with banking panics that either produce or aggravate the effects of monetary contraction. In their monumental A Monetary History of the United States, 1867-1960, Friedman and Schwartz devote considerable attention to the role of banking panics in producing monetary instability in the United States. For Friedman and Schwartz, banking panics are important because of their effects on the money supply, and hence on

economic activity.

According to them, banking panics occur because the public loses confidence in the ability of banks to convert deposits into currency. A loss of confidence is typically associated with the failure of some important financial institution (as happened in 1873 and 1893). Attempts by the public in a fractional reserve banking system to increase currency as a fraction of its money holdings, if not offset, can only be met by a multiple contraction of deposits. A banking panic, in turn, if not prevented by the monetary authorities, will lead to massive bank failures of otherwise sound banks. They are forced into insolvency by a fall in the value of their assets that they sell in a vain attempt to satisfy a mass scramble for liquidity. Banking panics, such as occurred in 1930-33, have deleterious effects on economic activity primarily by reducing the money stock through a decline in both the deposit-currency and deposit-reserve ratios.

Schwartz (1986) extends this approach by making clear the distinction between what she calls 'real financial crises' and 'pseudo-financial crises.' According to her, a true financial crisis is a banking panic or a stock market crash, when depositors and investors fear that means of payment will be unobtainable at any price. Furthermore, "a real financial crisis occurs only when institutions do not exist, when authorities are unschooled in the practices that preclude such a development, and when the public sector has reason to doubt the dependability of preventive arrangements" (1986, p.12).

According to Schwartz, other events not including banking panics and stock market crashes, referred to by others as financial crises, are really 'pseudo-crises.' These include deflations and disinflation, the financial distress of large nonfinancial firms, of financial industries, abrupt declines

in the prices of particular commodities or assets and speculative attacks on fixed-exchange-rate regimes. All these events represent losses of wealth in particular sectors of the economy, but none involve a scramble for highpowered money, the hallmark of a "real" financial crisis.

Within this context, Kaufman (1994) examines the evidence on contagious bank runs. He distinguishes between firm-specific contagion and industry-specific contagion. In the former case, depositors stage runs on banks with characteristics similar to those of the first (insolvent) bank. In the latter, depositors stage runs on all banks irrespective of their condition. That case,, which is the hallmark of a true panic, occurred in the U.S. only in 1893 and between 1930-33. Since World War II the only evidence of contagion (based on stock-market returns of both sound and unsound banks following important failures such as Continental Illinois in 1984) is firm- specific, which in no case led to additional failures.

According to the monetarist approach, transmission of financial crises as well as business fluctuations internationally occurs primarily through the monetary standard. Under a fixed exchange rate, such as the classical gold standard, deflation as a result of declines in the money supply and velocity in a given country creates a balance of payments surplus that attracts gold flows from other countries. These countries then suffer a contraction of their money supplies, deflation, and a reduction in economic activity. By contrast under flexible exchange rates, according to the monetarist approach, the transmission of financial disturbances is considerably muted.

2.2 The Financial Fragility Approach

A tradition going back to the nineteenth century regards financial crises as an essential part of the upper turning point of the business cycle,

as a necessary consequence of the 'excesses' of the previous boom. Its modern proponents, Hyman Minsky (1977), Charles Kindleberger (1978), Henry Kaufman (1986), Benjamin Friedman (1986), and Mervyn King (1994), basically extend the views Irving Fisher expressed in Booms and Depressions (1932), and in "The Debt Deflation Theory of Great Depressions" (1933).

According to Fisher, the business cycle is explained by two key factors: overindebtedness and deflation. Some exogenous event that provides new, profitable opportunities for investment in key sectors of the economy that increase output and prices initiates the upswing in the cycle. Rising prices, by raising profits, encourage more investment and also speculation for capital gains. The whole process is debt financed, primarily by bank loans, which in turn, by increasing deposits and the money supply, raise the price level. According to Summers (1991), recent financial innovations make this scenario more relevant today. An overall sense of optimism raises velocity, fueling the expansion further. Moreover, the rising price level, by reducing the real value of outstanding debt, encourages further borrowing. The process continues until a general state of "overindebtedness" is reached. It exists when individuals, firms, and banks have insufficient cash flow to service their liabilities. In such a situation a crisis can be triggered by errors in judgment by debtors or creditors. Debtors, unable to pay debts when due or to refinance their positions, may be forced by creditors to liquidate their assets.

Distress selling, if engaged in by the whole community, produces a decline in the price level because, as loans are extinguished and not renewed, bank deposits decline. Falling prices reduce net worth and profits, leading to bankruptcy. Both factors contribute to a decline in output and employment.

In addition, while nominal interest rates fall with deflation, real rates increase, worsening the situation. The process continues until either widespread bankruptcy has eliminated the overindebtedness, or at any stage reflationary monetary policy is adopted. However, once recovery begins, the whole process will repeat itself.

Minsky, in a series of articles since 1957, has elaborated and extended Fisher's theory. According to him (1977), the financial structure becomes more fragile as the upswing proceeds. A crisis occurs when a shock triggers a sell-off of assets in a thin market, producing a sharp decline in asset prices.

For Kindleberger (1978), 'a speculative mania' produced by a Fisherian displacement involves a shift from money to real or financial assets, 'overtrading', and then 'distress'. At that point, some event triggers an attempted massive shift from real or financial assets to money, and a 'panic' results. The culmination of the process is the crash, with the collapse of the prices of assets acquired during the mania.

According to Kindleberger's (1978) approach, international transmission of financial crises occurs not only through the traditional links of gold flows, the balance of trade, and capital flows, but also through psychological factors, and by commodity and interest arbitrage. The latter, by linking the banking systems of different countries directly, can offset the normal operations of the classical price-specie-flow mechanism.

2.3 Recent Approaches

Recent approaches attribute systemic risk in a domestic context to (1) the inherent instability of banking and (2) the presence of asymmetric information. International linkages in a third approach are psychological.

2.3.1 Inherent Instability of Banking

According to Diamond and Dybvig (1983), banks transform illiquid financial assets into liquid ones by offering liabilities with a different, smoother pattern of returns over time. Banks provide efficient risk sharing, which the private market cannot provide. However, banks are vulnerable to runs because of the illiquidity of their assets. A run can be triggered on even a sound bank by a random event because rational depositors, not wishing to be last in line, will rush to convert deposits into currency. The Diamond-Dybvig model is based on a single monopoly bank without capital. Accordingly, it does not allow depositors to shift funds from a bank perceived to be unsound to one perceived to be sound. In this approach, only the institution of deposit insurance can prevent banking instability. It ignores the role that an unstable price level environment can play in weakening banks' portfolios or that measures such as capital adequacy can assure the public of a bank's soundness.

2.3.2 Information Asymmetry

An alternative mechanism that can cause systemic risk is asymmetric information (Mishkin 1991). Lenders are said to be less informed than borrowers about the merit of projects to be financed. A rise in interest rates may increase adverse selection leading to a decline in lending. Heightened uncertainty that makes screening of borrowers more difficult can worsen adverse selection problems. A widening of credit-quality spreads is an indicator of such problems. Lower collateral values will also increase adverse selection for lenders. Agency costs rise when borrowers have low net worth, attributable to a stock market crash or disinflation, since they have less to lose by default.

The explanation of bank panics that the asymmetric information approach

offers is that depositors cannot costlessly value individual banks assets, and hence have difficulty in monitoring the performance of banks (Jacklin and Bhattacharya, 1988). On this view, a panic is a form of monitoring. Faced with new information, which raises the perceived riskiness of bank assets, depositors force out both sound and unsound banks by a system-wide panic.

What is not made clear in this approach however, is whether information asymmetries due to the "lemons" problem can be overcome by access to better information and whether information which monetary authorities possess could be released, enabling the public to distinguish solvent from insolvent banks and idiosyncratic from systemic risk (Beenstock 1987).

2.3.3 Psychological Linkages

Krugman (1991) discusses a number of nontraditional international linkages, allied to some mentioned by Kindleberger (1978). Equity markets may be linked by psychological forces; by the behavior of outsiders and insiders; and by bandwagon effects. Outsiders follow a bandwagon into a country's stock market and then bail out when prices start to fall, precipitating a crash. Insiders then jump back in, withdrawing funds from another country's stock market, and precipitating the crash there. Investors around the world view a stock market crash in one country as a harbinger of worldwide recessions, so they sell, precipitating crashes in other countries.

2.4 New Institutional Developments

Rapid developments in international markets in the past two decades, in response to financial innovation and deregulation, have led many observers to worry that they represent new and dangerous sources of systemic risk. These developments include: international banking; payments risk; capital market integration and securitization; derivatives; and stock market comovements.

2.4.1 International Banking

The growth of money center banking as an offshoot of the Eurocurrency market in the past four decades has sparked considerable interest in international banking as a possible source of systemic risk. International banks act as clearinghouses for international loans by regional banks. Each large money center bank in New York or London serves as a lead bank for a network of regional correspondent banks and uses its expertise in financial intermediation in placing international loans. These banks face credit (default) risk, sovereign (possible exchange controls) risk, liquidity (bank run) risk and (intraday) settlement risk. Systemic risk can arise because of an asymmetric-information-induced run, or because of the close pyramiding of interbank transactions -- a troubled bank may be a net debtor in aggregate but net creditor to a large number of banks (Saunders 1987; Guttentag and Herring 1987).

Also of concern are the systemic effects of the failure of an international bank with branches in several countries or of the subsidiary of a foreign bank operating in the domestic market. An elaborate series of arrangements following the Basle Concordat of 1982 assigns supervision of bank subsidiaries to the authorities of the resident country and supervision of international bank branches to the host country's authorities (Goldstein and Folkerts-Landau 1993). Most countries have adopted the maximum capital requirements of the 1988 Basle Accord.

Calls for further harmonization of bank regulation have recently been made (Padoa-Schioppa and Saccomani 1994), although Benston (1994) argues to the contrary that international banking risks differ little from domestic risks and, that, with the exception of foreign branches, there should be no

concern over the safety and soundness of international banking. In the case of foreign branches that could quickly transfer funds from the host country to the parent bank, reliance should be placed on foreign supervision or, alternatively, the domestic monetary authorities should be able to seize sufficient branch assets to protect depositors in the event of failure.

Although doomsday scenarios about the systemic risk of international banking abound, there is little empirical evidence to back it up. According to Saunders (1987), three different empirical methodologies (Libor spreads between banks in different regions before and during the 1980's Latin American debt crisis; loan flows between a similar group of banks over the same time period to capture credit rationing effects; and correlation of stock price returns between troubled and sound banks following major U.S. bank failures in the 1970s and 1980s) produced, at best, limited evidence of firm-specific contagion.

2.4.2 Payments Risk

The massive increase in the volume of payments generated by domestic and foreign securities transactions, which are cleared through money center banks and through public and private payments clearing arrangements, has led some observers to express concern over systemic risk arising from a breakdown of the payments system settlement mechanism (Folkerts-Landau 1991). A problem could arise in a payments system based on net periodic settlement and no payments finality. In such an arrangement, which characterized the New York Clearing House Interbank Payments System (CHIPS) until quite recently, net settlement between all the members is made at the end of the day. If a net debtor bank is unable to pay its balance, this deprives other institutions of expected funds and prevents them from settling. Under CHIPS previous netting

transactions would have been unwound until settlement was achieved. This could conceivably, absent central bank intervention, have led to insolvency of previously solvent banks (Humphrey 1986).

Systemic risk can be avoided by instituting payments finality, as is the case with Fedwire (the Federal Reserve's domestic clearing system) in which the Fed guarantees settlement but imposes caps on net debit positions and charges interest on daylight overdrafts to discourage moral hazard, and in other countries' systems (FXNET in the UK, SIC in Switzerland), which are based on gross continuous settlement. Indeed, CHIPS recently has introduced payments finality by requiring the largest net debit balance to be collateralized by U.S. government securities (Eisenbeis 1995).

Systemic risk could still be a problem, however, if clearing systems are not based on net finality. In that case, a default in dollar payments in an offshore payments network could impinge on the domestic clearing system in the U.S. To prevent such an event, improved international oversight of payments systems is recommended (Padoa-Schioppa and Saccomani 1994).

Although much has been written about the threat of a meltdown of the payments system, no serious problems have yet arisen (with perhaps the exception of the computer error which caused a temporary loss of $20 billion at the Bank of New York in 1985). As in the case of bank run contagion, when monetary authorities must act as lender of last resort, in a payments crisis they must act as guarantor of the payments system. The real risk to the system is not so much systemic but rather that of reduced market discipline as the safety net is extended to prevent pseudo-systemic risk.

2.4.3 Capital Market Integration and Securitization

With the rapid growth and internationalization of securities markets in response to deregulation of banking and financial systems in the past decade, increased systemic risk seems possible. Some have argued that securitization has increased risk by lowering the quality of bank portfolios (Levich 1988). Others find the proliferation of international securities markets has made the system more vulnerable because of increased asset price volatility (Levich 1988; Goldstein 1994). Still others hold that the international spread of securities markets, by increasing the number of linkages, makes the system more vulnerable during periods of market turbulence (Levich 1988; Goldstein 1994).

Despite the growth of international capital markets and repeated calls for their regulation, little evidence links them to the perceived problems. Attempts to regulate new market developments inevitably lead to evasion and the creation of new market instruments. An early example was the development of the Eurodollar market. Eurodollar deposits were subject neither to U.S. reserve requirements nor to interest rate ceilings. Similarly, off-balance sheet entries by banks have grown in response to regulation of bank balance sheets.

2.4.4 Derivatives

The burgeoning of the market in OTC derivatives has aroused particular concern. It is argued that derivatives represent a new source of systemic risk. Because they are concentrated in a small number of large U.S. banks and their affiliates, contagion seems likely since interest rate swaps (which comprise the majority of the large bank derivative holdings) are sensitive to changes in interest rates. If all banks take similar positions, then the failure of one bank could lead to the failure of others. This could occur

because derivatives are complicated and opaque -- senior management does not understand them and junior management does not adequately assess the risks involved (Goldstein and Folkerts-Landau 1993; Gorton and Rosen 1995). Moreover, derivatives may contribute to international systemic risk since connections between markets in different countries have grown (Goldstein and Folkerts-Landau 1993). Observers of these developments call for increased regulation of derivatives activity including minimum capital requirements for nonbank dealers as well as listing OTC derivatives on official exchanges.

Two recent studies assess the risks associated with derivatives (Darby 1994; Mackay 1994). According to both, the credit risk is small relative to other bank activities (the replacement cost of derivatives is only 1-3 percent of notional value); settlement risk is also small because of netting and because the market is relatively small; thick markets make liquidity risk for interest rate and exchange rate swaps low. The only serious problem (which is being rectified by international agreement) is legal risk -- local authorities could cancel a transaction (it happened in the U.K. in 1991). Both argue that rather than increasing risk, derivatives on net balance reduce it.

A recent empirical study (Gorton and Rosen 1995) estimates the interest sensitivity of interest rate swaps held by U.S. banks (a market of $6.0 trillion at the end of 1992 in notional value) -- the key factor in determining risk. Their simulations show that a 100 basis point rise in interest rates would cause the seven largest U.S. dealer banks to lose 23 percent of their equity because of losses on their swap holdings, while the next 30 largest banks would lose 5 percent of their equity. However, these losses would be almost completely offset by hedging of other assets the banks hold. Perhaps higher estimates of the interest sensitivity of interest swaps

are conceivable, but they do not yet exist.

2.4.5 Stock Market Comovements

The global linkage of capital flows extends beyond banking systems. Harvey (1994a) notes a total capitalization in world equity markets of U.S.$747.1 billion in June 1992, with the capitalizations of emerging markets such as Mexico and Taiwan similar to those of the longer established ones of Italy and the Netherlands. However, emerging markets have been especially volatile. Harvey (1994b) reports that higher than 33 percent volatility characterizes stock returns of 13 emerging countries, which is well above the maximum of the developed countries in the Morgan Stanley Capital Index. Emerging markets also tend to move as a group, driven by common economic fundamentals. Indeed, after controlling for a common set of fundamentals, determining each country's stock price index, we find, in our empirical analysis in section 4 below, that stock markets in both Latin America and Asia follow and amplify movements in the U.S. market. This suggests an alternative possible source of contagion, related not to fundamental factors, but to fluctuating equity investments by the developed world impinging on emerging markets.

2.4.6 Summary

Our survey of the literature on possible sources of systemic risk in an international setting leads us to distinguish between real and pseudo-systemic risk, between contagion and transmission, between contagion and currency crises. We highlight these distinctions in discussing historical episodes. The aim of the paper, however, is to illustrate the difference between real and pseudo-systemic risk.

Two phenomena have historically occasioned panics and financial crises.

One is a flight to currency that shrinks bank reserves (in itself an indictment of misguided monetary policy); the second is a stock market crash that engenders fear that lenders will lack resources to extend loans. These phenomena are cases of real systemic risk. In the absence of preventive action by monetary authorities, the payments system will be impaired, and the real economy will be brought to its knees. History, however, teaches that contagion and panic do not occur when a lender of last resort provides adequate liquidity in each of these cases. Its action will stabilize financial markets whether the disturbance has arisen in the domestic economy or has been imported from abroad. Other situations that the systemic risk literature portrays as potential breeders of panic in our view are pseudo-crises. Pseudo-crises are examples of financial distress occasioned by losses individuals, firms, or industries sustain. They do not trigger real crises.

3. Historical Episodes of International Systemic Risk

The systemic risk literature conjectures that international relationships could be the source of crises. Instead of contemplating conjectural events, we propose to review what actually happened and offer our interpretation of a series of episodes with international overtones. We divide the full period we cover into three segments: 1870-1914, the era of the classical gold standard; 1929-1933, the years of the Great Depression; post-World War II.

3.1 Pre-World War II

We isolate years when the fixed-exchange-rate gold standard ruled by studying the period before 1914 and the Great Depression years. This enables us to draw the distinction between contagion and transmission. Transmission occurs under fixed exchange rates whether or not a financial crisis exists. A

reduction in the money supply or velocity in one country was transmitted through the current and capital accounts to trading partners, activating gold flows to the contracting center. The loss of gold produced a reduction in the money supply in the partner countries, lowering their real incomes and price levels. This is transmission, not contagion and systemic risk.

3.1.1 The Classical Gold Standard, 1870-1914

Bordo (1986) compared Kindleberger's (1978) chronology of international financial crises and Morgenstern's (1959) chronology of stock market crashes with a chronology of banking panics for the four core countries (U.S., U.K., Germany, and France) as well as two peripheral countries (Canada and Sweden). He found that stock market crashes occurred in the core countries during the years Kindleberger identifies as years of international financial crises (1873, 1893, 1907), but that banking panics did not. Only in the U.S. were there banking panics in those years, although the money supply declined in the other countries linked through gold flows. The principal reason that the U.S. suffered panics, while the other countries did not, was that it lacked an effective lender of last resort mechanism that the others had established. Other reasons for U.S. panics include its unit banking system, whereas nationwide branch banking was found abroad, and the greater frequency and intensity of U. S. macroeconomic shocks (Bordo 1986; Grossman (1993).

Morgenstern's stock price index and the spread between short-term and long-term interest rates are most closely correlated for the core countries in the three years in question. The results suggest that Kindleberger's psychological linkages may have been at work, and that monetary shocks were transmitted by the monetary standard. True international systemic risk was not present.

3.1.2 The Great Depression, 1929-1933

The Great Depression is often treated as the classic case of systemic risk. A downturn in the U.S. beginning in August 1929 was intensified by the stock market crash in October. The Federal Reserve Bank of New York acted as an effective lender of last resort, providing needed liquidity to the money market and preventing panic. Except for Canada, the crash was not repeated in other countries (Krugman 1991).

The contraction turned severe following a contagious banking panic in October 1930. Depositors en masse tried to convert deposits into cash, and the Federal Reserve refrained from undertaking expansionary monetary actions. The resultant decline in the money supply further contracted output, commodity prices, and asset prices. Bankruptcies rose and otherwise solvent banks failed. This was a true financial crisis.[2]

The U.S. depression was transmitted to other countries on the gold standard through the current and capital accounts. In some countries, most notably Austria, Germany, and Hungary, bank runs and failures accompanied deflation and depression. Panic, however, was averted by lender-of-last-resort action, bailouts, and cutting the link with gold. According to Eichengreen (1992), it was not possible for a country to resolve a banking crisis and at the same time remain on the gold standard. He believes that expansionary monetary policy, even if temporary, would have led to a speculative attack on the currency. In our view this was not the case for the U. S. and France, with reserves far in excess of legal requirements.

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2 Wicker (1995) argues that the banking panics of 1930-33 were strictly local, so that there was no nationwide contagion. Calomiris and Mason (1995) maintain that the Chicago banking crisis of 1932 did not exhibit any contagion effects. Neither paper explains why the deposi-currency ratio declined nationwide during these episodes -- surely a measure of contagion.

According to Eichengreen and Portes (1987), both exchange rate instability and debt default were propagating mechanisms. Expectations of devaluation exacerbated instability of banking systems as foreign depositors withdrew their funds to avoid capital loss. Debt defaults weakened the commercial banks of debtor countries because foreign short-term credits exited. For these reasons financial crisis in 1931 in Austria moved to Germany and Hungary.

The Credit-Anstalt crisis of 1931 exemplifies a classic example of international systemic risk. Announcement in May 1931 of the insolvency of the Credit-Anstalt, Austria's largest bank, long hobbled by serious structural problems, led to a run on it by nonbank and Austrian commercial bank depositors. An infusion of government funds prevented panic. A run on the Austrian schilling followed as both domestic and foreign depositors feared the consequences of the authorities' actions. The schilling stabilized on the imposition of exchange controls and Austria's de facto departure from the gold standard (Schubert 1991). The banking problems of a major German institution, the Darmstadter bank, led to a similar scenario there, as foreign investors, fearful of exchange controls, withdrew their funds. Again, a banking panic was averted by a bailout and imposition of controls. Hungarian banks, tightly linked to their Austrian counterparts, also experienced runs. The outcome was similar to that in both Austria and Germany (Eichengreen and Portes 1987). The similarity of the problems in the three countries suggests that contagion effects were what Kaufman (1994) terms firm-specific (and not industry-specific). Rational depositors were alerted by the Credit-Anstalt insolvency to similar problems in universal banks in neighboring countries.

The speculative attack on sterling in September 1931, which led to

Britain's departure from gold, was not a contagious result of the central European banking crisis. The British banking system was never threatened. Rather, it was a currency crisis, precipitated by fears that an incipient fiscal deficit and the low level of the Bank of England's reserves threatened the gold exchange standard. British creditors' inability to withdraw funds from Austria and Germany may, however, have contributed to the currency crisis (Cairncross and Eichengreen 1983).

Bernanke and James (1991), based on annual data for 24 countries in the 1930s, show a close correlation between the severity of depression and the incidence of banking crises and adherence to the gold standard. Deflation intensified depression by reducing the net worth of banks and borrowers, thus disrupting flows of credit. In turn, deflation precipitated banking crises, which intensified the deflation.

The international spread of the Great Depression contains elements of systemic risk, but in large measure it can be explained by transmission through the balance of payments. Contagious bank runs in several countries occurred for banks facing similar problems. Countries on the gold standard imported depression and deflation through traditional channels. Recovery was possible when countries cut the link with gold.

3.2 Post-World War II

We classify post-World War II episodes into five groups: (1) currency crises; (2) bank failures; (3) stock market crashes; (4) the Latin American country debt crisis; (5) U.S. interest rate hikes. For the first three groups with more than one episode, we follow chronological order.

3.2.1 Currency Crises

Three examples of runs on currencies are commonly described as currency

crises: under Bretton Woods between 1949 and 1969; under the European Monetary System (EMS) in 1992-1993; and the Mexican peso crisis of 1994-1995. At least the first two crises are examples of transmission, not systemic risk.

Currencies under the Bretton Woods system were linked to the dollar. Devaluations occurred by the U.K. in 1949, when about twenty countries followed it, and 1967; by France in 1957 and 1969. Revaluations occurred by Germany in 1961 and 1969. The need to repeg was predictable, and the market sold off a weak currency and avidly purchased a strong currency. There is no evidence of international transmission of these changes in exchange rates. Resistance by authorities to the changes may have disturbed domestic economies, but the need to adjust exchange rates in one country did not spread to other countries. No systemic risk existed.

Overshadowing what was happening to the currencies of non-reserve countries was the situation of the overvalued U.S. dollar, for which the system provided no easy way for it to be devalued. For domestic reasons the U.S. chose to inflate, and when the rest of the world rejected a link to the dollar that subjected them to U.S. home-made inflation, in 1971 the system collapsed.

A study of short-run international transmission under Bretton Woods concludes that, with respect to inflation, despite pegged rates, countries exercised some control over their own short-run inflation rates through monetary policy (Stockman 1993). If this finding is correct, it suggests that problems of non-reserve-center countries in maintaining pegged exchange rates that led to devaluations or revaluations were home-grown, not imported. This result did not preclude a role for the U. S. as the reserve-center country to affect the long-run inflation rates of Bretton Woods nations.

Until the fall of 1992, many observers believed that attitudes toward inflation and output among members of the EMS had converged, and that the system would escape the fate of Bretton Woods. The inflationary effects of German reunification, however, led the Bundesbank to pursue an aggressive deflationary policy. The exchange rate links to the Deutsche mark of the British pound, the Italian lira, and the Swedish krona enforced a corresponding deflation on the economies the currencies represented. The market's disbelief that deflation was compatible with domestic conditions in these economies led to massive speculative attacks on their currencies. The countries, at enormous cost to their budgets, repeatedly raised interest rates in a desperate attempt to maintain the existing links to the Deutsche mark, that is, to acquiesce in the transmission of the German deflation performance. In the end the countries whose currencies were under attack devalued. The EMS is no longer the triumphant exchange rate arrangement it was once thought to be. It is clearly not a source of systemic risk.

Did systemic risk emerge as a consequence of the devaluation of the Mexican peso on December 20, 1994, and since then of its (probably managed) floating rate? A run on the Argentine peso immediately after the Mexican devaluation and an intense run on the Hong Kong dollar on January 11-12, 1995, have been cited as contagion.

The facts do not support the citations. The Argentine peso for some time has been recognized as overvalued. Argentina's current account is in deficit, and many of its banks are troubled -- conditions similar to those that occasioned the Mexican devaluation. This is not contagion. The market simply has responded to common problems in the two countries.

As for the Hong Kong dollar, the run on it could just as well have been

associated with the slide in the Hong Kong stock market, which fell 31 percent in 1994, and continued to fall in January 1995, as with the weakening of the Mexican peso. If investors were withdrawing funds from the Hong Kong stock market, the sale of Hong Kong dollars could have been merely the form in which the exit took place. Systemic risk has not been proven.

3.2.2 Troubled Banks

In at least four cases of bank difficulties, systemic risk was invoked: Bankhaus I.D. Herstatt, Continental Illinois, BCCI, and Barings. Continental Illinois was bailed out, the other three were liquidated.

Herstatt sustained losses in its foreign exchange operations in 1974. Two other banks, one in West Germany, the other in Switzerland, experienced losses without further repercussions. Only in the United States was the case of Franklin National Bank, which announced in May 1974 that it had lost heavily in forward transactions in the foreign exchange market, treated as if systemic risk was at stake. The Federal Reserve had lent the insolvent Franklin $1.75 billion before it was merged with another bank in October. This was a case of pseudo-systemic risk. No disruptions followed in the foreign exchange, loan syndication, and interbank markets. The Federal Reserve, whether justified or not, will claim that it was its forbearance that yielded these positive results.

The run at Continental Illinois in 1984 was triggered by its inability to obtain the renewal of short-term uninsured deposits of major institutions. It had access to the Federal Reserve's discount window even after it had become both book and market value insolvent. The actions taken to rescue Continental reflect Federal Reserve fears that closure would bring on runs on the interbank depositors with claims on Continental. Had the Federal Reserve

notified foreign central banks that their banks might need support until their claims on Continental had been settled, we doubt that the international financial system would have been damaged.

The disappearance of the final two troubled banks that we consider did not shake financial markets. Bank of Credit and Commerce International collapsed in July 1991. Owned by Arabs, run by Pakistanis, its depositors had risked their money to obtain above-market interest rates or to hide their assets. With a complicated corporate structure, most of its banking offices were controlled through holding companies in Luxembourg and the Cayman Islands. It escaped bank regulation. When it was run on, it was not bailed out. No contagion followed.

Barings was destroyed in March 1995 by the bets its trader in Singapore placed on a future upturn in Japan's Nikkei stock market average, His losses of $900 million far exceeded Barings capital, and the Bank of England did not rescue it. No contagion followed.

In our judgment the troubles of the banks discussed above were all pseudo-systemic risks.

3.2.3 Stock Market Crashes

In 1987 there was great apprehension in advance of a possible U.S. stock market crash. It occurred in October 1987. A replay of 1929-1933 was foreseen by some, a crash of stock markets across the world was foreseen by others. Neither eventuality was realized. The U.S. economy did not succumb to a recession and stock markets elsewhere moved in response to their own domestic conditions. The Federal Reserve provided classic lender-of-last-resort liquidity to the banking system so it had ample funds to lend to dealers and investors. A lesser crash in 1989 was no different.

The apprehension about the fallout from a U.S. stock market crash was paralleled by that from a crash in Japan. It would be followed, according to those who harbored such fears, by a withdrawal of Japanese funds from U.S. markets, and by contagious effects on Japanese banks and insurance companies.

The Nikkei stock market average has fallen from its peak in the 40,000 range at the end of 1989 to a range of about 16,500 in mid-1995. In August 1992 the government bought shares, blocked new issues, leaned on firms not to sell shares, and compelled public pension funds and the postal savings bank to invest in shares. The stock market, nevertheless, continued to slump. In summer 1995 banks and insurance companies are in no position to prop up the stock market. They are both so troubled they need to sell shares rather than buy them. The stock market, however, has reacted positively to the Bank of Japan's lowering of the overnight call money rate in July to around 0.75 percent from 1.25 percent.

The underlying problem in Japan is asset price deflation. The inflation that the boom years in the 1980s generated led the Bank of Japan to adopt a contractionary policy, which produced a recession in 1992. Timid signs of recovery were hampered by continuing deflation not only in prices of land and equities but lately also in prices of goods and services. As asset prices fell, the value of collateral against bank loans declined. The banking system's capacity to provide credit intermediation has been impaired by the enormous overhang of nonperforming loans. The Bank of Japan has been unsure of the way to overcome the protracted deflation experienced by the economy. Japan's condition in recent years is reminiscent of deflationary conditions in the United States in 1930-33. A recent paper suggests that the parallel reflects the failure of the Federal Reserve then and of the Bank of Japan now

(until the spring of 1995) to inject adequate liquidity into the financial system (Laurent 1994).

In any event, Japan's problems are domestic and the solution is at hand in domestic action. Even if Japanese investors, who have done poorly with their U.S. real estate investments, sell some of it at a markdown from what they paid, it is unlikely to expose the U.S. market to systemic risk.

3.2.4 Countries in Default

Systemic risk was said to have been created by the announcement in 1982 by a number of Latin American countries that they could not service their international debts without immediate new loans. What was at stake was the solvency of U.S. money-center banks because Latin American debt was a multiple of the banks' equity and loan loss reserves. The money-center banks as well as the regional banks had participated in loan syndicates. They initially consented to the regulators' proposal that they lend the debtors enough to pay contractual interest. In that way they could maintain the fiction that the assets on their balance sheets were performing loans and bank income was unimpaired. In 1987 the banks began to acknowledge the likelihood of credit losses on their Latin American loans and increased loan loss reserves. By various devices since then the loans were written down, rescheduled, or collateralized by zero-coupon U.S. Treasury securities. The banks in turn increased their capital.

In the case of the Latin American debt crisis, the effect on banks so far as their balance sheets were in question was no different from what it would have been had bad loans been made to domestic borrowers. What was different was the intervention of U.S. regulators and the international agencies (Eichengreen and Fishlow 1995). If the money-center banks had been

permitted to negotiate immediately with the debtor countries to write down the debts, rather than dragging out the resolution of the problem for a decade, would confidence in the stability of the banking system have been shaken? This may well have been another case of pseudo-systemic risk.

3.2.5 The U.S. Interest Rate Shock, 1994-1995

The Federal Reserve's decision to raise the federal funds rate seven times between February 1994 and February 1995 led to a sharp drop in long-term bond prices. As a result hedge funds and banks, surprised by this unexpected movement in interest rates, experienced substantial losses. Investors reassessed the risks of their portfolios, with a notable reversal of their exposure in Latin America.

There is a long record of Federal Reserve shifts from expansionary to contractionary monetary policy. There is nothing unique about the most recent episode. The United States is a major player in the world economy, and its actions affect risk-return calculations by individuals, firms, institutions, and countries. If policies were stabler, the amplitude of cyclical changes would be dampened, but in a market economy there would still be periods of recession and recovery. What may have changed in recent decades is the readiness of authorities to shore up inefficiency by bailing out those who have made unfortunate investment decisions.

3.2.6 Summary

International systemic risk is an elusive concept. It is hard to pin it down in the variety of historical episodes before and after World War II reviewed in this section. Fears of systemic risk may be harmless if they do not encourage policies that damage the prospects for a stable noninflationary environment worldwide.

4. Stock Market Linkages

The emergence of a truly global capital market in the past decade has created both opportunities and risks. Some developing countries now have access to developed country equity capital. At the same time they may be subject to waves of favorable and unfavorable investor sentiment in the larger equity markets. The high volatility in stock returns noted in section 2 above may be due in part to the spread of shocks from the U.S. and Japanese stock markets.

Here we present an estimate of the magnitude of possible contagion effects associated with equity markets. After controlling for the effects of common macroeconomic fundamentals, we find in some cases that shocks are amplified as they cross national borders.

4.1 Correlation Among Raw Returns in the Emerging Markets

We analyzed quarterly stock market data from 1984:2 to 1995:1 for five emerging countries (India and Korea in Asia and Chile, Mexico, and Venezuela in Latin America) and for their major trading partners, Japan and the United States.[3] Some market commentators view the emerging markets as a single market because of the high correlation among observed stock returns. This result in our view reflects the fact that these countries share common macroeconomic fundamentals.[4] For example, a recession in the U.S. decreases exporters' profits, which depresses their share prices.

The correlation matrix in Table 1 shows the comovement of stock market returns (log differences of broad national share indices) among the five

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3. The source of the data is the International Monetary Fund's IFS data base. We are indebted to Tam Bayoumi of the IMF for providing the data.

4. Pindyck and Rotemberg (1993) make a similar point in the context of individual company returns on U.S. stock markets.

emerging markets. The comovements are of the same order of magnitude that Kasa (1995) reports for developed countries. Comovements, in addition, are not strictly regional. Chile's stock returns are almost as strongly correlated with Korea's as with Mexico's.

A more formal test of the hypothesis of common market comovements can be based on the entire correlation matrix. If the returns are independent, then the correlation matrix Π of stock returns should be a diagonal matrix. The statistic,

$$\lambda = -2\log[\det\Pi]^{N/2} \tag{4.1}$$

where N is the time series sample size. λ is distributed $X^2(q)$ where q is the number of off-diagonal elements in the lower triangle of Π. For the correlations among the five emerging countries, $\lambda = 19.708$, which enables us to reject the hypothesis at a 99 percent confidence level given only 10 degrees of freedom.

4.2 Controlling for Fundamentals

The country stock returns should move together only to the extent that their fundamentals are correlated. Accordingly, we controlled for the common movements in the fundamental determinants of stock returns. We regressed the returns for each country on its lagged returns, the change in the spot exchange rate, the current and capital account surpluses, a short-term interest rate, and the inflation rate.[5] We then focused on the residuals from these regressions.

Table 2 reports the results. The model fits most of the countries

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5. The regressions can be regarded as instrumental variables estimates. We do not claim that every possible fundamental factor has been incorporated. We can, however, be sure that the residuals are not correlated with any of the included variables.

reasonably well. Only the Venezuelan regression explains less than 5 percent of returns. Statistically significant current or capital account shocks are present in all the developing country for which we have data.

In Table 3 we report the residual correlation matrix after controlling for macroeconomic factors. [6] The cross-correlations are markedly lower in several cases. In particular, the Mexican and Chilean correlation falls by almost one-half. For the emerging markets group, $\lambda = 15.906$, too low now for us to reject that the returns are independent.

4.3 Propagation

To see whether movements in emerging stock markets were particularly vulnerable to movements in larger markets, we included the U.S. and Japanese stock return residuals in the correlation matrix in Table 3. Even after accounting for common macroeconomic effects, we find that the stock returns are no longer independent. With the U.S. and Japan included, $\lambda = 59.041$, which, even with 21 degrees of freedom, leads us to reject the hypothesis at better than the 99 percent level.

To estimate the magnitude of developed country propagation, we included, in the fundamental regressions for each emerging market returns, either U.S. or Japanese stock returns from the current period and two lags. In principle, these regressions capture the effects of large country stock returns on the emerging markets, independent of their common macroeconomic factors. Treating these regressions as quasi-vector autoregressions, we solve for the impulse response functions and report the cumulative effects four quarters after the initial shock.

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6. These results are probably sensitive to both the number of emerging markets and the sample period covered.

The numbers in Table 4 show the effects of a 1 percent shock to the U.S. or Japanese stock market on their trading partners.[7] A 1 percent increase in the Japanese stock market, for example, is followed by only a 0.08 percent increase in the U.S. stock market. The same shock, however, increases Korea's stock market by 0.50 percent and Venezuela's by 0.17 percent.

Propagation is particularly strong in the Latin American region in response to U.S. shocks. A 1 percent shock to the U.S. market moves Chile's market by 1.07 percent. The markets in Venezuela and Mexico also suffer bigger shocks than the source country. A 1 percent movement in the U.S. increases Venezuela's returns by 1.68 percent and Mexico's by 3.40 percent.

The developed countries have little to fear from independent movements in the emerging markets. In 1992:3, for example, the Mexican market fell 10 percent while the U.S. market gained 0.5 percent. Similarly, the 17.8 percent decline in Mexico in the first quarter of 1995 had no effect on the strong rally in the U.S. stock market in the first half of the year.

Conversely, movements in the large country equity markets can cause large ripple effects abroad in both negative and positive directions. The U.S. market fell 10.4 percent during the quarter of the October 1987 crash, while the Mexican market fell three times as much, 31.15 percent. The U.S. market rally in 1990-91 boosted the Mexican market an average of 10.16 percent per quarter from 1991:2 to 1992:1.

Changes in stock prices are transmitted to other countries by their effects on aggregate demand. A decline in stock market wealth, for example, is thought to lower consumption, including imports, and to lower investment by

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7. The 1 percent is with respect to the mean of the lagged level of the series.

its effect on Tobin's *q*. For open economies like Mexico and Canada, changes in U.S. aggregate activity are thought to transmit their effects through the balance of payments. To the extent that our list of independent variables is complete, our analysis traces propagation across equity markets *independent* of these macroeconomic effects. A latent variable, such as investor sentiment, seems to amplify shocks in several cases. Our regressions indicate that a routine correction of 10 to 15 percent in the U.S. stock market could result in a 30 to 40 percent decline in Mexican share prices.

Whether or not such potential contagion effects, even if they impose significant wealth losses on investors, should be of concern to policy makers depends only on whether they create fears that the demand for loans will not be met or that the payments system will be imperiled. Otherwise, stock price comovements represent just another example of pseudo-systemic risk.

5. Lessons from the Record

We believe that the following lessons emerge from our survey of the literature and historical episodes in which international systemic risk was featured as well as statistical evidence on comovements of national stock price indices:

1. A lender of last resort can forestall threats to the payments system associated with bank runs and stock market crashes. It does so by injecting high-powered money into the monetary system at a rate equal to the increased demand for currency that prevents a sharp decline in the means of payment and enables banks to satisfy an increased demand for loans. It should be known in advance to which central bank foreign banks can turn for advances in case of need.

2. Until the world adopts a single currency, an international lender of

last resort has no role. Which high-powered money would an international lender at present be authorized to supply without limit? Dollars? Yen? Each central bank can deal with liquidity needs of its home country. The proposal to expand the role of the IMF to give it international lender-of-last-resort authority or to transform it into a bankruptcy court raises serious questions (Sachs 1995). Which base money would the IMF issue? SDR's that each country would monetize? Arranging bankruptcy for sovereign debtors is likely to impair their ability to borrow, rather than be a source of support when they are in financial distress.

4. Markets monitor risks. Investors, provided information is not withheld from them (as happened in 1994 with respect to Mexico), will shun entities where they perceive uncompensated risk and flock to entities with more inviting returns. Emerging stock markets are an example.

5. Although there is evidence of possible contagion effects between developed and emerging country stock markets, it represents another source of pseudo-systemic risk. The fact that holders of emerging country funds suffer wealth losses in developed countries is no different than wealth losses stemming from other causes. For both developed and emerging countries only if the payments mechanism is impaired or there is uncertainty that the demand for loans by sound debtors will be met is there true systemic risk.

References

Beenstock, Michael (1987). "Discussion," in Richard Portes and Alexander K. Swoboda (eds). Threats of International Financial Stability. Cambridge: Cambridge University Press. pp. 186-188.

Bernanke, Benjamin and Harold James (1991) "The Gold Standard, Deflation, and Financial Crisis in the Great Depression: An International Comparison." in R. Glenn Hubbard (ed) Financial Markets and Financial Crisis. Chicago: University of Chicago Press. pp. 32-68.

Benston, George J. (1994). "International Harmonization of Banking Regulations and Cooperation Among National Regulators: An Assessment." Journal of Financial Services Research, September 8. pp. 201-25.

Bordo, Michael D. (1986). "Financial Crises, Banking Crises, Stock Market Crushes and the Money Supply: Some International Evidence, 1870-1933" in Forrest Capie and Geoffrey E. Wood (eds). Financial Crises and the World Banking System. London. MacMillan Press. pp. 190-248.

Cagan, Philip (1965). Determinants and Effects of Changes in the Stock of Money, 1875-1960. New York: Columbia University Press.

Cairncross, Alex and Barry Eichengreen (1983). Sterling in Decline. Oxford: Blackwell Publishers.

Calomiris, Charles and Joe Mason (1994). "Contagion and Bank Failures in the Great Depression: The June 1932 Chicago Banking Panic." NBER Working Paper No. 4934 (November).

Darby, Michael R. (1994). "Over The Counter Derivatives and Systemic Risk to the Global Financial System." NBER Working Paper No. 4801, July.

Davis, E. P. (1992). Debt, Financial Fragility and Systemic Risk. Oxford: Clarendon Press.

Diamond, Douglas W. and Dybvig, Philip H. (1983). "Banks Runs, Deposit Insurance, and Liquidity," Journal of Political Economy, 91(3) June, pp. 401-19.

Eichengreen, Barry (1992). Golden Fetters. Oxford: Oxford University Press.

Eichengreen, Barry and Richard Portes (1987). "The Anatomy of Financial Crisis." in Richard Portes and Alexander K. Swoboda(eds) Threats of International Financial Stability. Cambridge: Cambridge University Press. pp. 10-57.

Eichengreen, Barry and Albert Fishlow (1995). "What is Different About the Recent Wave of Lending to Developing Countries?" (June). U. of California, Berkeley, mimeo.

Eisenbeis, Robert (1995) "Private Sector Solutions to Payments System Fragility." University of North Carolina. (Mimeo) January.

Fisher, Irving (1932). Booms and Depressions. New York: Adelphi.

Fisher, Irving (1933). "The Debt Deflation Theory of Great Depressions," Econometrica, Vol. 1, pp. 337-57.

Folkerts-Landau, David (1991). "Systemic Financial Risk in Payment Systems," Chapter I in International Monetary Fund. Determinants and Systemic Consequences of International Capital Flows. Occasional Paper 77. Washington, D.C.

Friedman, Benjamin (1986). "Increasing Indebtedness and Financial Stability in the United States," in Debt, Financial Stability and Public Policy. Federal Reserve Bank of Kansas City.

Friedman, Milton and Anna J. Schwartz (1963). A Monetary History of the United States, 1867-1960. Princeton: Princeton University Press.

Goldstein, Morris (1994). "International Aspects of Systemic Risk," Institute

for International Economics. Mimeo, December.

Goldstein, Morris and Folkerts-Landau, David (1993). International Capital Markets. Part II Systemic Issues in International Finance. World Economic and Financial Surveys. Washington, D.C., International Monetary Fund. Goldstein, Morris (1994). "International Aspects of Systemic Risk," Institute for International Economics. Mimeo, December.

Gorton, Gary and Richard Rosen (1995). "Banks and Derivatives." NBER Working Paper No. 5100. April.

Grossman, Richard (1993). "The Macroeconomic Consequences of Bank Failures Under the National System." Explorations in Economic History. 30, July, pp. 294-320.

Guttentag, Richard and Jack Herring (1987). "Emergency Liquidity Assistance for International Banks" in Richard Portes and Alexander K. Swoboda. (eds) Threats of International Financial Stability. Cambridge. Cambridge University Press. pp. 186-188.

Harvey, Campbell R. (1994a). "Predictable Risk and Returns in Emerging Markets." NBER Working Paper 4621.

Harvey, Campbell R. (1994b). "Conditional Asset Allocation in Emerging Markets." NBER Working Paper 4623.

Humphrey, David B. (1986). "Payments Finality and Risk of Settlement Failure." in Anthony Saunders and Lawrence J. White (eds) Technology and the Regulation of Financial Markets Securities, Futures and Banking. Lexington Mass: Lexington Books.

Jacklin, Charles J. and Sudipto Bhattacharya (1988). "Distinguishing Panics and Information -Based Bank Runs: Welfare and Policy Implications." Journal of Political Economy, 96(3) June, pp. 568-97.

Kasa, Kenneth (1995). "Comovements Among National Stock Markets." Federal Reserve Bank of San Francisco Economic Review (1), pp. 14-20.

Kaufman, George (1994). "Bank Contagion: A Review of the Theory and Evidence." Journal of Financial Services Research. April 8, pp. 123-50.

Kaufman, Henry (1986). "Debt: The Threat to Economic and Financial Stability," in Debt, Financial Stability and Public Policy. Federal Reserve Bank of Kansas City.

Kindleberger, Charles (1978). Manias, Panics and Crashes: A History of Financial Crises. New York: Basic Books.

King, Mervyn (1994). "Debt Deflation: Theory and Evidence." Papers and Proceedings of the Eighth Annual Congress of the European Economic Association, 27-29 August 1993, pp. 419-45.

Krugman, Paul (1991). "International Aspects of Financial Crises," in Martin Feldstein (ed.) The Risk of Economic Crisis. Chicago: University of Chicago Press, pp.85-108.

Laurent, Robert (1994). "Monetary Policies in the Early 1990s -- Reflections on the Early 1930s." Federal Reserve Bank of Chicago Working Paper Series WP- 94-26 (December).

Levich, Richard (1988). "Financial Innovations in International Financial Markets" in Martin Feldstein (ed.) The United States in the World Economy. Chicago: University of Chicago Press. pp. 215-257.

Mackay, Robert J. (1994). "Derivatives and Systemic Risk: Issues, Views and Analysis: Virginia Polytechnic Institute. December.

Minsky, Hyman (1977). "A Theory of Systemic Fragility," in Edward J. Altman and Arthur W. Sametz (eds.) Financial Crises: Institutions and Markets

in a Fragile Environment. New York: Wiley, pp.138-152.

Mishkin, Frederick S. (1991). "Asymmetric Information and Financial Crisis: A Historical Perspective." in R. Glenn Hubbard, ed. Financial Markets and Financial Crisis. Chicago: University of Chicago Press, pp. 69-108.

Morgenstern, Oskar (1959). International Financial Transactions and Business Cycles. New York: National Bureau of Economic Research.

Mussa, Michael and Goldstein, Morris (1993). "The Integration of World Capital Markets," in Changing Capital Markets: Implications for Monetary Policy. Federal Reserve Bank of Kansas City.

Padoa-Schioppa, Tommaso and Saccomani, Fabrizio (1994). "Managing a Market-Led Global Financial System," in Peter B. Kenen (ed.) Managing the World Economy: Fifty Years after Bretton Woods. Washington, D.C.: Institute for International Economics, pp. 235-268.

Pindyk, Robert S. and Rotemberg, Julio J. (1993). "The Comovement of Stock Prices," Quarterly Journal of Economics 108(4), November, pp. 1073-1104.

Sachs, Jeffrey (1995). "Do We Need an International Lender of Last Resort?" Paper delivered as the Frank D. Graham Lecture, Princeton University, April 20, 1995.

Saunders, Anthony (1987). "The Interbank Market, Contagious Effects and International Financial Crises," in Richard Portes and Alexander K. Swoboda (eds.) Threats to International Financial Stability. Cambridge University Press.

Schubert, Aurel (1991). The Credit-Anstalt Crisis of 1931. Cambridge: Cambridge University Press.

Schwartz, Anna J. (1988). "Financial Stability and the Federal Safety Net," in Rose Marie Kushmeider and William S. Haraf (eds.) Restructuring Banking and Financial Services in America. Washington D.C: American Enterprise Institute, pp. 34-62.

Schwartz, Anna J. (1986). "Real and Pseudo-Financial Crises," in Forrest Capie and Geoffrey E. Wood (eds.) Financial Crises and the World Banking System. London: MacMillan Press, pp. 11-31.

Summers, Lawrence H. (1991). "Macroeconomic Consequences of Financial Crisis." in Martin Feldstein (ed). The Risk of Economic Crisis. Chicago:University of Chicago Press. pp.135-157.

Wicker, Elmus (1995). The Banking Panics of the Great Depression. New York: Cambridge University Press (forthcoming).

Table 1

Correlation Matrix of Stock Returns

1984:2 to 1995:1

	Chile	India	Korea	Mexico	Venez.	Japan	U.S.
Chile	1.000						
India	0.070	1.000					
Korea	0.318	-0.176	1.000				
Mexico	0.350	0.136	0.359	1.000			
Venez.	-0.128	0.080	-0.005	0.088	1.000		
Japan	0.056	-0.414	0.518	0.241	-0.041	1.000	
U.S.	0.321	-0.029	0.200	0.612	0.168	0.382	1.000

Table 2

Stock Returns and Economic Fundamentals*

	Lag(-1)	Lag(-2)	ΔFX	Cap. Acc.	Curr. Acc.	Int. Rate	Infl.	$\bar{R}^2$
Chile	0.0755	0.0147	0.075	-0.008	0.034	0.000	0.003	0.345
	(0.63)	(0.12)	(0.36)	(0.74)	(2.64)	(0.29)	(1.53)	
India	0.299	0.008	-0.156				-0.002	0.099
	(0.00)	(0.12)	(1.40)				(1.32)	
Japan	0.348	-0.136	0.110	0.001	0.000	0.001	-0.003	0.172
	(5.16)	(1.57)	(1.03)	(0.40)	(0.03)	(0.15)	(1.57)	
Korea	0.082	-0.042	-0.396	0.031	0.020	-0.011	0.005	0.282
	(0.65)	(0.50)	(1.71)	(0.19)	(1.67)	(3.28)	(1.44)	
Mexico	-0.197	-0.069	-1.918	0.036	0.058	0.005	-0.019	0.334
	(0.00)	(0.00)	(2.44)	(2.35)	(2.45)	(1.07)	(1.61)	
U.S.	0.242	-0.100	0.188	0.000	-0.000	-0.000	-0.000	0.071
	(2.13)	(1.26)	(0.80)	(0.09)	(0.36)	(0.02)	(0.05)	
Venez.	0.101	-0.053	-0.017			0.002	0.001	0.026
	(0.91)	(0.65)	(0.12)			(0.94)	(0.38)	

*T-statistics are in parentheses. All the regressions include a constant term which is not reported. ΔFX is the log difference of the nominal exchange rate. Cap. Acc. and Curr. Acc. are the current and capital account surpluses, respectively. The inflation rate is the annualized quarterly change in consumer prices.

Table 3

Correlation Matrix of Stock Return Residuals

1984:2 to 1995:1

	Chile	India	Korea	Mexico	Venez.	Japan	U.S.
Chile	1.000						
India	0.072	1.000					
Korea	0.274	-0.110	1.000				
Mexico	0.201	0.354	0.239	1.000			
Venez.	-0.166	0.056	-0.010	0.043	1.000		
Japan	0.022	-0.376	0.363	-0.078	0.049	1.000	
U.S.	0.359	-0.030	0.265	0.564	0.037	0.298	1.000

Table 4

Four Quarter Impulse Responses from Large Country Shocks

1984:2 to 1995:1

	1% US Shock	1% Japanese Shock
Chile	1.079%	0.175%
India	0.942	-0.097
Korea	0.838	0.496
Mexico	3.398	-0.220
Venezuela	1.682	-0.058
U.S.		0.079
Japan	-0.059	