

Exchange Rate Stability and Financial Stability

Barry Eichengreen
University of California, Berkeley
June 1998

Most of the literature on the choice of exchange rate regime pays little mind to implications for financial stability. Contributions typically focus on factors emphasized by the theory of optimum currency areas: economic size and openness to trade, the flexibility of labor markets, and the incidence of macroeconomic shocks (Mundell, 1961). McKinnon (1963) hints at the importance of financial factors, suggesting that countries with deep financial markets will prefer to float. Heller (1976) argues the opposite, that countries with integrated and developed financial markets will prefer to peg. But neither these nor other authors systematically analyze the significance of financial structure for the optimality of exchange-rate arrangements or the implications of the exchange rate regime for the stability of the financial system.

In this paper I consider these connections, focusing on the implications of international monetary arrangements for the stability of the banking system. I ask questions like the following. Under what conditions can a currency peg jeopardize the stability of the banking system? Can adopting a peg set in motion processes that weaken the banks, themselves the linchpin of the financial system? Once the banking system weakens, how serious an obstacle is the currency peg to lender-of-last-resort intervention?

The timeliness of these questions is clear. Since the 1970s banking crises have been endemic in both developing and advanced industrial economies. Casual observation suggests

a connection between exchange rate policy and banking problems. The Argentine banking crisis of 1980 and the Chilean crisis of 1981, two early examples, occurred in countries pursuing exchange-rate-based stabilizations (Sundararajan and Balino 1991). Finland, Norway and Sweden experienced banking crises in the 'eighties and 'nineties while operating ecu or basket pegs (Goldstein and Folkerts-Landau 1993). The banking systems of the CFA franc zone deteriorated in the 1990s, culminating in 1994 in the first devaluation of the franc-zone currencies in nearly 50 years. Mexico and Argentina, which experienced banking crises in 1994-5, both entered the period committed to policies of exchange-rate pegging (though Mexico was soon compelled to abandon its crawling peg). The banking-cum-financial crises experienced by Thailand, South Korea and Indonesia all occurred in the context of exchange rate regimes characterized by limited flexibility (although Korea and Indonesia both moved toward greater flexibility just before or just when the crisis struck).

While cases such as these would appear to establish a presumption that countries pegging their exchange rates are especially prone to banking crises, counterexamples also exist. The savings-and-loan crisis in the United States and the Japanese banking crisis of the 1990s, for example, both occurred under floating rates. These cases flag the fact that the relationship between exchange rate and banking stability is complex.

Here I employ historical evidence to shed light on the relationship between banking crises and exchange rate arrangements. This makes it possible to do more than simply compare banking crises under pegged and floating rates; in addition, we can compare countries with tightly and loosely regulated financial systems, with and without controls on international capital flows, and with histories of high and low inflation. We can compare

countries with and without central banks and with and without deposit insurance. We can compare countries which have recently pegged their currencies as part exchange-rate-based stabilizations against countries, long-lived currency pegs, and countries, in which the behavior of wages, prices and interest rates suggests that the markets vest different degrees of credibility in the government's commitment to stabilizing the nominal rate.

These more detailed comparisons lead one to question any monocausal explanation for banking crises, including one which would emphasize the maintenance of a currency peg. To some extent this follows from the standard textbook wisdom: whether fixed or flexible exchange rates are preferable depends on the source of disturbances. For example, when threats to the stability of the banking system take the form of fluctuations in world interest rates that make it more difficult for banks to fund themselves offshore, there will be a case for exchange rate flexibility to discourage the banks from relying excessively on external sources of finance and to enhance the capacity of the domestic authorities to act as lenders of last resort. Conversely, when the main threats to the stability of the banking system emanate from erratic monetary policies at home, there will be an argument for attempting to peg the exchange rate in order to discipline domestic policymakers and vent shocks via the external sector. From this point of view, it is no surprise that there is no simple correlation between the exchange rate regime and the prevalence of banking crises.

The paper develops these ideas in four steps. Section 1 introduces the issues. Section 2 discusses banking crises under the 19th century gold standard, a prime hunting ground for anyone investigating the connections between exchange rate and financial stability. Section 3 contrasts the interwar period, the heyday of financial instability and an obvious contrast with

the classical gold standard. Section 4 then provides a selective survey of recent experience with banking crises and exchange rate policies. The conclusion, Section 5, summarizes the implications.

I. Analytical Issues

Any discussion of the connections between exchange rates and banking crises must start by defining variables.

A. Definitions

I distinguish two aspects of exchange arrangements: the flexibility of the domestic-currency price of foreign exchange, and the convertibility of the currency. Exchange rate flexibility can range from pegged to freely floating.¹ And whether the exchange rate is pegged or allowed to vary, the domestic currency can be freely convertible into foreign exchange by market participants, or convertibility can be limited by statute.² Internal convertibility may be limited or free; that is, the right to convert bank liabilities into gold or foreign exchange at par (or, for that matter, at any price) may or may not be restricted.

Following Bordo (1985, 1986) and Caprio and Klingebiel (1997), I define a banking crisis as a situation where actual or incipient bank runs or failures lead banks to suspend the internal convertibility of their liabilities or force the government to intervene to avert this by replacing a significant share of bank capital.

¹ As in Eichengreen (1994), I use the term "pegged" rather than "fixed" on the grounds that supposedly fixed exchange rates can always be "unfixed."

² Universally or for specified transactions.

B. The Exchange Rate and the Causes of Banking Crises

Gavin and Hausmann (1996) provide a catalog of macroeconomic factors that can contribute to banking crises, distinguishing shocks to bank assets from shocks to bank liabilities. Shocks to asset quality include recession (which can cause insolvency among borrowers, adversely affecting their ability to repay), adverse terms of trade movements (which will similarly undermine creditor solvency), erratic fiscal policies (which will affect borrowers' ability to repay by raising interest rates), and bubbles in financial markets (like markets for real estate). Factors affecting bank funding include expected depreciation (which will reduce the demand for domestic-currency deposits), the availability of domestic credit (which will affect the liquidity of the interbank market), and world interest rates (which affect the ability of banks to borrow abroad).

Given the heterogeneity of this list, it is hardly surprising that no one exchange rate arrangement is necessarily best for contending with shocks to the banking system. Standard models suggest that floating exchange rates will be advantageous when disturbances are primarily monetary and primarily foreign, since in this case exchange rate changes can largely insulate the domestic economy. They suggest that pegged rates are preferable when shocks are associated mainly with unstable domestic monetary and financial policies, since pegged rates will then work to discipline erratic policymakers. This textbook logic is directly applicable to the case at hand. If shocks to the banking system are associated with changes in the level of world interest rates, exchange-rate flexibility can help to insulate the economy and the banks. It introduces an element of risk that limits the magnitude of the capital inflows

when world interest rates are unusually low and enhances the capacity of the domestic authorities to act as lenders of last resort.

On the other hand, if shocks to the banking system are domestic and associated mainly with erratic monetary policies, there may be a case for pegged rates. A propensity toward erratic monetary policies will be discouraged when the government is committed to a currency peg (and capital markets are open). There is less scope for policy to disturb interest rates when the exchange rate is credibly pegged and capital controls are absent.³ This is the logic for currency boards and other strategies of binding policymakers' hands by tying the exchange rate to the mast.

This discussion assumes that the currency peg is credible. In countries where the exchange rate is used as a nominal anchor in disinflation programs, this is not necessarily the case. In such cases the transition to price stability can be accompanied by large capital inflows. Residents borrow abroad to finance consumption and imports of durable goods for fear that the stabilization of prices is only temporary. Households borrow from banks, which fund loans by borrowing offshore. Foreign investors are willing to lend insofar as interest rates remain high (in part reflecting the incomplete credibility of the program). The currency peg limits exchange risk for foreign banks and other lenders confident of their ability to repatriate their funds before the stabilization breaks down. Thus, foreign funds flow into the domestic banking system in the early stages of stabilization, leading to a lending boom and a deterioration in asset quality. The lending-based consumption boom means a current-account deficit and dependence for balance-of-payments equilibrium on the continued inflow of foreign

³ By implication of the interest parity condition.

funds. If that inflow dries up for any reason (including doubts about the permanence of the stabilization), an exchange rate crisis will ensue in which investors withdraw their money from the banks to avoid capital losses on domestic-currency-denominated assets. The exchange rate crisis can lead to a banking crisis which magnifies the impact of the former (Goldfajn and Valdes 1995).⁴

The next section, in discussing the response to financial crises, considers the lender of last resort. It is worth anticipating that discussion insofar as last-resort lending can itself affect the incidence of crises. One argument to this effect, due to Diamond and Dybvig (1984), is that the existence of a lender of last resort eliminates the scope for self-fulfilling bank panics. These authors emphasize that even banks solvent in the absence of a run can fail when a run occurs, for the simple reason that bank liabilities are more liquid than bank assets. Bank deposits are demandable, but loans can be liquidated only with time or at a loss. When some depositors queue up at the till, others have an incentive to do likewise to avoid being denied redemption of their claims; if information is asymmetric, a bank run can be self-fulfilling. And banks being linked by the interbank market and the payments and clearing system, bank runs can spread contagiously and degenerate into panics. But if depositors are confident that the central bank or government will provide the liquidity the bank needs to meet the demands of its creditors, depositors will have no incentive to withdraw their funds. The

⁴By implication, the idea that pegged exchange rates are desirable where macroeconomic disturbances are domestic in origin needs to be qualified where the response to those internal dislocations is exchange-rate-based stabilization. An elegant theoretical treatment of the point is Edwards and Vegh (1997). After first establishing that a temporary stabilization is likely to ignite a domestic consumption boom financed in part by large capital inflows, they then show that in a model in which the creation of bank credit and deposits is costly and has real effects, exchange-rate-based stabilization cycles also lead to cycles in output and employment.

prevalence of self-fulfilling runs and panics may thus depend on the presence or absence of a lender of last resort. Hence, a rigid currency peg which limits the scope for last-resort lending (under circumstances discussed in subsection C below) can increase the incidence of banking panics.

The counter-argument is that last-resort lending is a source of moral hazard that itself increases the prevalence of banking problems. Insured depositors having little incentive to scrutinize bank balance sheets, depositor discipline is weakened. Banks will bias their portfolios toward risky investments, since the distribution of returns will be truncated downward. Moral hazard can be limited by bailing out depositors but not banks (by being sure that bank management suffers consequences), by making last-resort loans costly (obeying Bagehot's rule), and by extending last-resort loans only to banks that submit to regulatory surveillance. Only then will the presence of a lender of last resort prevent banking panics without at the same time encouraging other equally costly financial problems.

C. The Exchange Rate and the Response to Banking Crises

Under a rigid currency peg, the central bank has no capacity to undertake lender-of-last-resort operations. The textbook currency board law, for example, requires that each unit of domestic currency issued by the central bank or currency board be backed by a unit's worth of foreign exchange. While Bagehot's rule instructs the central bank to support the banking system by lending freely at a penalty rate, the textbook currency board is prohibited by statute or constitution from issuing the domestic currency unless it possesses foreign exchange. If it does not possess excess reserves, it may be precluded from providing liquidity to the banks.

A similar constraint can bind countries with less rigid currency pegs. There may be one supply of central bank credit to the economy consistent with exchange rate stability but another larger supply needed to prevent the collapse of distressed financial institutions. Injecting credit into the financial system may therefore undermine confidence in the currency peg and provoke a balance-of-payments crisis, deterring a central bank which values the peg from aiding the banks even when it is not legally prevented from doing so.⁵

More realistically, the monetary authority may have some, limited room for maneuver even under a currency board. Reserves in excess of the statutory minimum may enable it to increase the supply of domestic credit without violating its currency board statute. A central bank with only the desire, not the statutory requirement, of pegging the exchange rate may be able to do the same. But while it may be able to increase the supply of domestic credit without exhausting its reserves, it may not be able to simultaneously peg the exchange rate.⁶

⁰ There are reasons to think that both velocity and output might be affected by banking crises, velocity insofar as ease of transactions is different for currency and deposits, output

⁵ A model of this relationship is Miller (1996), who considers bank failures and currency crises under the gold standard. In her model, a deterioration in bank asset quality leads households to shift from deposits to currency. The increase in currency demand prompts an inflow of capital and reserves, with which the monetary authority backs additional note emissions. Because that additional liquidity merely satisfies household demand, it does not offset the decline in deposits, a source of distress among financial institutions. If the monetary authority provides still more liquidity with the objective of aiding the banks, reserves will flow out, and intervention on behalf of the banking system may jeopardize the currency peg.

⁶ Imagine a banking panic that leads investors to withdraw x dollars from the banking system and to hold instead an additional x dollars of domestic currency. x dollars of foreign capital flows in, is added to the central bank's stock of reserves, and backs the emission of x additional dollars of currency. The money supply (currency plus deposits) is unchanged. If output and velocity are unchanged, domestic prices are unchanged (by the quantity equation: $MV = PY$).

insofar as bank panics reduce the efficiency of the financial sector. Miller (1996) considers a case where asset market equilibrium (and therefore prices) depend on high-powered money rather than the money stock broadly defined, and shows that there are conditions under which bank runs can lead to reserve inflows and strengthen the exchange rate, but that particular specification does not appear relevant to the general case under discussion here.⁷

In general, only if instruments like sterilized intervention are effective for stabilizing the exchange rate in the face of changes in the money supply is there scope for last-resort lending under pegged rates. The central bank can offset the exchange-rate effects of the additional domestic credit by selling foreign-currency-denominated bonds from its portfolio for their domestic-currency equivalent (where the foreign-currency-denominated bonds are the excess reserves) so long as sterilized intervention works. Unfortunately, the evidence on sterilized intervention is mixed, many observers questioning its effectiveness. If it is ineffectual, there will be no way for the central bank to avoid having to choose between exchange rate stability and financial stability.⁸

If the central bank is precluded from lending, the government may still intervene in its stead. It may have balances with the central bank that it can transfer to the commercial banks. This can be thought of as an increase in the demand for deposits and for money (on the part of the government), which will help to restore bank liabilities to pre-crisis levels. Thus, under

If the exchange rate is given by purchasing power parity, then the exchange rate is unchanged. But if the central bank now issues additional domestic currency (above and beyond x) in order to recapitalize the banking system, M will begin to rise, along with the price level and the exchange rate.

⁸ For a survey of the literature see Dominguez and Frankel (1993).

the early-20th century gold standard, the U.S. government transferred deposits from U.S. treasury accounts to the commercial banks in periods of financial stringency (see Section II below). The Argentine Government helped to recapitalize the banking system in the wake of the 1994-5 tequila crisis (see Section IV).

These options are open not just to governments and central banks with resources in reserve but also to those which can borrow abroad. A government or central bank obtaining a foreign loan can replenish bank capital without changing the balance-sheet position of the consolidated public sector (aside from increasing its external obligations). Examples of the use of foreign loans to finance last-resort lending under a pegged exchange rate include loans to the Bank of England by the Bank of France and the Russian Government in 1890 (Section II) and the loan to the Argentine Government by the International Monetary Fund in 1995 (Section IV).

Finally, there is the possibility of invoking an exchange-rate "escape clause" to reconcile the exchange rate commitment with last-resort lending. If the disturbance provoking the crisis is verifiable by third parties and not of the authorities' own making, then the latter may be able to suspend their defense of the currency peg without damaging the credibility of their commitment to its long-term maintenance.⁹ Investors will know that the authorities are suspending defense of the exchange rate only until they sort out the banking system's problems. Although the exchange rate may depreciate temporarily, capital will flow in from abroad in anticipation of the restoration of the previous parity when the additional domestic credit is eventually withdrawn from the financial system. These stabilizing capital flows will

⁹ See Canzoneri (1985) and Obstfeld (1993).

limit the currency depreciation associated with the temporary provision of additional domestic credit.

Thus, the escape-clause provision can help to reconcile an exchange rate commitment with last-resort lending. But that escape clause can be invoked without damaging the credibility of the exchange rate commitment only under the limited circumstances detailed in the preceding paragraph. Recourse to the escape clause will not be available to governments and central banks at all times and places.

II. The Gold Standard

If pegged exchange rates are conducive to banking crises, then one would expect to see a proliferation of the latter in the gold standard years. In fact, crises were not uncommon, although their frequency varied across countries. This points to the importance of institutional arrangements as a determinant of the success with which exchange rate stability and financial stability were reconciled.

A. Institutional Arrangements

Exchange rates were widely though not uniformly pegged to gold and hence to one another under the classical gold standard.¹⁰ 34 of the 39 countries studied by Eichengreen and Flandreau (1996a) were on some form of gold standard in 1908.¹¹ In all but three of those 34 countries, banks issuing paper money were obliged to redeem their notes for specie. Where

¹⁰ For present purposes, 1890 to 1913. Prior to 1890 adherence to the gold standard was spotty (Eichengreen and Flandreau, 1996a, Table 1).

¹¹ The term "standard" refers to the asset — in this case, gold — that was legal tender in unlimited amounts and could be freely coined.

the currency was inconvertible — in Austria, Italy, and pre-1910 Greece -- additional issues could produce a premium on specie; that is, the price of notes in terms of currency could vary, introducing an element of exchange rate flexibility. But the exchange rate was pegged within narrow bands vis-a-vis other gold standard countries.¹²

Gold standard pegs, like all pegged rate systems, still offered a limited degree of exchange rate flexibility. Fluctuation bands under the gold standard were made up of two components.¹³ One reflected transactions costs, the other "the gold devices." In England these devices included the Bank of England's right to pay out old Sovereigns (whose foreign exchange value was less than that of newly-minted, full-bodied coins). The central banks of formerly bimetallic countries like France, Belgium and Italy had the further option of redeeming their notes in depreciated silver. This allowed them to maintain wider fluctuation bands, although some central banks made only limited use of this freedom.¹⁴

Institutional arrangements also differed along a number of further dimensions.¹⁵ While in some countries domestic financial conditions were tightly linked to the gold and foreign exchange reserves of the banks under rules specified by the gold standard statutes, elsewhere

¹² The remaining five countries in the Eichengreen-Flandreau sample (Guatemala, Honduras, Salvador, China and Persia) were on silver standards (Persia was officially bimetallic but no gold circulated). While their exchange rates could vary against the gold-based currencies, those exchange rates depended mainly on aggregate supplies and demands in global markets for precious metals, not on economic policies or conditions in any one country. For present purposes these countries too can be thought of as operating exchange rate pegs.

¹³ As described at more length by Eichengreen and Flandreau (1996b).

¹⁴ In France, for example, it was thought that the central bank should not more than double the size of the fluctuation band, while Italy used its room for maneuver more liberally.

¹⁵ The definitive account of these arrangements is Bloomfield (1959).

this link was loosened by the practice of holding excess reserves, by provisions that allowed the reserve ratio to slip below the legal minimum under specified conditions, and by the practice of suspending the convertibility of currency into gold in the event of exceptional circumstances.¹⁶ Some countries had central banks in which those reserves were concentrated, others (such as Canada, Australia, New Zealand) not. Some central banks were aware of their lender-of-last-resort responsibilities, while others denied their existence.

Various authors have tabulated the incidence of banking crises under the gold standard. For the United States, Schwartz (1988) identifies bank panics in 14 of the 141 years between 1790 and 1930. Bordo's (1985, 1986) chronology covers six countries (the United States, Britain, France, Germany, Sweden and Canada) for six decades (1870 to 1933): he identifies 16 banking crises (characterized by bank runs or failures) and four panics (in which runs and failures forced the suspension of payments). In the classical gold standard period, the major crises were 1873, 1884, 1890, 1893 and 1907 in the United States, 1882 and 1889 in France, 1901 in Germany, and 1914 in both the U.S. and Canada.

B. The United States

The dominance of the United States in lists of 19th century banking crises points to the structure of the country's monetary and financial system as a determinant of crisis incidence. The literature on financial crises in the U.S. can be traced back to the studies conducted for the National Banking Commission (e.g. Sprague 1910). In accounting for the prevalence of banking and financial problems this literature points to the fragmented structure of the banking

¹⁶ Thus, in Belgium reserves could slip below the legal minimum upon the authorization of the finance minister, while in Austria-Hungary, Germany, Italy, Japan and Norway they could do so if the central bank paid a tax.

system, such as prohibitions on interstate branching, which limited banks' ability to diversify their portfolios and risks.¹⁷ It highlights the magnitude of cyclical and seasonal fluctuations in the demand for money and credit, which led to sharp fluctuations in bank assets and liabilities.¹⁸ It emphasizes the absence of a central bank which limited the ability of the federal government to manage credit conditions.¹⁹

Given the strength of agrarian and silver-mining interests, the country's commitment to defending its fixed dollar parity was less than complete. Inflationist interests lobbied for the free coinage of silver, making the gold standard a political issue in the 1892 and 1896 presidential elections. Suspending convertibility temporarily threatened to reinforce investors' doubts about the depth of the exchange rate commitment and to destabilize expectations; hence, the escape clause provision of the gold standard was not available until the Gold Standard Act of 1900 removed remaining doubts about the country's commitment to the regime.

With no central bank to operate a discount window or to engage in open market operations, using monetary policy to head off panics would have been awkward in any case. Contemporaries like Kemmerer (1910) complained of the "inelasticity" of the currency -- that

¹⁷ Thus, it is revealing that the Canadian monetary system shared many features with that of the United States -- including no central bank and an inelastically supplied currency -- and yet experienced a minimum of serious financial crises before 1914 (Rich 1989), a contrast that is plausibly attributable to its more widely branched and concentrated banking system.

¹⁸ On the role of seasonal factors, see Eichengreen (1984) and Miron (1986). On the role of cyclical instability in precipitating financial crises, see Gorton (1988).

¹⁹ Although some central banking operations were in fact undertaken by the Treasury; see below.

supply did not accommodate demand, causing interest rates to spike up in the spring and the fall, when planting and crop moving augmented money demand. Banking panics were concentrated in those same seasons, when the banks were least liquid (reflecting the increase in credit demand on the part of their customers). The inelasticity of the currency provided one motivation for the founding of the Federal Reserve System in 1913.

The U.S. Treasury had some capacity to ameliorate these strains. It could borrow abroad to augment the resources that it could marshal in defense of the dollar and the banking system. In 1895 Treasury Secretary J.G. Carlisle negotiated a contract with a syndicate of international bankers, led by the Morgan and Rothschild houses in London, to borrow some \$60 million of gold from foreign countries. The Belmont-Morgan Syndicate, as this consortium was known, also agreed to protect the Treasury against gold withdrawals and continued doing so for nearly a year and a half (Garber and Grilli, 1986; Eichengreen 1992).

In addition, in the first decade of the 20th century, Treasury Secretary Shaw restored the earlier practice of running down the Treasury's cash balance when the money market tightened. Each autumn he transferred government deposits from subtreasuries to national banks designated as depositories for public funds and augmented the public's currency holdings by purchasing government bonds or prepaying interest due. Most experts believe, however, that Treasury operations made only a modest contribution to relieving financial strains (see e.g. Timberlake 1963, 1978).

More important were the banks' self-help measures. The major urban banks had established clearing houses for netting claims on one another; these developed into mechanisms for exchanging information and dealing with difficulties that might prevent

particular banks from making good on their debts. In the event of a serious crisis, the members of the clearing house might suspend the convertibility of their deposits into gold and currency. The suspension of the convertibility of deposits into currency relieved distressed banks of the need to obtain liquidity from other banks to meet the demands of their depositors, which in turn prevented the crisis from spreading through the financial system. During the period of suspension, banks might make payments with specially-issued clearing house certificates (which traded at a discount relative to currency and gold).²⁰ These certificates were issued in every major financial crisis from 1857 through 1914. A bank obtained certificates from the clearing house upon submitting acceptable (if illiquid) collateral, and the other members stood ready to accept them in payment of intra-clearing-house debts. Thus, under clearing house cooperation, strong banks effectively provided liquidity to their weaker counterparts.²¹

Moreover, because the suspension of internal convertibility was regarded as temporary, it attracted international capital flows. Foreign investors would buy domestic bank

²⁰ Meanwhile, the banks, in the words of Friedman and Schwartz (1963, p.328), “continued to make loans, transfer deposits by check, and conduct all their usual business except the unlimited conversion of deposits on demand.” Armaos (1992) analyzes suspensions of convertibility from a theoretical perspective and shows conditions under which they can be an efficient response to a bank run.

²¹ In the words of Cannon (1910), p.12, "In times of panic it is not infrequently the case that a bank in good standing becomes temporarily embarrassed. Unfortunate report may cause a run upon it, and, being unable to call in a sufficient amount of its outstanding loans to meet the demands of frightened depositors, it must either secure a loan or fail. In such an emergency the other members of the clearing house are usually willing to render assistance until the strain is relaxed."

deposits at a discount relative to currency in anticipation of reaping capital gains once internal convertibility was restored (Miller, 1996).

The U.S. under the gold standard thus provides an example of an inflexible currency peg which provided the authorities little scope for last-resort lending. Seasonal and cyclical shifts in the demand for money repeatedly strained the banking system. The absence of a central bank constrained the management of money and credit. Limited credibility precluded recourse to temporary suspensions of the dollar parity. While Treasury operations, foreign loans and clearing house cooperation prevented financial difficulties from precipitating a complete breakdown of the banking system, as in the 1930s, they did not preclude repeated crises.

C. Great Britain

The Bank of England and British Government, having effectively been on the gold standard since 1717, enjoyed a level of credibility matched in few other countries. They therefore found it straightforward to invoke the escape clause provision of the gold standard in times of crisis. In 1847, 1857 and 1866 they suspended the statute linking the Bank of England's note issue to the gold reserve held by the Issue Department.²² Clearing banks which saw asset quality deteriorate could discount at the Bank of England, which financed these operations using excess gold reserves in the Banking Department. If the Banking Department ran dry, a Treasury letter relieved the Bank of England of the need to back each additional

²² As emphasized by Bordo and Kydland (1995). Horsefield (1953) notes that the Bank itself had suggested that an explicit escape clause be built into the 1844 Bank Act, but Peel omitted it from the final legislation. The first occasion on which this was done, the financial crisis of October 1847, is studied in depth by Dornbusch and Frenkel (1984).

currency note with gold, enabling it to continue discounting. Because there was no question that the relevant provision of the 1844 Bank Act would be restored as soon as the crisis passed, capital flowed in stabilizing directions, and the exchange rate hardly weakened.²³

Recourse to a Treasury letter would be taken only under exceptional circumstances. At other times the Bank of England could head off problems by altering its discount rate. Raising the discount rate attracted gold from abroad, augmenting the reserves of the Banking Department. Lowering the rate encouraged the clearing banks to rediscount and raise their liquidity. In times of crisis the Bank discounted freely at a penalty rate, combining the two procedures. Thus, while financial crises were anything but absent from Britain in the gold standard years, the presence of a central bank that could adjust its discount rate to moderate seasonal and cyclical strains meant that such crises were relatively few and far between.²⁴

The Bank of England did not always respond in the manner of a modern central bank. It was criticized in the 1866 crisis for refusing to meet the demand for discounts and for failing to grant advances against government securities.²⁵ Still a profit-oriented, officially private

²³ As Hughes (1984) put it, "Once the London financial world realized that a Treasury letter could always be counted on to be forthcoming, the Bank's crisis-proven management technique conceivably added long-term stability to expectations and thus to the gold standard itself." He continues "Conceivably." Hughes suggests that this crisis-management technique remained untested for the remainder of the gold standard period because growth slowed and therefore financial fluctuations moderated relative to earlier years.

²⁴ Especially in the final third of the 19th century, and especially in comparison with the United States.

²⁵ Bagehot (1873, repr. 1902, pp.64) observed that in 1866 there was "an instant when it was believed that the Bank would not advance on Consols, or at least hesitated to advance on them. The moment this was reported in the City and telegraphed to the country, it made the panic indefinitely worse." Schwartz (1986) calls 1866 the last real financial crisis in Britain.

(continued...)

entity, it could succumb to the temptation to sell securities in periods of stringency to raise cash for itself.

The “up side” of the Bank of England’s ambiguous status was that it could cooperate with other private banks in arranging lifeboat operations. In 1890, for example, not only did the Bank borrow abroad to replenish its reserves, enabling it to freely discount Baring’s bills, but it cooperated with Rothschilds and other merchant banks to support the price of Baring’s securities. The members of the syndicate promised to make good any loss sustained by the Bank in the course of liquidating Baring’s position (establishing a guarantee fund) in return for the power to effectively assume control of Barings’ affairs. Thus, the fact that it was at the same time a central and private bank allowed the British financial system to be supported both by countercyclical central bank operations, as in other Continental European countries, and by intra-bank cooperation, as in the United States.

The Bank of England’s ability to shape financial conditions was limited by the fact that it commanded a shrinking share of transactions on the London market over the course of the 19th century. The Bank’s reserve was a mere 3 per cent of the British money supply from the 1860s and fell to less than two per cent at times of crisis. In the wake of the 1866 crisis the Bank therefore sought to augment its reserve; it made similar efforts in the aftermath of the 1890 crisis. While additional reserves meant additional room for maneuver, the reserve constraint might still bind, prompting the Bank to solicit foreign assistance. Faced with the Baring Crisis, Rothschilds negotiated on the Bank’s behalf a L3 million gold loan from the

(...continued)

Still, the Bank did lend freely enough to prevent the failure of Overend and Gurney from bringing down the entire nation’s banking system.

Bank of France against Treasury bills and William Lidderdale of the Bank of England obtained half that sum from Russia to ensure that the gold reserve ratio would not be violated (Pressnell 1968). In 1906 and 1907, again faced with financial stringency, the Bank once more obtained foreign assistance from the Bank of France and, this time, from the German Reichsbank. In 1909 and 1910 the Bank of France again discounted English bills, making gold available to London.

Thus, the British case is one where the exchange-rate commitment and management of the domestic financial system were relatively well reconciled. The credibility of the country's commitment to the gold standard facilitated use of Treasury letters and bills of indemnity, relieving the Bank of the consequences of violating provisions of the 1844 Act and allowing the exchange-rate escape clause to be invoked and domestic financial problems to be addressed. The existence of a central bank that accumulated excess reserves and actively managed domestic credit conditions minimized crises in the final third of the 19th century. Repeated recourse to foreign assistance allowed the central bank adjust policies in ways that might otherwise have been impossible owing to the inelasticity of reserves.

III. The Interwar Gold Standard

During World War I these institutional arrangements were placed in abeyance. The gold standard as restored in the 1920s was a very different creature.

A. Institutional Arrangements

Friedman and Schwartz (1963, p.346) note that “[t]he more extensive use of deposits [was] widely regarded during the twenties as a sign of the great progress and refinement of

the American financial structure...” Where in 1907 the American public had held \$6 of deposits for every \$1 in currency, by March 1931 the deposit/currency ratio had risen to more than 10. The same trend was evident in other countries. This increased the excess reserves that governments and central banks had to hold in order to accommodate panic-induced shifts from deposits to currency. Unfortunately, there was no commensurate rise in the reserve backing of the currency (and, by implication, in the authorities’ capacity to issue additional gold-backed currency if investors shifted out of deposits).²⁶ To the contrary, the excess of gold reserves over the statutory minimum fell from \$5.0 billion to \$3.6 billion between 1913 and 1927.²⁷ While the scope for a shift from deposits to currency was now greater, central banks’ capacity to accommodate it was less.

The standard remedy, according to those concerned to create an elastic currency, was to establish central banks where they did not exist. The United States had founded one, the Federal Reserve System, in 1913. To prevent this new institution from issuing credit too liberally, its statutes required the Federal Reserve to back monetary liabilities not collateralized with gold (or silver dollars, silver certificates and greenbacks) with “eligible” paper, namely commercial, agricultural and industrial securities and bankers acceptances. These and not government bonds were the only securities that could be discounted or purchased in open market operations when the Fed lacked “free gold” above that required by statute. How tightly the free-gold constraint bound prior to its abolition 1932 (under the

²⁶ In fact the ratio of reserves (including both gold and foreign exchange) to the currency and other sight liabilities of central banks was little changed from 1913.

²⁷ On the assumption that central banks held as much foreign exchange as they were legally permitted. League of Nations (1930), p.98.

provisions of the first Glass-Steagall Act) is a disputed issue. The fact that legislators saw it as important to eliminate this provision in the depths of the slump suggests that eligible securities might grow scarce when economic activity turned down, making it difficult for the Fed to discount such securities in order to support the financial system.

The lack of an adequate investment portfolio initially prevented the Federal Reserve from employing open market operations, while an overhang of short-term government debt discouraged it from actively manipulating the discount rate until the debt had been funded in 1920. But by the mid-'twenties the Fed had emerged as a leading player in international financial markets. Whether this dominant player had a clear conception of its lender-of-last-resort responsibilities is another question. Confusion about its priorities may have been a consequence of institutional inexperience.²⁸ But it is also true that different factions within the Federal Reserve System had different views of the causes and consequences of bank failures and of the desirability of last-resort lending; some viewed commercial and financial failures as a healthy corrective which purged financial excesses from the economy and were therefore disinclined to engage in lender-of-last-resort operations.²⁹

An indirect effect of the creation of a U.S. central bank was the decline of self-help by American financial institutions. The restriction of payments, emission of clearing house certificates, and assistance for weak banks by their stronger clearing house partners that had been commonplace before 1913 were not repeated between the wars. Friedman and Schwartz

²⁸ A point to which I return in my discussion of the European Central Bank in Section IV below.

²⁹ As I have argued elsewhere, the Fed's failure to respond to bank failures cannot be fully understood without reference to this "liquidationist view."

(1963, pp.311-2) attribute the decline of lifeboat operations to the advent of the Fed. Establishing a central bank created a presumption that concerted action by commercial banks was no longer necessary. The Fed's existence weakened the incentive for stronger banks to aid their weaker counterparts, since they could now replenish their liquidity through alternative channels — namely, at the Fed's discount window — and hence were not in the same boat as the weaker banks.

Similar trends were evident elsewhere, for example in Western Europe. The expectation that central banks would intervene to stabilize the clearing system meant that strong banks no longer saw it necessary to support their weaker counterparts in order to protect themselves. In some cases the authorities sought to engineer shotgun marriages between banks as a substitute for lifeboat operations: the merger of the Austrian Kreditanstalt with the Bodenkreditanstalt is one example; the Austrian government imposed this merger on the reluctant chairman of the Kreditanstalt to protect the National Bank from losses on the rediscounts it had previously extended the now insolvent smaller bank.³⁰

Governments elsewhere — in Latin America and Eastern Europe — established central banks along similar lines, often following the model of the United States.³¹ But where

³⁰ Another example is the Royal Bank of Scotland's take-over of Williams Deacons in 1929-30, with Bank of England assistance (see Sayers 1976, pp.235-259). The German Government was involved in the Dresdner Bank's absorption of the Danat Bank and the merger of the Commerz- und Privat-Bank A.G. with the Barmer Bank-Verein Hinsberg, guaranteeing the Danat Bank's foreign obligations and injecting funds into the Commerz- und Privat-Bank. Friedman and Schwartz (1963) discuss the Canadian authorities' resort to preventive bank merger in 1930. And the Italian authorities relied on forced merger and reorganization in dealing with that country's 1931-32 banking crisis.

³¹ And with the advice of American apostles of central banking like the Princeton professor
(continued...)

one justification for founding the Fed had been to establish an elastic currency, many of these other central banks created in its image operated under gold-standard statutes which rigidly linked their note issues to their international reserves. This reflected the desire to create a central bank as a device for insulating monetary policy from political pressures (Simmons, 1994). The experience with floating exchange rates in the early 'twenties reinforced the belief that the alternative to autonomous central banking was monetary chaos, exchange-rate volatility and, ultimately, hyperinflation. Even countries like France, which had long possessed central banks, reformed their monetary statutes to limit the ability of those entities to undertake discretionary open market operations. Hence, the restored gold standard was characterized by an element of rigidity not shared by its prewar predecessor.³²

Nor was the gold standard escape clause invoked as readily as before World War I. The credibility of the authorities' commitment to the maintenance of convertibility was now tempered by political and economic developments that shattered the constellation of political power upon which the prewar policy regime had been based.³³ Adopting the corporatist strategy for securing labor peace, wartime governments encouraged the spread of unionism. Issues that had previously remained outside the political sphere, such as the determination of wages and employment, became politicized. Extension of the franchise and the growth of

(...continued)

Edwin Kemmerer (the same Kemmerer whose 1910 book is cited above).

³² Grossman (1984) notes that the Reichsbank, the Netherlands Bank and certain other continental central banks were also limited in their ability to conduct open market operations.

³³ This is a subject about which I have written previously. The version of the argument here is from Eichengreen (1995).

political parties dominated by the working classes intensified the pressure to adapt policy toward employment targets. When employment and balance-of-payments goals clashed, it was no longer clear which would dominate. Doubt was cast over the credibility of the commitment to gold. No longer did capital necessarily flow in stabilizing directions; now it might do the opposite, intensifying the pressure on countries experiencing a loss of reserves.³⁴

This rendered governments and central banks reluctant to invoke the exchange-rate escape clause. With the credibility of their commitment to convertibility in doubt, a temporary suspension could permanently damage their reputation for defending the exchange rate peg. By allowing the rate to depreciate they might be thought to be manipulating it under cover of their contingent rule, announcing the existence of exceptional circumstances when these did not exist or producing those circumstances themselves. Reassurances that the suspension was temporary might be dismissed, and capital would no longer flow in to cushion the currency's fall. Governments and central banks consequently hesitated to invoke the escape-clause provision of the gold standard for fear of damaging their reputations.³⁵

³⁴ Those responsible for fiscal policy enjoyed even less insulation from political pressures than their counterparts in central banks, the war having shattered earlier understandings regarding the distribution of the fiscal burden. The level and composition of taxes had been radically altered, while incomes had been redistributed. Economic interest groups now fought a fiscal war of attrition, resisting any and all increases in taxes and all reductions in transfer payments. Even in countries where central bankers had retained considerable independence from political pressures, fiscal policy became politicized. And without a fiscal consensus, there was no guarantee that taxes would be raised or government spending cut when required to defend the gold standard.

³⁵ Temporary suspensions of the sort observed in the 19th century thus did not take place under the interwar system. The closest approximation was Roosevelt's abandonment of gold convertibility in 1933, which was restored in January 1934, but not at the pre-suspension parity.

The difficulty of resorting to temporary suspensions placed a premium on foreign assistance to replenish reserves. Unfortunately, the requisite level of cooperation was not forthcoming. Three obstacles blocked the way: domestic political constraints, international political disputes, and incompatible conceptual frameworks. Special interest groups with the most to lose were able to stave off adjustments in economic policy that would have facilitated international cooperation. Disputes over war debts and reparations contaminated efforts to redesign and cooperatively manage the gold standard system. Incompatible conceptual frameworks prevented policymakers from reaching a common understanding of their economic problem, let alone agreeing on a solution.

B. The Exchange Rate and the Interwar Financial Crisis

The global expansion of the second half of the 1920s was driven by capital flows from the principal financial centers, notably New York, to countries in earlier stages of economic development and to those where postwar reconstruction and adjustment were still underway. Latin America and East-Central Europe, two leading destinations of U.S. funds, were representative of these two groups of countries. Although much of the literature on foreign lending in the 1920s (viz. Lewis 1938) focuses on bond and stock markets, considerable quantities of foreign capital in fact flowed through the banks. Banks in East-Central Europe and Latin America borrowed offshore, soliciting foreign deposits and floating bonds under their own names. In the depths of the interwar depression German banks (other than the Reichsbank) had nearly \$1 billion of short-term liabilities to foreigners, nearly half of all German short-term debt. The banks accounted for a third of all short-term debts in Hungary,

a quarter in Bulgaria, half in Romania, and four fifths in Poland.³⁶ Given the fractional-reserve structure of these banking systems, the foreign funds that flowed through these institutions had a magnified impact on economic activity.

All the while, the gold standard's pegged exchange rates worked as a powerful magnet for foreign funds. As before the war, the gold standard was regarded as a “good housekeeping seal of approval” for countries seeking to borrow abroad (Bordo and Rockoff 1996). It signaled that they had returned to sound and stable policies. It suggested that exchange risk was minimal. In some cases, like Germany in the aftermath of the war, foreign funds anticipated the return to gold (Holtfrerich 1986), but in most they waited on stabilization and the resumption of gold convertibility

This dependence on foreign funds proved problematic when U.S. lending fell off in the summer of 1928 and global economic activity declined. Not only did the banks experience a funding shock (foreign markets displaying a sudden reluctance to lend), but they were simultaneously exposed to a shock to asset quality (as farm loans fell into delinquency and industrial concerns began failing). Declining agricultural commodity prices led to farm mortgage delinquencies and weakened the condition of rural banks. The rise in U.S. interest rates made it increasingly difficult for banks outside the United States to borrow offshore and fund their loans. And the collapse of prices and production in the Depression led to a dramatic deterioration in asset quality and performance.

Banking crises were widespread: by Grossman's (1994) count, they occurred in Austria, Belgium, Estonia, France, Germany, Hungary, Italy, Latvia, Norway, Poland,

³⁶ League of Nations (1933), p.269.

Romania, Switzerland, Yugoslavia and the United States.³⁷ Yet they were not universal: Bulgaria, Canada, Czechoslovakia, Denmark, Finland, Greece, Lithuania, Portugal, Spain, Sweden and the UK proved immune. There is no shortage of explanations for the contrast: Grossman cites bank branching, size and concentration, the condition of the macroeconomy, and the prevalence of lender-of-last-resort intervention. But the single most important variable in his econometric tests of crisis incidence is the exchange rate. Countries which depreciated their currencies starting in 1931 had a significantly lower probability of experiencing banking crises than those which remained on gold. Revealingly, all of the countries listed in the second sentence of this paragraph as escaping banking crises abandoned the gold standard at a relatively early date.

Grossman suggests several reasons why the maintenance of a currency peg adversely impacted the banking system. Most countries imported the destabilizing macroeconomic impulse from abroad; and countries with pegged exchange rates quite logically enjoyed less insulation from this shock.³⁸ Such countries had less leeway for responding with expansionary monetary and fiscal policies. And their central banks had less capacity to engage in last-resort lending.

As explained above, the combination of imperfect credibility, which discouraged resort to the exchange-rate escape clause, and obstacles to international cooperation rendered the

³⁷ An alternative list, which is broadly overlapping, is provided by Bernanke and James (1991).

³⁸ As in the standard textbook model. This point is perhaps most persuasively documented by Choudri and Kochin (1980).

scope for central bank action especially limited. The German case illustrates the point.³⁹ While the German Bank Law authorized the General Council of the Reichsbank to reduce the cover ratio to less than the 40 per cent minimum required by statute under exceptional circumstances, this measure was not invoked for fear of damaging confidence in Germany's commitment to gold. The government's budgetary problem was conspicuous, and the association of budget deficits with inflation had been burned into investors' consciousness by the hyperinflation ten years before. The Social Democrats opposed all cuts in unemployment benefits; the military objected to cuts in defense spending; agriculture demanded subsidies to offset the collapse of farm prices; and the Reich Association of German Industry pressed for cuts in corporate taxes.

Under such circumstances, anything less than strict adherence to the gold standard encouraged the fear that deficits would reignite inflation. The markets had no confidence that an abridgement of Germany's gold standard would be temporary. The psychological effect of breaching the 40 per cent cover requirement, Hans Luther, Reichsbank President warned, might be "absolutely fearful." Hans Schaeffer, Reich State Secretary, warned that breaching the 40 per cent limit could "precipitate a massive flight from the mark." German officials found it difficult to argue that the disturbance to the financial system was not of their own making (as would have been necessary to avoid damaging their credibility). Among Bruning's priorities was a reparation settlement, and the weaker Germany's payments position, the stronger the case for concessions by the Allies. Bruning was therefore accused of pursuing policies that aggravated Germany's payments problem.

³⁹ I draw this discussion from Eichengreen (1994b).

For all these reasons, the Reichsbank's ability to act as lender of last resort was severely constrained. The 1931 financial crisis did not take long to reveal this fact. When the failure of the Austrian Credit-Anstalt spilled over to the German banking system, the Reichsbank responded initially by injecting liquidity. But the faster funds were poured into the banking system, the faster they leaked back out. Providing liquidity signaled that the authorities attached as much weight to propping up the banking system as to defending the gold standard. Realizing that convertibility might be compromised and that with devaluation they would incur capital losses on domestic assets, investors rushed to get their money out of the country. Reserves were depleted, forcing the authorities to drain liquidity from the banking system in order to defend the exchange rate. By the end of the third week of June, the Reichsbank was forced to ration credit. Almost immediately a full-fledged banking panic ensued.

A couple of weeks passed before the government finally closed the banks, during which it sought foreign support. Luther solicited a \$100 million loan from the Bank of England, the Federal Reserve and the Bank for International Settlements. Although this money was made available in a matter of days, no further credits were granted. Montagu Norman of the Bank of England insisted that this was impossible so long as there remained uncertainty about Germany's willingness to pay reparations. Clement Moret of the Bank of France demanded as a condition for assistance that the German government renounce Bruning's request to reopen reparations negotiations. George Harrison of the Federal Reserve Bank of New York made his support for further credits contingent on an extensive list of financial and economic conditions. Here, then, was a clear case where the deterioration

of the international political climate prevented central bank cooperation and heightened the conflict between exchange rate stability and financial stability.

While other national cases were less dramatic, the same underlying forces were at work. The gold standard heightened the banking system's exposure to the foreign shock. Not only did it constrain lender-of-last-resort intervention, but it rendered it counterproductive insofar as the provision of liquidity excited devaluation expectations. Countries prepared to abandon the currency peg were better able to stabilize economic activity and support their banking systems.⁴⁰ It is noteworthy that no major banking crises occurred after countries left the gold standard.⁴¹

IV. The 1980s and 1990s

⁴⁰ Hori (1996) estimates monetary policy reaction functions for a panel of 24 countries, using annual data from 1929 to 1937. Dividing his sample into observations for countries on and off the gold standard, he detects no tendency for countries on the gold standard to reduce their discount rates in response to a banking crisis, but a significant tendency in this direction for countries off gold.

⁴¹ Only the United States might be thought to be different. There the macroeconomic disturbance was home grown rather than imported. And authors like Friedman and Schwartz deny that the exchange-rate constraint significantly constrained lender-of-last-resort intervention. The argument that it did emphasizes the free gold constraint prior to the Glass-Steagall Act (Wicker 1966; Eichengreen 1992), fears of declining reserves in the summer of 1932 (Epstein and Ferguson 1984), and doubts about Roosevelt's commitment to defending the dollar parity in the winter of 1932-3 (Wigmore 1987). Hori (1996) documents a break in the Fed's monetary-policy reaction function in March 1933 when the country left gold. Before that there was no tendency for the Fed to reduce the discount rate in response to an increase in the deposits at suspended banks; thereafter it does so in a statistically significant way. This evidence suggests that the U.S. was not all that different from other countries in which exchange-rate stability and financial stability were at odds.

The end of World War II inaugurated four decades of tranquility in the global banking system.⁴² White (1992) identifies several factors contributing to this stability.⁴³ Economies were growing buoyantly prior to the first the OPEC oil-price shock. The fact that a stable world price level was maintained through the 1960s, as a corollary of the operation of the Bretton Woods System, enhanced the transparency of loan and collateral evaluation (Schwartz 1988). With prices and interest rates relatively stable, the book and market values of bank assets and liabilities never moved far out of line. Competition from nonbank intermediaries developed only slowly, reflecting the relative stability of financial services technologies. Finally, banks were protected from excessive competition by a heavy layer of regulation. Thus, banking stability was sustained by a combination of favorable microeconomic and macroeconomic circumstances.

A. Recent Experience⁴⁴

All this changed in the 1970s. Inflation increased the difficulty of assessing credit quality, while the two OPEC oil shocks undermined borrowers' ability to repay. Rising interest rates accentuated adverse selection, as safer borrowers dropped out of the market. Petro-dollar recycling encouraged money-center banks to seek out higher-yielding investments abroad. Much of this money was channelled through developing-country banks who acted as agents for their national governments or as independent borrowers. This same ample supply

⁴² Tranquility **relative** to the periods before and after.

⁴³ While his analysis focuses on the United States, his conclusions are applicable more broadly.

⁴⁴The one important industrial-country case that is not considered under this heading is the Japanese banking crisis, which is still unfolding at the time of writing.

of funds weakened the incentive for the money-center banks to carefully scrutinize the quality of the customers approaching them for loans.

The Volcker disinflation brought this lending boom to a halt. Interest rates rose, and U.S. economic growth slowed. The large and growing budget deficits of the first Reagan Administration placed additional upward pressure on interest rates. It is no coincidence that the Savings & Loan crisis followed on the heels of these events. 80 per cent of the industry's assets were fixed rate mortgages, the return on which no longer matched the cost of attracting funds.⁴⁵ The decline in agricultural land prices (by as much as 30 per cent) in the succeeding five years, itself a function of tighter credit conditions, then compounded the plight of S&L's in the American West.⁴⁶ Although restrictions on the geographical diversification of S&L's investments had been phased out in the 1960s, tradition and limited management competence left their investment portfolios regionally concentrated, allowing regional economic cycles to disproportionately affect bank balance sheets.

But while these financial difficulties were associated with macroeconomic factors, they were not associated with pegged exchange rates. The exchange rate was not a precipitating factor in the S&L crisis, nor was it a constraint on lender-of-last-resort intervention.

Throughout the 1980s the dollar fluctuated (in the first half of the decade, in the virtual

⁴⁵ BIS (1989), p.94. Commercial bank failures also soared in the 1980s, suggesting that this was not just a mortgage-related phenomenon.

⁴⁶ The fall in oil prices in 1985 made for further difficulties for S&Ls in the Southwest in particular.

absence of intervention by the U.S. authorities).⁴⁷ Nor did concern for the exchange rate prevent the government and the Fed from launching the most expensive bank bailout in history in the second half of the 1980s. Owing largely to this response, the macroeconomic disturbances of the late 'seventies and early 'eighties did not culminate in a full-scale financial meltdown like that of the Great Depression.

The developing countries were on the other end of the lending boom of the 1970s. The debt crisis in which that boom culminated is too well known to be recounted here. What are relevant for present purposes are the role of the exchange rate and the consequences for the banks. The typical sequence of events was financial liberalization followed by exchange-rate-based stabilization and large-scale foreign borrowing. In many cases the maintenance of pegged rates predictably amplified the ebb and flow of foreign funds. Argentina, for example, used a crawling peg as a stabilization tool from late 1978 through early 1981. With exchange risk minimized, residents were able to borrow offshore: there was a boom in real estate markets, apartment prices in Buenos Aires rising by 50 per cent between 1977 and 1980. Inevitably, however, the exchange-rate peg together with inertial inflation resulted in overvaluation, and the competitive difficulties of Argentine exporters set the stage for recession. When the Argentine economy turned down in early 1980, a banking crisis erupted almost immediately. As capital inflows fell off, real lending rates turned strongly positive, leaving borrowers financially strapped and banks saddled with an overhang of nonperforming

⁴⁷ Indeed, some authors have argued that an exchange-rate constraint, had it existed, would have forced the United States to reign in its budget deficit and stem the rise in interest rates and the dollar, thereby relieving the problems of the banks. See e.g. Bergsten and Henning (1996).

loans. By the end of 1982, 43 financial institutions, including the country's largest commercial bank, had been liquidated.

Chile in 1981 is another case where capital-account liberalization and exchange-rate-based stabilization unleashed a surge of capital inflows. In the second half of the 'seventies the banks were freed to borrow abroad in dollars (but not to assume exchange risk). Pegging the exchange rate encouraged the money-center banks to lend. Capital inflows fueled a consumption boom (partially in the form of consumer durables purchased by households skeptical of the durability of liberalization and stabilization), until the banking crisis in neighboring Argentina put sudden upward pressure on interest rates. The financial position of borrowers had already been undermined by a long period of overvaluation. As those borrowers experienced growing distress, the position of the banks was undermined. Eleven Chilean financial institutions accounting for 15 per cent of total loans had to be liquidated in 1981-82. Clearly, macroeconomic factors (and exchange rate policy in particular) aggravated the difficulties of the Chilean banking system, although Edwards (1995) convincingly argues that lax regulation and supervision also played a role by allowing the banks to succumb to adverse incentives.⁴⁸

While banking problems in Argentina and Chile preceded the developing-country debt crisis, the opposite was true in Colombia, Mexico, Peru and Uruguay. There, banking crises

⁴⁸ Especially in the Southern-Cone countries, inadequate information-disclosure requirements generated situations of adverse selection in which good and bad risks were not distinguished. As interest rates rose, riskier borrowers were the only ones still willing to borrow, and the quality of bank loan portfolios deteriorated. Macroeconomic instability exacerbated this situation by increasing the variance of project yields and making it particularly difficult for banks to rate risks (McKinnon 1991).

were precipitated by the curtailment of foreign financing in 1982. In each case the capital account had been liberalized and the exchange rate stabilized, encouraging inflows of foreign funds. The rise in the cost of borrowing and decline in credit availability consequent on the debt crisis in turn provoked loan defaults and bank insolvency. In most cases, the government responded to its deteriorating financial position by pressuring the central bank to print money. The resulting inflation further depressed the ratio of deposits to national income, which in turn undermined the banks' ability to fund loans and withstand runs.⁴⁹

The sequence typical of Latin America -- capital-account-cum-financial liberalization, followed by exchange rate pegging, macroeconomic disturbance, and banking crisis -- was also evident in muted form in Northern Europe. For the Nordic countries the 'eighties were a decade of deregulation and relaxation of restrictions on cross-border financial transactions.⁵⁰ Encouraged by stimulative monetary and fiscal policies, the banks, responded by lending freely, fueling a consumption boom and soaring real estate and equity prices.⁵¹ When central banks and governments finally retrenched to counter the inflationary consequences, bank

⁴⁹ Inflation caused a fall in deposits by depressing the demand for money. In many of these countries the authorities capped the interest rates at which the banks could lend as a way of guaranteeing the provision of cheap credit to the government; interest rate caps together with inflation were a deadly combination for deposits (Rojas-Suarez and Weisbrod 1996). BIS (1996) notes that a number of chronically high inflation Latin American countries continue to have ratios of bank credit to GDP well below those of other countries at similar stages of economic development, reflecting the instability of their macroeconomic environments.

⁵⁰ Measures motivated by the desire to retain the option of entering the European Union and the need to place growing amounts of public debt.

⁵¹ In Sweden, for example, these reduced unemployment to the lowest levels in a decade and raised inflation significantly relative to levels in the country's principal trading partners. Jonung and Stymne (forthcoming), p.37.

borrowers and the banks themselves ran into the wall. The Norwegian crisis, starting in 1986-7, was precipitated by a sharp decline in the price of oil (akin to that experienced by the U.S. Southwest on the eve of the S&L crisis), which raised the rate of corporate bankruptcy by nearly half between 1986 and 1989. A recession followed the drop in oil prices and led to sharp falls in commercial property prices (in 1987) and housing prices (in 1988). The Finnish crisis of 1990-1 was similarly precipitated by monetary tightening (in 1989) and by the collapse of trade with the Soviet Union.⁵² Sweden's crisis, which showed up in that country's finance companies in 1990-91, was affected by many of the same factors as in neighboring Finland and in addition by a tax reform introduced in the late 1980s which limited the tax deductibility of interest payments and put a damper on the housing market.⁵³

Having entered the 1980s poorly capitalized, Nordic banks had little cushion against loan losses; encouraged by lax supervision, they responded to problems with their portfolios by doubling up their bets.⁵⁴ In doing so they only dug themselves a deeper hole. Thus, in the Nordic countries, as in Japan, the banks' substantial stakes in the equity and real estate markets were a source of serious problems when asset prices collapsed.

Exchange-rate pegging was the final ingredient in this combustible mix. Norway, Finland and Sweden all pegged their currencies from 1983. Each operated a trade- (in the case of Norway, payments-) weighted peg until the early 'nineties, when they shifted to ecu

⁵² As well as by declining paper and pulp prices.

⁵³ An introduction to the Nordic banking crises is Moeller and Nielson (1995).

⁵⁴ Consistent with this interpretation, Danish banks, which had the strongest capitalization, survived the crisis of the 'eighties most easily despite having the largest losses and provisions as a percentage of lending.

pegs. Capital inflows were discouraged by limited exchange risk, and all three countries imported the higher level of European interest rates consequent upon German unification.⁵⁵ In Finland, banking and macroeconomic problems forced the government to devalue in 1991 and then abandon the peg in 1992. The devaluation of the markka undermined the financial position of Finnish corporations which had taken out foreign currency loans but had few foreign currency earnings, in turn aggravating the problems of the banks. In Sweden, there were widespread doubts about the durability of the exchange rate peg; as early as 1990 devaluation expectations led to a decline in deposits amounting to five per cent of GDP (Gavin and Hausmann 1996). Desperate attempts to defend the exchange rate peg in the autumn of 1992, which forced the central bank to raise lending rates to as much as 500 per cent, then increased the cost of funding loans relative to the return on assets (Wihlborg et al. 1994). In neither Finland nor Sweden were major banks allowed to fail; in both cases the government opted instead to abandon the currency peg, freeing it to run budget deficits and recapitalize the banks. Still, it can be argued that following a more flexible exchange rate policy previously would have averted some of the subsequent problems. Had the markka been allowed to float more freely, Finnish corporations without foreign-currency earnings would not have taken out unhedged foreign-currency loans to the same extent. Had the Swedish krona not been pegged so rigidly, it would not have been necessary to subject the country's banks to 500 per cent interest rates. Given the circumstances of the early 'nineties — German unification, a weak dollar, and uncertainty about the prospects for European monetary

⁵⁵ Jonung and Stymne (forthcoming) show that real interest rates in these countries climbed sharply after 1990.

unification — a unilateral currency peg meant an unstable macroeconomic environment and, potentially, problems for the banks.

A summary evaluation would thus be that the Nordic banking crises were compounded but not caused by exchange-rate policy. Their seeds were lax supervision and overly accommodating monetary and fiscal policies, and the crisis was precipitated by macroeconomic shocks emanating from Germany and the Soviet Union. While the Swedish and Finnish authorities ultimately abandoned their currency pegs in order to prop up their banking systems, their initial efforts to defend those currency pegs worked to magnify the effects of those external shocks.⁵⁶

The latest round of banking problems has been in emerging markets.⁵⁷ In Mexico, the confidence crisis associated with the December 1994 devaluation of the peso ratcheted up interest rates to the high double digits; firms relying on short-term bank credit and with dollar-denominated loans outstanding experienced severe distress, undermining the position of the banks. Bank balance sheets were already weak, reflecting the familiar combination of deregulation and lax supervision (Desmet and Mann 1996); the need to recapitalize the

⁵⁶ Another interesting parallel is with earlier efforts, discussed in previous sections of this paper, to rely on self-regulation. Traditionally, the Nordic banking industry has dealt with the problem of weak banks by arranging marriages with stronger partners. Self-regulation and mutual support may have worked less well in the 1980s than in earlier decades both because deregulation disrupted the cozy atmosphere in which the banks had previously operated but also because strong banks had no incentive to support their weaker counterparts once they came to believe that the government regarded them all as too big to fail (in parallel with Friedman and Schwartz's argument about the U.S. in the 1930s).

⁵⁷ One should probably include under this heading banking crises in the transition economies, although bad loans made by state-owned banks to state-owned enterprises make these a somewhat special case (Anderson et al. 1996).

banking system was a major factor in the Mexican government's decision not to repeg the exchange rate in early 1995. The larger banks (led by Banamex and Bancomer) were better able to cope with the shock by virtue of their relatively ample reserves. To contain the spread of problems, the Mexican government purchased subordinated debt from the banks in order to raise their capitalization; in addition it provided dollar loans to banks with dollar-denominated liabilities on relatively liberal terms. Finally, it liberalized rules governing the acquisition of Mexican banks by foreign financial institutions and encouraged large banks to absorb their smaller, weaker counterparts (although the large banks have been understandably reluctant to ascend the alter). This has forced the Zedillo Government to agree to buy bonds issued by troubled banks in an effort to recapitalize them without resorting to direct intervention.⁵⁸

Without question, macroeconomic policy — notably the overvaluation associated with the deadly combination of inflation and exchange-rate pegging — contributed to both Mexico's banking problems (by undermining the competitiveness of firms in the traded-goods sector and adding to nonperforming loans) and its balance-of-payments problems (again through deteriorating competitiveness but also by rendering the central bank reluctant to defend the currency by raising interest rates if that meant further worsening the condition of the banks). But the now-familiar combination of financial deregulation and lax supervision set the stage: the financial condition of many banks was already weak as early as 1992, prior to the recent episode of real appreciation.

Argentina's banks found themselves in the same position when they felt the reverberations of the Mexican crisis; in addition, banks in Buenos Aires held large stocks of

⁵⁸ If those bonds are not redeemed upon maturity they will be converted into shares.

Brady bonds, whose prices collapsed with Mexico's difficulties. Sensing that the exchange rate might have to be devalued, deposit withdrawals, amounting to some \$2 billion in two weeks, began in early 1995. Overnight rates reached 30 per cent in Buenos Aires in mid-January.⁵⁹ By the end of March, deposits in Argentine banks had fallen by \$7.5 billion (or 17 per cent), the most serious losses being suffered by smaller provincial and cooperative banks.

The convertibility law requiring the central bank to peg the exchange rate severely limited its ability to undertake lender-of-last-resort operations. The monetary authorities could reduce the banks' reserve requirements (from 33 to 30 per cent) to make liquidity available for meeting depositor demands and use their excess reserves to extend some \$2 billion extraordinary liquidity assistance above the limits of bank capital (Caprio 1997). They authorized banks with excess reserves to loan these to their weaker counterparts and persuaded the top five banks to provide some \$250 million. The government for its part loaned to the banks out of its own financial reserves, but the \$1 billion allocated for this purpose was exhausted by the end of April.⁶⁰ Only a major package of international assistance from the IMF, IBRD and IDB along with President Menem's reelection in mid-May 1995 quieted fears about the future of the convertibility law and the stability of the banks, leading a third of the deposits which had flowed out of Argentina's banks following the Mexican crisis to flow back in. Public funds were then used to finance the closure or privatization of the main provincial banks.

⁵⁹ At the same time, smaller banks saw their loan portfolios deteriorate as a result of currency overvaluation, slow growth and mounting unemployment.

⁶⁰ In addition, a deposit insurance scheme was implemented in April in an effort to restore depositor confidence.

This episode has been taken as confirming that developing countries vulnerable to sudden shifts in capital flows cannot afford to peg their currencies (viz. Sachs 1995). If the confidence of investors is disturbed, such countries can find themselves threatened by banking and balance-of-payments crises which will feed on one another in a vicious circle. Their central banks will have few options for responding to these crises. The counter-argument is that the problem in Mexico was not the exchange rate per se but the failure of the authorities to appropriately harmonize monetary and fiscal policies with the exchange rate peg. And, the critics continue, the case of Argentina shows that a government can undertake lender-of-last-resort operations even when maintaining a rigid currency peg.

Both objections are too simple. For Mexico it is now widely agreed that monetary and fiscal policies were only a minor part of the problem. Also important were a currency peg that offered one-way bets to speculators and large amounts of short-term, foreign-currency-denominated debt that offered scope for a debt run (Sachs, Tornell and Velasco 1996). Argentina for its part was able to support both its exchange rate peg and its banking system only because it received some \$8 billion of foreign financial assistance, mainly from the IMF, part of which was used to recapitalize the banks and fund a deposit insurance scheme. Thus, while Argentine experience confirms that a currency peg can be consistent with lender-of-last-resort intervention, it underscores the need for international cooperation.⁶¹

In the wake of its 1995 crisis, the Argentine government has taken steps to secure lines of credit with foreign banks upon which it will be able to draw in the event that another

⁶¹ Like that in which the Bank of England, the U.S. Treasury and other governmental institutions engaged in the 19th century.

crisis again compels it to inject liquidity into the banking system. In addition, it has imposed high reserve and capital requirements which limit the banks' ratios of liquid liabilities to liquid assets and therefore the resources that must be raised in the event of a run. High reserve requirements can also be lowered in the event of stringency, freeing up resources to meet depositors' demands. Thus, recent experience, like that of a hundred years ago, suggests that a rigid exchange rate peg and last-resort lending can be rendered compatible, but only in the presence of institutional arrangements specifically tailored to reconcile them.

B. The Asian Crisis

These same points are driven home by Asia's experience in 1997-8. The critical ingredients of that crisis were the familiar combination of lax supervision and regulation, implicit guarantees for bank creditors, and pegged exchange rates. Investors had again been encouraged to establish and maintain positions in emerging markets by the low level of interest rates in leading money centers. They funded themselves in mature markets and invested in Asia, the ample credit of which they made use reflecting the low level of interest rates in Japan and the United States.

Much of this was bank-to-bank lending. Asian banks with implicit guarantees had an incentive to fund themselves abroad and invest in high-yielding securities. Hence the stories of Korean banks obtaining funds from Japanese banks and investing in Indonesian corporate paper, Russian GKO's, and Brazilian Brady bonds. And Asian governments, having long regarded their financial systems as central to their national economic development strategies, were loath to let their banks fail. Aware of the tendency for governments in this position to

guarantee the liabilities of distressed domestic financial institutions, international investors were not deterred from lending by the riskiness of the banks' assets.⁶²

The exchange rate peg is critical to this story, comprising as it did a key link in the chain of implicit guarantees. The government purported to guarantee that the exchange rate would not be devalued, relieving foreign investors of all exchange risk. It purported to guarantee all bank deposits, relieving foreigners lending short to the financial system of all credit risk. These distortions created a one-way bet encouraging excessive capital inflows.

But, as in earlier episodes, the situation was not sustainable. The carry trade was susceptible to being disrupted by a modest move toward more restrictive global credit conditions. In the spring of 1997 this took the form of interest rate increases in the United Kingdom and Germany. Japanese long rates moved up from 2 to 2½ percent when the outlook for the Japanese economy appeared to brighten, and short rates firmed with talk that the Bank of Japan might raise rates by the end of the year.⁶³ Together with the appreciation of the dollar against the yen, which undermined the competitiveness of Asian countries that placed heavy weights on the dollar in their basket pegs, a slowdown in the global electronics industry, and mounting problems in some of the recipient countries, most notably Thailand, these developments curtailed the carry trade. The ability of the Thai government to honor its

⁶²Guarantees were not limited to the borrower side. Thus, it was European banks enjoying implicit guarantees, including state savings banks in Germany and institutions like Credit Lyonnais in France, that moved most aggressively into high risk, high yielding Asian loans. They were late to the party: even while American banks were winding down their exposure in Asia, European banks were continuing to build up their's. And Japanese banks, for their part, invested in high-yielding Asian securities as a way of gambling for redemption.

⁶³See Aliber (1998).

exchange rate commitment was cast into doubt. International banks and other investors closed out their long positions in Asian fixed-income securities and began shorting the baht as Thailand's vulnerability became apparent. What had previously been an excessive capital inflow became an unmanageable capital outflow.

The Mexican crisis had already led some far-sighted observers to suggest that the dominant source of financial crises in emerging markets was likely to be weak banking systems and weak bank supervision.⁶⁴ In Thailand, the failure of the finance companies appears to have been the trigger that set off the run on the currency. In other Asian countries, the timing of events was generally the reverse -- currency depreciation undermined the balance-sheet positions of banks and bank customers with unhedged foreign exposures, helping to precipitate a run on the banking system, which then further weakened the position of the banks -- but the weakness of financial systems and financial supervision was again key.

What lessons can be drawn from this most recent episode? While the advocates of pegged exchange rates have not fallen silent -- some of those alarmed by the instability of currencies in Asia continue to plump for currency boards and common basket pegs, and a few have even suggested that Asia may eventually be driven to emulate Europe in attempting to banish exchange rate instability from the region by establishing a common currency -- the dominant conclusion would nonetheless appear that the Asian crisis is simply more evidence of the irresistible pressures for greater exchange rate flexibility as a way of reconciling monetary stability with banking stability. Governments, in other words, need to introduce greater currency flexibility earlier rather than later as a way of encouraging banks and others

⁶⁴See for example Goldstein (1996) and Kaminsky and Reinhart (1996).

to hedge their foreign exposure and of introducing an element of risk that will work to moderate excessive capital flows.

The other lesson drawn is the importance of stricter prudential supervision and regulation of banking systems in both lending and borrowing countries.⁶⁵ Unfortunately, this is easier said than done. Political pressure for regulatory forbearance is intense. The specialized knowledge required to assess bank balance sheets is in short supply, nowhere more so in emerging markets. Efforts to loosen this bottleneck through technical assistance by the World Bank and banking-system surveillance by the IMF run up against personnel and expertise constraints of their own. The problem grows more intense as banks branch into new lines of business and with the proliferation of exotic, thinly-traded derivative financial instruments.

The alternative is to rely on simple rules, limiting, inter alia, banks' foreign-currency exposures as a way of containing risk. Unfortunately, simple rules can have complex

⁶⁵In particular, supervisors should monitor the adequacy of internal controls, internal and external audits, loan and investment policies, and risk-management techniques. They should verify that banks have adequate management information systems in place to identify loan and investment concentrations in their portfolios. They should make a particular effort to prevent abuses associated with connected lending and require banks to lend on an arm's-length basis. They should require realistic valuation of bank assets while imposing appropriate capital adequacy, liquidity, credit diversification, foreign exchange exposure, and nonbank activity requirements and limits. Bank supervisors should be granted political independence, financial autonomy, legal immunity, and the right to conduct on-site inspections. Banks for their part should be required to provide adequate and accurate information to their supervisors, who should have the power to impose remedial and punitive measures, including revocation of the license to operate, in the event of noncompliance. Other desirable elements include limiting public sector distortions (by limiting public sector guarantees, restricting deposit insurance to small deposits, and establishing a credible exit policy) and raising the quality of public disclosure as a way of strengthening market discipline. This list is essentially drawn from the Core Principles for Effective Banking Supervision (Basle Core Principles).

consequences, including unintended ones. Restricting the open foreign exchange positions of banks, for example, may simply cause the latter to pass on that exposure to their domestic customers (who are even less able to handle it) in the form of foreign-currency-denominated loans.

Similarly, capital requirements higher than the Basle standards are a deterrent to excessive risk taking only if bank capital is ultimately written down. Political pressure may lead the authorities to recapitalize an otherwise insolvent bank on concessionary terms or to establish a special public facility that takes nonperforming loans off the banks' books in return for government bonds in excess of those loans' marked-to-market value. If so, capital requirements will have little deterrent effect.

These dilemmas have motivated the search for additional options for regulating and restructuring the banking sector. One such option is narrow banking, under which banks, or at least insured banks, are permitted to invest their liquid liabilities only in liquid assets.⁶⁶ Eligible assets could be limited to deposits with other banks and to interest-bearing assets like short-term government securities, the market in which is deep and broad. Since narrow banks are still exposed to interest-rate risk and small depositors will still have difficulty in evaluating banks' portfolios, there may still be a case for deposit insurance. But narrow banks would have little scope for taking on additional risk.⁶⁷

⁶⁶See Litan (1987) and Burnham (1990).

⁶⁷They would be competitive with other financial institutions in the same sense as money-market mutual funds. And were there any doubt about this, giving them exclusive access to the payments system operated by the central bank would give them a special advantage in terms of convenience in carrying out transactions for their customers.

The demand for other banking services would not disappear, of course. Firms with a demand for external finance would supply increasing amounts of commercial paper and junk bonds, the demand for which would be provided by the expansion of mutual funds.⁶⁸ But only relatively credit worthy borrowers are able to issue the kind of publicly-traded securities attractive to mutual-fund-like vehicles.⁶⁹ The demand for commercial, industrial, real estate and consumer loans by less credit-worthy borrowers would presumably shift to finance companies and finance-company-like organizations which were not offered deposit insurance.⁷⁰ The latter would then have an incentive to offer deposit-like liabilities.⁷¹ Thus, many of the risks presently associated with banks would simply shift to non-bank intermediaries, which might themselves have a tendency to affiliate with narrow banks (through, inter alia, holding companies). The question would then become whether the authorities' ex ante commitment not to apply too-big-to-fail arguments to these entities would be politically sustainable ex post. Insofar as financial distress in these entities gave rise to bank-like externality problems, this might not be the case. The hope of narrow-banking proponents is that the authorities could head off threats to systemic stability by undertaking lender-of-last-resort operations (following sound central bank practice, lending only at penalty rates against acceptable collateral), but not necessarily compensating investors for their losses,

⁶⁸As well as insurance companies, pension funds, and hedge funds.

⁶⁹For a theoretical explanation, see Diamond (1991).

⁷⁰Finance companies typically fund themselves with capital (significantly more capital than commercial banks) and long-term debt.

⁷¹Unless this was prohibited and prevented in practice by detailed and rigorously enforced regulatory restrictions.

who would then have an incentive to exert stronger market discipline against unsound lending practices. But in a sense, the proponents of narrow banking are simply assuming a convenient answer to the fundamental question; were it really so simple for governments to limit depositor bailouts in this way, they could simply limit the provision of those bailouts to existing financial institutions, obviating the need to create narrow banks.

A second option is to internationalize the banking system. A banking system with an internationally diversified asset base is less likely to be destabilized by a domestic economic crisis and in turn to worsen crisis conditions. Domestic branches of foreign banks effectively possess their own private lenders of last resort in the form of the foreign head office. And the institution as a whole can count on last-resort lending by the central bank of the country in which the home office resides, where that country is likely to be a more stable mature market. Finally, where competent management is in short supply, allowing entry by foreign banks can be a means of importing expertise. Parent banks with hard-earned reputations for financial probity have an incentive to apply to their foreign branches state-of-the-art internal controls and accounting standards.

All this provides an argument for internationalizing national banking systems. To be sure, the elimination of statutory barriers to the establishment of foreign branches and subsidiaries will not produce a single global banking system overnight. Domestic banks have an advantage when seeking to defend their market share as a result of having invested in proprietary sources of information. And however invigorating the chill winds of international competition, suddenly opening domestic banking to foreign entry can be a sharp shock to previously sheltered financial institutions. In the absence of an orderly exit policy, it may

encourage gambling for redemption and other perverse short-run responses. This argument for phasing in the internationalization of banking suggests that this solution will take time to implement.

A final option is to place taxes or quantitative limits on the short-term foreign-currency borrowing of banks. Banks, it has already been argued, are a special source of vulnerability to the stability of the financial system. Knowing that the importance the authorities attach to the maintenance of confidence will ultimately induce them to make good on the banks' liabilities, international investors attracted by high domestic interest rates will be inclined to freely provide short-term foreign-currency funding in the expectation of being able to get their money out. At the same time, allowing the banks to borrow freely short term, in foreign currency, greatly heightens the risk of crisis, since the domestic authorities cannot print the foreign exchange needed by a lender of last resort seeking to make good on these liabilities and can only pay off the banks' creditors by putting the domestic economy through a wrenching internal and external adjustment.

These are arguments for placing limits on the banks' short-term foreign-currency borrowing. Each bank could be restricted to borrowing no more than a certain percentage of its liabilities. Alternatively, the total short-term foreign-currency borrowing of the banks could be limited to a certain percentage of total banking-sector liabilities, and banks could auction entitlements to borrow among themselves.

Limiting the ability of banks to borrow abroad would, however, simply encourage nonbanks to do the borrowing for them. Domestic corporates could borrow offshore in foreign currency and deposit the proceeds with domestic banks which, their access to external

funding restricted, would presumably offer relatively attractive deposit rates; the banks would then onlend the proceeds to other customers. If corporates hedged their exposure by making foreign-currency denominated deposits the banks would end up with the same short-term foreign currency exposure as when there were no limits on their ability to fund themselves abroad. Assuming no change in the pressure on the authorities to provide the banks with guarantees, foreigners would have the same incentive to freely supply short-term foreign-currency funding, since there would still be little question about their ability to get their money back. The vulnerabilities to which the financial system was subject would remain essentially unchanged.⁷²

The logical result of starting down this road is therefore a tax or tax equivalent on all foreign capital inflows, not merely on inflows into the banking system. If it was intended to target short-term capital inflows, it could be structured as a holding period tax, for example like the Chilean measure which requires all nonequity foreign investment to be accompanied by a one year, noninterest-bearing deposit (whose tax equivalent therefore declines with the duration of the investment).

C. European Prospects

Looking forward, it is in Europe where the exchange rate commitment and the lender-of-last-resort function may conflict most strongly. The danger is that European monetary

⁷²If, on the other hand, corporates made domestic-currency deposits, they would assume the foreign-exchange exposure and be subject to similar insolvency risk from exchange rate changes as the banks in the no-restriction scenario. It seems likely that the authorities that had previously felt impelled to extend guarantees to the banks would now extend similar support to nonbanks, having induced the latter to take on financial-intermediation responsibilities.

unification and the creation of a European Central Bank (ECB) will heighten the tension between these two imperatives.

When Stage III of the monetary unification process commences on January 1st, 1999, the exchange rates of the participating countries will be locked, and the ECB will be committed to exchanging their currencies for one another at par.⁷³ The ECB's mandate, stated in the central bank's statute, is to maintain price stability and advance the general economic interests of the EU without jeopardizing the primary objective of price stability. In particular, that statute states that the ECB is responsible for overseeing the operation of the payments system, a provision which can be interpreted as preventing problems of bank illiquidity and insolvency from spreading contagiously through the financial system.

Under what conditions might an exchange rate commitment prevent the ECB from discharging this function? One circumstance would be when the ECB was obligated to peg the Euro against the dollar or a basket of foreign currencies, in which case the same kind of conflict that arose in Finland and Sweden in the early 'nineties between the exchange rate peg and the lender-of-last-resort function might force it to choose between defending the peg and the banking system. This can be dismissed as a short-run possibility on the grounds that the adoption of an external peg for the Euro is unlikely. While the Council of Ministers is free under the provisions of the Maastricht Treaty to provide "general orientations" for exchange rate policy the ECB is not obliged to act upon them. It is not likely to embrace a commitment to a "quiet target zone" for the Euro against the dollar or the yen while it is still establishing

⁷³ National currencies will be replaced by the single European currency three years later, at the beginning of 2002.

the credibility of its commitment to price stability. The Council of Ministers has the power to negotiate a formal agreement with countries outside Europe for the establishment of a Bretton-Woods-like exchange rate regime and to require the ECB to adapt policy to its dictates. But any such agreement is unlikely. With the inauguration of Stage III, the Euro zone will come to more closely resemble the relatively large, relatively closed economy epitomized by the United States, which has been disinclined, on standard optimum-currency-area grounds, to peg its currency against those of other countries.⁷⁴

While its statute states the ECB's responsibility for the payments system and, by implication, the banks, it also puts barriers in the way of central bank operations in support of the public finances. The "no-bailout" clause of the treaty (Article 21 of the Protocol on the European System of Central Banks) states that the ECB cannot acquire public debt directly from the issuer.⁷⁵ Article 21 is designed to shelter the ECB from pressure to monetize public debts and thereby encourage fiscal profligacy. Knowing that the ECB is prohibited from purchasing public debt directly from the issuer and otherwise subsidizing the issue of public debt by governments, those governments will be deterred from issuing excessive debt and running excessive deficits, while the ECB will be deterred from inflating away existing debts.

A complication is that in many European countries commercial banks have substantial investments in public debt. Fear of default which caused the prices of those securities to

⁷⁴ An external exchange rate commitment for the Euro, in the form of a new international monetary system of pegged rates or target zone, is simply not in the cards, a position that I have argued at more length in Eichengreen (1994a).

⁷⁵In a sense, this rule is an exchange rate constraint, since Germany and other signatories of the Maastricht Treaty required its inclusion as a prerequisite for agreeing to the creation of a European Central Bank empowered to peg intra-European exchange rates once and for all.

plunge could therefore create problems of solvency for the banks and undermine depositor confidence. Precisely this problem arose in Mexico in 1994-5, where the banks held large amounts of government paper and the run on *tesobonos* and *cetes* damaged their balance-sheet position. Were the ECB forced to stand back from the public-debt market in the event of a meltdown, it could then find itself faced with very serious problems in the banking system.

In fact, Article 21 only precludes ECB purchases of public debt *directly from the issuer*. Nothing prevents it from purchasing public debt on the secondary market and from the banks in particular. In doing so it can help to restore the liquidity of the latter. But if debt prices have collapsed, the banks will be selling their government securities to the ECB at a loss. While the transaction will enhance their liquidity, the collapse in debt prices will still eat into commercial bank capital, potentially undermining investor confidence. It may be necessary for the ECB to inject additional liquidity to stabilize the situation.

The question then becomes whether the ECB will hesitate to do so for fear of undermining the credibility of its commitment to price stability. Credibility will require acquiring a track record for pursuing anti-inflationary policies. Buying up the public debt holdings of the banks and more generally engaging in last-resort lending could be seen by the markets as the ECB taking its eye off the ball. In particular, if the ECB was targeting the narrow money supply, providing liquidity in support of the banking system in violation of those targets and as a credibility-damaging signal.

Other central banks have been able to engage in lender-of-last-resort operations without damaging the credibility of their commitment to price stability; the Fed in 1987

springs to mind. Its injection of liquidity in the wake of the October stock market crash did not excite inflationary expectations or throw monetary policy off course. Once the panic passed, it withdrew the additional funds and restored policy to its previous trajectory. The Banco de Mexico in 1995 is an example of the opposite, where the injection of liquidity necessary to support the financial system was associated with an acceleration of inflation to the mid-double digits. Two factors help to explain the contrast. First, the Fed's 1987 operation occurred against a backdrop in which aggregate supply and demand conditions were well balanced and there were few inflationary expectations to excite, whereas the Banco de Mexico's 1995 operation took place in a more unbalanced macroeconomic environment in which the climate for inflation was ripe. Second, the Fed's superior credibility, accumulated over many years, made for a better outcome.

The first of these two considerations suggests that the ECB should be willing and able to undertake lender-of-last-resort operations. In its early reputation-building years, it will take seriously the pursuit of price stability, so any banking problems should occur in a relatively benign inflationary climate. But the second consideration suggests that the ECB may be reluctant to lend on the grounds that it has not yet built the requisite reputation. Which consideration will dominate is uncertain, which gives grounds for concern about how the ECB will respond to banking problems in its early years.

Can European governments, as opposed to the central bank, assist the banks, as the Argentine government did in 1995?⁷⁶ Yes, if the governments in question have financial reserves or the ability to borrow. The danger here is that European governments will be

⁷⁶ Or Secretary Shaw did before 1913?

constrained by the Excessive Deficit Procedure of the Maastricht Treaty and the Stability Pact. Under their provisions, countries with deficits in excess of three per cent of GDP may be subject to fines and sanctions unless they are exempted on grounds of an exceptionally severe recession. For governments with balanced budgets or current surpluses, this constraint will not bind. But most European governments, with their recent history of large deficits, will be up against their Stability Pact limits when Stage III commences. They may lay themselves open to fines if they expend additional resources to bail out the banks. And depositors, knowing the disincentive this provides for a government bailout, may not be deterred from running on the banks.

Thus, both the ECB and Europe's national governments should have the capacity to intervene to stabilize their banking systems once Stage III of the EMU process has been underway for some time. In the short run, however, the constraints of imperfect credibility and the Stability Pact may limit their room for maneuver. This is one of several grounds for thinking that the early years of Stage III may prove exciting.

V. Conclusions and Implications

While this review of the historical record shows that there is no simple mapping between exchange rate stability and financial stability, it confirms that the textbook insight about the origin of disturbances and the advantages of fixed and floating rates is still the obvious place to start. When foreign monetary disturbances are important, a flexible rate provides useful insulation, but when such disturbances originate at home, exchange rate stability allows them to be shared with the rest of the world and disciplines domestic

policymakers. This logic applies directly to the stability of the banking system. When changes in global monetary and financial conditions are an important source of disturbances to the banking system, as has repeatedly been the case, exchange rate flexibility can help to insulate the banks from shocks to their funding and investments and give the authorities the opportunity to act as lenders of last resort. The Great Depression provides perhaps the clearest illustration: in the 1930s most countries experienced the contraction of credit and collapse of activity as an imported shock, and those which allowed their exchange rates to adjust, decoupling domestic monetary and financial conditions from those abroad, were best able to avert banking panics and to engage in lender-of-last-resort operations. Conversely, when monetary and financial shocks jeopardizing the stability of the banking system are home grown, as has also often been the case, pegging the exchange rate imposes valuable discipline on domestic policymakers. Argentina in the 1990s illustrates the point: by adopting a rigid currency peg it has prevented domestic policymakers from succumbing to the monetary excesses that long destabilized its banking system.⁷⁷

But this experience also illustrates the problems created for banking stability if the source of disturbances changes, as it did in Argentina at the beginning of 1995. An exchange-rate arrangement that had contributed positively to banking and financial stability so long as disturbances were primarily monetary and primarily domestic proved to be a liability once an external financial shock -- the Tequila crisis -- came to dominate Argentina's financial affairs.

⁷⁷ And led to one of the lowest ratios of bank deposits to GDP for a country at its stage of economic development.

This case also highlights the positive role for policy in shaping the link between exchange rate and banking stability. A government or central bank can reconcile a commitment to peg the exchange rate with a readiness to act as lender of last resort by establishing credit lines abroad: this was the expedient used by Argentina to recapitalize its banks without jeopardizing its currency peg. Additional devices include encouraging lifeboat operations among the banks (as in the Nordic countries) and invoking the exchange-rate escape clause (abandoning the peg temporarily). To be sure, encouraging mutual-support operations, like establishing foreign credit lines, is easier said than done; if there is a government or a central bank in the background concerned that some financial institutions are too big to fail, strong banks may be reluctant to support their weaker counterparts, as in the United States in the Great Depression. This is a lesson of U.S. experience in the Great Depression. And for countries like Argentina, whose pegged rates are less than fully credible, invoking the exchange-rate escape clause is not an option.

Thus, where lack of domestic monetary discipline is the problem, pegged rates retain obvious appeal. But countries adopting pegged rates, for this or other reasons, must take care to tailor financial arrangements affecting their banking systems to accommodate this additional constraint.

References

- Aliber, Robert Z. (1988), Transforming Korean Values, in *Korea's Economy 1998*, New York: Korea Economic Institute of America, pp. 28-32
- Anderson, Ronald, Erik Berglof and Kalman Mizsei (1996), Banking Sector Development in Central and Eastern Europe, London: Centre for Economic Policy Research.
- Armaos, John (1992), "Bank Runs and Partial Suspension of Convertibility," Graduate School of Business, Columbia University, Working Paper FB-92-34.
- Bagehot, Walter (1873 [1902]), Lombard Street, New York: Scribner's.
- Balino, Tomas J.T. (1991), "The Argentine Banking Crisis of 1980," in V. Sundararajan and Tomas J.T. Balino (eds), Banking Crises: Cases and Issues, Washington, D.C.: International Monetary Fund, pp.58-112.
- Bergsten, C. Fred and C. Randall Henning (1996), Global Economic Leadership and the Group of Seven, Washington, D.C.: Institute for International Economics.
- Bernanke, Ben 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 Crises, Chicago: University of Chicago Press, pp.33-68.
- Bloomfield, Arthur (1959), Monetary Policy Under the International Gold Standard, New York: Federal Reserve Bank of New York.
- Bordo, Michael D. (1985), "The Impact and International Transmission of Financial Crises: Some Historical Evidence, 1870-1933," Rivista di Storia Economica 2, International Issue, pp.41-78.
- Bordo, Michael D. (1986), "Financial Crises, Banking Crises, Stock Market Crashes and the Money Supply: Some International Evidence, 1870-1913," in Forrest Capie and Geoffrey Wood (eds), Financial Crises and the World Banking System, London: Macmillan, pp.190-248.
- Bordo, Michael D. (1990), "The Lender of Last Resort: Alternative Views and Historical Experience," Economic Review, Federal Reserve Bank of Richmond (January/February), pp.18-29.
- Bordo, Michael D. and Kynn Kydland (1995), "The Gold Standard as a Rule: An Essay in Exploration," Explorations in Economic History 32, pp.423-465.

Bordo, Michael and Hugh Rockoff (1996), "The Gold Standard as a Good Housekeeping Seal of Approval," Journal of Economic History 56, pp.389-428.

Burnham, James B. (1990), "A Financial System for the Year 2000," Center for the Study of American Business, Formal Publication Number 97 (February).

Cannon, James G. (1910), Clearing Houses, Washington, D.C.: Government Printing Office.

Canzoneri, Matthew (1985), "Monetary Policy Games and the Role of Private Information," American Economic Review 75, pp.1056-1070.

Caprio, Gerald, Jr., Michael Dooley, Danny Leipziger and Carl Walsh (1997), "The Lender of Last Resort Function Under a currency Board: The Case of Argentina," Open Economies Review 7, pp.625-650.

Caprio, Gerald, Jr., and Daniela Kinglebeil (1997), "Bank Insolvencies: Cross-Country Experience," Policy Research Working paper No. 1620, Washington, D.C.: The World Bank.

Choudri, E. and Levis Kochin (1980), "The Exchange Rate and the International Transmission of Business Cycle Disturbances," Journal of Money, Credit and Banking 12, pp.565-574.

Desmet, Klaus and Thomas Mann (1996), "Lessons from the Mexican Banking Crisis," unpublished manuscript, Stanford University of and University of Cologne.

Diamond, Douglas (1991), "Monitoring and Reputation: The Choice Between Bank Loans and Directly Placed Debt," Journal of Political Economy, 99, pp. 689-721

Diamond, Douglas and Phillip Dybvig (1984), "Bank Runs, Deposit Insurance and Liquidity," Journal of Political Economy 91, pp.401-419.

Dominguez, Kathryn and Jeffrey A. Frankel (1993), Does Foreign Exchange Intervention Work? Washington, D.C.: Institute for International Economics.

Dornbusch, Rudiger and Jacob A. Frenkel (1994), "The Gold Standard and the Bank of England in the Crisis of 1847," in Michael D. Bordo and Anna J. Schwartz (eds), A Retrospective on the Classical Gold Standard, Chicago: University of Chicago Press, pp.233-264.

Edwards, Sebastian (1995), Crisis and Reform in Latin America, Oxford: Oxford University Press.

Edwards, Sebastian and Carlos A. Vegh (1997), "Banks and Macroeconomic Disturbances Under Predetermined Exchange Rates," NBER Working Paper no. 5977 (March).

Eichengreen, Barry (1984), "Currency and Credit in the Gilded Age," in Gary Saxonhouse and Gavin Wright (eds), Technique, Spirit and Form in the Making of the Modern Economies, Westport, Conn.: JAI Press, pp.87-114.

Eichengreen, Barry (1992), Golden Fetters: The Gold Standard and the Great Depression, 1919-1939, New York: Oxford University Press.

Eichengreen, Barry (1994a), International Monetary Arrangements for the 21st Century, Washington, D.C.: The Brookings Institution.

Eichengreen, Barry (1994b), "Wages and the Gold Standard: Perspectives on the Borchardt Debate," in Christoph Buchheim, Michael Hutter and Harold James (ed), Zerrissene Zwischenkriegszeit: Wirtschaftshistorische Beiträge: Knut Borchardt zum 65. Geburtstag, Baden-Baden: Nomos Verlagsgesellschaft, pp.177-204.

Eichengreen, Barry (1995), "Central Bank Cooperation and Exchange Rate Commitments: The Classical and Interwar Gold Standards Compared," Financial History Review 2, pp.99-117.

Eichengreen, Barry and Marc Flandreau (1996a), "The Geography of the Gold Standard," in Jorge Braga de Macedo, Barry Eichengreen and Jaime Reis (eds), Currency Convertibility: The Gold Standard and Beyond, London: Routledge, pp.113-143.

Eichengreen, Barry and Marc Flandreau (1996b), "Blocks, Bands and Crawls: International Monetary History in Light of Recent Theoretical Developments," Scottish Journal of Economics 43, pp.389-418.

Epstein, Gerald and Thomas Ferguson (1984), "Monetary Policy, Loan Liquidation and Industrial Conflict: The Federal Reserve and the Open Market Operations of 1932," Journal of Economic History XLV, pp.957-984.

Friedman, Milton and Anna J. Schwartz (1963), A Monetary History of the United States, 1863-1960, Princeton: Princeton University Press.

Garber, Peter M. and Vittorio U. Grilli (1986), "Belmont-Morgan syndicate as an optimal investment banking contract," European Economic Review 30, pp. 649-677.

Gavin, Michael and Ricardo Hausmann (1996), "The Roots of Banking Crises: The Macroeconomic Context," in Richardo Hausmann and Liliana Rojas-Suarez (eds), Banking Crises in Latin America, Washington, D.C.: Inter-American Development Bank.

Goldfajn, Ilan and Rodrigo O. Valdes (1995), "Balance of Payment Crises and Capital Flows: The Role of Liquidity," unpublished manuscript, MIT.

Goldstein, Morris (1996), *The Case for an International Banking Standard*, Washington, D.C.: Institute of International Economics.

Goldstein, Morris and David Folkerts-Landau (1993), International Capital Markets: Part II: Systemic Issues in International Finance, Washington, D.C.: International Monetary Fund (August).

Gorton, Gary (1988), "Banking Panics and Business Cycles," Oxford Economic Papers 40, pp.751-781.

Grossman, Richard S. (1994), "The Shoe that Didn't Drop: Explaining Banking Stability During the Great Depression," Journal of Economic History 54, pp.654-682.

Heller, H. Robert (1978), "Determinants of Exchange Rate Practices," Journal of Money, Credit and Banking 10, pp.308-321.

Horsefield, J. K. (1953), "The Origins of the Bank Charter Act, 1844," in T. S. Ashton and R.S. Sayers (eds), Papers in English Monetary History, Oxford: Clarendon Press, pp. 109-125.

Hughes, Jonathan (1984), "Comment on Dornbusch and Frenkel," in Michael D. Bordo and Anna J. Schwartz (eds), A Retrospective on the International Gold Standard, Chicago: University of Chicago Press, pp.265-271.

International Monetary Fund (1994), "The Nordic Banking Crises: Pitfalls in Financial Liberalization?" unpublished manuscript, IMF.

Jonung, Lars and Joakim Stymne (1996), "The Great Regime Shift: Asset Markets and Economic Activity in Sweden, 1985-93," unpublished manuscript, University of Lund.

Kaminsky, Graciela and Carmen Reinhart (1996), "The Twin Crises: The Causes of Banking and Balance of Payments Problems," unpublished manuscript, Federal Reserve Bank.

Kemmerer, Edwin (1910), Seasonal Variations in the Relative Demand for Money and Capital in the United States, Washington, D.C.: GPO.

Krugman, Paul (1979), "A Model of Balance-of-Payments Crises," Journal of Money, Credit and Banking 11, pp.311-325.

League of Nations (1930), Interim Report of the Gold Delegation, Geneva: League of Nations.

League of Nations (1933), Economic Survey 1932/33, Geneva: League of Nations.

Litan, Robert (1987), *What Should Banks Do?* Washington, D.C.: The Brookings Institution.

Lewis, Cleona (1938), *America's Stake in International Investments*, Washington, D.C.: The Brookings Institution.

McKinnon, Ronald (1991), *The Order of Economic Liberalization: Financial Control in the Transition in a Market Economy*, Baltimore: Johns Hopkins University Press.

Miller, Victoria (1996), "Exchange Rate Crises with Domestic Bank Runs: Evidence from the 1890s," *Journal of International Money and Finance* 15, pp.637-656.

Mundell, Robert A. (1961), "A Theory of Optimum Currency Areas," *American Economic Review* 53, pp.717-725.

McKinnon, Ronald (1963), "Optimum Currency Areas," *American Economic Review* 51, pp.657-665.

Miron, Jeffrey A. (1986), "Financial Panics, the Seasonality of the Nominal Interest Rate, and the Founding of the Fed," *American Economic Review* LXXVI, pp.125-140.

Moellere, Michael and Niels Chr. Nielsen (1995), "Some Observations on the Nordic Bank Crisis," Institute of Finance, Copenhagen Business School Working paper 95-8.

Obstfeld, Maurice (1993), "Destabilizing Effects of Exchange Rate Escape Clauses," NBER Working Paper no. 3603.

Pressnell, L.S. (1968), "Gold Reserves, Banking Reserves, and the Baring Crisis of 1890," in C.R. Whittlesey and J.S.G. Wilson (eds), *Essays in Money and Banking in Honour of R.S. Sayers*, Oxford: Oxford University Press, pp.167-228.

Rich, Georg (1989), "Canadian Banks, Gold, and the Crisis of 1907," *Explorations in Economic History* 26, pp.135-160.

Rojas-Suarez, Liliana and Steven R. Weisbrod (1996), "Banking Crises in Latin America: Experiences and Issues," in Ricardo Hausmann and Liliana Rojas-Suarez (eds), *Banking Crises in Latin America*, Washington, D.C.: Inter-American Development Bank, pp.3-22.

Sachs, Jeffrey A. (1995), "Do We Need an International Lender of Last Resort?" unpublished manuscript, Harvard University.

Sachs, Jeffrey A., Aaron Tornell and Andres Velasco (1995), "The Collapse of the Mexican Peso: What Have We Learned?" *Economic Policy* 22, pp.15-56.

Sayers, Richard S. (1976), The Bank of England, 1891-1944, Cambridge: Cambridge University Press.

Schwartz, Anna J. (1986), "Real and Pseudo Financial Crises," in Forrest Capie and Geoffrey Wood (eds), Financial Crises in the World Banking System, New York: St. Martin's, pp.11-31.

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

Simmons, Beth (1994), Who Adjusts? Domestic Determinants of International Economic Policy in the Interwar Years, Princeton: Princeton University Press.

Sprague, O.M.W. (1910), History of Crises under the National Banking System, Washington, D.C.: Government Printing Office.

Sundararajan, V. and Tomas J.T. Balino (1991), Banking Crises: Cases and Issues, Washington, D.C.: International Monetary Fund.

Timberlake, Richard H. (1963), "Mr. Shaw and his Critics: Monetary Policy in the Golden Era Reviewed," Quarterly Journal of Economics LXXVII, pp.40-54.

Timberlake, Richard H. (1978), The Origins of Central Banking in the United States, Cambridge: Mass.: Harvard University Press.

Velasco, Andres (1991), "Liberalization, Crisis, Intervention: The Chilean Financial System, 1975-85," in V. Sundararajan and Tomas J.T. Balino (eds), Banking Crises: Cases and Issues, Washington, D.C.: International Monetary Fund, pp.113-174.

Weichere, John C. (1988), "The Future of the Housing Finance System," in William S. Haraf and Rose Marie Kushmeider (eds), Restructuring Banking and Financial Services in America, Washington, D.C.: American Enterprise Institute, pp.296-336.

White, Lawrence J. (1992), "Change and Turmoil in U.S. Banking: Causes, Consequences, and Lessons," New York University, Salomon Center Working Paper S-92-93.

Wicker, Elmus (1966), Federal Reserve Monetary Policy 1917-1933, New York: Random House.

Wigmore, Barrie (1987), "Was the Bank Holiday of 1933 Caused by a Run on the Dollar?" Journal of Economic History XLVII, pp.739-756.

Wihlborg, Clas, Michael Hutchinson and Lars Meuller (1994), "Credit Market Deregulation, Asset Prices and Banking Crisis in Sweden," unpublished manuscript, Goteborg University and University of California, Santa Cruz.