

The Lender of Last Resort: Alternative Views and Historical Experience

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I. INTRODUCTION

Recent liquidity assistance to failing savings and loans and banks (some insolvent and some large) in the U.S. and similar rescues abroad have prompted renewed interest in the topic of the lender of last resort. Under the classical doctrine, the need for a lender of last resort arises in a fractional reserve banking system when a banking panic, defined as a massive scramble for high-powered money, threatens the money stock and, hence, the level of economic activity. The lender of last resort can allay an incipient panic by timely assurance that it will provide whatever high-powered money is required to satisfy the demand, either by offering liberal access to the discount window at a penalty rate or by open market purchases.

Henry Thornton (1802) and Walter Bagehot (1873) developed the key elements of the classical doctrine of the lender of last resort (LLR) in England. This doctrine holds that monetary authorities in the face of panic should lend unsparingly but at a penalty rate to illiquid but solvent banks. Monetarist writers in recent years have reiterated and extended the classical notion of the LLR. By contrast, Charles Goodhart and others have recently posited an alternative view, broadening the power of LLR to include aid to insolvent financial institutions. Finally, modern proponents of free banking have made the case against a need for any public LLR.

The remainder of this paper is organized as follows:

- II. The LLR's role in preventing banking panics
- III. Four views of the LLR: central propositions

IV. Historical evidence:

- Incidence of banking panics and LLR actions, U.S. and elsewhere
- Alternative LLR arrangements in the U.S., Scotland, and Canada
- Record of assistance to insolvent banks

V. Lessons from history in the context of the four views of the LLR

II. BANKING PANICS AND THE LENDER OF LAST RESORT

The need for a monetary authority to act as LLR arises in the case of a banking panic—a widespread attempt by the public to convert deposits into currency and, in response, an attempt by commercial banks to raise their desired reserve-deposit ratios. Banking panics can occur in a fractional reserve banking system when a bank failure or series of failures produces bank runs which in turn become contagious, threatening the solvency of otherwise sound banks.

Two sets of factors, some internal and some external to banks, can lead to bank failures. Internal factors, which affect both financial and nonfinancial enterprises, include poor management, poor judgment, and dishonesty. External factors include adverse changes in relative prices (e.g., land or oil prices) and in the overall price level.

Of the external factors, changes in relative prices can drastically alter the value of a bank's portfolio and render it insolvent. Banking structure can mitigate the effects of relative price changes. A nationwide branch banking system that permits portfolio diversification across regions enables a bank to absorb the effects of relative price changes. A unit banking system, even with correspondents, is considerably less effective. The nearly 6000 bank failures that occurred during the decade of the 1920s in the U.S. were mostly small unit banks in agricultural regions. Canada, in contrast, had nationwide branch

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banking. Consequently, many bank branches in those regions closed, but no banks failed (with the exception of one, in 1923, due to fraud).

A second external factor that can lead to bank failures is changes in the overall price level (Schwartz, 1988). Price level instability (in a nonindexed system) can produce unexpected changes in banks' net worth and convert *ex ante* sound investments into *ex post* mistakes. Instability means sharp changes from rising to falling prices or from inflation to disinflation. It was caused by gold movements under the pre-1914 gold standard, and, more recently, by the discretionary actions of monetary authorities.

Given that bank liabilities are convertible on demand, a run on an insolvent bank is a rational response by depositors concerned about their ability to convert their own deposits into currency. In normal circumstances, according to one writer, bank runs serve as a form of market discipline, reallocating funds from weak to strong banks and constraining bank managers from adopting risky portfolio strategies (Kaufman, 1988). Bank runs can also lead to a "flight to quality" (Benston and Kaufman et al., 1986). Instead of shifting funds from weak banks to those they regard to be sound, depositors may convert their deposits into high-quality securities. The seller of the securities, however, ultimately will deposit his receipts at other banks, leaving bank reserves unchanged.

When there is an external shock to the banking system, incomplete and costly information may sometimes make it difficult for depositors to distinguish sound from unsound banks. In that case, runs on insolvent banks can produce contagious runs on solvent banks, leading to panic. A panic, in turn, can lead to massive bank failures. Sound banks are rendered insolvent by the fall in the value of their assets resulting from a scramble for liquidity. By intervening at the point when the liquidity of solvent banks is threatened—that is, by supplying whatever funds are needed to meet the demand for cash—the monetary authority can allay the panic.

Private arrangements can also reduce the likelihood of panics. Branch banking allows funds to be transferred from branches with surplus funds to those in need of cash (e.g., from branches in a prosperous region to those in a depressed region). By pooling the resources of its members, commercial bank clearing houses, in the past, provided emergency reserves to meet the heightened liquidity demand. A clearing house also represented a signal to the public that

help would be available to member banks in time of panic. Neither branch banking nor clearing houses, however, can stem a nationwide demand for currency occasioned by a major aggregate shock, like a world war. Only the monetary authority—the ultimate supplier of high-powered money—could succeed. Of course, government deposit insurance can prevent panics by removing the reason for the public to run to currency.¹ Ultimately, however, a LLR is required to back up any deposit scheme.

III. ALTERNATIVE VIEWS ON THE LLR FUNCTION

Four alternative views on the lender of last resort function are outlined below, including:

- * The Classical View: the LLR should provide whatever funds are needed to allay a panic;
- * Goodfriend and King: an open market operation is the only policy required to stem a liquidity crisis;
- * Goodhart (and others): the LLR should assist illiquid and insolvent banks;
- * Free Banking: no government authority is needed to serve as LLR.

The Classical Position

Both Henry Thornton's *An Enquiry into the Effects of the Paper Credit of Great Britain* (1802) and Walter Bagehot's *Lombard Street* (1873) were concerned with the role of the Bank of England in stemming periodic banking panics. In Thornton's time, the Bank of England—a private institution which served as the government's bank—had a monopoly of the note issue within a 26-mile radius of London, and Bank of England notes served as high-powered money for the English banking system.² For Thornton, the Bank's responsibility in time of panic was to serve

¹ In theory private deposit insurance could also be used. In practice, to succeed in the U.S., such arrangements would require the private authority to have the power, currently possessed by the FDIC, to monitor, supervise, and declare insolvent its members. Also the capacity of the private insurance industry is too limited to underwrite the stock of government-insured deposits. (Benston et al., 1986, ch. 3). Alternatives to deposit insurance include requiring banks to hold safe assets (treasury bills), charging fees for service, and one hundred percent reserves.

² Bank of England notes served as currency and reserves for the London banks. Country banks issued bank notes but kept correspondent balances in the London banks. From 1797 to 1821, Bank of England notes were inconvertible into gold.

as LLR, providing liquidity to the market and discounting freely the paper of all solvent banks, but denying aid to insolvent banks no matter how large or important (Humphrey, 1975, 1989).

Bagehot accepted and broadened Thornton's view. Writing at a time when the Bank had considerably enhanced its power in the British financial system, he stated four principles for the Bank to observe as lender of last resort to the monetary system:

- * Lend, but at a penalty rate³: "Very large loans at very high rates are the best remedy for the worst malady of the money market when a foreign drain is added to a domestic drain." (Bagehot, 1873, p.56);
- * Make clear in advance the Bank's readiness to lend freely;
- * Accommodate anyone with good collateral (valued at pre-panic prices);
- * Prevent illiquid but solvent banks from failing.^{4,5}

Recent monetarist economists have restated the classical position. Friedman and Schwartz (1963), in *A Monetary History*, devote considerable attention to the role of banking panics in producing monetary

³ Bagehot distinguished between the response to an external gold drain induced by a balance of payment deficit (raising the Bank rate) and the response to an internal drain (lending freely).

⁴ Bagehot has been criticized for not stating clearly when the central bank should intervene (Rockoff, 1986), for not giving specific guidelines to distinguish between sound and unsound banks (Humphrey, 1975), and for not realizing that provision of the LLR facility to individual banks would encourage them to take greater risks than otherwise (Hirsch, 1977).

⁵ In part, Humphrey's summary of the Classical position is: ". . . The lender of last resort's responsibility is to the entire financial system and not to specific institutions."

"The lender of last resort exists not to prevent the occurrence but rather to neutralize the impact of financial shocks."

"The lender's duty is a twofold one consisting first, of lending without stint during actual panics and second, of acknowledging beforehand its duty to lend freely in all future panics."

"The lender should be willing to advance indiscriminately to any and all sound borrowing on all sound assets no matter what the type."

"In no case should the central bank accommodate unsound borrowers. The lender's duty lay in preventing panics from spreading to the sound institutions, and not in rescuing unsound ones."

"All accommodations would occur at a penalty rate, i.e., the central bank should rely on price rather than non-price mechanisms to ration use of its last resort lending facility."

"The overriding objective of the lender of last resort was to prevent panic-induced declines in the money stock. . . ." (Humphrey, 1975 p.9)

stability in the United States (also see Cagan, 1965). According to them, the peculiarities of the nineteenth century U.S. banking system (unit banks, fractional reserves, and pyramiding of reserves in New York) made it highly susceptible to banking panics. Federal deposit insurance in 1934 provided a remedy to this vulnerability. It served to assure the public that their insured deposits would not be lost, but would remain readily available.

Friedman and Schwartz highlight the importance in the pre-FDIC system of timely judgment by strong and responsible leadership in intervening to allay the public's fear. Before the advent of the Fed, the New York Clearing House issued clearing house certificates and suspended convertibility, and, on occasion, the Treasury conducted open market operations. In two episodes, these interventions were successful; in three others, they were not effective in preventing severe monetary contraction. The Federal Reserve System, established in part to provide such leadership, failed dismally in the 1929-33 contraction. According to Friedman and Schwartz, had the Fed conducted open market operations in 1930 and 1931 to provide the reserves needed by the banking system, the series of bank failures that produced the unprecedented decline in the money stock could have been prevented.

Schwartz (1986) argues that all the important financial crises in the United Kingdom and the United States occurred when the monetary authorities failed to demonstrate at the beginning of a disturbance their readiness to meet all demands of sound debtors for loans and of depositors for cash. Finally, she views deposit insurance as not necessary to prevent banking panics. It was successful after 1934 in the U.S. because the lender of last resort was undependable. Had the Fed acted on Bagehot's principles, federal deposit insurance would not have been necessary, as the record of other countries with stable banking systems but no federal deposit insurance attests.

Meltzer (1986) argues that a central bank should allow insolvent banks to fail, for not to do so would encourage financial institutions to take greater risks. Following such an approach would "separate the risk of individual financial failures from aggregate risk by establishing principles that prevent banks' liquidity problems from generating an epidemic of insolvencies" (p. 85). The worst cases of financial panics,

according to Meltzer, “arose because the central bank did not follow Bagehotian principles.”⁶

Goodfriend-King and the Case for Open Market Operations

Goodfriend and King (1988) argue strongly for the exercise of the LLR function solely by the use of open market operations to augment the stock of high-powered money; they define this as monetary policy. Sterilized discount window lending to particular banks, which they refer to as banking policy, does not involve a change in high-powered money. They regard banking policy as redundant because they see sterilized discount window lending as similar to private provision of line-of-credit services; both require monitoring and supervision, and neither affects the stock of high-powered money.⁷ Moreover, they argue that it is not clear that the Fed can provide such services at a lower cost than can the private sector. Goodfriend (1989) suggests that one reason the Fed may currently be able to extend credit at a lower cost is that it can make fully collateralized loans to banks, whereas private lenders cannot do so under current regulations. On the other hand, the availability of these fully collateralized discount window loans to offset funds withdrawals by uninsured depositors and others may on occasion permit delays in the closing of insolvent banks.⁸ Goodfriend regards government-provided deposit insurance as basically a substitute for the portfolio diversification of a nationwide branch banking system. By itself, however, deposit insurance without a LLR commitment

⁶ Meltzer (1986) succinctly restates Bagehot’s four principles: “The central bank is the only lender of last resort in a monetary system such as ours.”

“To prevent illiquid banks from closing, the central bank should lend on any collateral that is marketable in the ordinary course of business when there is a panic . . .”

“Central bank loans, or advances, should be made in large amounts, on demand, at a rate of interest above the market rate.”

“The above three principles of central bank behavior should be stated in advance and followed in a crisis.” (Meltzer, 1986, p. 83)

⁷ Like Goodfriend and King, Friedman (1960) earlier argued for use of open market operations exclusively and against the use of the discount window as an unnecessary form of discretion which “involves special governmental assistance to a particular group of financial institutions” (p. 38). Also see Hirsch (1977) and Goodhart (1988) for the argument that Bagehot’s rule was really designed for a closely knit/cartelized banking system such as the London clearing banks.

⁸ Cagan (1988) in his comment on Goodfriend and King makes the case for retention of discount window lending in the case of “a flight to quality”. In that case, the discount window can be used to provide support to particular sectors of the economy which have had banking services temporarily curtailed.

to provide high-powered money in times of stress is insufficient to protect the banking system as a whole from aggregate shock.

The Case for Central Bank Assistance to Insolvent Banks

Charles Goodhart (1985, 1987) advocates temporary central bank assistance to insolvent banks. He argues that the distinction between illiquidity and insolvency is a myth, since banks requiring LLR support because of “illiquidity will in most cases already be under suspicion about . . . solvency.” Furthermore “because of the difficulty of valuing [the distressed bank’s] assets, a Central Bank will usually have to take a decision on last resort support to meet an immediate liquidity problem when it knows that there is a doubt about solvency, but does not know just how bad the latter position actually is” (Goodhart, 1985, p. 35).

He also argues that by withdrawing deposits from an insolvent bank in a flight to quality, a borrower severs the valuable relationship with his banker. Loss of this relationship, based both on trust and agent-specific information, adds to the cost of flight, making it less likely to occur. Replacing such a connection requires costly search, a process which imposes losses (and possible bankruptcy) on the borrowers. To protect borrowers, Goodhart would have the central bank recycle funds back to the troubled bank.

Solow (1982) also is sympathetic to assisting insolvent banks. According to him, the Fed is responsible for the stability of the whole financial system. He argues that any bank failure, especially a large one, reduces confidence in the whole system. To prevent a loss of confidence caused by a major bank failure from spreading to the rest of the banking system, the central bank should provide assistance to insolvent banks. However, such a policy creates a moral hazard, as banks respond with greater risk-taking and the public loses its incentive to monitor them.

Free Banking: The Case against Any Public LLR

Proponents of free banking have denied the need for any government authority to serve as lender of last resort. They argue that the only reason for banking panics is legal restrictions on the banking system. In the absence of such restrictions, the free market would produce a panic-proof banking system.

According to Selgin (1988, 1990) two of the most important restrictions are the prohibition of nationwide branch banking in the U.S. and the prohibition everywhere of free currency issue by the commercial banking system. Nationwide branch banking would allow sufficient portfolio diversification to prevent relative price shocks from causing banks to fail. Free note issue would allow banks to supply whatever currency individuals may demand.

Free banking proponents also contend that contagious runs because of incomplete information would not occur because secondary markets in bank notes (note brokers, note detectors) would provide adequate information to note holders about the condition of all banks. True, such markets do not arise for demand deposits because of the agent-specific information involved in the demand deposit contract—it is costly to verify whether the depositor has funds backing his check. But, free banking advocates insist that clearing house associations can offset the information asymmetry involved in deposit banking.

According to Gorton (1985), and Gorton and Mullineaux (1987), clearing houses in the nineteenth century, by quickly organizing all member banks into a cartel-like structure, established a coinsurance scheme that made it difficult for the public to discern the weakness of an individual member bank. The clearing house could also allay a panic by issuing loan certificates which served as a close substitute for gold (assuming that the clearing house itself was financially sound). Finally, a restriction on convertibility of deposits into currency could end a panic. Dowd (1984) regards restrictions as a form of option clause.⁹ In an alternative option (used in pre-1765 Scotland) banks had the legal right to defer redemption till a later date, with interest paid to compensate for the delay.

For Selgin and Dowd, the public LLR evolved because of a monopoly in the issue of currency. The Bank of England's currency monopoly within a 26-mile radius of London until 1826 and its extension to the whole country in 1844 made it more difficult than otherwise for depositors to satisfy their demand for currency in times of stress. This, in turn, created a need for the Bank, as sole provider of high-

⁹ A restriction of convertibility itself could exacerbate a panic because the public, in anticipating such restriction, demands currency sooner.

powered money, to serve as LLR.¹⁰ In the U.S., bond-collateral restrictions on state banks before 1863 and on the national banks thereafter were responsible for the well-known problem of currency inelasticity. Selgin and Dowd do not discuss the case of a major aggregate shock that produces a widespread demand for high-powered money. In that situation, only the monetary authority will suffice.

In sum, the four views—classical, Goodfriend/King, Goodhart, and free banking—have considerably different implications for the role of a LLR. With these views as backdrop, the remaining paragraphs now examine evidence on banking panics and their resolution in the past.

IV. THE HISTORICAL RECORD

In this section, I present historical evidence for a number of countries on the incidence of banking panics, their likely causes, and the role of a LLR in their resolution. I then consider alternative institutional arrangements that served as surrogate LLRs in diverse countries at different times. Finally, I compare the historical experience with the more recent assistance to insolvent banks in the U.S., Great Britain, and Canada. This evidence is then used to shed light on the alternative views of the lender of last resort discussed in section III.

Banking Panics and Their Resolution

The record for the past 200 years for at least 17 countries shows a large number of bank failures, fewer bank runs (but still a considerable number) and a relatively small number of banking panics. According to a chronology compiled by Anna Schwartz (1988), for the U.S. between 1790 and 1930, bank panics occurred in 14 years; Great Britain had the next highest number with panics occurring in 8 years between 1790 and 1866. France and Italy followed with 4 each.

An alternative chronology that I prepared (Bordo, 1986, Table 1) for 6 countries (the U.S., Great Britain, France, Germany, Sweden, and Canada) over the period 1870-1933 lists 16 banking crises (defined as bank runs and/or failures), and 4 banking

¹⁰ Selgin (1990) argues that the Bank Charter Act of 1844 exacerbated the problem of panics because it imposed tight constraints on the issue of bank notes by the Issue Department. However, the Banking Department surely could have discounted commercial paper from correspondent banks without requiring further note issue. That is one of Bagehot's main points in *Lombard Street*.

panics (runs, failures, and suspensions of payments), all of which occurred in the U.S. It also lists 30 such crises, based on Kindleberger's definition of financial crises as comprising manias, panics, and crashes and 71 stock market crises, based on Morgenstern's (1959) definition.

The similar failure rates for banks and nonfinancial firms in many countries largely reflect that individual banks, like other firms, are susceptible to market vagaries and to mismanagement. Internal factors were important, as were the external factors of relative price changes, banking structure, and changes in the overall price level. The relatively few instances of banking panics in the past two centuries suggests that either (1) monetary authorities in time developed the procedures and expertise to supply the funds needed to meet depositors' demands for cash or (2) the problem of banking panics is exaggerated.

A comparison of the performances of Great Britain and the U.S. in the past century serves to illustrate the importance of the lender of last resort in preventing banking panics. In the first half of the nineteenth century, Great Britain experienced banking panics when the insolvency of an important financial institution precipitated runs on other banks, and a scramble for high-powered money ensued. In a number of instances, the reaction of the Bank of England to protect its own gold reserves worsened the panic. Eventually, the Bank supplied funds to the market, but often too late to prevent many unnecessary bank failures. The last such panic followed the failure of the Overend Gurney Company in 1866. Thereafter, the Bank accepted its responsibility as lender of last resort, observing Bagehot's Rule "to lend freely but at a penalty rate". It prevented incipient financial crises in 1878, 1890, and 1914 from developing into full-blown panics by timely announcements and action.

The United States in the antebellum period experienced 11 banking panics (according to Schwartz's chronology) of which the panics of 1837, 1839, and 1857 were most notable.¹¹ The First and Second Banks of the United States possessed some central banking powers in part of the period; some states

¹¹ Selgin (1990), based on evidence by Rolnick and Weber (1986), argues that the episodes designated as panics in the antebellum Free Banking era are not comparable to these in the National Banking era because they did not involve contagion effects. Evidence to the contrary, however, is presented by Hasan and Dwyer (1988).

developed early deposit insurance schemes (see Benston, 1983; Calomiris, 1989), and the New York Clearing House Association began issuing clearing house loan certificates in 1857. None of these arrangements sufficed to prevent the panics.

In the national banking era, the U.S. experienced three serious banking panics — 1873, 1893, and 1907-08. In these episodes, the Clearing Houses of New York, Chicago, and other central reserve cities issued emergency reserve currency in the form of clearing house loan certificates collateralized by member banks' assets and even issued small denomination hand-to-hand currency. But these lender of last resort actions were ineffective. In contrast to successful intervention in 1884 and 1890, the issue of emergency currency was too little and too late to prevent panic from spreading. The panics ended upon the suspension of convertibility of deposits into currency. During suspension, both currency and deposits circulated freely at flexible exchange rates, thereby relieving the pressure on bank reserves. The panics of 1893 and especially 1907 precipitated a movement to establish an agency to satisfy the public's demand for currency in times of distrust of deposit convertibility. The interim Aldrich-Vreeland Act of 1908 allowed ten or more national banks to form national currency associations and issue emergency currency; it was successful in preventing a panic in 1914.

The Federal Reserve System was created in 1914 to serve as a lender of last resort. The U.S. did not experience a banking panic until 1930, but as Friedman and Schwartz point out, during the ensuing three years, a succession of nationwide banking panics accounted for the destruction of one-third of the money stock and the permanent closing of 40 percent of the nation's banks. Only with the establishment of federal deposit insurance in 1934 did the threat of banking panics recede.

Table I compares American and British evidence on factors commonly believed to be related to banking panics, as well as a chronology of banking panics and banking crises for severe NBER business cycle recessions (peak to trough) in the period 1870-1933.¹² The variables isolated include: deviations from trend of the average annual growth rate of real output; the absolute difference of the average annual rate of change in the price level during the preceding

¹² For similar evidence for the remaining cyclical downturns in this period, see Bordo (1986, Table 6, 1A).

Table I
Banking Panics (1870-1933): Related Factors, Incidence, and Resolution

	Reference Cycle		Deviations from Trend of Average Annual Real Output Growth ^a (peak to trough)**				Absolute Difference of Average Annual Rate of Price Level Change (trough to peak minus peak to trough)*		Deviations from Trend of Average Annual Monetary Growth ^b (specific cycle peak to trough)**		Change in Money due to Change in Deposit-Currency Ratio (specific cycle peak to trough)**		Banking Crisis ^c **		Banking Panic ^d **		Existence of Clear and Credible LLR Policy***		Agency***	
	Peak	Trough																		
United States	1873	1879	0.5%	-7.1%	-4.7%	2.7%														
	1882	1885	-3.2%	-12.2%	2.6%	5.2%							5/84							
	1893	1894	-9.5%	-9.0%	-9.3%	-4.3%														
	1907	1908	-14.7%	-6.1%	-1.7%	-2.7%														
	1920	1921	-7.6%	-56.7%	-2.5%	2.8%														
	1929	1932	-16.7%	-12.5%	-11.7%	-27.4%								1930,1931,1932	1933					
Great Britain	1873	1879	0.9%	-7.1%	-3.1%	5.2%														
	1883	1886	-1.2%	-5.4%	-2.8%	2.3%														
	1890	1894	-0.2%	-4.4%	-2.5%	-2.2%														
	1907	1908	-4.7%	-13.6%	-1.6%	-1.0%														
	1920	1921	-6.9%	-68.0%	-5.1%	4.5%														
	1929	1932	-3.7%	-7.9%	-4.3%	-1.3%														

Data Sources: * See Data Appendix in Bordo (1981).

** See Data Appendix in Bordo (1986).

*** Judgmental, based on this paper and other research.

Notes: (a) The trend growth rates of real output were 3.22% for the U.S. (1870-1941) and 1.48% for Great Britain (1870-1939). Each was calculated as the difference between the natural logs of real output in terminal and initial years divided by the number of years.

(b) The trend monetary growth rates were 5.40% for the U.S. (1870-1941) and 2.71% for Great Britain (1870-1939). Each was calculated as in footnote (a).

(c) Banking crisis—runs and/or failures. Source Bordo (1986).

(d) Banking panic—runs, failures, suspension of payments. Ibid.

trough to peak and the current peak to trough as a measure of the effect of changes in the overall price level; deviations from trend of the average annual rate of monetary growth; and the percentage change in the money stock due to changes in the deposit-currency ratio.¹³

The table reveals some striking similarities in the behavior of variables often related to panics but a remarkable difference between the two countries in the incidence of panics. Virtually all six business cycle downturns designated by the NBER as severe were marked in both countries by significant declines in output, large price level reversals, and large declines in money-growth. Also, in both countries, falls in the deposit-currency ratio produced declines in the money stock in the three most severe downturns: 1893-94 (U.S.); 1890-1894 (G.B.); 1907-08; and 1929-32.

¹³ In relating the changes in the money stock to changes in the deposit-currency ratio, we hold constant the influence of the other two proximate determinants of the money supply: the deposit-reserve ratio and the stock of high-powered money. It is calculated using the formula developed in Friedman and Schwartz (1963), Appendix B.

However, the difference in the incidence of panics is striking—the U.S. had four while Britain had none. Both countries experienced frequent stock market crashes (see Bordo, 1986, Table 6.1). They were buffeted by the same international financial crises. Although Britain faced threats to the banking system in 1878, 1890, and 1914, the key difference between the two countries (see the last three columns of Table I) was successful LLR action by the British authorities in defusing incipient crises.

Similar evidence over the 1870-1933 period for France, Germany, Sweden, and Canada is available in Bordo (1986). In all four countries, the quantitative variables move similarly during severe recessions to those displayed here for the U.S. and Great Britain, yet there were no banking panics. In France, appropriate actions by the Bank of France in 1882, 1889, and 1930 prevented incipient banking crises from developing into panics. Similar behavior occurred in Germany in 1901 and 1931 and in Canada in 1907 and 1914.

One other key difference was that all five countries had nationwide branch banking whereas the U.S.

had unit banking. That difference likely goes a long way to explain the larger number of bank failures in the U.S.

Alternative LLR Arrangements

In the traditional view, the LLR role is synonymous with that of a central bank. Goodhart's explanation for the evolution of central banking in England and other European countries is that the first central banks evolved from commercial banks which had the special privilege of being their governments' banks. Because of its sound reputation, position as holder of its nation's gold reserves, ability to obtain economies by pooling reserves through a correspondent banking system, and ability to provide extra cash by rediscounting, such a bank would evolve into a bankers' bank and lender of last resort in liquidity crises. Once such banks began to act as lenders of last resort, "moral hazard" on the part of member banks (following riskier strategies than they would otherwise) provided a rationale for some form of supervision or legislation. Further, Goodhart argues that the conflict between the public duties of such an institution and its responsibilities to its shareholders made the transition from a competitive bank to a central bank lengthy and painful.

Though Goodhart (1985 Annex B) demonstrates that a number of central banks evolved in this fashion, the experiences of other countries suggests that alternative arrangements were possible. In the U.S. before the advent of the Fed, a variety of institutional arrangements were used on occasion in hopes of allaying banking panics, including:

- * Deposit insurance schemes: relatively successful in a number of states before the Civil War (Benston, 1983; Calomiris, 1989);
- * A variety of early twentieth century deposit insurance arrangements which were not successful (White, 1981);
- * Clearing houses and the issue of clearing house loan certificates (Timberlake, 1984; Gorton, 1985);
- * Restriction of convertibility of deposits into currency by the clearing house associations in the national banking era;
- * Various U.S. Treasury operations between 1890 and 1907 (Timberlake, 1978);
- * The Aldrich-Vreeland Act of 1908.

Two countries which managed successfully for long periods without central banks were Scotland and

Canada. Scotland had a system of free banking from 1727 to 1844. The key features of this system were a) free entry into banking and free issue of bank notes, b) bank notes that were fully convertible into full-bodied coin, and c) unlimited liability of bank shareholders.

Scotland's record under such a system was one of remarkable monetary stability. That country experienced very few bank failures and very few financial crises. One reason, according to White (1984), was the unlimited liability of bank stockholders and strict bankruptcy laws that instilled a sense of confidence in noteholders.¹⁴ Indeed, the Scottish banks would take over at par the issue of failed banks (e.g., the Ayr bank, 1772) to increase their own business. A second reason was the absence of restrictions on bank capital and of other impediments to the development of extensive branching systems that allowed banks to diversify risk and withstand shocks.¹⁵ Faced with a nationwide scramble for liquidity, however, Scottish banks were always able to turn to the Bank of England as a lender of last resort (Goodhart 1985).

Although Canada had a competitive fractional reserve banking system throughout the nineteenth century, no central bank evolved (Bordo and Redish, 1987). By the beginning of the twentieth century, though, virtually all the elements of traditional central banking were being undertaken either by private institutions or directly by the government.

By 1890, the chartered banks, with the compliance of the Government, had established an effective self-policing agency, the Canadian Bankers Association. Acting in the absence of a central bank, it succeeded in insulating the Canadian banks from the deleterious effects of the U.S. banking panics of 1893 and 1907. It did so by quickly arranging mergers between sound and failing banks, by encouraging cooperation between strong and weaker banks in times of stringency, and by establishing a reserve fund to be used to compensate note holders in the event of failure.

In addition, the nationwide branch system overcame the problem of seasonal liquidity crises that characterized the United States after the Civil War,

¹⁴ Sweden from 1830 to 1902 had a system of competitive note issue and unlimited liability. According to Jonung (1985), there is evidence neither of overissue nor of bank runs.

¹⁵ Switzerland also had a successful experience with free banks 1826-1850 (Weber, 1988) but like Scotland's dependence on the Bank of England, she depended on the Bank of France as lender of last resort (Goodhart, 1985).

characterized the United States after the Civil War, thus lessening the need for a lender of last resort. However, the Bank of Montreal (founded in 1817) very early became the government's bank and performed many central bank functions.

Because Canadian banks kept most of their reserves on "call" in the New York money market, they were able in this way to satisfy the public's demand for liquidity, again precluding the need for a central bank. On two occasions, 1907 and 1914, however, these reserves proved inadequate to prevent a liquidity crisis and the Government of Canada had to step in to supplement the reserves.

The Finance Act, passed in 1914 to facilitate wartime finance, provided the chartered banks with a liberal rediscounting facility. By pledging appropriate collateral (this was broadly defined) banks could borrow Dominion notes from the Treasury Board. The Finance Act clause, which was extended after the wartime emergency by the Amendment of 1923, provided a discount window/lender of last resort for the Canadian banking system.

In sum, though Canada, Scotland, and several other countries did not have formal central banks serving as LLRs, all had access to a governmental authority which could provide high-powered money in the event of such a crisis.

LLR Assistance to Insolvent Banks

The classical prescription for LLR action is to lend freely but at a penalty rate to illiquid but solvent banks. Both Thornton and Bagehot advised strongly against assistance to insolvent financial institutions. They opposed them because they would encourage future risk-taking without even eradicating the threat of runs on other sound financial institutions. Bagehot also advocated lending at a penalty rate to discourage all but those truly in need from applying and to limit the expansion in liquidity to the minimum necessary to end the panic.

Between 1870 and 1970, European countries generally observed the classical strictures. In the Baring Crisis of 1890, the Bank of England successfully prevented panic. It arranged (with the Bank of France and the leading Clearing Banks) to advance the necessary sums to meet the Barings' immediate maturing liability. These other institutions effectively became part of a joint LLR by guaranteeing to cover losses sustained by the Bank of England in the pro-

cess (Schwartz, 1986, p. 19). The German Reichsbank in 1901 prevented panic by purchasing prime bills on the open market and expanding its excess note issue, but it did not intervene to prevent the failure of the Leipziger and other banks (Goodhart, 1985, p. 96). The Bank of France also followed classical precepts in crises in 1881 and 1889.

The Austrian National Bank, however, ignored the classical advice during the Credit Anstalt crisis of 1931 by providing liberal assistance to the Credit Anstalt at low interest rates (Schubert, 1987). Then, a run on the Credit Anstalt and other Viennese banks in May 1931 followed the disclosure of the Credit Anstalt's insolvency and a government financial rescue package. The run degenerated into a speculative attack on the fixed price of gold of the Austrian Schilling.

The U.S. record over the same period is less favorable than that of the major European countries. Before the advent of the Federal Reserve System and during the banking panics of the early 1930s, LLR action was insufficient to prevent panics. By contrast, over the past two decades, panics may have been prevented, but LLR assistance has been provided on a temporary basis to insolvent banks and, prior to the Continental Illinois crisis in 1984, no penalty rate was charged. In the U.S. on three notable occasions, the Fed (along with the FDIC) provided liberal assistance to major banks whose solvency was doubtful at the time of the assistance: Franklin National in 1974, First Pennsylvania in 1980, and Continental Illinois in 1984. Further, in the first case, loans were advanced at below-market rates (Garcia and Plautz, 1988). This Federal Reserve policy toward large banks of doubtful solvency differs significantly from the classical doctrine.

The Bank of England followed similar policies in the 1974 Fringe Bank rescue and the 1982 Johnson Matthey affair. In 1985, the Bank of Canada arranged for the major chartered banks to purchase the assets of two small insolvent Alberta banks and fully compensate all depositors. In contrast to the Anglo-Saxon experience, the German Bundesbank allowed the Herstatt Bank to be liquidated in 1974 but provided LLR assistance to the market. Thus, although the classical doctrine has been long understood and successfully applied, recent experience suggests that its basic message is no longer always adhered to.

V. CONCLUSION: SOME LESSONS FROM HISTORY

One can draw a number of conclusions from the historical record.

(1) Banking panics are rare events. They occurred more often in the U.S. than in other countries. They usually occurred during serious recessions associated with declines in the money supply and sharp price level reversals. The likelihood of their occurrence would be greatly diminished in a diversified nationwide branch banking system.

(2) Successful LLR actions prevented panics on numerous occasions. On those occasions when panics were not prevented, either the requisite institutions did not exist or the authorities did not understand the proper actions to take. Most countries developed an effective LLR mechanism by the last one-third of the nineteenth century. The U.S. was the principal exception.

(3) Some public authority must provide the lender of last resort function. The incidence of major international financial crises in 1837, 1857, 1873, 1890-93, 1907, 1914, 1930-33 suggests that in such episodes aggregate shocks can set in train a series of events leading to a nationwide scramble for high-powered money.

(4) Such an authority does not have to be a central bank. This is evident from the experience of Canada and other countries (including the U.S. experience under the Aldrich-Vreeland Act in 1914). In these cases, lender of last resort functions were provided by other forms of monetary authority, including the U.S. Treasury, Canadian Department of Finance, and foreign monetary authorities.

(5) The advent of federal deposit insurance in 1934 solved the problem of banking panics in the U.S. The absence of government deposit insurance in other countries that were panic-free before the 1960s and 1970s, however, suggests that such insurance is not required to prevent banking panics.

(6) Assistance to insolvent banks was the exception rather than the rule until the 1970s.¹⁶ The monetary authorities in earlier times erred on the side of deficiency rather than excess. Goodhart's view is certainly not a description of past practice. The recent experience with assistance to insolvent banks is inconsistent with the classical prescription. Liberal assistance to insolvent banks, combined with deposit insurance which is not priced according to risk, encourages excessive risk-taking, creating the conditions for even greater assistance to insolvent banks in the future.

In sum, the historical record for a number of countries suggests that monetary authorities following the classical precepts of Thornton and Bagehot can prevent banking panics. Against the free banking view, the record suggests that such a role must be provided by a public authority. Moreover, contrary to Goodhart's view, successful LLR actions in the past did not require assistance to insolvent banks. Finally, the record suggests that the monetary authority's task would be eased considerably by allowing nationwide branch banking and by following a policy geared towards price level stability. Under such a regime, as Goodfriend and King argue, open market operations would be sufficient to offset unexpected scrambles for liquidity.

¹⁶ Although in the U.S., the policy of purchase and assumption carried out by the FDIC and FSLIC before that date incorporated elements of public subsidy.

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