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Fighting the Last War: economists on the lender of last resort

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Abstract

In this paper we trace the evolution of the lender of last resort doctrine—and its implementation—from the nineteenth century through the panic of 2008. In many areas of economics, the profession assumes that only the most recent literature is relevant; however, when it comes to the lender of last resort the voice of Walter Bagehot, who wrestled with the how to deal with the financial crises that hit Britain between the end of the Napoleonic Wars and the great panic of 1866, still reigns supreme. More generally, we find that economists typically tended to “fight the last war”: formulating policy guidelines that would have dealt effectively with the last crisis, only to be confronted by new issues, requiring new solutions, in subsequent crises.

1. Introduction

In this paper we trace the evolution of lender of last resort (LOLR) doctrine—and its implementation—from the nineteenth century through the panic of 2008. There are, of course, many excellent histories of the LOLR, for example, Bordo (1990), Humphrey (1989, 1992), Goodhart (1999), Capie and Wood (2006), Kindleberger and Aliber (2011), and Bignon, Flandreau, and Ugolini (2012). Inevitably, we will cover many of the same experiences and ideas as these authors, but we hope to draw attention to some patterns in the way ideas about the LOLR have emerged from historical experience that have not received as much attention as we believe they should.

In the next section we define a LOLR and identify some of the important controversies. In section 3 we recount the evolution of the Bank of England as LOLR and in section 4 that evolution in other countries. Section 5 then discusses ideas of the LOLR focusing especially on Bagehot's *Lombard Street*. Section 6 discusses the Great Depression and section 7 the contributions of R.G. Hawtrey, Milton Friedman and Anna J. Schwartz, and Ben Bernanke to the theory of the LOLR. In sections 3-7, our focus is on the provision of money to calm a financial panic that is already underway. In section 8 we address "rescue operations": bailouts of individual firms with the idea of preventing a financial panic from starting. Section 9 discusses the subprime crisis and section 10 concludes.

2. The Lender of Last Resort: Definitions and Controversies

What is a lender of last resort? Economists have offered many definitions. Thomas Humphrey (1992, 571) put it this way: “The term ‘lender of last resort’ refers to the central bank’s responsibility to accommodate demands for high-powered money in times of crisis, thus preventing panic induced contractions of the money stock.” In *Manias, Panics, and Crashes* Charles P. Kindleberger (1978, 261) tells us, however, that “[t]he lender of last resort stands ready to halt a run out of real and illiquid financial assets into money by making more money available.”

At the heart of both definitions is the notion of a “run” or “panic” and the damage it can do. The classic banking panic was characterized by a sudden widespread fear that “hard cash” (i.e., specie when there was a metallic monetary standard, fiat currency when there was not) would not be available when needed, leading holders of bank notes or deposits to try to withdraw their funds as quickly as possible. The potential for a damaging run is inherent in fractional reserve banking: since banks only hold cash accounting for a portion of deposits, if everyone demands their cash at once only a fraction can be paid. Diamond and Dybvig (1983) was the first of a long line of papers analyzing the inherent instability of the banking system within a formal model.

The two definitions of the LOLR differ, however, in terms of the range of events that would call for interventions. Humphrey, evidently, would limit the LOLR’s actions to a relatively narrow swath of the financial sector, perhaps to just the banking sector, and would focus on the goal of maintaining the stock of money. Kindleberger’s definition goes beyond the familiar case of commercial bank depositors attempting to convert deposits into cash. His “Real and illiquid financial assets” would include real estate, stocks and bonds, reserves of raw material, and so on. For Kindleberger, a collapse of farm prices or a crash on the stock market might require action by a LOLR. The range of markets and institutions that should be protected by the LOLR remains one of the fundamental controversies in the theory of the LOLR.

The “contagion of fear” (Friedman and Schwartz 1963, 308) that ignites a run might be based on bad economic news, such as the decline of a key agricultural price or the failure of an important company that endangered the soundness of the banking system. Alternatively, it might be based on a false rumor that, for example, that an unsuccessful speculation had put an important segment of the financial sector at risk. In the classic analogy someone yells “fire” in a crowded theater and everyone rushes to the exit hoping that they won’t be the one consumed by the fire. The panic may have a factual basis (someone may have detected the start of a potentially damaging electrical fire) but it might be based on an unfounded rumor (the person who yelled fire was mistaken).

There is no doubt that historically financial crises, especially banking panics, have been associated with severe economic contractions. Why panics cause so much distress, however, is still a matter of controversy. In some cases the inability to complete transactions – to pay workers or suppliers of raw materials for example – clearly depressed economic activity in the short-run (James, McAndrews, and Weiman 2013). Monetarists point to contractions in the money stock produced by decreases in the money multiplier as the main channel (Friedman and Schwartz 1963, Cagan 1965). Note that Humphrey’s definition of the LOLR expressly stresses the role of the LOLR in preventing contractions in the stock of money. In response, Keynesians have pointed to waves of pessimism that depress investment spending (Temin 1976). And Bernanke

(1983) argued that banking panics could depress economic activity by raising the cost of financial intermediation.

Typically, we think of the central bank as the institution making more money available during a panic; however, Kindleberger's definition, rightly in our view, leaves open the institutional identification of the LOLR because other institutions have often played this role, including government Treasury departments, individual or groups of private banks, and wealthy individuals. In the recent American crisis both the Treasury and the Federal Reserve played important roles in meeting the crisis, and private banks were brought into the policy response. Kindleberger would go even further. He has suggested, for example, that decisions by legislatures to address a financial panic should be counted as lender of last resort operations.

The money that the LOLR can make available in a crisis depends on the underlying monetary regime. At one extreme is a major country with a central bank that creates fiat money. In the event of a bank run the central bank can print whatever amount is needed no matter how large the demand. The central bank may worry that money creation will lead to inflation or an asset price bubble, but not that it will run out of money. At the other extreme is a country on the gold standard where the central bank has limited reserves. In those circumstances a central bank must husband its reserves. A rumor that the central bank itself is running short of reserves may intensify a crisis.

Once a run on the banking system is underway the experts agree that the LOLR needs to step in and bring the run to a halt. The only disagreement is over the terms on which additional funds should be made available. Some traditional theorists, Walter Bagehot in particular, suggested that the LOLR should set stiff terms: interest rates should be high and no compromise should be made on the quality of the collateral required. Others have suggested that it is wrong for the LOLR to be so exacting, and that the important thing is for the LOLR intervene to stop the crisis before it spreads.

Perhaps the most significant disagreement is over whether the LOLR can and should intervene to prevent panics from developing in the first place. Historically, panics have often been precipitated by the failure of an important financial institution. If the LOLR could have stepped in and rescued the failing institution it might have prevented the ensuing panic. The question then becomes how widely the LOLR should roam in its search for firms in need of rescue. Should it provide assistance only to solvent banks, or should it rescue the insolvent as well? Should it stick to banks, financial institutions in general, or should it rescue any business or government agency that it believes is so "systematically important," to use the currently fashionable term, that its failure might trigger a financial panic?

In the following two sections we will sketch the development of the LOLR in various countries. Then in sections 5, 6 and 7 we examine how the thinking of economists and policy makers about the proper role for the LOLR has evolved over time. In Section 8 we focus on the thinking about rescue operations. Section 9 address the subprime crisis. And section 10 draws some general conclusions.

3. The evolution of the Bank of England as LOLR

Although the Bank of England was the first institution in the world to act as LOLR on a consistent basis, its evolution into that role was neither direct nor quick. The Bank was granted a charter as England's first limited liability joint stock bank in 1694 in return for a substantial loan to the crown. The charter was renewed nine times between 1697 and 1844, typically in return for a fresh loan or an improvement in the terms of its outstanding loans (Broz and Grossman 2004). With the passage of the second rechartering act in 1708, the Bank was granted an exception to the law prohibiting firms of more than six persons from operating bank, effectively giving it a monopoly on joint stock banking in England and Wales, a privilege that persisted into the 19th century.

Despite its quasi-public character as the government's banker and privileged position as England's only joint stock bank, the Bank of England was universally regarded as a private institution with limited responsibility beyond its shareholders. Nonetheless, Ashton (1959, 112) asserts that the Bank expanded its discounts during 18th century stringencies, and Lovell's (1959) statistical analysis of the period 1758-1798 demonstrates that the Bank did expand its discounts in response to both the level and change in the level of commercial bankruptcies.

One factor that may have complicated the Bank's willingness and ability to function as LOLR was its responsibility to maintain the rate of exchange between the pound and gold, that is, adherence to the gold standard. This requirement gave the Bank an incentive to conserve its gold holdings at the precise moment when, as LOLR, it should have been lending freely. This conflict seemed to impair the Bank's actions as a LOLR during the crisis of 1793, when, according to Baring ([1797] 1993, 20-21), "…the Directors caught the panic; their nerves could not support the daily and constant demand for guineas (i.e., gold); and for the purpose of checking that demand, they curtailed their discounts." Thus, the Bank reduced its lending and discounting in order to preserve its gold holdings (Clapham, 1945, I, 261). The failure of the Bank to act as LOLR led the government to take on that role by issuing Exchequer bills to merchants on the security of commodities of all kinds (Thomas 1934, 26).

The conflict between the Bank's evolving role as LOLR and its commitment to maintain gold convertibility arose again during the crisis of 1797. Contrary to the Bank's 1694 charter, which forbade it from lending to the government without the consent of Parliament, Chancellor of the Exchequer William Pitt tapped the Bank for funds by discounting Treasury Bills. The continual borrowing led the Bank's gold reserve to fall from over £6 million in 1795 to about £1 million in 1797. With the outbreak of the crisis in February 1797, the government issued an order prohibiting the Bank – against its wishes – from redeeming its notes in gold. The suspension of the gold standard would last until 1821.

Although, the Bank of England's reaction to the crisis of 1793 was tentative, Bagehot (1924 [1873], 52) describes the response to the crisis of 1825 which was more confident:

> The way in which the panic of 1825 was stopped by advancing money has been described in so broad and graphic a way that the passage has become classical. "We lent it," said Mr. Harman [a former governor], on behalf of the Bank of England, "by every possible means and in modes we had never adopted before; we took in stock on security, we purchased Exchequer bills, we made advances on Exchequer bills, we not only discounted outright, but we made advances on the deposit of bills of exchange to an immense amount, in short, by every possible means consistent with the safety of the Bank, and we were not on some occasions over-nice. Seeing the dreadful state in which the public were, we rendered every assistance in our power." After a day or two of this treatment, the entire panic subsided, and the 'City' was quite calm.

Despite the Bank's activism in 1825, its behavior in 1836 was again timid. As financial pressure increased in 1835, the Bank decided not to make advances on bills that had been endorsed by note-issuing joint-stock banks. This was no doubt partly a consequence of the Bank's displeasure that the 1833 recharter had eliminated its monopoly on joint stock banking in London. During the summer of 1836, the Bank further decided to reduce substantially the amount of its holdings of bills accepted by the major merchants in Anglo-American trade (Collins 1972, 52). Upon a deputation from the Bank of Liverpool, the Bank of England relaxed its policy, and again agreed to permit the discounting of American bills drawn against actual transfers of goods.

The Bank of England became much less hesitant as LOLR in subsequent crises, particularly those following the enactment of the Bank Charter Act of 1844, called Peel's Act after Prime Minister Sir Robert Peel. In theory, this legislation should have made it more difficult for the Bank to act as LOLR. Among its other provisions, the law split the Bank into two departments, an Issue Department, which was to assume responsibility for the note issue (and, hence, maintaining convertibility into gold), and a Banking Department, which was to carry on the rest of the Bank's business. The Act permitted the Bank to issue £14 million in notes backed by securities, the so-called "fiduciary issue." Any additional notes beyond the fiduciary issue were to be back one-for-one by gold, thus hampering the Bank's ability to expand the note issue—in the absence of a corresponding increase in the gold reserve—in times of crisis. And, in fact, opponents the Act, including Thomas Tooke and John Fullarton, raised this objection during the debate over the legislation. Fullarton argued that an increase of notes should be permitted in time of emergency, warning that the arrangement "…must have the very effect of disabling [the Bank of England] for the performance of what has hitherto been considered the duty of the Bank in time of difficulty and pressure" (Fetter 1965, 187-191).

Peel understood the constraints of the new law and privately acknowledged that it might be necessary to suspend the Act in time of emergency. A new pattern emerged following the law's passage in 1844: during the crises of 1847, 1857, and 1866, the Government encouraged the Bank to violate Peel's Act by exceeding its fiduciary limit and, in return, sent the Bank a letter promising that it would introduce a bill in Parliament indemnifying the Bank for any violations of the law: such a law was enacted in 1857, but was not needed during the crises 1847 or 1866.

The rigidity in the law regarding the quantity of notes issued can be seen as a protection against an overexpansion of the note issue. Peel, however, believed that would be possible for the Bank to act as LOLR despite the law. Following the crisis of 1847 Peel, now in opposition, congratulated the Government on their handling of the crisis:

> My confidence is unshaken that we are taking all the precautions which legislation can prudently take against the recurrence of a monetary crisis. It *may* recur in spite of our precautions, and if it does, *and if it be necessary* to assume a grave responsibility for the purpose of meeting it, I daresay men will be found willing to assume such responsibility (Andréadès 1909, 329n).

Thus, in Peel's view, the LOLR should be constrained in its note issue in normal times, but should have the flexibility to expand its note issue during an emergency.

The second half of the 19th century saw three crises in Britain that highlight the distinction between a LOLR operation and a bailout and the difficulties faced by policy makers in navigating them. Financial upheavals of 1866, 1878, and 1890 were each centered on a key—and to use modern terminology—systematically important financial institution: Overend, Gurney, and Company; the City of Glasgow Bank; and Baring Brothers, and Company.

Overend, Gurney had its origins in a firm of Norwich wool merchants, which eventually became established a country bankers. The company later merged with a firm of London bill brokers and grew to such status, according to the *Times* of London (May 11, 1866), that it could, ". . . rightly claim to be the greatest instrument of credit in the Kingdom." The relationship between Overend, Gurney and the Bank of England had long been hostile and, when Overend collapsed in 1866 leading to widespread panic, it appealed to the Bank of England for assistance. The Bank denied the particular request on the grounds that the firm did not have adequate security; however, the Bank did increase its discounting activities, in line with its role as LOLR. It is unclear whether the City of Glasgow Bank—which failed largely due to fraud—approached the Bank of England, but it did request assistance from the association of Scottish bankers, which denied the request on the grounds that bank's affairs were so obviously beyond repair.

The Baring crisis erupted in 1890 when Baring Brothers, an old established firm of merchant bankers, failed. Baring's had long been London's leading lender to Latin America, particularly Argentina and Uruguay. When Argentina's land boom collapsed leading to a run on the banking system, the market for Baring's substantial portfolio of Latin American debt securities dried up. The threat of an international run on Baring's would also have called Britain's commitment to the gold standard in question, and so when Baring's directors approached the Bank of England with a request for assistance, the Bank reacted with alacrity. The Bank immediately ordered an audit in order to determine whether, given enough time, Baring's currently illiquid assets would be sufficient to eventually pay off its liabilities. Convinced that it was—and accompanied by an assurance from the government that it would also absorb some of the cost of the liquidation of Baring's, should it not prove true—Bank of England governor William Lidderdale set about assembling subscribers to a guarantee fund which would be called on if the Bank-supervised liquidation of Baring's assets was not sufficient to meet its liabilities. Lidderdale placed the Bank of England's name at the top of the list for £1 million and set about coaxing, cajoling, and, in some cases, even threatening potential subscribers. All of this was done before news of Baring's difficulties became public. By the time the story became known, the guarantee fund was already fully subscribed and no panic materialized. The Baring rescue surely spared Britain a banking crisis and, potentially, a run on the pound.

The Baring Crisis was by no means the first time that the Bank of England had provided funds for individual firms. In 1801 the Bank had lent to Hibberts, Fuhr, & Purrier on guarantees from 13 firms including Baring Brothers & Co. In 1836-37 the Bank loaned to several firms that had run into difficulties while financing trade with the United States. Aid was provided to Sir James Esdaile, Esdaile, Grenfell, Thomas & Co. on the guarantee of several private bankers. Aid was also provided to the three W's – Wiggin, Wildes, and Wilson – for a time although they were eventually let go. And aid was provided to W. & J. Brown & Co., which received a total of almost £2,000,000, about £5.6 billion in today's money using GDP as the inflator (www.measuringworth.com). Still it was the relief of Baring in 1890 that brought the

Bank's practice of lending to individual firms to arrest an incipient panic clearly into focus.[1]

4. Lenders of Last Resort elsewhere in the 19th and early 20th century

Other central banks acted as LOLR during the nineteenth century, although none had as much time to grow into this role as the Bank of England. In 1890 the Bank of Japan—just eight years after its establishment—provided liquidity during a stock market crisis, preventing the collapse of a large number of banks (Tamaki 1995, 66-67). Under the leadership of Governor Jacques Lafitte, the Banque de France—which had only been established in 1800—loaned freely during the crisis of 1818 acting as "an intuitive lender of last resort." This mantle was, however, only temporary, since, "[t]hereafter, the Bank of France forgot the lesson…" When a downturn in the textile industry led to a financial crisis ten years later, the Bank responded by restricting its lending. The crisis was only stemmed after syndicate of six Paris banks stepped in to provide funds (Kindleberger 1984, 279). The Banque was consistent in this attitude for many years, refusing to intervene during the failures of the Crédit Mobilier in 1868 or the Union Générale in 1882. It did, however, provide a loan for the Paris Bourse in 1882 (White, 2007). And it intervened when the Comptoir d'Escompte was on the point of failure in 1889 by authorizing a large loan on behalf of the Banque and persuading several large banks to guarantee the loan (Hautcoeur, Riva, and White 2013). Kindleberger and Aliber (2011, 218) argue that the Comptoir d'Escompte was bailed out not because of

[1] This paragraph is based on Hidy (1946).

any change of heart by the Banque, but because it was thought that a second large bank failure in the span of seven years might have destroyed the credibility of the French financial system. According to Plessis (1995, 11), during the late 19th and early 20th century the Banque de France considered itself to be in competition with the large deposit banks, although it was

> …willing 'to help Trade and Treasury' by making capital available to them—in so far as it could. On an *ad hoc* basis, it helped banks with temporary difficulties (such as Société Générale in early 1914), but had no intention of fully taking on the role of lender of last resort.

LOLR facilities emerged rapidly in response to worldwide financial crisis of 1857, sometimes by central banks acting alone, other times in concert with governments. Although many major commercial centers were hard hit during this crisis, the disruption was especially severe in Hamburg. As an important center for trade between Scandinavia, northern Germany, Britain, and the Americas, the expansion in the issue of Hamburg bills of exchange in the years leading up to the crisis left it particularly vulnerable when the crisis struck (Wirth 1874, 373ff.). Hamburg's government, after debating whether to increase its note issue, with the potential consequence of a depreciation of its silver-backed currency, created a new bank to discount mercantile trade bills. This new bank was funded with securities deposited by the Treasury, as well as government-borrowed silver.

By contrast, the Bank of Prussia refused to lend the required silver during the crisis. Assistance came from Austria, which was on an inconvertible paper standard and was thus happy to lend 10 million marks *banco* (the securities deposited by the Treasury accounted for 5 million marks *banco*) at interest. The arrival of the train carrying the silver (*Silberzug*) from Austria is said to have calmed the crisis almost immediately (Flandreau 1997, 750; Kindleberger and Aliber 2011; Ahrens 1986).

Elsewhere in northern Europe, governments and central banks responded vigorously to the crisis of 1857. The Denmarks Nationalbank unilaterally extended the maturity on all Hamburg bills it held by three months and the quantitative limit on its note-issue was abolished. Sweden and Norway contracted large state loans to tide the markets over the crisis (Jensen 1896, 380; *Times* of London, December 7, 1857). And the Nederlandsche Bank undertook the role of LOLR during the 1857 crisis by "lending freely at a penalty rate," as Bagehot's advice would later be formulated: the bank raised its discount rate sharply (from between 3 and 4 percent to 7 percent), and discounted freely against good collateral. As it noted in its annual report on the year:

> We decided to enlist all our forces in an effort to allay the crisis; (…) while we did increase the interest rate, we equally let it be known far and wide that we did not lack in strength and that anyone who could pledge good collateral might count on the support of our institution (Vanthoor 2005, 48-49).

In subsequent crises, the focus shifted from governments to central banks. In Finland, the government acted as LOLR during the late 1870s and early 1880s, when the state took the unusual action of approving loans to the banks in order to alleviate their liquidity problems—a role it reprised during a crisis at the turn of the century. It was the Bank of Finland, however, that rescued Kansallis-Osake-Pankki in the early 1890s and provided selective support to banks during the 1931 crisis (Herrala 1999; 7-12, Capie, Goodhart, Fischer, and Schnadt 1994, 137). The Norges Bank (1899) and Sweden's Rikabank (1897) also adopted the role of LOLR later in the 19th century (Capie, Goodhart, Fischer, Schnadt 1994, 124, 147). Taking on this role may have been facilitated by the fact that both of these banks were developing a clearing system among domestic banks around this time, allowing them to directly affect the level of reserves.

The Banca d'Italia, established in 1893, developed into a LOLR shortly after the turn of the 20th century, adopting Bagehot's principle of lending freely during the crisis that struck in 1906—going so far as to refer to Bagehot by name in its 1907 Report and Accounts. After having taken a similar action in 1910, the Bank's annual report stated: "At that particular time, what was important to the Italian business community was not so much to obtain funds at reasonable conditions, but to know that credit was still available for good risk transactions. And the Bank did not fail to provide this type of credit" (Wood 2000, 208-209).

A set of private institutions took on the role of LOLR in United States during the nineteenth century: the bank clearinghouse. Clearinghouses of one sort or another have existed in many times and places; they are institutions that provide a central location where representatives of individuals or firms can meet to settle claims against one another, thus reducing the time, effort, and cash necessary to do so. For example, if A owes B 10 and B owes C 10, the debts can be cleared with one payment from A to C, rather than two payments (A to B and B to C). If A owes B 10, B owes C 10, and C owes A 10, the account can be settled with no payment whatsoever, rather than three individual payments of 10.

American bank clearinghouses settled a variety of claims, including banknotes, checks, drafts, and bills of exchange during the nineteenth century. They also set rules for the behavior of member banks, including limiting deposit rates and setting prices on claims to be traded. Unlike the central banks discussed above, American bank clearinghouses were entirely private, owned by the banks themselves. The New York clearinghouse was officially formed in 1853, although Albert Gallatin—who had been Secretary of the Treasury under presidents Jefferson and Madison--had suggested the formation of clearinghouses as early as 1831. Clearinghouses were subsequently formed in Boston (1856) and Philadelphia (1858). Clearinghouses were not only established in large banking centers, but also in smaller banking markets including Topeka, Kansas and St, Joseph, Missouri (Cannon 1900; 1910).

Clearinghouses took on special importance during crises (Gorton 1985, 280-281; Cannon 1900, 1910; Timberlake 1984). At the outbreak of a panic the clearinghouse would authorize the issuance of clearinghouse loan certificates, a sort of reserve currency. A bank facing a shortfall of cash could apply to the clearinghouse loan committee for certificates, against which the bank would submit a portion of its securities portfolio as collateral. Certificates were issued with maturities of from one to three months, carried an interest charge, and were issued in large denominations. They could then be used in place of cash in the clearing, allowing banks to keep more cash on hand to satisfy depositors' demands.

American clearinghouses worked, in some ways, like the Bank of England during crises, creating liquidity in the form of loan certificates during emergencies. The loan certificates were the joint obligations of the members of the clearinghouse, so that if the security posted as collateral was not sufficient to redeem the loan, the liability fell upon the surviving members of the clearinghouse. Like the Bank of England, the clearinghouses issued additional liquidity on the security of collateral, and discounted the collateral as warranted.

The operations of the clearinghouses differed from the Bank of England in a number of important respects. Because the clearinghouses were private institutions, operating without any government supervision or regulation, they did not require legislative approval to increase the supply of money or reserves beyond some government-imposed limit. Second, at least in earlier crises, the clearinghouse created liquidity only in the form of large-denomination clearinghouse loan certificates, which were used solely for inter-bank clearing, unlike Bank of England notes which served both as reserves and also as a circulating medium. In the later crises of 1893 and 1907, however, American clearinghouses went even further, issuing small denomination loan certificates, which circulated among the public. These issues amounted to approximately $100 million, or 2.5 percent of the total outstanding money stock, in 1893 and $500 million, or about 4.5 percent of the money stock, in 1907 (Gorton 1985, 282). The issuance of a “private” currency without official sanction soon attracted the attention of the government. Following the crisis of 1907, the Aldrich-Vreeland Act (1908) restricted the power to authorize the issue of emergency currency to the Secretary of the Treasury.

Finally, clearinghouses differed markedly from Bagehot’s ideal of a lender of last resort in their willingness and ability to micro-manage banking affairs during crises. Clearinghouses often directed loans from healthy banks to ailing banks during periods of financial turbulence. Banks that were in poor condition were usually not allowed to fail during crises, but were expelled for failing to repay loans after the panic had ended, generally leading to their failure (Gorton 1985). Thus, although the clearinghouse fulfilled the classical role of the lender of last resort, it also appears to have instituted elements of a bailout, by directing credit to ailing institutions, and added the powers of a regulator, with the authority to discipline poorly behaving banks.

5. The Lender of Last Resort: The idea takes shape

The theory of the lender of last resort developed in response to the financial crises outlined in the previous sections, but the theory, it must be said, did not progress rapidly. The ideas of theorists writing decades ago, in a few cases writing more than a century ago, still appear relevant and are still debated by today's experts. In the following sections we describe the evolution of thinking about the lender of last resort. We focus first on ideas about what should be done once a panic has begun; what should be done once the forest fire is well underway and flames are leaping from tree to tree; after that we look at "rescue operations" intended to prevent individual failures from igniting panics, that is, how to spot the stroke of lightning and burning tree that left unattended might set the whole forest ablaze.

5.1 From Adam Smith to Henry Thornton

As usual Adam Smith is a good place to start. In the *Wealth of Nations* Smith points out that even in his day the Bank of England played a unique role in supplying credit to merchants, especially during times of stress in financial markets. The Bank, according to Smith,

> "…upon several different occasions, supported the credit of the principal houses, not only of England, but of Hamburgh and Holland. Upon one occasion, in 1763, it is said to have advanced for this purpose, in one week, about 1,600,000£; a

> great part in bullion. I do not, however, pretend to warrant either the greatness of the amount or the shortness of the time." (Smith 1981 [1776], II.ii.85, 320).[2]

The failure of the Ayr Bank in Scotland was one of the pivotal moments in the Crisis of 1772. Smith may well have been aware of many of the details. According to Checkland (1975, 130-1) in a last desperate effort to avoid bankruptcy the Ayr Bank sent a delegation, which included the Duke of Buccleuch a shareholder who was being advised by Smith (Smith had been his tutor), to negotiate a loan from the Bank of England. The Bank of England offered £300,000. But the terms were so stiff that the Ayr Bank refused the loan. Shortly after, the Ayr Bank closed its doors, accelerating the panic; a Lehman Brothers moment.

These clearly read like LOLR operations. Smith's opinion appears to be, although admittedly one has to read between the lines, that the role of LOLR "goes with the territory": The Bank of England was given special privileges; as a result it became a huge, dominating institution; and in exchange it was expected to support the government and the merchant community in their times of need. It must be admitted, however, that Smith did not address the key issue, or at least what for us would be the key issue: whether this arrangement was a good thing (Rockoff 2013, 320-21).

The term lender of last resort was first used, it is commonly held, by Sir Francis Baring (1797) in "Observations on the establishment of the Bank of England." The French Revolution had provoked financial crises in 1793 and 1797. The 1793 crisis affected the British country banks, but the 1797 crisis, triggered by the French landing in Wales, was a larger crisis that produced a suspension of gold payments by the Bank of England as well as many interior banks, although apparently not by the Scottish banks.

[2] Estimates of this sum in today's dollars would range from £190 million pounds using a retail price index as the inflator to £17.3 billion using the share of GDP (www.measuringworth.com).

Baring used the French legal term for a court of last appeal, *denier resort*, and seems to have used it much like Smith, as a description of the economic facts of life: Once a loan request had been turned down by everyone else, the last resort was the Bank of England. Baring offered three recommendations for meeting the current difficulties: a prohibition on the issue of demand notes and deposits by the country banks (notes or deposits paid at a later date were OK), making the notes of the Bank of England legal tender, and limiting the total note issue of the Bank of England.

Henry Thornton (1802) provided what appears to be one of the first clear statements of the case for a LOLR.[3] The crisis of 1793 was relieved in part, Thornton (1807 [1802], 40) tells us, by the issue of exchequer bills – government bills that merchants could obtain by pledging private securities.

> The very expectation of a supply of exchequer bill, that is, of a supply of an article which almost any trader might obtain, and which it was known that he might then sell, and thus turn into bank notes, and after turning into bank notes might also convert into guineas, created an idea of general solvency.

This was certainly a LOLR operation, but one carried out by the Treasury, not the Bank of England. In 1797 the Bank, according to Thornton (1802, 59-78), reduced its note issue in response the crisis to protect its reserve, but as a result, in Thornton's view, increased the severity of the crisis. The right thing to do was to increase its note issue during a panic.[4] Thornton also saw dangers from overexpansion of the Bank of England's note issue during the Napoleonic suspension. At the end of his masterpiece Thornton (1807 [1802], 248-49) offered a prescription for the Bank of England to follow--

[3] See Hetzel (1987) for a detailed study of Thornton.

[4] Thornton (1807 [1802], 78) took the Bank to task for acting "according to what seems likely to have been the advice of Dr. A. Smith in the case." But as we indicated above, Smith did not provide a clear statement of what he thought the Bank of England should do in financial crises. Thornton's criticism, rather, is based on deductions from some of Smith's conclusions in other contexts.

both in normal times and in panics--that even now would be considered sound advice for a central bank.

> To limit the total amount of paper issued, and to resort for this purpose, whenever the temptation to borrow is strong, to some effectual principle of restriction; in no case, however, materially to diminish the sum in circulation, but to let it vibrate only within certain limits; to afford a slow and cautious extension of it, as the general trade of the kingdom enlarges itself, to allow of some special, though temporary, increase in the event of any extraordinary alarm or difficulty, as the best means of preventing a great demand at home for guineas, and to lean to the side of diminution, in the case of gold going abroad, and of the general exchanges continuing long unfavourable, this seems to be the true policy of the directors of an institution circumstanced like that of the Bank of England.

5.2 Bagehot's *Lombard Street*

Britain suffered financial crises in 1810, 1815, 1819, 1825, 1837, 1839, 1847, 1857, and 1866. These crises, especially those of 1825, 1847, 1857, and 1866 provided the raw material for what is still the most influential text on the LOLR: Bagehot's *Lombard Street* (1873).[5]

Bagehot's policy prescription, what is often referred to as "Bagehot's rule," was "that in time of panic it [the Bank of England] must advance [lend] freely and vigorously to the public out of the reserve." This plan, however, was subject to two important qualifications. "First, that these loans should only be made at a very high rate of interest." And "Secondly. That at this rate these advances should be made on all good banking securities, and as largely as the public ask for them" (Bagehot 1873, 187-88).

In a recent series of lectures Ben Bernanke put it this way:

[5] Bagehot (1873) thought that the crises of 1793 and 1797 lay too far in the past to provide much instruction, that the crises of 1815 and 1819 occurred during the restriction of gold payments and therefore raised a different set of issues, and that neither of the crises of 1837 and 1839, although severe, did not "terminate in a panic."

> He [Bagehot] had a dictum that during a panic central banks should lend freely to whoever comes to their door; as long as they have collateral, give them money. Central banks need to have collateral to make sure that get their money back, and that collateral has to be good or it has to be discounted. Also, central banks need to charge a penalty interest rate so that people do not take advantage of the situation; they signal that they really need the money by being willing to pay a slightly higher interest rate. If a central bank follows Bagehot's rule, it can stop financial panics. (Bernanke 2013, 7).

To fully understand Bagehot's rule, it is necessary to understand the institutions that Bagehot took for granted. Bagehot was prescribing for a particular patient, and did not warrant that his medicine, and the dosage he recommended, would provide a satisfactory outcome in all patients. The most important of these institutions was the gold standard. Adherence to the gold standard had become an article of faith accepted by the business community and most other segments of the community, and maintaining the gold standard was perhaps the highest priority for monetary policy. Bagehot fully supported Britain's commitment to gold and opposed bimetallism when it became an issue in the 1870s. "England, Bagehot wrote, has a currency now resting solely on the gold standard, which exactly suits her wants, which is known throughout the civilized world as hers, and which is most closely united to all her mercantile and banking habits" (Bagehot 1877, 5: 613). A fiat money regime was also well known to Bagehot: after all that was the regime which had prevailed in Britain from 1797 to 1819 when specie payments were suspended as a result of the Napoleonic Wars. Bagehot specifically rejected basing his prescription for the lender of last resort on the financial crises that had occurred during those years because "the problems to be solved were altogether different from our present ones" (Bagehot 1873, 190).

A second constraint was that the Bank of England was the holder of the main reserve of gold. The joint stock banks and other participants in the money market looked to the Bank of England provide them with gold when necessary and so held minimal reserves. Bagehot believed, moreover, that the Bank of England itself often held an inadequate reserve, and it was part of his purpose to persuade the Bank to make every effort to maintain a reserve commensurate with its responsibilities.

It was possible, Bagehot understood, to imagine alternative institutional arrangements. In an oft-quoted passage Bagehot appears to have endorsed the theoretical superiority of free entry in banking.

> But it will be said – What would be better? What other system could there be? We are so accustomed to a system of banking, dependent for its cardinal function on a single bank, that we can hardly conceive of any other. But the natural system – that which would have sprung up if Government had let banking alone – is that of many banks of equal or not altogether unequal size (Bagehot 1873, 66).

But Bagehot goes on to argue that turning the clock back and starting over with a free banking system was unwise if not impossible. People trusted the current system, and trust was a valuable form of what today would be called “social capital” that took long time to accumulate. So Bagehot’s goal was to make the existing institutions work better, not to propose some alternative set of institutions that might work better, if they could be adopted at all, only after a long transition period.

Bagehot’s first qualification to his rule, that emergency loans be made at high interest rates, followed in part from the dependency of the British banking system on the Bank of England’s reserve. High interest rates during a panic would discourage merchants from borrowing simply to fortify their own reserve positions, thus reducing the reserve at the Bank of England. Since the public followed the Bank of England’s reserve and was alarmed when it fell to low levels, it was important to protect the reserve even during a panic.

> The rate should be raised early in the panic, so that the fine may be paid early; that no one may borrow out of idle precaution without paying well for it; that the banking reserve may be protected as far as possible (Bagehot 1873, 187-88).

The case for raising the rate of interest during the panic was especially strong during a panic in which an “internal drain” (gold was flowing from the banking system to the public) was combined with an “external drain” (gold was flowing abroad). Bagehot believed that internal drains and external drains tended to arrive at the same time (Mints 1945, 191). And Bagehot was insistent that when that happened the right medicine was a high rate to end the outflow of gold combined with liberal lending. Here is Bagehot’s (1873, 56) recommendation.

> Before we had much specific experience, it was not easy to prescribe for this compound disease [an external drain combined with an internal drain]; but now we know how to deal with it. We must look first to the foreign drain and raise the rate of interest as high as may be necessary. Unless you can stop the foreign export, you cannot allay the domestic alarm ... 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.

While it is clear that Bagehot believed that a high rate was especially important in the face of an external drain, it is a mistake to think that he recommended a high rate only in the case of an external drain. Recall that in summarizing his rule, Bagehot (1873, 188) recommended a high rate during panics without a further qualification that a high rate would be appropriate only when an external drain was present. A second consideration is that Bagehot approved of the Bank’s handling (after a bad start) of the Panic of 1825, a panic that Bagehot (1873, 54) regarded as “entirely internal.” At the height of the panic in December 1825 the Bank of England raised the Bank Rate from 4 percent to 5 percent, the legal maximum.

Sometimes, as in the quote from Bernanke, Bagehot's high rate is described as a *penalty* rate, a term that Bagehot himself did not use. If penalty is being used simply as a synonym for high, Bagehot's prescription, obviously, is unchanged. Bagehot, as we showed above, explained his high rate as a *fine* for excessive timidity. However, some writers who have used the term penalty have suggested that Bagehot meant a rate that was higher than the very high market rates that prevailed, typically, during financial panics. But as Goodhart (1999) and Bignon, Flandreau, and Ugolini (2012) show, this is going too far. Bagehot thought of his rate in instrumental terms: one that would be recognized as high by pre-crisis standards and that was high enough to discourage hoarding of reserves.

Under a fiat standard the urgent need to protect the reserve that so concerned Bagehot would disappear. There might still be reasons to lend at a high rate, for example to discourage borrowing for the purpose of speculative investments, or In the event of an external drain to protect the reserve of foreign currency. It is clear, however, that the accumulation of a large gold reserve, or the transition to a fiat standard, would alter the costs and benefits of raising rates during a panic. It is not at all clear, therefore, that Bagehot would have recommended a high rate for a central bank in a financial crisis under these circumstances. As we will see below, Friedman and Schwartz thought that the Federal Reserve had made a mistake in keeping its lending rate too high during the Great Contraction when the Federal Reserve, although adhering to the gold standard, had what Friedman and Schwartz considered an abundance of reserves.

Similarly, Bagehot's recommendation that the Bank of England lend only against good collateral was based on another important feature of the existing economic landscape: almost all of the securities circulating in the marketplace would be good under ordinary circumstances. The Bank of England could provide general relief by insisting on good collateral and only a very few potential borrowers would be excluded. Bagehot (1873, 188) put it this way.

> The amount of bad business in commercial countries is an infinitesimally small fraction of the whole business. That in a panic the bank, or banks, holding the ultimate reserve should refuse bad bills or bad securities will not make the panic really worse; the 'unsound' people are a feeble minority, and they are afraid even to look frightened for fear their unsoundness may be detected.

What if a speculative boom had proceeded so far that a substantial amount of securities were suspect? What if the unsound firms were not a "feeble minority" but rather a substantial minority? The costs and benefits of insisting on good collateral would be altered and the benefits of lending to some potential borrowers who lacked good collateral would be higher. Under a fiat standard, moreover, the costs of accepting weak collateral would be lower because there would be no need to sell securities to replenish the reserve. Again it is not at all clear that under these alternative institutional realities Bagehot would have insisted that lending be limited to amounts that could be backed by good collateral. If the unsound people were more than a "feeble minority" it might be necessary to lend to some of them to calm a panic.

Bagehot's concept of LOLR, it is important to note, did not include other modes of rescuing the banking system, namely bailing out individual institutions or more drastic rescue measures, such as nationalizing the banking system (Grossman 2013, chapter 4). Capie (2002, 310) illustrates of how a LOLR would work in theory (and often in practice) if it followed Bagehot's prescriptions, highlighting how this policy differs from others forms of rescue:

> The mechanism can be thought of as the central bank with a discount window that is of frosted glass and is raised just a few inches. Representatives of institutions could therefore appear at the window and push through the paper they wanted discounted. The central bankers would return the appropriate amount of cash, reflecting the going interest rate. The central banker does not know, nor does he care, who is on the other side of the window. He simply discounts good quality paper or lends on the basis of good collateral.

The identity, creditworthiness, and importance of the borrower are completely irrelevant to the process—the LOLR merely lends against sound collateral. We will return to the theory and practice of rescue operations below.

6. The Great Depression and the absence of a LOLR in the U.S.

The Dow Jones Industrial Average started 1928 at 200. By September 1929, it had reached 380, the final leg of the bull market of the roaring twenties. But it began to fall, and on October 28, (Black Monday) and October 29 (Black Tuesday) lost over 25% of its value. The stock market crash drastically altered expectations and produced a decline in spending on consumer durables (Romer 1990). The New York Federal Reserve reacted to the immediate effects of the crash by supplying additional funds to New York banks so that they could make loans to brokers and dealers of securities. But it did not address the macroeconomic trends set in motion by the stock market crash. In the following three years the American banking system suffered from wave after wave of bank failures. According to Friedman and Schwartz (1963, 299) more than a fifth of the commercial banks in the United States … suspended operations because of financial difficulties."[6] The stock of money (M2) fell 35 percent between 1930 and 1933. To be sure, the monetary base rose, but not nearly enough to reverse the decline in the stock of money, and of course, other quantitative measures of the banking system.

Many explanations have been put forward for the failure of the Federal Reserve to act as LOLR, all of which probably highlight some part of the full story. Friedman and Schwartz (1963, 412-16) argued that a lack of effective leadership was key. Benjamin Strong, the governor of the Federal Reserve Bank of New York, and a dominant figure in the early years of the Federal Reserve System had recognized that a banking panic called for aggressive open market purchases. But Strong died in 1928, and no one with the same grasp of the problem or forceful personality emerged to take his place. The governors of the regional banks, moreover, had secured an increase in the membership of the Open Market Committee, reducing the potential for decisive action. Temin (1989) and Eichengreen (1992), on the other hand, stressed the constraints, real and psychological, imposed by the gold standard. And Wheelock (1991) and Meltzer (2003) argued that flawed policy doctrines hampered the Federal Reserve. The Federal Reserve tended to rely on borrowed reserves – what Meltzer called the "Riefler-Burgess doctrine" after the developers of the theory – and nominal interest rates as indicators of monetary policy: Low bank borrowing and low interest rates signifying that monetary policy was easy. Since that was precisely the state of affairs in the early 1930s, the Federal Reserve assumed that it was doing all it could to abort the slide.

One could also ask why outside experts on banking and finance did not pressure the Federal Reserve to change course. Some did, but opposition to Federal Reserve

[6] Some of these banks were reopened after the emergency had passed; in some cases without major changes in their balance sheets, and in some cases after major reorganizations.

policy was a minority cause. Perhaps the weightiest outside expert was O.M.W. Sprague, the author of the classic *History of Financial Crises under the National Banking System* (1910). Had he campaigned for a vigorous response to the Depression by the Federal Reserve, especially if he had been joined by a chorus of other experts, he might have made a difference. But Sprague never saw any part of the banking failures of 1930-33 as a financial crisis requiring LOLR action. The problem may have been that the developments that defined a financial panic in earlier crises, and that Sprague had discussed at length in his classic, were absent in 1930-33 (Rockoff 2012). In 1907 for example, as shown in figure 3, the commercial paper rate rose sharply at the same time that the banking crisis in New York was ignited by the failure of the Knickerbocker Trust; nothing like that happened in November 1930 when Caldwell and Company failed and December 1930 when the Bank of United States failed. In retrospect economists have identified these failures as important, but an economist looking to short-term interest rates to measure the temperature of the money market would not have identified them as such.

The banking crises of the 1930s came to a head with the wave of "bank holidays" announced by state and local governments during the interregnum between the election of President Roosevelt in November 1932 and his assumption of office in March 1933. Once in office Roosevelt took several actions that ended the crisis. First he turned the mounting tide of state and local bank holidays into a National Bank Holiday. During the holiday, the Roosevelt administration explained, the banks would be inspected and the sound banks would be allowed to reopen. The administration also announced legislation creating federal deposit insurance. These reforms – which were neither LOLR operations nor bailouts of individual firms, but something more dramatic – seem to have quieted the storm and there were few bank failures in the United States during the remainder of the 1930s.

In the wake of this colossal meltdown a number of important financial reforms were introduced. Some were aimed at strengthening the banking system and making future panics unlikely. These included the separation of commercial banking from investment banking, the creation of the Securities and Exchange Commission to regulate securities brokers and insure that investors had accurate information about the securities they were buying, the regulation of interest on bank deposits, among others.[7] Other reforms were aimed explicitly at strengthening the capacity of the Federal Reserve to act as LOLR. The Board of Governors was made the dominant part of the system to prevent conflicts between the regional banks and the Board from preventing effective action. The Federal Reserve, moreover, was given legal authority to lend to non-member banks and in "exceptional and unusual circumstances" to non-banks.

The Great Depression may have begun in the United States – not all scholars are agreed – but it soon spread to Europe. The Europeans were suffering from some of the same problems as the United States. Falling farm prices, for one thing, undermined European banks with a strong presence in agricultural areas just as they did in the United States. But it is also likely that the fears generated by the stock market crash on Wall Street and the bank failures in the United States simply jumped over international boundaries. In May 1931 the Kreditanstalt, the largest private bank in Austria failed. The panic then spread quickly to Germany. The Danat Bank, one of the largest German

[7] These and other reforms left the banking system more stable, but also more constrained and less competitive. The rollback of this regulation contribued to financial instability that emerged in the 1970s and 1980s. Grossman (2010, 251-259).

Banks failed on July 13th and Germans banks were closed on the 14th and 15th. The pressure then hit Britain. In August John Maynard Keynes recommended a major devaluation. In September Britain left the gold standard, ending a connection that had been established after the end of the Napoleonic wars. Many other countries, particularly those in the British Empire, followed Britain off gold and established a relationship between their own currency and the pound. As a result the world was effectively divided into two blocs: a sterling bloc led by Britain and a gold bloc led by the United States.

Various attempts based on international cooperation were made to stop the downward spiral in Europe, but for political reasons – after all this was happening only a decade after the end of World War I – they proved insufficient (Kindleberger 1978, 194-201). When the Kreditanstalt's difficulties were revealed the Austrian government turned to the League of Nations which then turned to the Bank for International Settlements. Credits from a number of countries were arranged, but these were soon exhausted. When the run shifted to Germany credits were arranged from the Bank of England, the Bank of France, and the Federal Reserve Bank of New York, but again not in sufficient amounts to quench the panic. When the run shifted to Britain private and government credits were arranged, but again in insufficient amounts. When New York experienced an external drain of gold, the Federal Reserve Bank of New York raised its discount rate, probably stanching the drain but further undermining the economy.

The appropriateness of monetary policy during the remainder of the Great Depression continues to be a matter of debate. In the United States after 1933 the stock of money rose at a fairly rapid rate except during the "recession within the depression" in 1937-38. The outbreak of World War II produced a radically different monetary policy. The federal government ran large deficits to finance the war effort and the Federal Reserve froze the prewar interest rates on government bonds; buying any bonds not taken by the private sector at the prewar price. Between 1930 and 1933 the stock of money fell 11.7 percent per year; between 1933 and 1941 it rose 8.3 percent per year; and between 1941 and 1945 it rose 17.6 percent per year, doubling in four years.

The Federal Reserve entered the postwar era with its powers as LOLR greatly enhanced for several reasons, although for the better part of the next half century, these powers would not be called upon. (1) As noted above, reforms during the 1930s had centralized power within the Federal Reserve Board, giving it increased authority to deal with incipient panics. (2) A chastened Federal Reserve had learned important lessons about the danger of allowing banks to fail. To be sure, the rise to dominance of Keynesian economics meant that the potential for monetary policy to influence the macro-economy was downplayed. Nevertheless, there was an understanding that permitting the fear of bank failures to spread among depositors had been a mistake. And (3) The United States had accumulated large stocks of gold, and under the Bretton Woods system the U.S. dollar had become the hegemonic currency. There was little danger that a fear of running out of reserves would prevent the Federal Reserve from quenching a potential panic.

7. The Impact of the Great Depression on the doctrine of LOLR

The Great Depression produced some rethinking of the role of the central bank as LOLR. This rethinking was more limited than might be expected. Bagehot's *Lombard*

Street still remained the touchstone in discussions of the doctrine of LOLR. Here we briefly review three of the most important contributions that reflected the impact of the Great Depression: R.G. Hawtrey's (1932) *the Art of Central Banking*, Friedman and Schwartz's (1963) *A Monetary History of the United States*, and Ben Bernanke's "Nonmonetary effects of the financial crisis in the propagation of the great depression" (1983).

7.1 R.G .Hawtrey: *the Art of Central Banking*

Although Francis Baring deserves credit for first describing the Bank of England as the dernier resort, it was R.G. Hawtrey's *The Art of Central Banking* (1932) that propelled the English term "lender of last resort" into the mainstream of economic discussion. A Google Ngram (Figure 1) shows that specific phrase "lender of last resort" first came into widespread use in the 1930s. And a search of Google Books, and a search of JSTOR (where the term also emerges in the 1930s) suggest that Hawtrey's (1932) *The Art of Central Banking* was the source.

Indeed, Hawtrey's book was a milestone in the development of the theory of the LOLR. Hawtrey, like Bagehot, saw the need for the LOLR to lend freely in a financial panic, although on good collateral. Hawtrey thought that central banks in his day could attack a panic more easily than the Bank of England in Bagehot's day because they could issue fiat currency in denominations the public would find acceptable, something that in practice the Bank of England had been prevented from doing in the nineteenth century. But the Crisis of 1931, Hawtrey thought, was something new. International withdrawals were of such magnitude that they could drive countries off of the gold standard. The Austrian government had addressed the problem of internal panic when it guaranteed the deposits of the Kreditanstalt, and the German government had done likewise when it guaranteed the deposits of Danatbank. But the problem of external drains could not be addressed in this way (Hawtrey 1932, locations 3828-70). The events of 1931, in short, were like the run on an individual bank, but were “a run on the entire banking system of a country” (Hawtrey 1932, locations 3936-42). What was needed then, Hawtrey argued, was an international lender of last resort (Hawtrey 1932, locations 3942-47). This idea appears to be new, or at least given a decisive boost, by Hawtrey (de Boyer des Roches and Solis Rosales 2011). Finding or creating an institution that could become the international lender of last resort, Hawtrey warned, would not be easy. The Bank for International Settlements was, as far as Hawtrey could see, the best existing candidate. But turning it into an effective international lender of last resort would require changes in both the balance sheet of the Bank for International Settlements and its leadership.

7.2 Friedman and Schwartz: A Monetary History of the United States

Banking panics play a central role in Friedman and Schwartz’s *A Monetary History of the United States*. Several of the panics -- in 1873, 1893, 1907, and 1931 – were associated with severe economic contractions. During the earlier crises there was no central bank in the United States. What little lender of last resort actions there were, were carried out by the private bank clearing houses and by the U.S. Treasury and private banks and clearinghouses. But while Bagehot, Hawtrey, and others saw the need for the central bank to maintain gold payments, Friedman and Schwartz now emphasized maintenance of the stock of money. Their analysis followed from a model of the economy based on the demand for and supply of money. The demand for money was determined by GDP and the proportion of GDP that people wanted to hold as money, which in turn was a function of interest rates, expected inflation, and other variables – the quantity theory of money. The supply of money was determined by the amount of high-powered money and the money multiplier. The latter in turn was a function of the deposit-currency ratio of the public and the deposit-reserve ratio of the banking system, with the supply of money rising when either of these determinants rose.

In this framework there is a straightforward interpretation of a banking panic. When people fear the safety of their bank deposits they withdraw cash from banks: the deposit-currency ratio falls. Banks would also attempt to increase their liquidity by, say, refusing to renew loans: the deposit-reserve ratio would also tend to fall, although in theory there is some ambiguity because in the first instance a withdrawal of currency from a bank would raise the deposit-reserve ratio. If the amount of high-powered money did not change during the panic, the stock of money would fall, and with it GDP. This framework then, provides a clear set of symptoms to look for in a banking panic: a decline in the deposit-currency ratio, a decline in the deposit-reserve ratio and, hence, if no offsetting actions were taken, a decline in the stock of money.

Table 1 shows what happened in 1873, 1884, 1890, 1893, 1907, (the major crises under the national banking system), and 1931 (the first under the Federal Reserve). The panic years are marked in bold. In each case, except for the mild panic in

1890, there was a decline in the stock of money in the panic year or the following year: 1.8 percent from 1873 to 1874, 6.5 percent from 1892 to 1893, 3.4 percent from 1907 to 1908, and 6.2 percent from 1930 to 1931. These decreases were exceptional – the stock of money normally rose -- and driven mainly by decreases in the money multiplier.

Figure 2, based on Friedman and Schwartz's monthly data, shows what happened in 1931. The pattern is similar to the earlier panics: The deposit-currency ratio drops precipitously after the failure of the Bank of United States, the trigger for the crisis. (More on this failure below.) The deposit-reserve ratio also falls, although not as precipitously, and there may have been a slight downward trend in the ratio before the banking crisis. In other words, if we use the stock of money and its determinants as the metrics for indicating the presence of a financial panic, then it is correct to view the crises of 1930-1933, and especially the crisis of 1930-31, as the same sort of malady that had hit the economy in 1873, 1893, and 1907.

Friedman and Schwartz then offer, implicitly, an alternative to Bagehot's rule. The central bank should inject sufficient high-powered money to the banking system to offset the decline in the deposit-reserve and deposit-currency ratios and maintain the stock of money. If velocity was affected presumably they would support a further increase in the amount of high-powered money to offset any decline in velocity.

Friedman and Schwartz (1963, 407) did argue, however, that even a policy based solely on Bagehot's rule would have produced far better results than the policy actually followed. Here is how they put it.

> The actions required to prevent monetary collapse [in the early 1930s] did not call for a level of knowledge of the operation of the banking system or of the workings of monetary forces or of economic fluctuations which was developed only later and was not available to the Reserve System. On the contrary, as we

> have pointed out earlier, pursuit of the policies outlined by the System itself in the 1920's, or for that matter by Bagehot in 1873, would have prevented the catastrophe. The men who established the Federal Reserve System had many misconceptions about monetary theory and banking operations. It may well be that a policy in accordance with their understanding of monetary matters would not have prevented the decline in the stock of money from 1929 to the end of 1930. But they understood very well the problem raised by a panic attempt to convert deposits into currency, and provided ample powers in the Act to deal with such a panic. There is little doubt that a policy based solely on a thorough perusal of the hearings preceding the enactment of the Federal Reserve Act and a moderately informed understanding of them would have cut short the liquidity crisis before it had gone very far, perhaps before the end of I930.

Allan H. Meltzer's recent history of the Federal Reserve reinforces Friedman-Schwartz on this point. In his final summary of policy in the 1930s Meltzer (2003, 729) writes that:

> Bagehot's work was known at the time. Senior officials referred to him but they did not follow his advice. They tried to protect the gold reserve, and at crucial times did not function as a system.

The difference between Bagehot and Friedman-Schwartz can be seen in particular with respect to interest rates and open market operations. Recall that Bagehot, with one eye always on the Bank of England's reserve, recommended high interest rates even during an internal drain. But when criticizing Federal Reserve policy in 1931 Friedman and Schwartz (1963, 395) go in the opposite direction.

> True, during the height of the internal and external drain in October, it permitted its discounts and its bills bought to rise sharply. But this was at the initiative of the member banks, in spite of sharp rises in the rates on both, and was a result of the desperate situation of member banks because of the double drain. As we have seen, even after the height of the crisis, the New York Bank reduced bill buying rates only gradually and kept them above market rates, so bills bought declined rapidly. The System took no active measures to ease the internal drain, as it could have done through open market purchases.

Evidently, Friedman and Schwartz concluded that given the abundant reserves of the Federal Reserve, and the possibility that formal legal restraints would have been lifted if they had asked for it, the need to protect the Federal Reserve's gold reserve should have been ignored in favor of increasing the stock of money.

In the ensuing decades Bagehot's idea of calming panics by free lending, and Friedman and Schwartz's idea that the stock of money had to be prevented from falling remained fundamental to thinking about the lender of last resort. Perhaps the most intense debate was about how aggressively the central bank should turn to lender of last resort actions. The aggressive view is exemplified by Kindleberger's *Manias, Panics, and Crashes* (1978). Kindleberger believed that market economies often went off the rails, and needed government interventions to get them up and running again. Although it is hard to reduce Kindleberger's wide ranging essay to a simple formula, it appears that Kindleberger's conclusion was that the social costs of untreated financial crises were extremely high and that central banks should therefore generally err on the side of intervention. Anna Schwartz in a well-known essay entitled "Real and pseudo-financial crises" took the other side arguing that asset price bubbles could be allowed to burst and insolvent financial firms be allowed to fail without endangering the payments mechanism, the latter being the appropriate object in need of protection by the lender of last resort.

7.3 Ben Bernanke and the Cost of Financial Intermediation

There have been many criticisms of the Friedman and Schwartz interpretation of the Great Depression, as well as many defenses. The criticism, or more accurately the addition, with the most resonance for the doctrine of the LOLR has proved to be Bernanke's (1983), who argued that there was more to the financial side of the Great Depression than the decline in the stock of money, without dismissing the idea that monetary contraction seriously undermined the economy. The failure or near failure of many financial institutions ruptured long-term relationships between lenders and borrowers, increasing the “cost of credit intermediation.” Potential borrowers who could not go to the institution they had long depended on might (after a time consuming search) find another lender with sufficient reserves to make a loan, but the borrower could not then offer adequate proof of his or her character, his or her commitment to fulfill long-term financial contracts. The trust between borrower and lender that had been built up over a long period of time was missing. In effect the cost of financial intermediation had risen. The potential borrower might make up for the lack of trust by offering collateral. But the decline in asset prices produced by the Depression made it hard to collateralize new loans. The persistence of the Great Depression in this analysis reflected the time it took to rebuild borrower-lender relationships shattered by the initial financial crisis.

The implication of Bernanke’s analysis for the LOLR was that simply maintaining or increasing the stock of money was not enough. The increased demand for money produced by the financial crisis might be fully slaked, and yet the economy would not be able to recover because important borrower-lender relationships had been severed. Therefore, it was important for the LOLR to preserve important lending institutions, and to funnel credit to borrowers who could not utilize their normal sources of credit. In the 2008 crisis as we will show below, Bernanke followed through on this vision, by (in many cases) rescuing individual financial institutions that were “systemically important” and by creating special credit facilities for borrowers cut off from their traditional sources.

8. Rescue Operations

Bagehot's main concern was with what the Bank of England should do once a panic was underway. He recognized a stage preceding the full-blown panic that he referred to as an "incipient panic" when financial markets were anxious and a panic was likely. In those circumstances he thought that the Bank of England needed to be especially vigilant about protecting its reserve because the reserve would be needed when incipient panic turned to panic. Bagehot never tells us how to distinguish an incipient panic, when the right policy was for the bank to conserve its reserve, from an actual panic when the right policy was to lend the reserve freely. He appears to have thought that it would be obvious (Rockoff 1986). But was there nothing that the central bank could do except to keep its powder dry? In 1890 during the famous Baring Crisis, discussed in greater detail in section 3, the Bank of England famously took action to prevent a panic from starting. Baring, an important investment bank, was on the verge of insolvency as a result of poor investments in Argentina. A consortium of lenders, which included the Rothchilds, was organized by the Bank of England to guarantee Baring's liabilities, successfully forestalling a panic. Clearly the Bank and other leading firms feared a panic if Barings was allowed to go under, but would there have been a panic if the firm had been allowed to go under?[8]

Indeed, whether the failure of a single firm could trigger a panic in the absence of fundamental strains in the financial system remains an unsettled question. On the one

[8] There are, of course, many examples of troubled financial institutions being bailed out by the government because of the perceived cost of permitting the firm to fail. Among the earliest bailouts on record are those of Australia's Bank of New South Wales in 1826, the Banque de Belgique in 1838-39, and Cologne's A. Schaaffhausen Company in 1848. In the modern context, the question is frequently asked about the failure of Lehman Brothers.

hand, many explanations for panics stress the buildup of distortions in the financial system, and this emphasis suggests that the failure of a particular firm is merely an epiphenomenon. Once a panic becomes inevitable, it cannot be stopped merely by rescuing a single firm. If one firm is rescued, another will fail and start the panic. Some examples of theories that emphasize the buildup of distortions are Calomiris and Gorton (1991), Reinhart and Rogoff (2009), and Schularick and Taylor (2012), or to take an older example, Mitchell (1941). We don't mean to go to the extreme of suggesting that these authors would completely discount a role for individual failures, merely that their analyses stress the buildup of fundamental strains rather than idiosyncratic events.

On the other hand, another class of explanations for panics stresses the inherent instability of a fractional reserve banking system. In that view a dramatic event can produce a cataclysmic banking contraction even when distortions are absent. Banks promise to pay cash on demand. But banks only hold a fractional reserve because on an ordinary day only a small percentage of depositors will want cash. But if alarm about the liquidity of the bank takes hold, there will be a run on the bank, and the bank will be forced to break its promise to its depositors. If fear about all the banks takes hold, a full-blown panic will result.

Diamond and Dybvig (1983) were the first to provide a formal model of a fragile banking system prone to runs. Their initial effort has produced a large literature extending, modifying, and criticizing their original model. In the Diamond-Dybvig model government policies such as deposit insurance or a commitment to freeze deposits in the event of a run can prevent panics from occurring. Some of the difficulties that can arise in models of this type are illustrated by Ennis and Keister (2009), who show that although the most efficient policy ex ante is for the central bank to commit to a policy of freezing all deposits in the event of a panic, the most efficient policy ex post is to allow exceptions to the freeze for people in need. Knowing that this will be the policy actually followed may increase the probability of run. Goodhart and Huang (1985) model the rescue choice itself, and illustrate the tradeoff between the cost in terms the increase of moral hazard created by the rescue of a large financial institution and the benefit from reducing the risk of a financial panic.

The two approaches – fundamental distortions and inherent fragility – are not, of course, mutually exclusive. It may be that true that distortions built up in the economy are bound to produce a severe contraction, and yet it may still be possible that additional random events determine whether a panic is added to the contraction. There may be a fire in a crowded auditorium, and that may mean that many people will be overcome by smoke, but it is still possible to imagine two outcomes. In one, someone rises quietly, politely asks their neighbors to excuse them, and begins walking toward the exit, leading to an orderly evacuation. In the other, someone yells fire, a panic ensues, and the crush of people trying to leave magnifies the damage done by the fire.

In any case the idea that the failure of a large bank can start a panic, although often questioned, remains an important folk theorem for financial historians. Bagehot, for one, believed that the financial system in his day was inherently fragile and that the failure of an important financial firm could trigger a panic.

> “Such accidental events [that trigger panics] are of the most various nature: a bad harvest, an apprehension of foreign invasion, the sudden failure of a great firm which everybody trusted, and many other similar events, have all caused a sudden demand for cash” (Bagehot 1873, 118).

The Baring crisis (1890) is the iconic example of successful intervention to prevent a potentially damaging failure. The astute American expert on financial crises, O.M.W. Sprague (1909, 401), noted that the practice of central banks had been broadened by the Baring Crisis to include the rescue of banks that were not "hopelessly insolvent" in order to prevent crises. The Bank of England's response to the Baring episode, to reiterate, did not fit the mold of classical LOLR operations described by Bagehot for three reasons. First, the Bank of England acted proactively; typically, LOLRs provide liquidity only *after* a crisis emerges. Second, the Bank of England's response involved providing a guarantee, rather than actual liquidity: in this sense, the Bank's actions were more like an ex post provision of deposit insurance, guaranteeing Baring's liabilities. Finally, the Bank did not act alone. It was the main organizer of the rescue, but because it was not the sole participant—and also had an explicit government commitment as a fiscal backstop—it was able to do so while at the same time limiting its potential loss on the operation. Although Bagehot's formulation did not exclude the possibility of a syndicated rescue, it did not envision it either.

But, as Sprague noted, it was practice that had changed, not theory. In the ensuing years economists examined and debated central bank responses to the potential failure of great financial firms, but no clear consensus emerged. The failure of the Bank of United States in December 1930 plays an important role in the Friedman-Schwartz history of the Great Depression. This failure, they argue, was of special importance because it was the first large bank in New York to fail during the Great Contraction, and possibly because its name misled some people into believing that it was sponsored by the federal government, although in fact it was an ordinary commercial bank chartered by the state of New York. As shown in Figure 2, both the deposit-reserve ratio of the banking system and the deposit-currency ratio head down after the failure, thus accelerating the decline in the stock of money.

In a long footnote in *A Monetary History* Friedman and Schwartz (1963, 309) described the efforts to save the bank. The plan was to merge the bank with several others in New York and to inject $30 million provided by the clearing house banks. It would not have been the sort of emergency lending described by Bagehot in *Lombard Street*, but it would have been similar to the rescue organized by the Bank of England in the Baring crisis and in earlier crises. In *A Monetary History* Friedman and Schwartz (1963, 310 n. 9) provide only hints as to why the plan fell apart. They report a recollection by one of the participants, Jackson Reynolds, the President of First National Bank and of the Clearing House Association, who thought that the effects of the closure would be "local." And they report the recollection of another participant that the representatives of the Clearing House were concerned about the Bank of the United States' real estate investments. In modern parlance the beliefs were that the bank was not "systemically important" and not solvent.

In some of his popular writings and most importantly in his 1980 TV series, "Free to Choose," Friedman went further in pointing to the failure of the Bank of United States as the trigger for the crisis and in identifying the reasons why it was allowed to close. He began Episode Three, "Anatomy of a Crisis," his story of the Great Depression, with scenes in which he is filmed looking up at the building that was the former home of the Bank of United States.[9] This was where the crucial event occurred, Friedman tells the

[9] http://www.youtube.com/watch?v=SWVoPrntBso.

viewer, which turned a recession that was already severe because of the stock market crash into a crisis.[10] He goes on to explain that the bank served mainly Jewish merchants on the Lower East Side of New York, the famous starting point for many poor Jewish immigrants. Anti-Semitism, Friedman suggested, was the reason why the Clearing House failed to rescue of the Bank of United States. Rumors fueled by anti-Semitism, he added may even have contributed to the runs on the bank that had so weakened it that a rescue was necessary. In the end, Friedman and Schwartz (1963, 355) noted that the Bank had paid well when it was liquidated and that the Bank was probably therefore a good candidate for a rescue.

Friedman's contentions about the role of anti-Semitism have been vigorously challenged and defended (Temin 1976, 90-93, Lucia 1985, Friedman and Schwartz 1986b, O'Brien1992, and Trescott 1992). But while Friedman and Schwartz evidently believed that Bank of United States should have been rescued because its failure had disastrous effects and because it was in fact a sound bank they do not state explicitly, as far as we can tell, what they think should have been done if in fact the Bank had been clearly insolvent.

There were many important potential failures in the postwar period. Some were allowed to go to bankruptcy without a government sponsored bailout, and yet these failures did not produce financial panics. The failure of Equity Funding Corporation of America in 1973 and of Drexel Burnham Lambert in 1990 are examples. Perhaps these failures did not have systemic effects because the narratives about them stressed corruption and made them appear to be outliers. In any case, the belief based on the

[10] The book that accompanied the television series, Friedman and Friedman (1980, 80-82), also gives a starring role to the failure of the Bank of United States.

reactions to the failure of the Bank of United States in 1930 or the Knickerbocker Trust in 1907, and earlier examples, was that the failure of an important firm *could* trigger a damaging panic and led to several government rescues.

In June 1970 the Penn Central Railroad declared bankruptcy. There was a widespread fear that the failure of Penn Central to make good on its borrowings in the commercial paper market would ignite a panic. The Federal Reserve then took several actions designed to prevent a panic including open market purchases to increase the stock of money. Friedman (1970) was critical of this rescue operation. In his view, there was little danger of a banking panic being ignited by the failure of Penn Central. Failures of industrial firms, in Friedman's view, were distinctly different from failures of financial firms, and only the latter could precipitate a true panic. As long as the payments system was protected by a LOLR or deposit insurance there was no need, in his view, to bail out an industrial firm.

In 1974, however, there was a major bankruptcy within the banking system: Franklin National Bank. The Federal Reserve provided an emergency loan and later the Federal Deposit Insurance Company stepped in as receiver. In this case, Friedman (1974) was more sympathetic to the need for government action, but at the same time he expressed confidence that there was no danger of a financial panic because the presence of deposit insurance would prevent the sort of contagion of fear that undermined the banking system in 1931-33. In 1984 Continental Illinois, the nation's eighth largest bank failed because of losses on investments in energy loans made by Penn Square Bank of Oklahoma. The Federal Reserve and Federal Deposit Insurance Company cooperated in creating a bailout plan that included replacement of the bank's management. Friedman and Schwartz (1986a) thought that the bailout had been handled well, and used it as an example of the ongoing danger of contagion in banking that created a need for government involvement in banking. Thus, it would appear that Friedman and Schwartz had moved to the position that the potential failure of large institutions within the banking system needed to be addressed by the authorities in a way that would minimize the danger of a panic-inducing bankruptcy. A fire department was needed, but not every fire needed to be extinguished, only those that threatened to ignite a major conflagration.

9. The Subprime crisis

It has become commonplace for journalists to describe to the sub-prime mortgage crisis as the "worst financial crisis since the Great Depression" (Grossman 2013, 137). Google Trends shows a sharp increase in media references to "Great Depression" following the failure of Lehman Brothers in September 2008 (Eichengreen 2012, 289). Journalists are not alone in this regard. When Christina Romer asked President Obama's chief of staff Rahm Emmanuel why she, an economic historian, was chosen to chair the president's Council of Economic Advisers rather than someone with a more purely policy background, Emanuel replied: "You're an expert on the Great Depression, and we really thought we might need one."[11]

The similarities of the sub-prime crisis with the Great Depression were not lost on chairman of the Federal Reserve at the time the crisis erupted, Ben Bernanke.

[11] http://newscenter.berkeley.edu/2011/10/11/romer-talk-offers-young-academics-solace-sense-and-secrets/

Bernanke authored a series of essays on the Great Depression prior to joining the Federal Reserve (Bernanke 2000).[12] In 1992 as a member—although not yet chair--of the Fed's Board of Governors, Bernanke spoke at the 90th birthday celebration for Milton Friedman who, along with Anna Schwartz, famously wrote about how misguided Federal Reserve policy had worsened the Great Depression. In his remarks, Bernanke addressed Friedman and Schwartz directly: "You're right, we did it. We're very sorry. But thanks to you, we won't do it again."[13] Thus, it is clear that at the very highest levels of the Federal Reserve and the executive branch, there was little doubt about the severity of the crisis and a strong awareness of the consequences of inaction.

The sub-prime crisis, like the majority of financial crises during the last 200 years, resulted from the collapse of a boom-bust economic cycle (Fisher 1932, 1933, Minsky 1982, Kindleberger and Aliber 2011). The boom had a number of causes, among them expansionary fiscal policy (i.e., three tax cuts along with increased spending to fund wars in Afghanistan and Iraq) and excessively loose monetary policy. The situation was made worse by wholly inadequate regulation and supervision, particularly of the sub-prime mortgage market and the new funding instruments used to speed the flow of funds to low quality mortgages. The collapse of house prices left a large volume of mortgages under water, a number of home-owners unable to service their debts, and many intermediators holding distressed—often denoted "toxic"—assets, the value of which were dubious, threatening many institutions, including banks, investment banks, as well as institutions such as insurance giant AIG, which had insured a substantial amount of toxic assets.

[12] And, in its wake, penned a series of lectures on the Federal Reserve and the crisis (Bernanke 2013).
[13] http://www.federalreserve.gov/BOARDDOCS/SPEECHES/2002/20021108/

On the one hand, the extraordinary relief efforts included actions well beyond those envisioned by Bagehot. Through a variety of programs falling under the main category of the Troubled Asset Relief Program (TARP), the Treasury, with assistance from the Federal Reserve, purchased preferred stock, equity warrants, and provided assets guarantees to a variety of financial institutions.[14] Another segment of the TARP program provided funds to restructure General Motors and Chrysler. In addition, the amount of deposits covered by the Federal Deposit Insurance Corporation was raised to $250,000 from $100,000.

On the other hand, some of the programs established under the auspices of the Federal Reserve were similar in spirit to those prescribed by Bagehot, providing credit for money market mutual funds in danger of being unable to meet depositor withdrawals, issuers of commercial paper, primary dealers (broker-dealer counterparties to the Federal Reserve in Open Market Operations), to depository institutions (through the Term Auction Facility), and by lending out high-quality Treasury securities from the System Open Market Account against the collateral of good (but, presumably less credit-worthy than Treasury securities), much as exchequer bills had been used to quell the panic is 1793. In addition, the Fed provided currency swap lines with international central banks, in order to avoid a shortage of dollars on international markets. To quote a central bankers from a previous century, the Fed "… lent it by every possible means and in modes […] never adopted before…[was] not on some occasions over-nice."

The defining moment in the crisis was the failure of Lehman Brothers on September 15, 2008. The U.S. economy had already contracted and an atmosphere of

[14] These initiatives included the Capital Assistance Program, the Capital Purchase Program, the Community Development Capital Initiative, the Asset Guarantee Program, and the Targeted Investment Program.

near panic prevailed in financial markets. But the failure of Lehman Brothers precipitated a full blown financial panic and accelerated the decline in the economy. Why did the failure of Lehman Brothers have major consequences? Partly, it was the characteristics of Lehman Brothers itself. A large and once highly regarded Wall Street investment bank, its failure naturally undermined confidence in the financial system as a whole. If Lehman Brothers could not be trusted, who could be? It was also partly due to the order in which the crisis events had occurred. Other firms had gotten into trouble and had received aid. In March 2008 the Federal Reserve provided financing to help JPMorgan Chase acquire the troubled investment bank, Bear Stearns. In July The Federal Reserve Board and the Treasury authorized lines of credit for the Federal National Mortgage Association (Fannie Mae) and the Federal Home Loan Mortgage Corporation (Freddie Mac). On September 7 Fannie Mae and Freddie Mac were essentially nationalized. But on September 15 Lehman Brothers, another troubled investment bank, was simply allowed to fail, while American International Group, which had sold credit protection against a large volume of now toxic assets, was bailed out by the Federal Reserve and government in return for a nearly 80 percent share in the company. This decision raised questions about the willingness or the ability of the government to act as LOLR, and that may well have been the final precipitant of the panic. Andrew Ross Sorkin (2009, locations 10,283-91, of 13,296) put it this way in his detailed history of the financial crisis.[15]

> They offered a safety net to Bear Stearns and backstopped Fannie Mae and Freddie Mac but allowed Lehman to fall into chapter 11, only to rescue AIG soon after. What was the pattern? What were the rules? There didn't appear to be any, and when investors grew confused – wondering whether a given firm might be saved, allowed to fail, or even nationalized – they not surprisingly began to panic.

[15] Anna Schwartz made a similar argument (Ryssdal 2009).

There has been some debate about why Lehman Brothers was allowed to fail. The Federal Reserve has maintained that it lacked the legal authority to rescue Lehman Brothers because Lehman was insolvent; Lehman Brothers simply lacked securities that could adequately collateralize sufficient loans. On the other hand, more than a few observers have suggested that political considerations also played a role. As the crisis progressed the government came under increasing pressure to end what appeared to the public to be simply handouts to the richest Americans. Shortly before the collapse of Lehman Brothers, Treasury Secretary Henry Paulson purportedly told Ben Bernanke and Timothy Geithner at the Federal Reserve: “I can’t be Mr. Bailout” (Sorkin 2009, locations 5,055-10 of 13,296).[16] But the question for the future is whether Lehman should have been bailed out, and in what circumstances in general, if any, should apparently insolvent institutions be rescued.

It did not take long for the crisis to stimulate discussion and policy recommendations. The major legislative response to the crisis was the Dodd–Frank Wall Street Reform and Consumer Protection Act, an 848-page, 360,000-plus word law enacted in 2010. This law’s provisions, too numerous to outline here and not completely finalized, include measures to coordinate financial stability oversight, provide for orderly liquidation of failing financial institutions, increase oversight of securities transactions, and establish more stringent consumer protections. There have been numerous complaints the financial sector that the regulatory burden of Dodd-Frank is too heavy,

[16] That said, the first version of the bailout bill that Paulson sent to Congress was 840 words long, would have authorized $700 billion in spending to buy toxic assets, and essentially made the Secretary of the Treasury immune from oversight by the courts or Congress.

although it is far too soon to know if benefits the stability-enhancing and consumer protection provisions outweigh the regulatory burdens.

In the wake of the crisis Goodfriend (2012) drew attention to the large discretionary power exercised by the Federal Reserve and the Treasury during the crisis and suggested that Congressional approval be required for large scale “bridge loans” to financial intermediaries or for purchase of private securities. Meltzer (2013, 413) pointed out that the Federal Reserve has never followed Bagehot’s advice and announced the LOLR policies it intended to follow during the next crisis. Meltzer’s recommendation is that the Federal Reserve announce the types of collateral it would accept in emergencies, and impose capital requirements that would rise (up to a limit) with the size of the institution. One is entitled, however, to be skeptical and to question whether any announced policy that would lead to costs being imposed on politically influential sectors could be adhered to in the midst of a crisis, particularly if it was felt that the failure of a particular firm could substantially worsen a crisis that was already underway. It will be “another Lehman Brothers” is a potentially powerful argument. Gary Gorton (2012), on the other hand, has suggested that each crisis is so unique and arrives so suddenly that it is impossible to follow rules announced before the crisis. Some guidelines might be possible – don’t try to liquidate financial institutions during a panic is his suggestion – but overall he is skeptical about the possibility of announcing credible policies that will be followed.

Another mechanism for reducing the likelihood—and potential impact—of a crisis—is through enhanced shareholder liability. This can be achieved by turning debt holders into equity participants when capital levels fall to a predetermined level through contingent convertible securities (Cocos), has been suggested by Flannery (2010). Historically, enhanced shareholder liability has been achieved by issuing “uncalled liability.” For example, in 19th century Britain, shares were typically issued with a stated nominal share value, only a portion of which was paid in at issue. Thus a £50 share in a firm might have been issued with only £40 paid-in, meaning that the shareholder could be called upon to pay in an additional £10 in the case of failure or, more generally, at the discretion of the management (Jefferys 1946). Grossman and Imai (2013, 141) note that uncalled liability was more common and extensive in sectors where leverage was high and the physical assets were either meager or inaccessible to creditors.

In the United States during the 19th century, bank shares were frequently issued with “double liability.” Under double liability, when a the bank failed, shareholders would not only lose the total amount that they had invested in the shares, but would also be liable for an amount equal to the value that shares had been worth at their initial offering. In some states, shareholders were liable for twice the initial value of the shares (i.e., so-called “triple liability”); in other states, shareholder liability was unlimited (Grossman 2001, 2007). Flannery (2010), White (2010), and Grossman and Imai (2010) have suggested that the liability of shareholders in financial institutions be increased, thus increasing the incentive of shareholders to monitor banks while allowing the Fed and FDIC to protect other stakeholders. Despite these and other suggestions no consensus has emerged about the best way forward.

10. Conclusions

The theory of the LOLR evolved in response to financial crises. Typically, economists looked back at the most recent crisis—and possibly the one before that—in order to formulate guidelines that would have prevented that crisis, and that, they hope, might prevent the next one. That was true for Adam Smith who studied the crises of 1763 and 1772; Henry Thornton who studied the crises of 1793 and 1797; Walter Bagehot who studied the crises of 1825, 1847, and 1866; and Friedman and Schwartz who studied the crises of 1873, 1893, 1907, and 1930. Alas, this program has not led to rapid progress. In most branches of economics, the literature cited is primarily of recent vintage; but when it comes to the LOLR, Bagehot's *Lombard Street*, published in 1873, still reigns supreme. Economists it turns out are like the generals, always fighting the last battle: as we have seen, economists have begun, tentatively, to come up with guidelines based on the most recent crisis that will provide government officials with new and better ways to handle financial panics. Clearly, more rethinking of the LOLR doctrine is needed. In the meantime, policymakers will need to make do with the older prescriptions of Thornton, Bagehot, Friedman and Schwartz, Bernanke, et. al. Perhaps, there is no general rule to follow and central banking in financial crises will remain, as R.G. Hawtrey suggested, an art rather than a science.

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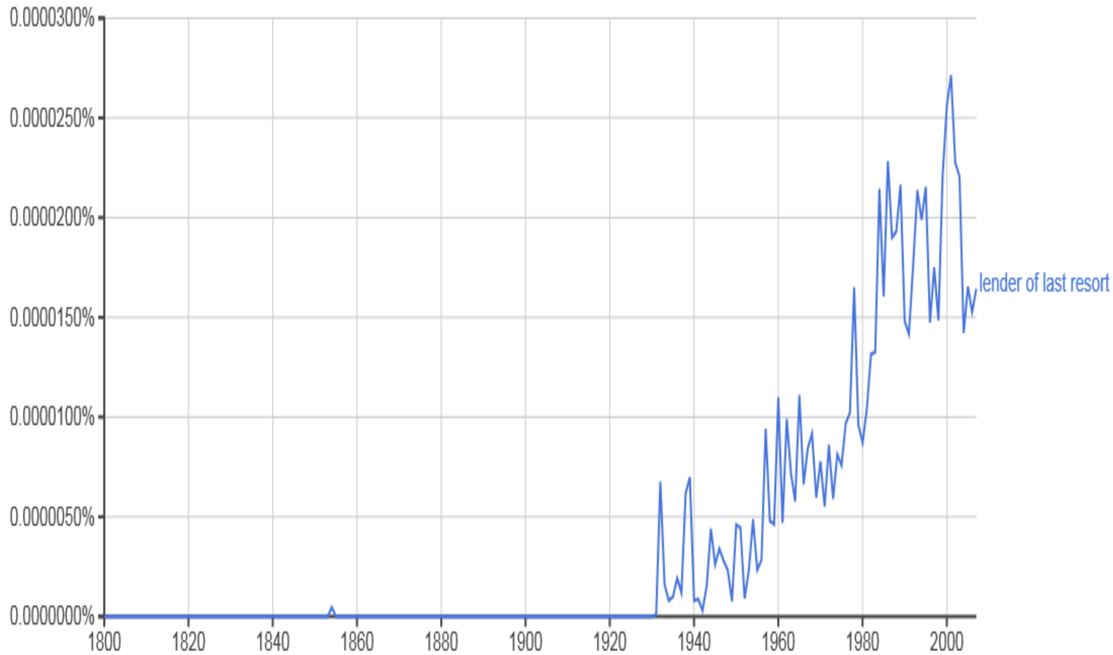
Figure 1. A Google Ngram of “Lender of Last Resort,” 1800-2008.



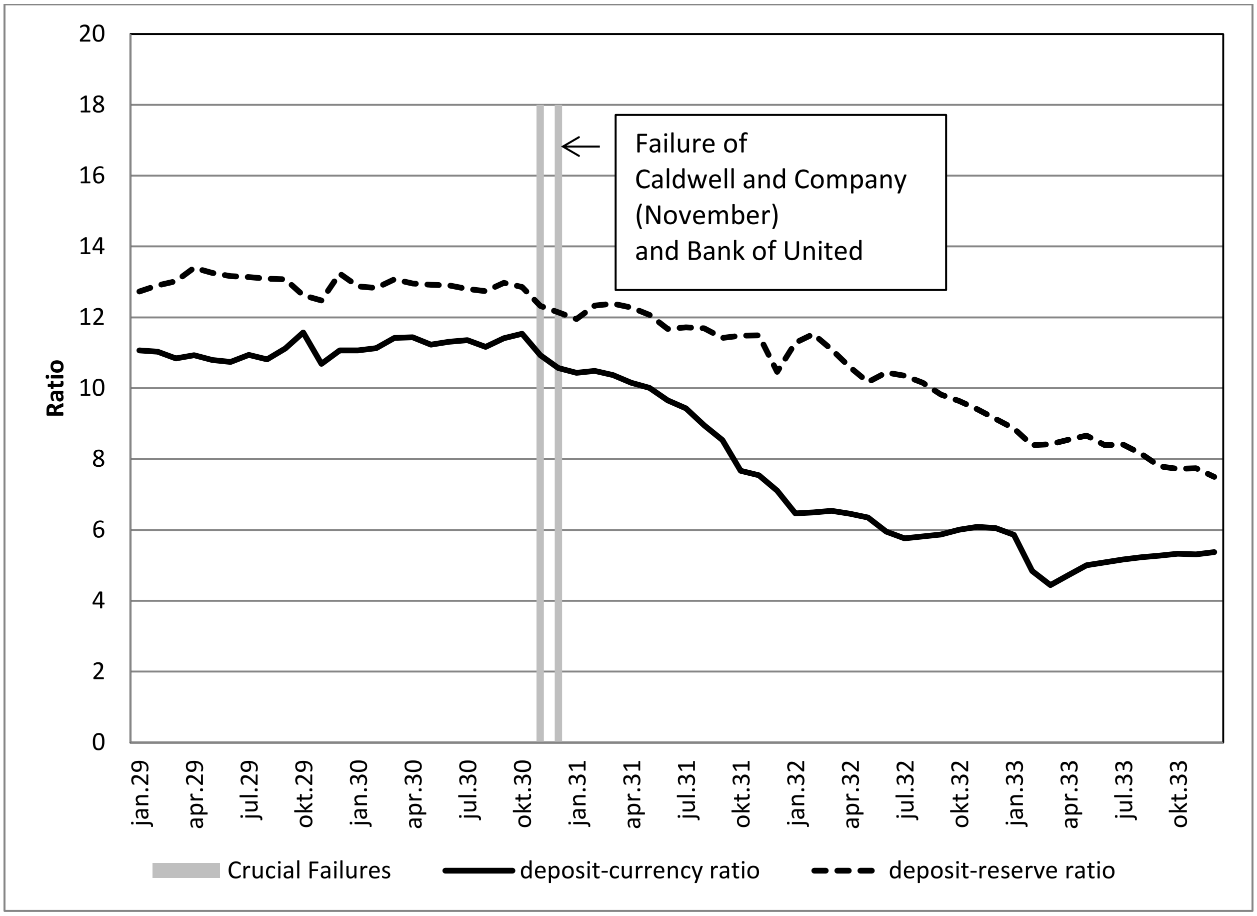


Figure 2. The deposit-reserve ratio and the deposit-currency ratio in the Great Contraction, 1929-1933.

Source. Friedman and Schwartz (1963, Table B3, pp. 799-804).

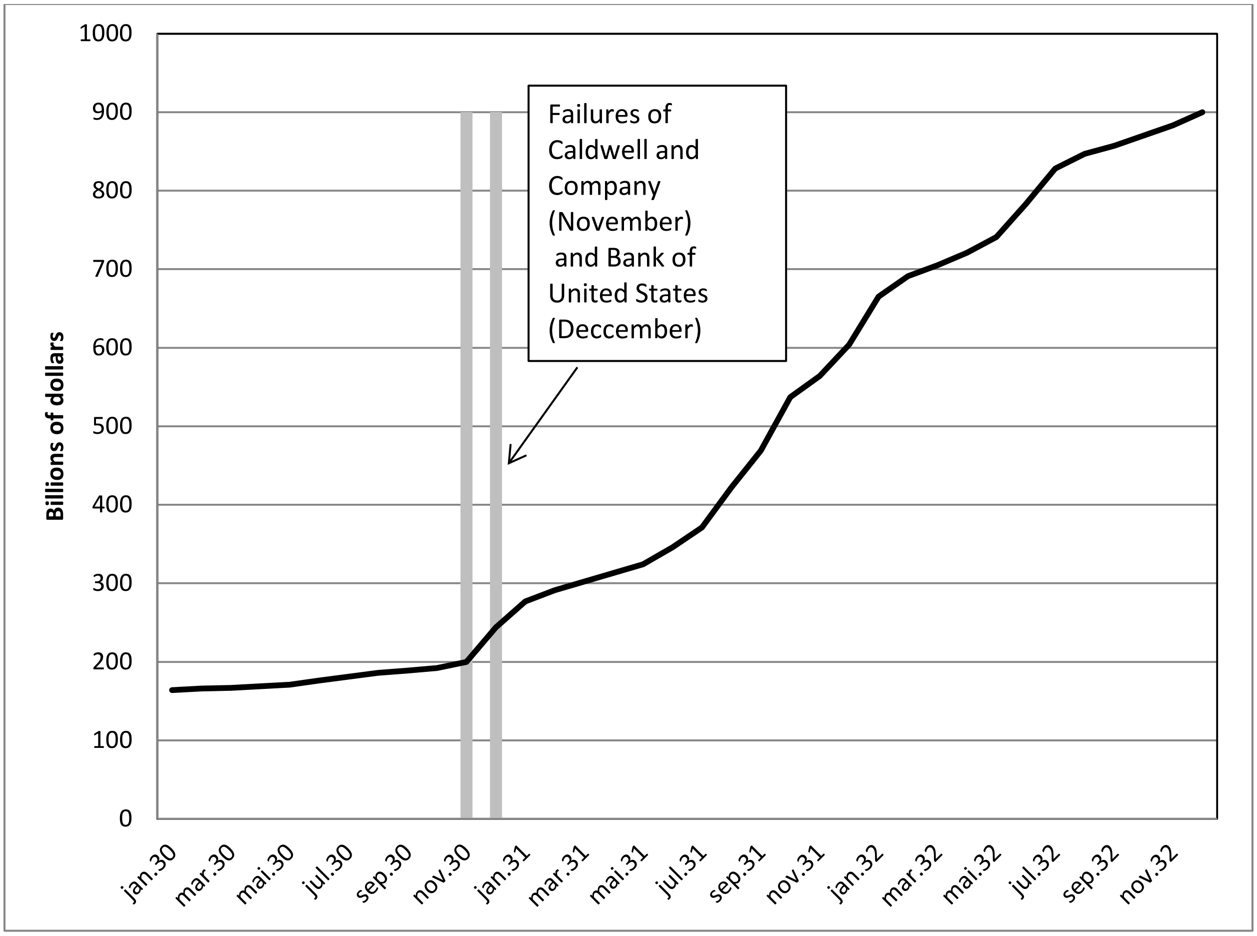


Figure 3. Postal savings in the United States, Monthly, January 1930 - December 1932.

Source. Friedman and Schwartz (1970, Table 1, pp. 24-26, column 6).

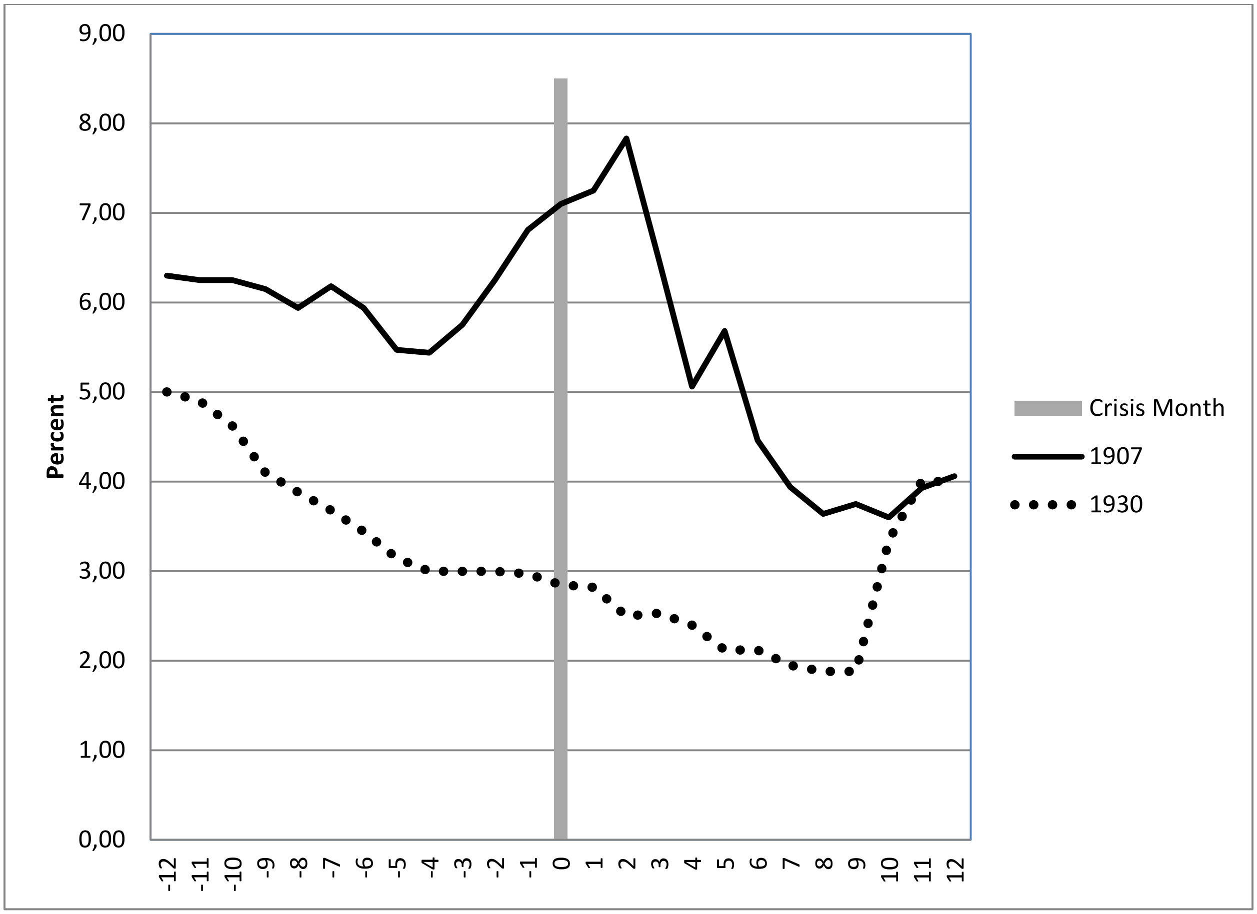


Figure 3. The Commercial paper rate in 1907 and 1930.

Note. The data is monthly. The crisis month in 1907 was October when the Knickerbocker Trust failed. In 1930 it was December when the Bank of United States failed.

Source. The NBER macrohistory data base. (http://www.nber.org/databases/macrohistory/rectdata/13/m13001a.dat accessed January 2014).

Table 1. Annual Monetary Statistics for Six Financial Crises

Year	Month	High-Powered Money	Deposit-Reserve Ratio	Deposit-Currency Ratio	Money Multiplier	M2	Percent Change in M2
		Billions of dollars	Ratio	Ratio	Ratio	Billions of dollars	Percent
1873	February	0.78	4.63	1.94	2.07	1.62	2.45
1874	**February**	**0.80**	**3.88**	**2.03**	**1.99**	**1.59**	**-1.80**
1875	February	0.78	4.82	2.12	2.17	1.70	6.28
1883	June	1.184	5.96	2.28	2.37	2.81	8.03
1884	**June**	**1.189**	**5.54**	**2.28**	**2.32**	**2.76**	**-1.65**
1885	June	1.233	4.54	2.64	2.30	2.84	2.68
1890	June	1.366	6.32	3.40	2.86	3.91	9.75
1891	**June**	**1.433**	**6.05**	**3.36**	**2.80**	**4.02**	**2.75**
1892	June	1.529	5.90	3.81	2.92	4.47	10.66
1892	June	1.53	5.90	3.81	2.92	4.47	10.66
1893	**June**	**1.51**	**6.05**	**3.25**	**2.76**	**4.19**	**-6.54**
1894	June	1.57	4.87	3.78	2.69	4.22	0.87
1907	June	2.82	8.87	5.84	4.12	11.61	6.66
1908	**June**	**3.08**	**6.98**	**5.53**	**3.64**	**11.23**	**-3.37**
1909	June	3.14	7.48	6.45	4.00	12.57	11.34
1929	June	7.10	13.16	10.74	6.46	45.91	0.14
1930	June	6.91	12.90	11.31	6.56	45.31	-1.31
1931	**June**	**7.30**	**11.67**	**9.66**	**5.83**	**42.59**	**-6.20**
1932	June	7.79	10.44	5.95	4.43	34.48	-21.13
1933	June	7.94	8.39	5.08	3.79	30.08	-13.63

Source and Notes. Friedman and Schwartz (1963, Table B3, pp. 799-804). The first observation following the panic is shown in bold. High-Powered money is a synonym for the monetary base.