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Lender of last resort policies: from Bagehot to Bailout

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I thank David Longworth for comments, and the Bank of Canada for giving me the time and ideal colleagues to think about these issues.

- discussions of the need for a lender of last resort often start by stating that British and United States 19th century experience illustrated the need for a lender of last resort; this article reexamines that lesson
- lenders of last resort emerged in England and the United States in response to banking panics, which in turn reflected legislative restrictions, most importantly on the substitution between bank notes and bank deposits, but also, in the United States, on branching
- in Canada there were no legislative restrictions of that sort, and, largely as a result, there were no banking panics in Canada and the central bank (the Bank of Canada) was not established until 1934;
- the need for a lender of last resort is not inherent in a fractional reserve banking system, but depends on the legislative environment; furthermore, the lender of last resort justified in the 19th century environment was one which created market liquidity to counteract the legislative impediments, rather than emergency lending assistance to a particular institution.

Policies concerning the lender of last resort both in the domestic and international arenas are hotly debated in central banks today. In Canada, the Bank of Canada has traditionally been a lender of last resort to Canadian banks and provides both Standing Liquidity Facilities (SLF, described more fully below) and emergency lending assistance. SLF are a necessary feature of the Canadian payments and clearing system and the expansion of the membership of the Canadian Payments Association to non-banks, and possibly non-Canadian banks, opens up the question of to whom, to what extent, and how, the lender of last resort facility should be provided. On the international front, the debate continues as to the need for an international lender of last resort and the extent to which the IMF should play this role (Sachs (1995), Calomiris (1998)).

Choosing the optimal scale of lender of last resort in the changing economic environment - one where the boundaries of nation and financial institution products are breaking down -requires an examination of the available evidence on the operation of lender of last resort policies.[1] Such evidence is (thankfully!) slim, and recourse is often made to historical experience. In this essay, I briefly review the historical debate over

[1] . Empirical analysis is a complement to theoretical analyses. See Lai (2001) for a survey of the theoretical literature on financial crises, and Freixas et al. (1999) and references there for theoretical models of lender of last resort.

lender of last resort policy, and then attempt to draw out some of the lessons from the experiences of England, the United States and Canada, casting previous interpretations of that experience in a new light.

Historical experience shows that (a) government regulations imposed constraints on the private sector that motivated much of the need for a lender of last resort; (b) in the absence of a public lender of last resort, private sector institutions evolved that reduced the need for government intervention and (c) central banks were established to reduce systemic liquidity scarcity not to lend to individual institutions facing a liquidity drain. These lessons do not necessarily imply that there is no role for a lender of last resort in today's economy, but they call for a minimalist approach and careful consideration of the scope for deregulation and private sector responses.

The essay proceeds in four steps: I begin with a brief review of the theoretical issues around lender of last resort policy, and then discuss the experiences of the UK, United States and Canada before the establishment of a central bank (in England's case, before the Bank of England took on central banking functions). The conclusion discusses what - if anything - can be learned from this historical survey for today's policy on lender of last resort.

Why have a Lender of Last Resort Policy?

A lender of last resort is typically defined as a provider of liquidity to firms - usually financial intermediaries, most often banks - that are solvent but illiquid, that is, that face a maturity mismatch on their balance sheet but have positive net worth. Liquidity could be provided to a specific institution or to the market generally, where in the latter case not all eligible institutions would necessarily avail themselves of the facility.

There are two competing theories for why a bank might face a liquidity crisis, the Diamond and Dybvig self-fulfilling beliefs model, and Calomiris and Gorton's asymmetric information model.[2] In the Diamond-Dybvig model of banks there are two possible (and in the basic model, equally likely) equilibria: one where an individual depositor expects other depositors to leave their money in the bank and so leaves her money in the bank, and another where the individual depositor expects other depositors to withdraw and so she withdraws - or tries to withdraw. In the latter case, the individual attempts to withdraw solely because she knows that, because of the maturity mismatch, if everyone acts like her only the first in line will be able to withdraw their funds; if you're not at the front of the queue you get nothing. In this world there is no credit risk and a lender of last resort, which credibly promises to lend money to a solvent institution facing a run, will in fact eliminate the run equilibrium.

The second model of bank liquidity crises focuses on information problems. The value of the assets of a bank cannot be known with certainty to a depositor. The theory argues that if depositors get information that they think implies that the bank may be insolvent, then they will attempt to withdraw money before the possible failure. Since the downside risk (the cost of withdrawing if the bank is actually solvent) is minimal, depositors may respond to relatively small pieces of information. In this model a lender of last resort could resolve the information problem by making loans only on good collateral.

While the basic models describe a rationale for a run on a bank, they can be expanded to think about banking panics - runs on a number of banks. In the Diamond and Dybvig model this could occur amongst banks connected by a correspondent relationship whereby a run on one bank leads that bank to liquidate its reserve deposits in another bank and so on. In the asymmetric information world, if depositors at Bank A see that Bank B has failed, and they think that both bank had similar portfolios, then the bad news may cast doubt on the viability of Bank A.

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[2] These are both very schematic approaches and the original models have been extended since they were first elaborated. See.... In addition, the `bank' here could be thought of as a country in liquidity crisis - see for example, Chang and Velasco. Rochet? Freixas et al.? Goodhart ?

Obviously all types of firms could face a maturity mismatch, but economists have put forward a variety of arguments why there should be a public sector provider of liquidity for banks -and perhaps other FIs - but not for other firms.

- the liabilities of banks - e.g. demand deposits - are a component of the money stock, and an integral part of the payments system; if a bank fails it may impose externalities on the economy as it impedes the functioning of the payments system;

- the assets of a bank are very hard to price (if loans were easy to price they would be bonds); the value of a loan portfolio may be known to the loan officer who has worked with it but it would be hard to securitize;

- in a sense *banks* are the lenders of last resort to *non-bank* firms. If a non-bank firm is illiquid, it has recourse to lenders in the financial sector, who can make a judgement about the solvency of the firm; if a bank is illiquid, it must turn to its competitors to ask for a loan, which (a) they might reject in order to increase their market share if the applicant fails and (b) they might approve only after a thorough inspection of the applicant's balance sheet implying a loss of valuable private information for the applicant;

Is there a downside to having a central bank act as a lender of last resort? In theory a central bank acting as the lender of last resort today takes no risk as it only lends on a fully-collateralized basis, and makes no losses as the loans are at a `penalty' rate.[3] In practice the function is more difficult. The fundamental problem is that it is rarely clear whether or not the borrower is solvent. If it was unambiguously the case, then the capital market would in most cases provide liquidity.[4] The principal issue is that the central bank when making lender of last resort loans takes priority over unsecured creditors. So, if the central bank were to make loans to a bank that became (or was, unknownst to the central bank) insolvent, the central bank would be protected but the unsecured creditors would

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[3] In practice, the collateral pledged is far from prime, and ensuring that title can be taken in diverse classes of assets and that the appropriate haircut is taken, are difficult problems.

[4] See Goodfriend and King (1988) who make this case quite forcefully.

now have fewer assets to divide amongst themselves.[5] The system is inefficient because the agency making the decision (the central bank) is different from the agency bearing the costs (the unsecured creditors, the largest of which is often the deposit insurance fund).

In addition, according to the asymmetric information model, the provision of lender of last resort facilities diminishes the incentive for depositors to monitor the banks. The argument so far is for lending to solvent but illiquid banks. The possibility of contagion opens the door to lending to insolvent institutions. Goodhart and Huang (1999) argue that since (a) it is impossible to distinguish between insolvency and illiquidity in the time that such decisions have to be made and (b) contagion imposes negative external costs, a lender of last resort facility should be open to insolvent institutions. This is the underpinning of the too-big-to fail doctrine. The Bank of Canada has taken/takes the position that capital support (bail-outs) are the domain of the Department of Finance or its agencies, and that its mandate is strictly to assist illiquid solvent institutions.

The lender of last resort facility provided by the Bank of Canada has two components, standing liquidity facilities (SLF) and emergency lending facilities (ELA). SLF are provided to all institutions that clear through the Large Value Transfer System, the clearing system for large value payments (and ACSS).[6] Loans are made at `bank rate' and are collateralized on a routine basis. The inherent balance in LVTS implies that typically institutions needing to borrow will find an institution with surplus funds that will lend somewhat below bank rate - on the same collateralized basis - and so lending is rather limited. In contrast, ELA is not extended on a routine basis but on an exceptional basis to institutions that are having severe liquidity difficulties but are declared to be solvent by OSFI and that can post acceptable collateral. The most well-known examples were loans to the Canadian Commercial Bank and Northland Bank in the mid 1980s. Until the passage of Bill C-8, all the members of the Canadian Payments Association were banks, and so were eligible for both ELA (as banks) and SLF (as members of the clearing systems). The inclusion of non-banks in the CPA may imply a separation

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[5] See Goodfriend and Lacker (1999).

[6] For details of the operation of the LVTS system, see the papers collected on the Bank of Canada website: http://www.bankofcanada.ca/en/lvtsmp.htm

between those institutions eligible for ELA (banks) and those with access to SLF (clearers).

Bagehot and the evolution of lender of last resort policies in Britain

Credit for elucidating lender of last resort policies is usually given to Walter Bagehot, an English economist, for his writing particularly in the *Economist* magazine and in his monograph on banking, *Lombard Street.* published in 1873.[7] He argued that, in the face of a run on the banking system, the Bank of England should lend freely on good collateral at a penalty rate. The policy evolved out of banking experience through the first two-thirds of the 19th century, so to appreciate the process we must examine the history of banking over that period.

Table 1: Events in English banking history

1819	Act requiring resumption of convertibility of Bank of England notes
1825	Financial crisis - South America
1826	Joint stock banks permitted outside London
1833	Bank of England notes legal tender;
1837	Financial crisis - US
1844	Peel's Act - Bank of England gets note monopoly; Issue Department separated from Banking Department
1847	Financial crisis - wheat price crash + railways
1857	Financial crisis - U.S.
1866	Financial crisis - Overend Gurney
1873	Bagehot publishes Lombard Street
1878	City of Glasgow bank fails - no crisis
1890	Barings Bank fails - Bank of England coodinates response; no crisis.

[7] More fairly, credit is frequently given to Henry Thornton who, in his testimony before some committee in 1819, argued that the Bank of England provided a central reserve for English banks which should be used in times of crisis. However, his words did not `catch on' more generally and did not seem to change the Bank's behaviour.

Table 1 summarizes the relevant events, beginning in 1819 with the resumption of convertibility of Bank of England notes after the suspension related to the Napoleonic Wars. At that time the Bank of England was a private bank that was the only joint stock bank (i.e. of more than 6 partners) in the country that had the right to issue bank notes. There were about other banks in London that did not issue notes, but financed loans using deposits and there were hundreds, perhaps 800, `country banks' that issued notes, as well as taking deposits, outside London. In the early 1820s, England experienced a lending boom, much of which involved investing in the newly independent South American countries. In 1825, when it became clear that many of these loans would not be repaid, the banks faced a run during which 10% of the banks in England failed. Country banks typically held deposits in London banks as reserves, and many of these London Banks held deposits at the Bank of England as their reserves. During the panic, deposit holders tried to withdraw their cash from country banks which in turn attempted to draw down their deposits at London banks, which turned to the Bank of England. The Bank of England, at first reacted by decreasing loan renewals although after a few days of crisis, the Bank began extending credit quite widely, though at raised interest rates.[8]

In partial response to this crisis, the Bank Act was revised in 1826 to allow joint-stock banks to operate outside London (by at least 65 miles). This was not necessarily meant to punish the Bank of England by increasing its competition, but as a way of increasing the capitalization of the country banks. In 1833 a further legislative response made Bank of England notes legal tender (except at the Bank where they were still required to be convertible into gold). This had the effect of allowing country bank notes and deposits to be paid in Bank of England notes rather than in gold, at the option of the bank, and further encouraged the use of the Bank of England as a reserve centre.[9]

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[8] "We lent money by every possible means, and in modes which we had never adopted before; we took in stock of security, we purchased Exchequer Bills, we made advances on Exchequer Bills, we not only discounted outright, but we made advances on deposits of bills of Exchange to an immense amount - in short, by every possible means consistent with the safety of the Bank" Statement by the Governor, cited in Bagehot (1873;192).

[9] Throughout the crisis of 1825 Bank of England notes were considered `as good as gold'; the crisis was a run on the country banks not on the Bank of England.

These changes did not, however, prevent a financial crisis in New York from spreading to the London banks in 1836/7.

Again, there was a legislative response. Peel's Act, passed in 1844, transformed the English banking system. It led to a complete monopoly of note issue by the Bank of England, and it reorganized that bank into two Departments: the Issue Department and the Banking Department, with a Chinese Wall between them. The Issue Department was to issue bank notes; the first £14 million were to be issued on the backing of government securities but all notes issued in excess of £14 million - the fiduciary issue - were to be 100% backed by gold. The idea was that the Issue Department would not have to make any decisions, it would operate automatically. The Banking Department was to operate like a private bank, accept deposits, keep reserves (of Bank of England notes) and make loans. If a country bank had its deposit at the Bank of England and then - for example, in a financial crisis - withdrew its deposit, if the Banking Department did not have sufficient notes on reserve, *it could not borrow them from the Issue Department.*

There followed 3 financial crises, approximately a decade apart. In 1847, an unexpectedly good harvest led to losses amongst firms lending on corn (wheat). In September, a large Liverpool bank failed. This generated failures of bill brokers in London and then a `panic' in which the bankers withdrew deposits from the Bank of England, cut back loans and raised interest rates. Fears that the Bank of England would run out of notes led to a run on the Bank. In October 1857, a financial crisis was imported from the United States. Businesses and banks waiting for payment from New York didn't receive funds because the New York banks suspended payments. The Bank of England raised bank rate from 6% to 8% and, in November, after the City Bank of Glasgow suspended payments, the rate was raised to 10%. Finally, on 10 May 1866, Overend and Gurney a banking company that had at one time controlled more than half the business of the discount market (Morgan, 179) failed. There was an immediate run on the Bank of England, which - after a day's hesitation - lent over £10 million on 12 May.

In each of these three cases, the crisis led to a run on the Banking Department of the Bank of England, which came very close to forcing it to suspend the convertibility of its deposits. In 1847, when this occurred, the Chancellor of the Exchequer wrote a letter to the Bank stating that if the Issue Department expanded its note issue without gold backing, and was sued, the government would indemnify the Bank for costs. That is, the government would permit/encourage the Bank of England issue department to lend notes to the Bank of England banking department. The publication of this letter halted the run on the banks, and the limits on the fiduciary issue were not exceeded. Similarly, in 1857 a letter was issued and, this time, notes in excess of the limit were issued. In 1866 again, the Chancellor issued a letter although the fiduciary limit was not exceeded.

This is where Bagehot comes into the story. In the crises of 1847 and 1857, the Bank had initially responded as it did in 1825, by refusing to lend. Only after the Government stepped in had the Bank started lending, and increased the lending rate. In 1866 the Bank lent much more quickly. After the event, the Governor of the Bank, Launcelot Holland, summarized his position in a report to the Court of Directors which was then published in the *Economist.* He acknowledged the special position of the Bank of England, averring that, unlike private banks which would naturally reduce lending in the face of a crisis, the Bank of England should expand its lending, albeit at a `penalty' rate. It was this position that Bagehot endorsed and publicized: in the face of a drain a lender of last resort should lend liberally but at a high rate on good collateral.

After 1866, there were no major banking crises in Britain. In 1878, the City Bank of Glasgow failed, but it did not lead to a widespread crisis. A more extreme test perhaps occurred in 1890 when Barings Bank, one of the largest banks in London, told the Bank of England that it would not be able to meet its due debts. The Bank of England, on satisfying itself that Barings was solvent, convinced the government to bear half of any loss on Barings debt for 24 hours and then coordinated a guarantee funded by the London banks. In the event, after 5 years, the debt assumed by the consortium was all paid off, with interest.

This history suggests a number of lessons and leaves a number of open questions. Why was there a need for a `lender of last resort'? What actually changed after 1866? Should we think of the lender of last resort function as `emergency lending assistance' (ELA) or `standing liquidity facilities' (SLF) in today's parlance. I will deal with the first two questions briefly and then spend more time on the last issue.

Even if we accept for the moment that there was a need for a lender of last resort in the 19th century, and that the Bank of England fulfilled that function after 1866 and thus eliminated banking crises in Britain, it is not a given that all banking systems need a lender of last resort. Advocates of free banking argue - and indeed Bagehot agreed - that Britain's need for a lender of last resort reflected the structure of the English banking system, in which the Bank of England had been given exclusive privileges in return for giving the government large loans on generous terms.[10] The Bank of England's monopoly over note issue, and the legal tender characteristic of Bank of England notes, virtually forced it to be a centralized reserve depot. Peel's Act then rendered the system inflexible. Such advocates argue that unregulated banking systems - such as those of Canada and Scotland - evolved stable branch banking systems that did not need a lender of last resort. We take this up again when looking at the Canadian historical experience.

The conventional lesson drawn from this history is that after 1866 the Bank of England accepted the need to act as a lender of last resort. The evidence that is consistent with this view is that (a) there were no banking panics after 1866 - despite major bank failures such as in 1878; (b) the influence of the statement of the Governor of the Bank and of Bagehot's writing; and (c) the Bank's role in coordinating lending to Barings during its liquidity crisis in 1890.

But there is some evidence that sits less comfortably with the conclusion. First, the lack of a smoking gun - there was no legislative change or minute of the Court of Directors that stated that they would play that role, and the 1890's coordinating effort is the only positive evidence produced that they did play such a role.[11] Second, there were clearly bankers in 1878 who thought there was a very good chance of a disastrous banking panic, and they did not seem to have seen a regime change. Collins (1989) cites a letter by the Newcastle branch of the Bank of England to Head Office on October 1878

[10] Prominent advocates of these views include Dowd (1996), Selgin and White (1984). Check - is ltd liab. part of the story?

[11] Bagehot (p.196) himself felt that the Bank had followed an appropriate policy in 1866, but that by not responding to critics of the policy, and not having an official policy, they left questions as to the policy in place: "In common opinion there is always great uncertainty as to the conduct of the Bank…. The public is

(the day after the City of Glasgow bank failed) in which the writer states that "if one even of these banks or any English Bank were to stop just now, it might precipitate a Banking panic [of] which it would be difficult to see the end". Clearly the writer did not think banking panics were a thing of the past.[12] Finally, in 1890, the Chancellor offered to write a letter for the Bank just as had been done earlier, but the Governor of the Bank refused the offer: a reliance on such letters was the cause of a great deal of bad banking in England".[13]

The primary objection to the view that there was no lender of last resort after 1866 is the absence of banking panics after that date. This means that the question must remain an open one, but a couple of comments may suggest a resolution. Firstly, Collins (1989) argues that the banks increased their reserve ratios after 1866 - in self-defense, making the banks less vulnerable to a run.[14] Secondly, runs became less likely both because bank deposits replaced bank notes as the largest component of the money stock, and because of the expectation of a Chancellor's letter. These factors worked through the following channel. In the early to mid-19th century, bank notes were the dominant medium of exchange. If, in the beginning of a bank run, the Bank of England made loans (or discounted bills), then recipients of funds would be likely to demand their funds in the form of bank notes. But, Peel's Act limited the amount of notes that the Bank could issue, and in fear of running out of notes, the Bank would restrict lending. The fear that the Bank would restrict lending in turn exacerbated the liquidity run.

Later in the 19th century, the Bank of England was less concerned about the potential demand to payout loans in bank notes, because of the much greater acceptance of bank deposits, and because of the virtual certainty that the Chancellor would write a

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never sure what policy will be adopted at the most important moment: it is not sure what amount of advance will be made, or on what security it will be made".

[12] Similarly the Manchester correspondent on October 5, 1898: "a Bank failure here just now would be disastrous beyond conception". While it is very possible that the regional branches did not know Head Office policy, this policy would only be effective if it was widely known, and if the regional representatives of the Bank were unaware that there was a lender of last resort, so presumably were at least some bankers and depositors.

[13] Cited by Clapham (332).

[14] From June to November 1878 `banker's balances rose by 42%. Somewhat surprisingly, the Banking Department's reserves of notes and coin rose by only 18%.

letter allowing the Bank of England to issue more notes if it needed to. Thus, the Bank did not hesitate to expand lending and, equally important, there was no fear that it might do so.

The final aspect of English experience to consider concerns the nature of the lender of last resort policy it implies, specifically the distinction between Emergency Lending Assistance and Standing Liquidity Facilities. Did the English experience endorse SLF or ELA? Bagehot's policy advice can I think be interpreted as arguing for SLF. In the three crisis years, 1847, 1857 and 1866 he believed that the Bank of England should lend freely on all reasonable collateral. This is very close to saying that there should be a discount window or SLF. The actual behaviour of the Bank is more difficult to classify. In coordinating the support for Barings, the Bank was helping a particular institution. The motivation of the Bank seems to have been to support a systemically important player, and to preempt a panic that was believed to be certain if Barings had suspended payments.[15] The agreement of the London Banks to form a guarantee fund, represented an internalization of the potential external costs of a panic. The agreement of the London Banks to form a guarantee fund, represented an internalization of the potential external costs of a panic.

Banking panics in the absence of a central bank: the United States in the 19th century

The U.S. banking system evolved in a very different regulatory environment from that in the Britain. After the second attempt to establish a national (quasi-central) bank ended in 1836, the banking system comprised state-regulated banks, which issued notes under a variety of regulations, were in general prohibited from branching within states, and were all prohibited from interstate branching.

In 1863 the federal government passed the National Banking Act whereby banks - denoted National Banks - could issue notes secured 111 % by Federal government

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[15] The Bank of England's action was a precursor to the New York Fed's co-ordinating role in the support for LTCM in 1998.

bonds.[16] These notes would circulate throughout the country at par. In 1865 the Federal government imposed a tax on state bank notes, effectively giving national bank notes a monopoly in the note circulation. In addition, the National banking laws imposed a tiered system of reserve requirements: `country' national banks had to hold 15% reserves against notes, but 60% of those reserves could be in the form of (interest earning) deposits at a reserve city National bank; National banks in reserve cities had to hold 25% reserves of which 50% could be in the form of deposits in a central reserve city national bank; national banks in central reserve cities (New York and, after 1887, St. Louis and Chicago) had to hold 25% reserves.[17] Reserves not held as deposits at a reserve city or central reserve city bank could be held in gold coin, non-circulating National Bank notes or notes issued by the Federal government.[18]

Table 2: Events in US Banking History

1861	Suspension of convertibility - issue of Greenbacks in North
1863	National banking system established
1865	Tax on state bank notes - national bank notes effective monopoly
1873	Financial crisis - Jay Cooke fails due to railroad failures
1879	Resumption of convertibility
1884	Financial crisis - "fraud and defalcation"
1890	Financial crisis - Barings crisis
1893	Financial crisis - country bank failures
1900	Gold standard act - eliminates question of returning to bimetallism
1907	Financial crisis - New York trust companies
1913	Creation of Federal Reserve System

[16] After 1900, only 100% backing in bonds. The National Banking system was established both to provide a uniform and sound currency, and to create a demand for federal bonds, issued to fight the civil war. In addition, the Southern states, which had been most opposed to the intrusion of the Federal government into the banking arena, were no longer represented in Congress.

[17] St. Louis and Chicago never attained the predominance of New York, and in fact National Banks in those two cities continued to hold deposits in New York banks. In 1863 there were 15 reserve cities, and this increased to 46 by 1910.

[18] These were the major components. Silver coin, and Treasury certificates were also eligible to be held as reserves.

The United States banking system between 1863 and 1914, when the Federal Reserve began operation, had two important characteristics: unit banks that were unable to internally diversify the risks of their portfolios, or withdrawals; and a correspondent structure that could facilitate contagion through the spread of liquidity demands. Perhaps then it is not surprising that there were banking panics in: 1873, 1884, 1890, 1893, 1907 and 1914.

The underlying causes of the panics were the inelasticity of the currency system, and the unit banking system. The demand for `cash' - in particular after 1863 national bank notes - varied dramatically over the year, with an upswing every fall when the crops were being harvested. But the quantity of cash was essentially fixed, meaning that in the Fall cash was relatively scarce and banks had lower reserve ratios, making them more susceptible to liquidity problems.

The proximate causes of the financial crises differed and are sometimes difficult to pinpoint. In September 1873 Jay Cooke and Co. - a major brokerage house - failed, leading to runs on the banks in New York, and a temporary closure of the stock market. In 1884 "a series of instances of fraud and defalcation unexampled in our history" (Sprague) were critical components of the crisis. In 1890 the increase in interest rates in England in the run-up to the Barings crisis, led to an outflow of gold, putting pressure on the New York banks. In 1893, bank failures in the South and West led to an internal drain on the New York banks. Finally in 1907, the system was made more vulnerable by the expansion of state banks and trust companies in New York which did banking business but usually did not belong to the clearing house - even as indirect clearers.[19]

How did the system respond, in the absence of a central bank? A key component of response emerged in the clearing houses. Clearing houses were established in the major United States cities beginning in the 1850s, to permit multilateral clearing of notes and cheques. To facilitate the clearings, some clearing houses took gold, Treasury notes or National Bank notes on deposit and issued certificates (100% backed) against such

[19] These institutions had been indirect clearers until 1903 when the clearing house banks required indirect clearers to have reserve ratios of 25% (rather than the legal requirement of 15%), on the grounds that this was necessary to level the playing field -since the National banks had to hold 25% reserve ratios.

currency. The certificates were then used to clear end-of-day balances between members. In November 1860, during a banking panic related to Lincoln's election as President, the New York clearing house issued loan certificates -that is, it issued certificates backed by securities rather than gold. The certificates were lent to members on demand at an interest rate of 6%. They were to be accepted in clearing by members, and were a liability of the members as a whole. The loans were repaid by the following March. The issue of clearing house loan certificates (CHLCs) became the first line of defense against a liquidity drain. The issue of CHLCs, which were acceptable as cash at the clearing house, was equivalent to the creation of liquidity - at least for local payments.

Although there was no legislative preference for a single bank as there was in England, the national banking system led to a centralization of reserves in New York, and within New York, competitive forces led to a concentration of reserves in just 6 or 7 of the (roughly 40) National banks in that city. In October 1872, 7 banks held 70% of the interbank deposits held by New York national banks; in August 1907, 6 banks held the same share, although by then, non-national banks (state banks and trust companies) which paid interest on deposits were also holding a large share of interbank deposits.[20] Thus New York became a pivot of the banking system.

In 1873, CHLCs were issued in September, but while this could solve the immediate liquidity needs of the city, it could not supply liquidity to the rest of the country. So when the banks outside New York attempted to withdraw deposits to shore up their reserves in case the New York panic spread, the clearing house banks determined to restrict withdrawals. The clearing house banks issued certified cheques, which permitted the transfer of funds between depositors with accounts at a clearing house bank, but restricted cash withdrawals to amounts less than $100 per customer. A market for currency sprang up with a premium of 5% for cash, but within a few days the premium fell to 1 %, where it remained for about a month until full convertibility was restored. Importantly, the clearing house did not make public which banks were borrowing CHLCs. The example of the New York clearing house was quickly followed

[20] Sprague, p.17 and 233. Note also that in 1872, 80% of interbank deposits held by National banks were those of other national banks, while in 1907 only 56% were.

by other clearing houses across the countries, which adopted similar rules, and some went so far as to require all banks to borrow so that no particular bank would be seen as weak. All loans were fully collateralized, and to ensure that the loans were for illiquid rather than insolvent banks, the clearing houses had the right to accept/reject members, and gradually introduced the right to examine member banks. Sprague argues that the actions of the clearing house banks led to a minimal dislocation of the domestic exchanges that the crisis had relatively little influence on the course of trade. It is difficult to assess this conclusion. There was certainly a significant economic downturn, but how much was a result of the banking problems rather than the cause of the banking problems is very difficult to determine.

The crisis of 1884 was undoubtedly less serious than that of 1873. It did not spread across the country, and while CHLCs were issued by the New York clearing house banks, they did not restrict payments. Most likely, the mildness of the crisis reflected the fact that its cause was more bank fraud than an economic downturn. The fraud typically involved unauthorized use of funds in the stock market, which were revealed when the market declined. The Metropolitan Bank National bank suspended payments for 24 hours, after which time it reopened using CHLCs to settle its balances at the Clearing House.

In 1890 the economy was under stress even before the surprise increase in the Bank of England rate and the failure of Barings in mid-November. These put additional pressure on the New York banks, which issued CHLCs but, as in 1884, did not restrict payments.

The crisis of 1893, like that of 1873, came when the economy was in difficulties across the country. Banks failed in the West and South, leading to a drain of currency out of New York. CHLCs were issued in June 1893, and continued to be used until November. The crisis peaked in August in New York, when 95% of clearing house balances were paid in CHLCs. On August 3, the banks restricted withdrawals, and for 30 days there was a premium (of from 1% to 5%) on currency. Sprague's view of the crisis (p.206) is somewhat ambiguous - he suggests that the restriction led to a paralysis of internal trade, but that trade was "not completely blocked but deranged"!

The crisis of 1907 has received considerable attention in the literature as it was in some sense the straw that broke the camel's back. After the crisis, U.S. legislators realized that the banking system needed structural reform, and established a National Monetary Commission to propose reforms. Although not a direct recommendation of the commission, the outcome was the creation of the Federal Reserve system.

More than earlier crises, the problems in 1907 seemed to point to systemic flaws in the banking system as a cause rather than as channels for other economic problems. The monetary standard had been at issue in many earlier crises (in 1873 the United States was on the Greenback standard, and in 1890 and 1893 debate about returning to bimetallism may have influenced the credibility of the currency) but by 1907 the United States was unambiguously on the gold standard. The crisis is often dated from 22 October, when the Knickerbocker Trust Co. (the third largest trust company in New York) suspended payments, but the year 1907 had already seen two significant `corrections' in the stock market, and Knickerbocker Trust was run because of its associations with other banks in difficulties. [21] There was an immediate run on other trust companies, which turned to the National banks to obtain cash by redeeming their interbank deposits. The expectation that the use of CHLCs would be accompanied by a restriction of payments and therefore a premium on currency, naturally added to the run on the banks as people saw a potential profit opportunity. On October 26 the NY national banks decided to issue CHLCs and simultaneously restricted convertibility.[22] The run spread through the country, and clearing houses typically reacted as did those of New York: restricting payments to some degree and issuing CHLCs. In addition, some

[21] Alone of the trust companies the had increased its reserve ratio in 1903 in order to clear indirectly, through the National Bank of Commerce. The run began the day after the Commerce announced that it would no longer clear for the Knickerbocker.

[22] Sprague makes an interesting argument that the restriction need not have been necessary. In 1873, the clearing house banks had `equalized reserves' when they issued CHLCs. That is, they pooled their reserves. In 1907, this did not happen, and all bank used CHLCs to settle balances. If they had pooled their reserves, the banks facing drains from out-of-town would have had the reserves to pay them.

clearing houses issued small denomination clearing house loan certificates - which became a substitute for currency.[23]

In the absence of a public sector lender of last resort, and in the face of significant constraints on the structure of the banking industry (viz., no branching, and no competitive note issue) the private sector created institutions to mitigate the problems of liquidity crises. These institutions were only partially successful, as shown by the recurrent financial crises, and restrictions of payments by the banks.

What worked and didn't work? First note that in a unit banking system on a gold standard as was the United States, a (public sector lender of last resort would have undoubtedly had many of the same problems. Absent restrictions on branch banking, a national clearing house would have accomplished more than the New York clearing house could. In particular, with a national clearing house, CHLCs would have sufficed without restrictions of payments.[24]

A second problem was the implementation of the CHLC program. The 1907 panic was exacerbated by the delay in issuing certificates. A discount window program, where the discount window is always open, eases this problem, although decisions to raise or lower the discount rate have the same flavour. A final concern, raised by Charles Goodhart, is that private sector lenders of last resort may be something of a club, which will act to stifle competition. The decision not to clear for the Knickerbocker Trust - which resumed in March **1908** suggesting that it was illiquid but not insolvent - is consistent with such an interpretation, but central banks too have made such choices.

Canadian experience with lender of last resort policy

Before 1935 there was no central bank in Canada - how did the banking system survive? The Federal government did issue notes - named Dominion notes. Under the 1870 Dominion notes act the first $9 million were backed 20% by gold and 75% by government securities; any excess over $9 million were required to be 100% backed by

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[23] The quasi-legality of this remedy was one of the spurs to the establishment of the Federal Reserve System.

[24] This was proposal of NMC?

gold, eliminating any seignorage rationale for expanding the issue of notes. Dominion notes were legal tender and were issued in small denominations (<$5) for hand-to-hand currency, and large denominations, which were used by the Banks as reserves. The government committed to redeem the notes in legal tender gold coin (sovereigns or American eagles) on demand. Amendments to the Dominion notes act gradually raised the fiduciary issue from $9 million to $50 million by 1914. In addition, after the 1914 Finance Act, the government could also issue Dominion notes to be lent to the chartered banks on the security of `good collateral'. These latter notes had no mandatory gold cover.

The banking system comprised a small number (maximum 49) of banks that could and often did branch nationwide, and that issued notes and deposits against general assets with relatively few restrictions. The banks were required to redeem their bank notes and demand deposits into gold or Dominion notes on demand. From 1870 to 1935 banks there

Table 3: Events in Canadian Banking History, 1867-1934

1870	Dominion Notes Act
1908	Seasonal expansion of chartered bank note circulation permitted
1914	Finance Act - inconvertible notes; discount window during War
1923	Amendment to make permanent the discount window
1926	Resumption of convertibility
1928	De facto suspension of convertibility
1931	De jure suspension of convertibility
1934	Creation of the Bank of Canada

were 26 bank failures, with resulting losses to shareholders, frequently depositors and, occasionally, note holders (see Table 2).[25] There were no banking panics, even during the series of panics that plagued the United States during the Great Depression from 1930 to 1933. How did the system avoid panics in the absence of a lender of last resort?

[25] After 1880 a form of note insurance (similar to the current deposit insurance system) was introduced which eliminated losses to note holders when a bank failed. In addition, shareholders in banks faced double liability, so that they were required to contribute an amount equal to their equity holding if a bank failed (and they could be found).

There is no definite answer, but a number of mechanisms have been identified which were surely important. Firstly, the ability to branch meant that a Canadian bank could diversify its loan portfolio more than a U.S. bank could and thus was inherently less risky. (This advantage was naturally offset somewhat by the endogenous response of the Canadian banks to hold fewer reserves.)

A second feature that helped the stability of the Canadian banking system was the elasticity of the note issue. Canadian banks could substitute notes for deposits, a particularly useful characteristic in the Fall. When Canadians borrowed to finance the crop movement, the banks could pay out their loans in notes rather than as deposits. (In the United States, notes could only be obtained by a bank sending bonds to the Treasury as security for the notes - this often took weeks.) Thus Canada saw neither the seasonal interest rate volatility nor the autumnal reserve ratio declines of the United States, making the system less vulnerable (Champ, Smith and Williamson, 1996).

A further mechanism that is frequently cited as a source of Canadian bank stability was the possibility for the Canadian banks to hold secondary reserves in New York. That is, they could hold call loans in New York, which unlike gold reserves would pay interest, and they could liquidate them instantly if they faced a sudden need for gold. While the Canadian banks did indeed hold reserves in the form of New York call loans, this option was of course open to any U.S. bank so was not a differential advantage to the Canadian banks.

The highly concentrated nature of the banking system (the 35 largest banks held 66% of the assets in 1925) may also have been important to the stability of the system, both by facilitating co-ordination amongst the players and by leading to greater internalization of the benefits of mergers. In Canada, particularly after 1900, if a bank was having liquidity problems, it was likely to be taken over by one of the other banks. Table 3 lists the amalgamations that occurred. After 1900 there were fewer bank failures and more mergers. Mergers required the approval of the Minister of Finance, whose stated policy was to prevent losses to depositors by permitting mergers.

It is difficult to know how to interpret this behaviour. One interpretation is that healthy banks purchased insolvent banks to eliminate the costs that contagion and banking panics would create for the banking system. An alternative, and less rosy, interpretation is that in the absence of a lender of last resort, an illiquid bank but solvent bank would fall into the clutches of the surrounding vultures. Similar ambiguity surrounds the record of bank failures. Did the absence of a lender of last resort lead to the (unnecessary) failure of illiquid banks, or were the banks that failed insolvent anyway?

There is one episode prior to 1914, in which some authors argue the Department of Finance acted as a lender of last resort. This occurred in the Fall of 1907. As described above, in 1907 the United States was in a financial crisis and short-term interest rates rose to x%. The Canadian banks tightened lending and wheat farmers, anxious that loans to finance the movement of the crop not be restricted, persuaded the government to lend Dominion notes to the banks for that purpose. $5 million was borrowed and repaid between November 1907 and May 1908 (M1 was approximately $240 million in 1907, and base about $90 million). While this has been seen as a lender of last resort action, the banks had not asked for the program, (it was grain farmers who had lobbied for it) and it was not intended to provide liquidity to any specific bank. It seems more appropriate to see it either as a subsidy to farmers (Rich) or as an expansionary monetary policy.

In August 1914, when the threat of war became imminent, the Canadian banks approached the Minister of Finance, because they expected a run. The Minister acceded to their request and, by Order in Council (ratified by Parliament later in the month), he declared bank notes legal tender, made Dominion notes inconvertible, and established a discount window where the Canadian banks could borrow Dominion notes (on good security). Dominion notes issued under this authority (when ratified, known as the Finance Act) did not have the any provision for gold cover, but this did not pose a threat as long as convertibility was suspended.[26]

In 1923, the government passed legislation that continued the discount window provisions of the Finance Act, but required that bank notes and Dominion notes be convertible into gold after July 1, 1926. At that point the Finance Act became potentially inconsistent with the Dominion Notes Act, and in 1928, when interest rates in New York

[26] The Act was in fact, an "Act to Conserve the Commercial and Financial interests of Canada" perhaps a more appropriate title!

rose above the (rarely altered) discount rate there was a clear arbitrage opportunity. The banks could borrow Dominion notes, convert them into gold, ship the gold to New York to invest, and earn considerably more than the cost of the borrowed Dominion notes.[27] The government used moral suasion to prevent the banks from doing this either directly or indirectly, and Canada effectively left the gold standard. While the banks had the right to borrow under the Finance Act, and on occasion did so, borrowings were slight, and there is no suggestion in the literature that they were necessary - the Department of Finance simply represented a cheap source of funds.

There is, however, one instance where it has been suggested that the Canadian banks benefited from, and needed, government support. Kryzanowski and Roberts (1993) have argued that during the 1930s the Canadian banks were insolvent, but that the implicit guarantee of the government to support any bank that failed prevented runs on the banks and enabled them to continue to function despite impaired balance sheets. While this is certainly a plausible hypothesis, the evidence is ambiguous. In 1923 the Home Bank failed, and depositors would have received nothing if the government had not subsidized them to the tune of 35 cents on the dollar.[28] In the enquiry following this failure, government officials stated that it was their policy to assist banks that were insolvent to merge with solvent banks and to eliminate bank failures "if reasonable action on its part will obviate them".

In July 1933, the government established a Royal Commission on Banking and Currency in Canada to examine the Canadian banking system and the `advisability of establishing a central bank'. In September 1933, after holding hearings across country, the Commission reported in favour of establishing a central bank. The objectives of the bank (article 236) were to be "a more rational and unified control over the credit structure, an instrument for exchange rate policy and an institution to advise governments and facilitate international monetary co-operation. In the report there is no mention of the

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[27] See Shearer and Clark. The exchange rate moved slightly outside the gold points after February 1929, and remained so until explicit exchange controls were introduced in 1931. Advances under the Finance Act were $1.4 million in $14.lmillion, and $57.6 million in January 1927, 1928 and 1929 respectively.

[28] Note holders were 100% compensated by the Bank Circulation Redemption Fund, an insurance fund for note holders created in 1890.

need for a lender of last resort, or of the role of central banks as lenders of last resort, other than the undefined (and repeated) "regulation of the volume of credit and currency". Even in the discussion of bank failures and mergers in the description of the Canadian banking system there is no mention of a potential role for a central bank.

In summary, the Canadian banking system never suffered the banking panics that characterized the United States and British banking systems in the 19th century before they developed central banking institutions. The explanation would seem to lie in the combination of the `elasticity' of the currency, the branching system of the Canadian banks, and the acceptance of a high degree of concentration in the banking system.

Conclusion

Perhaps the key lesson that can be learned from this history - not a very surprising one, but important nonetheless - is that lenders of last resort have a contextualized function. It is inappropriate to argue that: `we learned in the 19th century that fractional reserve banking systems need a lender of last resort'. Rather we learned that a banking system established under the legislation of 19th century England needed a lender of last resort. Whether or not a lender of last resort is required in the 21st century depends on the nature of banks and their regulatory constraints.

A second reminder that the history provides is that the private sector responds to the legislative environment. In Canada, banks that were concerned that there would be negative externalities from insolvencies, merged with banks in difficulty and internalized the externalities. In the United States, clearing houses went a long way to providing private sector lender of last resort facilities by issuing Clearing House loan certificates. In England, the monopoly privileges granted to the Bank of England crowded out such initiatives.

None of these solutions seems ideal. The Canadian banking system may have been too concentrated; the US system may have produced a club that helped only `insiders'; the English system required an institution with monopoly power. The point is to appreciate the diversity of the historical experience.

Table 4: Canadian Bank Failures, 1868-1934

Year	Assets($m)	Bank	Paid to Noteholders	Paid to depositors
1868	3	Gore Bank [Commerce]	?	
1868	1.2	Commercial Bank NB	100%	
1873	0.2	Bank of Acadia, NS	0	
1876	0.8	Metropolitan B., Q	100%	
1879*	1.3	Stradacona, Q	100%	
1879	3.0	Consolidated	100%	
1879	0.7	Mechanics, Q	57.5%	57.5
1881	1.0	Bank of PEI	59.5%	59.5
1883	3.8	Exchange Bank	100%	66.5
1887	3.2	Central Bank, Ont	100%	99.6
1887	1.8	Maritime Bank	100%	10.6
1887	1.3	London, Ont	100%	100%
1888*	4.9	Federal Bank,	100%	100%
1893	2.0	Commercial Bank, Man	100%	100%
1895	9.5	Bque du Peuple,	100%	75.2
1899	2.3	Bque Ville Marie	100%	17.5
1899	2?	Bque Jacques Cartier	100%	100%
1905	0.8	Bank of Yarmouth, NS	100%	100%
1906	15.9	Ontario,	100%	100%
1908	1.5	Bque de St. Hyacinthe	100%	100%
1908	0.3	Bque de St. Jean	100%	30.3
1908	19	Sovereign	100%	100%
1910	.8	St Stephen's, NB	100%	100%
1910	3	Farmers Bank	100%	0
1914	1.5	B of Vancouver	100%	0
1923	27	Home Bank	100%	25%

Table 5: Canadian Bank Amalgamations, 1868-1914

Year	Bank	Absorbing Bank	Assets ($m)
1875	St. Lawrence		1?
1875	Niagara District	Imperial	2.8
1875	City Bank	Consolidated	4
1875	Royal Cdn	Consolidated	
1883	Union Bank, PEI	Nova Scotia	1
1901	Summerside, PEI	Bank of NB	.3
1901	Bank of BC	Commerce	16
1902	Commercial B., NS	Union Bk, Hx	2
1903	Halifax Bdg Co.	Commerce	6
1903	Exchange Bk, NS	Montreal	1
1905	People's Bank, NS	Montreal	6
1906	Merchants Bk, PEI	Commerce	2
1907	People's Bk, NB	Montreal	1
1908	Crown	Northern Crown	1
1908	Northern	Northern Crown	1
1909	Western	Standard	6
1910	Union, NS	Royal	25
1911	United Empire B	Union Bk	1
1912	Eastern Twps	Commerce	28
1912	Traders	Royal	51
1913	Bank of NB	Nova Scotia	12
1913	Bque Internationale	Home	3
1914	Metropolitan	Nova Scotia	12
1917	Quebec	Royal	21
1918	Bk ofo BNA	Montreal + losses	78
	Northern Crown	Royal + losses	28
1919	Ottawa	Nova Scotia	66

1922	Merchants	Montreal + losses	182
1923	Molsons	Commerce? Montreal?	66

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