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A COMPARISON OF THE STABILITY
AND EFFICIENCY OF THE
CANADIAN AND AMERICAN
BANKING SYSTEMS 1870-1925

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ABSTRACT

In this paper we compare the performance of the U.S. and Canadian banking systems from 1870-1925 in terms of stability and efficiency. In an earlier study we found that the Canadian banking system, based on nationwide branch banking, dominated the U.S. system, based on unit banking, on both criteria in the period 1920-1980. In this study we find that there is little significant difference between the two systems in the preceding 50 years. The difference between the two periods we attribute to the merger movement in Canada after 1900 which allowed the Canadian banking system to evolve from a system with incomplete regional diversification, and hence subject to a significant risk of an occasional failure by a large bank, to one characterized by national diversification and greater stability. The greater stability in turn allowed the financial structure of the banking system to evolve in a more efficient direction.

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I. Introduction

In the middle of the nineteenth century the United States and Canada embarked on two very different roads toward the goal of stable banking. The United States set up the National Banking system (1863 and 1864), which tried to achieve stability by imposing high capital requirements, a bond backing system for note issues, reserve requirements on deposits, and other constraints. The idea of permitting branch banking and allowing market forces to operate was rejected. Canada, following Confederation, followed a very different path. Relatively few regulatory restrictions were imposed, and Canada relied on the formation of large banks with interprovincial networks of branches to provide stability.

A financial economist from today transported to the middle of the nineteenth century, would expect the Canadian approach to be the better one. And in the end it was. The Canadian system survived the Great Depression undamaged, while the American system collapsed, and there have been no major bank failures in Canada since 1923.¹ In a previous paper (1994) we have shown that this experience contrasts vividly even with that of the U.S. national banks (the strongest sector within the U.S. banking system) and, moreover, was not bought at the expense of the consumers of Canadian bank services.

But our time-traveling economist would be disappointed if he or she expected the race to be decided quickly. For long stretches of time before 1925, one could well argue that the U.S. national

¹ There have been a substantial number of failures among the Trust companies, especially since 1983. (Carr, Mathewson, and Quigley 1994, pp. 1-4).

banking system exhibited greater stability. It was only after the merger movement in Canadian banking (1900-1925) reduced the number of banks and created a system characterized by a small number of large banks with thick interprovincial branch networks that the race was clearly won. Before the merger movement, freedom to branch allowed banks in Canada to become bigger relative to the Canadian banking system as a whole than could American banks relative to the American banking system. This created banks that could absorb big shocks, but it also created banks that could make big mistakes.

Section II compares the stability of the two systems between 1870 and 1925 in terms of bank failures and system-wide disorders. Section III explains the differences in stability over time in terms of branch banking and the shocks faced by the banking systems. Section IV examines the effectiveness of the lender of last resort in both systems. Section V takes a closer look at the merger movement and its effects on the stability of the system. Section VI explores some additional evidence derived from bank portfolios and rates of return. Section VII reviews the main findings and discusses their implications for policy.

II. Stability

We consider separately two aspects of stability: the year to year variations in bank failures measured by the losses experienced by depositors and note holders and the susceptibility of each system to liquidity crises.

A. Losses on Deposits and Notes

Figure 1 shows deposit losses as a fraction of all deposits from 1870 to 1925 for National Banks in the United States and for all banks in Canada. This is the right comparison, at least to start with, because the national bank sector was stronger and weighted more heavily toward large money-center banks. Loss rates were defined simply as total losses ultimately experienced by depositors of the banks that failed in a given year divided by total deposits in that year, expressed as a percentage. The number of years it took to collect on the assets, and to raise the additional amounts due from shareholders under the double indemnity rule that held in both countries, varied from bank to bank. Better measures would be the present value at the time of failure of the losses actually experienced, or the difference between the nominal value of deposits and their market value at the time of failure, but these are not available.

Losses for Canada are from Beckhart (1929, pp. 480-81), and total deposits are from Historical Statistics of Canada (1965, p. 231, series H20). Losses on U.S. National Banks deposits are from the U.S. Federal Deposit Insurance Corporation, Annual Report, 1934. For the years 1870 to 1920 we simply divided the "amount of losses" of "National Banks which did not reopen" (FDIC, Annual Report 1934, pp. 92-93) by "average of deposits reported on call dates" (p. 89). This calculation omits some losses incurred by depositors in national banks that reopened. A feature of some reopenings was an agreement by depositors to waive some of their deposits. But the

error from this source is likely to be small in the years we cover. For the years 1921 to 1925 we took deposits of "suspended" national banks and subtracted deposits of banks that reopened (FDIC, Annual Report 1934, p. 94) to get deposits of failed national banks. The obvious problem here is a national bank that was temporarily closed, but reopened in a subsequent year. This should be less of a problem before the 1930s, and should even up over time -- the overestimate in one year will be offset by an underestimate the following year. To get deposit losses we then multiplied our estimate of deposits in banks that did not reopen by .319 which is based on a sample of 267 "national banks which suspended during 1921-1930 and did not reopen" (FDIC, Annual Report 1934, p. 100). As for 1870-1920 we divided by the "average of deposits reported on call dates" (FDIC, Annual Report 1934, p. 89).

As can be seen in figure 1, there were some losses for U.S. national banks in virtually every year, while in Canada there were long stretches with no losses. But when failures did occur in Canada, they involved, on some occasions, much larger fractions of total deposits than was true in the United States.² A particularly striking example occurs in the 1890s. The U.S. banking system experienced severe difficulties in the early nineties. Losses of national banks peaked at .27 percent of total deposits in 1893, and gold payments were suspended for two months. No banks failed in Canada in 1893, and Canada avoided suspension. But in 1895 the

² As Neufeld, The Financial System of Canada, p. 81 points out, the record of the chartered banks was also "more tarnished" than that of other Canadian intermediaries.

failure of one bank in Canada, the Banque du Peuple in Montreal, created losses equalling .86 percent of deposits.

In the United States losses on notes (issued only by national banks) appear to have been negligible owing to the bond security provision of the National Banking Act. In most years the Comptroller (Annual Report of the Comptroller of the Currency 1920, vol. 2, Table 37, pp. 80 - 123) shows sufficient cash deposited to redeem the outstanding notes of all failed banks. In a few years, however, there are small deficiencies and some notes may have gone unredeemed. In Canada noteholders lost in the long run in only two bank failures: the Mechanics Bank of Montreal which failed in 1879 and the Bank of Prince Edward Island which failed in 1881. But on those occasions the losses were sizable compared with annual losses on deposits in both countries: the losses in 1879 amounted to about .32 percent of total circulation in Canada, and the losses in 1881 amounted to about .33 percent of total circulation. The bond security system in the U.S., moreover, meant that note holders were paid off quickly when a bank failed -- as soon as the Comptroller of the Currency could realize on the highly liquid bonds he held.

The comparative safety of the U.S. national banks, and especially the greater safety of national bank notes, was not lost on Canadian observers. In the late 1870s some sentiment existed in Canada to adopt a bond-secured note issue. Various counter arguments, however -- perhaps the most persuasive being that a bond-secured note issue would lack "elasticity" -- carried the day.

The 1890 Bank Act revisions (the Bank Act regulated behavior of

the chartered banks and was revised decennially), however, introduced a Bank Circulation Redemption Fund. Each bank was required to pay in an amount equal to 5% of its average note circulation. Liquidators of an insolvent bank could draw on this fund, if the bank assets were not realized within 60 days. When assets were realized, reimbursement of the Fund was a first charge against the assets. Additionally, the notes of any bank that suspended were to bear interest at 6% per annum until redeemed (MacIvor 1961, p. 77).³ Notes were also given a senior lien (ahead of deposits) on bank assets. (Breckenridge, 1910, p. 123)

Although Canadian banks had a higher loss ratio than did the U.S. national system, they had a lower loss ratio than U.S. nonnational banks, and a lower loss ratio than all U.S. banks. Losses on U.S. nonnational banks deposits are also from the U.S. Federal Deposit Insurance Corporation, Annual Report, 1934. Loss data for nonnational banks in the United States are far less reliable than for the national banks. State banking authorities did not always require detailed reports on bankruptcy proceedings, and some private commercial banks were not under any obligation to report to a government authority. The data we plot here are probably adequate for a broad brush comparison with Canada, or with the U.S. national banks, but not for more demanding uses. The data we have is based on surveys made by the U.S. Comptroller of the Currency.

For the years 1870 to 1920 we began with the liabilities of the

³The Fund was held by the Minister of Finance and the banks received interest of 3% per annum on their contributions.

"state and private banks which did not reopen" (FDIC, Annual Report 1934, pp. 92-93). We then multiplied by .90 to get an estimate of the deposits -- the figure the Federal Deposit Insurance Corporation used (FDIC, Annual Report 1934, p. 110) to adjust for nondeposit liabilities such as bonded debt. To get losses we then multiplied the deposit estimates by loss factors based on samples, each of which covered a group of banks failing over a number of years (FDIC, Annual Report 1934, pp. 100-101). To get the loss rate we then divided by "estimated average deposits" of commercial banks other than national" (FDIC, Annual Report 1934, p. 89). This data is reported on a biannual basis. For a given year we used the first of the pair of estimates that include data from that year. This decision may impart a slight upward bias in our estimates, perhaps offsetting in some measure the downward bias resulting from incomplete coverage.

For the years 1921 to 1925 we subtracted our estimate of losses on national bank deposits from the estimate of losses borne by all depositors reported by Friedman and Schwartz (1963, p. 438) to get an estimate of losses at nonnational banks. We then divided by the "estimated average deposits of commercial banks other than national" (FDIC, Annual Report 1934, p. 89) to get the loss rate.

Figure 2 contrasts the loss rates of U.S. national and nonnational banks, and figure 3 contrasts loss rates of Canadian chartered banks and all U.S. banks. Although a number of Canadian failures still stand out, the worst Canadian years now have some rivals in the U.S., particularly 1878, 1893, and 1907.

The high loss rate experienced by nonnational banks in 1878 was surprising to us because this year is not identified as a crisis year by the leading financial histories of the United States. Most financial histories appear to rely on Sprague's (1910) chronology. Sprague, however, may have neglected 1878 because of his focus on the national banking system. As shown in figure 2, the difficulties in 1877 and 1878 were confined almost entirely to nonnational banks.⁴ It appears that failures were particularly heavy among mutual savings banks. Indeed, the FDIC Annual Report (1934, pp. 112-13) shows 1878 to be the worst year for mutual savings banks in terms of loss rates between 1865 and 1934. The Boston mutual savings banks were especially hard hit in 1878. There were runs on a number of them, and the Massachusetts legislature responded by simplifying the procedure by which mutual savings banks could temporarily suspend payments. (Bankers' Magazine, vol. 32, 1877-1878, pp. 826-27). In 1877 similar problems had afflicted savings banks in St. Louis and Chicago. But although losses were concentrated in certain cities, there were at least a few failures in a substantial number of states. The difficulties of the mutual savings banks may have been associated with the decline in commodity prices and the decline

⁴ The FDIC report for 1934, which we relied on to compute the estimates of deposit losses, is based on The Comptroller of the Currency's Annual Report (1896, 52-57) for information concerning nonnational bank losses. This source reports the results of the Comptroller's survey of national bank examiners, and the data may vary from state to state depending on the cooperation received by the examiners, how they defined a bank, and the effort they put forward. The Comptroller's report, however, does confirm the large number of failures and the substantial liabilities of the nonnational banks that failed in 1877 and 1878.

in railroad and utility stocks that occurred in 1877 and 1878. The entire episode deserves further study.

Table 1, which makes use of data from the FDIC's Annual Report for 1940, shows averages for several segments of 1865-1920. The estimates reported in 1940 may incorporate revisions of the estimates, particularly for nonnational banks reported in 1934, which underlay figures 2 and 3. (Unfortunately, while the Annual Report, 1934 reported annual estimates, the Annual Report, 1940, reported only averages for long periods.) The general picture, however, is similar. The Canadian system enjoys an edge for the whole period, but 1881-1900 is an exception. Loss rates for Canada and for the U.S. banking system as a whole were similar in 1881-1900, but the loss rate for Canadian banks was higher than for U.S. national banks.

The most important conclusion to be drawn from these comparisons is that losses on deposits and notes in Canada were on occasion quite large by U.S. standards. This presents a sharp contrast with the stability observed after 1925. We turn now to a somewhat different aspect of stability.

B. Banking Crises

In the United States banking difficulties, on five occasions (1873, 1884, 1890, 1893, and 1907)⁵, led to severe stringencies in the money markets, and on three occasions (1873, 1893, and 1907), to restrictions on the convertibility of deposits and notes with gold.

⁵These are Sprague's (1910) dates.

These crises produced severe contractions in the stock of money and reductions in the quality of the stock of money (the ability of various components to perform as media of exchange) that in turn produced steep falls in the price level and contractions in economic activity. Canada, however, avoided this form of instability. Below we will consider the extent to which branch banking deserves the credit for this difference in stability.

III. The Role of Branch Banking

The role of branch banking in mitigating instability in the banking system can be best understood by considering separately three classes of shocks: bank specific shocks, regional shocks, and system wide shocks.

A. Bank Specific Shocks

Bad luck may lead to a large percentage of assets of a single bank going bad at one time, and to the failure of the bank even as its neighbors remain solvent. The rules normally followed by prudent bankers, such as diversifying portfolios and demanding collateral for risky loans, are designed to minimize the probability of this type of failure, so that most failures of this type are likely to be the result of imprudent or fraudulent banking. Imprudent or fraudulent bankers were probably not more plentiful in Canada than in the U.S. But the relative freedom of Canadian banks, compared with the U.S. nationals, to invest in a wide range of assets, and to grow quickly to a large size by opening branches and acquiring other banks, were likely to make errors from mismanagement or fraud more

costly.

Indeed, most of the major Canadian failures have been traced to gross mismanagement or fraud.⁶ The failure of the Mechanics bank of Montreal in 1879 was attributed by Breckenridge (1910, p. 116) to mismanagement and excessive note issue. The failure of the Maritime Bank of Canada in 1887 was attributed by Breckenridge (1910, p. 127) to its being a one-man bank that made excessive loans to a few favored firms. The failure of the Banque Ville Marie in 1895 was attributed by Breckenridge (1910, p. 168) to gross fraud. And the failure of the Home Bank in 1923 was attributed by Jamieson (1955, p. 43) partly to bad loans to the bank's directors. The failures of the Sovereign Bank of Canada in 1908 and the Farmer's Bank in 1910 were attributed by Jamieson (1955, pp. 42-23) partly to the attempt to add branches, and attain an impressive size, rapidly; a possibility, it is interesting to note, that was barred to U.S. banks.

Granted, there is a tendency to make management the scapegoat when a bank fails, and it is conceivable that in some cases managements of banks that failed did not act very differently from banks that survived. But the specificity of the criticisms suggests that in most cases management was to blame.

But why should the oligopoly of chartered banks that existed after the merger movement be entirely free of failures due to gross

⁶Neufeld, The Financial System of Canada, p. 104 concludes that "...loss of confidence in banks almost always resulted from their having made imprudent loans and investments or from suffering defalcations, and almost never from external forces over which the banks had no control."

mismanagement or fraud? In other words, given that a fair number of Canadian banks failed before 1925 due to these causes, why shouldn't we expect at least one or two failures owing to mismanagement or fraud after 1925? We suggest three possible answers.

(1) The promotion pyramid within the large nationwide branch banks may have been so difficult to scale that incompetent managers were weeded out before they reached levels of management where their decisions could have endangered the entire institution, and may have discouraged short-sighted entrepreneurs from joining such banks in the first place. The large chartered banks, according to the conventional wisdom, would take on young men after graduation from high school and assign them to minor branches in remote areas of Canada. Those that did well would be given larger branches to manage, and after a number of years would be brought back to the head office in Montreal or Toronto. After years of service they would eventually be given heavy responsibilities. In this way the banks developed a core of managers who felt they owed all of their success in life to their bank, and who responded with wholehearted institutional loyalty. (2) As described by Jamieson (1955, Part II, passim) the large chartered banks developed a very sophisticated system, replete with fail safe devices, to audit and control branches, and to make it difficult for individuals to do much damage. (3) The large chartered banks may have been lucky.

B. Regional Shocks

The great strength of the Canadian banks was their ability to absorb regional shocks such as a decline in wheat prices that

affected western Canada or the western United States. The Canadian banks were able to offset losses in one region with gains in another and to transfer reserves from head offices to the branches facing losses. Here is Breckenridge (1910, pp. 125-126) on how the Canadian system handled a regional shock in 1882.

"So serious were the losses there [Manitoba], ...because of the thoroughness with which the whole commercial community had been infected with the speculative virus, that three out of the seven Winnipeg managers were dismissed. Bad debts which would have swamped local banks, perhaps for all time, were taken care of by the Canadian banks which suffered them without other outward sign than reductions of capital, smaller additions to rest account, or lower dividends upon their stock."

After 1900, even Canadian banks that did not possess nationwide branch networks were protected in some degree from regional shocks by the market for banks that existed in Canada.⁷ Consider a bank with branches in only one province. A regional shock would impose heavy short-term losses on the bank, and possibly alarm depositors. But the bank could then seek a merger with a larger bank with branches throughout the country. Although the larger bank would have to absorb some losses it would acquire the branches, the goodwill, and the local knowledge of the smaller bank. As Carr, Mathewson, and Quigley (1994, pp. 27-36) show, this market worked extremely well in Canada and assured that only banks that were thoroughly rotten would have to close.

As an example consider the Union Bank of Canada which was acquired by the Royal Bank of Canada in 1925. The Union Bank had 327

⁷We discuss the legal change in 1900 that facilitated mergers in section V.

branches and its head office was in Winnipeg. It had taken a leading role in the development of western Canada, but it had been struggling since 1923, when it announced increases in its loan loss reserves -- probably for the same reason many U.S. banks were struggling, the postwar fall in world agricultural prices -- and it was afraid that the announcement of a large cut in dividends that seemed imminent might adversely effect the "general standing" of the bank. Merger with a strong eastern bank was a reasonable solution. (Jamieson 1955, p. 68). This was one of a series of mergers during a period marked by great uneasiness about the soundness of Canada's banks, and even runs, that might have degenerated into a panic.

In the United States, on the other hand, banking laws prevented the development of an interregional, and in many cases even an intrastate, market for distressed banks. A bank in Kansas suffering from loan losses and deposit withdrawals resulting from a decline in wheat prices could not look for salvation to a white knight from Chicago or New York.

C. System Wide Shocks

By this we mean an event that leads to currency withdrawals throughout the banking system and may lead to a temporary suspension of convertibility. The event that triggers such a drain may be an "internal drain" -- a shock to the domestic economy, such as the collapse of a major corporation, that damages the balance sheets of many banks and leads in turn to a scramble by the public to convert deposits into currency. Or it might be an "external drain" -- for example, a withdrawal of capital inflows from England prompted by an

increase in the Bank of England's discount rate. In either case, branch banking played a role in protecting the Canadian system.

A major cause of banking crises in the United States appears to have been the so-called "pyramiding of reserves" in New York City. Country banks in the western and southern sections of the United States relied on correspondents in New York to provide reserves during times of heavy withdrawals. (Bordo, Rappoport, Schwartz, 1992). Presumably branch offices in western and eastern Canada relied upon head offices in Toronto and Montreal in the same way. But the commitment of a New York bank to its independent correspondents in the South and West was less strong, and less visible to the depositor, than the commitment of head offices in Canada to their western and eastern branches. Moreover, on several such occasions the correspondents, having their assets tied up in a collapsing stock market, were unable to deliver. The holder of deposits in western and southern banks in the United States was therefore more prone to run to cash at the first sign of trouble, than his opposite number in Canada.

Not all of the relative financial instability in the United States, however, can be laid at the door of limited branching. One ongoing problem was the continuing debate over cheap money, particularly silver. The threat that the silver forces would gain the upper hand in the United States and force the United States off the gold standard may have made the system-wide shock in 1893 more severe.

In any event, it does appear that U.S. economy suffered

severely on the three occasions -- 1873, 1893, and 1907 -- when system-wide shocks in the U.S. produced a restriction of convertibility. The basic data are given in Table 3. Real and Nominal GNP fell significantly with each crisis in the U.S, and in each case the fall was larger than the corresponding fall, if any, in Canada.⁸ Indeed, during the first two episodes real GNP actually rose in Canada. Two factors seem to have been at work during the U.S. financial crises. First, as argued by Friedman and Schwartz (1963), the banking difficulties produced a decline in the money multiplier which reduced the growth rate of the money supply, and hence aggregate demand. Second, as argued by Grossman (1993), the financial crisis in the U.S. disrupted the credit allocation mechanism.⁹

There are some anomalies in Table 4. The rise in real GNP in Canada between 1873 and 1874, despite the fall in the stock of money, and despite the financial distress to the South, is somewhat

⁸ We have relied on Balke and Gordon's (1989) estimates of GNP, rather than Romer's (1989), because the former estimates appear to be closer methodologically to Urquhart's (1986) estimates of GNP for Canada.

⁹The implications of the differences in susceptibility to system-wide shocks for long-run macro-economic stability, however, are unclear. On one hand Rich (1988, 157) concluded that "Canadian GNP fluctuated less than its U.S. counterpart." On the other hand, Williamson (1989, 332), relying on more recent estimates of U.S. GNP, due to Romer (1989) and Balke and Gordon (1989) and a different method for detrending the data, found that Canadian GNP was 11% or 56% more volatile than U.S. GNP, and that the GNP deflator was 9% or 54% more volatile, depending on the measure of U.S. GNP used. Indeed, Williamson concludes that branch banking, the absence of reserve requirements on deposits, and bond backing requirements on notes in Canada produced greater sensitivity to real shocks in Canada.

surprising. But note that over the whole cycle 1873 to 1878 real GNP in Canada fell about 4 percent. The very rapid growth of money in Canada between 1907 and 1908 is also surprising, and can be accounted for by the lender of last resort operations described in the next section, and to a large gold inflow that produced an increase in highpowered money sufficient to more than offset declines in the deposit-reserve ratio and the deposit-currency ratio.

The three episodes explored above are famous crises in the United States but they also were international in scope so they should have had some impact in Canada. Nevertheless, it is fair to ask whether we would get similar results if we began with periods of distress in Canadian banking. The failure of the Home Bank in 1923 and the subsequent anxiety about the banking system comes closest to a banking crisis in Canada. According to Jamieson (1955, p. 65): "This [anxiety about the safety of the banks] was reflected in the dissemination of rumours, some of the wildest nature, and sporadic "runs" by depositors, which only a few of the very strongest banks escaped." Several mergers of weaker with stronger banks followed in the wake of the failure of the Home Bank. But while nominal GNP did fall 1.19 percent in Canada between 1923 and 1924, real GNP rose, although an admittedly anemic .73 percent, and the stock of money in Canada rose 3.77 percent. In the United States, by way of contrast, nominal GNP rose 2.64 percent, real GNP rose 2.62 percent, and the stock of money rose 5.27 percent. Evidently this episode does not compare in intensity with the more serious crises in the United

States.

Overall, the conclusion that branch banking helped the Canadian banks cope with system wide shocks seems to be well established. This conclusion is supported, moreover, by Calomiris (1993, 33-38) whose broad international survey of evidence on the relationship between branch banking and stability includes Canada. It is possible, however, to imagine system-wide shocks that are too big to be absorbed even by a system of large banks with nationwide branch networks. A lender of last resort, which we discuss in the following section, may be needed.

IV. The Lender of Last Resort

The Canadian banking system developed a lender of last resort only slowly, and by the end of our period was still without either a central bank or deposit insurance. Yet an institutional structure had evolved that contained many of the features of a lender of last resort. This gradual evolution reflected the many protective barriers that insulated the Canadian banking system from such shocks. First, Canada was a small open economy and the Canadian banks held deposits in New York as a form of contingent reserves Goodhart (1988, p. 52). In addition, the asset-backed note issue of the Canadian banks created an elasticity of the Canadian currency which permitted an instantaneous switch between deposits and notes. The significance of this elasticity became clearer when it was reduced in 1907.

The first occasion when the government acted as lender of last resort occurred in 1907. The ability of the government to do so

rested on its issues of Dominion Notes. These notes were legal tender notes issued by the federal government. The government was required to redeem them on demand and held 25% reserves against issues up to \$30 million and 100% gold reserves against any issues in excess of \$30 million (MacIvor 1961, p. 65). In 1907, at the instigation of the public (rather than the chartered banks) the Canadian government made an emergency issue of Dominion notes which it lent to the banks. The emergency issue reflected concern, primarily amongst farmers, of an incipient credit squeeze. The traditional explanation for the squeeze has been that the restriction of bank note issues to an amount less than paid up capital had become binding -- a story which is consistent with the passage of legislation in 1908 that permitted the banks to increase their note issue to 115% of paid in capital during the crop-moving season. However, Rich (1989) argued that the crisis was brought about by the Canadian banks shifting funds to New York to take advantage of the very high interest rates there in the fall of 1907, and restricting domestic credit to do so. In any case, the emergency Dominion note issues of 1907 represented the first time that the Canadian government had intervened to supply liquidity to the banking system. In 1914, at the onset of World War I, the government passed the Finance Act which created a discount window for banks.

It is clear then that by 1907 the Canadian government had begun to play a modest role of lender of last resort. A more difficult question to answer is whether the Bank of Montreal, or the club of large Canadian Banks, had also begun to play this role. In 1906 the

assets and liabilities of the Ontario bank were assumed by the Bank of Montreal, with other banks giving a guarantee, and in 1908 the assets and liabilities of the Sovereign Bank were taken over by a group of 12 banks including the Bank of Montreal. In testimony before the U.S. National Monetary Commission Sir Edward Clouston, General Manager of the Bank of Montreal was willing to agree that the Bank had acted as a lender of last resort in these cases: "... in the case of the Ontario Bank and Sovereign Bank it was a very ticklish time, and if that run had been allowed to continue it might have spread, and it was done partially in self defense." (U.S. National Monetary Commission, 1910, p. 181). Carr, Mathewson, and Quigley (1994, pp. 21-22), however, stress that the takeovers helped smooth the "transfer of business" from the insolvent banks, although they also note the concern about "externalities" associated with the closure of these banks. Ultimately the point may be that there was a recognition on the part of the Bank of Montreal and the other large banks that they could be hurt by a general decline in confidence sparked by a bank failure, but this consideration could never be divorced from an analysis of the effect of a takeover on the profits of the banks.

The United States did not have a formal lender of last resort before the establishment of the Federal Reserve in 1914. A set of market driven and official arrangements evolved to provide liquidity to the banking system in times of panic. These arrangements proved successful in allaying panics on several occasions: 1884, 1890, 1900, but not on others.

One such arrangement was the issuance of Clearinghouse loan certificates whereby the clearinghouses of New York, Chicago, and other central reserve cities issued emergency reserve currency in the form of clearinghouse loan certificates collateralized by member bank assets, and even issued small denomination certificates that circulated from hand to hand as currency. (Timberlake [1984], Gorton [1985], and Gorton and Mullineaux [1987]). A second was operations by the Independent Treasury which on occasion conducted rudimentary monetary policy. The Treasury in times of stringency would use its powers as depository of fiscal revenues to transfer deposits to key commercial banks, speed up debt redemption, and to arrange syndicates of private investors to provide timely liquidity, Timberlake (1987).¹⁰ Finally, after the disastrous experience of the panic of 1907-08, the Aldrich-Vreeland Act was passed in 1908, which allowed groups of national banks to form a National Currency Association empowered to issue emergency currency based on members' collateral of commercial paper. Although only invoked once, it was successful in preventing panic at the outbreak of World War I in 1914. (Friedman and Schwartz, 1963, pp. 170-172).

V. The Merger Movement

As we have had occasion to note above, the Canadian banking system was transformed by mergers and acquisitions between 1910 and 1925, ushering in a period of impressive stability. The causes of this consolidation are not completely understood, but there is

¹⁰ Some states developed early deposit insurance schemes (Calomiris 1990) but none were successful in preventing major panics.

general agreement that the Bank Act revision of 1900, which permitted a bank to acquire the assets of another bank without a special Act of Parliament, was at least a proximate cause. Prior to 1900 a merger was a "time-consuming and frequently costly affair" (Bond 1969, p. 5) while after 1900 approval of the Minister of Finance was sufficient to permit a merger.

Table 2 shows the percentage of total bank assets held by the top 3 banks, the top 5 banks, and the top 10 banks by quinquennia. It also shows the Herfindahl index. The most dramatic change in the percentage of assets held by the largest firms is in column three, the percentage of assets held by the top 10 firms. This was already high by American standards in 1895, 64 percent; but by 1927 it was close to 100 percent. The Herfindahl index is the sum of the squared shares, and handles mergers particularly well. The number in parentheses is the inverse of the Herfindahl index to the nearest whole number. It is the number of equal size banks that would yield the same Herfindahl index as the actual distribution. Between 1910 and 1925 the equal-bank-equivalent declined from 13 to 6. By way of contrast consider the United States in 1920. The three largest banks were in New York City: Chemical with 4.13 percent of total National Bank assets, National City Bank with 3.85 percent, and Chase with 2.41 percent, for a total of 10.40 percent, of National Bank assets which amounted to about 5.09 percent of all commercial bank assets - - a far cry from the 51.95 percent of bank assets owned by the three

largest Canadian banks.¹¹ The Canadian banking system had taken its modern form.

The last failure among Canada's chartered banks was the failure of the Home Bank in 1923. By 1925 all of the Canadian banks, except two based in Quebec, had nationwide branch networks able to withstand the severe shocks that would hit the system in the 1930s.

VI. Balance Sheet Ratios and the Rate of Return on Equity

Although stability is important, it cannot be the sole basis for judging a banking system. We also want to know how efficient the system is in providing loans and other basic banking services. In our earlier paper (1994) focussing on the period 1920-1980 we measured efficiency by comparing rates of interest charged on loans, paid on deposits, and received on securities for the two countries, and the overall rate of return on equity. For the earlier period such comparable data for the two countries is not available so we are forced to use cruder proxies.

Table 4 brings together decadal averages of some key ratios for the Canadian chartered banks and the U.S. national banks.¹² The loan-asset ratio during this period, we would argue, measures the ability of the banking system to supply loanable funds to the private sector. Evidently, the loan-to-asset ratio was consistently higher in Canada, in part because the security-to-asset ratio was

¹¹Annual Report of the Comptroller of the Currency 1920, vol. 2, pp. 156, 621.

¹² See Calomiris (1993, 58-62) for a complementary discussion of these ratios.

consistently lower, although the differences narrowed somewhat during the decade of the first world war. The U.S. ratio was lower primarily because of regulations that allocated bank funds to the government or to suppliers of outside money in order to increase the safety of the system. The security-asset ratio was higher in the U.S. because of the bond security system instituted to protect national bank notes, and because national banks were required to purchase government bonds to secure their charters. The reserve ratio was also higher in the U.S. because of the required reserve ratios instituted to protect deposits.

The last line of each panel of the table is the debt (primarily deposits) to equity ratios of the banking systems. In our previous paper we showed that the debt-equity ratio was consistently higher in Canada. We interpreted this as a reflection, ultimately, of the greater stability of the Canadian system: neither regulators nor depositors showed much concern when Canadian banks raised their debt-equity ratios. Between 1870 and 1919, interestingly, the situation was very different. In the first two decades the debt-equity ratio was actually slightly higher in the United States, and a substantial difference in favor of Canada did not arise until the decade of the first world war. This picture is consistent with our earlier argument, the Canadian system was not notably more stable than the U.S. national system and was not permitted notably higher debt-equity ratios.

Figure 4 compares the rate of return on equity in Canada (defined as the ratio of dividends and change in surplus to equity)

with the rate of return on equity in the United States (defined as the ratio of net profits to equity) between 1890 and 1913. As is evident the two move on similar paths. This suggests that despite the higher proportion of their portfolio that Canadian banks were able to devote to lending, the banking market was sufficiently competitive so that Canadian banks were unable to earn greater profits. This result contrasts with our findings for the post-1929 period. For that period we found that the rate of return on equity was generally higher in Canada. Admittedly, we used a different definition of rate of return on equity for the latter period so our results are not strictly comparable. But assuming that the second period was different, the explanation would turn on the achievement of stability. Stable banking permitted Canadian banks to increase their leverage, which in turn produced high returns to equity after 1925.

In summary, a comparison of the balance sheets and earnings of the banking systems reinforces the basic picture. A Canadian system roughly on a par with the U.S. system to start, but gradually pulling ahead in terms of safety and efficiency.

VII. Conclusions

Before 1925 the difference in stability between the Canadian and U.S. banking systems was smaller than it would be afterwards. True, measured by susceptibility to banking crises, the Canadian system was clearly stronger. But, measured by losses experienced by depositors and noteholders, the difference becomes problematic:

Canadian banks were more stable than U.S. nonnational banks, but less stable than U.S. national banks.

Depositors and noteholders in U.S. banks experienced some losses in virtually every year between 1870 and 1925, while the Canadian system often escaped unscathed. But when a Canadian bank failed, the resulting losses often represented a relatively high percentage of total bank deposits. On two occasions, moreover, noteholders were not paid in full, and on others noteholders had to wait an extended time to get their money. In the United States immediate redemption at par was assured by the bond security system of the National Banks.

The Canadian banks were never forced to restrict convertibility of notes or deposits into highpowered money during international banking crises, while the U.S. banking system was forced to do so in 1873, 1893, and 1907. It should be noted, however, that it is not certain that the two systems faced system-wide shocks of the same intensity. For example, in the 1890s the political success of the free silver forces in the United States raised doubts about the commitment of the United States to the gold standard, a difficulty that the Canadian system was not forced to face.

The merger movement in Canada, however, radically altered the picture, by creating a banking system characterized by a small number of large banks with thick interprovincial networks of branches. From 1925 on, as we show in our previous paper, the Canadian banking system exhibited remarkable efficiency as well as stability. The key lesson from this paper is that the transition

process was protracted and there were times when losses from bank failures were heavy. On some occasions imprudent entrepreneurs took advantage of the freedom to branch and merge by expanding their institutions too rapidly. To judge from the contrast between Canadian and U.S. banking in the 1925 to 1980 period, however, it would have been a mistake to cut short the evolutionary process by imposing a system of highly restricted unit banks such as the national banking system on Canada, a proposal strongly advanced at the time.

The Canadian banking experience suggests that once an equilibrium in the industry was achieved, it enjoyed both stability and efficiency. However, the experience of the United Kingdom and possibly other countries suggests a different outcome. In the U.K. case once the merger movement worked itself out by World War I, the resultant "big five" banks formed a cartel, with the government's tacit assistance, which according to recent studies became very inefficient (Capie 1995, Hannah 1995). Protected by exchange and capital controls and legal restrictions on potential competition by other financial intermediaries, it took a major change in legislation in 1971 (Competition and Credit Control Act) and the removal of external controls to rectify the situation. One can speculate that the Canadian banking system did not go the British route because of less intrusive government intervention; because of the proximity of the U.S. financial system, and because of the absence of extensive controls on capital movements.

These historical comparisons, we believe, have important

messages for contemporary policy making. Currently the United States is moving rapidly toward removing the centuries old barriers to interstate branching. Once the forces of competition are unleashed it is our belief that the U.S. banking system will follow a route similar to that taken in Canada in the first decades of this century, and in the United Kingdom somewhat earlier. Large banks will acquire smaller banks across states and regions creating a much more concentrated banking system than now exists. In the process mistakes will be made, as happened in Canada, and large institutions may become insolvent. It will then be the responsibility of the monetary authorities to act to protect the payments system at large, but not to cut short the evolutionary process with new restrictions. Also, provisions may be in order to protect small depositors from losses. Although the current system of deposit insurance does accomplish this, other serious problems associated with it suggest that other solutions may be required.

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Table 1. Losses on Deposits			
Years	Canada	U.S. National Banks	U.S. All Banks
1865-1880	.01 ^a	.06	.21
1881-1900	.16	.08	.15
1901-1920	.01	.01	.05

^a This figure is for 1867 (Confederation) to 1880. In 1866 there was a major failure: The Bank of Upper Canada. If this failure were included the Canadian average for 1865 to 1880 would be about .07. See Breckenridge (1910, pp. 79-80) for a discussion of this failure.

Sources: Canada and U.S. National Banks, see text. All U.S. banks; U.S. FDIC, Annual Report (1940, p. 69).

Table 2. Canadian Bank Concentration Measures, 1895-1927

	Percent of Total Bank Assets			Herfindahl Index
	Top 3 Banks	Top 5 Banks	Top 10 Banks	
1895	34.19%	43.85%	64.07%	.0648 (15)
1900	37.81	48.46	69.08	.0754 (13)
1905	37.39	46.03	68.64	.0775 (13)
1910	38.08	48.56	69.70	.0786 (13)
1915	44.14	55.89	78.86	.0891 (11)
1920	51.95	66.11	86.51	.1128 (9)
1925	65.9	78.91	98.31	.1656 (6)
1927	68.61	81.99	99.78	.1793 (6)

Source: Beckhart (1929, pp. 330-33).

Table 3. The Canadian and U.S. Economies During the Financial Crises. (Percent Change)

		1873-74	1893-94	1907-08
Real GNP	U.S.	-.63	-2.96	-5.62
	Canada	2.01	4.93	-5.12
Nominal GNP	U.S.	-3.55	-8.42	-7.77
	Canada	-.47	-4.65	-4.41
Money (M2)	U.S.	1.83	.47	-1.39
	Canada	-3.75	3.27	13.97

Sources: U.S.: Real and Nominal GNP, Balke and Gordon (1989, p. 84); M2, Friedman and Schwartz (1982, p. 122). Canada: Real and Nominal GNP, Urquhart (1986, p. 30); M2, Bordo and Jorjung (1987, pp. 154-55).

Table 4. Bank Balance Sheets, Canada and the United States, 1870-1919.

	1870-79	1880-89	1890-99	1900-09	1910-19
Canada					
Loan/Asset	.717	.706	.696	.722	.640
Security/Asset	.013	.021	.071	.087	.110
Debt/Equity	1.458	1.914	2.796	4.232	6.876
United States					
Loan/Asset	.487	.563	.589	.546	.567
Security/Asset	.253	.169	.117	.164	.168
Debt/Equity	1.826	2.334	2.620	4.184	5.352
Sources: U.S; U.S. Comptroller of the Currency, Annual Report. Canada: Curtis (1931)					

Figure 1
 Deposit Losses, 1870-1925

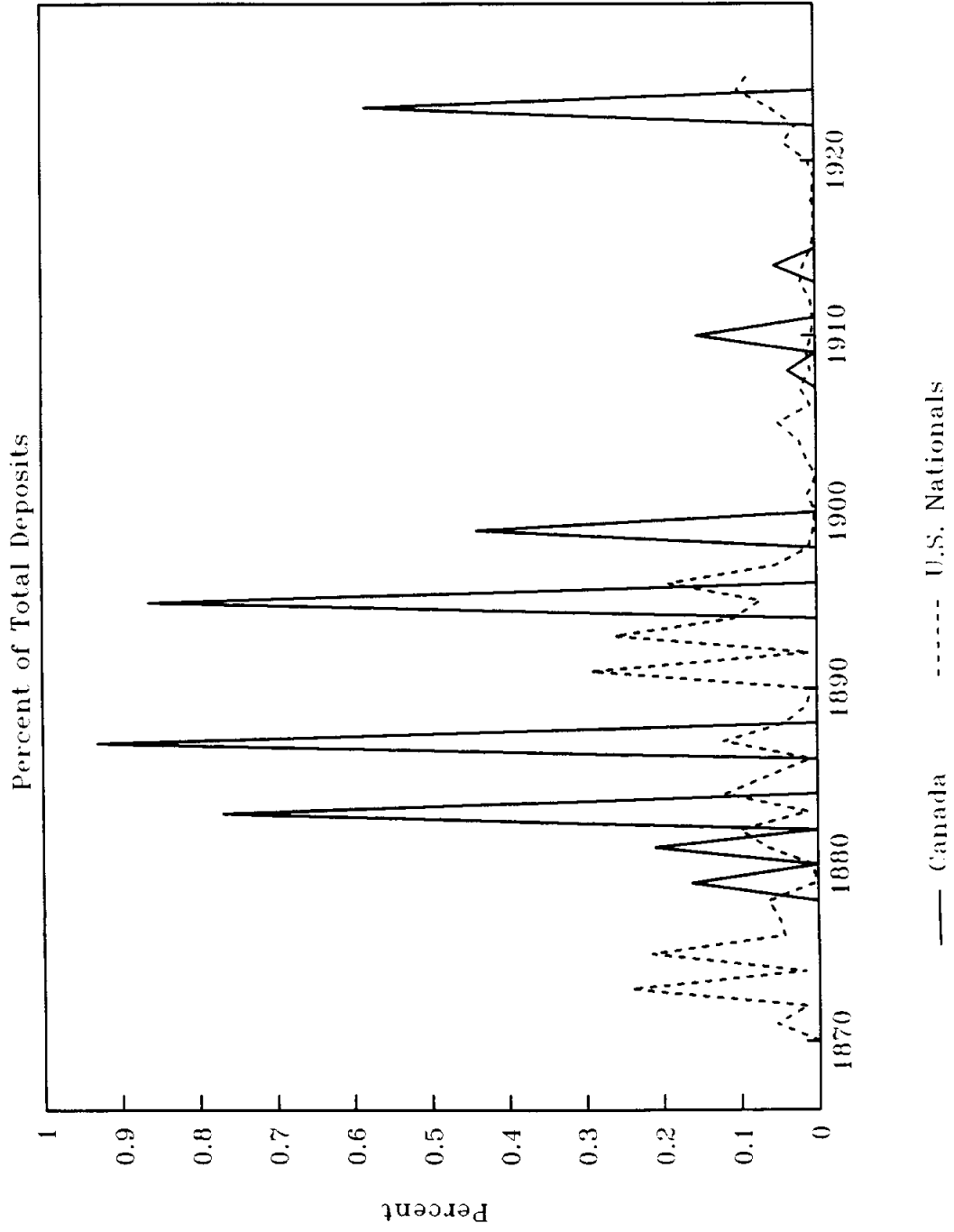


Figure 2
 Deposit Losses, 1870-1925

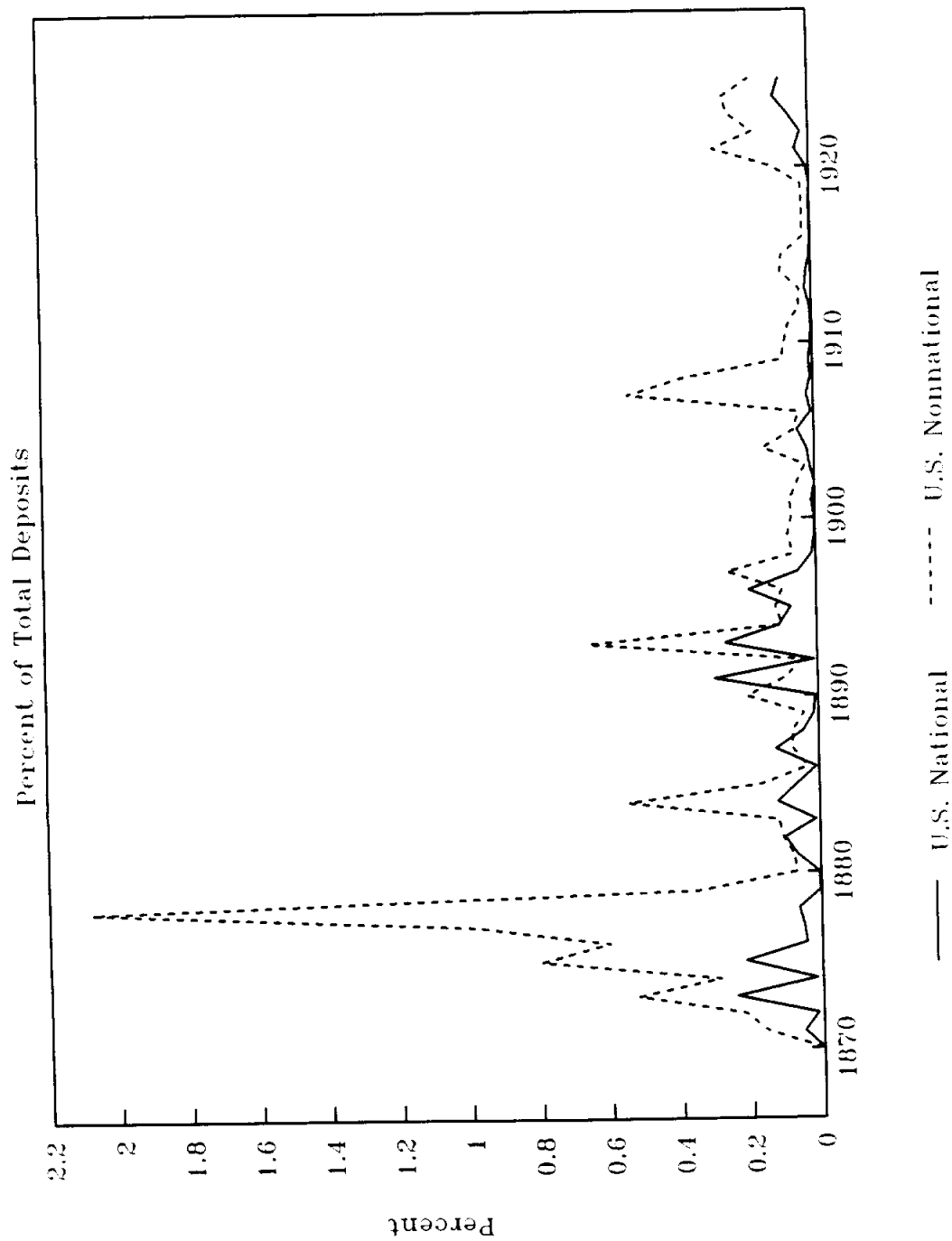


Figure 3
 Deposit Losses, 1870-1925

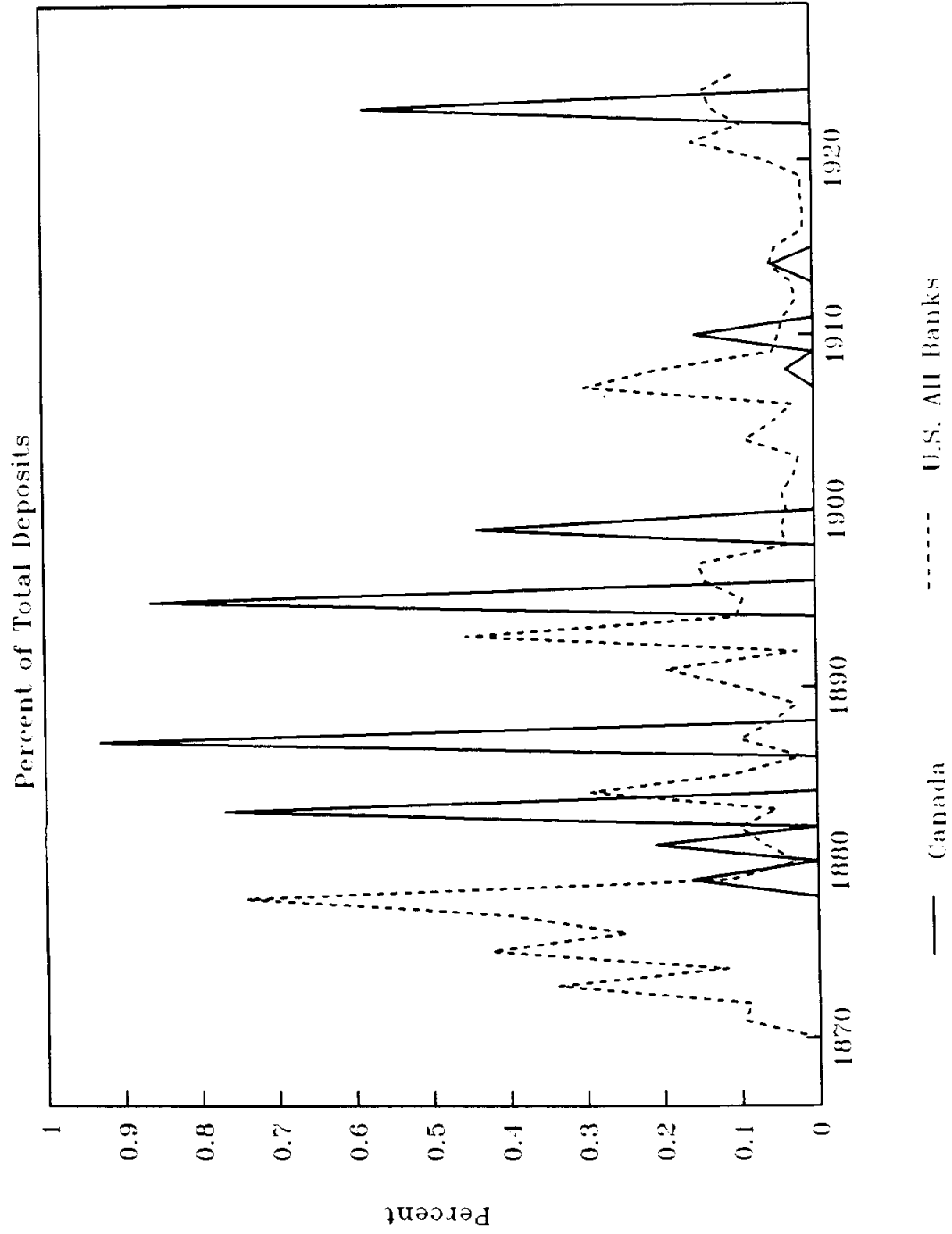


Figure 1
 Rates of Return to Equity
 Canada and the United States, 1890-1913

