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Liquidity Provision during the Crisis of 1914: Private and Public Sources

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Caught between the end of the National Banking Era and the beginning of the Federal Reserve System, the crisis of 1914 provides an example of a banking panic avoided. We investigate how this outcome was achieved by examining data on the issues of Aldrich-Vreeland emergency currency and clearing house loan certificates to New York City institutions that identify the borrower and the quantity requested for each type of temporary liquidity measure. The extensive provision of temporary credit to a wide array of financial intermediaries was, in our opinion, essential to the successful alleviation of financial distress in 1914. Empirical results indicate an important role for clearing house loan certificates that is distinct from the influence of Aldrich-Vreeland emergency currency issues.

Key words: liquidity provision, lender of last resort, correspondent banking, closure of stock exchange, financial crisis, clearing houses, Aldrich-Vreeland emergency currency.

JEL codes: E42, E59, E65, N22.

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I Introduction

This paper examines how the United States avoided a banking panic in 1914 despite threatening circumstances following the initial stages of World War I. During the summer of 1914, the U.S. suffered gold outflows, Europe was at war, blockades threatened world trade, and cash was soon to become scarce. Following the actions of stock exchanges worldwide, the New York Stock Exchange was closed on July 31, 1914, isolating New York City banks from their main market for financial liquidity. The closure of the stock exchange likely forestalled the impending financial crisis by preventing the large-scale sales of foreign-owned bond and stock securities and the related (and feared) outflow of gold overseas. The shutdown of the exchange also exposed the financial system to the risk of a liquidity shortage. In New York City, two liquidity provision mechanisms, Aldrich-Vreeland emergency currency and clearing house loan certificates, became crucial stop gap measures to prevent vulnerable financial markets from spiraling into a full-scale panic.

We investigate the 1914 episode because crisis prevention mechanisms were able to support deposit levels and thus promote the growth of the aggregate money supply, an outcome consistent with standard policy prescriptions for combating financial distress. Powerful market participants and policymakers engaged in a successful intervention before the Federal Reserve System was operational and remarkably prevented the occurrence of a far more damaging financial event (see Silber 2007a). Existing literature lauds the successful outcome in 1914 as the result of the issuance of Aldrich-Vreeland emergency currency, which made its simultaneous debut and exit in 1914. In New York City in particular, clearing house loan certificates may still have been an important liquidity resource, even though they were unable to prevent full-scale banking panics and financial crises in 1907, 1893, and 1873.

We show that the financial intermediaries in New York City that requested temporary liquidity loans through these two mechanisms were able to maintain (or increase) their level of deposits and hence stave off a contraction in the money supply.¹ We examine data on the issues of Aldrich-Vreeland emergency currency and clearing house loan certificates in New York City institutions that identify the borrower and quantity requested for each type of temporary liquidity measure. We combine these data with high-frequency (weekly) balance sheet data to verify how temporary liquidity borrowing affected changes in deposits.

Banks that borrowed temporary liquidity instruments maintain interbank payments despite initial cash drains to the interior and large gold outflows arising from asset liquidations by foreign investors. By comparing the characteristics of the financial distress in 1914 with previous National Bank Era (1863-1913) panics, specifically those in 1907, 1893, 1890, 1884, and 1873, we infer that the outcome of 1914 is benignly different. In the earlier instances of financial distress, bankers employed only clearing house loan certificates as a temporary liquidity mechanism because emergency currency did not exist as an alternative. Several features of 1914 play out differently and more favorably compared to these prior crises, suggesting that the addition of emergency currency was crucial in alleviating the financial distress.

We argue that clearing house loan certificates in 1914 play a secondary, but still consequential, role in forestalling financial panic. Our data and statistical examinations reveal that financial intermediaries borrowing solely Aldrich-Vreeland emergency currency and, separately, those borrowing only clearing house loan certificates are associated with an increase

¹ Our empiric analysis focuses on the role of Aldrich-Vreeland emergency currency and clearing house loan certificates in New York City because New York City represented nearly half of the banking assets in the United States in 1914. New York City institutions were also most acutely affected by the closure of the stock exchange.

in net deposits that is larger than the increase in net deposits among those intermediaries that did not borrow either form of temporary liquidity. Clearing house loan certificates as a liquidity provision were particularly important for state banks and trust companies that did not have access to emergency currency. Intermediaries that borrowed both emergency currency and clearing house loan certificates -- a subset of national banks -- experienced a net decline in deposits.²

The extensive provision of temporary credit to a wide array of financial intermediaries was, in our opinion, essential to the successful alleviation of financial distress in 1914. Although emergency currency was crucial in preventing a panic in 1914, it was only available to national banks -- a subset of financial institutions. Clearing house loan certificates, however, were available to trust companies and state banks that were members of the New York Clearing House. The access of these institutions to borrowing a form of temporary liquidity provision prevented the isolation of important, non-national banks in New York City. The borrowing of clearing house loan certificates in addition to emergency currency by a subset of national banks further suggests a non-trivial role for this form of temporary liquidity provision.³ As a result, the private (and perceived as inferior) form of temporary liquidity in the form of clearing house loan certificates may have a secondary yet still palliative role that may have been previously overlooked.⁴

² We suspect that the decline in deposits arises from the fact that national banks borrowing large proportions of clearing house loan certificates required additional liquidity most intensively.

³ Further work will investigate institutional characteristics associated with this distinctive fact. The role of clearing house loan certificates in national bank borrowing is complicated by the presence of emergency currency, an alternative liquidity mechanism thought of as superior.

⁴ The Panic of 1907, in particular, demonstrated the importance of access to temporary liquidity when the isolation of trust companies from liquidity sources heightened the severity of trust depositor withdrawals (see Tallman and Moen 1990, and Moen and Tallman 2000). Hoag (2011) offers a contrasting view.

II Background

The motivation for our historical comparison arises from the existing literature examining the 1914 crisis, the aggregate effects of the liquidity provision mechanisms in New York City, and the challenging circumstances facing the financial system in 1914. The existing literature studies the successful alleviation of the financial distress and emphasizes the provision of emergency currency in 1914 as the key liquidity mechanism that prevented anything like the Panics of 1907, 1893, or 1873 from arising.⁵ Friedman and Schwartz (1963: 196) highlight how emergency currency enabled the US financial market to stabilize after the declarations of war in Europe. Silber (2007a) suggests that emergency currency produced an outcome – the increase in the money supply by seven percent – that clearing house loan certificates were unable to generate on their own. The decline in the money supply observed in previous national banking era panics indicates that the issuance of clearing house loan certificates failed to reverse the forces of contraction endemic to financial panic.

Clearing house loan certificates were loans issued by the New York Clearing House to member bank borrowers upon approval by the Clearing House Loan Committee. The Committee's decision to lend (or not) hinged on their assessment of the value of posted collateral. The certificates traded at par at the New York Clearing House, paid 6 percent interest to the holder, and were effectively guaranteed by the entire membership of the clearing house. Clearing house loan certificates substituted for specie and legal tender claims that were exchanged at the New York Clearing House to settle transaction balances between clearing house members. Members of the clearing house were obliged to accept them, and non-acceptance was

⁵ Wicker (2005:47) suggests that if a crisis issue of emergency currency occurred prior to the adoption of the Federal Reserve System, the question of panic prevention would have been addressed and perhaps a central bank would not have been established in the United States.

grounds for expulsion from the clearing house association. Functionally, clearing house loan certificates freed up cash and other forms of lawful money to be paid out to depositors and corresponding banks without forcing the liquidation of bank assets or collapsing the size of balance sheets. One can think of them as allowing a mutually-enforced forbearance on final payments at the New York Clearing House.

While the private clearing house system was largely the inspiration for Aldrich-Vreeland emergency currency, the crisis of 1914 presented a challenge for the untested public liquidity provision. At the beginning of World War I, United States Treasury Secretary William McAdoo, in concert with the leaders of the New York Stock Exchange, took dramatic action to close down the New York Stock Exchange to halt a substantial outflow of capital from the United States and prevent the financial repercussions of such a drain (Silber 2007a). The closure hindered the attempts of European investors to liquidate their investments and ship gold from the United States to Europe. The action also constrained the effective exchange of transactional liquidity in domestic U.S. financial markets, much of which represented rearrangements of short-term credit collateralized by stock and bond assets primarily among New York City banks and trusts.

McAdoo apparently recognized that the closure of the stock market placed significant constraints on domestic financial markets, and took action to ensure that adequate mechanisms were in place for national banks to tap emergency currency to manage unanticipated liquidity demands from customers.⁶ In the legislation of the Aldrich-Vreeland Act of 1908, policymakers addressed what contemporary economic professionals recognized as an “inelastic” base money supply. The United States’ monetary system lacked an effective way to adjust the supply of

⁶ McAdoo encouraged Congress to amend the Aldrich-Vreeland Act to ensure that emergency currency issue would be accessible to a wider scope of banking institutions (Silber 2007a:71). Silber highlights that without the amendment many national banks, especially the large, New York City national banks, would not have qualified for emergency currency. It is notable that Laughlin (1908) raised awareness of such shortcomings in the original act.

high-powered money quickly, which was a major obstacle to adequate crisis prevention. The act provided for the creation of emergency currency – national bank notes backed by collateral other than United States Bonds⁷ – as an interim solution while policymakers discussed and researched a structure for what was perceived as a more durable solution. They ultimately concluded that a distinct, nation-wide reserve association would overcome the lacunae of the existing crisis prevention mechanisms and the Federal Reserve System, a public entity, was the ultimate product of their travails.

Upon the discretion of the Secretary of Treasury, the Aldrich-Vreeland Act could be invoked allowing banks to post collateral other than US bonds at their local National Currency Association in exchange for national bank notes indistinguishable from regular national bank notes.⁸ Even though the organizational structure intentionally resembled the clearing house system, there were several key distinctions regarding circulation permissions and membership requirements. Emergency currency could be paid out as cash to depositors while clearing house loan certificates were only permitted to circulate amongst member banks in New York City.⁹ As for membership, the original legislation of the Aldrich-Vreeland Act stipulated that only national banks could be members of a National Currency Association. An amendment passed at beginning of the 1914 turmoil, however, allowed state banks and trusts the possibility of gaining

⁷ Emergency currency printed by the Bureau of Engraving and Printing were minor reconfigurations of existing national bank note plates. The plates were modified to alter the statement “Secured by US Bonds” on national bank notes to express, “Secured by US Bonds or Other Securities.” The plates also were altered on the back of currency. The altered plates – series 1892 and series 1902 – display both the series date and 1908 on the reverse side of emergency currency to denote that they were in compliance with the Aldrich-Vreeland Act (Annual Report of the Secretary of the Treasury on the State of Finances 1908:36). See Figure 1 for a comparison of national bank note series.

⁸ National banks could also apply for emergency currency by posting collateral at the Treasury rather than a National Currency Association. The 1914 Annual Report of the Comptroller of the Currency (Volume 1: 59) reports that less than \$1 million (\$910, 500) or about 0. 25 percent of the total \$374,680,715 issued as of October 31, 1914 in the entire United States was obtained in this manner. All national banks in New York City obtained emergency currency through the New York National Currency Association.

⁹ Andrew (1908) illustrates that temporary liquidity provisions referred to as clearing house loan certificates were circulated to the non-bank public by interior banks in 1893 and 1907.

access to emergency currency provided that they agreed to join the Federal Reserve System.¹⁰ State banks and trusts for the most part declined membership, preventing them from directly borrowing emergency currency throughout the duration of the crisis.

State banks and trust companies that were members of the New York Clearing House still had the opportunity to borrow clearing house loan certificates, which made them the next best option for temporary liquidity expansion. We point out that some national banks also borrowed clearing house loan certificates in addition to emergency currency which leads us to hypothesize that emergency currency and clearing house loan certificates were not simply substitutes.¹¹

Timberlake (1984) and Gorton (1985) analyze the role of clearing house loan certificates as palliative mechanisms employed during panics of the National Banking Era prior to 1914, but Silber (2007a) and Wicker (2005) view clearing house loan certificates as a relic in 1914. In these latter descriptions of the 1914 episode, there is no indication that clearing house loan certificates play an important role in the solution to the crisis. In contrast, Noyes (1916) provides an account by a contemporary observer in which clearing house loan certificates are relevant for the solution, even though he makes clear the primary role of Aldrich-Vreeland emergency currency. Although emergency currency was an enhancement of clearing house loan certificates, it still had its deficiencies, namely that it could not be counted as reserves at national banks and was not accepted by the New York Clearing House as final payment.¹² Newspaper accounts (*New York Tribune*, August 4, 1914: page 4) reported that the New York Clearing House passed a resolution to accept emergency currency in settling balances at the clearing house. However, it is noted the

¹⁰ Congressional Record, 63rd Congress, Session II, Chapter 225, page 683.

¹¹ Table 1 presents a summary of the different characteristics of each form of temporary liquidity and the requirements necessary for a financial institution to borrow each form.

¹² See Laughlin (1908) and Sprague (1909).

following day that the New York Clearing House would still prefer to accept clearing house loan certificates as the substitute medium to settle account balances. “No emergency currency has yet been used in settling balances at the Clearing House. The opinion prevailed yesterday that the banks would prefer to use Clearing House certificates in liquidating their Clearing House obligations and employ the money authorized by the Aldrich-Vreeland act for over-the-counter payments and shipments to the interior,” (*New York Tribune*, August 5, 1914: page 5).

Furthermore, at no point did the New York Clearing House accept national bank notes as final payment media, and emergency currency were essentially national bank notes with weaker collateral standards. In the absence of verifiable and corroborated evidence to the contrary, we believe that emergency currency was not used as final payment at the New York Clearing House.

Further evidence that national banks used clearing house loan certificates and emergency currency for distinct roles can be seen in Figure 2 which details the denominations of national bank circulation (including both national bank notes and emergency currency) and clearing house loan certificates. In the entire country, the denominations of national bank note circulation ranged from \$1 to \$1,000 notes on October 31, 1914 with \$10 as the median denomination. In contrast, the denominations of clearing house loan certificates in New York City from August 3 to November 28, 1914 shows a range of denominations of \$5,000 to \$100,000 with the median denomination at \$20,000.¹³ With evidence indicating that national banks used clearing house loan certificates and emergency currency for distinct roles, our view is that the solution to the crisis in New York City in 1914 hinged on the combined issuance of temporary liquidity instruments. The institutional limitations and differing collateral requirements of Aldrich-Vreeland emergency currency described in Table 1 made the availability of clearing house loan

¹³ We thank George Selgin for the suggestion to investigate the denominations of Aldrich-Vreeland emergency currency and clearing house loan certificates.

certificates crucial in overall credit expansion.

To illustrate the success of the intervention in 1914 in alleviating crisis conditions, Figure 3 displays a comparison of the monthly path of the M2 money supply relative to the level at the onset of the respective 1907 and 1914 crises. Friedman and Schwartz (1963) and Silber (2007a) point out that the money supply increased relative to its initial level in August 1914, whereas there was substantial contraction in 1907 following the financial crisis. Figure 3 illustrates that the money supply increased in 1914, even though there was some relative contraction in November and December of that year.¹⁴ In contrast, the money supply decreased sharply in 1907 and remained below the money supply level in October 1907 for over 9 months.

The relative stability of the money supply in 1914 (Figure 3) reflects the fact that there was no widespread suspension of convertibility of deposits into cash, the bane of the panics of the National Banking Era.¹⁵ In those situations, depositors (both individual and correspondent banking depositors) would drain cash from banks, and thus the banking system, to ensure access to their funds. The cash withdrawal would then lead to an overall contraction of deposits and a shortage of cash within the banking system.

Figure 4 illustrates the lack of cash hoarding by interior banks in 1914.¹⁶ These series represent the net flows between interior banks and New York City banks at the end of each week.¹⁷ In 1914, there are only two weeks where there are net outflows from New York City

¹⁴ Clearing house loan certificates in New York City were entirely cancelled (or equivalently repaid) by November 29, 1914 which may have contributed to this contraction.

¹⁵ See James, McAndrew, and Weiman (2013) for analysis of the costs of suspension of convertibility.

¹⁶ Goodhart (1969) argues that the data for this period are not an accurate characterization of flows from New York City clearing house banks to interior banks. We verified the implications of these series with sources that Goodhart alleges as more accurate. The series display distinctly different levels but maintain the same general contours with the same directionality and relative movements. We use the series for motivation purposes, relying mainly on their movements. As a result, we retain the graphics.

¹⁷ Because of the rapid growing intermediary system, the measures are scaled by nominal GDP for the given year relative to 1914, which leaves 1914 as 1. As a result, the flow series from 1907 and especially 1893 are increased

institutions to their interior correspondents and those two weeks are at the onset of the panic. Although 1914 has a sharp initial drop, comparable to the decline in the Panic of 1893, it also has a sharp rebound unlike the Panics of 1907 and 1893. In those crises, cash flowed out of New York City banks to the interior for extended periods when cash hoarding and suspensions of payments caused serious disruptions in payments. In contrast, in 1914 there was no dramatic disruption of financial intermediation despite the war in Europe and the closure of the New York Stock Exchange. We speculate that the provision of Aldrich-Vreeland emergency currency directly to interior banks reduced their cash demands from correspondent banks in New York City and thereby attenuated the dysfunctional flow of cash from New York City banks to interior correspondents typical during crises.

By borrowing temporary liquidity, financial intermediaries prevented an undesirable contraction on the asset side of their balance sheet thereby preventing both a suspension of payments and cash hoarding, two malignant characteristics of the Panics of 1893 and 1907. Figure 5 displays the time series data for currency held by the public from 1907 to 1916. The grey shading indicates the Panic of 1907 as well as the crisis of 1914; both periods indicate a sharp upward movement in currency held by the public relative to the non-crisis periods. In 1907, the sharp increase in currency held by the public was satisfied by a reduction of cash holdings at banks. It is associated with both a net contraction in deposits at banks and the reduction in the money supply displayed in Figure 3. In contrast, the increase in currency held by the public in 1914 was effectively satisfied by the \$385.6 million issue of Aldrich-Vreeland emergency currency. Figure 6 further emphasizes the differences in deposits in 1914 and 1907. In 1914, deposits did not contract while they plummeted in 1907 by nearly 5 percent during the

and hover at quantities comparable to 1914. We interpret the adjusted series that result as flows between New York City and the rest of the United States comparable across decades.

panic.

In the following discussion of the empirical results, we investigate whether the institutions that borrowed these liquidity measures display demand deposit changes different from institutions that did not borrow. We also investigate the changes in net deposits of banks that borrowed only clearing house loan certificates, only Aldrich-Vreeland emergency currency, or both forms of liquidity provision.

III Data

We employ data measures from the Annual Report of the Comptroller of the Currency for 1915 that lists aggregate data on clearing house loan certificate issues and Aldrich-Vreeland emergency currency for the entire United States as well as for specific National Currency Associations, like New York City. Table 2 lists the total amount of Aldrich-Vreeland emergency currency issued in the entire United States as approximately \$385.6 million, and the total amount of those issues to New York City comprised about 37 percent of the total issue. The total amount of clearing house loan certificates issued in the United States during 1914 was \$211.8 million, of which nearly 60 percent were issued in New York City. Clearly, the proportion of clearing house loan certificates issued in New York City relative to the total issued was higher than the relative proportion of emergency currency issued in New York City relative to the total.

In New York City alone, total borrowing of loan instruments during the crisis period amounted to \$269,670,960; emergency currency issues totaled \$144,975,960 and clearing house loan certificates \$124,695,000. The aggregate measures from the Annual Report do not precisely match our data, which is assembled from the daily borrowings by individual institutions recorded in the minutes of the New York City National Currency Association and the minutes of the Clearing House Loan Committee of the New York Clearing House Association.

Compiling an aggregate amount outstanding from our data sample, we find a total of \$140,934,800 for emergency currency and of \$118,180,000 for clearing house loan certificates.¹⁸ National banks were responsible for 82 percent of all temporary liquidity borrowing in the greater New York City area taking out the entire \$140,934,800 of emergency currency and 60 percent of clearing house loan certificates totaling \$71,130,000. Trust companies borrowed \$34,500,000 in clearing house loan certificates representing 13 percent of the total borrowing and slightly less than 30 percent of clearing house loan certificates. State banks borrowed \$12,550,000 in clearing house loan certificates, which is only 5 percent of the total borrowing and about 10 percent of clearing house loan certificates. We note that clearing house loan certificates comprised 46 percent of all borrowing in New York City. Substantial borrowing of clearing house loan certificates among all financial intermediaries indicates a revealed preference for them as a liquidity provision mechanism in New York City.¹⁹

The sum of legal tender and specie – the components of high powered money held by national banks in New York City – hovered at \$276.35 million according to the call report data for September 12, 1914.²⁰ The total of emergency currency issues taken out by national banks in New York City in 1914 represented an increase in their currency and reserve holdings of over 50 percent in the form of “near” cash provisions. Including clearing house loan certificates and looking at financial institutions in New York City more broadly, these liquidity provisions were

¹⁸ In the 1914 *Annual Report of the Treasury of the State of the Finances*, the estimate of emergency currency issues in New York City is \$141,228,000 which is much closer to our total. This leads us to believe that there were some revisions made to the total estimated for the 1915 *Annual Report of the Comptroller of the Currency*.

¹⁹ New York City borrowed 55 percent of all clearing house loan certificates in the country indicating that the borrowing patterns of New York banks were different from the rest of the country. We attribute this to the distinct money center role New York banks played as key correspondent links for interior banks during the national banking era and the close ties between these banks and the call loan money market at the New York Stock Exchange.

²⁰ Looking at a fuller sample that includes some state banks and trust companies, we observe that the weekly money holdings (specie plus other money) for New York Clearing House banks were approximately \$500 million on August 1, 1914 and totaled just over \$450 million on September 12, 1914.

able increase what can be considered a broad concept of their base money supply by over 50 percent (\$259 million increase over a base of \$450 million as mentioned in footnote 20). This proportional increase far exceeds the proportional increase in a comparable broad measure of base money supply represented by the issuance of clearing house loan certificates in New York City during any previous National Banking Era crisis.²¹

Our sample consists of 111 banks representing the greater New York City area.²² Of this sample, 38 are national banks that make up 34 percent of our sample observations and represent roughly 50 percent of the total assets of our sample. There are 42 state bank observations, which represent only about 12 percent of the total banking assets of the sample and are 38 percent of our sample observations. Finally, there are 31 trust companies that represent 28 percent of the number of institutions in the sample and account for 38 percent of total assets. Measuring the average size of the institutions in terms of total assets, national banks average \$50,413,430, trusts companies average a comparable \$48,000,620, and state banks are smaller averaging \$11,462,010. The data on balance sheets were those reported at the call date of September 12, 1914 for national banks as well as for state banks and trust companies. Balance sheet data for 1915 were those reported on September 2, 1915 for national banks. Balance sheet data for national banks come from the *Report of the Comptroller of the Currency*. The call report data for state banks and trust companies come from *Reports of the New York Superintendent of Banks*.

²¹ We adjust the total clearing house loan certificate issues in New York City for differences in the level in nominal GDP to make totals across the panics comparable relative to the volume of economic activity. We use nominal GDP in 1914 as the basis so the value of clearing house loan certificates issued in 1914 is \$118 million. Among the pre-crisis periods, the adjusted totals for New York City are (in millions) \$99.8 (1873), \$68.9 (1884), \$35.9 (1890), \$107 (1893), and \$102.7 (1907). Even with the adjustment, the totals for clearing house loan certificates for 1873, 1893, and 1907 are between 10 to 20 percent smaller than in 1914. Including emergency, temporary liquidity mechanisms total roughly \$259 million in 1914 which is about 60 percent larger than the issues in any previous panic. Hence, we suggest that the total volume of temporary liquidity issues during prior National Banking Era panics was too small to offset the contractionary effects of financial panic.

²² This geographical sample includes Manhattan and Brooklyn.

Additionally, we use data from the *Commercial and Financial Chronicle*, which publishes select balance sheet items for 74 of the 111 financial institutions in our sample. From August 1, 1914 till December 5, 1914 – our assessment of the duration of the financial distress – the *Commercial and Financial Chronicle* did not publish data on individual financial intermediaries but still provided aggregates for certain series.²³

IV Empirical Methods and Results

The empirical investigation centers on the idea that New York City financial institutions that borrowed either form of temporary liquidity were better able to continue their intermediation operations as a result. The temporary liquidity expansion enabled those banks to return cash to depositors and maintain clearing balances at the New York Clearing House to a greater extent than otherwise. If institutions that borrowed liquidity were better able to continue financial intermediation as a result of their borrowing, we expect that institutions that borrowed either clearing house loan certificates or Aldrich-Vreeland emergency currency should maintain their deposit levels despite the onset of the financial crisis.

We pose a simple argument in support of this hypothesis: national banks borrowed Aldrich-Vreeland emergency currency to satisfy cash withdrawal demands of individual banks and depositors to avoid reducing their legal cash reserves. Similarly, state banks, trust companies, and national banks that borrowed clearing house loan certificates to offset adverse debit balances at the New York Clearing House could satisfy payment demands with what was effectively a temporary IOU so that legal tender balances would be unaltered by these

²³ The Appendix Table lists the banks in New York City that comprise the sample. In the first column, we list the name of the bank and indicate in the subsequent columns whether the institution is a member of the New York Clearing House (a necessary condition for borrowing clearing house loan certificates), whether or not data was published in the *Commercial and Financial Chronicle*, whether the institution borrowed clearing house loan certificates, and whether it borrowed emergency currency.

transactions. In both cases, the preservation of legal tender balances (reserves) would put these institutions in a better position to maintain loans and deposit balances throughout the period of financial distress.

Although clearing house loan certificates were unable to increase the legal tender of a given bank, they had an indirect benefit to depositors by allowing banks to settle balances with other clearing members. This action then freed up legal tender from settlement balances at the New York Clearing House to be allocated for other uses such as paying out cash to depositors and at the same time maintaining or even increasing loan balances.

Figure 7 illustrates the evolution of the net deposits series²⁴ for the national banks in our sample. Data points marked with a circle indicate yearly data from the Comptroller of the Currency while data points marked with a square indicate weekly series from the *Commercial and Financial Chronicle*. Net deposits fall from the beginning of July to the closure of the New York Stock Exchange on July 31, 1914. From August 1, 1914 to the September 12, 1914 call date, aggregate net deposits increased making the August 1, 1914 data point a local trough in the net deposit data. Since bills of other national banks and various other balance sheet columns are counted in the net deposits series, our initial investigation suggests that the increase in net deposits from the start of the panic to the September 12, 1914 call date arises from the accumulation of emergency currency. In the same way Figure 4 indicated the absence of a persistent currency drain to the interior, Figure 7 highlights the absence of a large contraction in deposits. Furthermore, Figure 7 uncovers a relationship between temporary liquidity borrowing and deposit changes that supports our main argument.

²⁴ Net deposits are defined in the *Commercial and Financial Chronicle* as: gross deposits + unpaid dividends – (exchanges for the clearing house+ amounts due from all other banks + notes of other banks and checks on non-clearing institutions). We compile a similar series from the Comptroller of the Currency data.

The co-movement between the net deposits series and the emergency currency and total borrowing series²⁵ further supports our inference with respect to the relationship between the two balance sheet measures; as total borrowing increases, net deposits increase as well. Likewise, when total borrowing decreases, net deposits also decline. Figure 8 shows that loans generally maintain levels similar to those of deposits after the closure of the stock exchange except for the September 12, 1914 call date.²⁶ Loans, as measured narrowly as loans, discounts, and overdrafts, decline from August 1, 1914 to September 12, 1914 and then then increase from a local trough to surpass their August 1, 1914 level by December 5, 1914. The broader measure of loans which includes other bonds, investments, and real estate in addition to the narrow measure, shows a local peak at the September 12, 1914 call date, indicating that the other bonds, investments, and real estate series increased from August 1, 1914 to September 12, 1914. Looking at both the narrow and broad series, the level increase after the crisis indicates that banking business was otherwise able to maintain activity despite the crisis.

The observations in Figures 7 and 8 contrast sharply with the data for the National Banking Era financial crises (1873, 1884, 1890, 1893, and 1907) listed in Table 3. The summary of facts in Table 3 indicate that measures of banking activity – both intermediation services (loans and deposits) as well as liquidity storage (specie and legal tenders) – contracted during most of the panics, especially those considered the most severe – 1873, 1893, and 1907. The

²⁵ Total borrowing is the accumulated daily requests of clearing house loan certificates and Aldrich-Vreeland emergency currency. For the emergency currency, we were unable to find record of cancellations except for aggregates at various intervals. We linearly interpolated the cancellation of emergency currency based on these select dates.

²⁶ Like the net deposit series, the loans series is an attempt to reconcile *Commercial and Financial Chronicle* data and Comptroller of the Currency data. Some discrepancies in categories may still exist. In the *Commercial and Financial Chronicle*, the loan series consists of loans + discounts + stocks and bonds + mortgages. In the Comptroller of the Currency Data, the loans series is loans + discounts + overdrafts. We plot this series along with a broader measure of loans from the Comptroller of the Currency data which consists of loans + discounts + overdrafts + other bonds + investments + real estate.

most notable contrast between Figures 7 and 8 and the observations in Table 3 is that the aggregate level of net deposits in New York City in 1914 remains close to the August 1 level, whereas the net deposits aggregate for New York City national banks falls below the pre-panic level at some point in all the previous National Banking Era panics, and in some cases, the contraction is substantial.²⁷

The New York Clearing House halted publication of individual bank balance sheet data at the onset of market distress. As a result, we lack data on individual banks from August 1, 1914 to December 5, 1914. Instead, we track the aggregate evolution of net deposits and loans in Figure 9, which plots net deposits and loans and investments for national banks, state banks, and trusts that were members of the clearing house. Figures 7, 8, and 9 show similar evolutions of the net deposits series, the broad loans, narrow loans, and the loans and investments series throughout the crisis thus allowing us to use our sample data despite missing data on individual banks for a large portion of our sample.²⁸

Table 4 displays the sum of deposits on August 1, 1914 – the start of the crisis – and on December 5, 1914 – the end of the crisis – grouped by borrowing status. Recall that clearing house loan certificates were entirely cancelled by the end of November 1914 so the measure of net deposits would not reflect temporary liquidity borrowing in that form. The net deposit data from the *Commercial and Financial Chronicle* offers us more timely observations but also limits

²⁷ The data in Figure 7 are for 32 of the 38 national banks in New York City that are listed in the *Commercial and Financial Chronicle* weekly balance sheets. These national banks comprise 98.5 percent of national banking assets in New York City. There is some contraction in net deposits displayed in Figure 8 which includes all clearing house banks – member trusts and state banks as well.

²⁸ The lack of data for individual financial institutions over this interval prevents us from using time series or panel data analysis with the weekly data. In further work, we hope to exploit our data series more completely. For individual financial institutions, we have daily observations of emergency currency and clearing house loan certificate issues outstanding although we have no complementary balance sheet data.

us to data for 74 of the 111 total financial intermediaries.²⁹ Borrowers of only emergency currency, representing nearly 20 percent of aggregate net deposits in New York City, experienced an increase of \$34.7 million in deposits, which is a 9.29 percent gain from the start to end of the crisis. Borrowers of only clearing house loan certificates, which represented over 30 percent of aggregate New York City net deposits, saw an increase of over \$98 million, reflecting a 15.3 percent increase in their net deposits. The non-borrowing banks represented less than 10 percent of aggregate New York City net deposit, and experienced an increase in net deposits by \$8.7 million from August to December 1914, which represented a 5 percent gain.

Banks that borrowed both emergency currency and clearing house loan certificates – a subset of national banks that comprise more than 40 percent of net deposits – display a contraction in deposits of \$-24.78 million, or -3.06 percent in their net deposits. Financial intermediaries that borrowed only clearing house loan certificates or only emergency currency experienced deposit growth that distinguishes them from the group that borrowed both forms of liquidity provision.

Table 4 elucidates several inferences on the outcome of deposit levels before and after the crisis. To begin, Table 4 shows that the issue of clearing house loan certificates during 1914 was an important and effective method of introducing temporary liquidity to non-national banks in New York City. The total increase in the aggregate New York City net deposits for the 74 institutions in this sample was \$117 million or 5.9 percent; the increase in net deposits among borrowers of only clearing house loan certificates (state bank and trust company members of the New York Clearing House) represents a 4.9 percent increase in that total or 84 percent of the increase in aggregate New York City net deposits. Although our results are composed only of

²⁹ The limitation is more restrictive for the state banks and trusts than for national banks, in which the restricted sample contains 98.5 percent of New York City national bank assets.

balance sheet items and temporary borrowing in New York City, we can also make the general inference from Table 4 that borrowing \$260 million in temporary liquidity is associated with an aggregate increase in deposits of \$117 million.

Since national banks that borrowed only emergency currency are associated with an increase in net deposits, the contrasting result for banks that borrowed both emergency currency and clearing house loan certificates suggests a negative effect for clearing house loan certificates. Table 4, however, shows that clearing house loan certificates are associated with deposit growth for non-national banks. The contrasting result among the different borrowing groups implies that different types of financial intermediaries borrowed clearing house loan certificates for different reasons. We suggest that borrowing clearing house loan certificates when emergency currency was available may have been interpreted as a signal of financial distress. Furthermore, the observed contraction in net deposits of national banks that borrowed both emergency currency and clearing house loan certificates may have indicated the severity of the liquidity needs of a substantial subset of these national banks.³⁰ Stricter collateral requirements on emergency currency may have made clearing house loan certificates the best available option for certain national banks, especially those with weaker balance sheets.

V Discussion

During the panics of the National Banking Era, clearing house loan certificate issues were unable to produce an effective increase in the money supply and failed to prevent the suspension of convertibility in the most severe panics. In 1914, we suggest that national banks used clearing

³⁰ The New York City national banks held the majority of correspondent banker balances, which were typically the source of the funds that were lent in the call loan market. Some of these large, correspondent banks would have likely experienced the most severe disruption of their banking operations as a result of the closure of the stock exchange and the initial withdrawals of deposits by their correspondent banks in the interior of the country.

house loan certificates to perform their core mission – to alleviate unfavorable (debit) balances at the New York Clearing House – and national banks used emergency currency to satisfy cash demands. Trust companies and state banks, unable to borrow emergency currency directly, likely experienced indirect benefits from the existence of emergency currency as it contributed to the availability of cash. Likewise, trust companies and state banks also used clearing house loan certificates as the next best option for directly obtaining additional liquidity. If temporary liquidity was only available as emergency currency, then state banks and trusts would have been dependent upon national banks for additional liquidity. Furthermore, those national banks that borrowed clearing house loan certificates in addition to emergency currency would have faced more severe liquidity constraints without the availability of clearing house loan certificates. Hence, we suggest that either form of temporary liquidity issued in isolation would not have been as effective as the increase resulting from the combined issuance.

Figure 10 displays a schematic chart that illustrates how emergency currency and clearing house loan certificates were individually imperfect substitutes for legal tender. The combination of clearing house loan certificates and emergency currency formed a composite good that was a more complete substitute for legal tender money, which was thus able to generate a temporary increase in a loose definition of a monetary base. From this perspective, emergency currency and clearing house loan certificates combined to perform the distinct roles of legal tender. We consider two additional elements illustrated in Table 1 that may influence the relative demands for emergency currency and clearing house loan certificate borrowing by national banks –1) the collateral requirements for the respective temporary liquidity instruments and 2) the relative cost of clearing house loan certificates to emergency currency.³¹

³¹ With a 3 percent charge imposed on emergency currency issues for the first three months (with an increasing rate of 50 basis points per month thereafter) and a 6 percent rate on clearing house loan certificates, one could imagine a

For national banks, emergency currency had more stringent collateral requirements than clearing house loan certificates. Emergency currency allowed state and municipal bonds as forms of collateral (valued at 90 percent of market value) and commercial paper and other securities at a larger discount. The securities or bills receivable that were not acceptable as emergency currency collateral may have qualified as collateral for clearing house loan certificates.

Emergency currency borrowing was limited to 125 percent of surplus and capital, potentially limiting the supply of this form of liquidity to specific borrowers.³² We do not observe requests for emergency currency and clearing house loan certificates as taking place sequentially (e.g., first emergency currency, then clearing house loan certificates). Instead, we suspect that a national bank could allocate its available collateral early in the crisis and take out liquidity in amounts that were tentatively and potentially sufficient for the duration of the financial distress.

Table 1 indicates that the interest cost of emergency currency was 3 percent whereas the interest cost of clearing house loan certificates was 6 percent. Wicker (2005) argues that the interest cost alone should have removed any desire to take out clearing house loan certificates. New York City national banks, however, took out a substantial quantity of clearing house loan certificates despite the obvious price advantage of borrowing emergency currency. Table 2 suggests that about 88 percent of clearing house loan certificates issued were eventually circulated, but the duration of the circulation is not available information. Despite the higher interest rates, the amount of clearing house loan certificates issued and circulated between members of the New York Clearing House suggest that they were a valuable source of liquidity.

strategy to borrow emergency currency up to some threshold and then borrow clearing house loan certificates at the higher cost. We, however, did not see any evidence of this behavior when examining the daily borrowings data and it may not be an accurate reflection of how banks behaved in this crisis.

³² As measured on the September 12, 1914 call date, only five banks have a ratio of circulating national bank notes to capital and surplus over 90 percent.

In summary, Table 4 suggests that emergency had a substantive role in liquidity creation that alleviated crisis conditions in the New York City financial market. In addition, Table 4 offers evidence that clearing house loan certificates supported subsequent net deposit increases among non-national banks; borrowers of only clearing house loan certificates contributed \$98 million of the \$117 million increase in net deposits by December 5, 1914.

VI Conclusions

This paper emphasizes that the borrowing of clearing house loan certificates by New York City financial institutions of all types in 1914 was substantial and important for the continuation of financial intermediation especially throughout the closure of the New York Stock Exchange. Overall, emergency currency, combined with clearing house loan certificates, provided temporary liquidity to a wide range of financial institutions in New York City and thereby ensured that large financial institutions had access to some form of direct provision. We find that financial intermediaries borrowing emergency currency issues and clearing house loan certificates maintained and increased deposit levels relative to those banks that did not borrow. National banks that borrowed both clearing house loan certificates and emergency currency experienced a contraction in net deposits, but the contraction is more than offset by net deposit increases among other banks. Further work will expand from New York City to the entire United States characterizing the relationship between aggregate net deposits and relevant aggregates of temporary liquidity mechanisms.

Appendix 1: Data Sources

1. National Bank Balance Sheet Data

Source: *Annual Report of the Comptroller of the Currency* 1914, Vol. II and 1915, Vol. II

Description: Resources and liabilities of national banks.

Call dates: September 12, 1914 and September 2, 1915

2. State Bank Balance Sheet Data

Source: *Annual Report of the Superintendent of Banks of the State of New York* for 1914 and 1915

Description: Resources and liabilities of state banks.

Call dates: September 12, 1914 and September 25, 1915

3. Trust Company Balance Sheet Data

Source: *Annual Report of the Superintendent of Banks Relative to Savings Banks, Trust Companies, Safe Deposit Companies, Personal Loan Companies, and Personal Loan Brokers* for the years 1914 and 1915

Description: Resources and liabilities of trust companies.

Call dates: September 12, 1914 and September 25, 1915

4. Weekly Balance Sheet Items

Source: *Commercial and Financial Chronicle* 1914-1915, Vol. 99 and Vol. 100

Weekly averages of daily balance sheet items of select banks in the greater New York City area.

5. Clearing House Loan Certificate Data

Source: *Annual Report of the Comptroller of the Currency* 1915, Vol. I

Description: Clearing house loan certificates issued during the crisis of 1914. Outlined aggregate borrowing and maximum outstanding for each Clearing House Association

Source: "Minutes of Clearing House Loan Committee of the New York Clearing House"

Description: Lists the name of institutions who borrowed or cancelled clearing house loan certificates and the quantity borrowed at daily intervals.

6. Aldrich-Vreeland Emergency Currency Data

Source: *Annual Report of the Comptroller of the Currency* 1915, Vol. I

Description: Summary of final reports of the National Currency Associations. Outlined aggregate borrowing, maximum outstanding, and securities pledged for each National Currency Association

Source: "Minutes of the New York National Currency Association"

Description: Lists the name of institutions who borrowed emergency currency and the quantity borrowed for each meeting of the New York National Currency Association.

Appendix Table: National Banks, State Banks, and Trust Companies in New York City

	Bank name	NYCH	C&F	AVEC	CHLC	Assets
1	Brooklyn, First	0	1	1	0	5.68
2	Brooklyn, Greenpoint	0	0	0	0	1.5
3	Brooklyn, Nassau	1	1	0	0	10.59
4	Brooklyn, National City	0	1	0	0	6.75
5	Brooklyn, Peoples	1	0	0	0	1.99
6	New York, First	1	1	1	1	157.33
7	New York, Second	1	1	1	1	21.16
8	New York, Fifth	1	1	1	1	6.02
9	New York, American Exchange	1	1	1	1	81.11
10	New York, Bank of New York	1	1	1	0	40.98
11	New York, Battery	0	1	1	0	2.88
12	New York, Bronx	0	0	0	0	1.73
13	New York, Chase	1	1	1	1	168.67
14	New York, Chatham and Phenix	1	1	1	1	30.63
15	New York, Chemical	1	1	1	1	52.32
16	New York, Citizens Central	1	1	1	1	34.51
17	New York, Coal and Iron	1	1	1	0	10.27
18	New York, East River	1	1	1	0	2.79
19	New York, Garfield	1	1	1	1	13.88
20	New York, Gotham	0	0	1	0	3.52
21	New York, Hanover	1	1	1	1	121.56
22	New York, Harriman	0	0	1	0	16.16
23	New York, Importers and Traders	1	1	1	1	39.58
24	New York, Irving	1	1	1	1	70.37
25	New York, Liberty	1	1	1	1	35.69
26	New York, Lincoln	1	1	1	0	21.97
27	New York, Market and Fulton	1	1	1	1	15.1
28	New York, Mechanics and Metals	1	1	1	1	132.46
29	New York, Merchants	1	1	1	1	33.36
30	New York, Merchants Exchange	1	1	1	1	13.24
31	New York, National Bank of Commerce	1	1	1	0	208.22
32	New York, National Butchers and Drovers	1	1	1	1	3.21
33	New York, National City	1	1	1	0	338.7
34	New York, National Park	1	1	1	1	143.81
35	New York, New York County	1	1	1	0	12.8
36	New York, Seaboard	1	0	1	1	37.76
37	New York, Sherman	0	1	0	0	2.86
38	New York, Union Exchange	1	1	1	1	14.55
39	Astor Trust Company, NYC	1	1	0	1	25.2
40	Bankers' Trust, NYC	1	1	0	1	166.2
41	Broadway Trust, NYC	1	1	0	1	19.41
42	Central Trust, NYC	0	0	0	0	116.5
43	Columbia Trust, NYC	1	1	0	1	67.62
44	Commercial Trust, NYC	0	0	0	0	4.27

45	Empire Trust, NYC	0	0	0	0	24.49
46	Equitable Trust, NYC	0	0	0	0	86.16
47	Farmers' Loan and Trust, NYC	0	0	0	0	129.43
48	Fidelity Trust, NYC	1	1	0	0	10.52
49	Fulton Trust, NYC	0	0	0	0	9.81
50	Guaranty Trust, NYC	1	1	0	1	262.48
51	Hudson Trust, NYC	0	0	0	0	4.77
52	Lawyers' Title and Trust, NYC	1	1	0	1	24.01
53	Lincoln Trust, NYC	1	1	0	1	13.21
54	Metropolitan Trust, NYC	1	1	0	1	33.02
55	Mutual Alliance Trust, NYC	0	0	0	0	10.92
56	New York Life Insurance and Trust, NYC	0	0	0	0	43.46
57	New York Trust, NYC	1	1	0	1	56.52
58	Title Guarantee and Trust, NYC	1	1	0	0	44.29
59	Transatlantic Trust, NYC	0	0	0	0	3.99
60	Union Trust, NYC	0	0	0	0	69.53
61	United States Mortgage and Trust, NYC	1	1	0	1	60.22
62	United States Trust, NYC	0	0	0	0	83.97
63	BROOKLYN TRUST, Brooklyn	1	1	0	0	32.85
64	Franklin Trust, Brooklyn	1	1	0	0	14.32
65	Hamilton Trust, Brooklyn	0	0	0	0	8.63
66	Home Trust, Brooklyn	0	0	0	0	4.36
67	Kings County Trust, Brooklyn	0	0	0	0	21.88
68	Manufacturers Citizens Trust, Brooklyn	0	0	0	0	14.02
69	Peoples Trust, Brooklyn	1	1	0	1	21.95
70	23rd Ward Bank	0	1	0	0	2.77
71	Bank of America	1	1	0	0	38.8
72	Bank of Europe	0	0	0	0	2.29
73	Bank of Flatbush	0	0	0	0	1.13
74	Bank of the Metropolis	1	0	0	1	18.47
75	Bank of United States	0	0	0	0	3.25
76	Bank of Wash Height	0	1	0	0	2.11
77	Bowery Bank	1	1	0	0	5.11
78	Century bank	0	1	0	0	8.56
79	Chelsea Bank	0	0	0	0	3.25
80	Clinton Bank	0	0	0	0	0.32
81	Colonial Bank	0	1	0	0	9.54
82	Columbia Bank	0	1	0	0	8.44
83	Corn Exchange Bank	1	1	0	1	97.14
84	Cosmopolitan Bank	0	0	0	0	0.63
85	Fidelity Bank	0	1	0	0	1.53
86	Fifth Avenue Bank	1	1	0	0	18.72
87	German American Bank	1	1	0	1	6.33
88	Germania Bank	1	1	0	0	8.57
89	German Exchange Bank	1	1	0	0	5.57

90	Greenwich Bank	1	1	0	1	13.84
91	Homestead Brooklyn Bank	0	0	0	0	0.86
92	International Bank	0	0	0	0	3.02
93	Manhattan Company	1	1	0	1	56.81
94	Metropolitan Bank	1	1	0	0	22.33
95	Montauk Bank Brooklyn	0	0	0	0	0.77
96	Mutual Bank Brooklyn	0	1	0	0	7.73
97	New Netherland Bank	0	1	0	0	4.72
98	Northside Bank of Brooklyn	0	1	0	0	3.65
99	NY Produce Exchange Bank	1	1	0	1	14.56
100	Pacific Bank	1	1	0	0	8.76
101	Peoples Bank	1	1	0	0	3.73
102	Public Bank	0	0	0	0	12.71
103	Security Bank	1	1	0	1	15.99
104	State Bank	1	1	0	1	27.85
105	Westchester Avenue Bank	0	0	0	0	0.88
106	West Side Bank	1	1	0	1	6.21
107	Yorkville Bank	0	1	0	0	7.19
108	Broadway Central	0	0	0	0	0.71
109	Bronx Borough Bank	0	0	0	0	2.46
110	Bryant Park Bank	0	0	0	0	1.69
111	Mechanics Bank Brooklyn	0	1	0	0	22.41

NOTES:

NYCH is 1 for New York Clearing House member institutions and 0 otherwise.

C&F is 1 for banks with balance sheet items in the *Commercial and Financial Chronicle* and 0 otherwise.

AVEC is 1 for borrowers of Aldrich-Vreeland Emergency Currency and 0 otherwise.

CHLC is 1 for NYCH member borrowers of clearing house loan certificates and 0 otherwise.

Total assets are in millions of 1914 US dollars.

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Table 1: Characteristics of the Temporary Liquidity Mechanisms

	<i>Aldrich-Vreeland Emergency Currency</i>	<i>Clearing House Loan Certificates – New York Clearing House</i>
Eligibility to borrow	Membership in the National Currency Association *	Membership in the New York Clearing House Association
Interest cost	3 percent for the first three months, and rises by 0.5 percentage points per month until reaching 6 percent	6 percent accrued to the clearing house member bank that held the certificate – NYCH as intermediary.
Collateral	State and municipal bonds, commercial paper, other securities.	Commercial paper, bills receivable, other securities.
Discount on collateral	State and municipals at 90 percent, commercial paper, other securities at 75 percent	The standard discount on all securities was 75 percent. Discounts were smaller on US Treasury, state and municipal securities, but those assets were rarely used in practice.
Transferability	Emergency currency could pass between banks as repayment for deposits, and could be issued to individual depositors. However, it did <u>not</u> serve as final payment at the New York Clearing House.	Clearing house loan certificates could only pass as final payment between NYCH member banks. It was not designed as a substitute form of cash payment in New York City.
Issued by:	National Currency Association supported by United States Treasury	New York Clearing House (effectively, its membership)
Classification as currency	Emergency currency were national bank notes backed by collateral other than U.S. Bonds. Like national bank notes, emergency currency were lawful money but not legal tender and could not be used to settle international transactions.	The New York Clearing House was unequivocal that only national bank notes could be issued as a currency; if clearing house loan certificates circulated outside of clearing house members, the 10 percent tax on state bank notes may have been triggered.

* Membership in the Federal Reserve System or a commitment to join the Federal Reserve System was a necessary condition for membership in a National Currency Association.

Table 2: Emergency Currency and Clearing House Loan Certificates – Aggregates

Aldrich Vreeland Emergency Currency

United States:

Total amount issued:	\$385,553,905.00		
Total amount in circulation:	\$374,029,063.00	as percent of issued:	97

New York City:

Total amount issued:	\$144,925,960.00	as percent of US issue:	37.6
Total amount in circulation:	\$137,012,260.00	as percent of US circulation:	36.6

Clearing House Loan Certificates

United States:

Total amount issued:	\$211,778,000.00		
Total amount in circulation:	\$195,754,000.00	as percent of issued:	92.4

New York Clearing House:

Total amount issued:	\$124,695,000.00	as a percent of US issue:	58.9
Total amount in circulation:	\$109,185,000.00	as percent of US circulation:	55.8

Circulation of Clearing House Loan Certificates relative to Emergency Currency

United States

CHLC / AVEC in circulation:	52.3 percent
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New York City

CHLC / AVEC in circulation:	79.7 percent
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Source: Annual Report of the Comptroller of the Currency, 1915.

Table 3: Banking Aggregates in New York City During the National Banking Era Crises Contractions From Levels Prior to Panic				
	<i>Aggregate measures of New York Clearing House Banks (in millions)</i>			
		Change in level of the respective aggregate measure relative to the level observed prior to the onset of panic		
Dates of Panic	Clearing House loan certificates	Loans	Net deposits	Specie and legal tenders
Defined by the initiation of CHLC, the imposition of suspension of payments, and or the lifting of suspension, the cancellation of CHLC	<i>Maximum issued; value at end of panic</i>	<i>Minimum; value at end of panic</i>	<i>Minimum; value at end of panic</i>	<i>Minimum; value at end of panic</i>
Sep 20-Dec 27, 1873	22.57; 2.83	-36.5; -26.5	-56.5;-12.2	-37.5; 11.0
May 17-Aug 30, 1884	21.89; 5.4	-45.8; -46.5	-49.2; -25.7	-19.3; 20.3
Nov 15, 1890, Jan 10, 1891	15.155; 0	-14.9; -1	-15.5;18.8	-3.7; 31.1
May 27-October 14, 1893	38.28; 0	-24.8; -19.6	-68.3; -5.4	-57.5; 23.0
Oct 19, 1907-Jan 11, 1908	87.87; 68.35	-6.6; 33.7	-2.3; 25.6	-51.8; 1.3
Aug 1-Dec 5, 1914	118.18; 1.53	0.072; 100.14	0.048; 0.006	-102.11; -102.11

Sources: Minutes of the Clearing House Loan Committee, New York Clearing House, various dates. *Commercial and Financial Chronicle*, various issues. Andrew, A. Piatt. Statistics of the United States, 1867-1910, Table 28, pages 75-118.

Table 4: Total Deposits by Borrowing Status
Millions of dollars

	<i>Borrowing Status</i>				Totals
	<i>AVEC only</i>	<i>CHLC only</i>	<i>Both AVEC and CHLC</i>	<i>No Borrowing</i>	
August 1, 1914 total deposits	373.442	643.685	809.443	174.075	2000.645
____ as a percent of aggregate total	18.67%	32.17%	40.46%	8.70%	
December 5, 1914 total deposits	408.143	742.026	784.695	182.777	2117.641
____ as percent of aggregate total	19.27%	35.04%	37.06%	8.63%	
December August difference	34.701	98.341	-24.748	8.702	116.996
Percent change December-August per grouping	9.29%	15.28%	-3.06%	5.00%	
Change as percent of aggregate total August 1, 1914	1.73%	4.92%	-1.24%	0.43%	5.85%
Change in deposits as a percent of the total change	29.66%	84.06%	-21.15%	7.44%	100.00%
Total borrowing	54.533	47.551	157.6205	-	259.7045
Number of banks	9	21	21	23	74
Average bank net deposits (August 1914 levels)	41.49355	30.651667	38.5449048	7.568478	27.03574
Aggregate deposit change / total borrowing					0.450496

Sources: *Commercial and Financial Chronicle*, various issues.

Notes: Data does not include full sample of all 111 financial institutions. The institutions included in the sample break down as follows: 32 national banks amounting to 98.5 percent of total national banks assets, 15 trust companies representing 47.5 percent of total trust company assets, and 27 state banks amounting to 90 percent of state bank asset

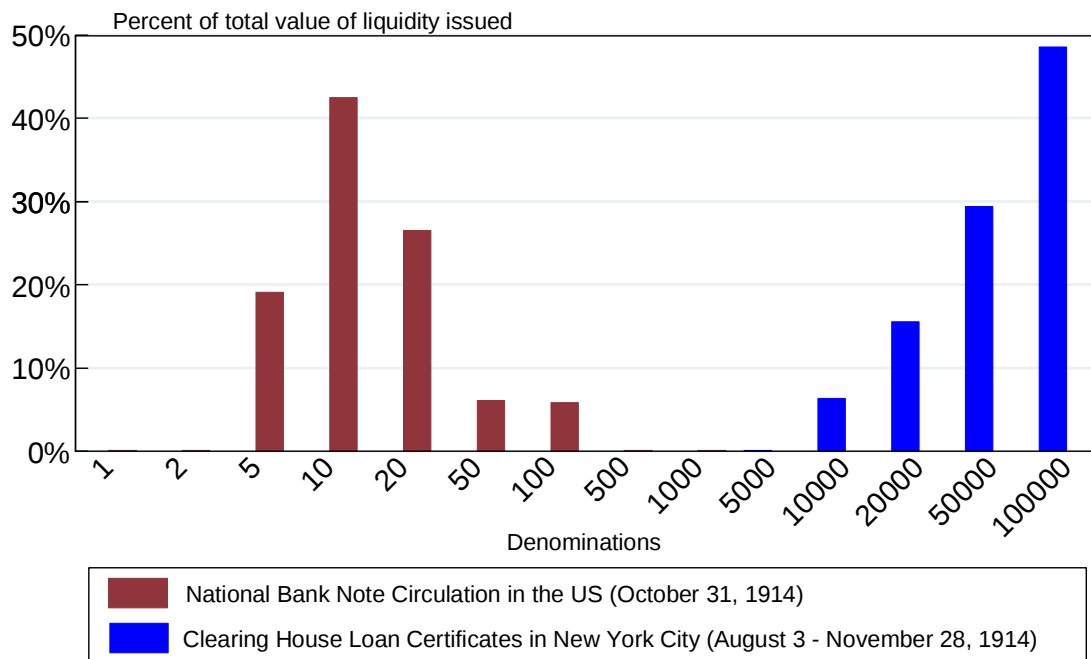
Figure 1: National Bank Notes and Emergency Currency



Top [1105] is a national bank note from Bowery and East River National Bank of New York

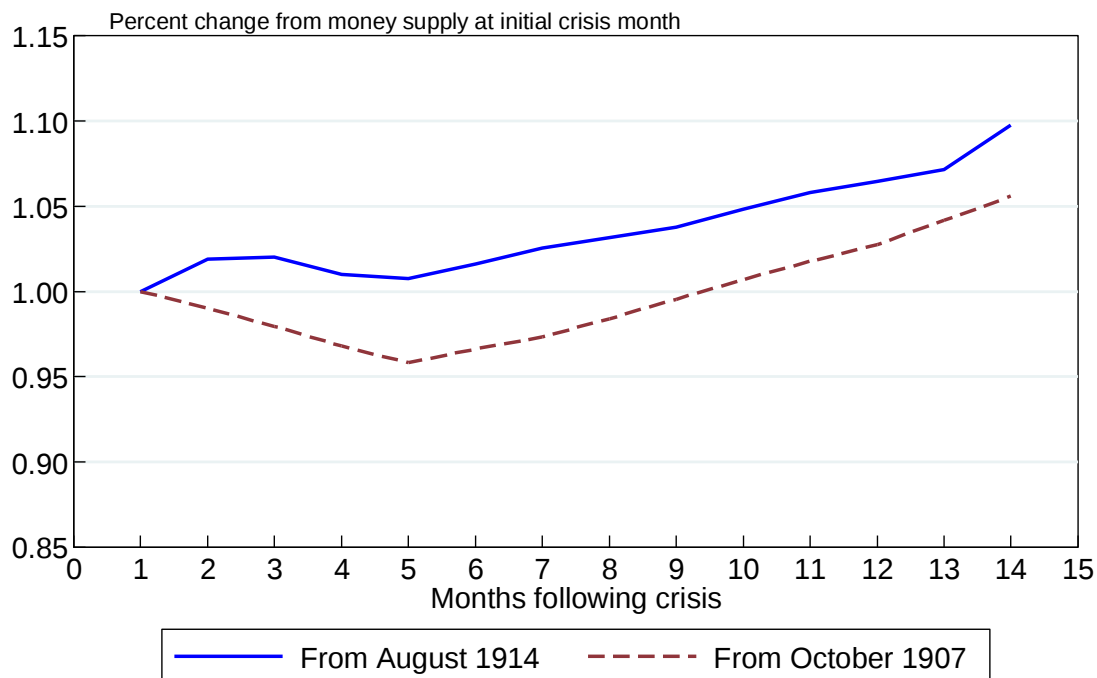
Bottom [3854] is an emergency currency national bank note from Merchants National Bank of Aurora, Illinois

Figure 2: National Bank Notes (Including Emergency Currency) and Clearing House Loan Certificates



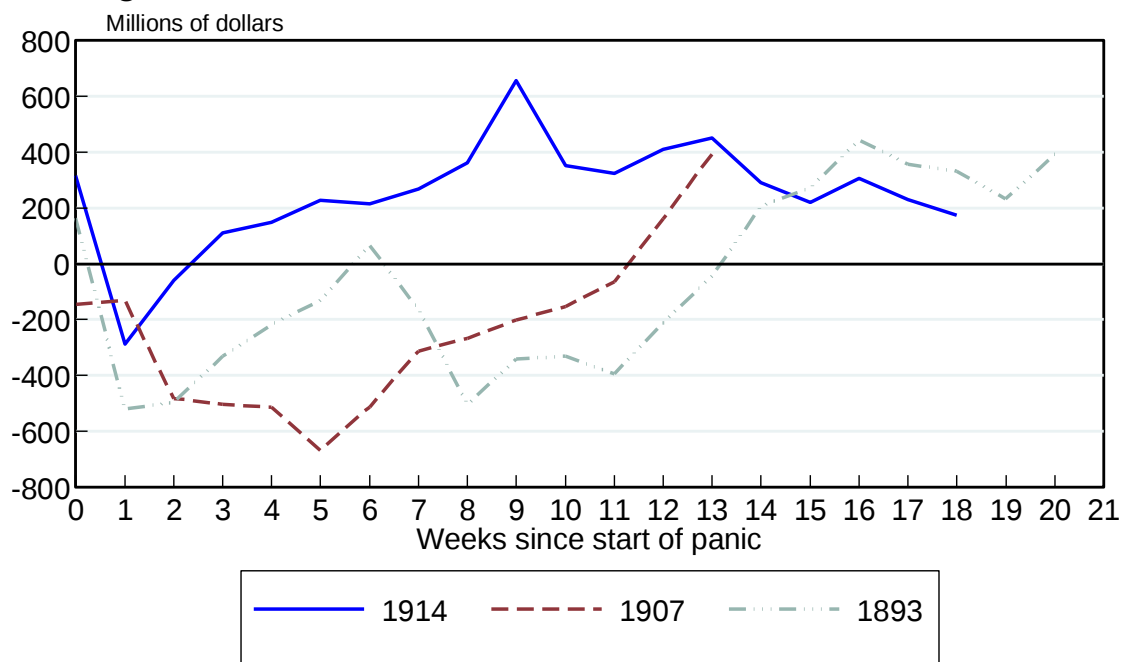
Source: *Annual Reports of the Comptroller of the Currency*, 1914 Vol. I page 53 and 1915 Vol. I page 103.

Figure 3: Aggregate U.S. Money Supply



Source: *Monetary Statistics of the United States*

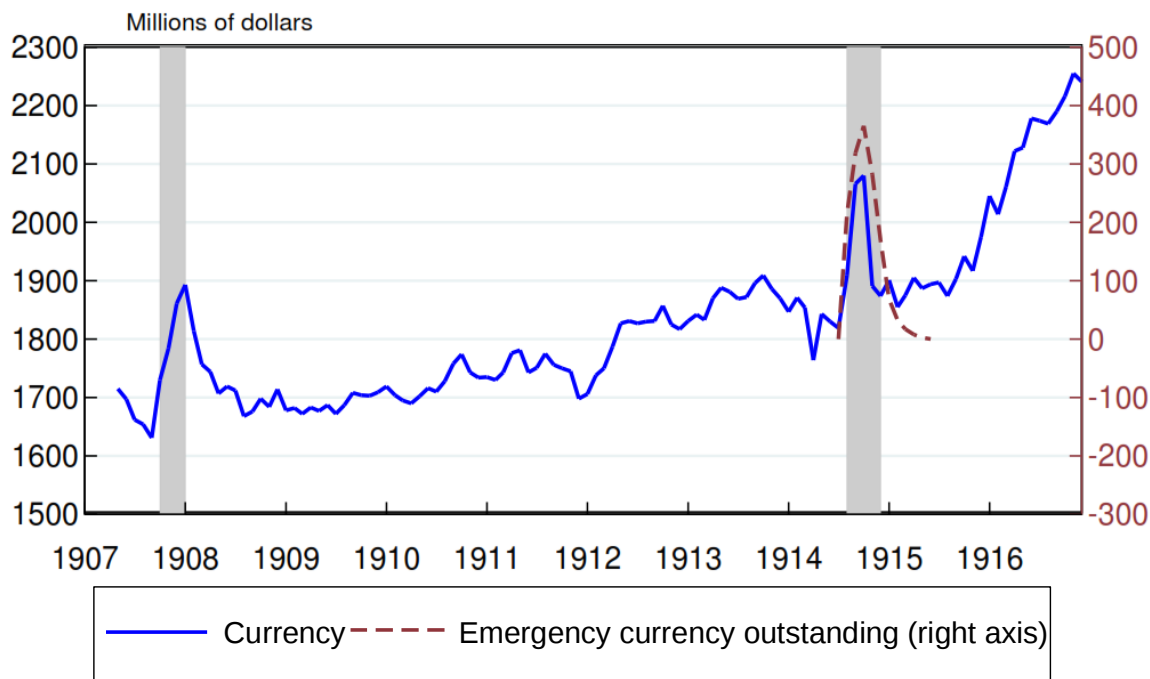
Figure 4: Net Flows to the Interior from New York Banks



Note: Flows series are scaled by nominal GDP for each respective year

Source: *Commercial and Financial Chronicle*, various volumes; Johnston and Williamson, MeasuringWorth

Figure 5: Currency Held by the Public

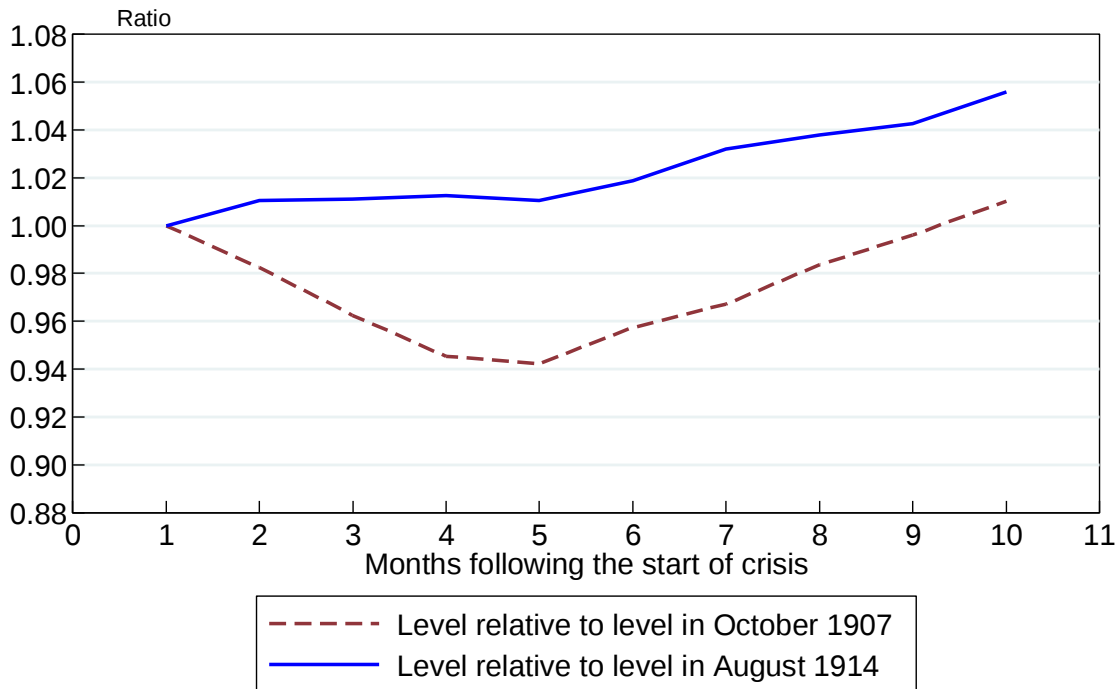


Note: shaded areas indicate crisis periods

Currency held by the public is defined as currency in circulation outside of the Treasury and Federal Reserve Banks minus vault cash of all banks

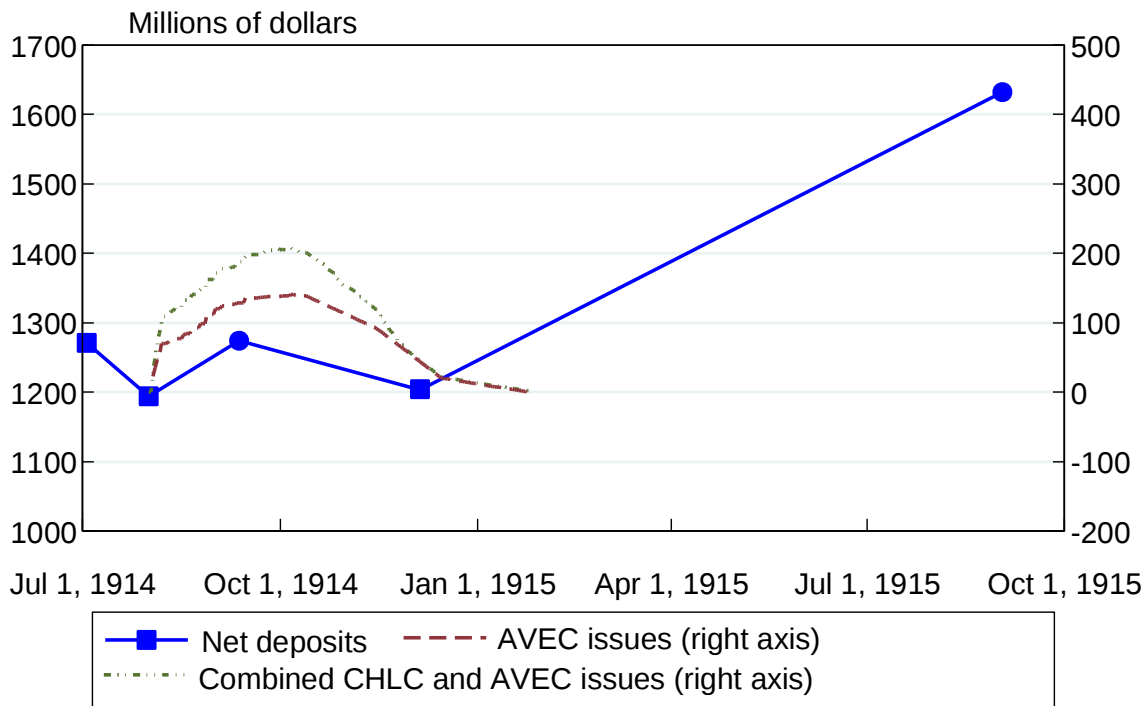
Sources: Friedman and Schwartz (1970) and *Annual Report of the Comptroller of the Currency* 1915 vol. 1

Figure 6: Demand Deposits, All Commercial Banks



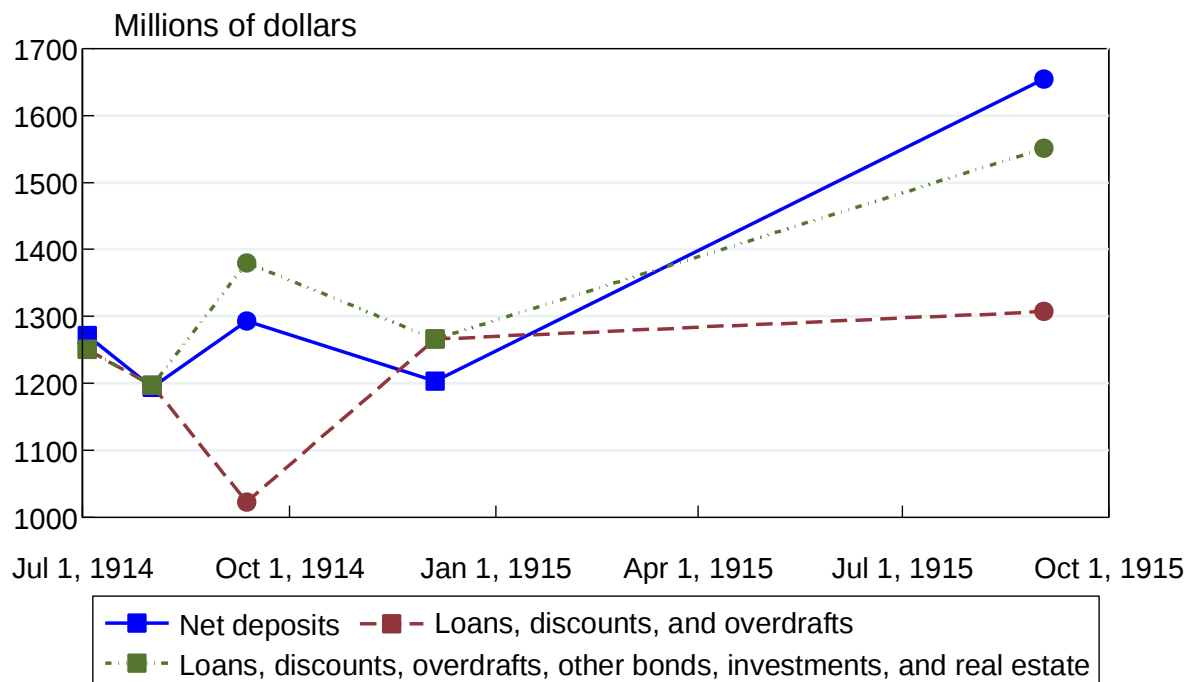
Source: Friedman and Schwartz, *Monetary History of the United States*, Table A1, NBER Series 14145

Figure 7: National Bank Borrowing and Net Deposits



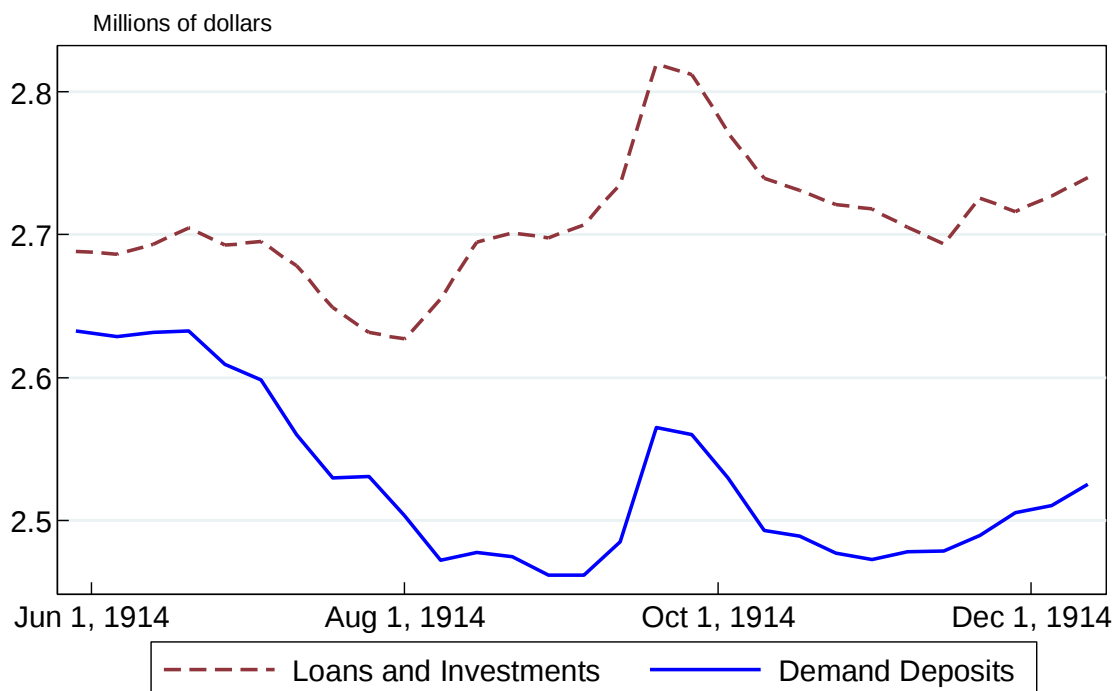
Sources: *Annual Reports of the Comptroller of the Currency*, 1914 and 1915; *Commercial and Financial Chronicle*, vols. 99 and 100; Minutes of the Clearing House Loan Committee of the New York Clearing House; Minutes of the New York National Currency Association

Figure 8: Net Deposits and Loans



Sources: *Annual Reports of the Comptroller of the Currency*, 1914 and 1915; *Commercial and Financial Chronicle*, vols. 99 and 100; Minutes of the Clearing House Loan Committee of the New York Clearing House; Minutes of the New York National Currency Association

Figure 9: Clearing House Banks and Trusts in Greater New York City



Source: *Commercial and Financial Chronicle*, Vols. 99 and 100

Figure 10: Base Money Supply Constraint

