

Knodel, Jane

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# The long road to accommodative central banking: the US case

Jane Knodell

The University of Vermont, Burlington, VT, USA

*For Basil Moore and post-Keynesians who have followed him in developing the theory of endogenous money, accommodative central-bank behavior is a logical necessity in credit-money economies. Such central banks have no choice but to accommodate the banking system's demand for liquidity. Accommodative central banking evolved through a historical process, as this paper shows for the specific case of the US economy. The road to accommodative central banking was a long one in the US, marked by failed experiments with alternative institutional regimes: the Second Bank of the US of the early national period, the urban clearing-houses of the late nineteenth century, and the early Federal Reserve.*

**Keywords:** *history of central banking, endogenous money, evolution of monetary institutions*

**JEL codes:** *E12, N11, N12*

## 1 INTRODUCTION

The idea of an accommodative central bank is central to the theory of endogenous money pioneered by Basil Moore. Central banks with responsibility for financial stability – that is, all modern central banks – have no choice but to accommodate the banking system's demand for reserves, under normal conditions and especially during a 'rush to liquidity.' According to Moore, '[a]ccommodative central bank behavior, with its focus on maintaining some administered level of interest rates, is a logical necessity derived from the nature of money and liquidity in all credit-money economies' (Moore 1985: 24). Following Moore's early work, post-Keynesian monetary economists have explicated the institutions, practices, and instruments that produce endogenous central-bank money in the modern setting (ibid.; Fullwiler 2003; Rochon 2006).

Accommodative central banking did not develop 'de novo'; it is the product of a historical process.<sup>1</sup> It arises out of a dialectical tension at the heart of this 'logical necessity' that has been worked out through an ongoing process of institutional innovation. The liquidity that must be provided endogenously, in response to demand, must also be an 'outside' money. That is, it must be provided from outside the circle of profit-seeking banks that collectively provide 'inside money' (bank deposits). Only an 'outside money' is free of the kinds of risk that attach to inside money and that come to the fore during

1. This paper follows in the tradition of Niggler (1991) and Chick (1992) in seeing the degree of endogeneity of the money supply as very much dependent on the specific monetary institutions in place at a specific time and place. I have developed this point in some detail in Knodell (2017a).

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monetary crises.<sup>2</sup> The ultimate form of liquidity must come from outside the banking system, and at the same time it must be supplied ‘endogenously’: at the right time, in the right place, and in the right amount. This is a tall order.

In this paper I assess three ‘central’ monetary institutions from nineteenth- and twentieth-century US economic history against the Moore test for accommodative outside money: the Second Bank of the United States, the New York Clearing House, and the early Federal Reserve Banks. They all fell short. Each of these monetary institutions operated within the larger context of a specie standard, but this was not the binding constraint on accommodative behavior. The problem was institutional design. In the case of the Second Bank and the New York Clearing House, self-protection and competition interfered with accommodation: they were not sufficiently ‘outside.’ The early Federal Reserve Banks were ‘outside,’ but they initially lacked the centrality within the banking system to get the job done.

## 2 THE SECOND BANK OF THE UNITED STATES

The Second Bank of the United States (1816–1836) was a public bank created in response to a public finance crisis, not a banking crisis.<sup>3</sup> Towards the end of the War of 1812, the Treasury reached the limit of the market’s appetite for its long-term debt, and turned to short-term notes to finance war deficits. Interregional interbank payments broke down after banks in regions that held US debt suspended specie payments, so that, in early 1817, ‘although there was a balance of \$22 m in the Treasury, the government was compelled to borrow \$500,000 ... to pay the interest due on the public debt at Boston ...’ (Knodell 2017b: 9). The US Treasury sought a national money for its own disbursements and receipts. After it could not negotiate a solution with private commercial banks, Congress chartered the Second Bank of the US, and granted it the unique power to establish a national system of branches.

The Second Bank was a private commercial bank (80 percent of its capital was owned by private wealthholders, 20 percent by the federal government) with certain public duties (to carry out costly domestic and international transfers for the US government without charge). The Bank developed lines of business that were complementary to its public duties and that drew it into a competitive relationship with other commercial banks, especially the city banks that challenged the Second Bank for leadership of the domestic banking system. This competitive relationship fundamentally impeded the Second Bank’s ability and willingness to be a lender of last resort.

Under the specie standard prevailing at the time, bank notes and deposits issued by the Bank of the United States and by state-chartered banks (‘state banks’) were convertible

2. Chick (1973: 81) defined outside money as an asset held by the private sector ‘to which there corresponds no private sector liability.’ The private sector, Chick argued (1983: 308), ‘has no ability to influence directly the supply of outside money ...’ For Smithin (2003: 35), a monetary production economy requires some ‘ultimate asset’ which is accepted as final payment of debt. ‘All that is actually required for an asset to be accepted as final payment of debt is some kind of guarantee that others will accept it as such in some subsequent round of transactions’ (ibid.: 35). Such a guarantee must come from some source, some authority, external to markets that is not subject to the vicissitudes of markets. The essential point is that outside money is the monetary asset whose acceptability is beyond question, even and especially during monetary crises.

3. The Second Bank was modeled after the First Bank of the United States (1791–1811) and performed many of the same fiscal functions. See Knodell (2013) for a detailed discussion of the origin and design of both banks. This section draws largely on Knodell (2017b).

into specie (silver and gold coin) at a fixed rate set by Congress. Since the US was not a producer of silver or gold at this time, the national stock of specie at any point in time was determined by past inflows from abroad. The transportation system was in early stages of development, so it took a very long time by modern standards to move outside money (specie) from one place to another. Specie was the final settlement asset in interbank payments, with 'specie funds' serving as a more or less close substitute. 'Specie funds' referred to the notes and deposits of the Second Bank and of the major city banks, and were a close, but not perfect, substitute for specie. Importantly, the Second Bank was not the only bank whose monetary liabilities had this status.<sup>4</sup>

The fixity of the size and location of the stock of specie in the short term was a challenge for monetary stability until national money was completely severed from its metallic anchor. However, by endogenously generating the money category of 'specie funds,' the commercial banking system developed a partial solution to this problem. Of interest to us here is the potential for the endogenous mobilization and/or creation of near-outside money during crises through specie funds: more specie, in the right form (minted coins, not bars), could not be created within the course of several days, but more 'specie funds' could be. This would require the issuers of specie funds (the Second Bank and/or the major commercial banks in New York, Philadelphia, Boston, and Baltimore) to be willing and able to expand their lending in a targeted and timely way (within the day and to banks with payments deficits). Given the time required for information and monetary assets, whether metallic or paper, to move between cities, effective lending of last resort was limited to intracity settings. Such emergency money creation by issuers of 'specie funds' would increase other banks' net claims on their specie holdings.

The one bank with a national system of branches in all the major commercial centers, the Second Bank, was best positioned to provide lender of last resort services. It had a market presence in all of the nation's banking centers, and it could use its branch network to move specie to branches that provided emergency liquidity, if needed. If it were to lead the way by expanding its notes, it would have reduced the liquidity risk for other issuers of specie funds to follow suit, thereby relieving pressure on itself as well. This potential was not realized, because the Second Bank never saw itself as an institution that provided services to the state-chartered banks, especially payments clearing and settlement services.<sup>5</sup>

During the Second Bank years, there were essentially two payment systems with connecting points in the cities where Second Bank branches were located. One segment, organized by the state banks, took the form of regional note-clearing networks in which country banks held redemption balances with city banks to support the circulation of their notes in city centers. The city banks organized note exchanges with each other and maintained peer-to-peer balances with 'foreign' city banks. The other segment, organized by the Second Bank, was a long-distance payments network. The Bank sought to afford 'the merchant the means of remitting without loss; and, by facilities and advantages he cannot obtain elsewhere, to make it his interest to transact his business with the bank and its offices' (Knodell 2003: 15). Western and southern branches financed the movement of cotton and other agricultural crops to market by discounting (monetizing) bills

4. See Knodell (2017b: 100–104) for evidence on the presentation of Second Bank notes on the balance sheets of state banks.

5. In 1817, Bank President Jones directed the New York branch to 'decline receiving for collection the drafts or checks of the banks of your city, upon the banks in other cities ... [I]t has never been the contemplation of this board to furnish to the state banks all the facilities of exchange ... while the bank and its offices should undertake the invidious task' of collecting the debts (quoted in Knodell 2003: 15).

of exchange, two-name paper payable in eastern centers. As the paper matured, it created the basis for covering the notes and drafts issued to buy the paper when they were presented for payment at eastern branches. These domestic bill-of-exchange operations kept intercity exchange rates within the specie points, and thereby 'freed up' specie from use as a transaction medium.

At the connecting points between the two segments of the payments system, the Bank's goal was to maintain a net-creditor position with the state banks as much of the time as possible. The Bank wanted to be able to counter any presentation of its notes for payment from any given bank, with a larger presentation of the other bank's notes for payment. The idea was to keep the net balances due from the state banks at an optimal level – neither so large as to create excessive risk without return, nor so small as to remove the Bank's ability to control. The Bank regulated the growth of the state banks by setting credit limits (limits on the state bank notes each branch would be willing to hold) and insisting on regular and prompt clearing of notes above the credit limit, in specie. Before the entry of the Bank, interbank payments were settled at longer intervals, and in inside money (claims on the banks themselves). Maintaining an 'ascendant' net creditor position vis-à-vis the state banks (as Second Bank President Nicholas Biddle put it) was a way to control the pace of expansion in the state banking sector, but, just as importantly, to protect the Bank's specie against potential specie raids.

The Bank did worry, and have cause to worry, about runs on its specie from other 'monied institutions,' and especially from coalitions of banks, brokers, and dealers.<sup>6</sup> It responded by using the strict letter of its charter to pay specie for notes only at the branch that issued them, and through active management of the location of the Bank's specie. Outside of the northeast, considerable time and expense was required to present US Bank notes at their issuing branches for specie. By failing to stand ready to pay all of its notes for specie regardless of where they were issued or presented, the Bank reduced the liquidity of other banks' claims on it, which is the opposite of what a central bank would do.<sup>7</sup> A central bank wants to promote the perception among other banks that its claims are the best, most risk-free and costless claims in the banking system. The Bank's self-protective behavior fostered resentment among the big city banks, and may well have made the Bank more vulnerable to runs and speculative attacks in a self-perpetuating cycle of specie-hoarding.

The philosophy of self-protection was also applied during periods of monetary stringency. In 1825, as liquidity pressures intensified, the Bank protected its specie reserve and moved specie within its branch system to bolster branches under pressure. It also

6. A run on the Bank's specie in 1817 from state banks almost forced the Bank to suspend specie payments soon after it started operations. In 1832, the Bank became aware of a plan to present a large amount of the Bank's notes to one of the interior branches, forcing it to suspend payment into specie. The head office in Philadelphia directed other branches to move specie to the target branch. Biddle observed: 'If it were known that more than a million in specie could be concentrated in the course of a week at one of the five (interior) offices, it is probable that the attempt of our enemies would be abandoned' (Knodell 2017b: 149).

7. It is almost shocking that the New York Second Bank branch even refused to accept its own notes (larger than \$5) that had been issued by non-local branches when presented in interbank clearing with the New York City state banks. The New York City banks would sell these non-local Second Bank notes (issued in Savannah, New Orleans, and so forth) to brokers at a small loss, who would sell them to merchants with customs duties to pay. By law, they were accepted at full face value by the New York branch of the Second Bank when presented for payment of customs duties. The Bank realized the pointlessness of its policy, and changed its practices, but too late to make a difference in terms of improving its relations with the New York banks.

directed branches to sell government debt to restore a net-creditor position vis-à-vis the state banks, and to take profits on high-value Spanish coin as its premium rose. The Bank released liquidity (Spanish silver coin) to the banking system, but in a way that turned interbank balances against the state banks, and in favor of the Second Bank (Knodel 2017b: 118–121). Given the Bank's 'safety first' strategy, and its desire to insulate itself from risks in the state banking system as much as it could, the Bank exhibited no interest in meeting an excess demand for liquidity by supplying it to the state banking system in the right place, at the right time, and in the right amount.

The Second Bank's behavior in 1825–1826 is a lesson in central-banking 'what not to do.' Still, the Bank did stabilize money, but through a 'buffer stock' mechanism instead of a lender-of-last-resort mechanism. The Bank's share of specie steadily rose and its reserve ratio was consistently higher than the state banks.' The Bank allowed its specie reserve to act a buffer stock vis-à-vis shifts in the international balance of payments, cushioning the state banks from fluctuations in the stock of outside money and limiting both their upside and their downside. The cost of this stability was stagnation in banking-system capacity: per capita bank capital was about the same in 1830 as it was in 1820 (*ibid.*: 128).<sup>8</sup>

### 3 THE NEW YORK CLEARING HOUSE

The New York Clearing House Association was organized in 1854 for the initial purpose of providing a central location for check-clearing among members of the Association. Banks in other commercial cities followed New York's lead in organizing local clearing-houses over the course of the nineteenth century. These urban clearinghouses provided services that might otherwise have been provided by branches of a central bank. As New York was the center of national financial markets and the cross-country correspondent banking system, its clearinghouse played the most important role in crisis management. The Clearing House has been aptly described as a 'club': not all banks were admitted, and members could be expelled. Membership had its responsibilities and its privileges, especially during panics.

After the Civil War, the payments media consisted of currency issued by nationally chartered banks (national bank notes), deposits subject to orders to pay (checks) issued by nationally- and state-chartered banks, US government currency ('greenbacks'), and specie (silver and gold coin, and paper certificates representing silver and gold coin). Currency and deposits were all convertible into gold (except for periods of restriction) on demand at a price set by the US government. Outside money took the form of specie and Treasury currency. The issuance of national bank notes was notoriously 'inelastic' with respect to seasonal surges in the demand for currency tied to the movement of crops to market in the fall.

Checks (orders to pay drawn on deposits) were the fastest-growing component of the money supply in the nineteenth century. Checks aggregated in urban wholesaling centers for payment. Before city banks self-organized into an Association, they each individually cleared 'bilaterally,' that is, with every other local city bank on which they held orders to pay. The Association became the central clearing agent for its members. Every day, each member bank sent checks drawn on other members to the Association, which kept the accounts of credits and debits for members and calculated whether each bank had a net

8. However, within this aggregate, the Second Bank and its shareholders enjoyed asset growth and profitability while the state-chartered banking sector contracted. This was a successful business model, but it was not a successful political strategy.

debit to settle, or a net credit to collect. The clearinghouse was the ‘agent of the banks,’ paying to the net-creditor banks the money it received from the net-debtor banks. Each Association defined for itself the form in which final settlement was to be made. Smaller associations outside of New York settled in outside money or drafts on banks in larger cities, often New York; the New York Clearinghouse settled in outside money only (Cannon 1900: 37–46 and 188).<sup>9</sup>

The Clearinghouse Association was quickly adapted for the purpose of coordinating the response to banking panics, when banks generally (not just isolated, individual banks) face an excess demand for ‘cash’ (outside money or legal reserves). During banking crises, the Clearinghouse issued clearinghouse loan certificates, which were substitutes for cash settlement at the clearinghouse. The process of issuance was as follows. At some point during an emerging or full-blown monetary crisis, the Association would meet and vote to set up a Loan Committee. The Committee would examine the collateral offered by member banks seeking short-term loans to cover cash shortfalls. Clearinghouse loan certificates were issued equal to 75 percent of the value of the collateral, for a specified term, and up to a specified amount (which could be increased by a subsequent vote). The member-bank borrower paid interest to the member-bank lender that accepted its loan certificates in payment of clearing debt. The loan certificates could only be used in interbank clearing within the Association, and all members were required to accept them in settlement in proportion to their share of borrowers’ net debt. If a borrowing bank defaulted on its certificates, the collateral was liquidated and the remaining members shared in any remaining losses in proportion to their capital (Moen/Tallman 2013: 4–6).

Loan certificates relieved the stringency by freeing up cash for other uses, notably meeting payment demands from individual depositors and banks outside the Association. The loan certificates ‘bought time’ for member banks in deficit, which might otherwise try to call in loans or sell assets in a falling market to get cash. Ideally, loan certificates forestalled the restriction of cash payments by banks (the payment of currency for deposits at par), but it did not always work out this way. During panics of the late nineteenth century, the restriction of cash payments by New York banks (and others) led to ‘currency famines’ with real and direct effects on employment and output in sectors where workers and farmers were paid with currency. In 1893, there were widespread reports of factories, mines, and mills that shut down simply because their owners could not procure currency to pay wages. Disruptions to interregional payments through the domestic bill-of-exchange market reduced output as well. Currency sold at a premium over deposits in New York and other cities, as deposits became a less trusted means of payment.<sup>10</sup> Seasonal shortages of currency (national bank notes in particular) created fragility and vulnerability in the banking system.

There were clearly aspects of ‘endogeneity’ and accommodation in the issuance of clearinghouse loan certificates. Because they arose out of the interbank payments process, assistance to member banks could be well timed to cover short-term cash deficits. Relief from pressure on scarce stocks of cash could be provided at the right place, and at the right time. In this sense the loan certificate was superior to the other two liquidity mechanisms available at the time: US Treasury operations and gold imports. The Treasury could respond quickly, and in a targeted way, as it actively monitored money market conditions through its sub-treasuries around the country. However, the size of Treasury relief was

9. The banks deposited gold with the Clearinghouse and received clearinghouse certificates which were used in settlement, transferring ownership of the physical gold from net debtors to net creditors.

10. On payment-system disruptions and their real economy effects, see James et al. (2013).

limited by its own reserve requirement, set by law for the purpose of maintaining the international convertibility of the US dollar.<sup>11</sup> In the case of gold, there was a two-week lag required to move it to New York from London or Paris, it would not necessarily enter the banking system in the right place, and it was a useless form of cash in terms of meeting payment demands from ordinary depositors. The loan certificates were responsibly supplied, unlike gold and Treasury currency, but they were not risk-free in the way that gold or Treasury currency was.

As a result, the loan certificate mechanism was limited by design and contingent in ways that reduced its effectiveness in accommodating the demand for liquidity. Because of the coinsurance feature of the loan certificate, it would tend to be undersupplied relative to the demand for liquidity. The Clearinghouse made this this kind of emergency lending available only to clearinghouse members; it was not available to other banks or to other kinds of financial intermediaries. This made sense from a credit risk management point of view; ‘the potential exposure of clearinghouse banks to each other’s credit risk gave clearinghouses strong incentives to limit the breath of access to loan certificate credit’ (Roberds 1995: 19). Management of the credit risk on loan certificates in this way may have increased their credit quality, it but certainly reduced their effectiveness as financial stabilizers. If a banking crisis originated outside of the circle of New York Clearinghouse members (as in 1907), response would be delayed until it threatened to spread, or had spread, to the member banks, and thereby rendered less effective.

The loan certificate was a passive mechanism; ‘there was apparently no way for the New York Clearing House to offer liquidity to the market directly by compelling member banks to borrow loan certificates’ (Moen/Tallman 2013: 21). A member bank may be inhibited by a ‘stigma effect’ from borrowing, or it may not have enough of the right kind of collateral. Finally, the clearinghouse loan certificates generally circulated only within the circle of clearinghouse banks. The certificates were not outside money, so they were not useful when it came to meeting other customers’ demands to convert deposits to cash (Treasury currency or national bank notes).<sup>12</sup>

Although the Associations could not create more outside money, they could pool the cash reserves of their members and redistribute them so that members under pressure from interior correspondents or depositors could maintain cash payments. The New York Clearing House pooled reserves in 1860, 1861, and 1873, which made it pointless for member banks to try to raid each other’s cash reserves, and thereby work at cross-purposes with the issuance of loan certificates.<sup>13</sup> Some students of the period believe this was an underused power which should have been used in 1893 and 1907, but wasn’t, as it failed to garner agreement from the membership (Wicker 2000: 12–14).

11. During the height of the panic of 1907, ‘the Treasury had deposited all the money it could spare, which was not very much, because revenue was declining’ (Taus 1943: 123). The Treasury provided three of the New York clearing banks with small-denomination silver certificates to help meet the demand from interior correspondent banks for currency, but the amount was insufficient. According to Wicker (2000: 98), the US Treasury played a ‘supporting role’ in the JP Morgan-organized rescue package for distressed trust companies, but ‘Treasury support was a one-shot affair. After the initial injection of funds, its resources were exhausted.’ See also Sprague (1910: 264).

12. In 1907, some clearinghouses issued small-denomination certificates to depositors that met some of the demand for currency. Dwyer/Gilbert (1989: 52) see the loan certificates as ‘at least a partial remedy for runs on the banking system because, with access to them, banks could operate with lower reserve ratios.’

13. For example, a bank could enlist a ‘friendly depository to present checks on other banks directly for cash payment instead of depositing them for collection through the clearing house,’ where they would have been settled to some extent in loan certificates (Sprague 1910: 48–49).



The issuance of loan certificates was contingent on a high level of agreement among members on the need for issuance. Members had to rise above their individual self-interest in pursuit of the collective interest, or they had to see that it was in their self-interest to assist illiquid member banks. Goodhart has argued that there was a ‘conflict of interest’ problem inherent to clearinghouses which rendered the provision of emergency liquidity assistance ‘more uncertain and more difficult,’ either because members needing liquidity are reluctant to ask for it from competitors, or because members in the position of supplying liquidity see ways they can benefit from the demise of a rival (Goodhart 1988: 42–43 and generally; see also Roberds 1995: 18–19).<sup>14</sup> There was always the potential for the strong banks which went into the crisis in a more liquid position, having been more conservative in the previous upswing, to question why they should assist competitors that operated further out on the risk frontier, and expose themselves to credit risk to boot.<sup>15</sup>

These limitations and contingencies of the clearinghouse loan certificate were observed to varying degrees and with varying consequences during the financial panics and near-panics in the period between the Civil War and the organization of the Federal Reserve. The panic of 1907 was by most accounts the most severe, with the longest period of restricted cash payments. Most scholars agree with Wicker (2000: 13–14) that the New York Clearing House ‘may not have been an effective institution for crafting a policy of collective action ... the self interest of the separate banks was incompatible with voluntary collective action.’ The panic of 1907 started with a run on trust companies, state-chartered intermediaries that were competitors of the New York Clearinghouse banks. Loan certificates were issued, and on a large scale, but well after initial applications for assistance, and too late to prevent the restriction of cash payments for deposits nationally (Wicker 2000: 97).<sup>16</sup> White (1983: 79–80) concluded that

the clearinghouses were poor substitutes for a full-fledged central bank as they could not freely expand the monetary base ... [T]heir ability to cope with a crisis was dependent on the mutual trust and cooperation that was fostered by their daily exchanges. The exclusive character of the clearinghouses promoted cooperation in the face of crises, yet the proliferation of national and state banks and trust companies to meet the growing demand for banking services threatened their ability to cope with the extraordinary needs for increased liquidity in bad times.

After the panic of 1907, there was a growing consensus in private and public sectors that the country needed a better way of managing crises. The result was the Federal Reserve.

14. Tallman/Moen (2012) show that in the panic of 1907, most of the New York Clearinghouse loan certificates were issued by the ‘big six’ group of New York City banks that held most of the correspondent balances of banks outside of New York. In this instance, ‘protecting private interest was more aligned with the collective interest than in earlier panics,’ but they also argue that the issuance of loan certificates did not resolve the panic (ibid.: 290). They conclude that the panic ended only when gold inflows restored the legal reserves of the ‘Big Six’ New York banks.

15. In fact, if competitors were allowed to fail and the strong banks were strong enough to survive possible contagion, they would come out of the crisis with larger market shares. This was National City Bank’s strategy; see Cleveland/Huertas (1985). Prior to the onset of the panic of 1907, the president of the National City Bank wrote another officer who questioned the bank’s high liquidity and capital ratios: ‘If by able and judicious management we have money to help our dealers when trust companies have suspended, we will have all the business we want for many years’ (ibid.: 52).

16. Sprague (1910: 286) believed that restriction of cash payments fostered cash hoarding by the non-bank public and delayed the redepositing of currency into the banking system. Friedman/Schwartz (1963: 160–161) agree, but they point out that once the panic was in full swing, suspension of cash payments was better than allowing large numbers of banks to fail, as in the 1930s.

#### 4 THE EARLY FEDERAL RESERVE

The Federal Reserve System was established in 1914 to address banking instability created by the seasonal inelasticity of the currency. Here I focus on the role and functions of the ‘new’ district Federal Reserve Banks within the payment system, at the local, regional, and national levels. In many respects, the Federal Reserve Banks were modeled after the clearinghouses, some of whose shortcomings as providers of emergency liquidity were carried into the new regime and became apparent in the Great Depression. However, the Federal Reserve was transformative in its creation of a new type of bank, the Federal Reserve Bank, that was ‘outside’ the private banking system yet potentially positioned to supply liquidity in a fully accommodative way. This potential was realized once the mature Federal Reserve occupied a fully central role in the national payments system.

During the Federal Reserve’s early years, money was still tied to gold. The Federal Reserve Act created two mechanisms for an initial transfer of gold from the commercial banks to the Reserve Banks. First, the Act required all nationally chartered banks to become members of the Federal Reserve System by subscribing to the capital stock of their district Reserve Bank, payments to be made in gold or gold certificates. Member banks were also required to hold reserves in the form of Reserve Bank money, initially by depositing the required amount of ‘lawful money’ (gold or money that the Treasury would exchange for gold) (Friedman/Schwartz 1963: 194).<sup>17</sup> In turn, the Federal Reserve Banks were to hold 40 percent of their notes and 35 percent of their deposits as gold.

Reserve and currency elasticity was created through the discount window mechanism.<sup>18</sup> Federal Reserve Banks were authorized to create central-bank money when they rediscounted acceptable commercial paper presented by member banks. From the point of view of the commercial banks, Federal Reserve notes and deposits were equivalent to gold. This ultimate liquidity feature of Federal Reserve money was a crucial improvement over the clearinghouse loan certificate, which could only be used to settle payments within the clearinghouse *and carried credit risk*. There was no risk of default on Federal Reserve notes and deposits. Federal Reserve notes were obligations of the US government, redeemable upon demand into gold, either at the US Treasury or at the issuing Reserve Bank.

The ability of the Federal Reserve to achieve the goals of the Act depended on its ability to retain national banks, attract state-chartered banks to membership, and convince state-chartered banks to switch to national banks. Membership had its privileges, but also costs, notably the non-interest-earning required reserves to be held at the Reserve Banks (and only at the Reserve Banks). A bank’s alternative was correspondent banking, where bankers’ balances sometimes paid interest and were always bundled with services, notably collection of checks. If Federal Reserve members had to hold both Federal Reserve balances for their reserve requirement and correspondent bank balances for check-clearing, it would be difficult to retain and grow Federal Reserve membership (Lacker et al. 1999: 24).

17. The opening of the Federal Reserve Banks was wisely delayed due to the premium on gold in the fall of 1914. As long as gold was at a premium, member banks would send Treasury currency to the Federal Reserve instead of gold, and any gold that was sent would be immediately lost to a profitable arbitrage operation. See Silber (2007 generally, and 131–150 specifically) on the steps taken by the US Treasury to prevent gold outflows and reduce the sterling exchange rate below the gold export point. This made it possible for the Reserve Banks, especially the New York Reserve Bank, to successfully start operations.

18. The rediscounting feature was very attractive to banks that faced seasonal demands for cash, and was successful in reducing the seasonal liquidity pressures of the pre-Federal Reserve era (Miron 1986).

For the Federal Reserve to achieve meaningful scale and reach in the banking system, it was necessary to 'direct the stream of checks and drafts to the reserve banks and thus to keep the reserve balances there constantly living and changing, thus preventing them from becoming mere dead sums of cash held simply because required by law' (Stevens 1996: 23, quoting Willis 1923). Towards this end, the Federal Reserve Act gave the Reserve Banks the ability to provide check-collection services within and between reserve districts. Check-collection would be the 'institutional glue' that attached the central bank to the commercial and financial system, that 'anchored its existence ... with a significant operating role in the financial system' (Stevens 1996: 25). This operating role would become the platform for the mature Federal Reserve to supply outside money in an 'accommodative' way.

However, in light of the existing and competing private-sector alternatives, the Fed needed to create demand for its check-collection services. Initially, '[a]s a closed voluntary system, the Fed clearinghouse enlisted only about one-quarter of its members and so could not compete with the more extensive networks of New York correspondent banks' (James/Weiman 2005: 129).<sup>19</sup> The Federal Reserve's smaller network of clearing banks was intrinsically inferior to the private-sector option, which had the added advantage of well-established relationships and routines. During the five years following the adoption of the Federal Reserve Act, the Federal Reserve sought and received legislative changes to attract banks to its check-clearing services. These changes, and operational enhancements adopted by the Federal Reserve, made it more attractive for many banks (member and non-member alike) to collect and clear checks through the Federal Reserve Banks rather than through correspondent banks.<sup>20</sup> By 1918, the Federal Reserve offered clearing of checks at par nationally (that is, without collection fees), which was particularly attractive to city banks that had formerly paid collection fees (and less attractive to country banks that had formerly received collection fees). Willis (1923: 36–37) reported that 'checks on 28,000 national banks, and trust companies throughout the United States are collected by the Federal Reserve at par ...'. Further, to receive this service, banks needed to hold only one account, at its district Federal Reserve Bank. In contrast, clearing through correspondents involved non-par collection of distant checks, and required banks to maintain multiple correspondent balances.

The Federal Reserve established a Gold Settlement Fund in 1915 for the purpose of clearing debts between district Reserve Banks and moving funds between the banking system and the US Treasury. Final settlement of interdistrict debts within the Gold Settlement Account had to be made, as the name says, with gold. Each Reserve Bank was required to maintain a balance in gold (or gold certificates) for the purpose of settling net balances owed to other Reserve Banks. This was a book-entry system in which net positions were settled by telegraph, initially weekly. After the US entered World War I in 1917 and increased its domestic borrowing for the war effort, the volume of clearings over the Fund increased dramatically. In 1918, the Federal Reserve adopted daily transfer of funds over the wire ('Fedwire') at zero cost for both the US government and member banks.<sup>21</sup> Daily clearing by telegraph created parity between Federal Reserve check-clearing

19. See also Lacker et al. (1999) for an economic analysis of the failure of the voluntary system.

20. Lacker et al. (1999) point out that contemporary complaints about the high cost of check-clearing came from the city banks, and they argue that the Fed's entry into check-clearing did not improve the efficiency of check-clearing, but did solve the cost-allocation problem perceived by the city banks at the hubs of correspondent banking networks.

21. Daily transfer may have been required to accommodate the volume of traffic. Of course, there was a cost to this service, but it was socialized through the Federal Reserve. Willis (1923: 34)

and the correspondent bank check-clearing system (which had already shifted from mail to telegraph) in terms of the time required for collecting banks to receive credit for items in collection. Those interregional interbank transfers that were formerly accomplished with intercity bank drafts in the market for 'domestic exchange' would now all be accomplished with checks cleared through the Gold Settlement Fund.

Many of the proponents of the Federal Reserve hoped that it would replace the correspondent banking system, but this did not happen; the Fed 'did not disrupt the structure of the system' (White 1983: 101 and 103). The problem was limited membership and therefore limited reach of Reserve Bank services. For many banks, especially the smaller, rural banks, a state charter was better than a national charter. States relaxed minimum capital requirements and other regulations to attract banking capital to their states (White 1983: 126–187). As in the pre-Fed system, non-member state banks used their balances with a correspondent to clear checks and receive other services.

There was credit risk and settlement risk on a bank's balance with a correspondent bank, but not on a balance with a Reserve Bank. This central difference between the private and public segments of the payments system became apparent during the banking crises of the Great Depression, when correspondent banking transmitted liquidity shortages from bank to bank. Richardson (2007: 667) presents evidence on interlinked bank failures within correspondent banking groups: 'correspondents and respondents formed lines like dominoes ... . When one domino toppled, the reserves of the next domino disappeared, and it suspended operations also, which forced additional dominoes to fall.' This kind of 'counter-party cascade' cannot happen and did not happen within the Federal Reserve segment of the payment system. Central banks 'are never liquidity-constrained and can never default in the currency they issue' (Bindseil/Laeven 2017).

The Federal Reserve Banks should have, could have, but didn't, act as a lender of last resort during the sequential wave of bank failures between 1930 and 1933. One factor identified in the very extensive literature on this topic is the passivity of the discount window mechanism (also demonstrated in the global financial crisis of 2007–2008), and its availability to members only, drawbacks of the clearinghouses as well.<sup>22</sup> Early bank failures were concentrated among the small, rural, non-member state banks, and not seen as a significant problem by either the city banks or Federal Reserve officials. Once depositor concerns about the safety of banks were heightened, member banks were reluctant to borrow. Discount window lending rose in several spurts, but not in a sustained fashion between 1929 and 1933. Another problem was the lack of cooperation between district reserve banks (Friedman/Schwartz 1963: 367–380). The early Federal Reserve did not suffer from the conflict of interest problem that plagued the clearinghouses, but it had its own internal collective action problem to solve in the early years.

In any event, the ultimate solution to depositor runs was not Federal Reserve reform, but creation of a national system of deposit insurance. This institutional innovation shifted the Federal Reserve's role from ensuring convertibility of deposits into currency at the level of retail banking to ensuring the continuity and stability of large-value

observed: 'Had it not been for the existence of the clearance system [through the Gold Settlement Fund] the Government with its obsolete sub-Treasury system of collecting the proceeds of public loans would have found itself in an almost impossible position.' See also Garbade/Silber (1979).

22. Still, in at least one instance during this period, a district Reserve Bank (Atlanta) managed a local run well by taking the initiative to ship large amounts of currency to member banks, both hubs of correspondent networks, that were facing large demands for cash demands withdrawals. The Atlanta Fed's response came at the right time, entered the banking system at the right place, and had the right scale. See Carlson et al. (2011).

interbank payments.<sup>23</sup> In the decades since the creation of the Federal Reserve, Fedwire has evolved into a liquidity backstop mechanism for stabilizing the payments system. As described in Bech et al. (2012), Fedwire is the central hub of a network of wholesale clearing and settlement platforms. Fedwire uses ‘real time gross settlement’ in which ‘payment instructions are executed continuously, at the instant they enter the system, ... for each payment instruction, the total gross amount of funds is transferred’ (Shen 1997: 46). The other platform nodes manage the preponderance of transactions and use net settlement, in which payments and receipts of participants are netted during the day, creating settlement risk for the platform but economizing on the need for liquid balances. Final settlement takes place at the end of a specified period *using accounts on Fedwire*. Payment on Fedwire is final and irrevocable.

Over the course of the post-war period, as banks started managing their liquidity more intensively, Fedwire evolved from a ‘cash-in-advance’ system, in which payments were drawn against positive reserve balances, to a system of automatic daylight credit for banks with payments deficits.<sup>24</sup> Automatic daylight credit is the ultimate in ‘accommodative’ systems of liquidity provision. Until the overdrafts are covered, the Federal Reserve assumes the credit risk that the deficit bank will be unable to cover the overdraft, transferring credit risk to the Federal Reserve, but reducing settlement risk for the private nodes in the wholesale payments system.<sup>25</sup> As seen in the global financial crisis of 2007–2008, the Fed’s overdraft facility is the first line of defense that prevents a potentially catastrophic cascade of counterparty payment failures at the apex of the payment system.

## 5 CONCLUSION

There are as many paths to modern central banking as there are central banks. This paper has examined one case, that of the modern US Federal Reserve and three historical antecedents. As each regime failed to provide those central-banking services required by a monetary production economy, a new regime took its place. In the early nineteenth century, with its branch offices and large specie reserve, the Second Bank had the ability to

23. The Fed also has an important role in stabilizing the retail payments network, which is increasingly dominated by private providers; see James/Weiman (2005). In the Texas banking crisis of the early 1990s, concern about counterparty risk caused smaller banks to shift to the Federal Reserve for check processing, as shown in Clair et al. (1995: 20), who conclude: ‘For the Federal Reserve to maintain the ability to respond to a financial crisis, it must maintain an ongoing payment-clearing operation that can be expanded as necessary. Such operations are complex and cannot be established overnight. A financial crisis can develop faster than the Fed could establish a payment-clearing operation from scratch.’

24. ‘In 1947, reserve-deposit balances represented 700 times the value of daily debits to member-bank reserve accounts ... [T]he average bank could make all of its own and its customers’ payments for seven successive business days without ever receiving a single offsetting payment, and without exhausting its initial reserve-deposit balance. By 1983, balances were a minuscule 4% of daily debits. The average bank could meet demands for payment for only 20 minutes of a single eight-hour business day before it would have to receive some offsetting payments, or go into overdraft’ (Stevens 1989: 3). Stevens also acknowledges that ‘to have maintained the 1947 reserve deposits/debits ratio with the 1983 volume of debits would have involved reserve deposits equal to an impossible two-and-a-third times the total assets of all commercial banks’ (ibid.: 3, fn 4). After the explosion of the Fed’s balance sheet to rescue the global financial system, Fedwire has returned for the time being to a high-reserve ‘cash in advance’ system. See Bech et al. (2012: 19).

25. As Mingle (1992: 9) puts it, the credit risk is ‘socialized’ while ‘systemic risk is eliminated because there is no avenue for losses to spread to other banks in the system.’

provide liquidity to banks with short-term cash deficits, but not the willingness to do so. It saw the state-chartered banks as rivals and threats, and did not see itself as a bankers' bank. The Second Bank lost its recharter bid in the early 1830s, possibly in part because it failed to behave like a central bank. The state-chartered banks in major cities subsequently organized central-bank-like clearinghouses, paramount among which was New York's. Clearinghouses proved unable to meet crisis-level demands for cash at either the local or national level, most notably during the panic of 1907.

The design of the Federal Reserve combined the national branch network of the Second Bank of the United States with the clearing and settlement services of the New York City clearinghouse. The Federal Reserve was created soon after the panic of 1907 with the explicit purpose of preventing monetary crises if possible, and responding if necessary. The notes and deposits issued by quasi-public district reserve banks became a new form of outside money in the domestic banking system which could be expanded, in theory at least, responsively: the right amount, at the right time, and in the right place. However, as the experience of the banking crises of the 1930s illustrates, it took time for the Federal Reserve's full potential as a Moore-ian 'accommodative central banker' to be realized. That it did reach its potential was amply demonstrated in the (first?) global financial crisis of the twenty-first century.

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