

Money, Credit, Banking, and Payments System Policy

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INTRODUCTION

The modern payments system is a complex set of arrangements involving such diverse institutions as currency, the banking system, clearinghouses, the central bank, and government deposit insurance. While there is an enormous literature about its constituent parts, there is little unifying analysis. Monetary economists have long pursued deeper understanding of currency as the medium of exchange. But they have generally ignored the banking system and clearinghouses, even when focusing on monetary policy. Financial economists, on the other hand, have been keenly interested in banks as financial intermediaries and in government deposit insurance. But, by and large, they have ignored the payments system aspects of these institutions; and they have tended to treat medium of exchange and monetary policy issues only peripherally.

To fully understand the payments system, though, including the evolution and structure of its constituent institutions, it is necessary to appreciate both its monetary and financial aspects. This paper presents a unified treatment by showing how the evolution of the payments system has been driven by efficiency gains from substituting credit, i.e., claims on particular institutions, for commodity money. The discussion emphasizes that the substitution of credit for commodity money was accompanied by arrangements to monitor and enforce restrictions on credit-issuing institutions. Among other things, it suggests alternative answers to some long-standing questions about banking. For example, it suggests why payments services and information-intensive lending have been provided jointly by the same set of institutions, i.e., banks; and it explains why

maintaining the value of bank deposits at par has been efficient, i.e., why banks have not been set up as mutual funds.

Insights developed by explaining the private payments system are subsequently employed to evaluate public payments system policy. I focus on the need for public protection of the payments system. One can imagine a payments system not in need of protection; namely, one using only government currency or coin, i.e., cash, and perhaps a postal money-order system. However, the public has apparently been willing to accept some credit risk for the substantial efficiency gains that the use of credit instruments in place of cash has afforded. The public's willingness to accept purely private measures for controlling credit risk prior to the Federal Reserve and government deposit insurance indicates that private protection of the payments system was largely effective.

I explore whether the development of the payments system by private decentralized competitive forces was deficient, however, by evaluating three prominent public payments system policies: monetary policy, central bank lending, and deposit insurance. Briefly, although valuing deposits at par and holding fractional reserves is efficient for individual banks, it has the potential for generating destabilizing systemwide bank runs that can be remedied most efficiently by central bank monetary policy. In contrast to monetary policy, fully collateralized discount window lending as practiced by the Federal Reserve matters only because the rules for pledging bank assets favor the Federal Reserve over private lenders. The provision of payments finality by private clearinghouses prior to the establishment of the Federal Reserve, however, suggests that some Fed lending in the process of making payments may be efficient. Moreover, it also suggests that Fed limits on direct access to the payments system are also efficient, both to protect Fed lending and to protect the interbank credit market.

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In contrast to safe discount window lending as practiced by the Fed, deposit insurance is a liability whose potential cost bank managers can increase by their choice of assets. Hence, deposit insurance must be supported by extensive supervision and regulation to protect the insurer's funds. My discussion points out some pitfalls of current protective provisions. It then uses insights developed in the discussion of private payments arrangements to suggest a tough exclusion principle as a potential remedy, and to critique an alternative proposal, narrow banking.

The plan of the paper is as follows. Section I outlines the fundamental efficiencies of monetized exchange. Section II discusses the basic benefits and costs of substituting credit for commodity money. Section III treats the role of banks in the payments system, suggesting how the four characteristic features distinguishing banks from other financial intermediaries flow from the role of banks in providing efficient medium of exchange services. Section IV explains further efficiencies made possible by the development of private multilateral arrangements among banks. It considers two historically important examples: The Suffolk Bank System and check clearinghouses. Section V evaluates the three public payments system policies mentioned above.

I. THE MEDIUM OF EXCHANGE

As the medium of exchange, money overcomes inconveniences associated with barter, most notably the double coincidence of wants and commodity indivisibilities.¹ Money also naturally serves as the medium of account. Having high purchasing power to weight, money economizes on the cost of carrying or transporting assets to make payments. Equally important, money is easily recognized, saving costly verification of its authenticity and value. Needless to say, money must also be a reasonably durable store of value.

In the early hunting societies skins served as money.² Such items as corn, tobacco, and olive oil served as money in agricultural societies. Of course, the precious metals silver and gold emerged as the most widely used commodity monies in the modern world. Their great value in nonmonetary uses, e.g., for ornamentation and jewelry, has given them considerable purchasing power portability. When properly alloyed, their durability is also very high. Both metals are readily divisible, though silver's lower purchasing power to weight has made it more convenient than gold for fractional coinage. And both

metals are easily recognizable. Beyond their color and metallic ring, simple tests, e.g., specific gravity and acid tests for gold, identify them cheaply. Their coinability has made possible a further economization of verification costs in everyday exchange. A coin stamp certifies the original weight and fineness of the metal and, along with milling on the edges, makes evident any subsequent alteration.

The exclusive use of commodity money in making payments would mean that each transfer of goods was accompanied simultaneously by a transfer from the buyer to the seller of a quantity of commodity money of equal value. From the modern point of view, making payments exclusively with commodity money seems highly restrictive. Yet if it were impossible to judge or guarantee individual reliability, e.g., if individual identities were private information, other arrangements for making payments would be infeasible.³ Settlement in paper claims on real assets would be ruled out because their value could not be verified. Likewise, individuals could not credibly precommit to settle in the commodity money itself, even in the near future. Since precommitment would not be enforceable, deferred settlement would not be feasible.⁴ Though it has been possible, of course, to develop systems for enforcing settlement in terms of paper claims or even book-entry claims, it is costly to manage them efficiently. Hence, it has remained efficient for society to finance the majority of its transactions with cash, i.e., government currency and coin.⁵

The need to employ cash gives rise to an inventory demand for it. The reason is that the cost of using cash is minimized by keeping an inventory on hand and replenishing it only infrequently. The average efficient cash inventory, i.e., the demand for cash, is smaller the lower is the replenishment cost. In addition, the efficient stock demand is lower the greater is the opportunity cost of holding it, i.e., the higher is the nominal rate of interest. It is, of course, the real value of cash demanded that is determined according to the above considerations. Other things the same, the nominal demand for cash moves proportionally with the price level. The real demand, of course, is related to the real flow of cash purchases.

II. CREDIT IN THE EXCHANGE PROCESS

As a commodity, paper has all the attributes of an efficient medium of exchange, except one. Paper is highly divisible and portable, and it can be made

durable with the proper processing. But its purchasing power to weight ratio is far too low for it to be an efficient pure commodity money. However, if there is a technologically feasible means of information production and a means of enforcement that allows verification of the value of paper claims on real assets, then it becomes efficient for paper claims, i.e., warehouse receipts, to circulate in place of commodity money itself.⁶ The efficiency stems from the fact that the purchasing power to weight of paper claims exceeds that for commodity money. In addition, leaving commodity money in a central location yields economies of scale in storage. These factors, in turn, reduce the cost of replenishing money balances, now paper claims, and thereby reduce the efficient inventory of money to have on hand. At the social level the reduced stock demand for money provides a benefit by freeing some of the money commodity for nonmonetary uses.

The abovementioned efficiencies are purchased at the cost of maintaining systems for monitoring and enforcement of the promise to honor the warehouse receipts. To understand the nature of these costs it is useful to view the leaving of commodity money at a warehouse as lending.⁷ The receipt, entitling its holder to reclaim the commodity money on demand, may be viewed as evidence of commodity money credit extended to the warehouse. Because the circulation of warehouse receipts in place of commodity money itself involves lending, it must be accompanied by rules and restrictions to protect the lender (claim check holder) against the possibility that the borrower (warehouse) will not repay the loan, i.e., that the warehouse will not honor its claim checks.

Efficient loan design involves the costly accumulation of detailed information about borrowers. To economize on the expense of acquiring information, lending is typically undertaken in the context of long-term relationships. In addition to establishing the borrower's reliability, there is usually an agreement to restrict the borrower's range of actions to reduce the risk of default. Typically the borrower agrees to collateralize the loan. That is, the borrower accepts a set of restrictions on the use or transfer of an asset designated as security. In order to enforce compliance with such restrictions, loan agreements contain provisions for the lender to monitor the borrower.⁸

Warehouse receipts, like claim checks for laundries, entitle the holder to reclaim the exact items left there. Moreover, such claims restrict their issuers from using or renting the items. In effect, then, commodity monies left with a warehouse, i.e., commodity

money loans to the warehouse, are perfectly collateralized. They would be safe so long as someone representing the borrowers monitored the warehouse. Note that even though each unit of commodity money in storage, in effect, collateralized a specific claim check, the claim checks could circulate interchangeably if the commodity money collateral were homogeneous. They would, however, have to be transferable. But this could be arranged either by allowing an initial depositor to endorse his claim over to another, or by having the claim simply promise to pay the presenter.

Because foolproof monitoring of the warehouse would be very costly, it would be useful to put in place other safeguards to protect the loan collateral, i.e., the warehoused commodity money.⁹ An efficient means of doing so would be for a wealthy man of long-standing reputation in the community to run the warehouse. Default would be known to be costly for such a man in terms of reputational capital. Equally important, he could pledge fixed property to further collateralize the loans in case of a misappropriation of the commodity money. In effect, he would provide capital to protect the customers of the warehouse against loss.

All the costs of running the warehouse, including rent for the building, management fees, the cost of printing warehouse receipts, fees for monitoring and enforcing protective restrictions, and a return to the owner for putting up capital, would be built into the warehouse storage charge. If these costs were smaller than the benefits discussed above of using warehouse receipts as the circulating medium, then it would be more efficient for paper claims on commodity money to circulate in place of commodity money itself. Of course, a gain might only obtain for some transactions. If a warehouse were only known locally, for example, then commodity money would still be used for traveling.

In fact, the evolution of the payments system has been, in large part, driven by efficiency gains from substituting credit, i.e., claims on particular institutions, for commodity money. The substitution of warehouse receipts for commodity money was only the first in a series of substitutions that have been found to be efficient. For reasons that will be discussed below, warehousing developed into banking relatively quickly. But the discussion of warehousing was conceptually valuable because it makes particularly clear the efficiency gains as well as the costs incurred in substituting credit for circulating commodity money. To reiterate, such substitution has

been efficient because the costs of enforcing restrictions on and monitoring institutions that issue credit money have been less than the cost of using commodity money directly. In other words, the drive for greater efficiency, which has dictated a continuing substitution of credit for commodity money in making payments, has brought with it a need to make arrangements to protect the payments system.

III. THE ROLE OF BANKS

Banks have been distinguished from other financial intermediaries by the following four characteristics. First, prior to the nationalization of currency, banks issued liabilities in the form of circulating banknotes. Second, bank deposits have normally been valued at par in terms of currency.¹⁰ Third, banks have provided checking services for their depositors. Fourth, banks have specialized in information-intensive lending.¹¹ That is, a large portion of bank assets have been loans which are not traded on secondary markets, and hence must be valued and managed entirely by individual banks themselves.¹² A long-standing puzzle in understanding banking is why payments services and information-intensive lending have both been offered by the same set of institutions, namely, banks. This section explains the mix of services distinguishing banking from other financial intermediation as an efficient outcome of a further substitution of credit for commodity money in the payments system.

Once the commodity money warehouses described above were set up, there was relatively little need for circulating claims to be cashed in. Claims might be made for travel, for payments to distant locations where the warehouse was unknown, in response to changes in the nonmonetary demand for the money commodity, or in response to changes in commodity money demand itself. But for the most part claims could simply circulate, the average inventory per person being determined efficiently as outlined above. Claims could retain their value indefinitely, with systems in place to monitor and safeguard the commodity money collateral in the warehouse.

The payments system could be run even more economically, however, if the warehoused commodity money were invested at interest, leaving just enough to manage efficiently any claims that might be made. Keeping too small an inventory of commodity money would lead to excessively costly stockouts. Too large an inventory would be costly

in terms of interest income foregone. Hence, a fractional reserve of commodity money was optimal. At the individual level, interest earnings could defray some of the fee for leaving commodity money at the warehouse. If large enough, they could provide net interest to claim check holders. The social value of fractional reserves was to free the money commodity for nonmonetary uses. By reducing the opportunity cost of money, i.e., lowering the implicit rental rate on money, fractional reserves also raised the efficient stock demand for money and reduced the cost of managing money balances.

The efficiency gains of fractional reserves could not be had, however, without changing the character of the warehouse claim check. As discussed above, a conventional warehouse receipt specifies a perfect collateral interest in the particular units of commodity money left in a warehouse, implicitly restricting the warehouse to hold 100 percent reserves of commodity money, or getting permission from the specific customer who owns the collateral every time it is moved around. Hence, to get the efficiency gains of fractional reserve banking, depositors had to give up perfected collateral interest and become general creditors.¹³ This point about the character of the deposit contract will be important below when I evaluate Federal Reserve discount window lending.

A bank free to invest in interest-earning assets but without any expertise in information-intensive lending would lend on the basis of easily verified safe collateral, that is, on real bills; or it could lend to entities well-known to have good credit, such as blue-chip firms or governments. Being based on publicly available information, such loans could take the form of traded securities. So although the incentive to hold fractional reserves explains why commodity money warehouses evolved into financial intermediaries, it does not explain the emergence of other distinctive features of banking, in particular, information-intensive lending. The following argument, however, suggests such an explanation.

Having developed arrangements to support the efficient issue of notes, banks were positioned to further economize on the use of resources in making payments: they could offer checkable deposits and check collection services. Checks allowed individuals to make payments in person without carrying currency.¹⁴ Because checkable deposits provided banks with loanable funds, they could pay a competitive return either as explicit interest or by defraying the cost of check-clearing services. Of course banknotes likewise represented a source of

loanable funds for banks and could, in principle, pay interest to their owner periodically. Such interest payments, however, would cause the value of notes to rise as the interest payment date approached and to fall sharply immediately after. Moreover, their value would fluctuate with the nominal interest rate that converts the future interest payment into a present value. Individuals using currency would thereby have to agree on its value before an exchange could take place. Such inconveniences have apparently made it inefficient to pay interest on currency.

Hence, the primary efficiency gain made possible by checks was to allow society, in part, to substitute interest-earning checkable deposits for non-interest-earning currency. In addition, checks made payments through the mail more convenient and reliable. A further saving was achieved because checks could be deposited directly and collected in bulk through the banking system.

With no further arrangements among banks, checks would require immediate payment in commodity money when received by the paying bank. Once again, however, an efficiency gain was achieved by using credit in place of immediate settlement in commodity money, this time in the form of interbank balances. In general, checks sent for collection from one bank to another tend to net out, so if payment were always made as checks were received, commodity money would simply be shipped back and forth with neither bank accumulating or decumulating any on average. Banks could, therefore, economize on such shipping costs by simply holding credit balances on each other instead of requiring immediate settlement in commodity money. For example, instead of triggering immediate shipment of commodity money from bank A to bank B, checks sent for payment by bank B to bank A could result in bank A giving bank B a deposit. Bank B would then be said to have an interbank deposit at bank A. When the flow of collections reversed, bank A could acquire a deposit at bank B. To economize on commodity money shipping costs, banks agreed to make temporary loans to each other on demand as dictated by developments in the payments system.¹⁵

Just as noteholders made arrangements to protect commodity money deposited with more primitive banks, banks employing interbank balances developed systems and expertise in monitoring and managing loans to each other. In contrast to individual depositors with relatively small deposits at a single bank, banks themselves needed numerous interbank

relationships to provide efficient payments services to their customers. Moreover, such relationships were geographically spread out. In addition, payments system efficiency dictated that banks grant possibly large loans, by accepting balances at another bank, on very short notice, without the safety of specific collateral. In effect, banks offered lines of credit to their correspondent banks. Hence, banks had to be particularly careful about the correspondents through which they collected checks. Equally important, they had to devote resources to continually evaluate the creditworthiness of those banks with which they chose to have collection relationships. In other words, banks specialized in information-intensive lending to support efficient payments services for their customers.

There are two important implications of this point. First, because banks had an incentive to monitor each other in the process of collecting checks, they could provide an economical indirect means for a depositor to monitor his own bank. A depositor could check what interbank collection relationships his bank could arrange. Since good banks had an incentive to publicize such arrangements, depositors would have little trouble monitoring interbank relationships. A substantial number of relationship terminations would be taken as evidence that a particular bank had become a bad credit risk. Depriving a weak bank of the ability to have its checks accepted for collection at other banks would also greatly reduce its ability to successfully market checkable deposits. Alternatively, banks might continue to accept for collection checks drawn on a bank perceived to be a bad credit risk, but announce that they would no longer hold deposits at the weak bank. Though it could still have its checks collected by other banks, the weak bank would be forced to hold larger cash reserves to manage its checkable deposits, forcing it to be less competitive in that respect.

Second, the holding of interbank deposits rather than publicly traded securities by banks made it much more difficult for depositors to continually evaluate bank solvency. This led banks to devote more resources to monitoring each other and reinforced the need for additional safeguards, such as more capital.¹⁶

I am finally in a position to suggest why payments services and information-intensive loans to nonfinancial firms have been provided jointly by the same set of institutions, i.e., banks. Imagine a set of finance companies satisfying the nonfinancial demand for information-intensive loans. They would develop the

same expertise currently used by banks to manage their loans. Moreover, one would expect such finance companies to organize a network to allocate credit to the best prospects, and to help diversify their loan portfolios. Intercompany balances would be managed with the same systems used to manage information-intensive loans to nonfinancial borrowers. Intercompany borrowing and lending would exist even if finance companies offered no payments services.

Now, one can imagine a separate network of mutual funds offering payments services. Would it be efficient for the finance and payments companies to exist independently? It would not seem so. Finance companies would have in place much of the network, systems, and expertise to run a reliable and efficient payments system. They would merely need to accept demand deposits and set up facilities for handling payments flows. The point is that systems to evaluate credit, monitor and enforce loan agreements, and extend credit on short notice are productive both in originating loans to nonfinancial borrowers *and* in managing lending to support an efficient provision of payments services. This, I am arguing, helps explain why institutions specializing in information-intensive lending, i.e., banks, have applied their expertise jointly to the production of payments services and nontraded loans.

Moreover, nonfinancial lines of credit involve long-term relationships in which the finance company and the borrower each have an incentive to assure that the other has staying power. A finance company requires information about a borrower. But a borrower who pays an ongoing fee for his credit line likewise needs assurances of his finance company's staying power. Other things the same, then, finance companies will offer checkable deposits more efficiently than pure payments companies, because potential depositors will already have acquired information about the reliability of finance companies as depositories. Independent payments companies could, of course, assure their reliability by holding publicly traded securities; but the low cost of verifying the value of traded securities would be reflected in a yield below that on nontraded loans. I am suggesting that, on net, using the same information to assure the reliability of both credit lines and deposits allows payments services to be provided at lower cost by firms also offering line of credit services.

The joint product efficiencies of combining information-intensive lending with the provision of payments services also explains why bank deposits

have been valued at par, i.e., why banks have not been set up as mutual funds. Of course, practically speaking this would have required banks to hold securities valued continually in the market. Yet restricting assets this way would certainly have been feasible, especially in modern times, and it would have made banks easier to monitor. As Fama and Jensen [1983, pp. 337-410] point out, however, institutions specializing in nontraded loans are not run efficiently as mutual funds. The incentive for such institutions to employ par value deposits, whose yield is independent of the fortunes of the firm, may be understood as part of a widespread use of bonds together with equity in the financing of firms in general. Jensen and Meckling [1976] have emphasized that from the point of view of claimants, bonds are an optimal part of a financial package to monitor management and ensure an efficient choice of assets. In other words, bank deposits have been par valued because it has been efficient for banks to use them to fund nontraded loans.¹⁷

IV. THE PAYMENTS SYSTEM

To this point, I have discussed efficiencies in the means of making payments that involved bilateral relationships among banks. Here I discuss further efficiencies made possible by the development of private multilateral cooperative arrangements. I consider two historically important examples: the Suffolk Bank System and the clearinghouses. The Suffolk System emerged as a more efficient means of redeeming banknotes. The clearinghouses economized on the collection of checks.

The Suffolk Bank System

The Suffolk Bank System arose in early nineteenth century New England.¹⁸ At that time, country banknotes made up the bulk of the regional circulating currency, although residents of Boston also used local checkable bank deposits to make payments. As pointed out above, normally there would be little reason for banknotes to be redeemed. In the process of circulating, however, banknotes could flow some distance from the banks that issued them. During this period the balance of payments within the region favored Boston, and country banknotes generally flowed in that direction.

Because banknotes entitled the holder to commodity money (by this time, gold or silver coin) at their issuing bank only, notes bore ever-greater discounts in terms of coin the farther they traveled from

their bank of issue. The discount reflected both the transport and time costs of carrying the notes to the bank for payment and returning with the coin. If information on creditworthiness were difficult to obtain at a distance or if solvency were in doubt, the discount could include a risk premium. The cost of authenticating notes to detect counterfeits increased the discount even further.

Under such conditions, it became profitable for individuals known as notebrokers to buy notes with coin in Boston and return them to their banks of issue for payment. By buying up and returning notes in bulk, notebrokers could reduce the per item transport cost. Competition among notebrokers thereby reduced the discounts on country banknotes in Boston. Carrying potentially large positions in notes of particular banks, brokers also had incentive to specialize in authenticating notes and evaluating bank credit risk. The economization on information production achieved by brokers probably also reduced the risk premium on notes.

Of course, competition would remove any abnormal arbitrage profit, as brokers bid the discount down to the point where it just covered the cost of redemption. In effect, notebrokering forced the country banks and the rural areas as a whole to finance their balance of payments deficit vis-à-vis Boston with coin instead of with paper credit, i.e., banknotes. Country banks and their customers deplored notebrokering because it forced banks to call in loans in order to accumulate coin which then went to Boston.

It was in this environment that the Suffolk Bank System was organized. The Suffolk System was an arrangement by which the Suffolk Bank in Boston redeemed a country bank's notes with coin, provided that the country bank deposited coin at the Suffolk Bank to cover the redemption. Initially, the System was set up on a purely bilateral basis and amounted to little more than centralized notebrokering with further economies of scale. Since country banks had to redeem their notes as before, the Suffolk System was likewise unpopular outside of Boston. But because the Suffolk Bank redeemed notes at a discount while nonmembers had to redeem theirs at par, country banks were given an incentive to participate.

After a while, the Suffolk System introduced a kind of collective net settlement, an important multilateral clearing procedure that was a precursor to that used in clearinghouses.¹⁹ To make this possible, the Suffolk Bank ruled that it would accept, as required

deposits, the notes of any participating banks in good standing. This ruling allowed a bank to redeem its notes by swapping them for excess coin in another account. In effect, the procedure allowed interbank borrowing, which made more efficient use of coin on deposit, and reduced the average inventory of coin that each bank had to keep on hand. Collective net settlement should be recognized as yet another example of the substitution of credit for the use of commodity money in the payments system. As in the earlier examples, the innovative use of credit was due to the saving it afforded in reduced commodity money shipping costs and smaller commodity money reserves. Here too the use of credit was supported by extensive safeguards on all the participants, including the Suffolk Bank itself, and especially by continual monitoring of the country banks by the Suffolk Bank. One important control was the power to expel a bank judged to be excessively weak from the system.

The Clearinghouses

Clearinghouses emerged in various cities around the United States in the middle of the nineteenth century as private cooperative arrangements among banks to economize on check collection.²⁰ In part, clearinghouses did for check collecting what the Suffolk Bank System did for the payment of coin against notes.²¹ The most well-known clearinghouse innovation was the replacement of bilateral collection procedures with collective net settlement. Each morning, clearinghouse member banks took checks to a central house for clearing. There the checks were netted out or offset against each other and a net credit or debit position against "the clearinghouse" was computed for each member bank. Later in the day, banks covered any net debit positions with government currency or coin. Funds so received paid off the net creditor banks from that morning's clearing.

The basic efficiency gains were these. Instead of making collections individually, each bank could take its checks to a central location for collection. Thus, centralized collection itself saved significantly on transport costs. Netting out provided an additional saving by greatly reducing the volume of currency and coin that was transported in the settlement process. Moreover, to further economize on shipments of currency and coin, clearinghouse members kept the bulk of their reserves in the vaults of the clearinghouse, receiving in return claims to their reserves known as clearinghouse certificates.²² Then, instead of shipping currency and coin to settle, member banks could simply pass around

clearinghouse certificates. The keeping of reserves at the clearinghouse, in turn, facilitated an interbank market that made possible a more efficient distribution of reserves among banks. These measures all contributed to reducing the efficient quantity of reserves that banks had to hold. By reducing checking fees, they also encouraged more intensive use of checks relative to currency on the part of the public.

Along with the set of benefits just described, clearinghouses eventually provided payments finality.²³ In the absence of finality, a check deposited for collection might not be paid if either the bank against which it was written failed or the deposit account against which it was written had insufficient funds. Obviously, neither the paying bank nor the clearinghouse would pay a check where there was insufficient funds, unless the drawer of the check had a prearranged line of credit at his bank. But with finality, a check deposited for collection in the same town was given immediate credit. In other words, finality insured the check depositor against failure of the paying bank. In order to provide finality, clearinghouse member banks agreed to assess themselves if a member bank failed to cover its position with the clearinghouse later that day. The assessments were then used to pay the failing bank's checks in return for a lien against the receiver of the failed bank. Making use of their cooperative nature, then, clearinghouses provided a kind of check insurance to the depositors of their member banks. If checks could be deposited quickly, finality allowed a check's reliability to depend entirely on the individual issuing it. Hence, finality further enhanced the convenience of checks as means of payment.

The clearinghouse represented a highly sophisticated example of efficiencies in the payments system achieved by substituting private credit for commodity money. The uses of private credit were numerous. The daily clearing and collection process routinely generated credit against the clearinghouse. Member banks held currency and coin in its vault. Extensive interbank lending and borrowing of reserves was carried out under its auspices. In addition, the clearinghouse managed an important contingent liability in the form of mutual insurance of checks in the process of collection.

As we would expect, the clearinghouse imposed numerous rules and regulations on its member banks and engaged in supervision and enforcement as well. There were minimum capital requirements. Coin and currency reserves at the clearinghouse partly col-

lateralized the debit positions of clearing banks. There were relatively frequent examinations of member banks by a clearinghouse committee. Clearinghouses also reserved the right to exclude, by vote, members shown to be weak.²⁴ The threat of expulsion was a powerful management tool because public expulsion would represent an adverse signal to depositors and cause a bank to lose the ability to have its checks accepted for collection at other banks. It was apparently efficient to restrict membership in the clearinghouse itself to a core of well-managed and highly reliable banks. Other banks cleared their checks through the clearinghouse by retaining a member as an agent. But clearinghouses held agents liable for checks against their clients authorized for collection through clearinghouse member banks.²⁵ Thus agents were given a powerful incentive to choose and monitor their client banks carefully. Agents thereby imposed a useful discipline on client banks.²⁶

V. PUBLIC PAYMENTS SYSTEM POLICIES

Previous sections explained the evolution of the payments system in terms of the efficiency gains had by substituting private credit for commodity money in the settlement process. Two insights were stressed. First, the shipping and inventory costs of settling in commodity money could be significantly reduced by making use of evermore sophisticated borrowing and lending arrangements. Second, these economies had to be purchased by setting up and managing evermore complicated safeguards to protect the institutional lending that supported the efficiency gains. One can imagine a payments system not in need of protection; namely, one using only government currency or coin, i.e., cash, and perhaps a postal money-order system. With the proper controls, however, users of payment services have apparently been willing to accept some credit risk for the substantial reduction in costs that the use of credit in place of cash has afforded. Here, however, I explore whether the development of the payments system by private decentralized competitive forces was deficient from the macroeconomic point of view by evaluating three prominent public payments system policies: monetary policy, central bank lending, and deposit insurance.²⁷

Monetary Policy

Monetary policy made possible two distinct efficiency gains. First, national paper currency replaced gold coin as the interregional means of

settlement. Second, the power of the Federal Reserve to create currency provided better protection against systemic bank runs. I discuss each benefit in turn.

Prior to the Civil War, interbank balances were settled in gold coin. During and following the war, however, the national government created paper currency substitutes for gold that could be used for settlement. The greenbacks, unbacked notes issued during the war, were one such paper currency. National bank notes, authorized by the National Bank Act to be issued by banks with the backing of Treasury bonds, were another. The Treasury also issued gold and silver certificates, which were warehouse receipts for the respective metals held in the Treasury. Because these currencies were liabilities of the national Treasury, they were accepted throughout the country. Though the use of gold in the settlement process had been greatly reduced locally by clearinghouses, the appearance of Treasury currency significantly reduced the shipping costs of settlement among different regions of the country.²⁸ The Federal Reserve further reduced costs by settling interbank balances via book-entry telegraphic messages rather than by physical transportation of gold or currency. It is worth noting that clearinghouse efficiencies provided by the Federal Reserve at the national level might have been provided privately had interstate banking not effectively been prohibited.

At any rate, management of high-powered money, i.e., currency plus bank reserves, by the Federal Reserve after 1914 provided another important benefit which we can understand as follows.²⁹ We have interpreted the banking system together with clearinghouses as a set of credit arrangements that increased the efficiency of commodity money in providing payments services. In particular, we saw in Section III that it was efficient for checkable deposits to be valued at par and for banks to keep fractional reserves. Obviously, a widespread demand to convert deposits into currency could not be satisfied by such a system without a central bank. The clearinghouses, however, could protect the banking system against a run by temporarily restricting the conversion of deposits into currency. But restricting cash payments would tend to cause deposits to depreciate in terms of currency. Hence, the system was potentially unstable. Even minor banking problems which made a restriction possible could make forward-looking depositors seek to protect themselves against (or profit from) a potential depreciation by immediately attempting to convert deposits

into currency. In aggregate, of course, such behavior could make a restriction inevitable.

In fact, between the end of the Civil War and the establishment of the Federal Reserve, there were numerous banking crises which involved the actual or expected restriction of the conversion of deposits into currency. Though these episodes were violent and disruptive, the evidence suggests that their aggregate insolvency effects were relatively small.³⁰ In other words, the pre-Fed banking crises appear to have been due to the inherent monetary instability described above.

Being able to create currency through open market security purchases, Federal Reserve monetary policy could guarantee the exchange rate between bank deposits and currency against systemwide runs. Monetary policy is effective in this regard precisely because it protects the banking system by creating the currency it needs, so depositors otherwise confident in the solvency of their banks need not worry about a depreciation in the value of their deposits in terms of currency. Hence, with a central bank “lender of last resort,” widespread runs need not develop, at least in the absence of real systemwide insolvencies.³¹ Hence, monetary policy protects the payments system in a way that the private market cannot.

Central Bank Lending

In contrast to monetary policy, central bank lending involves making loans to individual banks with funds acquired by selling off other assets, usually government bonds. In other words, I am defining central bank lending to be analogous to private financial intermediation in that it neither creates nor destroys high-powered money. Obviously, because it involves making loans, central bank lending must be accompanied by provisions to monitor and enforce compliance with certain restrictions on potential borrowers. In the public sector, these are known as supervision and regulation.

The three major categories of Federal Reserve lending are all importantly related to payments system policy. Although discount window credit is not generated in the payments system proper, it is valued in large part for the assistance it provides to individual banks in order to protect the payments system.³² In fact, the Fed’s discount window is often cited as a comparative advantage for Federal Reserve management of the payments system.³³ Daylight overdrafts constitute a second category of Fed lending. They

are intraday credits, granted by the Federal Reserve to depository institutions making payments over Fedwire, the Fed's electronic funds transfer network.³⁴ Though quantitatively less significant, Federal Reserve lending also takes the form of float generated in the process of clearing checks.³⁵ I evaluate, in turn, discount window lending and credit extended in the process of making payments.

While open market operations are seen as capable of handling aggregate monetary conditions, the discount window is valued for its ability to direct potentially large quantities of funds, on very short notice, to individually troubled banks. No one argues that the discount window should be used to rescue insolvent banks, only that it be used to aid temporarily illiquid banks. While the distinction between the two is crucial for evaluating central bank discount window lending more generally, we can sidestep it here.³⁶ The reason is that, in practice, the Federal Reserve fully collateralizes its discount window lending. Hence, discount window lending has involved little risk for the Fed. But what then explains the widespread use of discount window loans by banks in trouble? After all, private lenders should be eager to lend on the same terms as the Fed. Moreover, the Fed does not appear to charge a below-market rate for its emergency credit assistance.

The answer appears to be that banks cannot legally pledge specific assets against privately borrowed funds, i.e., private lenders cannot perfect a collateral interest in specific assets of a borrowing bank. In case of insolvency, then, private lenders must become general creditors. Government agencies, however, such as the U.S. Treasury and the Federal Reserve, are allowed to perfect a collateral interest in specific assets of a bank to which they lend funds.³⁷

Discount window advances may be secured by a wide range of bank assets. The riskier and less liquid the asset, however, the greater the haircut off book value that the Fed will lend on. The pledging of particular assets to borrow funds is similar, in principle, to selling them for cash. If the need for funds is expected to be temporary, however, borrowing on the basis of pledged assets is more economical. It avoids the greater transaction cost of a sale, including for loan sales the cost of restructuring a loan servicing relationship. Hence, borrowing from the Fed on pledged assets dominates selling those assets.

The effect of fully collateralized discount window lending, then, turns on the pledging rules. If the rules were the same for the Fed and private lenders,

discount window lending would make little difference, as long as no subsidy were involved in Fed lending. It is beyond the scope of this paper to analyze the socially optimal configuration of pledging rules. But allowing the Fed to select good collateral to back its loans permits weak banks to more cheaply obtain funds to continue operating, possibly pledging their best collateral at the discount window to pay out uninsured depositors, i.e., the hot money, prior to a bank's being closed. Currently, then, the discount window can delay the declaration of insolvency, while effectively moving uninsured depositors from last to first in line. This, of course, is at the expense of the deposit insurance fund. On the other hand, under current pledging rules the discount window is better able to save temporarily illiquid but solvent banks from bankruptcy, which is a social benefit.

However, if it is socially efficient for the Fed to have pledging privileges, shouldn't such privileges be given to private lenders as well? As mentioned in Section III, the efficiency gains of fractional reserve banking could not be had unless depositors gave up perfected collateral interest. But couldn't private bank debt such as certificates of deposit be made eligible for perfected collateral? The point is that whatever pledging rule is judged to be socially optimal, it is difficult to see why the Fed and private lenders should not both be subject to it, in which case unsubsidized fully collateralized discount window lending would make little difference.

My evaluation of Federal Reserve credit extended in the process of making payments is considerably different than that for discount window lending. First of all, daylight overdrafts and float generated in the process of making payments are not perfectly collateralized as are discount window loans. Moreover, daylight overdrafts are conceptually related to the credit generated by clearinghouses in connection with the provision of finality as discussed above. The fact that it was efficient for private clearinghouses to accept the generation of credit in that regard suggests that some portion of daylight overdrafts may be efficient. Since it is essentially feasible for the Fed to monitor reserve accounts electronically on a real time basis, it would also be feasible to eliminate daylight overdrafts.³⁸ However, to do so would make it costlier for banks to manage their reserve flows during the day. Banks would likely respond with a combination of increased use of correspondent balances for clearing purposes, increased effort to coordinate inflows and outflows of funds, and larger reserve accounts. So daylight overdrafts should be

reduced only to the extent found efficient based on proper pricing policy and the absence of subsidies.

Of course, the price of Federal Reserve credit generated in the payments system should also cover the cost of the supervisory and regulatory controls that the Fed must administer to protect its loans. In other words, the Fed should be careful to allocate such management costs efficiently as well, just as private clearinghouses had to allocate their costs. It has been said that the Fed's discount window gives it an advantage in managing the payments system. It should be clear that this makes little sense given the way the Fed runs the discount window. However, if it is efficient for a national clearinghouse to oversee the payments system, it is efficient for an institution like the Federal Reserve to do so. In the absence of restrictions on interstate branching, however, a national clearinghouse might easily have been organized by a group of private nationwide banks.³⁹

On the basis of this discussion, one can appreciate the concerns of some policymakers for maintaining a separation between banking on one hand, and finance and commerce on the other, and for limiting direct access to the payments system.⁴⁰ The separation of banking from finance and commerce would maintain a degree of homogeneity that would facilitate the monitoring and enforcement of safeguards in the interbank credit market. Moreover, as mentioned above, it was efficient for private clearinghouses before the Fed to limit their membership to a relatively exclusive core of banks, allowing other banks access to the clearing system through agent-member banks. This suggests that it is efficient for the Fed to restrict direct access to its national clearing system as well, both to protect Fed lending generated in the payments system and to protect the interbank credit market.⁴¹

Deposit Insurance

Deposit insurance is a promise to make good the value of covered deposits, in return for a bank's assets, in the event of a failure. The guarantee is essentially a put option on the assets of the bank that gives management the right to sell those assets to the guarantor for the value of the covered deposits.⁴² Because deposit insurance is a potentially costly contingent liability whose value is influenced by a bank manager's choice of assets, the guarantor must protect its funds by monitoring insured banks and enforcing restrictions on their behavior. Uninsured deposits and minimum capital requirements are two key provisions for protecting

the deposit insurer's funds. The discussion of deposit insurance below points out some pitfalls of such provisions. It then uses insights from the discussion of private payments arrangements to suggest a tough exclusion principle as a potential remedy, and to critique an alternative proposal, narrow banking. First, however, it points out a deficiency in the payments system that deposit insurance helps to correct.

As it is organized in the United States, deposit insurance is financed by assessments on participating banks. Because it does not involve the creation or destruction of currency, deposit insurance is neither necessary nor sufficient to protect the banking system against the monetary instabilities described above. It is not designed, as central bank lending is, to provide line of credit assistance to temporarily illiquid but solvent banks; nor does deposit insurance have anything to do with providing finality in the settlement process.

If deposit insurance has a role, it is a means of allowing depositors to better pool the risk of individual bank failures. Individual banks have an incentive to diversify to the point where the marginal benefit is just offset by the higher agency costs due to the reduced stake in the loans originated.⁴³ Non-traded loan portfolios are most efficiently diversified among those institutions specializing in information-intensive lending themselves, i.e., banks. Branching is probably the most important means of diversification, though interbank deposits, purchases and sales of loans, and loan syndications can provide the same benefits. The U.S. political system has, however, greatly restricted both intra- and interstate branching. The risk pooling made possible by deposit insurance may be useful as a means of diversifying bank assets in the presence of branching restrictions.⁴⁴ In other words, deposit insurance may be viewed as overcoming a deficiency in the payments system. The deficiency, however, arises not from a private market failure, but from inefficient political interference in the market for corporate control in banking.⁴⁵

While deposit insurance probably substitutes to some extent for diversification through free branching, it is beyond the scope of this paper to say how well it does so, especially relative to the alternatives mentioned above. It is possible, however, to point out some weaknesses in the means of protecting the insurance fund that tend to make deposit insurance inefficient. Consider uninsured deposits. These cushion the insurance fund by making it more likely that bank assets will cover insured deposits in the event of a failure. In practice, however, uninsured

deposits may not be a reliable cushion for two reasons. First, as we saw earlier, discount window lending makes it easier for uninsured deposits to be withdrawn from a weak bank before it becomes insolvent. Second, it is difficult for a public authority subject to political pressure to successfully precommit to not bailing out uninsured depositors ex post, especially in large bank insolvencies. In principle, bank capital also provides a cushion to protect the insurance fund. However, without the power to reorganize or recapitalize a weak bank before its net worth goes to zero, capital cannot provide a reliable cushion either.

Given that uninsured deposits and bank capital are unreliable cushions, an attractive alternative suggested by the behavior of the pre-Fed clearinghouses is to use the power to exclude. The insurer could reserve the right to exclude a bank from participating in the deposit insurance program if its capital falls below minimum requirements, or if it is perceived to be weak and mismanaged.⁴⁶ As was the case for the clearinghouses, the threat of expulsion would be a powerful disciplining device because its announcement would represent an adverse signal. If society wished to protect the depositors of an expelled bank, it could offer deposit insurance briefly following the announcement. Such a guarantee, though, would require higher minimum capital requirements and tougher participation standards to protect the insurer; but it might be necessary to make the exclusion principle politically viable. Roughly speaking, an efficient exclusion rule would fix the marginal cost of being tough (the compliance, monitoring, and enforcement costs) at the point where it equaled the expected marginal utility cost of claims on the insurer. Such a rule could leave the insurer open to some risk, though it would provide the optimal degree of protection.

A well-known proposed alternative to deposit insurance is the fail-safe, or narrow, bank.⁴⁷ This proposal involves restricting the assets backing checkable deposits to short-term marketable securities with little chance of declining in value due to credit or interest rate risk. One might imagine the Fed imposing such restrictions on banks in the payments system. It appears that narrow banking could, in principle, provide near perfect protection of the payments system with relatively little monitoring and enforcement costs.

It would do so, however, by destroying the efficient joint application of information-intensive lending to payments services and loans, reducing the rate

banks could offer on checkable deposits. One of the themes of the paper, however, is that it has always been possible for individuals to employ perfectly safe means of making payments, but with proper controls the public has accepted credit risk for the reduction in cost it has afforded. Moreover, since narrow banking would do nothing to provide a better diversification of nontraded loans to help overcome branching restrictions, it should not be viewed as an alternative means of risk pooling or insurance.

Narrow banking would protect the checkable deposit guarantee against abuse by bank managers. But checkable deposits are only a small part of total deposits, and their share is likely to shrink under narrow banking because of the lower checkable deposit interest rate. Unless the government could precommit to not guaranteeing other deposits, narrow banking would provide only marginal protection against abuses. By establishing the principle that a portion of deposits ought to be perfectly safe, narrow banking might even raise the expectation of a government guarantee for other deposits. Closing the deposit insurance agencies might lower expectations of such a guarantee, but weakening government controls on bank asset choice could lead to more severe problems if banks continued to expect such a guarantee. On net, narrow banking would appear to offer little relative to deposit insurance augmented with a tough exclusion principle as outlined above.

SUMMARY

This paper has analyzed the evolution and structure of the key components of the payments system: currency, the banking system, clearinghouses, the central bank, and deposit insurance. It began by pointing out efficiencies, such as recognizability and portability, that led particular commodities to be used as money. It explained the evolution of the payments system as driven by efficiency gains from substituting credit, i.e., claims on particular institutions, for commodity money. Two insights were stressed. Shipping and inventory costs of settling in commodity money were significantly reduced by making use of evermore sophisticated borrowing and lending arrangements. These economies were accompanied by evermore elaborate safeguards to protect the institutional lending that supported the efficiency gains.

Fractional reserve banking, banknotes, demand deposits, and checks were all explained as economizing on the use of commodity money. Systems to evaluate credit, monitor and enforce loan agreements, and extend credit on short notice are

productive both in originating loans to nonfinancial borrowers *and* in managing lending to support an efficient provision of payments services. This, I argued, explains why it has been efficient for payment services and information-intensive loans to be provided by the same set of institutions, i.e., banks. In addition, I pointed out that institutions specializing in nontraded loans could not be run efficiently as mutual funds. Par value deposits, like bonds, are an optimal part of a financial package to most efficiently monitor management and ensure an efficient choice of assets. Hence, this argument also explains that bank deposits have been par valued because it has been efficient to use them to fund nontraded loans.

The paper also discussed the Suffolk System and the check clearinghouses, two multilateral arrangements to further economize on the provision of payments services. They introduced centralized collection, collective net settlement, centralized holding of reserves, more extensive interbank lending, and payments finality. All involved more sophisticated uses of private credit to reduce payments costs. Consequently, the cooperative organizations imposed numerous rules and regulations on members and engaged in extensive supervision as well. For example, there were capital requirements and frequent examinations of member banks. Equally important was the power to exclude, by vote, a member shown to be weak. The private cooperative arrangements are particularly interesting because they represent the middle ground between an entirely decentralized payments system and one dominated by public authority. Hence, they provide examples, for comparison with actual and proposed public policies, of cooperative arrangements driven by efficiency rather than political concerns.

In the last part of the paper I focused on the possible need for public policies to protect the payments system. To repeat, it has always been possible to make payments safely with cash, but users of payments services have been willing to accept some risk for the benefits that private credit in place of commodity money has afforded. However, I explored whether the private development of the payments system was deficient by evaluating monetary policy, central bank lending, and deposit insurance in light of the earlier analysis.

Two features of efficient private bank structure, namely, par value deposits and fractional reserves, implied a useful role for monetary policy to protect the payments system. The clearinghouses protected

the banking system against widespread runs by temporarily restricting the conversion of deposits into currency. But currency restrictions were disruptive and the possibility of their use increased the likelihood of widespread runs themselves. Monetary policy was useful in this regard because it could, by creating the needed currency, protect the banking system against such disruptions.

In contrast to monetary policy, central bank lending neither creates nor destroys high-powered money. It involves making loans to individual banks with funds acquired by selling government bonds. I pointed out that private credit markets would be willing and able to provide emergency credit assistance on the same fully collateralized terms as the Fed discount window. Pledging rules explain the use of Fed emergency credit assistance. The efficiency gains of fractional reserve banking could not be had unless depositors gave up perfected collateral interest. This is reflected in the fact that banks cannot legally pledge specific assets against privately borrowed funds. The Fed's advantage is that it is allowed to perfect a collateral interest. I briefly considered altering the pledging rules. But whatever rule is judged to be socially optimal, it is difficult to see why the Fed and private lenders should not both be subject to it, in which case unsubsidized fully collateralized discount window lending would make little difference.

The Federal Reserve also extends loans, most importantly, as daylight overdrafts, in the process of making payments. Such loans are not perfectly collateralized as is discount window credit. Daylight overdrafts are conceptually analogous to the credit generated by private clearinghouses in connection with the provision of finality. Hence, some portion of Fed daylight overdrafts may be efficient. Likewise, it was efficient for private clearinghouses to limit their membership to an exclusive core of banks, with other banks accessing the clearing system through agent-member banks. This suggests that it is efficient for the Fed to restrict direct access to its national clearing system as well, to protect Fed daylight overdrafts and the interbank credit market.

Deposit insurance was the last public payments system policy to be evaluated. I interpreted such insurance literally as a means of allowing bank depositors to pool the risk of individual bank failures, not as a means of protecting the banking system against aggregate shocks. I argued that deposit insurance could be viewed as overcoming a deficiency in the payments system. But the deficiency arose because intra- and interstate branching, which is one

important means for banks to diversify nontraded loans, has been greatly inhibited by the political system. I also pointed out some weaknesses in the use of uninsured deposits and bank capital as means of protecting the insurance fund. Current pledging rules and discount window lending policy make it easier for uninsured deposits to be withdrawn from a weak bank before it is declared insolvent. It is also difficult for public authority not to bail out uninsured depositors *ex post*. Likewise, without the power to reorganize or recapitalize a weak bank before its net worth goes to zero, capital cannot provide a reliable cushion either.

In light of this point, I discussed the narrow bank proposal as a substitute for deposit insurance. My feeling, though, is that narrow banking would be unnecessarily costly because it would destroy the efficient joint application of information-intensive lending to the production of payments services and loans. Moreover, narrow banking would do nothing

to provide a better diversification of loans. Lifting branching restrictions would best do that. Most importantly, although it would protect the checkable deposit guarantee from abuse by bank managers, narrow banking would not protect any additional deposit guarantee such as might be difficult to avoid in the event of a large bank failure.

On the basis of the behavior of the pre-Fed clearinghouses, I argued that a tough exclusion principle would provide an attractive alternative to narrow banking. Banks could continue to fund information-intensive loans with checkable deposits, but the insurance agency could expel a weak or mismanaged bank, or one whose capital fell below a minimum requirement. The agency could even refuse to insure a bank too large or insufficiently diversified to handle safely. If society wished to protect depositors whose bank was expelled, it could do so by requiring sufficiently high minimum capital requirements and tough participation standards to protect the insurer.

ENDNOTES

1. See Lucas [1980], McCallum [1983], and Townsend [1980] for recent theoretical work motivating and emphasizing the medium of exchange role of money.
2. Jevons [1875] contains excellent descriptive and analytical material on the evolution of the payments system.
3. King and Plosser [1986] focus on this point.
4. See Townsend [1980 and 1986], and references contained therein, for theoretical analyses of these issues.
5. Humphrey [1984], p. 6, reports about 70 percent of all transactions as taking place with cash, though by value cash transactions account for only about 1.5 percent of the total.
Fama [1980] and McCallum [1985] discuss the possibility of an accounting system of exchange without money. See also de Roover [1979] and Usher [1967] on the early evolution of banking.
6. Richards [1929] contains a good discussion of goldsmith bankers and the evolution of English paper money.
7. The fact that a warehouse could charge a storage fee, *i.e.*, pay a negative rate of interest, does not diminish the usefulness of the analogy.
8. Boyd and Prescott [1986], Smith and Warner [1979], and Watts and Zimmerman [1983] contain excellent discussions of these issues.
9. See the discussion in Jensen and Meckling [1976], section 4.2.
10. An important exception, of course, was the temporarily fluctuating currency price of deposits that resulted from the restriction on cash payments during the pre-Fed banking crises. See Friedman and Schwartz [1963]. Private banknotes and non-par checks could circulate at a discount. However, when presented in person at the bank upon which they were drawn, they were paid at par.
11. Fama [1985] contains a nice discussion of this view of bank lending. See Goodhart [1987] and James [1987] for further discussion of this point.
12. See Gorton and Haubrich [1987] for a discussion and interpretation of the recent rise in loan sales.
13. Williams [1984] makes this point with regard to grain banking.
14. Since a check represents a personal promise to pay cash in the future, its acceptability requires a means of judging the reliability of the writer. Hence, checks are used when reliability is assured, such as for repeated purchases at the same firm, *e.g.*, for rent or for the purchase of groceries.
15. It is worth noting that the use of trade credit among non-banks is analogous to the use of interbank balances among banks.
16. Lindow [1963] reports a ratio of total bank capital (equity, loan loss reserves, and subordinated debt) to risk assets (total assets less cash and U.S. Treasury securities) from 1863 to 1963. The ratio falls from 60 percent in 1880, to about 20 percent at the turn of the century, to under 10 percent by the 1960s.

17. Strictly speaking, this argument explains only why bank deposits are par valued. It does not explain why they are valued in nominal units and not, for example, indexed to the price level. Perhaps it is because banks evolved as commodity money warehouses. In any case, this is a more general question which is beyond the scope of this paper to address.
18. See Whitney [1878].
19. Mullineaux [1987], p. 890.
20. Cannon [1911] and Spahr [1926] contain good institutional histories of check clearing.
21. Financial center banks, having numerous correspondent relationships with country banks, also provided check collection economies similar to those provided by the Suffolk System for note redemptions.
22. Westerfield [1921], pp. 634-39.
23. *The Constitution of the New York Clearinghouse Association* [1903], Section 13, p. 9.
24. For example, *The Constitution of the New York Clearinghouse Association* [1903], Section 20, p. 13, provided for expulsion of a member by majority vote.
25. See, for example, *The Constitution of the New York Clearinghouse Association* [1903], Section 25, pp. 14-15.
26. Gorton and Mullineaux [1987], and Timberlake [1984] emphasize the private regulatory and supervisory nature of clearinghouses.
27. For alternative discussions of policy issues, see Eisenbeis [1987], Heurtas [1987], and Ireland [1987].
28. See Garbade and Silber [1979].
29. See Goodfriend [1987] for a discussion of the efficiency gains, feasibility, and mechanics of central banking under a gold standard.
30. Benston, et al. [1986], pp. 53-60, and Goodfriend and King [1988], make this point.
31. Goodfriend and King [1988] emphasize that last resort lending is monetary policy. It is effective because the provision of high-powered money can prevent nominal interest rate increases and asset price declines from making the banking system insolvent.
32. For example, Continental Illinois Bank borrowed extensively at the Fed discount window from May 1984 to February 1985. It was in the window for over 4 billion dollars during much of that time. See Benston, et al. [1986], pp. 120-24.
33. See, for example, Flannery [1988].
34. Mingle, Humphrey, and Summers [1987], p. 12, reported total funds transfer daylight overdrafts of 76 billion dollars per day. This is an enormous number when one considers that total reserve balances with Reserve Banks were then around 35 billion dollars. Daylight overdrafts are currently not priced, though plans are now in place to do so by 1992. Overdrafts are interest free loans. Therefore, depository institutions have little incentive to economize on their use. To limit somewhat the use of intraday credit the Fed monitors depository institutions according to "caps" and relatively informal guidelines, resorting to consultations with bank officials when necessary.
35. The Monetary Control Act of 1980 directed that Federal Reserve check float be priced at the federal funds rate. Hence, Fed check float has fallen from 7.4 billion dollars in the first half of 1979 to under 1 billion dollars today. See "Tug-of-War Over Float," [1983], U.S. Congress, *The Role of the Federal Reserve in Check Clearing and the Nation's Payments System* [1983], and Young [1986].
36. Goodfriend and King [1988] evaluate the feasibility and desirability of discount window lending to illiquid but solvent banks.
37. See *American Jurisprudence* [1963], Vol. 10, pp. 390-401 for the banking law on the pledging of bank assets.

The ability of depository institutions to use repurchase agreements (RPs) as a funding instrument is a breach in the pledging prohibition for private lenders. Using RPs, legally characterized as a sale and repurchase of securities, effectively allows a depository institution to give private lenders a collateral interest in the RP'd securities. Bank use of RPs is limited by a 1969 Federal Reserve rule restricting RP collateral to direct obligations of the United States or its agencies. This restriction precludes a significant role for private emergency credit assistance to banks based on RPs.

Thrifts borrow on a secured basis using RPs, mortgage-backed bonds, and Federal Home Loan Bank advances. The 1980 Monetary Control Act also gives thrifts access to the Federal Reserve's discount window. Thrifts, however, have had little need for the Fed's discount window given the other means of collateralized borrowing available to them.

Prior to passage of the Financial Institution Reform, Recovery, and Enforcement Act of 1989 (FIRREA), it was unclear whether the deposit insurance agencies would respect a collateral interest for RP lenders. Such uncertainty has been greatly reduced under FIRREA. FIRREA (Sec. 212) views an RP as a "qualified financial contract" and states that no person shall be stayed or prohibited from exercising his right to liquidate RP collateral. Thus, the way is cleared for greater private RP-based emergency credit assistance to thrifts.

Uninsured creditors of thrifts have shifted out of deposits and into RPs as such institutions have become troubled. Below, the article emphasizes that the Fed discount window allows uninsured depositors to move from last to first in line. In the case of troubled thrifts, however, RPs and FHLB advances, rather than discount window loans, have facilitated this process.
38. The new Swiss Interbank Clearing System instituted in January 1988 has done so, at least for non-security transactions.
39. For example, a national clearinghouse run by private banks was established in Canada around the turn of the century, well before the Canadian central bank was founded in 1935.
40. See Corrigan [1987].
41. Goodfriend and Whelpley [1987] document the Fed's regulatory role in the evolution of the federal funds market.
42. See Merton [1977].

43. Agency costs include the costs of structuring, monitoring, and bonding a set of contracts among agents with conflicting interests, plus the residual loss incurred because the cost of full enforcement of contracts exceeds the benefits. See Jensen and Meckling [1976], pp. 306-10.
44. For a related discussion see Brickley and James [1987].

Although nationwide branch banks would be diversified against local risks, as Edwards [1988] argues, hundreds of smaller banks would remain viable in a deregulated system. The large diversified banks, however, would be positioned to provide small bank depositors with private insurance, either directly or through loan syndications.

It must be emphasized, however, that branching and deposit insurance only yield benefits associated with

diversification and risk pooling. Neither is capable of protecting against aggregate shocks. As discussed in Section V, aggregate monetary shocks must be addressed with monetary policy. As Goodfriend and King [1988] emphasize, protection of the banking system against aggregate real shocks must be in terms of a tax and transfer fiscal policy.

45. White [1981] provides evidence at the state level that deposit insurance was seen as a substitute for branching.
46. This suggestion is very close in spirit to that advocated in Benston and Kaufman [1988]. See Stelzer [1981] for an interesting discussion of the antitrust implications of exclusion.
47. See, for example, Litan [1986].

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