
FRBSF WEEKLY LETTER

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Controlling Payments System Risk

On an average day, more than \$1 trillion in payments are exchanged by depository institutions (hereafter, "banks") over large-dollar, or wholesale, wire transfer networks. In doing so, banks create and extinguish a huge volume of intraday credit, and thus may expose the financial system, even though for a short time, to the risk that a participant on one of these networks could fail before it had repaid its intraday obligations. The ramifications of this exposure for the stability of financial markets are discussed in this *Letter* along with the Federal Reserve System's program to reduce and control risks on large-dollar networks.

Large-dollar networks

Large-dollar networks are electronic telecommunications networks that enable banks to transfer funds much more quickly and with greater security than checks and other paper-based payments systems. However, because the per-transaction cost of using these electronic networks is high compared to paper-based systems, their greater speed and security are attractive primarily for time-critical, large-dollar payments among banks and large corporations. In fact, the average size of transfers on large-dollar networks is well in excess of \$2 million.

A transaction can involve two steps: clearing and settlement. For example, a corporate payor ("sender") directs its bank to make a payment to another corporation by "wiring" funds from its account to the bank at which the other corporation (referred to as the "receiver") has its account. The sender's bank ("sending bank") sends the network clearinghouse the payment information, including the amount of the payment, the names of the payor, receiver, and the receiver's bank. The network clearinghouse then debits the account of the sending bank and credits the account of the receiving bank and notifies it of the payment — a process known as "clearing". The payment is not "final," however, until "good" funds are transferred at "settlement", which takes place either at the

time the payment message is received or at the end of the day in the case of a network that delays settlement.

Currently, two facilities are involved in the bulk of large-dollar payments transactions in this country. Fedwire, operated by the Federal Reserve System, provides settlement services and enables participating banks to effect payments of good funds through reserve accounts at the twelve regional Reserve Banks. Transactions on Fedwire are final (and good funds are transferred) at the time notification of payment is received by the receiving bank. Nevertheless, because the Fed does not require banks to balance their accounts continuously throughout the day, it is possible for a bank to overdraw its reserve account prior to Fedwire's closing at the end of the day by making payments in excess of its reserve account balance.

The second major facility, CHIPS (Clearinghouse Interbank Payments System) also handles a substantial volume of large-dollar payments, particularly those involving international dollar payments. CHIPS is a network clearinghouse operated by a group of private banks through the New York Clearinghouse Association. In contrast to Fedwire, payments on CHIPS are not final until the end of the day, when each bank's position with the clearinghouse is determined by netting its debits to its CHIPS account against the credits to its account. A "net net settlement sheet" is then presented to the New York Fed and reserve account balances are transferred to those in a net credit position as soon as the Reserve Bank receives fed funds from those in a net debit position.

Thus, at any time during the day, one or more CHIPS participants may have net debit obligations substantially in excess of their reserve account balances. They must make up this shortfall by the end of the day, or risk being unable to settle with the clearinghouse.

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Credit risk

Despite differences in settlement procedures, transactions on both CHIPS and Fedwire ultimately are settled through the transfer of reserve account balances from one bank to another. Today, the stock of these balances is minuscule in relation to the daily volume of transactions. Receipts and disbursements are not synchronized and reserve account turnover is rapid (on the order of 25 times a day). Moreover, participants on both CHIPS and Fedwire rely heavily on the extension of intraday credit to bridge timing gaps.

On Fedwire, the Fed extends credit by providing finality of payment to receiving banks and by permitting sending banks to overdraw their reserve accounts during the day. On CHIPS, in contrast, receiving banks in effect extend credit by accepting payments from a sending bank that is in a net debit position to the clearinghouse. On both networks, these extensions of credit are very short-lived, "maturing" at the close of the business day.

Like any other extension of credit, there is a risk to the lender that the borrower will be unable to repay the loan at maturity. Moreover, the risk of default may rise as the amount borrowed and the leverage of the borrower increases. As a result, those who bear the risk on these networks have at least some incentive to monitor and control the size of their net debit exposures to any given participant.

Too much risk

Although the Fed on Fedwire and receiving banks on CHIPS attempt to monitor and control their exposures to risk, many observers believe that the overall level of risk on large-dollar networks is too high from society's perspective. As an article in the Spring issue of this Bank's *Economic Review* details, there are several reasons for this view.

First, the intraday credit extended by the Fed on Fedwire is underpriced. The Fed does not charge for the time value of the credit it advances when banks incur "daylight" overdrafts. Similarly, the Fed does not charge for the default risk it assumes while banks are overdrawn. This underpricing leads participants on Fedwire to incur daylight overdrafts more often and to a much greater extent than otherwise, perhaps exposing the system to greater risk than may be optimal.

Second, Mengle, Humphrey, and Summers have argued that the incentives to limit the use of intraday credit on private networks such as CHIPS also may not be sufficiently strong from society's perspective. Unlike Fedwire, there is a risk on a private network that one participant's inability to settle its debit obligation at closing would affect others' abilities to settle, and possibly cause a chain of payment failures and disrupt financial markets.

They argue that because any given participant does not bear the full cost of the risk that it imposes on the system as a whole, it will not limit its use of intraday credit sufficiently. (In this sense, intraday credit on private networks, like that on Fedwire, can be thought to be underpriced.) Moreover, if the network's participants believe that the Fed, as lender of last resort, would be willing to avert systemic settlement failure through open market operations or discount window advances, they would have even fewer incentives to limit their own reliance on intraday credit.

For the banks involved in large-dollar payments, the value of the subsidy provided by underpriced intraday credit has increased over time. The high interest rates of the late 1970s and early 1980s made it costly both for banks to hold reserves (which did not earn explicit interest) at the Fed and for corporations and households to hold zero-interest demand deposits. Consequently, both groups had incentives to develop cash management techniques that reduced holdings of reservable transactions balances and permitted investment in higher yielding instruments. In general, these techniques reduced required reserve balances by increasing turnover through an increase in the number and size of transactions on the wire networks. Because intraday credit has been underpriced, few resources were expended to ensure that the timing of receipts and disbursements matched. Instead, these systems were designed to rely heavily on credit to bridge gaps in timing.

Controlling risk

Because of its concern for the risks involved in large-dollar networks, the Fed adopted a policy in 1986 to reduce risk on private networks and to tighten control of risk on Fedwire. Under this policy, banks are encouraged voluntarily to establish limits on the net amount they can owe at any one time across all large-dollar networks ("cross-system sender net debit cap"). Also, they are encouraged to set limits on the net amount they can owe to the participants on any one network. In other words, banks using only Fedwire or only CHIPS agree to place limits on the

amount they send in excess of what they receive. Banks using both networks also agree to limit their overall use of intraday credit such that an increase in borrowing on one network automatically reduces their borrowing capacity on the other.

These limits, or "caps," are established as specified multiples of each bank's capital, depending on that institution's assessment of: 1) its own creditworthiness, 2) its credit policies towards customers and other management policies and controls, and 3) its ability to monitor and control the intraday credit risk it poses to the network or the Federal Reserve. Although this program is voluntary, only those institutions that perform a self-evaluation and file a cap are permitted to incur daylight overdrafts on Fedwire. Moreover, those institutions that are also participants on CHIPS are required by CHIPS rules to establish limits on the net amount of credit they are willing to grant to any given sender on the CHIPS system.

When this policy was first introduced, the Fed set high multiples for the cross-system caps. The goal at the time was to give banks an opportunity to adjust to a new regime while reducing intraday credit usage primarily at the institutions that incurred the largest overdrafts. Overall usage was expected to decline by a modest five to seven percent. In the year or so that the policy has been in effect, the volume of intraday credit has declined relative to what it would have been given the growth in transactions volumes. Moreover, the largest overdrafters have indeed taken steps to reduce their reliance on intraday credit.

These successes notwithstanding, the Board of Governors stated even at the time the new policy was announced that it intended to bring about further reductions in intraday credit usage. Consequently, the Board recently decided, among other things, to reduce the cap multiples by 25 percent. Moreover, the New York Clearinghouse has indicated its intention to move CHIPS to settlement finality as soon as practicable to reduce the risks associated with delayed settlement mentioned above.

Implications

The Fed's policy has had the impact of limiting the availability of intraday credit on wire net-

works. However, even with the most recent reductions, which will take effect in the first half of 1988, the extent of this impact will likely remain modest. If the policy were made more restrictive, a market for intraday funds likely would develop, enabling banks that are constrained by one or more caps to purchase funds for a few hours from banks that are not so constrained.

The development of a market price for intraday funds would have distinct advantages. In general, it would provide price incentives for banks to reduce their reliance on intraday credit. Currently, only a very few large overdrafters' behavior is constrained by the caps. A positive price for intraday credit, by contrast, would affect banks' intraday credit usage even at levels below the caps. Consequently, every bank would have incentives to alter payments practices to match better the timing of receipts and disbursements. Moreover, for those institutions that generally do not incur overdrafts, pricing may provide a modest incentive to hold additional reserves to lend in the intra-day funds market.

The development of an intra-day funds market would be especially rapid if the Fed were to develop a system that charged an explicit price for daylight overdrafts. Such an approach would be difficult to implement, given current accounting systems and problems with the queuing of wire transactions. Potentially, there are more fundamental difficulties with pricing. Some observers are concerned about the systemic risks that might be associated with the incentive overdraft pricing would create to shift risk exposure now borne by the Reserve Banks to private participants or to other countries where the limits on overdrafts are not as restrictive.

For these and other reasons, the Board of Governors in late July asked its Large-Dollar Payments System Advisory Group and a System staff task force to explore more fully the pricing of overdrafts, further cap reductions, clearing balance requirements, collateralization, and other techniques for reducing the risks associated with large-dollar transfers.

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BANKING DATA—TWELFTH FEDERAL RESERVE DISTRICT

(Dollar amounts in millions)

Selected Assets and Liabilities Large Commercial Banks	Amount	Change	Change from	7/23/86
	Outstanding 7/22/87	from 7/15/87	Dollar	Percent ⁷
Loans, Leases and Investments ^{1 2}	202,710	- 844	4,269	2.1
Loans and Leases ^{1 6}	179,579	- 1,064	1,139	0.6
Commercial and Industrial	51,548	- 380	164	0.3
Real estate	69,445	- 82	2,529	3.8
Loans to Individuals	36,973	107	4,090	9.9
Leases	5,429	- 2	93	1.6
U.S. Treasury and Agency Securities ²	16,171	206	5,637	53.5
Other Securities ²	6,961	16	460	6.1
Total Deposits	203,828	- 5,179	285	0.1
Demand Deposits	49,599	- 4,559	162	0.3
Demand Deposits Adjusted ³	35,097	- 1,701	217	0.6
Other Transaction Balances ⁴	19,560	- 177	3,247	19.9
Total Non-Transaction Balances ⁶	134,669	- 443	3,370	2.4
Money Market Deposit Accounts—Total	44,426	- 344	2,473	5.2
Time Deposits in Amounts of \$100,000 or more	31,653	- 149	4,432	12.2
Other Liabilities for Borrowed Money ⁵	22,221	- 1,199	2,493	10.0
Two Week Averages of Daily Figures	Period ended 7/13/87	Period ended 6/29/87		
Reserve Position, All Reporting Banks				
Excess Reserves (+)/Deficiency (-)	- 24	217		
Borrowings	18	18		
Net free reserves (+)/Net borrowed(-)	- 42	199		

¹ Includes loss reserves, unearned income, excludes interbank loans

² Excludes trading account securities

³ Excludes U.S. government and depository institution deposits and cash items

⁴ ATS, NOW, Super NOW and savings accounts with telephone transfers

⁵ Includes borrowing via FRB, TT&L notes, Fed Funds, RPs and other sources

⁶ Includes items not shown separately

⁷ Annualized percent change