
FRBSF WEEKLY LETTER

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Moral Hazard in Payments Systems

Payments systems enable financial institutions and their customers to exchange funds and effect transactions quickly and efficiently. For high-value transactions, there are two main payments systems in the U.S.: Fedwire, managed by the Federal Reserve System, and CHIPS (Clearinghouse Interbank Payments System), managed by the New York Clearinghouse Association, a group of private banks. "Large dollar" payments systems can entail considerable systemic risk (that is, the risk that the failure of one transaction could trigger the failure of many other, related transactions). The success of efforts to control systemic risk depends on how effectively such measures control the "moral hazard" that is at the heart of systemic risk. The story of how systemic risk arises, and how effectively moral hazard is controlled on Fedwire and CHIPS, are the topics of this *Letter*.

Risks in payments systems

Transactions initiated through a payments system typically involve two steps: clearing and settlement. Once the payor (which may be a bank or a bank's customer) initiates a transaction, the clearinghouse or other system manager debits the system account of the payor's bank and credits the system account of the recipient's bank; this is the clearing phase of the transaction. In the settlement phase, the payment is made "final" through the transfer of "good" funds, which, in the U.S., are reserve account balances at the Federal Reserve.

On Fedwire, settlement occurs prior to clearing, in the sense that the Federal Reserve credits good funds to the receiving bank's reserve account at the time that the bank receives notification of payment, but it does not debit the sending bank's reserve account until the end of the day. On CHIPS, in contrast, clearing occurs prior to settlement; all payments are "provisional" until good funds are transferred at the end of the day.

Both Fedwire and CHIPS permit participating banks to send payments during the day that exceed the balance in their reserve account. On

Fedwire, where transfers are final at the time of notification, this practice puts the Federal Reserve in the position of granting intra-day credit ("daylight overdrafts"), which, in turn, exposes the Fed to the risk that the sending bank could fail before the end of the day and not cover its overdraft. On CHIPS, in theory, no analogous credit is extended, since all payments are provisional until settlement at the end of the day.

At the same time, however, it is common practice on all large-dollar systems for participants to make transferred funds available to recipients soon after notification of payment. To the extent that CHIPS participants are doing this, they are making funds available before settlement, and are thus exposing themselves to credit risk. For example, by allowing recipients to withdraw funds from their account before settlement, CHIPS participants face the risk that in the event good funds to cover the withdrawals are not forthcoming, they will not be able to recover the funds from their customers.

On systems such as CHIPS, where there is some risk that initiated transactions will not be settled, there also exists a "systemic risk" that one participant's settlement default will trigger a chain reaction, resulting in many interdependent transactors being unable to settle. Systemic risk, as distinct from the credit risk faced by individual participants, exists because of a "moral hazard" problem; namely, individual participants do not bear all the risk that their transactions generate. The costs of systemic risk include both the costs of the increase in credit risk faced by interdependent participants and the transactions costs of "unwinding" defaulted payments, which, for a major default, might entail substantial disruption in financial markets.

Controlling systemic risk

To control systemic risk on CHIPS, beginning this fall, participants will be required collectively to guarantee transactions on this system by posting a total of about \$4 billion in collateral to cover defaults by system participants. The collateral

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fund technically should eliminate most of the systemic risk on CHIPS, since all but the largest defaults would be covered, thereby short-circuiting a chain of defaults among many participants.

On Fedwire, the Federal Reserve's offer of immediate payment finality precludes systemic risk. By granting immediate credits to receiving banks' accounts and delaying debits from sending banks' accounts, there is no risk to participants that a transaction will not settle; the Federal Reserve System takes all of this risk upon itself. When defaults occur, the Federal Reserve usually provides the liquidity to cover them. The most well known example of this involved the liquidity crisis of Continental Illinois Bank in 1984.

Moral hazard

However, when credit risk borne by the bank receiving payment is systematically reduced, banks may lose any incentive to control their credit risk exposure to other payments system participants. Because each individual bank's risk is perceived to be lower, its use of the payments system and exposure to other participants will increase. Thus, the very measures that are designed to reduce systemic risk in payments systems also may exacerbate the moral hazard that underlies systemic risk.

Consequently, on CHIPS, it is possible that the new collateral fund would not be effective in reducing risk, were it not for additional measures that will be put in place, as discussed below. Likewise, Fedwire officials have taken a number of steps to control risk, recognizing that the Federal Reserve's provision of daylight overdrafts and guarantee of payments finality otherwise would tend to aggravate moral hazard.

Reducing moral hazard

Both Fedwire and CHIPS are attempting to reduce moral hazard, and thereby both systemic risk and the risk exposure of the respective guarantors, the Federal Reserve in the case of Fedwire and the contributors to the collateral fund in the case of CHIPS.

At present, Fedwire policy requires that participants set sender "net debit caps" limiting the net amount that they can send in excess of what they receive. These caps limit daylight overdrafts and therefore the Federal Reserve's exposure to credit

risk. Moreover, the Federal Reserve is proposing that beginning in mid-1991, banks will be required to pay 0.25 percent interest (annual rate) on the amount of their average daily intra-day Fedwire overdrafts that exceeds 10 percent of their risk-based capital. Such a fee presumably would give Fedwire participants an even greater incentive to reduce their daylight overdrafts and thereby the risk exposure of the Federal Reserve.

However, the fee most likely is too far below the true time value of money to be effective. In comparison, the interest rate on reserves banks lend one another overnight in the federal funds market currently is around eight percent. Moreover, the overdraft fee is tied neither to an institution's credit-worthiness nor to the riskiness of the particular transaction. This further diminishes the fee's effectiveness in inducing desired changes in banks' behavior.

Thus, a higher, risk-adjusted fee may be appropriate, even though some observers worry that a high overdraft fee would induce Fedwire participants to try to synchronize payment inflows and outflows, thereby obstructing the smooth and efficient operation of Fedwire. If the overdraft fee were in fact so high that banks would prefer to delay transactions, we would expect the emergence of a private intra-day market to compete with the Federal Reserve Banks in providing intra-day good funds credit. Such a market could be expected to set risk-based prices for credit, which, in itself, would be beneficial in reducing systemic risk.

CHIPS' loss-sharing rule

On CHIPS, the proposal to reduce systemic risk also attempts to limit moral hazard. As discussed earlier, CHIPS is proposing to require each participant to post collateral to fund a \$4 billion pool that would guarantee settlement by covering virtually all defaults. The amount of collateral required of each participant will be determined by a loss-sharing formula, up to a predetermined maximum. This loss-sharing formula stipulates that a given participant's obligation to cover another's shortfall will be higher the higher is its allowable credit exposure to that participant.

Each CHIPS participant is required to establish a net credit limit on its transactions with every other participant. These "bilateral credit limits" determine the maximum amount of payments

outstanding that a participant is willing to accept from another, net of the payments it has outstanding to that other participant.

The CHIPS loss-sharing formula thus draws a direct link between each bank's self-determined maximum exposure to a given counterparty and its liability for losses due to the default of that counterparty. In this way, the rule should give banks an incentive to limit their potential bilateral credit risk exposure and thereby their potential contribution to systemic risk. In addition, it should give receiving banks an incentive to set lower credit limits on their transactions with less credit-worthy sending banks. This approach could prove highly effective in controlling systemic risk and moral hazard, provided participants have timely access to accurate information regarding other participants' behavior.

A private market?

Some have argued that the best way to control the risks involved in large-dollar payments systems is to allow a private market for intra-day funds to develop. Such an interbank market, the federal funds market, already operates for overnight funds. The primary reason it does not provide an intra-day credit facility is that the Federal Reserve has been providing unpriced intra-day credit on Fedwire.

In a private market, credit would be priced according to the credit-worthiness of the borrower, thereby providing incentives to control risk. Critics of such a proposal contend that the risk-based pricing that would arise in a private intra-day credit market would not adequately take into account systemic risk. The experience

of existing private clearing and settlement systems, which face systemic risk problems, suggests that this concern may be unfounded, however. The proposed collateral fund for CHIPS, for example, is one way to control systemic risk.

In addition, the private clearinghouses for the futures, options, and stock markets, such as the Options Clearing Corporation, effectively control systemic risk by legally assuming the obligation of guaranteeing the execution of each trade. Guaranteeing the execution of every trade, it is true, aggravates moral hazard, but these clearinghouses have taken a number of steps to reduce the probability that a member will default. For example, they set capital requirements, position limits, and other financial standards for members, they collect margin payments (a kind of collateral), and they continuously monitor the financial strength of and portfolio positions taken by member firms.

For the future. . .

The steps proposed by Fedwire and CHIPS to limit systemic risk and control moral hazard will strengthen the U.S. financial system. The proposed overdraft fee for Fedwire is a first step in reducing the potential liability of the Federal Reserve for losses due to Fedwire participant defaults. However, more extensive efforts to control moral hazard on Fedwire may be called for. In particular, risk-based overdraft fees and the type of loss-sharing rule proposed for CHIPS are indicative of the kinds of practices that could be considered for Fedwire in the future.

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