

Removing the Hazard of Fedwire Daylight Overdrafts

by E.J. Stevens

E.J. Stevens is an assistant vice president and economist at the Federal Reserve Bank of Cleveland. The author thanks John Carlson, Charles Carlstrom, Randall Eberts, and William Gavin for their useful comments on earlier drafts of this paper.

Introduction

The 12 Federal Reserve District Banks extend about \$115 billion of credit within a few hours on an average business day, only to take it back again before the close of business. This huge sum reflects banks' daylight overdrafts of their deposit accounts at Federal Reserve Banks when making large-dollar-value payments to other banks using Federal Reserve wire transfer systems.¹ If all goes well, subsequent receipts from other banks extinguish the daylight overdrafts before the end of the day.

Daylight overdrafts via Fedwire are not allocated by any market process and are free, a result of the order in which a bank's payments and receipts occur. The same might seem to be true of checks presented and deposits made to any checking account during a day, but there is a

crucial distinction: a Fedwire payment is irrevocable upon receipt, while a check is only a provisional payment. Therefore, the Federal Reserve is the party at risk if a daylight overdraft is not repaid by the end of a day.

Free daylight overdrafts are costly. Of course, the Federal Reserve faces no financing or resource costs in issuing daylight credit because it has the power to create money; failure of a bank to eliminate its daylight overdraft by the end of a day would simply add to Federal Reserve assets (claims on a bank) and liabilities (bank reserve deposits).² The costs arise from resource misallocations.

One source of these inefficiencies, and the focus of this paper, is the "moral hazard involved in providing free daylight overdrafts.³ Fedwire fully insures a payor bank's access to whatever volume of daylight overdraft credit it needs to make payments that are immediately available

¹ These systems include Fedwire, for transfer of reserve balances from one bank to another, and the securities wire, for transfer of book-entry U.S. government securities from one bank to another in return for reserve balances. The term Fedwire will be used here to refer to both systems. A third system, CHIPS (Clearing House Interbank Payment System), is operated by the private New York Clearing House Association; credit extended among participants in this system adds another \$45 billion of interbank daylight credit on an average day.

■ ² Failure to repay might result from a bank's insolvency, perhaps impairing the value of the asset, causing a charge against Federal Reserve income that would reduce Treasury receipts.

■ ³ Stevens (1988) provides a discussion of the probable nature of some resource misallocations resulting from this moral hazard.

and irrevocable. The result is a form of insurance that removes any incentive for payee banks to monitor or manage credit risk in receiving payments that payor banks fund with daylight credit.

Suggestions have been made to price Fedwire daylight overdrafts in an effort to control them. Market sources of funding would replace some or all Fedwire daylight overdrafts in making payments and would require compensation based on credit risk. Market discipline would then provide the now-missing incentive for payor banks to attend to risk, thereby avoiding moral hazard.

This paper suggests that economizing need not bring about the market discipline that would eliminate moral hazard. The first section provides a brief review of Fedwire daylight overdraft history, Federal Reserve payment system risk policy, and the problem of moral hazard. The second part shows how differences among three recently proposed daylight overdraft pricing mechanisms can influence the extent of daylight overdraft reduction and, more important, the way in which banks reduce daylight overdrafts. The final part argues that reducing Fedwire moral hazard does not depend on *how much*, but on *how* banks reduce daylight overdrafts, and that this should be a criterion for choosing among pricing proposals.

I. Fedwire Daylight Overdrafts and Moral Hazard

A bank goes into daylight overdraft when it has made more payments from its account at a Federal Reserve Bank by some point during a day than can be covered by its opening reserve-deposit balance plus payments received by that point in the day. A common example is that of a bank dependent on continuous overnight federal-funds borrowing. Operational convenience leads it to return the borrowed funds each morning, before borrowing replacement funds in the afternoon. The midday period is spent in overdraft, funded by the Federal Reserve.

As recently as 30 years ago, the U.S. large-dollar-value payments system was for the most part a cash-in-advance system. Irrevocable Fedwire payments were riskless both to payees and to the Federal Reserve because they were drawn against positive balances. Since then, Federal Reserve daylight risk exposure has mushroomed, associated with the telecommunications revolution in the payments mechanism, the proliferation of new financial instruments, and the explosion of trading volumes in worldwide money and capital markets.

A simple comparison illustrates the extent of

the change. In 1947, reserve-deposit balances represented 700 percent of (seven times) the value of daily debits (Fedwire, checks, etc.) to member-bank reserve accounts. That is, the average bank could make all of its own and its customers' payments for seven successive business days without ever receiving a single offsetting payment, and without exhausting its initial reserve-deposit balance. By 1983, balances were a minuscule 4 percent of daily debits. The average bank could meet demands for payment for only 20 minutes of a single eight-hour business day before it would have to receive some offsetting payments, or go into overdraft.⁴

Initially, the evolution from a cash-in-advance system toward automatic daylight credit seems to have gone undetected, but confronting the growing daylight credit risk problem became unavoidable in the late 1970s under the pressures of technological change and a demand for same-day net settlement service by potentially competing private large-dollar-value payment networks. Originally, starting in 1918, telegraph, telephone, or mail messages to the Federal Reserve were the only mechanisms for transferring ownership of reserve-deposit balances between banks with same-day finality. Related devices were official checks, offering only next-day finality, and interbank messages that simply instructed a bank to use Fedwire to transfer funds.

Introducing computer-to-computer telecommunications technology for payments by Fedwire and by the Clearing House Interbank Payment System (CHIPS), and for interbank message systems, suggested a new possibility in the 1970s. Private payment networks like CHIPS and the then-proposed CashWire network each would be capable of clearing payment messages among its own participants continuously during the day before presenting a single balanced set of net debit and credit positions to the Fed in time to achieve same-day final settlement.

Compared to the next-day systems prevalent then, this would offer the advantage of reducing costly overnight float financing of banks in net debit position by those in net credit position. In addition, it would shorten the length of time during which overnight float exposed banks to credit risk. Operating details of telecommunication devices, accounting-system modifications, backup facilities, and daily time schedules were laid out quickly, but the enterprise foundered on

■ 4 Reduced reserve requirements represent only a small portion of this change. To have maintained the 1947 reserve deposits/debits ratio with the 1983 volume of debits would have involved reserve deposits equal to an impossible two-and-a-third times the total assets of all commercial banks.

the "unpostable debit" — what to do if one of the participants had insufficient funds in its reserve account to cover its private network net debit at settlement hour.

Some found the unpostable debit an operational inconvenience to be ignored: from an operations perspective, it was no problem as long as the accounting system accepted negative numbers. After all, a Federal Reserve Bank did not check to see whether a bank had sufficient funds to cover a Fedwire transfer. Why should a net settlement message be treated any differently? Others found it troubling to design a system in which the central bank automatically would guarantee a private network settlement by accepting an unpostable debit as an offset to irrevocable credits. That issue is not fully resolved even today, but two developments did force some action with respect to daylight overdrafts.⁵

One development was the increasing incidence of *overnight* overdrafts of reserve accounts and adoption of the current Federal Reserve overnight overdraft policy.⁶ High interest rates, escalating wire-transfer traffic, and declining reserve requirements were making reserve-deposit accounts a less and less effective buffer stock in banks' daily reserve-balance management. With no formal overnight overdraft policy other than Regulation D (that banks maintain an average required balance over a one- or two-week reserve maintenance period), concern was mounting that banks might abuse the Federal Reserve by running overnight overdrafts when especially profitable opportunities arose.

Developing an overnight overdraft policy led to more widespread realization within the Federal Reserve that daylight overdrafts were a fact of life. Not only was there no mechanism in place to prevent daylight overdrafts, but neither was there a way to know how widespread the practice was. The second development was a carefully constructed survey of the incidence of daylight overdrafts. This provided the factual foundation for debating and developing the

initial Federal Reserve payment system risk (PSR) policy: guidelines for determining limits on daylight overdraft positions; continued recording of daylight overdraft positions (in addition to a real-time mechanism to control daylight overdrafts at problem banks and special institutions); and a stated intention to ratchet-down limits over time. Pricing daylight overdrafts now is being suggested as a next step for this policy.

The problem with free Fedwire daylight overdrafts is moral hazard. The term refers to the hazard an insurer faces as a result of the elimination of incentives for an insured party to avoid a risk precisely because any losses arising from that risk are covered by insurance. Fire, life, and casualty insurers protect against moral hazard in a variety of ways. For example, coinsurance in the form of deductibles or copayments gives the insured a stake in preventing loss; inspection and requirements to remove risks give the insurer the ability to manage risk.

Fedwire does have some similar protections. The payor bank's net worth is at stake if it is unable to repay its credit, constituting a form of coinsurance. Regulation, supervision, and examination of banks guard against imprudent banking practices, now extended to include payment practices. However, initial limits on daylight overdraft exposure deliberately have been set high, and do not yet apply to overdrafts from book-entry securities transfers. As a result, Fedwire moral hazard is real, particularly in the short run between bank examinations.

Payee banks have no reason to limit payments received during a day, regardless of the volume of daylight overdrafts per dollar of net worth of the payor bank, because the Federal Reserve is at risk. Payor banks face no external disincentives that would raise the cost of daylight overdraft credit as the volume they use increases and as their credit quality falls. Federal Reserve protections against moral hazard are not yet very strong.

II. Avoiding Daylight Overdrafts

Adjustments

Any bank could eliminate daylight overdrafts by holding more overnight reserve deposit balances, by borrowing balances for a few moments or hours during the day, or by modifying its own or its customers' payment practices to prevent a negative balance. Such adjustments might be costly, of course, but would be worthwhile if they cost less per dollar than a daylight overdraft.

■ **5** The most recent effort to resolve the unpostable debit issue is that of the New York Clearing House Association, which has adopted a requirement that CHIPS members participate in a loss-sharing arrangement. It also has proposed federal legislation apparently intended to give legal priority to network payment claims over all others if a network member becomes insolvent. See *American Banker*, April 7, 1989, pp. 1 and 16.

■ **6** Overnight overdrafts are subject to a penalty of the larger of \$50, or the larger of 10 percent or a rate 2 percentage points above the federal funds rate prevailing on the day the overdraft is incurred. The penalty charge is in addition to the cost of making up the reserve-deposit deficiency for reserve-requirement purposes.

A cost-minimizing bank might acquire excess reserves in the federal funds market. After meeting its temporary daylight need to cover payments, the bank would then have these extra funds available to hold, or to loan out overnight, if it could. The marginal cost of preventing a daylight overdraft would be the difference between the cost of borrowing and the return on lending.

A private daylight loan market does not now operate, but such a market would provide a second possibility for avoiding Federal Reserve daylight overdrafts? Daylight loans could redistribute existing reserve balances from banks having them and not needing them during the day for payment purposes, but only overnight for reserve-requirement purposes, to banks not having them and needing them during the day, but not overnight. Free Federal Reserve daylight credit preempts such a market now, but if daylight overdrafts were to become costly, and timely delivery were assured, borrowing in a daylight loan market might become an inexpensive way for a bank to prevent overdrawing its reserve account during a day, with repayment before close of business.

Finally, a bank could alter the amounts of debits and credits to its account, or their sequence during the day. It might do this by lengthening the maturity of its liabilities, or by adopting a continuing contract for federal funds borrowing, with daily renegotiation of the rate but no daily repayment and re-receipt of funds. Or, pairs of institutional customers operating in securities markets might be induced to net their transactions obligations during a day, producing a single net obligation for daily payment, again reducing debits that might now precede credits. Or, groups of banks might join in private payment networks, substituting daylight credit on the private networks for Federal Reserve daylight overdrafts. Only net settlement of end-of-day positions would need to be accomplished through Federal Reserve accounts.⁸

Modifying payment practices in these ways would involve some costs, too, such as paying higher rates on longer-term liabilities, or receiving lower prices or revenues for payment services when institutional customers engage in obligation netting, or sharing the cost of a private payment network. Some tactics would be more

expensive than others, so the marginal cost of preventing daylight overdrafts in reserve accounts by modifying payment practices would increase with the volume of overdrafts avoided.

In equilibrium, cost-minimizing banks would adopt the unique combination of adjustment mechanisms having marginal costs equal to or less than the marginal cost of a daylight overdraft. Pricing daylight overdrafts would lead banks to adjust from today's zero marginal cost to something higher.

Three Proposals to Price Daylight Overdrafts

Three specific pricing proposals that have been receiving attention are evaluated in this section.⁹ One would treat each daylight overdraft as an automatic overnight discount-window loan, booked at a penalty rate. A second would require a bank to hold additional balances at a Federal Reserve Bank in proportion to its daylight overdrafts. A third would simply impose a slight fee per dollar of daylight overdraft.

Penalty Rate The penalty rate proposal comes from Wayne Angell, member of the Board of Governors of the Federal Reserve System. A bank would be required to borrow the amount of any daylight overdraft as a collateralized loan from its Federal Reserve Bank discount window at an above-market penalty rate, but the Federal Reserve Bank would pay an explicit (below-market) rate of return on excess reserves.¹⁰ The combination of the two features means that, under normal circumstances, no bank would run a daylight overdraft intentionally and pay the penalty discount rate, because the maximum alternative cost would be only the interest-rate spread between the cost of financing extra excess reserves, perhaps the federal funds rate, and the earnings rate on excess reserves.

The same spread would become the cost of borrowing daylight funds in the likely event that a private daylight loan market developed. Banks

■ **7** Simmons (1987) contains an extensive discussion of daylight funds market possibilities.

■ **8** Humphrey (1987) and Board of Governors of the Federal Reserve System, Large-Dollar Payments System Advisory Group (1988) contain detailed explanations of a number of these potential modifications of payment practices.

⁹ These proposals are described in VanHoose (1988), the Angell proposal of a penalty rate; Hamdani and Wenninger (1988), supplemental balances; and Board of Governors of the Federal Reserve System, Large-Dollar Payments System Advisory Group (1988), fees.

■ **10** Penalty-rate borrowing would differ from an overnight overdraft in that a bank would be required to post eligible collateral for the loan associated with a daylight overdraft, but would not involve the cost of making up a reserve-deposit deficiency for reserve-requirement purposes.

would never pay more than this spread for a daylight loan because they could always borrow reserves in the federal funds market and lend at the overnight rate; lenders would never charge less than this spread because they could always sell their reserves at the federal funds rate, of course forgoing the rate earned on excess reserves.

Note, however, that excess reserves and a daylight loan market would be relevant only to the extent that daylight overdrafts were not eliminated by modifications in payment practices that were less costly than the rate spread.¹¹

Supplemental Balances The supplemental balance proposal has been described by the staff of the Federal Reserve Bank of New York. A bank would be required to hold a special interest-bearing deposit (the supplemental balance) in a current period equal to some fraction (the supplemental balance ratio) of prior-period daylight overdrafts of its combined reserve and supplemental deposit accounts. The maximum cost of a dollar's daylight overdraft today would be the supplemental balance ratio multiplied by the expected next-period spread between the cost of financing a dollar's supplemental balance and the rate earned on the supplemental balance. With both this rate spread and the ratio administratively fixed, the maximum cost of a daylight overdraft would be a simple constant amount per dollar of daylight overdraft.

The cost would set an upper limit on the market rate for daylight loans. And, as in the penalty rate case, supplemental balances and daylight lending would emerge only to the extent that less-expensive modifications in payment practices failed to eliminate daylight overdrafts.

Banks would not use ordinary non-interest-bearing excess reserves to avoid daylight overdrafts, because the cost of financing them at the federal funds rate normally would be greater than the supplemental balance ratio times the rate spread. Unlike the penalty rate proposal, the supplemental balance approach would not

necessarily eliminate all daylight overdrafts. Only at a very low earnings rate on supplemental balances (perhaps even a negative rate) would it be certain that banks would find payment-system modifications (or excess reserves) a cheaper way to avoid daylight overdrafts.

Fees The fee proposal has been suggested by the Federal Reserve System's Large-Dollar Payments System Advisory Group. It would simply have the Federal Reserve impose a fee for Fedwire overdrafts in excess of a base amount established for each bank. The maximum cost to a bank of a dollar's daylight overdraft would be that fee.

Extra excess reserves would not be used in this case unless the fee were set *higher* than the federal funds rate. A limited daylight loan market could develop, redistributing the required reserves of banks whose need for daylight balances was less than their need for required reserve balances. And, of course, neither daylight overdrafts nor daylight loans might be necessary if sufficient modifications in payment practices were forthcoming at a marginal cost less than the fee.

In brief summary, then, each of the three pricing proposals might be capable of eliminating Federal Reserve daylight overdrafts entirely through inexpensive modifications in payment practices. However, if modifying payment practices and redistributing required reserves through a daylight loan market were not sufficiently responsive to price, the outcome of pricing would differ substantially among the three proposals:

- The penalty rate regime would eliminate *all* remaining daylight overdrafts by expanded holdings of excess reserves and their redistribution in a daylight loan market.
- The supplemental balance regime would eliminate *some* of the remaining daylight overdrafts by expanded holdings of reserves in the form of supplemental balances and their redistribution in a daylight loan market.
- The fee regime would eliminate *none* of the remaining daylight overdrafts, unless the fee became a penalty rate.

III. Pricing and Moral Hazard

Each of the three pricing proposals could reduce daylight overdrafts, but to what extent would they reduce moral hazard? None of the proposals would directly relate price to a bank's credit quality or to the volume of its daylight overdrafts. Nor would any of them introduce the kind of actuarial relation between price and risk exposure needed to establish an insurance fund.

■ 11 Note also that the penalty rate proposal contains the seeds of a problem for monetary policy. Extra demand for excess reserves would be matched, on average, by extra supply through open market operations, maintaining a policy-desired level of the federal funds rate, on average. However, the variability of the federal funds rate around the average rate might increase, reflecting variations in payment needs for balances within a day, or perhaps day-to-day, unrelated to reserve requirements and monetary growth. A bulge in payment needs that drove up the daylight loan rate during a day would drive up the federal funds rate by the same amount, because the overnight earnings rate on excess reserves is administratively fixed. No creditor would lend federal funds during the day for less than the sum of the daylight loan rate and the overnight rate. As long as policymakers value the federal funds rate as a tool or information variable, adopting the penalty rate proposal might involve some risk of less-precise policy implementation.

Reduced moral hazard would have to come as a by-product of pricing, in some form of enhanced market discipline. This could not be administered by payee banks on Fedwire, for they remain free of any risk in receiving payments. Results, therefore, could come only from the behavior of other creditors, or from eliminating payments requiring daylight funding. Investigating the adjustment mechanisms banks could use in response to pricing, however, reveals an uncertain basis for expecting market discipline to flourish.

Excess Reserves

Both the penalty rate and the supplemental balance proposals could create a need to finance extra holdings of interest-bearing reserve balances. In both proposals, the earnings rate on those balances would be uniform across all banks, but the rate paid in the market to finance the extra balances might vary with the credit quality of a payor bank. If so, then the marginal cost of avoiding or funding a daylight overdraft would vary with the credit quality of the borrowing bank, injecting market discipline into payments.

Of course, moral hazard in the current deposit-insurance systems tends to dampen the role of credit quality in pricing both deposits and deposit insurance, and in pricing any kind of financing for a bank considered "too big to let fail." However, to the extent that a bank's marginal cost of funds can vary with credit quality, moral hazard would be diminished relative to the current arrangement of free daylight overdrafts.

Daylight Loans

Similar assertions are made about the market discipline of a daylight loan market: if pricing induced banks needing daylight funds to borrow them from banks having surplus daylight funds, risk premiums would emerge in daylight loan rates, as market scrutiny sorted borrowers by credit quality.

¹² Another strand of thinking about daylight overdrafts would add a third qualification, also relevant to excess reserves: the "event risk problem." Creditors might not have a way to assure themselves that the debtor would not borrow additional sums, an event raising the riskiness of their loans after-the-fact. If this were the case, early credit would be underpriced and risk premiums too low. This is a problem for any creditor, and gives rise to restrictive covenants in lending agreements. To be a serious qualification in the daylight loan case, however, would require a demonstration both that the second qualification does not hold, so that private lenders actually are at risk, and that covenants in standard daylight loan agreements combined with innovations in electronics network monitoring, such as already exist in CHIPS, could not deal with the problem. An elaborate treatment of the underpricing over lending case can be found in Gelfand and Lindsey (1989).

This argument needs two qualifications.¹² One is that neither the supplemental balance nor, more especially, the fee proposal provides much basis for an extensive daylight loan market. Balances available for daylight lending would be limited to those of banks whose need for payment balances was less than their required, or required plus supplemental, reserve balances. This suggests only a limited stock of reserve deposits available for market allocation of daylight loans to replace free daylight overdrafts, at least relative to the penalty rate proposal.

The second qualification recognizes the too-easy presumption that daylight lenders actually would be at risk. The presumption rests on an apparent analogy between unsecured overnight interbank loans in the federal funds market and the envisioned unsecured intraday interbank loans in a daylight loan market. Whatever the similarity between overnight and intraday lending, it does not extend readily to risk of loss.

Federal funds loans are risky even though their dominant maturity is only one day. While deposit insurance and the "too big to let fail" maxim may minimize risk, it is still possible for a bank to be closed, resulting in at least a delay in repayment, if not partial or complete loss of interest and principal to its federal funds market creditors. Even with assurance that a loan is for only one day, banks routinely impose limits on their lending to individual banks as a matter of credit policy, and risk premiums sometimes are required.

Daylight loans would seem to be much closer to a riskless opportunity. Under what circumstances could a borrower fail to repay? One is if regulatory authorities closed the bank *during* a day, rather than following the precedent of closing banks only after close of business.

Closing a bank in the midst of a day's business would seem exceedingly awkward in a financial and legal environment where the timing of competing claims arriving by different means (over the counter, mail, messenger, telephone, day-ahead magnetic tape, off-line telecommunication, on-line telecommunication) is not readily distinguished. In fact, one by-product of pricing daylight overdrafts could be a standard timetable for posting each off-line activity to the daylight balance monitor, and use of that standard for defining priorities among claimants. Such a monitor could make intraday closings easier to arrange, but unless all of this were to become well established, authorities are not likely to close a bank during daylight hours.

Ruling out unexpected daylight closings means that all lending and borrowing banks would have access to Fedwire, and could make irrevocable repayment of daylight loans if they wished to do

so. Daylight loans could be riskless because, in the normal case, a bank *unexpectedly* in trouble would in no way be prevented from sending Fedwires to repay daylight loans, even though that were to result in a daylight overdraft.

It may seem ludicrous to imagine a bank borrowing in the daylight loan market in order to avoid a daylight overdraft, but then repaying the loan later the same day by going into daylight overdraft—except as part of a tactic calculated to trigger a discount-window loan or an overnight overdraft. Nonetheless, the point is made—that any bank on the ex post monitor could make irrevocable repayment of a daylight loan during banking hours *if it wanted to do so*. Daylight loans would carry the risk of nonpayment only if the borrowing bank preferred to default on the loan rather than overdraw its account at a Reserve Bank. Daylight loans are riskless unless there are good reasons to think that any unexpectedly insolvent bank would prefer default in the market to overdraft at the Federal Reserve and potential closing.

The inexpensive technology of ex post monitoring of daylight overdrafts is perfectly adequate for ex post booking of a penalty rate loan, or ex post calculating of a supplemental balance to be held in the future, or ex post billing of a simple fee. The difficulty with the technology is that it leaves unclear who is at risk, or perhaps makes only too clear who is *not* at risk, in interbank daylight lending. As long as interbank daylight lending is riskless, no market discipline emerges from it. The moral hazard of free Federal Reserve daylight overdrafts would remain the moral hazard of private daylight loans.

Payment Practices

Modifying payment practices would be expected to reduce moral hazard. For example, as banks replace overnight federal funds with longer-maturity financing, their creditors would accept and demand compensation for additional risk. This risk formerly was accepted by the Federal Reserve, when daylight overdrafts provided an automatic means for an unexpectedly insolvent bank to close without having renewed its overnight credit.

A different example of risk shifting is that of netting the many payments of two customers into a single obligation. This would eliminate moral hazard because self-interest of the parties in the netting process would demand risk evaluation and compensation and would impose limits on any credit-risk exposure they might assume with respect to one another.

As a third example, pricing would encourage

the migration of payments from Fedwire to private networks. Moral hazard would diminish as payments shifted to private systems because, with prerequisite credit limits and loss-sharing agreements in place among participants, banks would be expected to ration and/or price network credit on the basis of credit quality.

How Much Good Would Pricing Do?

One thing certain is that none of the proposals would enlist the self-interest of payee banks directly in monitoring the credit quality of payor banks. As long as Fedwire provides irrevocable ownership of good funds upon receipt, payee banks do not extend credit in the Fedwire payment process, are not at risk, and have no incentive to monitor the credit quality of payor banks.

Market discipline would have to originate from other pressures on payor banks to manage payment risks. That said, the most crucial unknown factor is the rate at which the marginal cost of modifying payment practices rises as the volume of eliminated daylight overdrafts increases. If this marginal cost rises relatively slowly, so that inexpensive modifications effectively will eliminate all Fedwire daylight overdrafts, then moral hazard should disappear, supplanted by the market discipline of risk-sharing agreements in private payment networks, by netting agreements among banks' customers, and by the risk aversion of banks' creditors (and, perhaps in the future, of banks' insurers).

On the other hand, if this marginal cost rises relatively rapidly, the major burden of rationing daylight overdrafts would have to be borne through the direct mechanism of a pricing scheme. In this event, conjecture becomes somewhat more dependable — at least concerning the relative strengths of the three proposals.

The penalty rate proposal, while eliminating daylight overdrafts altogether, is not likely to be effective in removing moral hazard. Ex post daylight overdraft monitoring would leave the Federal Reserve bearing the credit risk of an active interbank daylight loan market, redistributing a much enlarged volume of excess reserves. High-quality banks could borrow excess reserves needed to avoid the penalty rate, not only for their own accounts, but also for riskless lending to lower-quality banks, with repayment assured by irrevocable Fedwire transfers.

The supplemental balance approach would more successfully tie the cost of daylight funding to perceptions of a bank's credit quality in the interday markets (via a risk spread paid for sup-

plemental balances). This seems to be the most effective of the three pricing devices for injecting market discipline into the cost of funding payments.

The simple fee proposal offers little protection against moral hazard to the extent that changes in payment practices fail to eliminate daylight overdrafts. Flat-rate pricing of assured access to daylight credit may discourage its use, but provides no basis for scrutiny of the credit quality of payor banks, and no risk-based market disincentive for payor banks to limit daylight funding of payments.¹³

The higher the proposed price, the more scope there will be for modifications in payment practices to eliminate Fedwire daylight overdrafts. But, in the limit, if sufficient modifications were not forthcoming, a price above the federal funds rate would guarantee elimination of daylight overdrafts, no matter which proposal was adopted, because excess reserves would be the economical way to avoid the price. Charging this high price would transform each proposal into a variant of the penalty rate proposal. However, unless a substantial earnings rate was offered on overnight holdings of excess reserves, daylight overdraft elimination would be quite costly to the banking system. In any case, imposing this net cost on banks and their customers to eliminate daylight overdrafts would not avoid moral hazard to the extent that excess reserves would feed an extensive market in riskless daylight loans.

IV. Conclusion

Fedwire daylight overdrafts of Federal Reserve deposit accounts create a moral hazard that pricing might reduce. Pricing could have the desired result to the extent that banks would respond by modifying payment practices, or by bringing payments-related credit needs under more effective market discipline based on risk evaluation.

Much of Fedwire payment and daylight overdraft volume can be traced to unsecured interbank lending and to settlement of securities-market trading. Rapid growth of these activities has taken place within the nationwide frame-

work of free Fedwire daylight overdrafts. There is little basis in actual experience, therefore, for predicting the responsiveness to pricing of either Fedwire daylight overdrafts or the financial-market activities they reflect.

The hope is that modifications in payment practices would be sufficiently responsive to price that there would be no need to test the strength of credit-market discipline; that moral hazard could be eliminated at relatively low cost.

The danger is that payment practices would be unresponsive to price and that market discipline would not be engaged because of a large residual element of moral hazard in the form of priced daylight overdrafts or riskless daylight loans. If this were to be the actual outcome, it would suggest that, in addition to efficient allocation of financial resources, an insidious driving force in the rapid growth of interbank lending and securities-market trading in recent decades has been the moral hazard of Fedwire daylight overdrafts.

■ 13 This may overslate the case in one way. Pricing would operate only on daylight overdrafts in excess of a "free" allowance, determined as a percent of capital. Price then depends on credit quality, in that capital influences price. Beyond that first step, however, no discipline from the market or from regulatory credit evaluation would discourage additional borrowing.

References

Board of Governors of the Federal Reserve System, "A Strategic Plan for Managing Risk in the Payments System," Report of the Large-Dollar Payments System Advisory Group to the Payments System Policy Committee of the Federal Reserve System, Washington, D.C., August 1988.

Gelfand, Matthew D. and Lindsey, David E., "The Simple Microanalytics of Payments System Risk," Finance and Economics Discussion Series No. 61, Board of Governors of the Federal Reserve System, March 1989.

Hamdani, Kausar and Wenninger, John A., "The Macroeconomics of Supplemental Balances, Appendix C," Controlling *Risk* in the Payments System, Report of the Task Force on Controlling Payments System Risk to the Payments System Policy Committee of the Federal Reserve System, Board of Governors of the Federal Reserve System, August 1988.

Humphrey, David B., "Payments System Risk, Market Failure, and Public Policy," in Elinor Harris Solomon, ed., *Electronic Funds Transfers and Payments: The Public Policy Issues*, Boston: Kluwer-Nijhoff Publishing, 1987.

Simmons, Richard D., "Would Banks Buy Daytime Fed Funds?" *Economic Perspectives*, Federal Reserve Bank of Chicago, May/June 1987, 36-43.

Stevens, E.J., "Pricing Daylight Overdrafts," Working Paper 8816, Federal Reserve Bank of Cleveland, December 1988.

VanHoose, David, "The Angell Proposal: An Overview," mimeo, Board of Governors of the Federal Reserve System, June 1988.