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The Federal Reserve's Contingency Financing Plan for the Century Date Change

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With the approach of the new millennium last year, many market participants resolved to limit their exposure to Y2K-related risks by cutting back normal trading activities. The Federal Reserve foresaw that the widespread adoption of such a strategy could lead to serious liquidity problems in key financing markets. Consequently, the Fed undertook to create a Standby Financing Facility that would provide securities dealers with a form of backup funding and ease market anxieties about year-end credit conditions.

Last year's century date change posed a unique challenge to the nation's capital markets and the Federal Reserve's monetary operations. Fears were widespread that Y2K problems might cause the computer systems of market participants to malfunction, upsetting trading and market-making activities. Of particular concern to the Fed was the possibility of a disruption in the short-term federal funds and repurchase agreement (RP) financing markets—markets critical to the effective implementation of monetary policy.

The uncertainty about the functioning of technical systems led many market participants to suggest that they would curtail their normal trading activities and apply credit limits very narrowly in the weeks before and after the date change. Such precautionary steps, while understandable, threatened to create exceptionally thin or illiquid market conditions in which banks and dealers could not obtain needed funding at a reasonable cost. Indeed, it seemed possible that these defensive actions could bring about the very outcome they were meant to guard against—a breakdown in market functioning.

To maintain orderly conditions in the country's capital markets around the year-end, the Federal Reserve's Federal Open Market Committee took an extraordinary step: it directed the Open Market Trading Desk of the Federal Reserve Bank of New York ("the

Desk") to establish a Standby Financing Facility. The facility would make available to primary dealers a form of backup funding—the opportunity to buy options on temporary RPs with the Desk. Through this action and a related initiative to create a special lending facility for banks, the Federal Reserve sought to assure the markets that it was fully prepared to provide liquidity if normal trading activities were disrupted.¹

In this edition of *Current Issues*, we explain how the sale of RP options through the Standby Financing Facility was intended to influence conditions in the capital markets critical to monetary operations. Specifically, we review the Federal Reserve's concerns about potential market disturbances around the year-end and describe how the options were designed to avert such events. Our assessment suggests that the central bank's efforts did in fact have a stabilizing effect on the markets. Although the exact contribution made by the options program is difficult to isolate, anecdotal evidence indicates that the options exerted a calming influence by easing anxieties about prospective market conditions. A further sign of the options' effectiveness is provided by the behavior of year-end funding premiums. These premiums declined substantially at key times during the conduct of the options program, suggesting that the availability of the options helped allay market participants' worst fears about high borrowing costs around the date change.

Potential Market Disruptions Associated with the Century Date Change

As the century date change approached, the fear of computer problems spurred market participants to test and upgrade their technical systems and to formulate contingency operating plans. But while individual dealers and banks might be confident about their own Y2K preparations, they could not assess their trading partners' vulnerabilities to a technical failure. As a consequence, a number of market participants sought to minimize their exposure to counterparty risk in the weeks surrounding the date change. They expressed the view that the best defense against unknown risks during this period was to reduce settlement, issuance, and trading volumes and to apply credit limits very strictly.

This reluctance to engage in normal trading activities posed a particular problem for the Federal Reserve. If participants in the short-term federal funds and RP

financing markets scaled back their lending and investment activities, then banks and dealers might be unable to finance their positions in the usual way—or to secure replacement financing at a reasonable cost (see box). In a climate of heightened uncertainty, financing difficulties at one institution could spread rapidly to others, and even ordinary disturbances to trading patterns could have a magnified effect on short-term interest rates.

For example, if cash investors at year-end refrained from lending to securities dealers except at exorbitant rates, then the dealers—including primary dealer counterparties in the Desk's monetary operations—would be compelled to pay these rates to finance their holdings of securities. Those dealers that could not pay extremely high rates could be forced to default. In such a situation, the Desk's ordinary open market operations might prove to be of limited value in counteracting the deterioration in credit conditions.

Monetary Operations under Routine Market Conditions

Under ordinary circumstances, the Federal Open Market Committee instructs the Manager of the System Open Market Account to use open market operations to maintain the overnight federal funds rate around the target level needed to achieve the Committee's policy objectives. The federal funds rate is the interest rate at which banks lend to one another the balances they hold in their Federal Reserve deposit accounts.

In the federal funds market, banks exchange funds to offset charges and credits to their Federal Reserve balances arising from the settlement of financial payments and to ensure that banks satisfy their two-week maintenance period reserve requirements and clearing balance requirements. A bank is penalized if it fails to meet all of its requirements, or if its Federal Reserve account is overdrawn at the end of any day. The federal funds rate is sensitive to the aggregate supply of banks' balances measured against their total requirements. The rate will rise if banks are at risk of ending a day overdrawn or if they fail to meet the maintenance period's requirements; it will fall if banks are in jeopardy of holding unwanted excess reserves.

The aggregate supply of Federal Reserve balances held by banks is subject to various influences outside the control of the Desk. Accordingly, the Desk uses open market operations—purchases or sales of securities—to manage the supply of balances, making these operations its instrument for influencing the federal funds rate. That is, banks' accounts at the Federal Reserve are credited or debited in

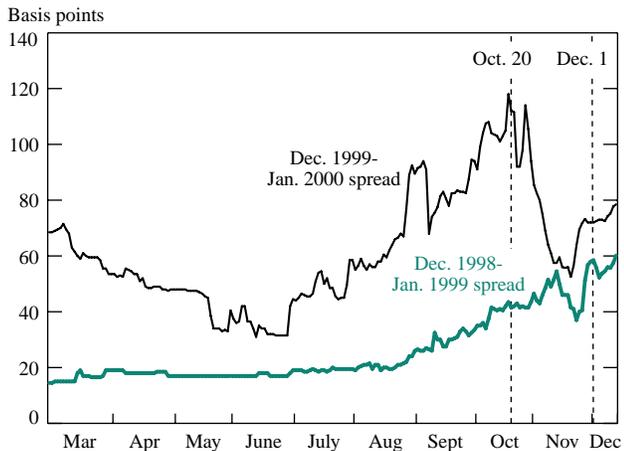
payment for any securities exchanged in the Desk's operations, altering the supply of balances. Open market transactions take several forms, but repurchase agreements (RPs) are the most common. RPs are similar to a loan by the Federal Reserve at an agreed-upon interest rate, with securities pledged as collateral. In October 1999, the Desk expanded the collateral eligible for its RPs to include mortgage-backed securities issued by government-sponsored entities in addition to direct obligations of these entities and the U.S. Treasury.^a Balances created by RPs are automatically extinguished upon their maturity.

The counterparties in the Desk's open market operations, called primary dealers, are securities firms and other active participants in the secondary government debt market. These dealers finance the large inventories of government securities held as a by-product of their ordinary business activities by borrowing from large institutional investors under very short-term RPs every day. Balances are created through the Desk's RPs when the Federal Reserve, in payment for the securities acquired under RPs, credits the Fed accounts of the clearing banks at which the primary dealers maintain deposit accounts.

Each morning, the Desk evaluates the need for open market operations, including RPs, based on available estimates of the supply of and demand for balances. Operations designed to adjust that day's supply of balances are typically arranged around 9:30 a.m. eastern time, mostly with an overnight maturity.

^aAt its August 1999 meeting, the Federal Open Market Committee authorized the Desk to accept an expanded pool of collateral on temporary operations through April 2000; it subsequently extended this authorization through the end of 2000.

Chart 1
Year-End Short-Term Interest Rate Premiums
 Spread between Rates on December and January Monthly
 LIBOR Futures Contracts, Daily Observations



Source: Bloomberg L.P.

Notes: October 20 is the date of the first options auction and December 1 is the date of the last auction. Monthly LIBOR (London interbank offered rate) futures contracts reflect expected average monthly eurodollar deposit rates for dates running from the middle of the indicated month through the middle of the following month.

Uncertainties about the availability of short-term financing around the year-end were reflected in elevated futures rates. As early as spring 1999, spreads between monthly December and January eurodollar futures rates were well above levels ordinarily associated with past year-end dates, and these spreads climbed steadily over the summer months (Chart 1).

The Use of Options to Alleviate Market Disruptions

In anticipation of the century date change, the Federal Reserve took steps to soften the impact that technical problems—and the risk-avoidance behavior brought on by those problems—might have on the functioning of the capital markets. To help ensure that banks would have adequate liquidity to meet any unusual demands around the date change, the Federal Reserve’s Board of Governors in July voted to establish a Century Date Change Special Liquidity Facility for lending to depository institutions between October 1, 1999, and April 7, 2000. The facility was designed to provide participants in the federal funds market with an alternative source of funding for meeting daily clearing and settlement needs during a time of increased uncertainty. Although the funding came at a premium—the interest rate for borrowing from this facility was 150 basis points above the prevailing federal funds target rate—the facility was not intended for routine use; rather, it was expected to eliminate some worst-case scenarios for borrowers in the federal funds market.

However, because of banks’ expressed unwillingness to commit themselves to extending the benefits of this facility to their customers, the Special Liquidity Facility proved to have only limited power to shape expectations about the availability of year-end liquidity in other financing markets. Specifically, primary dealers unable to secure financing in the RP market could not assume that their correspondent bank would mediate by extending this special funding to them.

Accordingly, to make available to the primary dealer community some of the protections that the Special Liquidity Facility offered banks, in August the Federal Open Market Committee authorized the Desk to establish a temporary Standby Financing Facility that would enable dealers to buy options on temporary operations. The Desk subsequently developed a program to auction “call” options on overnight RPs with the Desk; the holder could exercise the options on specified days around the year-end at a preset strike price, or borrowing rate, that was—like the interest rate offered banks under the Special Liquidity Facility—150 basis points above the prevailing federal funds target rate. If dealers that held these options could not obtain alternative funding at a lower interest rate, they could turn to the Desk directly for funding.

In creating the options, the Federal Reserve reasoned that it could prevent market RP rates from rising *above* the strike price if it offered a sufficient supply of options contracts to meet demand fully. But more fundamentally, the Fed hoped that the facility would sustain liquidity in the weeks before and after the century date change by easing market anxieties and encouraging primary dealers to continue to make markets and undertake their typical intermediation activities in the securities markets. In the Fed’s view, even dealers that did not hold options might benefit from the existence of the Standby Financing Facility if the perception that holders were prepared to maintain usual trading behavior around the date change encouraged other market participants to do the same.

Options Contract Features and the Auction Process

Through the Standby Financing Facility, the Desk sold daily options contracts for all dates from December 23, 1999, through January 12, 2000. Each individual contract gave the holder the right to arrange with the Desk a one-business-day RP for \$50 million at a preset strike price 150 basis points above the prevailing federal funds target rate. No secondary market trading in the options was permitted.

For operational convenience, the daily options were packaged into three weekly “strips,” with the first strip covering December 23 to December 29, the second cover-

ing December 30 to January 5, and the third covering January 6 to January 12. Purchasers of any weekly strip could elect whether to exercise the individual daily overnight options contracts within the strip on a day-by-day basis. Although dealers exercising the options could submit any type of collateral accepted for the Desk's ordinary RPs, it was assumed that they would most likely deliver mortgage-backed securities, since these instruments tend to be relatively costly to finance in the market.

Dealers were required to notify the Desk by 10 a.m. if they wished to exercise an overnight options contract under the terms described above.² In choosing 10 a.m. as the ordinary time of expiry, the Desk sought to balance its own reserve management concerns with dealers' desire to have as much time as possible to address potential funding surprises. Since the bulk of the dealers' daily financing activity is completed by 10 a.m., this exercise deadline gave them time to gauge their funding needs. The deadline also provided the Desk with sufficient time to arrange other open market operations each day to account for the reserve impact of the exercised options.

The first of what proved to be seven weekly rounds of auctions was held on October 20, far enough ahead of the century date change for the options to begin having an effect on the expectations of market participants. The quantity of each strip that the Desk intended to sell was announced before each round. For each strip, each primary dealer was allowed to place two bids for itself as well as two bids for each customer bidding through the dealer.³ Bids were accepted in basis-point terms, with each basis point representing a cost of about \$278 for every \$1 billion of overnight RP options contracts. Because dealers were expected to have difficulty valuing these novel options, a uniform price auction format was adopted, whereby all accepted bids were awarded at the minimum accepted offering price.

Bids were accepted and the results released to dealers over the same electronic systems that the Desk uses for its regular RPs, and premium payments on awarded bids were due the following day. At the conclusion of each round of auctions, the Desk publicly released information on total bids, final awards, and the price at which accepted bids were awarded for each strip.

Risks Posed by the Desk's Strategy

Under the Standby Financing Facility, the Desk intended to sell enough contracts in the aggregate to ensure that the options would be viewed as a relatively inexpensive source of financing insurance. The quantity sold at each weekly round of auctions would be adjusted in response to the strength of demand at the

previous round so that, in the end, all market participants would have the opportunity to purchase options at a relatively low cost. The Desk calculated that this strategy for determining the total supply of options could in itself soften risk perceptions and reduce the likelihood that the tight credit conditions necessitating the exercise of options would actually develop.

Under the terms of the options contracts, the Desk was in the unique position of bearing no default risk on its ability to arrange RPs. Nevertheless, selling a large quantity of options presented certain risks in the event that the options were exercised.⁴

Most notably, the Desk foresaw that to prevent the federal funds rate from falling below the target level, it might need to drain large reserve balances created by exercised options. To do so, the Desk would have to modify the structure of its other open market operations, either by cutting back its use of ordinary RPs or by arranging matched sale-purchase agreements (MSPs), which function like reverse RPs, to drain reserves later in the day. Either plan, however, involved a potential cost. On the one hand, reducing the volume of ordinary RPs would entail an opportunity cost, measured by the spread between the strike price on the options and the higher market rate that the Desk could have earned on newly arranged RPs. On the other hand, arranging MSPs would entail a direct loss, measured by the spread between the higher market rates that the Desk would likely have to pay on the MSPs and the lower strike rate on the options.⁵

In addition, the Desk might be unable to arrange matched sale-purchase agreements if dealers, ordinarily large net borrowers of funds in the financing markets, were reluctant to participate. If the Desk could not arrange a sufficient volume of MSPs, then the federal funds rate could plummet later in the day, or later in that period if the supply of balances for the two-week maintenance period could not be brought down in line with banks' requirements.

To be sure, the Desk was prepared to abandon its practice of keeping the daily supply of balances within a fairly narrow range. If intense upward rate pressures and broad-based market dislocations triggered a widespread exercise of options, then the Desk was willing to accept an overabundance of balances in the interests of countering market stress. Nevertheless, an overabundance of balances on one day could make it impossible for the Desk to steer the period-average level of balances back to a level in line with banks' requirements—an outcome that would likely give rise to strong downward pressures on the federal funds rate later in the maintenance period.

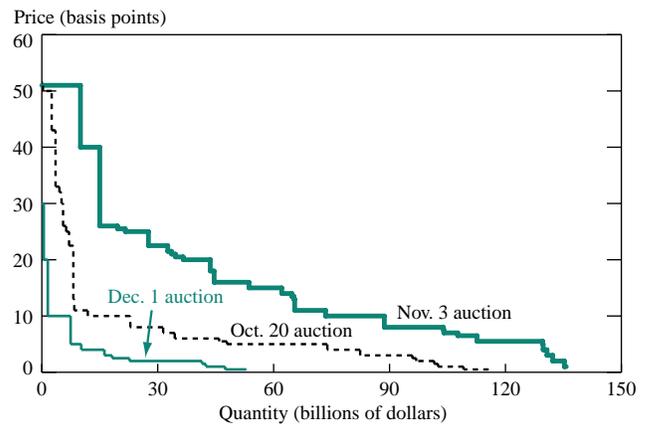
Although the Desk gave careful consideration to the risks posed by the options program, it concluded that they were not very likely to materialize. Moreover, it seemed clear that any potential costs of the Desk's actions fell far short of the costs that could be expected to arise from a breakdown in established financing patterns.

Auction Results

Not surprisingly, demand for the December 30 options strip exceeded that for each of the other two strips (see table). Because the December 30 strip spanned the turn of the year, when market participants foresaw the greatest potential for disruption, it consistently drew the greatest number of bids. In addition, the strip was almost always awarded at the highest rates, even with the larger quantities sold. By these same measures, demand for the January 6 strip was stronger than demand for the December 23 strip, likely reflecting the view that if Y2K problems did emerge around the century date change, they could linger through the early weeks of January.

Demand at the first round of auctions surpassed the Desk's expectations and continued to run very strong over the next two auctions, especially as measured by the relatively high rates on propositions. These early results prompted the Desk to increase the quantities of options to be sold over the first few rounds, and the decision was made to add two more weekly rounds of auctions. However, the diminishing volume of bids submitted during the final rounds of auctions and the declining rates on accepted bids suggested that demand was ultimately satisfied. Total premiums collected by the Federal Reserve on all options summed to \$6,074,104.

Chart 2
Demand Schedules for the December 30 Options Strip



The general bidding profile is illustrated in Chart 2, which shows cumulative bid amounts and rates for the December 30 strip at three of the auctions. All auctions attracted a certain number of seemingly aggressive bids, represented by the steeper portion of the demand schedules at the lower volumes. As the auction cycle progressed and demand became sated, however, the bidding curves flattened.

Conclusion

As it turned out, the financing markets experienced no date-change-related problems that disrupted trading. Accordingly, conditions in the markets that would have made it profitable to exercise the Federal Reserve's options never materialized (Chart 3).

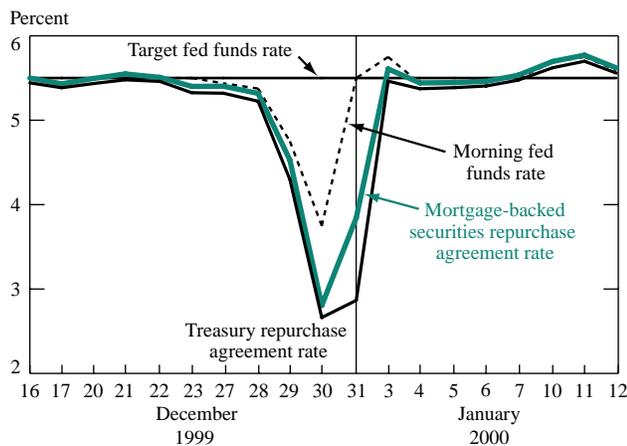
Results of Standby Financing Facility Auctions

Billions of Dollars, Except As Noted

Auction	Auction Date						
	Oct. 20	Oct. 27	Nov. 3	Nov. 10	Nov. 17	Nov. 23	Dec. 1
December 23 options strip							
Auction amount	12	12	20	30	15	10	15
Total propositions	48	56	77	44	49	27	20
Stop-out rate (basis points)	1.5	2.5	11.0	1.0	1.0	1.5	0.5
December 30 options strip							
Auction amount	18	25	50	50	30	25	25
Total propositions	116	147	136	86	83	51	53
Stop-out rate (basis points)	10.0	15.0	16.0	8.0	8.0	4.0	2.0
January 6 options strip							
Auction amount	12	12	25	40	20	20	15
Total propositions	67	86	108	66	64	36	44
Stop-out rate (basis points)	3.0	5.0	11.5	2.5	2.5	2.5	4.0

Note: The stop-out rate for each auction is the lowest rate on all accepted bids.

Chart 3
Financing Rates around Year-End
 Morning (Levels)



Immediately before and after the century date change, overnight RP rates on all types of collateral eligible for the Desk's RPs never approached the strike-price threshold, and the federal funds rate itself tended to be a bit below the target level. This outcome may have stemmed largely from the Desk's other reserve management operations at the time. For instance, the large outstanding volume of ordinary RPs arranged by the Desk convinced some participants in the federal funds market that the Desk intended to provide enough balances for banks to satisfy all of their requirements. Moreover, by year-end, the considerable amount of collateral that the Desk held under outstanding RPs may have driven down rates in the RP market.

To what degree the Federal Reserve's Standby Financing Facility can be credited with averting market disruptions cannot be established conclusively. However, at least two factors point to the facility's stabilizing

role. For one, implied year-end funding premiums declined substantially when the details of the options auction were unveiled, after the early auction results were announced, and later on when the Desk extended the number of auctions. Moreover, anecdotal evidence suggests that the options exerted a calming influence on the markets. In conversations with the Desk, many dealers indicated that the options program helped ease their anxieties about prospective market conditions around the year-end.

Notes

1. These actions are outlined in *Domestic Open Market Operations during 1999*, the Open Market Trading Desk's annual report (available at <http://www.ny.frb.org/pihome/annual.html>).
2. However, the December 30-January 5 strip, which bridged the shift to the new century, had a feature that allowed holders to exercise options between 10 a.m. and 11:30 a.m.—albeit at a strike price 250 points above the prevailing federal funds target rate.
3. In submitting bids on behalf of a customer, dealers were contractually obligated to ensure the performance of their customers on all aspects of the transaction, just as they are obligated to ensure customer performance when they bid on the Desk's ordinary RPs.
4. Some risks faced by the Desk were analogous to those borne by writers of call options in the private markets. Significantly, no mechanism existed for the Desk to hedge its risks, and even if one did, hedging would have undermined the public purpose of the options program by restoring to the market some of the risks that the Desk sought to remove.
5. Market RP rates on mortgage-backed and federal agency debt—the types of collateral the Desk would most likely have received on exercised options—are generally higher than the corresponding RP rates on Treasury securities, which are what the Desk delivers to dealers when it arranges MSPs. But these differences in market rates largely reflect the varying degrees of risk associated with the different collateral types.

About the Authors

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The views expressed in this article are those of the authors and do not necessarily reflect the position of the Federal Reserve Bank of New York or the Federal Reserve System.

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