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# DOMESTIC OPEN MARKET OPERATIONS DURING 2001

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A Report Prepared for the Federal Open Market Committee by  
the Markets Group of the Federal Reserve Bank of New York

February 2002

**DOMESTIC OPEN MARKET OPERATIONS DURING 2001**  
*FEDERAL RESERVE BANK OF NEW YORK, MARKETS GROUP*

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# DOMESTIC OPEN MARKET OPERATIONS DURING 2001

## I. IMPLEMENTATION OF MONETARY POLICY IN 2001

### A. Introduction

The directives pertinent to the implementation of domestic open market operations issued by the Federal Open Market Committee (FOMC) instruct the Trading Desk at the Federal Reserve Bank of New York (FRBNY) to foster conditions in the market for reserves consistent with maintaining the Federal funds rate at an average around a specified rate. This indicated rate is commonly referred to as the Federal funds rate target. The Desk arranges open market operations to target the funds rate, while at the same time achieving certain other objectives that may affect the structure of the Federal Reserve balance sheet.

This report reviews the conduct of open market operations in 2001. It begins with a description of the operating procedures that are used to control the funds rate and a summary of the key new developments in the policy implementation framework. The demand for balances at the Federal Reserve and the behavior of autonomous factors outside the control of the Desk that affect the supply of these balances are described in the following sections. Next, the different domestic financial assets held by the Federal Reserve, and the various types of open market operations used to adjust them, are reviewed. The behavior of the Federal funds rate in 2001 and use of the discount window are discussed in the following section. The conduct of open market operations in the aftermath of the terrorist attacks on the World Trade Center and Pentagon on September 11 is reviewed in the final section.

### B. Overview of Operating Procedures to Control the Federal Funds Rate

The FOMC lowered the Federal funds rate target on eleven different occasions during 2001, reducing it by a cumulative  $4\frac{3}{4}$  percentage points to end the year at a level of  $1\frac{3}{4}$  percent (Table 1). Three of these rate changes were made between regularly scheduled FOMC meetings. Associated with each FOMC policy move, the Board of Governors approved an equal sized reduction in the basic discount rate, which preserved a 50 basis point spread of the target funds rate over the discount rate.

To target the Federal funds rate, the Desk uses open market operations to align the supply of balances held by depository institutions at the Federal Reserve—or Fed balances—with banks' demand for holding balances at the target rate. Each morning, the Desk considers whether open market operations are needed based on estimates of the supply of and demand for balances, taking account of possible forecast errors and minimal levels of aggregate Fed balances that in practice are needed to facilitate settlement of wholesale

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*Adapted from a report to the Federal Open Market Committee by Dino Kos, Executive Vice President of the Federal Reserve Bank of New York and Manager of the System Open Market Account.*

financial payments by banks. When the funds rate is already near its target, the Desk aims to supply a level of balances in line with its best estimate of demand. And when the funds rate deviates from the target, the Desk may adjust the level of Fed balances it aims to supply accordingly, to nudge the rate in the appropriate direction. Operations designed to alter the supply of Fed balances that same day, most commonly of a short-term temporary nature, are typically arranged around 9:30 am Eastern Time each morning, shortly after a complete set of estimates is available. Open market operations that are designed primarily to meet other objectives that influence the size or composition of the Fed's balance sheet can generally be arranged at other times of the day, but their use must be co-ordinated with those operations geared towards achieving a particular level of Fed balances on each day.

The average level of balances banks demand over two-week reserve maintenance periods is in large measure determined by certain requirements to hold balances, with only a small level of additional, or excess, balances typically demanded. Levels of requirements and period-average demands for excess are relatively insensitive to changes in the target level of the Federal funds rate or only respond with some lag. The ability of depository institutions to average their holdings of balances over the days within a maintenance period to meet their requirements gives them considerable leeway in managing their accounts from day to day. This flexibility limits the volatility in rates that can develop when the Desk misestimates either the supply of or demand for balances. Nonetheless, the funds rate will firm if the level of balances falls so low that some banks have difficulty finding sufficient funds to cover late-day deficits in their Fed accounts; the rate will soften if balances are so high that some banks risk ending a period holding undesired excess balances.

*Table 1*

**Changes in the Federal Funds Rate Specified in FOMC Directives**

Date of Change	Target Federal Funds Rate (Percent)	Associated Discount Rate (Percent)
5/16/2000	6 1/2	6
1/3/2001*	6	5 3/4; 5 1/2 on Jan. 4
1/31	5 1/2	5
3/20	5	4 1/2
4/18*	4 1/2	4
5/15	4	3 1/2
6/27	3 3/4	3 1/4
8/21	3 1/2	3
9/17*	3	2 1/2
10/ 2	2 1/2	2
11/ 6	2	1 1/2
12/11	1 3/4	1 1/4

\* indicates policy change came between regularly scheduled meetings

### **C. New Developments in 2001**

There were no changes made to the FOMC's Authorization for Domestic Open Market Operations in 2001 (Appendix A). At its January meeting, the FOMC once again extended temporarily, through its first regularly scheduled meeting in 2002, its authorization for an expanded pool of eligible collateral for the Desk's repurchase agreements (RPs). The principal effect was to continue the inclusion of pass-through mortgage securities of the Government National Mortgage Association, Freddie Mac, and Fannie Mae, and of stripped securities of government agencies. To implement this decision, the FOMC voted to extend temporarily its suspension of several provisions of its "Guidelines for the Conduct of System Open Market Operations in Federal Agency Issues," which impose restrictions on transactions in Federal agency securities (Appendix B). Late in 2001, the Desk began to accept permanently the direct debt obligations of the Student Loan Marketing Association as collateral on its repurchase transactions.

The Desk continued to operate under the guidelines first articulated in July 2000 that limit the permanent holdings of single Treasury securities in the System Open Market Account (SOMA) to a given share of the total outstanding amount.<sup>1</sup> These guidelines were prompted by the prospect of paydowns of marketable debt associated with projected budget surpluses. Meanwhile, Federal Reserve staff continued work begun in 2000 on various studies of alternative assets the Federal Reserve might hold in its portfolio.

## **II. BANKS' DEMAND FOR FED BALANCES**

The Desk aims to satisfy banks' demand for holding Fed balances. Total demand may be viewed as the sum of two components: the portion needed to meet all requirements, and the portion held in excess of requirements.

### **A. Total Balance Requirements**

A bank's total balance requirement measures the level of balances it must hold at the Federal Reserve on average over a two-week maintenance period to meet various regulatory obligations. Total balance requirements may be decomposed into two basic parts: reserve balance requirements (the level of reserve requirements not met with applied vault cash) and clearing balance requirements. In addition, various as-of accounting adjustments may be applied that affect the actual level of Fed balances a bank must hold to meet all these requirements.<sup>2</sup> Clearing balance requirements and, under lagged reserve accounting rules in effect since August 1998, reserve balance requirements are determined prior to the start of each

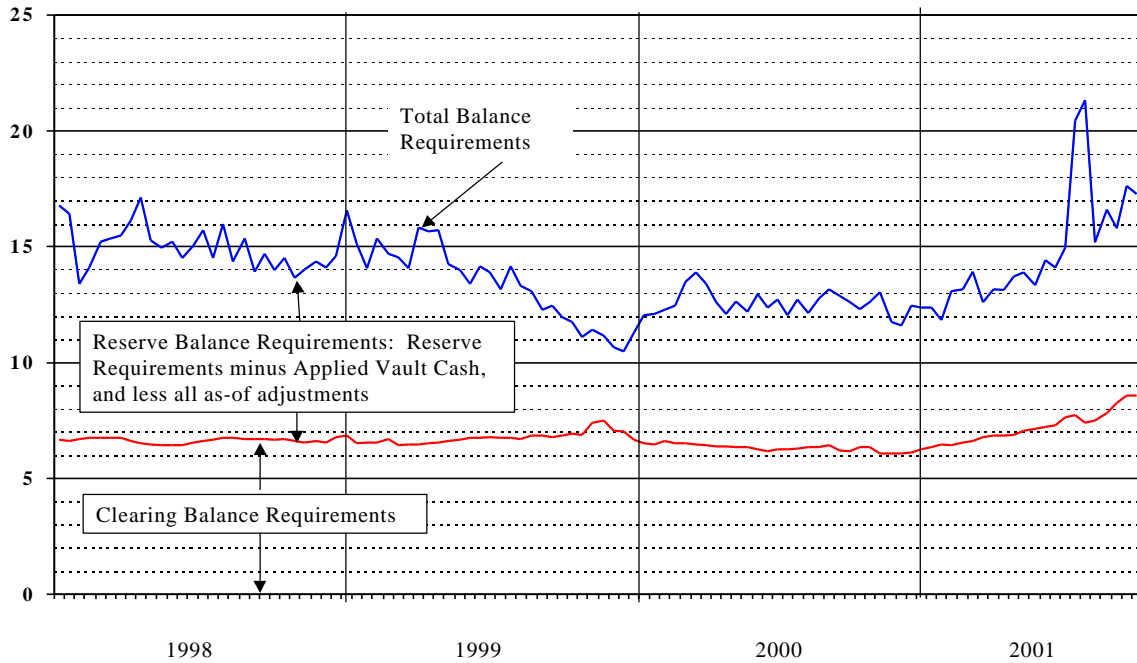
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<sup>1</sup> A detailed description of these guidelines and their motivation can be found at the following URL address: [www.ny.frb.org/pihome/news/announce/2000/an000705.html](http://www.ny.frb.org/pihome/news/announce/2000/an000705.html). They were also discussed in more detail in last year's annual report.

<sup>2</sup> Clearing balance requirements, applied vault cash, and as-of adjustments affect the level of a bank's total balance requirements, and hence its demand for Fed balances. In published data on reserves, these three variables are treated as sources of reserve supply.

**Chart 1**  
**TOTAL BALANCE REQUIREMENTS AND ITS COMPONENTS**

billions of dollars; maintenance period averages through 1/9/02



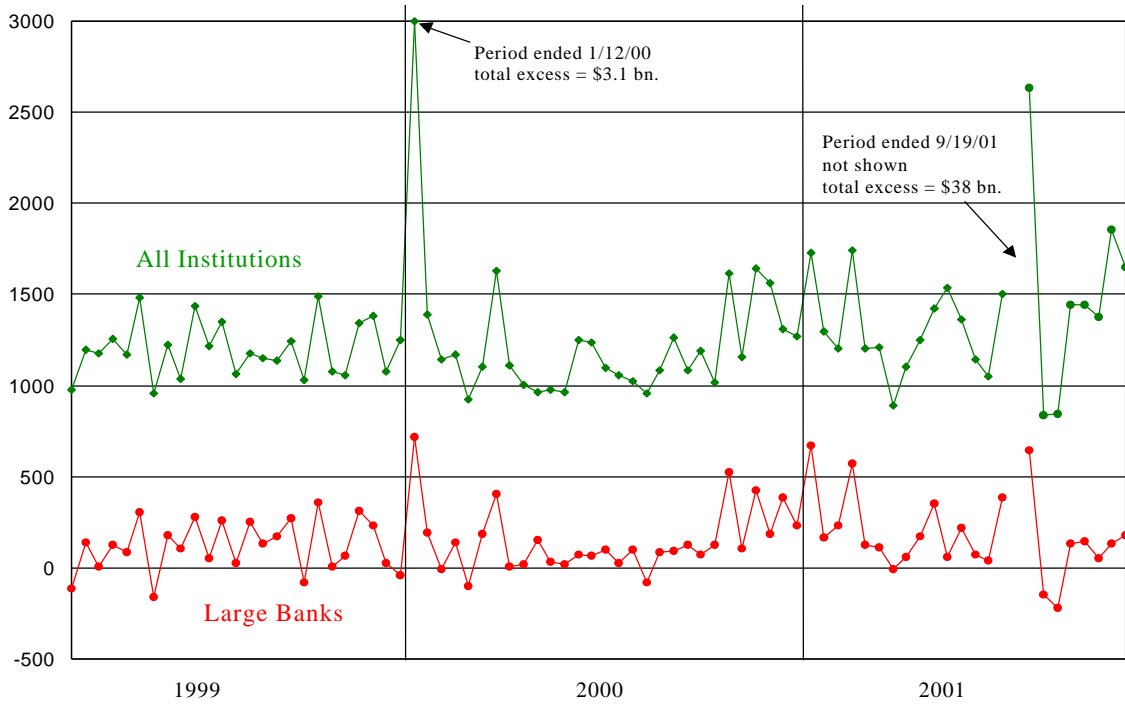
maintenance period, which facilitates estimation of the demand for Fed balances. But as-of adjustments are not all known when a period starts. Most problematically, when large as-of adjustments are applied or reported to the Desk on the settlement day, it affords the Desk little or no opportunity to adjust its estimates of demand and its operations.

Decreases in short-term interest rates contributed to an increase in the underlying level of requirements, particularly over the second half of the year (Chart 1). Falling interest rates spurred growth in reservable deposits over the year.<sup>3</sup> As a consequence, aggregate reserve requirements rose above the level of banks' applied vault cash, lifting the level of reserve balance requirements in a sustained fashion for the first time since the wholesale adoption of sweep programs in 1995. The reduction in interest rates also contributed to a rise in clearing balance requirements, which registered their first significant increase in several years. With the Fed using lower interest rates linked to the target funds rate to compute earning credits on clearing balance requirements, banks that wish to have the maximum useful level of clearing balance requirements, i.e., the level that generates just enough income credits to pay for all covered Fed services, had room to

<sup>3</sup> At the same time, there was little further growth in new sweep account programs, which in the past had been a major source of decline in reserve requirements. The estimated amount of demand deposits swept by commercial banks through the introduction of new sweep programs during 2001 was about \$40 billion, somewhat down from recent years and well below the peak level. A reduction in interest rates also reduces the incentive banks have to expand sweeps to reduce the level of their requirements.

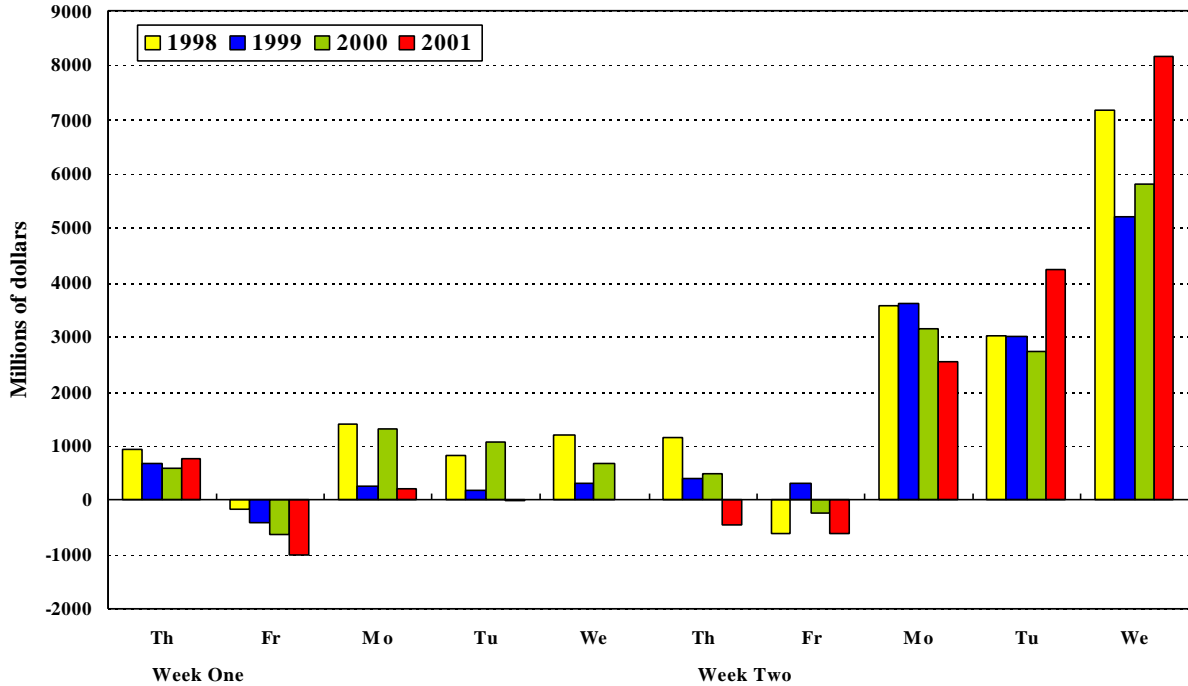
**Chart 2**  
**EXCESS BALANCES**

millions of dollars, maintenance period averages through 1/9/02



**Chart 3**  
**MEDIAN DAILY LEVELS OF EXCESS BALANCES**

by day in a maintenance period



increase these requirements. Over the twelve months ending in December, the underlying level of total balance requirements rose about \$5 billion, with somewhat more than half coming from the higher reserve balance requirements. This aggregate increase is not large when measured against the size of the Fed's balance sheet, but it is significant as a portion of total requirements.

Total balance requirements increased dramatically, but temporarily, in the two maintenance periods ended October 17 and October 31, as a byproduct of disruptions following the September 11 attacks. Reservable deposits soared at a handful of key money center banks that were not able to transfer out funds on behalf of their customers, and under lagged reserve accounting rules, these institutions faced much higher reserve requirements in October. These banks were able to restore their operational capabilities within days, and the higher levels of reserve requirements were transitory.

### **B. Excess Demands and Actual Excess Levels**

Period average and daily levels of Fed balances are measured relative to the period average level of requirements, to obtain measures of excess balances. Demands for excess balances display fairly stable and predictable patterns that are insensitive to the level of requirements, and the Desk must estimate these excess demand patterns as part of estimating total demand for Fed balances.<sup>4</sup> The reasons for the severe distortions to excess levels in the aftermath of the September 11 attacks are described in Section VI.

Over the last two months of the year, period-average levels of excess balances became more elevated, most notably at smaller banking institutions where positive excess levels historically are concentrated (Chart 2). To some degree, typical seasonal factors, the size of which can vary from year to year, may account for this late-year increase. But anecdotal evidence also suggests that the low absolute level to which interest rates have dropped, thereby lowering the opportunity cost of holding excess balances, may have contributed to the increase. No evidence suggests that excess demand at larger banks has been increasing.

The daily intraperiod distribution of excess balances in 2001 continued to reflect banks' strong preference for concentrating their accumulation of Fed balances late in a maintenance period, after the second weekend (Chart 3).<sup>5</sup> The degree of skew was more pronounced over this past year, with banks typically holding somewhat lower levels of excess on most days ahead of the second weekend and larger excess balances on the settlement day. This greater concentration of excess accumulated on the final day was encouraged by strongly held market expectations that the FOMC would adopt a lower target rate at its

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<sup>4</sup> In this section, actual levels of excess balances on average over time are used as an approximation of excess demand, even though a number of factors can cause actual excess levels to deviate from demand on any day or for any period.

<sup>5</sup> Median values are shown in this chart because they are less influenced than average values by the extreme and unrepresentative deviations from normal levels of daily excess that arise from time to time.



meetings during the year, most of which happened to fall on the second Tuesday of a maintenance period, which pushed demands for balances towards the end of these periods.

### **III. AUTONOMOUS FACTORS AFFECTING THE SUPPLY OF FED BALANCES**

Autonomous factors are the assets and liabilities on the Federal Reserve balance sheet that are outside the direct control of the Trading Desk.<sup>6</sup> They exclude the domestic financial assets controlled through open market operations, discount window loans, and the deposit balances held by depository institutions at the Fed. Federal Reserve Note liabilities represent the largest single autonomous factor on the Fed's balance sheet by far, and for this reason the net value (assets minus liabilities) of all autonomous factors has a large negative value; the net value of all other factors is close to zero. Net movements in autonomous factors affect the supply of Fed balances, and thereby create a need for open market operations to change the levels of the various domestic financial assets on the Fed's balance sheet to offset the effects of these factors.<sup>7</sup> The behavior of key factors in the aftermath of the September 11 attacks is discussed in Section VI.

#### *Federal Reserve Notes*

Federal Reserve Notes expanded by nearly \$50 billion over the year, and were once again the largest source of exogenous change on the Fed's balance sheet (Chart 4).<sup>8</sup> F.R. Notes outstanding increased at an 8 percent pace over the twelve-month period ending in December, somewhat faster than their 6 3/4 percent average annual rate of expansion over the preceding five year interval. Lower interest rates likely spurred demand for F.R. Notes in 2001 by reducing the economic cost of holding non-interest bearing notes. Foreign demand also contributed to faster growth late in the year, compounding the seasonal increase in F.R. Notes that occurred ahead of the holidays. Unsettled economic conditions in Argentina seemed to stimulate demand throughout much of the second half of the year.

#### *Changes in Other Autonomous Factors*

By comparison, the change in the net value of all other autonomous factors was small over the year. Some huge temporary changes in the foreign RP pool, Federal Reserve float, and foreign exchange holdings followed the September 11 attacks, but most quickly returned to their pre-attack values. The greatest exception was the level of the foreign RP pool, which remained elevated throughout the fourth quarter of

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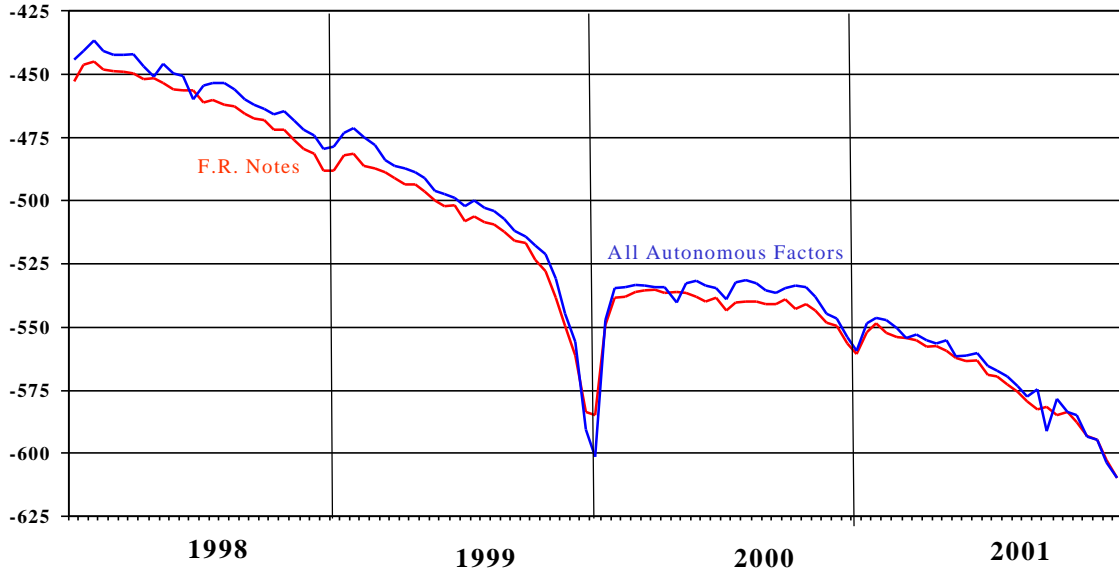
<sup>6</sup> Autonomous factors are defined to include liabilities arising from matched sale-purchase agreements arranged with foreign official institutions as part of the foreign RP pool. The foreign RP pool is not reported directly on the Fed's balance sheet, but it is a factor that affects the supply of Fed balances.

<sup>7</sup> In fact, the Desk retains a small degree of discretionary influence over the levels of some autonomous factors, which may be used to shape the need for open market operations on some days.

<sup>8</sup> The unusual decline in F.R. Notes over the twelve months ended in December 2000 was a byproduct of the temporary bulge in F.R. Notes outstanding around the century date change.

**Chart 4**  
**NET VALUE (ASSETS MINUS LIABILITIES) OF ALL**  
**AUTONOMOUS FACTORS, AND F.R. NOTES**

billions of dollars, maintenance period averages through 1/9/02



the year. Primarily as a consequence of these higher pool levels, the net value of autonomous factors other than F.R. Notes fell a bit, by roughly \$2 billion, over 2001.

*Volatility and Predictability of Key Autonomous Factors*

Excluding the roughly two week period following the September 11 attacks, the average of the daily absolute changes in the net value of autonomous factors was down from the previous year, and same-day predictability showed a slight improvement (Table 2). Reduced volatility in currency in circulation, which is used as a proxy for F.R. Notes in putting together daily forecasts of autonomous factors, mostly reflected the impact of the huge swings in this factor around the century date change, which elevated volatility in each of the two previous years.<sup>9</sup> Although the foreign RP pool was somewhat more volatile during 2001, forecasting errors were down.

The Treasury's Fed balance was much less volatile during 2001 than it was during 2000 and somewhat more predictable. Over the past few years, the ability of the staff to forecast the Treasury's Fed balance on a same-day basis has benefited from improved methods for collecting tax payment information early each morning from around the financial system. In 2001, predictability was also enhanced by a new cash management technique adopted by the Treasury, called dynamic investing, that enabled it to move some

<sup>9</sup> Currency in circulation consists mostly of F.R. Notes, but it also includes about \$30 billion of coins, which are liabilities of the Treasury. In absolute terms, changes in currency in circulation almost entirely reflected movements in F.R. Notes.

portion of unexpected flows arriving in its Fed account into its Treasury Tax and Loan (TT&L) accounts at commercial banks on a same-day basis. Throughout the year, TT&L capacity remained high relative to the level of Treasury's total cash balances. This helped moderate volatility in the Treasury's Fed balance by reducing the number of days in which the Fed balance jumped because of insufficient TT&L capacity, and it also may have improved indirectly the ability to forecast the Treasury's Fed balance.<sup>10</sup>

Table 2

### Daily Changes and Forecast Misses in Key Autonomous Factors Average and maximum of absolute values

(millions of dollars)

	1999		2000		2001 (excl. Sep.11-28)		2001 Sep.11-28	
	average	max.	average	max.	average	max.	average	max.
<b>Daily Change</b>								
Currency in circulation	918	5,379	970	8,087	851	2,696	919	2,537
Treasury balance	911	7,446	1,460	23,434	823	7,413	2,297	5,671
Foreign RP Pool	588	6,050	485	4,015	586	3,273	3,699	7,812
Float	712	6,217	887	9,677	894	4,923	6,888	32,099
Net value	1,709	17,653	2,058	23,896	1,828	7,918	7,028	30,770
<b>Daily Forecast Miss</b>								
Currency in circulation	233	1,361	238	1,648	210	1,043	502	1,135
Treasury balance	599	3,284	615	6,866	534	2,975	608	1,821
Foreign RP Pool	224	1,817	129	976	81	1,127	2,070	4,966
Float	394	4,274	392	2,742	447	2,084	2,312	10,398
Net value	811	5,443	787	7,218	762	3,503	2,568	12,723

Note: Forecast misses are based on New York staff estimates. Currency in circulation is used as a proxy for F.R. Notes.

#### IV. DOMESTIC FINANCIAL ASSETS ON THE FEDERAL RESERVE BALANCE SHEET & OPEN MARKET OPERATIONS

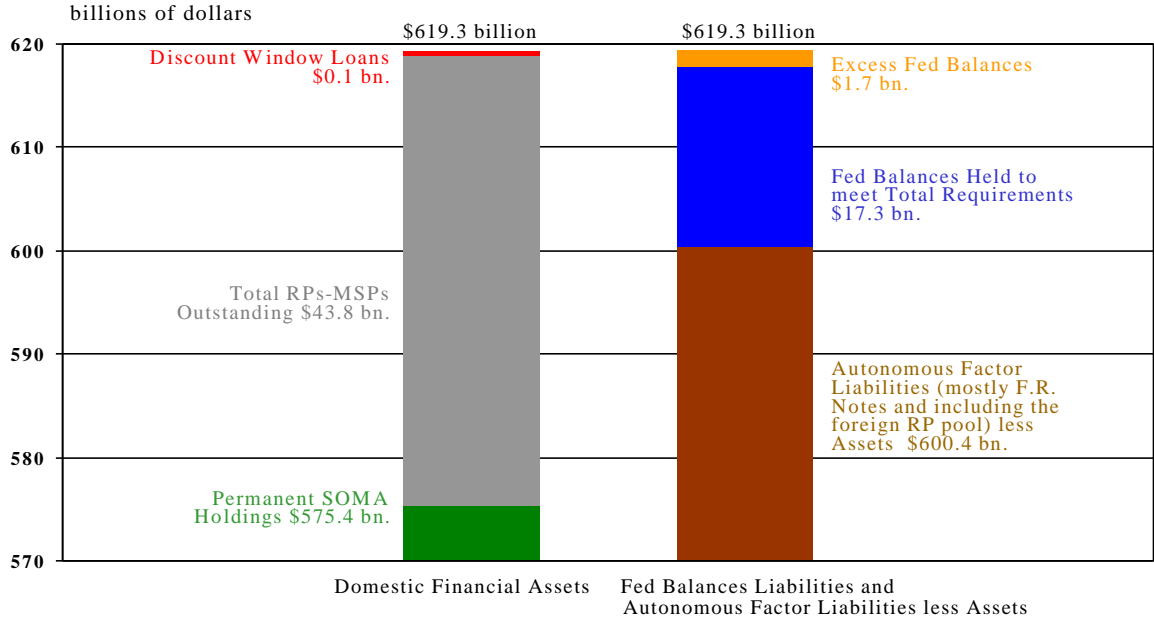
The total value of all domestic financial assets (less any matched sale-purchase agreements arranged in the market) held by the Federal Reserve mirrors the net level of autonomous factors and of Fed balances (Chart 5).<sup>11</sup> More substantively, the behavior of various autonomous factors and of sources of demand for Fed balances will influence the choice of open market operations used to adjust the Fed's domestic financial portfolio.<sup>12</sup>

<sup>10</sup> In 2001, the Treasury's general cash balance exceeded TT&L capacity, including Special Direct Investment capacity, by more than the normal level of balances placed at the Fed (usually \$5 billion) on only 2 days, compared with 6 days in 2000. The number of such occasions was 7 in 1999 and 16 in 1998.

<sup>11</sup> In this report, the securities sold under temporary matched sale purchase agreements (MSPs) as part of the foreign RP pool or in the market are considered financial assets held by the Fed, although they are not officially recorded as such on the Fed's balance sheet. See footnote 6 for the treatment of the foreign RP pool as an autonomous factor liability. In keeping with this treatment, in this report MSPs arranged in the market are considered a financial liability arranged at the discretion of the Desk.

<sup>12</sup> Discount window activity is discussed in section V.

**Chart 5**  
**Basic Components of the F.R. Balance Sheet**  
**for the maintenance period ended January 9, 2002**



#### A. Permanent Holdings in the System Open Market Account and Outright Open Market Activity

The domestic SOMA includes all the domestic securities held on an outright basis. By and large, changes in the level of the SOMA have been used to accommodate net changes in autonomous factors and in demands for Fed balances that are expected to endure. For this reason, these holdings are often characterized as being “permanent,” although their net value can be reduced whenever needed. The par value of the SOMA stood at \$575 billion at year-end, consisting almost entirely of Treasury securities, about \$42 billion higher than one year earlier.<sup>13</sup> The expansion in the SOMA in 2001, as in many years, roughly corresponded to the increase in F.R. Note liabilities.<sup>14</sup>

The distribution of SOMA holdings by remaining maturity and across individual issues is intended to achieve various objectives associated with having a liquid portfolio without distorting the yield curve or

<sup>13</sup> The increase reflects almost entirely new purchases in excess of redemptions, but also includes a \$529 million increase in the inflation compensation component of inflation-indexed securities, bringing its level to \$961 million.

<sup>14</sup> By comparison, the slight increase in net balance sheet liabilities from movements in other autonomous factors and the rise in total balance requirements added only modestly to any need for a “permanent” increase in the value of financial assets in the Fed’s portfolio.

impairing the liquidity of the market for individual Treasury securities. In pursuit of these objectives, the Desk continued to adhere to the per issue guideline limits on SOMA holdings of individual Treasury issues, articulated in July 2000. It also continued to limit SOMA purchases of newly issued Treasury securities, as it has no particular portfolio need for some of the liquidity characteristics that can add to the value of these issues in the market.

#### *Auction Participation and Redemptions*

Typically, any needed expansion of the SOMA is achieved by making outright purchases of Treasury securities in the secondary market, which are then sustained by replacing maturing holdings with newly issued debt at Treasury auctions. At Treasury auctions of coupons and bills in 2001, the FRBNY continued to place add-on bids for the SOMA equal to the lesser of (a) its maturing holdings on the issue date of a new security or (b) the amount that would bring SOMA holdings as a percentage of the issue to the percentage guideline limits.<sup>15</sup> There were no issues maturing on dates when newly auctioned Treasury Inflation Indexed Securities (TIIS) settled. In cases where maturing holdings were to be rolled into more than one new issue of different maturities, the Desk allocated the maturing amount in such a way as to leave the same gap, measured in percentage points, between the per-issue cap and the actual percentage holding of each new issue. A slightly different approach was taken for the weekly bill auctions after the introduction of the new 28-day bill, because of the potential volatility in amounts of 28-day bills auctioned from week to week. The Desk determined the amount of maturing bills to be rolled over and its allocation on the basis of the smallest 28-day bill auction size experienced to date, rather than the actual auction size.

Remaining within the per-issue percentage caps while the Treasury continued to cut back on auction sizes through the first half of the year forced another \$27 billion of redemptions of maturing Treasury holdings in 2001, roughly equal to the previous year's total; this includes about \$1.5 billion of maturing holdings that were redeemed because of the cancellation of a 28-day bill auction on September 11. Redemptions tapered off over the year, largely as a consequence of the changed federal budget situation and Treasury issuance patterns. Also during the year, \$120 million of holdings of Federal agency securities were called, which left a mere \$10 million of agency holdings in the SOMA at year-end.

#### *Secondary Market Purchases and Operational Techniques*

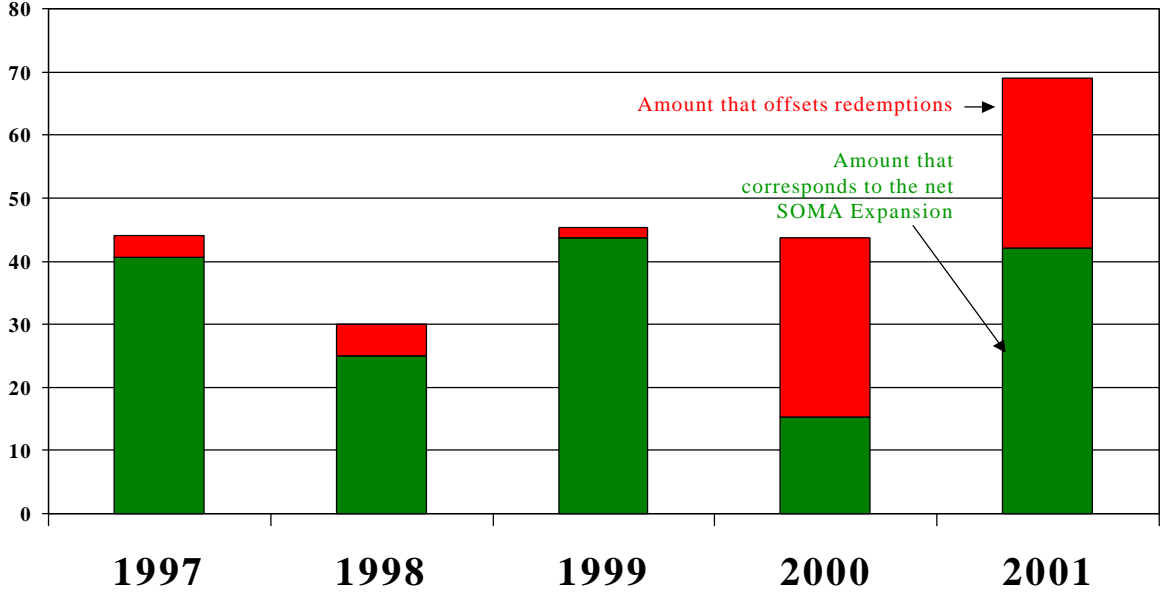
With redemptions again so large over the year as a whole and growth in F.R. Notes strong, the necessary expansion of the SOMA required a record value of outright purchases of Treasury securities by the Trading Desk, amounting to \$68.5 billion (Chart 6). There were no sales of securities.

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<sup>15</sup> Foreign add-ons, which are not known at the time the Desk determines its level of participation at auctions, were assumed to be zero in this calculation.

**Chart 6**  
**Total Outright Purchases: Net SOMA Expansion and Amount of Purchases that Offset Redemptions**

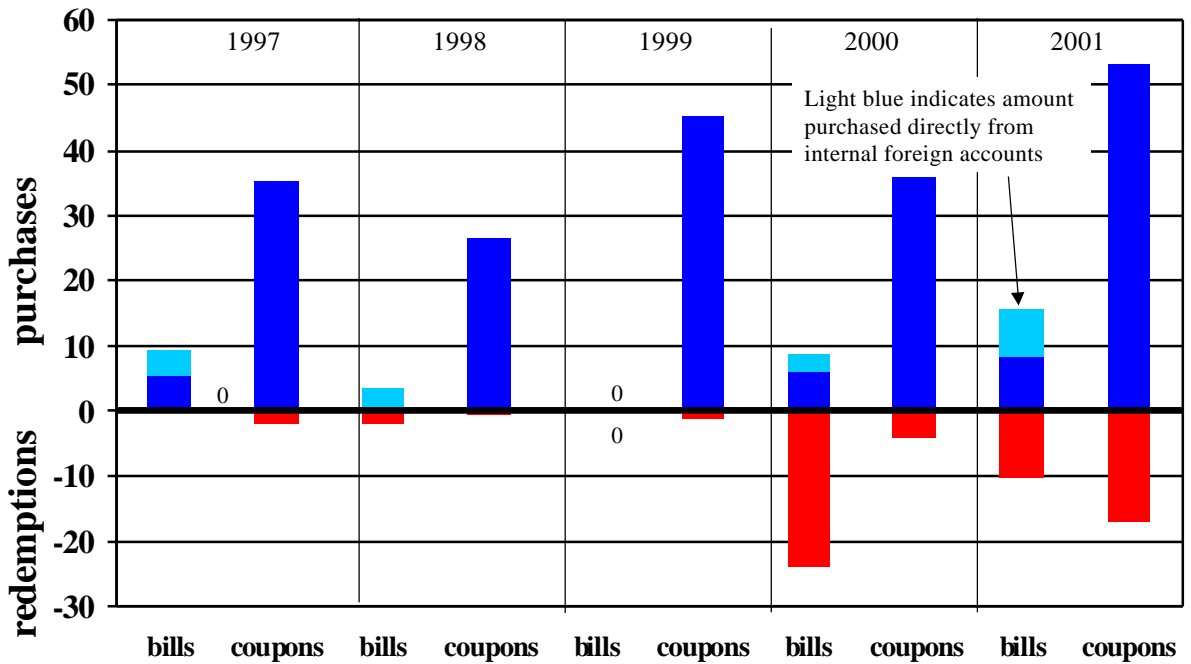
billions of dollars



**Chart 7**

**Treasury Bills vs. Coupons: Purchases and Redemptions**

billions of dollars



About \$15 billion of bills were purchased, and bill holdings increased by a significant amount for the first time in several years (Chart 7). Altogether, the Desk purchased \$8 billion of bills in the market in four operations. Another \$7 billion were purchased directly from foreign central banks, in small daily increments on days when sell orders from these accounts were available and consistent with SOMA portfolio guidelines.<sup>16</sup>

The Desk also purchased \$53 billion of coupon securities in the market, arranging a record 64 coupon operations.<sup>17</sup> These operations continued to be segmented into separate tranches across different portions of the yield curve to facilitate rapid execution. Given the frequent need for secondary market purchases, the Desk sought to distribute its purchases evenly over time as much as possible and did not attempt to concentrate operations in periods when F.R. Note growth was fastest.

The selection of specific issues in each operation was based on the relative attractiveness of propositions and portfolio considerations. In addition to remaining within the per-issue-guideline limits and avoiding on-the-run issues, the Desk avoided purchases that would be expected to cause a sizable redemption on any day in the foreseeable future, and it bought no issues in the secondary market that had less than four weeks remaining to maturity.

#### *General Characteristics of Domestic Permanent SOMA Holdings at Year-End*

The average maturity of the entire SOMA portfolio of Treasury securities was 53.5 months at year-end, up slightly from 52.9 months one year earlier. The share of all outstanding marketable Treasury securities held in the SOMA was 19 percent, about a percentage point higher than a year earlier. The SOMA held 25 percent of all bills (compared to 31 percent a year ago), and 17 percent of all coupons including TIPS (compared to 14 percent a year earlier). At the end of the year, approximately \$228 billion of marketable Treasury securities remained purchasable under the Desk's guidelines for percentage holdings—compared with \$260 billion at the end of the previous year. The gross remaining purchasable amount was \$183 billion if account is taken of the practices of avoiding purchases of recently issued debt, purchases that would contribute to sizable redemptions, and purchases of issues that mature within four weeks.

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<sup>16</sup> The Desk sets a \$250 million limit on total daily purchases from foreign accounts, subject to review if reserves needs or orders warrant an exception.

<sup>17</sup> This total includes five TIPS operations, totaling \$3.3 billion. On one day, two separate coupon operations were arranged.

## **B. Temporary Holdings and Open Market Operations**

### *Long Term Repurchase Agreements*

Over the past two years, long-term RPs, defined as operations with an original maturity of more than fifteen days, have been a standard asset in the Fed's domestic financial portfolio.<sup>18</sup> Temporarily increasing the total size of outstanding long-term RPs has proven to be an effective way of addressing significant increases in the net value of autonomous factor liabilities or increases in demands for Fed balances that are expected to last for a number of weeks or months, but not permanently. Long-term RPs can also be adjusted readily to accommodate an extended mismatch between changes in the permanent SOMA and in levels of autonomous factors and total balance requirements.

During the year, the Desk adhered to the practice of arranging an RP with a 28-day maturity on the Monday and/or Thursday of each week.<sup>19</sup> These operations are typically arranged early in the morning, before final daily reserve estimates are available, as their use is not geared toward addressing daily volatility in autonomous factors and excess demands. In other respects, these RPs are operationally just like those for short-term maturities. Dealer participation at these long-term RPs has consistently been very strong, measured by the size of propositions.

The sizes of the 28-day RPs arranged over the year ranged from \$2 billion to \$5 billion. Over most of the first half of 2001, their total outstanding value stood at \$12 billion, which was also the lowest outstanding total for the year (Chart 8). In the third quarter, the Desk built up their underlying level modestly, but in the immediate aftermath of the September 11 attacks the Desk allowed two long-term RPs to mature without replacement, to simplify its market involvement at the time. As reserve deficiencies deepened late in the year, at first when requirements bulged in October and then as F.R. Notes began to grow from seasonal factors, long-term RPs were gradually increased, peaking at a level of \$31 billion in the year-end maintenance period.

### *Short-term RPs and MSPs*

Short-term temporary operations, RPs and matched sale-purchases (MSPs), are the primary tool used to address day-to-day volatility in autonomous factors and in demands for Fed balances. These operations

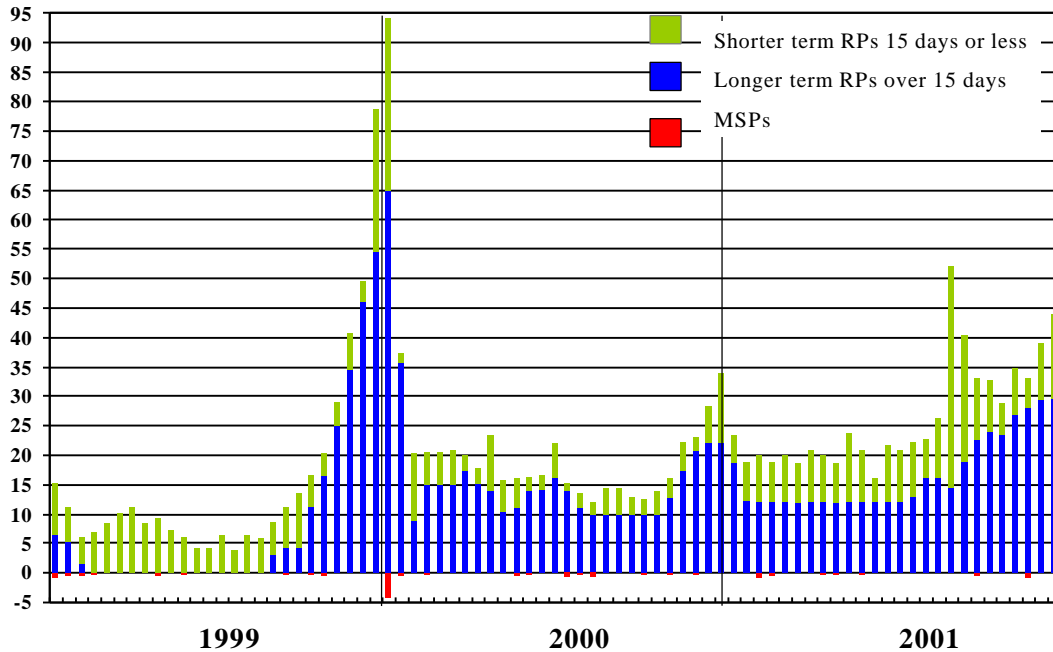
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<sup>18</sup> The choice of any maturity to distinguish long-term from short-term RPs is somewhat arbitrary. Fifteen days had been the maximum allowable maturity under the FOMC's Authorization for many years until 1998, and it approximates the length of a reserve maintenance period. Fifteen days is designated to be the longest "short-term" maturity because, as noted in this section, the RPs the Desk used that carried a fifteen day maturity had a clear short-term operational focus.

<sup>19</sup> This practice was first begun in March 2000. In January 2002, the Desk began to arrange these 28-day RPs just once per week, on each Thursday, adjusting the size of each operation to achieve the same desired total outstanding amount. This weekly schedule will continue to provide the desired flexibility to the portfolio at even lower operational cost.



**Chart 8**  
**TEMPORARY OPERATIONS OUTSTANDING**  
 billions of dollars, maintenance period averages through 1/09/02



also are used to fill temporarily the gaps left by more enduring changes in autonomous factors and Fed balance demands that are not immediately met by changes in the permanent SOMA or long-term RPs outstanding.

Daily volatility in short-term temporary operations outstanding (RPs less MSPs), measured by the average of absolute daily changes in short-term agreements outstanding, has been around \$3 1/2 billion in each of the past two years. Daily levels of net short-term operations outstanding ranged from -\$4 billion to +\$81 billion; excluding the days immediately following the September 11 attacks, the peak was +\$31 billion. On a period-average basis, short-term operations outstanding ranged from \$4 billion to \$38 billion; excluding the two exceptionally high period-average levels that covered late-September, the period-average peak was \$14 billion. For the year as a whole, short-term temporary operations outstanding averaged \$10 billion. The average was closer to \$8 billion excluding the September 19 maintenance period, which was somewhat above the \$5 billion average outstanding level in 2000.

Volatility in autonomous factors and in demand for Fed balances requires the Desk to be prepared to arrange these operations each day, and often an overlapping structure of short-term operations is constructed. By far, the most common operation was an overnight RP (which includes all RPs that cover

just one business day), of which 133 were arranged in 2001 (Chart 9). As usual, the Fed's portfolio continued to be structured in such a way as to keep reliance on MSPs relatively low.<sup>20</sup>

In general, propositions were sufficient to cover the intended size of the short-term operations the Desk wished to arrange. However, ahead of days on which propositions were expected to run low, the Desk sometimes layered in term agreements of short duration to ensure this outcome. For example, dealer participation on overnight RPs was relatively low on quarter-end dates, when high excess needs usually required a large amount of short-term RPs to be outstanding (Chart 10). Propositions on RPs on FOMC meeting dates in 2001 also tended to be low, as a byproduct of expected imminent rate cuts. On these dates, by the time the Desk was prepared to arrange its short-term operations, dealers had already met a greater than normal share of their total overnight borrowing needs, in response to heightened demand from their institutional customers. These cash investors had greater amounts to invest on an overnight basis with the dealers because the borrowers with whom they normally placed cash on a term basis were issuing less term debt on days of expected rate cuts.

Also in 2001, the Desk arranged two short-term RPs, an overnight operation and a term agreement of up to fifteen days, on seven different maintenance period settlement dates, usually out of concern that propositions on the overnight RP alone might not be adequate to address all of the remaining period need. Given banks' usual preference for holding higher excess levels on settlement dates, which was even more pronounced in 2001, the Desk sometimes faced a larger remaining add need on these days than it was comfortable addressing with a single, overnight operation. The term agreements arranged on these occasions were used to help meet needs in the following maintenance period.

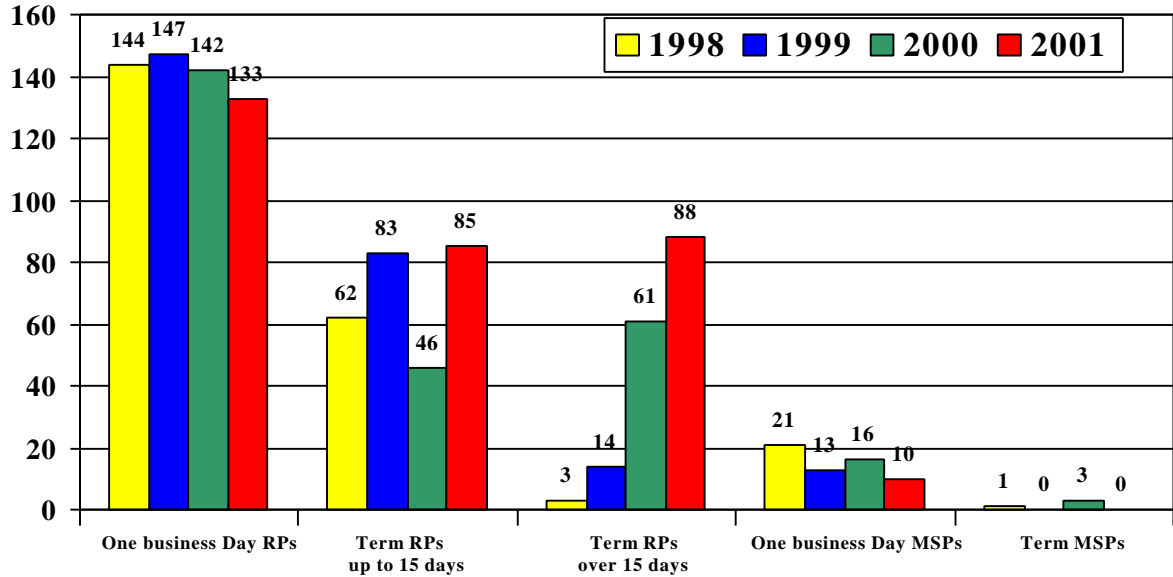
#### *Collateral Distribution*

The Desk solicited propositions across the entire pool of eligible collateral on all RPs arranged in 2001. But with the exception of nine RPs arranged on the days immediately following the September 11 attacks, all RPs were arranged as three separate simultaneous operations differentiated by type of collateral eligible. In the first of these, only Treasury debt was accepted; in the second, direct federal agency obligations (in addition to Treasury debt) were eligible; and, in the third, mortgage-backed agency debt was eligible (in addition to the other two categories of debt). For the purposes of this report, these separate operations are counted as different tranches of a single RP. In order to simplify the structure of its operations, for several days after September 11 the Desk only arranged RPs with a single tranche, under which dealers had the option to deliver Treasury, agency, or mortgage-backed collateral. All RPs arranged in 2001 settled under

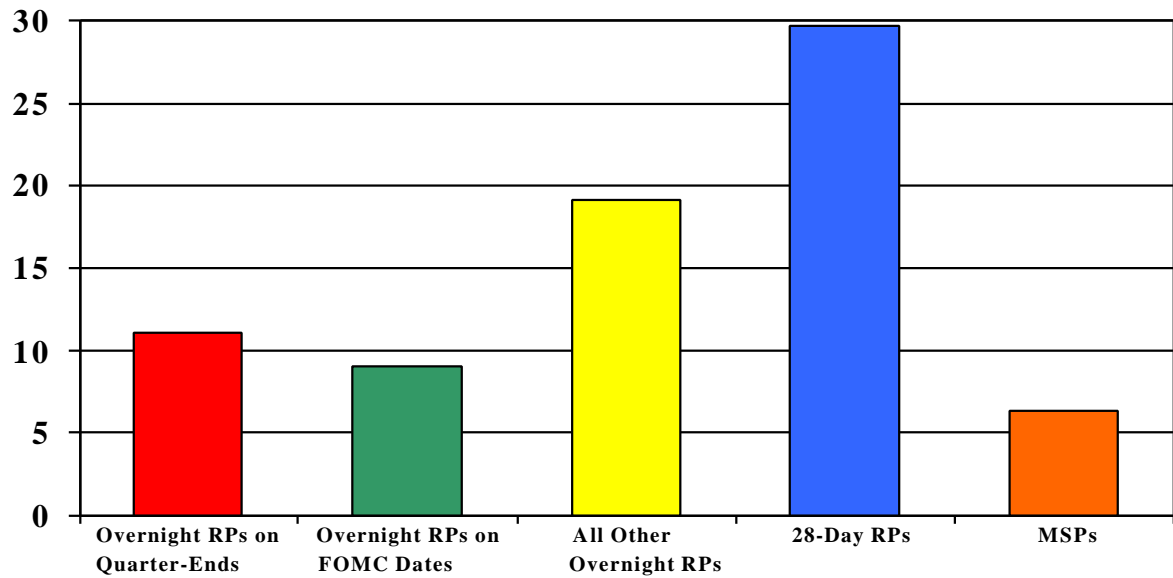
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<sup>20</sup> One reason the Desk avoids heavy reliance on MSPs is that propositions on these operations in general are low compared to RPs, reflecting dealers' net borrowing needs. Also, given the structure of the Fed's balance sheet, routine reliance on MSPs would require expanding the Fed's holdings of financial assets above the level that is needed to meet its net autonomous factor liabilities and demands for Fed balances.

**Chart 9**  
**Temporary Operations, by Maturity and Type**  
 number



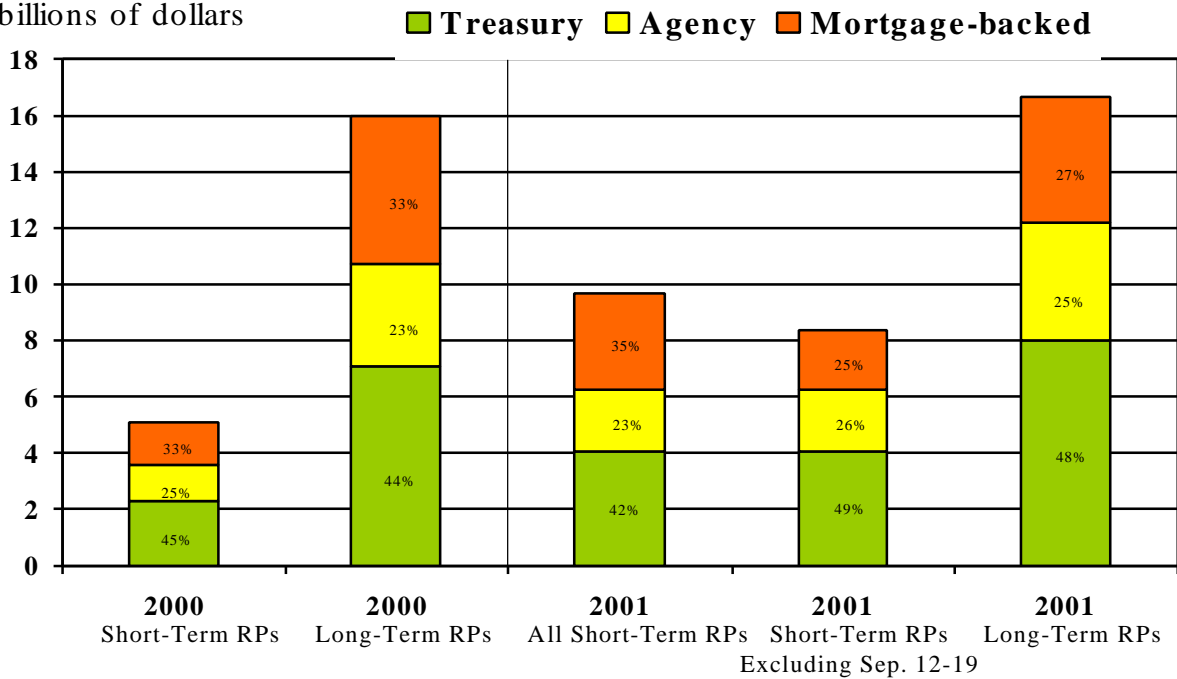
**Chart 10**  
**Average Propositions on Temporary Operations**  
 billions of dollars



Note: Data are from 2001, and exclude operations arranged during the maintenance period ended September 19

**Chart 11****Average Annual RPs Outstanding by Collateral Tranche**

billions of dollars



the triparty agreements established with two clearing banks in 1999. Under these agreements, dealers have flexibility to choose, and to change from day to day, the specific securities they deliver within each tranche.

The distribution of accepted propositions across collateral categories on multi-tranche RPs was determined by the relative attractiveness of rates in each tranche benchmarked against current market financing rates for that class of collateral. Distributions of collateral by tranche on outstanding RPs tend to be reasonably stable, but they can be very volatile from one operation to the next. In 2001, tranches in which mortgage-backed securities were eligible tended to account for a somewhat smaller share of total outstanding RPs. Their share on short-term RPs in 2001 was about the same as in the previous year, but only because of the large, single-tranche RPs arranged in the aftermath of September 11 (Chart 11).<sup>21</sup>

## V. THE FEDERAL FUNDS RATE AND DISCOUNT WINDOW CREDIT

### A. The Federal Funds Rate

Daily volatility in the Federal funds rate and deviations of effective rates from target in 2001 were slightly higher than in the preceding year, but still to the low side of recent norms (Table 3). Deviations of morning funds rates from target, often a measure of market expectations for likely rate behavior later in the day,

<sup>21</sup> These tranches reflect options that dealers have for delivering different categories of collateral on outstanding RPs where, for example, a dealer has the option to deliver Treasury debt on agency RPs but not vice versa.

continued to show the kinds of recurring patterns associated with certain calendar events seen in previous years. The deviations of the morning rate from target on high payment flow days and on Fridays were a touch smaller than in past years. However, morning premiums on maintenance period settlement days, which had been common in the past but which had largely disappeared over the preceding couple of years, were again evident in 2001, averaging around 6 basis points. The higher levels of excess reserves that had to be accumulated on the final day to meet requirements in 2001 may have contributed to funding anxieties of bank reserve managers.

Table 3

**Federal Funds Rate Behaviors**  
Medians and Averages of Daily Values  
(in basis points)

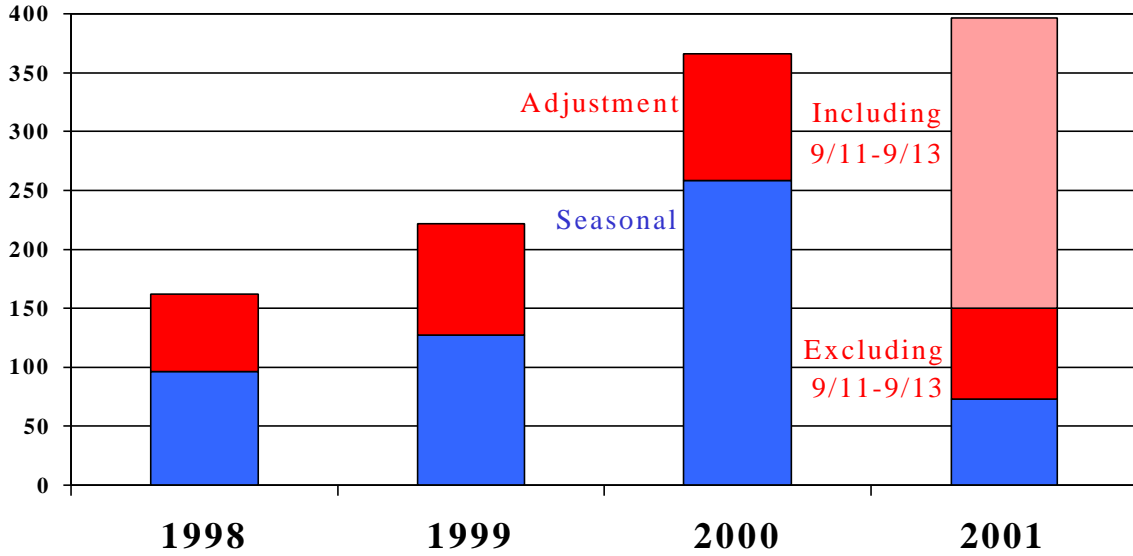
	1998	1999	2000	2001
<i>Deviations of Effective Rate from Target</i>				
Median	0	-1	1	0
Average	2	-1	2	-1
<i>Absolute Deviations of Effective Rate from Target</i>				
Median	8	7	4	5
Average	13	11	7	9
<i>Intraday Standard Deviations</i>				
Median	12	9	6	7
<i>Medians of Morning Rates less Target Rate on:</i>				
High Payment Flow Days (excl. quarter-ends)	25	19	19	16
Fridays	-6	-6	-6	-3
Maintenance Period Settlement Days	13	0	0	6

**B. Discount Window Credit**

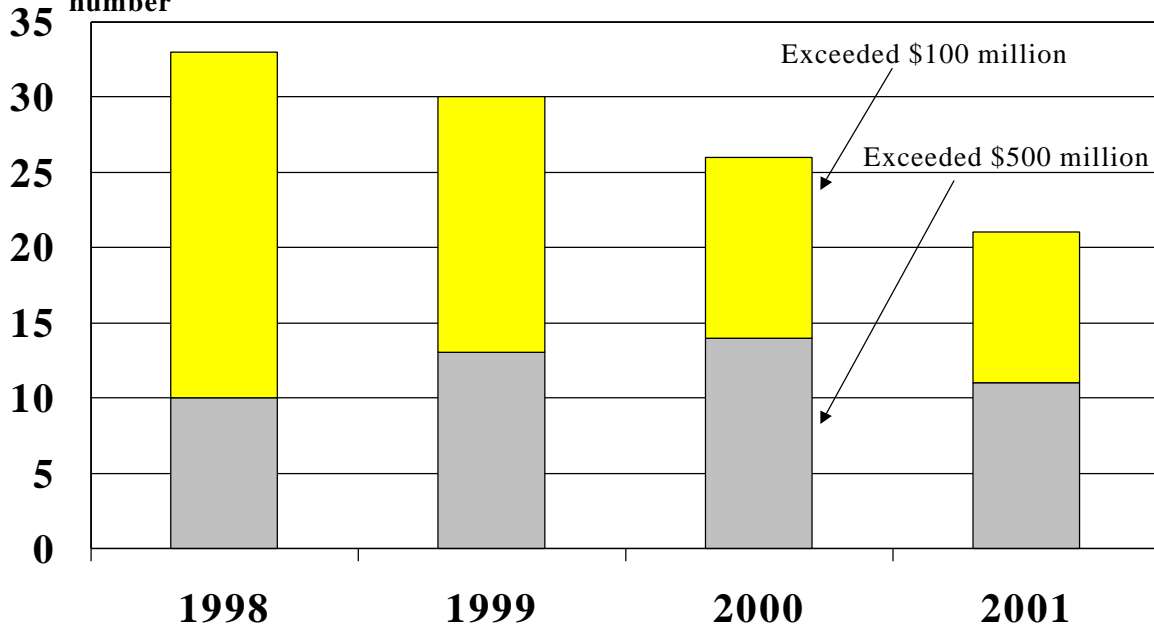
Discount window credit makes up a relatively small portion of the total domestic financial assets held by the Federal Reserve. Much of this credit is seasonal borrowing, which behaviorally is more akin to an autonomous factor in terms of its implications for open market operations (Chart 12).<sup>22</sup> Adjustment credit is typically quite small, but the existence of the adjustment credit facility is an important part of the monetary policy implementation framework. It acts as a stabilizer, moderating the upward movements in the Federal funds rate in the event a shortage of Fed balances leaves a bank overdrawn on its Fed account at the end of any day or deficient in meeting its requirements on a maintenance period settlement day. The critical role of the adjustment credit facility during times of severe stress in financing markets is highlighted by the discussion in the following section of its use immediately following the September 11 attacks. For meeting more routine reserve shortfalls and payments difficulties, even levels of adjustment borrowing that are small relative to the total supply of Fed balances can help alleviate the degree of upward rate pressure that can develop in the market.

<sup>22</sup> There were no instances of extended credit borrowing at the discount window.

**Chart 12**  
**Adjustment and Seasonal Discount Window Credit**  
**average annual levels, including and excluding Sep. 11-13 for 2001**  
 millions of dollars



**Chart 13**  
**Number of Days Total Adjustment Borrowing by Large Banks**  
**exceeded \$500 million and \$100 million**  
 number



Large banks as a group borrowed an amount in excess of \$500 million on eleven different days in 2001, including three occasions coming in the immediate aftermath of the September 11 attacks (Chart 13). This total is in line with the number of occasions banks borrowed at least that much in the preceding three years. Large banks borrowed a somewhat smaller but still significant amount, in excess of \$100 million, on another ten occasions in 2001, but this number was somewhat below the frequency in most other recent years.

## **VI. THE CONDUCT OF MONETARY OPERATIONS AFTER SEPTEMBER 11**

This section presents an overview of the context and conduct of open market operations in the aftermath of the terrorist attacks on the World Trade Center and Pentagon on Tuesday, September 11.

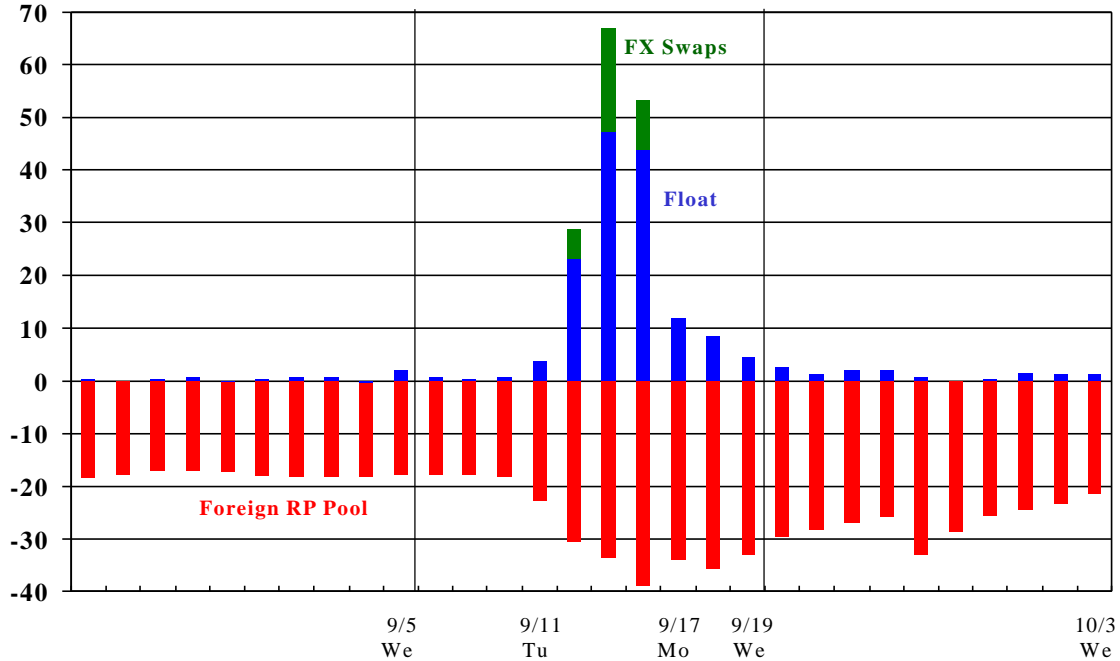
### *General Financing Market Conditions*

Immediately following the attacks, many financial markets effectively ceased operations. But with Fedwire and other wholesale payments networks remaining open, securities dealers and banks faced a continuing need to obtain funding for large pre-existing positions that they typically finance on an overnight basis. Communications disruptions prevented many borrowers from having normal access to their investor base for the first few days after September 11, even among those not directly affected by the attacks, and the impaired ability of a major clearing bank to process funds and securities transfers for itself and on behalf of its customers created additional uncertainties. Banks and dealers, uncertain about their general cash position or the availability of financing, tended to refrain from making cash outlays until later than normal in the day. In the Federal funds market, several of the major brokers ceased operations for a time, and many large banks resorted to arranging trades directly with one another. Although not fully back to normal levels of operating efficiency, by Monday, September 17 the payments and communications infrastructure most critical to the functioning of the financing market had recovered considerably, and participation levels were much improved.

### *Behavior of Autonomous Factors*

Levels of several of the autonomous factors on the Fed's balance sheet were dramatically affected by some of the responses to the World Trade Center and Pentagon attacks (Chart 14). Over the three day interval from September 12 to September 14 (Wednesday through Friday), net autonomous factor movements increased the supply of Fed balances dramatically, and then net factor movements began to drain large quantities. The level of float in the banking system peaked at \$47 billion on that Thursday as a result of the temporary curtailment of air traffic nationwide. Another \$20 billion of Fed balances was created that day when the ECB drew on a temporary foreign currency swap line that had just been established. Meanwhile, investments in the foreign RP pool jumped between \$15 billion and \$20 billion above prior levels, reducing the supply of Fed balances. The factors that were adding to the supply of Fed balances returned to

**Chart 14**  
**Impact of Key Autonomous Factors on the Supply of Fed Balances around September 11**  
 billions of dollars



something like normal levels by Monday, September 17, but persistent high levels of the pool began to leave large underlying deficiencies.

*Federal Reserve Monetary Operations, and the Level and Distribution of Fed Balances*

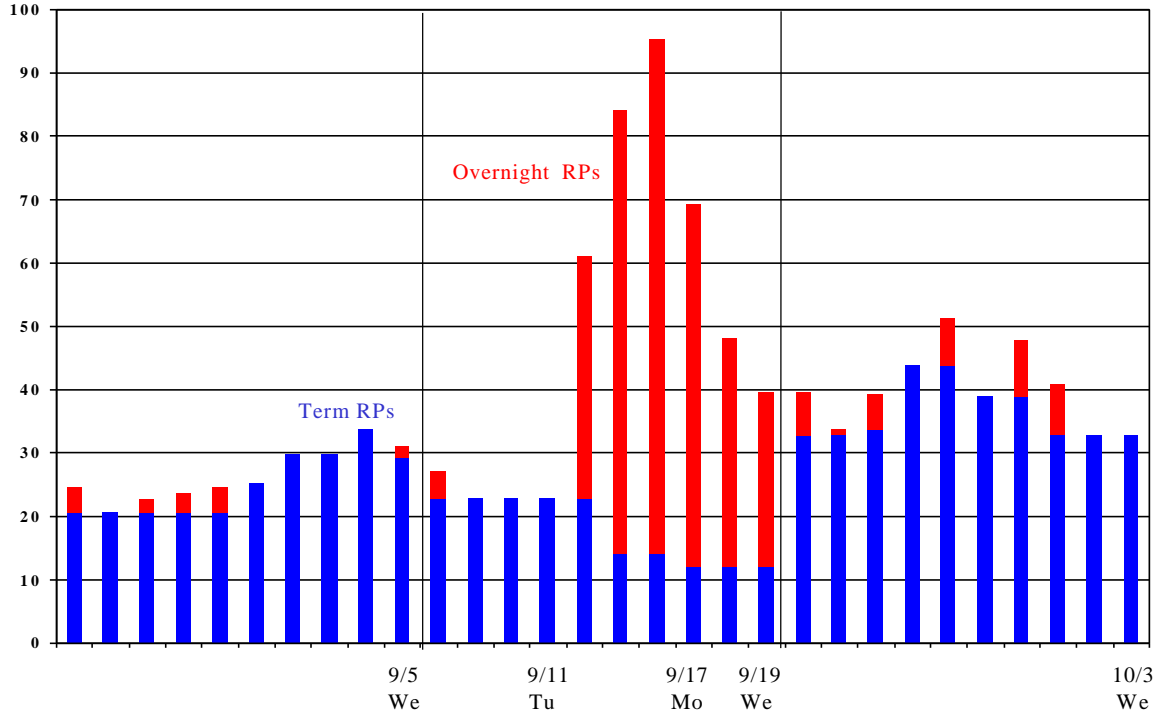
On the morning of September 11, the Federal Reserve issued a public release stating “The Federal Reserve System is open and operating. The discount window is available to meet liquidity needs,” to encourage banks to view the discount window as a source of liquidity. September 11 fell in the middle of the maintenance period ended September 19; for the remainder of that period, the Desk arranged only overnight RPs for same-day settlement because of the high degree of volatility in the needed level of RPs outstanding from one day to the next.

From Wednesday through the following Monday, the sizes of open market operations were aimed at satisfying all the financing that dealers wished to arrange with the Desk, in order to mitigate to the extent possible the disruptions to normal trading and settlement arrangements.<sup>23</sup> On these four days, all propositions with rates at or above the prevailing target were accepted, which was the vast majority. Dealers’ total demands for financing far surpassed any need to arrange operations simply to provide an aggregate level of Fed balances that would help banks meet their requirements or their desired end-of-day

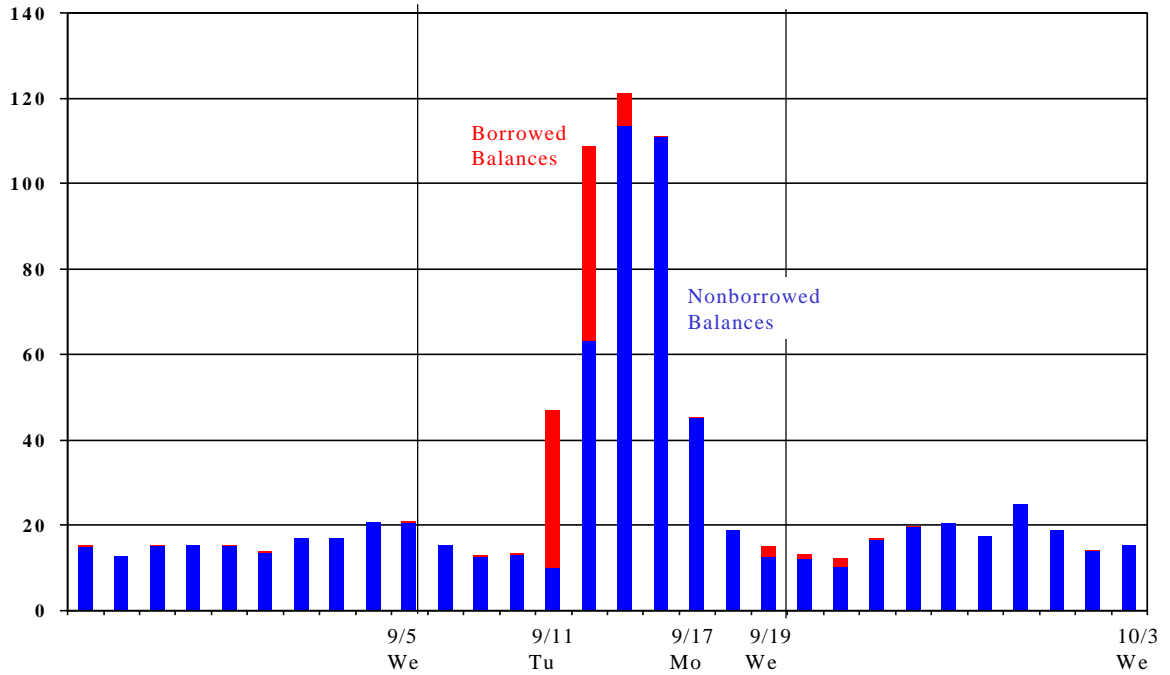
<sup>23</sup> The RP on September 12 was arranged from the Main Building. Subsequent operations were arranged out of the contingency site at FRBNY’s East Rutherford Operations Center (EROC).



**Chart 15**  
**Outstanding Term and Overnight RPs around September 11**  
 billions of dollars



**Chart 16**  
**Total Fed Balances around September 11**  
 billions of dollars



holdings of balances at the Fed. To more effectively serve as a source of financing of last resort and to help encourage dealers to continue to intermediate on behalf of some of their own customers, the Desk

operated relatively late in the day, after dealers had a good opportunity to assess their full financing needs and to secure all available financing in the market.

The size of the overnight RPs peaked on Thursday and Friday, at \$70 billion and \$81 billion, respectively, the same days that autonomous factors also added the most to the supply of Fed balances (Chart 15). Before discount window borrowing, Fed balances both those days topped \$110 billion, and, in general, Fed balances before borrowing were extraordinarily elevated from Wednesday through Monday (Chart 16). But even with such high levels of Fed balances, severe dislocations that interfered with their distribution in the first few days after the attacks caused many banks to borrow at the discount window to cover overdraft positions. As a result, levels of adjustment borrowing soared to record levels on Tuesday and Wednesday.

By the final days of the maintenance period, after financing markets began to function more normally, the Desk aimed its operations at maintaining a more traditional balance between the supply of and demand for Fed balances, consistent with the Federal funds rate trading around the target level, lowered to 3 percent on September 17. With cumulative excess positions so high and with financing rates generally quite low, reflecting the weight of these excess positions, the Desk was aiming to leave relatively low levels of Fed balances in place each day. The size of the RPs needed to provide even these relatively low levels of balances remained large for a time, reflecting the impact of autonomous factors that were now reducing the supply of Fed balances below normal levels. As dealers increasingly were able to communicate with and obtain financing from their usual customers, the Desk had to move up its operating time to ensure a sufficient level of participation for the large RPs that were still needed, and it had to accept the vast majority of propositions—even those offered at rates well below the new 3 percent target level—in order to arrange RPs of sufficient size.

Even with the low levels of excess provided late in the maintenance period, the average level of excess balances for the period ended September 19 was \$38 billion. This excess was highly concentrated at a small number of institutions that accumulated high balances as a result of an inability to make payments or to sell funds in the first days after the attacks, and it did not reflect any desire to hold huge excess balances.

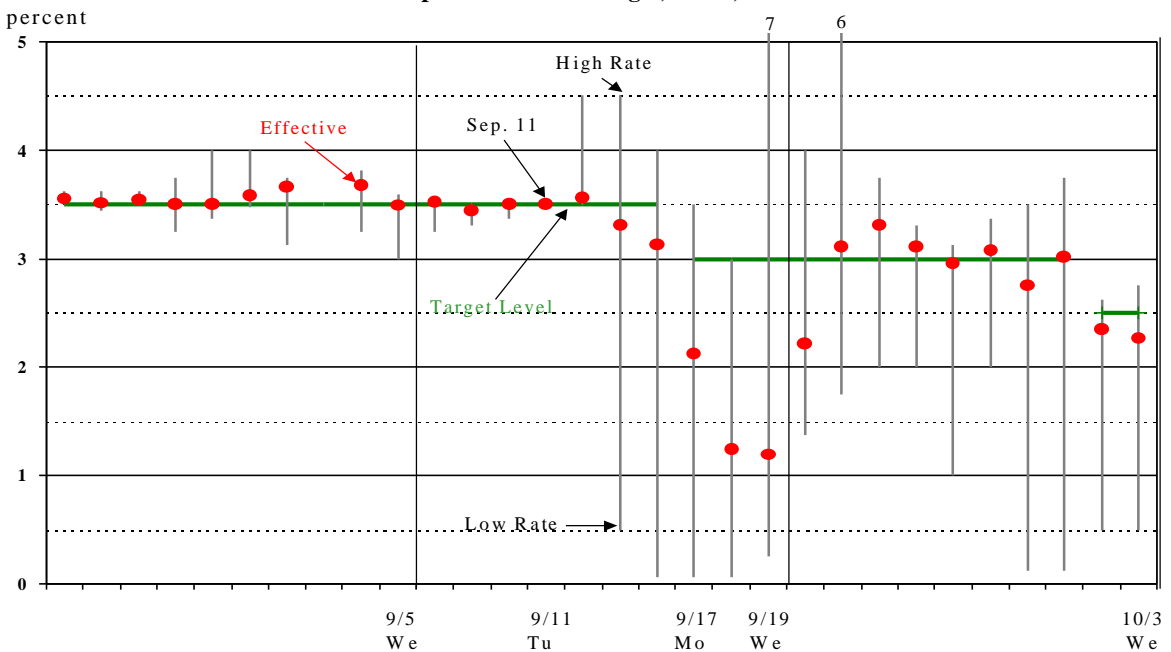
In part to simplify the nature of our direct market involvement under exigent circumstances, from September 11 through the remainder of the maintenance period underway, the Desk did not replace any of its maturing long-term RPs, and it arranged no outright operations. On the settlement day, the Desk arranged three term RPs that settled on a forward basis on the first day of the following maintenance period, totaling \$23 billion, in order to reduce the level of intervention that would be needed in financing markets in upcoming days. Other changes were also made to simplify operations. Instead of

differentiating between collateral types, each RP was arranged as a single tranche where dealers had the option to deliver any of our three categories of collateral. Because some dealers lacked connectivity at their contingency sites, the Desk operated in a semi-manual mode, inputting propositions for many dealers (although our automated trade processing system continued to operate uninterrupted). Because of the time required to establish voice communications with dealers lacking electronic connections and the time needed to receive bids by phone, the time between when an operation was first announced and when it was closed was lengthened, and the Desk often pre-announced its time-frame for operating.

*Financing Rate Behavior*

From Tuesday, September 11, through most of Thursday, September 13, market participants in both the government securities RP markets and in the Federal funds market simply priced their trades at the target funds rate, a response to the attacks that likely helped maintain some order in these markets. The high levels of excess balances provided through the Desk’s RPs first began to weigh heavily on the funds rate during late trading on Thursday and again on Friday, although through Monday, September 17 morning rates generally reverted back to the target (Chart 17). Thereafter, extremely low rates prevailed in the funds and RP markets for several days, falling even below 1 percent. These low rates in large measure reflected misperceptions that the Desk was continuing to provide high levels of balances, a view reinforced by the continuing large sizes of our RPs and widespread reports that were crediting the Desk with providing abundant liquidity to the market. Several episodes of rates being pushed higher in late-day trading, induced by the relatively low levels of Fed balances the Desk was leaving in place, were needed to nullify these perceptions and to bring the funds rate back up closer to the target.

**Chart 17**  
**Federal Funds Rates around September 11: High, Low, and Effective Rates**



## APPENDIX A: AUTHORIZATION FOR DOMESTIC OPEN MARKET OPERATIONS

Open market operations were conducted under the Authorization for Domestic Open Market Operations.

The Authorization in effect at the end of 2001 is reprinted below:

*Authorization for Domestic Open Market Operations*

1. The Federal Open Market Committee authorizes and directs the Federal Reserve Bank of New York, to the extent necessary to carry out the most recent domestic policy directive adopted at a meeting of the Committee:
  - (a) To buy or sell U.S. Government securities, including securities of the Federal Financing Bank, and securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States in the open market, from or to securities dealers and foreign and international accounts maintained at the Federal Reserve Bank of New York, on a cash, regular, or deferred delivery basis, for the System Open Market Account at market prices, and, for such Account, to exchange maturing U.S. Government and Federal agency securities with the Treasury or the individual agencies or to allow them to mature without replacement; provided that the aggregate amount of U.S. Government and Federal agency securities held in such Account (including forward commitments) at the close of business on the day of a meeting of the Committee at which action is taken with respect to a domestic policy directive shall not be increased or decreased by more than \$12.0 billion during the period commencing with the opening of business on the day following such meeting and ending with the close of business on the day of the next such meeting;
  - (b) To buy U.S. Government securities, obligations that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States, from dealers for the account of the Federal Reserve Bank of New York under agreements for repurchase of such securities or obligations in 65 business days or less, at rates that, unless otherwise expressly authorized by the Committee, shall be determined by competitive bidding, after applying reasonable limitations on the volume of agreements with individual dealers; provided that in the event Government securities or agency issues covered by any such agreement are not repurchased by the dealer pursuant to the agreement or a renewal thereof, they shall be sold in the market or transferred to the System Open Market Account.
  - (c) To sell U.S. Government securities that are direct obligations of, or fully guaranteed as to principal and interest by, any agency of the United States to dealers for System Open Market Account under agreements for the resale by dealers of such securities or obligations in 65 business days or less, at rates that, unless otherwise expressly authorized by the Committee, shall be determined by competitive bidding, after applying reasonable limitations on the volume of agreements with individuals dealers.
2. In order to ensure the effective conduct of open market operations, the Federal Open Market Committee authorizes the Federal Reserve Bank of New York to lend on an overnight basis U.S. Government securities held in the System Open Market Account to dealers at rates that shall be determined by competitive bidding but that in no event

shall be less than 1.0 percent per annum of the market value of the securities lent. The Federal Reserve Bank of New York shall apply reasonable limitations on the total amount of a specific issue that may be auctioned and on the amount of securities that each dealer may borrow. The Federal Reserve Bank of New York may reject bids which could facilitate a dealer's ability to control a single issue as determined solely by the Federal Reserve Bank of New York.

3. In order to ensure the effective conduct of open market operations, while assisting in the provision of short-term investments for foreign and international accounts maintained at the Federal Reserve Bank of New York, the Federal Open Market Committee authorizes and directs the Federal Reserve Bank of New York (a) for System Open Market Account, to sell U.S. Government securities to such foreign and international accounts on the bases set forth in paragraph 1(a) under agreements providing for the resale by such accounts of those securities in 65 business days or less on terms comparable to those available on such transactions in the market; and (b) for New York Bank account, when appropriate, to undertake with dealers, subject to the conditions imposed on purchases and sales of securities in paragraph 1(b), repurchase agreements in U.S. Government and agency securities, and to arrange corresponding sale and repurchase agreements between its own account and foreign and international accounts maintained at the Bank. Transactions undertaken with such accounts under the provisions of this paragraph may provide for a service fee when appropriate.
4. In the execution of the Committee's decision regarding policy during any intermeeting period, the Committee authorizes and directs the Federal Reserve Bank of New York, upon the instruction of the Chairman of the Committee, to adjust somewhat in exceptional circumstances the degree of pressure on reserve positions and hence the intended federal funds rate. Any such adjustment shall be made in the context of the Committee's discussion and decision at its most recent meeting and the Committee's long-run objectives for price stability and sustainable economic growth, and shall be based on economic, financial, and monetary developments during the intermeeting period. Consistent with Committee practice, the Chairman, if feasible, will consult with the Committee before making any adjustment.

**APPENDIX B: GUIDELINES FOR THE CONDUCT OF SYSTEM OPEN MARKET OPERATIONS IN FEDERAL AGENCY ISSUES**

The FOMC has established specific guidelines for operations in agency securities to ensure that Federal Reserve operations do not have undue market effects and do not serve to support individual issuers. Provisions 3-6 of the Guidelines were first temporary suspended in August 1999, in order to expand the types of agency securities the Desk could accept on its operations around the century date change. This suspension was extended in March 2000, in light of anticipated paydowns of federal debt, and it was reaffirmed in January 2001 until the FOMC's first meeting in 2002.

*Guidelines for the Conduct of System Operations in Federal Agency Issues*

1. System open market operations in Federal agency issues are an integral part of total System open market operations designed to influence bank reserves, money market conditions, and monetary aggregates.
2. System open market operations in Federal agency issues are not designed to support individual sectors of the market or to channel funds into issues of particular agencies.
3. System holdings of agency issues shall be modest relative to holdings of U.S. Government securities, and the amount and timing of System transactions in agency issues shall be determined with due regard for the desirability of avoiding undue market effects.
4. Purchases will be limited to fully taxable issues, not eligible for purchase by the Federal Financing Bank, for which there is an active secondary market. Purchases will also be limited to issues outstanding in amounts of \$300 million or over in cases where the obligations have maturity of five years or less at the time of issuance, and to issues outstanding in amounts of \$200 million or over in cases where the securities have a maturity of more than five years at the time of issuance.
5. System holdings of any one issue at any one time will not exceed 30 percent of the amount of the issue outstanding. Aggregate holdings of the issues of any one agency will not exceed 15 per cent of the amount of outstanding issues of that agency.
6. All outright purchases, sales and holdings of agency issues will be for the System Open Market Account.