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DOMESTIC OPEN MARKET OPERATIONS  
DURING 2002

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January 2003

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*FEDERAL RESERVE BANK OF NEW YORK, MARKETS GROUP*

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\* Revised May 4, 2005: This report was revised to incorporate an additional matched-sale purchase (MSP) in 2002 that was erroneously excluded from the original analysis.

# DOMESTIC OPEN MARKET OPERATIONS DURING 2002

## I. IMPLEMENTATION OF MONETARY POLICY IN 2002

### 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 (Desk) of 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 target rate. The Desk arranges open market operations to target the federal funds rate, while at the same time accomplishing other objectives that may affect the structure of the Federal Reserve balance sheet.

As this report will indicate, during 2002 the ability and manner in which the Desk strove to meet the directive set forth by the FOMC were influenced by the low level of interest rates and the growth pattern of currency in circulation. The stable and low federal funds target rate fostered a continuation of the elevated levels of required balances held by depository institutions at the Federal Reserve (Fed balances) that was reached at the end of 2001. The rate environment also contributed to subdued volatility in the federal funds market. On the other hand, currency growth was not as steady. The growth of currency required sizable open market operations during the first half of the year and then abruptly slowed resulting in a near halt of outright purchases during the fourth quarter of 2002.

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

The federal funds target rate was changed on only one occasion in 2002. At its regularly scheduled meeting in November, the FOMC reduced the rate by  $\frac{1}{2}$  percentage point to a level of  $1\frac{1}{4}$  percent. The Board of Governors approved an equal size reduction in the discount rate, which maintained a 50-basis point spread of the federal funds target rate over the discount rate through January 8, 2003.

In conjunction with the implementation of new discount window programs that is discussed below, the Board of Governors approved requests by the Reserve Banks to establish a primary credit rate at 100 basis points above the FOMC's federal funds target rate and the secondary credit rate at a level 50 basis points above the primary credit rate, effective January 9, 2003.

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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.*

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**Table 1: Changes to the Federal Funds Target Rate**

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<b>Effective Date of Change</b>	<b>Federal Funds Target Rate (Percent)</b>	<b>Basic Discount Rate<sup>2</sup> (Percent)</b>	<b>Primary Credit Rate (Percent)</b>	<b>Secondary Credit Rate (Percent)</b>
December 11, 2001	1 ¾	1 ¼		
November 6, 2002	1 ¼	¾		
January 9, 2003	1 ¼		2 ¼	2 ¾

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To target the federal funds rate, the Desk uses open market operations to align the supply of 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 Fed balances, taking account of possible forecast errors and the minimal levels of aggregate Fed balances that, in practice, are needed to facilitate settlement of financial payments by banks. The Desk aims to supply a level of Fed balances in line with its best estimate of demand. From time to time, the Desk's estimate of the balance between available supply and demand may be guided by the deviation of the federal funds rate from the federal funds target rate.

The average level of Fed balances that banks demand over two-week reserve maintenance periods are in large measure determined by requirements to hold Fed balances, with only a small level of additional balances (excess) typically demanded. The ability of depository institutions to average their holdings of Fed 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 Fed balances. Nonetheless, the federal funds rate tends to firm (i.e. trade above the target rate) if Fed balances fall so low that some banks have difficulty finding sufficient funds to cover potential overdrafts in their Fed accounts or required balance deficiencies; the federal funds rate tends to soften (i.e. trade below the target rate) if Fed balances are so high that some banks risk ending a period holding undesired excess balances.

### **C. New Developments in 2002**

There were no changes to the FOMC's Authorization for Domestic Open Market Operations in 2002. (Appendix A) At its January meeting, the FOMC approved a further extension of the temporary suspension of paragraphs 3 to 6 of the Guidelines for the Conduct of System Open Market Operations in Federal

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<sup>2</sup> The interest rates applied to the discount window change periodically to complement changes in the FOMC's target for the federal funds rate and to achieve broad monetary policy goals. The effective date of a change to the discount rate at individual Federal Reserve Banks can lag the change to the federal funds target rate. General information on the discount window is available at <http://www.frbdiscountwindow.org/>.

Agency Issues. (Appendix B) The suspension, which has been renewed annually since 1999, continued the approval for the expanded pool of collateral eligible for the Desk's repurchase agreements (RPs) through the FOMC's first scheduled meeting in 2003. The primary effect was to continue the inclusion of pass-through mortgage securities of the Government National Mortgage Association (GNMA), Federal Home Loan Mortgage Corporation (Freddie Mac) and Federal National Mortgage Association (Fannie Mae) and stripped securities of government agencies.

At its March meeting, the FOMC decided that further pursuit of alternative market instruments for purchase by the System Open Market Account (SOMA) should go forward once it was possible to do so without impeding the contingency planning effort that intensified following the September 11 terrorist attacks. The FOMC expressed a preference for continued reliance, to the extent feasible, on direct U.S. Treasury debt for outright SOMA transactions. While the available supply of marketable U.S. Treasury securities was not expected to impose a constraint on open market operations, it was recognized that there is inherent uncertainty in budget forecasts and considerable lead-time needed to implement new operating procedures. Thus, the FOMC requested that the staff focus their study of alternative investments on further examination of outright purchases of GNMA mortgage-backed securities (GNMA-MBS), subsequent to the completion of contingency planning efforts. The FOMC's preference for GNMA-MBS, over other alternative investments, stems from the securities' well-developed market and full faith and credit guarantee of the U.S. government.

At the same meeting, the FOMC implemented a change to its disclosure policy. The new policy called for the inclusion of the details of the policy action vote within the press statement released subsequent to each meeting. The press release now includes the identity of the voters, as well as the policy preference of dissenters. This change was designed to enhance communication with market participants, as they previously received this information on a lagged basis when the minutes of the FOMC meetings were released.<sup>3</sup>

At the June meeting, the FOMC updated its authorization for the FRBNY to enter into agreements that would enable another Federal Reserve Bank to conduct open market operations on behalf of the Federal Reserve System on a temporary basis in an emergency after designation by the FOMC or the Chairman.

#### *Reverse Repurchase Agreements*

Effective December 13, 2002, the Federal Reserve officially adopted reverse repurchase agreements (RRPs) –sales of securities under agreements to repurchase– to replace matched sale-purchase transactions

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<sup>3</sup> The FOMC press release announcing the disclosure policy is available at: <http://www.federalreserve.gov/boarddocs/press/general/2002/20020319/>

(MSPs), as a means of temporarily selling securities from the SOMA. RRP's are fundamentally equivalent to MSPs, and are more commonly used in financial markets.

The accounting treatment of RRP's differs from that of MSPs. MSPs were accounted for as an outright sale, and the securities sold under these agreements were removed from securities held outright on the balance sheet of the Federal Reserve. In contrast, RRP's are accounted for as financing transactions in which the securities pledged remain in total outright holdings of securities held by the Federal Reserve, and a liability is recognized until the transaction matures.

The adoption of RRP's reflects continued efforts by the Desk to conduct open market operations in accordance with standard market practice. The FOMC had provided the Desk with permanent authority to transact with RRP's in March of 2000. The timing of the move to RRP's in late 2002 reflects the implementation of a new accounting and settlement system at the FRBNY that was needed to accommodate these transactions. The Desk did not arrange any RRP's with primary dealers during 2002.<sup>4</sup>

#### *Primary Credit Facility*

In October 2002, the Board of Governors approved a revision to the Federal Reserve's discount window lending programs. The revised rule, which was effective January 9, 2003, replaced the previous adjustment and extended credit facilities that served the purpose of providing a temporary source of liquidity to depository institutions, with two new facilities, primary credit and secondary credit.<sup>5</sup>

Under the revised program, the primary credit facility allows sound financial institutions the opportunity to borrow short-term funds at an initial rate of 100 basis points above the FOMC's federal funds target rate.<sup>6</sup> The above-market rate is intended to reduce the incentive, which existed under the previous policy, for depository institutions to exploit the spread between market rates and the below-market discount rate, thereby reducing the need for Reserve Banks to monitor an institution's funding positions prior to approving an extension of credit. In line with this, the spread above the federal funds target rate was set at a rate high enough to encourage borrowing only to meet short-term, unforeseen needs.

The secondary credit facility is available to institutions that do not qualify for primary credit. Reflecting the less-sound condition of the institutions qualifying for the secondary credit facility, the Federal Reserve

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<sup>4</sup> The daily investment facility for the foreign central bank and international accounts (foreign RP pool) was transacted as RRP's starting on December 13, 2002.

<sup>5</sup> No change was made to the seasonal lending program. The press release of the revised rule can be found at <http://www.federalreserve.gov/boarddocs/press/bcreg/2002/200210312/>

<sup>6</sup> Reserve Banks establish the primary credit rate at least every two weeks, subject to the review and determination of the Board of Governors, through the same procedure formerly used to set the adjustment credit rate. The final rule includes a provision that could facilitate a reduction in the primary credit rate in a financial emergency.

initially set the secondary credit rate 50 basis points above the primary credit rate. Extensions of credit under the secondary credit facility entail a higher level of Reserve Bank administration and oversight than those under the primary credit facility.

The impact of the revised discount window programs on Desk operations and the federal funds market will be closely monitored in 2003. Assuming an increased willingness on the part of institutions to borrow due to the reduction in the administrative burden, the primary credit facility may reduce the likelihood that the federal funds rate spikes well above the federal funds target rate when the supply of Fed balances falls short of demand. Thus, in effect, the primary credit rate may serve as a ceiling in the federal funds market. However, market participants continue to debate the potential impact of the new structure on intra-day volatility in the federal funds market, as well as the effect on strategies for bank reserve management in the event that the federal funds rate moves above the federal funds target rate.

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

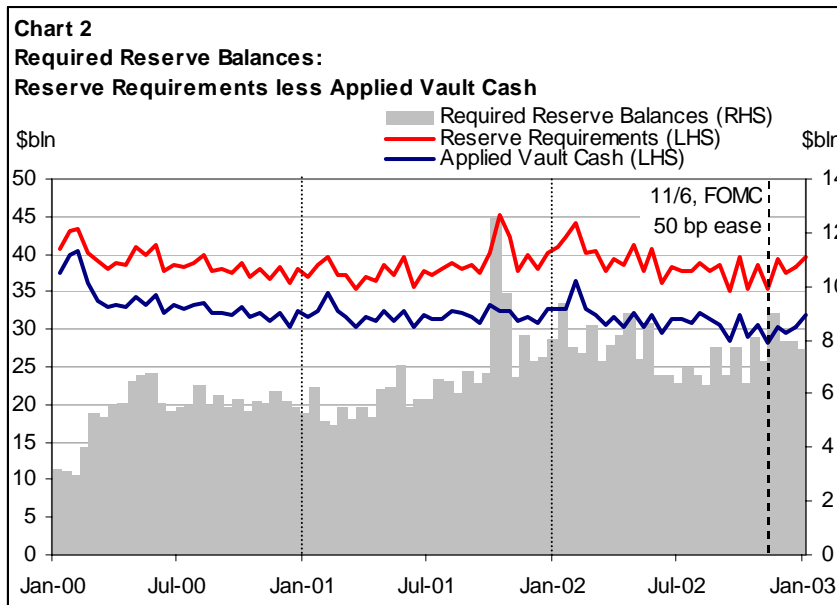
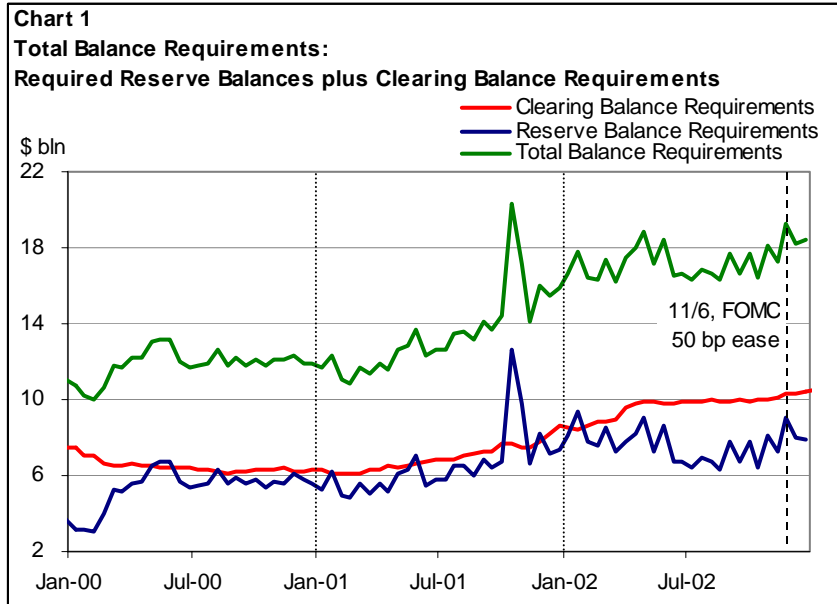
In designing permanent and temporary open market operations, the Desk aims to satisfy banks' demand for holding Fed balances on a daily and a maintenance period-average basis. Total demand consists of two components: the portion needed to meet all requirements and the desired portion held in excess of requirements.

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

A bank's total balance requirement is the average level of balances it must hold at the Federal Reserve over a two-week maintenance period to meet various regulatory or contractual obligations. Total balance requirements can be separated 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 that an institution must hold to meet reserve and clearing balance requirements. 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 maintenance period, which facilitates estimation of the demand for Fed balances. As-of adjustments, however, may be applied at any time before or during a maintenance period.

Following a significant increase throughout 2001, total balance requirements leveled off early in 2002 and remained around these elevated levels through most of the year, before moving up in early November. (Chart 1) Although total balance requirements were relatively stable, the component requirements shifted somewhat over the year. Required reserves balances were lower over the year as the decline in required reserves—balance requirements incurred based on the level of reservable liabilities a bank has on its balance sheet—was accompanied by a somewhat smaller decline in applied vault cash. (Chart 2) Clearing balance requirements, however, remained on the upward trajectory started in 2001 through the first quarter

of 2002, as banks continued to adjust their elected clearing balance levels in response to the sustained low level of rates. Since the November 2002 FOMC meeting, at which the federal funds target rate was lowered an additional 50 basis points, clearing balances rose again.



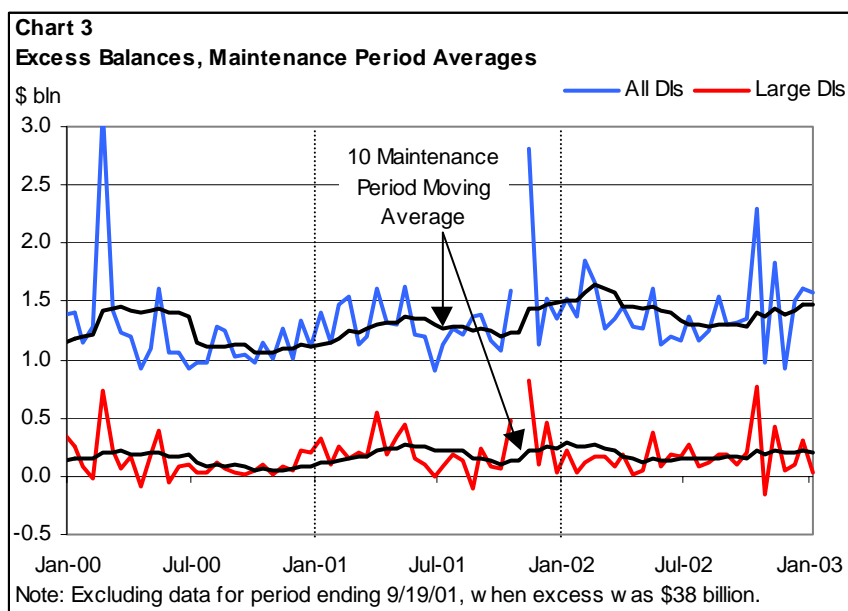
## B. Excess Balances

Period-average and daily levels of Fed balances are measured relative to period-average levels of total balance requirements to obtain measures of excess balances. Although excess balances earn no interest and represent a lost investment opportunity, in practice, banks routinely hold a positive level of excess balances



that in the aggregate represent an important component of the total demand for Fed balances. The Desk must account for this demand in its provision of Fed balances within a maintenance period.<sup>7</sup>

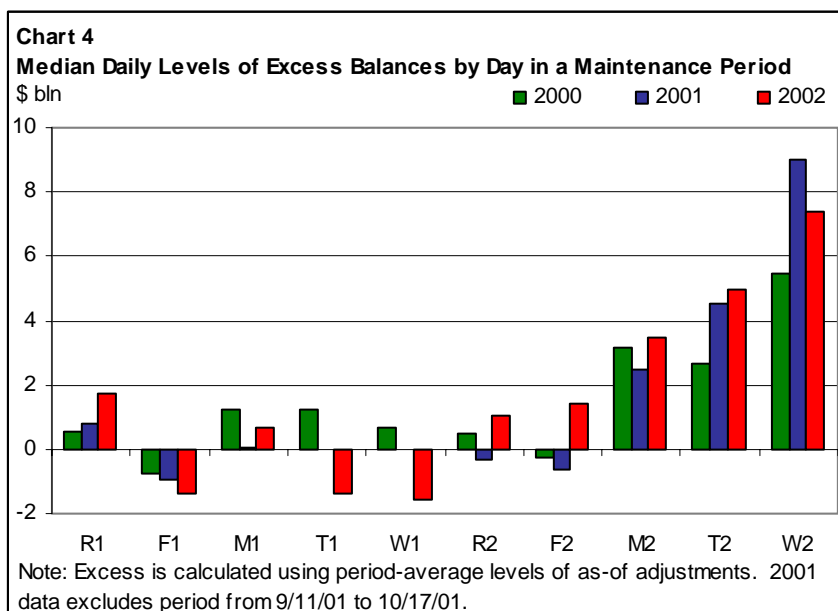
On a period-average basis, aggregate excess balances observed over 2002 suggest that the low level of the federal funds rate has had little to no impact on demand, as levels were in line with historical observations. Demand for excess balances continues to be concentrated at smaller institutions, as large banks more actively manage their balances at the Federal Reserve and keep excess balances to a minimum. (Chart 3)



The daily intraperiod distribution of excess balances was heavily skewed, and institutions were apparently willing to hold considerably lower Fed balances relative to their total required balances over the first week of the maintenance period than was the case in prior years. (Chart 4) In 2001, demand for Fed balances on many settlement days (W2) was elevated because of expected rate cuts on FOMC meetings scheduled for second Tuesdays (T2). In 2002, rather than distributing their Fed balances needed to meet higher total balance requirements evenly over a maintenance period, banks evidently chose to hold them in a more skewed pattern. This observation suggests that the higher balance requirements in place during 2002 have been more useful for protecting against the risk of unusable excess balances than end-of-day overdrafts.<sup>8</sup>

<sup>7</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>8</sup> When banks determine their daily demand for Fed balances, they weigh the risks of incurring an end-of-day overdraft against the risk of holding unusable excess balances at the conclusion of a maintenance period. To the extent that a bank can hold fewer balances, relative to their required level of Fed balances, early in a maintenance period, they are gaining some protection against the risk that an unexpectedly large



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

The supply of Fed balances is determined by the Desk's open market operations, discount window lending and the movements in autonomous factors on the Federal Reserve's balance sheet. Autonomous factors consist of Federal Reserve assets and liabilities over which the Desk has little or no control. In 2002, the net level of autonomous factors (assets less liabilities) increased by \$42 billion, similar to the prior year, and resulted in an equivalent drain on Fed balances.<sup>9</sup> (Chart 5)

#### *Changes in Autonomous Factors*

The net level of autonomous factors is primarily determined by the behavior of Federal Reserve note liabilities (F.R. notes), which increased by \$42 billion over the year. While such a gain was close to historical averages, currency growth in 2002, as measured by the seasonally adjusted currency component of M1, was concentrated over the first six months of the year, with an increase of nearly 11 percent, followed by a much weaker gain of 4 ½ percent over the latter half of the year.<sup>10</sup> With currency growth

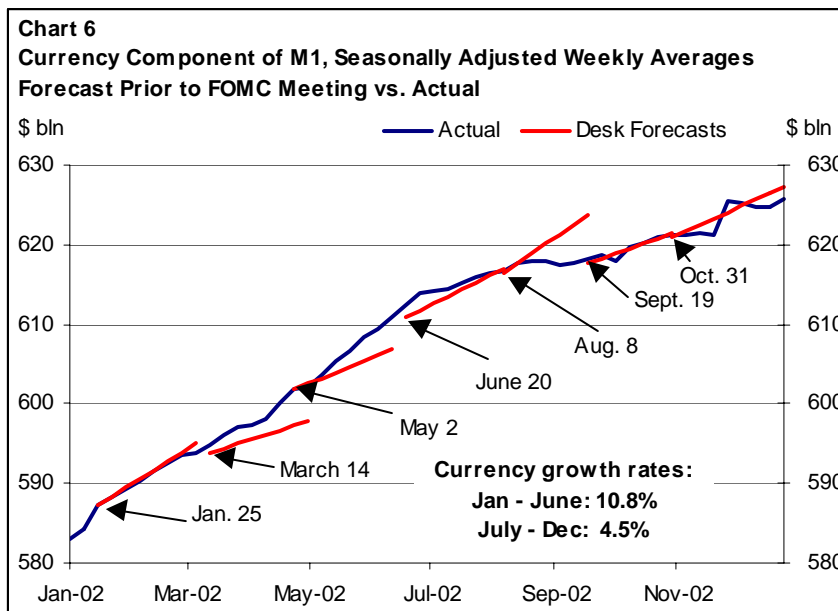
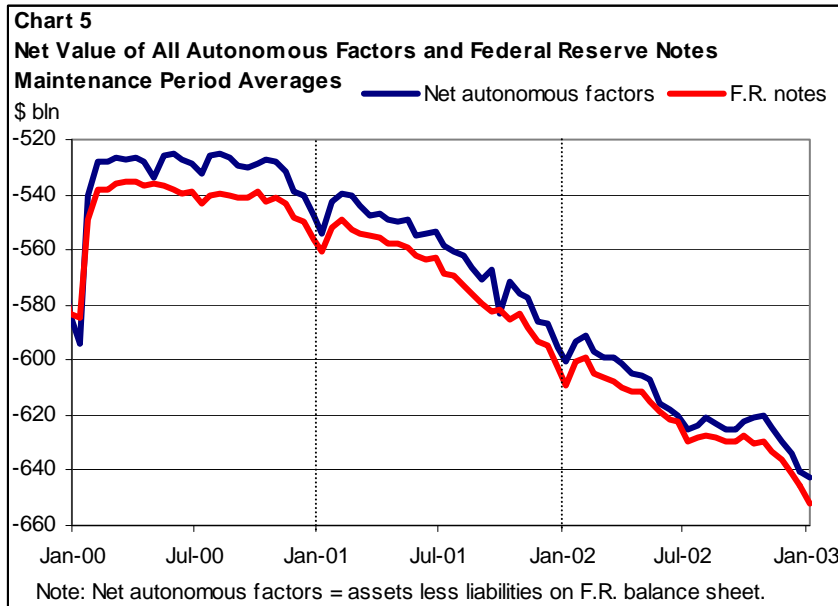
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inflow to their Fed account later in the period would leave them more excess balances than can be carried forward on a period-average basis.

<sup>9</sup> The change in autonomous factors was measured between reserve maintenance periods that contained the year-end date.

<sup>10</sup> Currency in circulation includes all paper currency and coin held by individuals and businesses, including banks both domestic and foreign. It does not include currency held by the U.S. Treasury and the Federal Reserve. Federal Reserve notes are the predominant form of paper currency. The currency component of the narrow money supply (M1) is defined as currency in circulation less currency and coin held in the vaults of depository institutions. M1-currency is published in both seasonally adjusted and not seasonally adjusted forms. Growth rates quoted in the text were based on data available at year-end 2002.

exceeding the forecast for much of the second quarter of 2002, the abrupt change in the growth pattern was not initially reflected in the Desk's forecast. (Chart 6) As will be discussed in the next section, the behavior of currency growth, versus the forecast, had a significant impact on monetary operations during the latter half of 2002.



Relative to these movements in currency, other autonomous factors showed little sustained change over the year. A slight offset to the reserve drain from currency was a small decline in the foreign RP pool. At the same time, Federal Reserve float was lower at year-end. During the year the average float level declined sharply from about \$1 billion in 2001 to close to zero, a large move for this factor, as Reserve Banks took steps to manage the float associated with the processing and transportation of paper checks more actively.<sup>11</sup>

*Volatility and Predictability of Key Autonomous Factors*

Variability of the key autonomous factors, as measured by average absolute daily changes, remained high in 2002, although somewhat lower than in prior years. (Table 2) Average daily forecast misses were also lower overall, reflecting modest improvements in the projections of the U.S. Treasury's Fed balance and Federal Reserve float.

Management of the U.S. Treasury's Fed account was facilitated in 2002 when Treasury introduced the Term Investment Option (TIO) on a pilot basis to Treasury Tax and Loan participants. Under this option, Treasury periodically offers participants the opportunity to obtain funds for a fixed term through a competitive bidding process. On balance, the TIO offerings improved the U.S. Treasury's ability to invest surplus funds, and facilitated the ability of the U.S. Treasury to remain close to their projected Fed balance at times when their total cash balances were high.

**Table 2: Daily Changes and Forecast Misses in Autonomous Factors  
Average and Maximum of Absolute Values**

(in \$ millions)	2000		2001		2002	
	Average	Max.	Average	Max.	Average	Max.
<b>Daily Change</b>						
Currency in circulation	965	8,087	852	2,696	874	3,015
Treasury balance	1,444	23,434	823	7,413	903	8,622
Foreign RP pool	489	4,015	596	3,273	500	3,502
Float	888	9,677	894	4,923	756	4,484
Net value	2,121	23,697	1,541	7,209	1,451	6,269
<b>Daily Forecast Miss</b>						
Currency in circulation	238	1,648	210	1,043	203	646
Treasury balance	615	6,866	534	2,975	479	3,629
Foreign RP pool	129	976	81	1,127	96	2,135
Float	392	2,742	447	2,084	413	2,028
Net value	792	7,224	798	4,128	726	4,125

Note: Forecast misses are based on New York staff estimates; 2001 data exclude September 11 through September 28; *Net value* reflects offsetting movements and forecast misses of all autonomous factors.

<sup>11</sup> Check processing float on the books of the Federal Reserve Banks results from timing differences between when funds deposited by checks are credited to depositing institutions and debited from paying institutions.

#### **IV. DOMESTIC FINANCIAL ASSETS & OPEN MARKET OPERATIONS**

The value of the Federal Reserve's domestic financial portfolio resulting from both outright and temporary open market operations mirrors the net level of autonomous factors and Fed balances reviewed in the preceding sections. More substantively, the different types of behavior of autonomous factors and of demand for Fed balances influenced the choice of open market operations used to adjust the Federal Reserve's balance sheet.

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

The domestic SOMA includes all the domestic securities held on an outright basis, consisting almost entirely of U.S. Treasury securities. Changes in the level of the SOMA have generally been made in accordance with net changes in autonomous factors and in demand for Fed balances that are expected to endure. For this reason, these holdings are often characterized as being "permanent," although their net value can actually be reduced as needed.

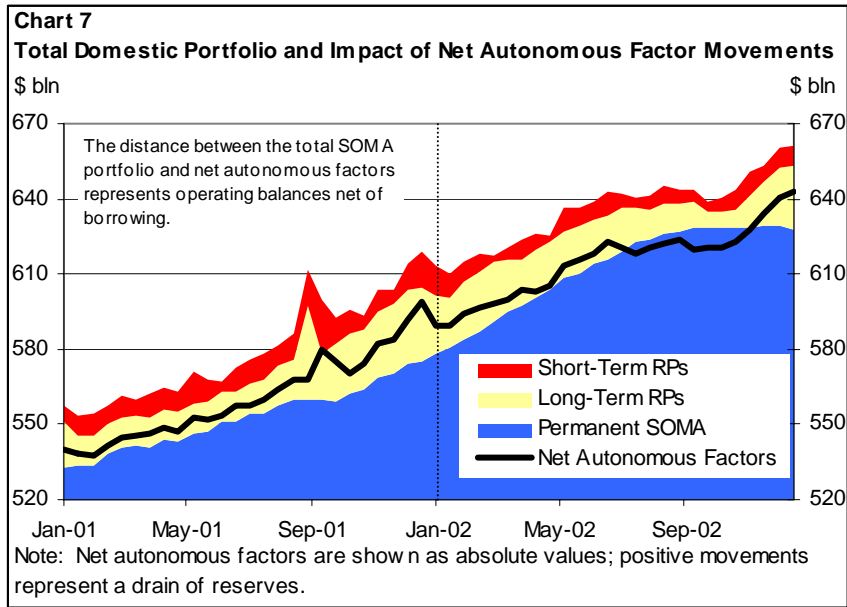
Historically, the annual growth in the SOMA has closely tracked the growth rate of F.R. notes. In 2002, however, at year-end the par value of the SOMA stood at \$628 billion, a record \$54 billion higher than one year prior, compared to an expansion of only \$43 billion in F.R. notes.<sup>12</sup> (Chart 7) This divergence occurred largely because of a significant leveling off of reserve drains from autonomous factors in the middle of the year, which was initially interpreted as an anomaly and so it did not lead to an immediate halt in outright purchases, but which persisted over the second half of 2002. As is presented below in the discussion of temporary operations, the expansion of the permanent SOMA beyond the growth in F.R. notes led to a sizable reduction in the level of outstanding long-term RPs.

In order to maintain a liquid portfolio without distorting the yield curve or impairing the liquidity of the market for individual U.S. Treasury securities, SOMA holdings are distributed across the entire yield curve. Accordingly, the Desk continued to adhere to the per issue guideline limits on the SOMA holdings of individual U.S. Treasury issues, articulated in July 2000.<sup>13</sup> The Desk also continued to limit its secondary market purchases of newly issued U.S. Treasury securities, because the Federal Reserve System has no particular portfolio need for some of the liquidity characteristics that can add to the value of these securities in the market.

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<sup>12</sup> The SOMA increase reflects almost entirely new purchases, but it also includes a \$300 million increase in the inflation compensation component of inflation-indexed securities, which now stands at \$1.3 billion.

<sup>13</sup> The announcement of changes to the management of the SOMA is available at <http://www.newyorkfed.org/pihome/news/announce/2000/an000705.html>



*Auction Participation*

Typically, expansion of the SOMA is achieved by making outright purchases of U.S. Treasury securities in the secondary market. At U.S. Treasury auctions of coupons and bills in 2002, the Desk continued to replace maturing securities by placing 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 the SOMA holdings as a percentage of the issue to the percentage guideline limits.<sup>14</sup> In cases where maturing holdings were to be rolled into two or more new issues with different maturities, the Desk allocated the funds 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. The Desk continued to take a slightly different approach for the weekly bill auction of the four-week bill, determining the amount of maturing bills to be rolled over and its percent allocation on the basis of the smallest four-week bill auction size experienced to date, rather than the actual auction size. Due to the U.S. Treasury’s increased auction sizes, especially in the bill sector, there were no redemptions of maturing U.S. Treasury holdings in 2002.

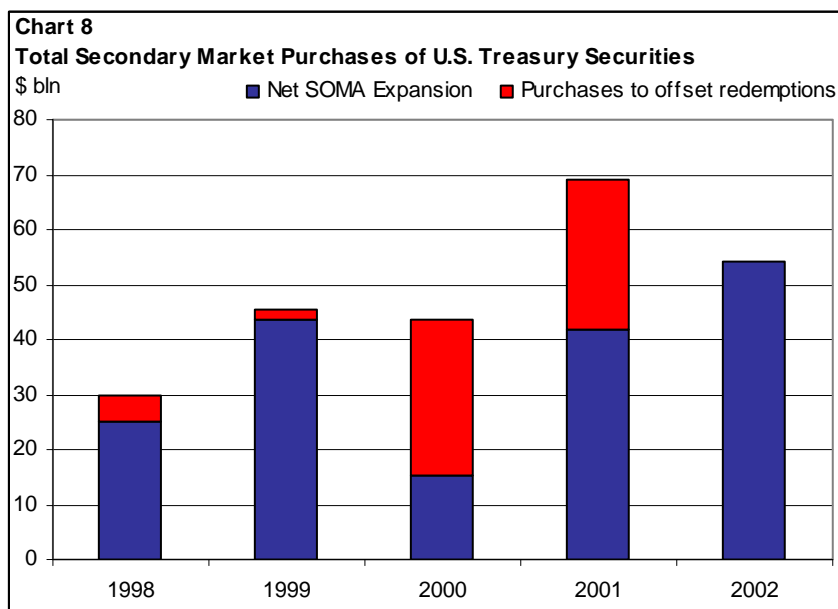
*Secondary Market Purchases and Operation Techniques*

The Desk typically conducts secondary market purchases of U.S. Treasury securities with the primary dealers. Purchase operations are designed to minimize disruption to the market, and thus are generally conducted mid-morning so as to avoid conflicting with economic data releases or U.S. Treasury security auctions while still ensuring sufficient market liquidity. Purchases from primary dealers generally settle on the following business day and thus do not have an immediate impact on Fed balances. In addition to

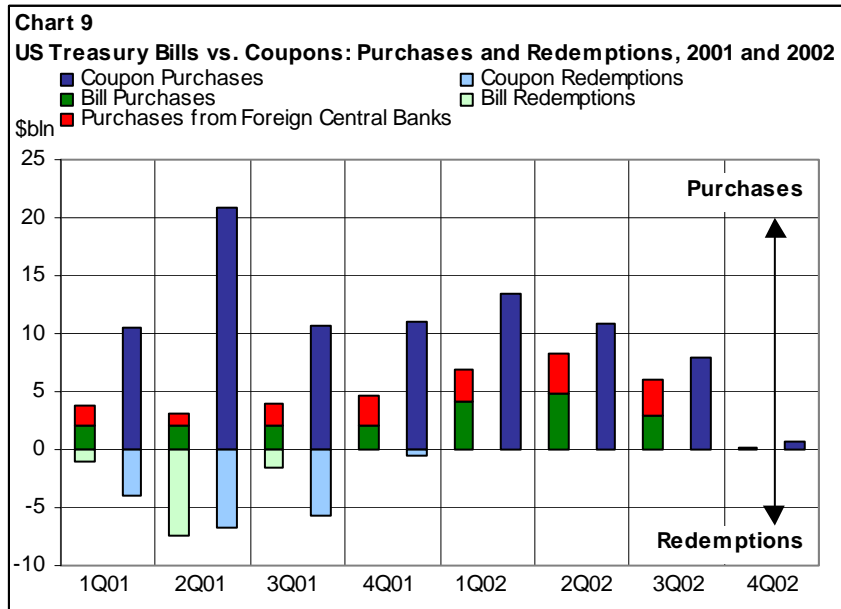
<sup>14</sup> The SOMA purchases at each U.S. Treasury security auction are considered an “add-on” because the amount of the purchases is an addition to the public offering amount.

transactions with the primary dealers, the Desk also purchases U.S. Treasury bills from foreign central bank and international accounts in small daily increments when sell orders from these accounts are consistent with the SOMA portfolio guidelines and the need for Fed balances. These transactions typically have a same day impact on Fed balances.<sup>15</sup>

Early in the year, outright purchases were conducted at a brisk pace in order to keep up with large drains from autonomous factors. During the second half of the year, the sharp slowing of currency growth dramatically reduced the need to expand SOMA through outright purchases from both primary dealers and foreign central bank and international accounts. And unlike in some recent years, the absence of redemptions at U.S. Treasury auctions also capped the need for outright purchases. As a result, the value of outright purchases of U.S. Treasury securities by the Desk totaled \$54 billion in 2002 with approximately three-quarters of these purchases occurring over the first half of the year, compared with total purchases of \$69 billion during the year prior. However, in 2001, the net SOMA expansion was only \$42 billion. There were no sales of securities in 2002. (Charts 8 & 9)



<sup>15</sup> The Desk sets a \$250 million limit on total daily purchases from foreign central bank and international accounts, subject to review if needs for Fed balances or orders warrant an exception.

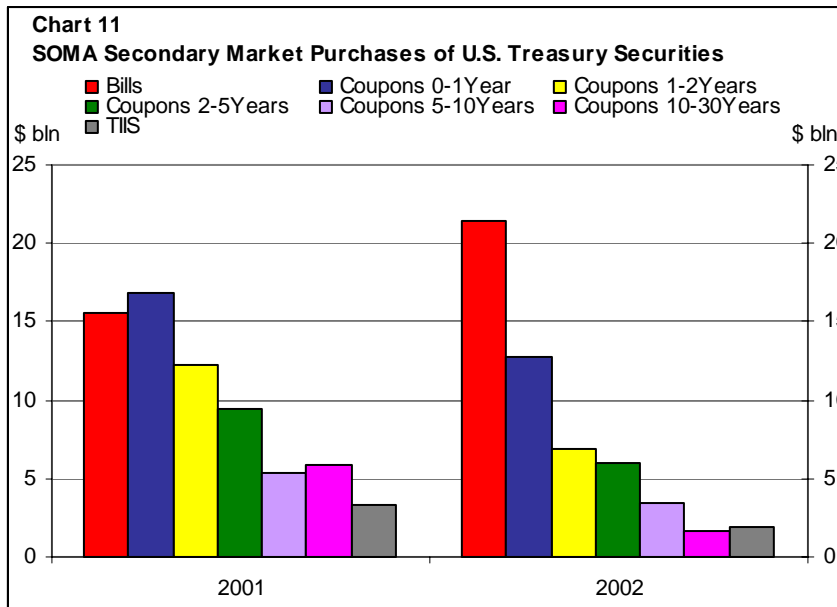
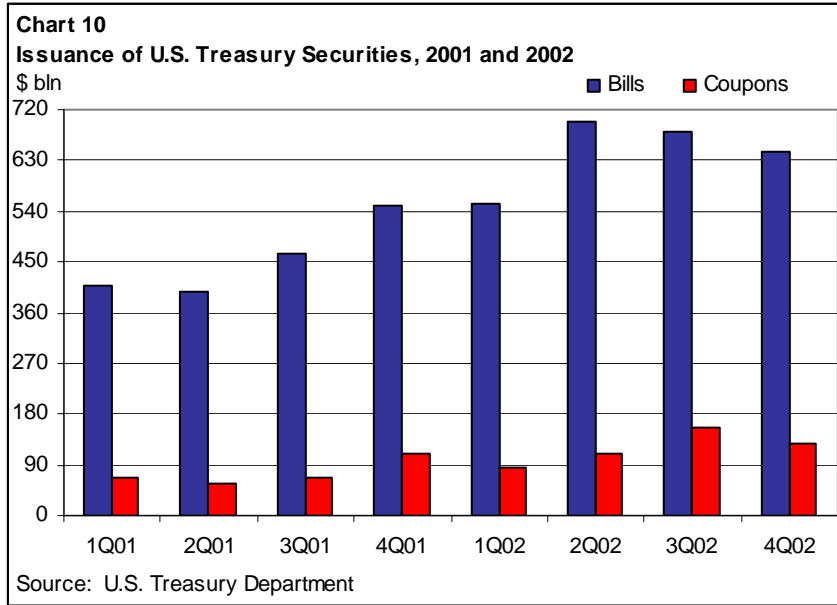


The Desk's outright purchases in the bill sector increased in 2002, as the sharp rise in the U.S. Treasury's bill issuance allowed the Desk greater leeway to remain within the per-issue percentage caps, thus supporting the liquidity objectives of the SOMA portfolio. (Charts 10 & 11). Bill purchases surpassed the \$16 billion arranged in 2001 with the Desk buying \$21 billion in 2002. Moreover, with no bill redemptions during the year, the net expansion of the SOMA's bill holdings in 2002 was equivalent to the outright purchases, whereas in 2001 redemptions reduced the net expansion of bills to \$6 billion.<sup>16</sup> Additionally, generally high levels of competitive propositions from dealers allowed the Desk to increase the size and frequency of its bill operations while remaining within portfolio per issue limits.<sup>17</sup> As a result of these factors, in five open market operations, the Desk purchased \$11.8 billion in bills in 2002, compared to \$8.4 billion in four operations in 2001. Another \$9.6 billion in bills were purchased directly from foreign central bank and international accounts, compared with \$7 billion in 2001.

<sup>16</sup> In light of this greater leeway, the Desk also conducted purchases in the bill sector more frequently, relative to the pace of purchases in the coupon sector. For example, in 2002, the Desk purchased from the bill sector at least once for each coupon pass, whereas in 2001, bill purchases generally occurred once for every two passes. A pass generally refers to Desk purchases of securities from primary dealers in a series of operations within maturity segments that in the aggregate extend across the entire yield curve.

<sup>17</sup> The bid-to-cover ratio on bill operations was 6.6:1 and 8.2:1 in 2001 and 2002, respectively.





The Desk also purchased \$33 billion of coupon securities in the market, arranging 37 coupon operations.<sup>18</sup> In 2001, the Desk conducted 64 coupon operations in which purchases (\$53 billion), net of redemptions (\$17 billion), expanded the SOMA holdings of coupon securities by \$36 billion. During 2002, these operations continued to be segmented into separate tranches across different portions of the yield curve to facilitate rapid execution. However, consistent with the decline in outstanding longer-dated U.S. Treasury securities, the maturity range covered in longer-dated operations increased. For example, while the

<sup>18</sup> This total includes four U.S. Treasury inflation index security operations, totaling \$1.9 billion.

longest-dated passes in 2001 typically targeted securities in the 20- to 30-year sector, by the end of 2002 long-dated passes targeted the much broader 6- to 30-year tranche. While the frequency of secondary market purchases declined significantly during the second half of 2002, the Desk continued to seek to distribute its purchases evenly over time, as much as possible.

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 five weeks remaining until maturity. The Desk also refrained from purchasing issues that were trading with significant scarcity value in the repo market in order to avoid impairing the liquidity of U.S. Treasury securities that were in greater demand.<sup>19</sup>

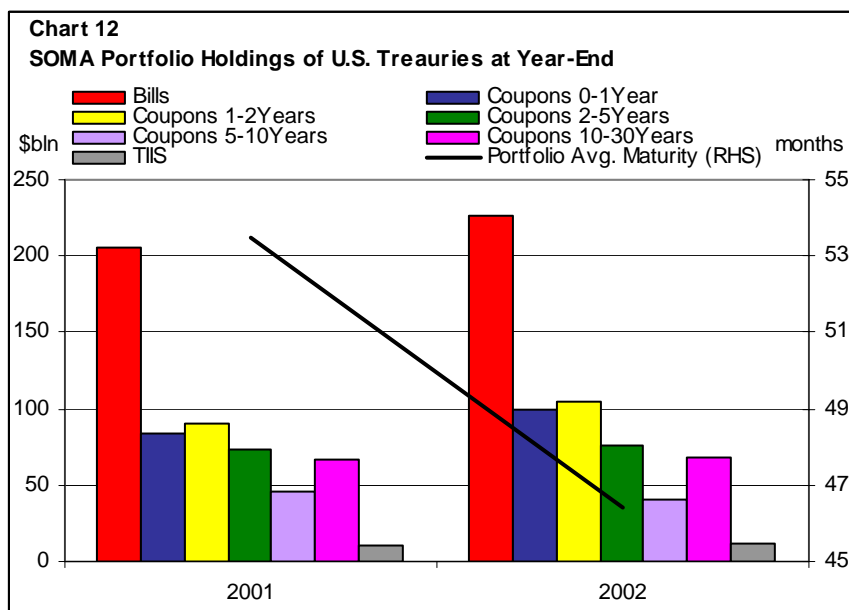
#### *General Characteristics of Domestic Permanent SOMA Holdings at Year-End*

Due to the Desk's increased bill purchases, the average maturity of the entire SOMA portfolio of U.S. Treasury securities was 46.4 months at year-end, down from 53.5 months one year earlier. (Chart 12) The share of all outstanding marketable U.S. Treasury securities held in the SOMA was 19.8 percent, about 0.4 percentage points higher than a year earlier. The SOMA held 26.1 percent of all bills and 17.4 percent of all coupons including U.S. Treasury inflation index securities (compared to 25.3 percent and 17.2 percent a year earlier, respectively). At the end of the year, approximately \$188.3 billion of marketable U.S. Treasury securities remained purchasable under the Desk's guidelines for percentage holdings, compared with \$182.8 billion at the end of the previous year.<sup>20</sup> At year-end 2002, the sole holding of non-U.S. Treasury securities with the SOMA's consisted of \$10 million of a security issued by Fannie Mae, which will mature in 2003.

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<sup>19</sup> A portion of the U.S. Treasury securities held within the SOMA are available to the primary dealers for overnight borrowing through a daily securities lending auction. The program serves as a temporary and secondary source of liquidity for specific issues in the U.S. Treasury market for which a primary dealer may have a particular demand in the financing market. The terms and conditions of the program are available at: <http://www.newyorkfed.org/pihome/news/opnmktops/2002/an020515.html>

<sup>20</sup> These purchasable amounts adjust for the Desk's practice of avoiding purchases of recently issued debt, purchases that would contribute to sizable redemptions, and purchases of issues that mature within five weeks. The remaining purchasable amount would total \$237.3 billion without these adjustments.



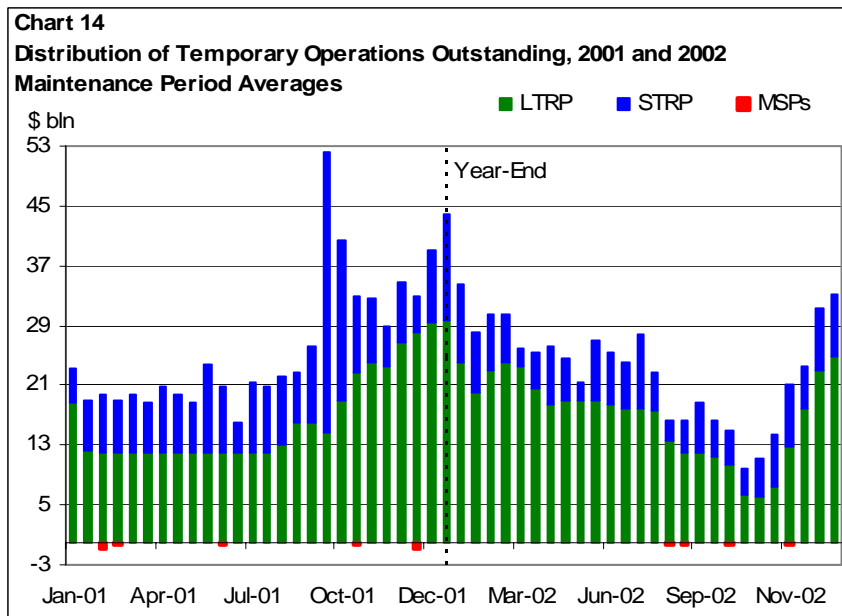
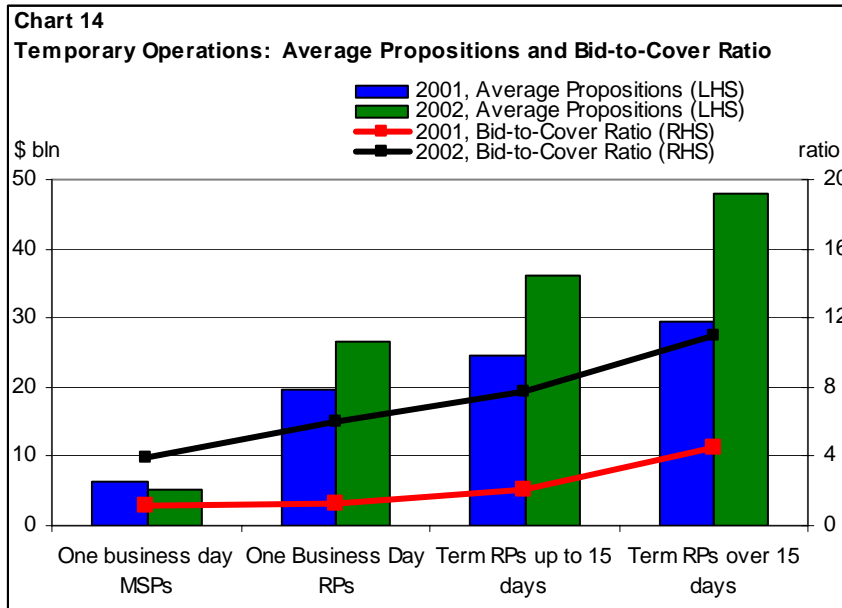
## B. Temporary Holdings and Open Market Operations

The Desk usually relies on a mix of short-term repurchase agreements (RPs) to address the patterns of temporary shortages of Fed balances that typically arise within a maintenance period. When shortages are forecasted for extended periods of time, but are expected to eventually reverse, the Desk adjusts the level of long-term RPs to address such seasonal needs.<sup>21</sup> Long-term RPs also provide the flexibility to temporarily bridge any protracted mismatch between the level of autonomous factors and the level of the SOMA outright portfolio. Throughout 2002 the Desk continued to transact temporary operations in such a manner as to typically be in a position to add Fed balances, rather than drain, due to significantly lower dealer participation in MSP operations. (Chart 13)

Historically, the Desk has found RPs to be an extremely useful tool for providing the necessary degree of flexibility in the total domestic portfolio. The size of outstanding RPs can be increased substantially on short notice to offset the impact of redemptions of outright holdings or movements in autonomous factors that drain Fed balances, or to meet increased demands for Fed balances, either temporarily or until the SOMA can be expanded by the necessary amount. Similarly, maintaining an outstanding level of RPs in the portfolio is helpful for offsetting the impact of temporary movements in autonomous factors that unexpectedly add substantially to the supply of Fed balances. Under these circumstances, the Desk would ordinarily prefer to let outstanding RPs mature without replacement, rather than reduce SOMA holdings or rely extensively on temporary draining operations. As described below, however, during the second half of 2002, the Desk came close to exhausting the downward flexibility that both its long-term and short-term

<sup>21</sup> The Desk defines RPs with original maturity of greater than fifteen days as long-term. During 2002 all long-term RPs operations conducted were between 27 and 29 days in length.

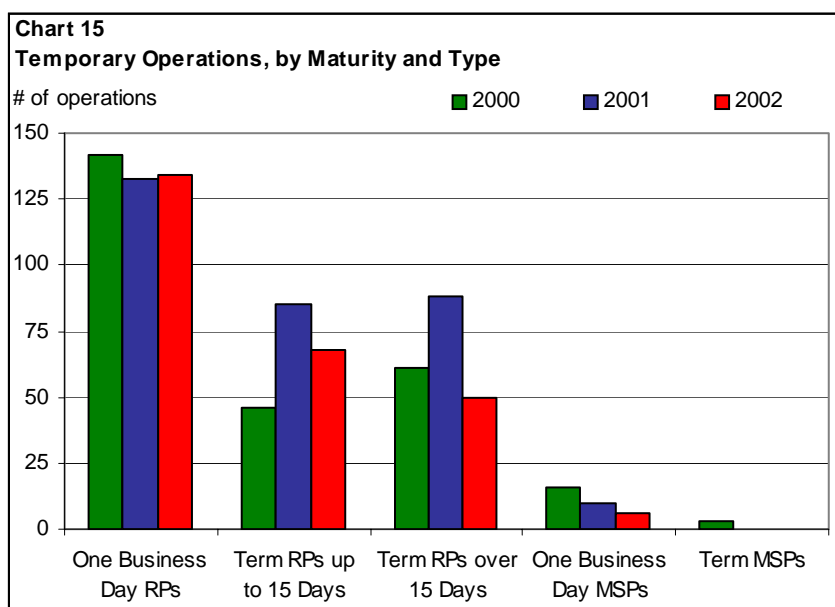
RPs provide. Going forward, the Desk will want to review the appropriate levels of RPs it should routinely plan to leave in place for these purposes. (Chart 14)



*Long-Term Repurchase Agreement Operations*

Long-term RP operations continued to serve as an integral tool for the Desk in meeting demand for Fed balances. These operations are not dependent upon the completion of the daily reserve supply forecast, as they are intended to meet intermediate needs. Thus, they are conducted at 8:20 AM, when the general

collateral RP market is most liquid. Beginning in January 2002, the Desk began arranging 28-day RPs only once a week, typically on a Thursday, instead of twice a week, which had been the regular practice since 2000. Weekly operations lowered operational cost with no significant loss to the liquidity for managing the level of Fed balances that these operations provide. The shift seemed to have had no effect on dealers' willingness to participate; the bid-to-cover ratio on these operations remained at approximately 11:1. (Chart 13) In total, the Desk arranged 50 long-term RPs in 2002, down from 88 in 2001. (Chart 15)



The pattern in the level of outstanding long-term operations differed somewhat this year from prior years. Normal seasonal cycles at the end of 2001 necessitated relatively high levels of long-term RPs outstanding in the final weeks of the year. Although those high levels would normally be worked down fairly quickly in the first few weeks of the new year, the Desk left long-term RPs at elevated levels to relieve a temporary mismatch between the level of the permanent SOMA and autonomous factors, most notably currency in circulation. (Chart 7)

During the second half of the year, the net drains of Fed balances caused by autonomous factors stalled. Initially, this behavior was interpreted as transitory, thus outright purchases continued to expand the permanent SOMA. However, upon the Desk's realization that the change to the behavior of autonomous factors was persisting, the long-term RPs were quickly reduced, reaching their lowest level since they became a regular tool in the conduct of open market operations at just \$6 billion. Long-term RPs had been at elevated levels at the onset, thus the Desk was able to execute the prolonged contraction of the domestic portfolio without the need for security redemptions or protracted use of term MSPs. At year-end, with a combination of weaker seasonal currency growth and the Desk targeting a higher level of short-term RPs, long-term operations reached a peak of \$26 billion, versus \$31 billion at year-end 2001.

### *Short-term Repurchase Agreements and Matched-Sale Purchase Operations*

In 2002 short-term operations continued to be conducted at 9:30 AM, after daily reserve supply forecasts were available. When there was a need for two short-term operations of different maturities on the same day, the Desk conducted the RP operations consecutively. On these occasions, prior to the announcement of the first operation, the Desk typically announced its intention to re-enter the market subsequent to the close of the first operation.

Concurrent with the reduction in long-term RPs, short-term operations were also compressed, sometimes to keep a reasonable size for individual long-term RPs. On occasion, the Desk's intended level of daily Fed balances would have required operation sizes that were below the size typically conducted. At times, the U.S. Treasury was able to accommodate small deviations from the target balance in their Federal Reserve account to aid the Desk in trying to ensure that the supply of Fed balances met the Desk's estimate of the daily demand for Fed balances. However, on occasions when no further open market operations were needed, but the market was expecting some, market participants could have misinterpreted the level of liquidity in the banking system until the end of the day. Thus, fine-tuning the federal funds rate became challenging at times. Maintenance period average levels of short-term operations (RPs minus MSPs) ranged from \$2 billion to \$10 billion, while daily levels ranged from \$0 to \$37 billion. For the year as whole, short-term operations outstanding averaged \$7 billion, compared with \$10 billion in 2001. The Desk chose to drain reserves with MSPs on seven occasions in 2002, all with a one-business day maturity, versus ten occasions in 2001.

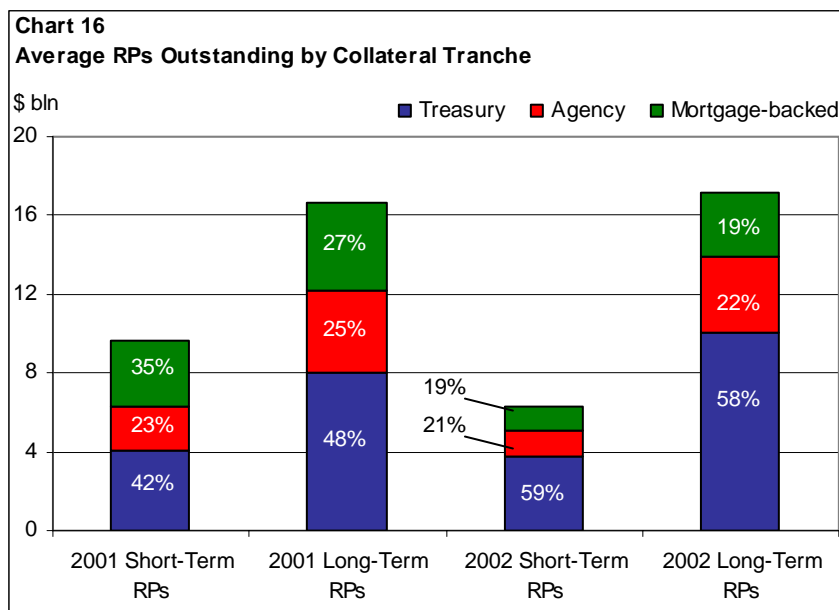
The most widely used maturity of operation in 2002, as in previous years, was one business day. In all, the Desk arranged 134 overnight RPs (including those spanning a holiday or a weekend). The very short maturity of this type of operation makes it a flexible and convenient tool when fine-tuning Fed balance levels to achieve desired rate outcomes, as it can address the daily variability in supply and demand. A strategy of layering several smaller multi-day RPs was often used within a maintenance period to either offset large transitory supply drains or to ensure sufficient balances on high payment flow days, such as quarter-end dates, when there was heightened risk of under-subscription to a large operation.

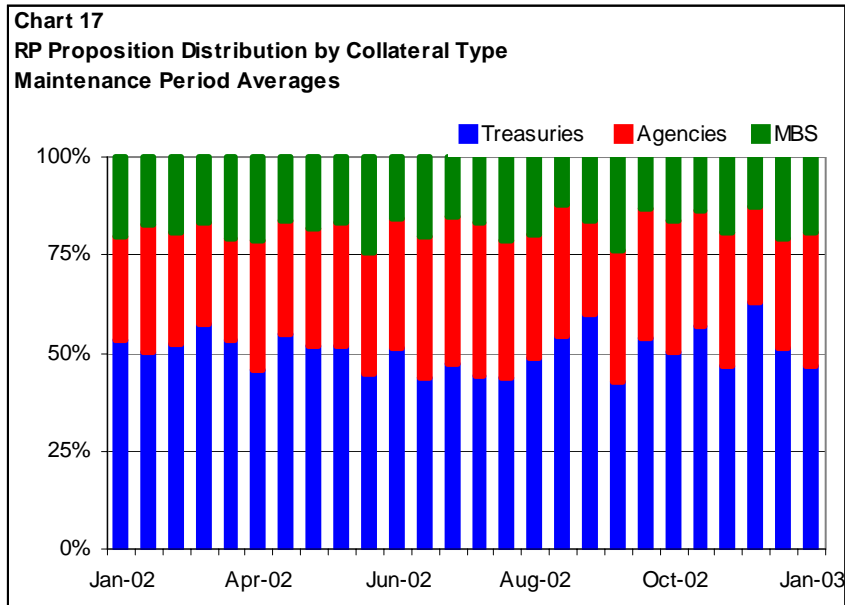
### *Collateral Distribution of Repurchase Agreements*

The Desk continued the practice of conducting each RP operation with three separate collateral tranches. On the first tranche only U.S. Treasury collateral could be offered, on the second tranche straight agency debt (in addition to U.S. Treasury collateral) could be pledged and on the third tranche mortgage-backed securities (in addition to U.S. Treasury and agency collateral) were eligible collateral. Primary dealers submitted propositions priced according to the collateral that they desired to deliver for the operation. The Desk subsequently selected across the three tranches according to the attractiveness of bids relative to

current rates in the financing markets for each particular class of collateral. All RP operations in 2002 were settled through triparty arrangements established in 1999 with two clearing banks. The triparty agreements allow the dealers flexibility in choosing each day the specific securities that they wish to deliver as collateral, as long as the specific issues are eligible for the tranche.

The collateral distribution of outstanding RPs was more heavily weighted toward U.S. Treasury securities in 2002. On average the U.S. Treasury tranche accounted for 59 percent of outstanding RPs, versus 46 percent last year. (Chart 16) The distribution of propositions and selected collateral across the three collateral classes can vary widely from one operation to the next, as well as from one maintenance period to another. (Chart 17) However, with an increased inventory of U.S. Treasury collateral, the primary dealers had a propensity to bid more aggressively on the U.S. Treasury tranche of each operation. The increase in U.S. Treasury collateral was offset by a reduction in mortgage-back securities, which accounted for 19 percent of the collateral accepted on the Desk's operations, down from 30 percent in 2001.





**V. THE FEDERAL FUNDS MARKET AND DISCOUNT WINDOW CREDIT**

**A. Trading in the Federal Funds Market**

With the federal funds target rate at its lowest levels in more than 40 years, there was a decline in the volatility of federal funds trading during 2002. Although on a downward trend over recent years, volatility was remarkably lower this year, by several measures. Intraday volatility, as measured by standard deviation and daily trading ranges, was considerably smaller. (Table 3) The distributions of the highest rates and the lowest rates from the federal funds target rate were both noticeably concentrated towards zero, with more than 70 percent of daily rate deviations within +25 basis points, and more than 50 percent of daily low deviations within -25 basis points, of the target rate. (Chart 18) Consequently, median and average absolute deviations of morning and effective federal funds rates were closer to the federal funds target rate, and inter-day volatility, as measured by the first difference of the daily effective rate was also much lower. (Table 3)



<b>Table 3: Federal Funds Rate Behavior</b>				
<b>Medians and Averages of Daily Values</b>				
(in basis points)	<b>1999</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>
<b>Measures of Intraday Volatility</b>				
<i>Standard Deviation</i>				
Median	9	6	7	5
Average	18	9	9	6
<i>Range</i>				
Median	75	41	56	31
Average	159	78	80	44
<b>Deviations from Target and Inter-day Volatility</b>				
<i>Absolute Deviations of Effective Rate from Target</i>				
Median	7	4	5	3
Average	11	7	7	4
<i>Absolute Deviations of Morning Rate from Target</i>				
Median	6	6	6	3
Average	10	6	7	4
<i>First Difference of Daily Effective Rate</i>				
Standard Deviation	20	15	13	7

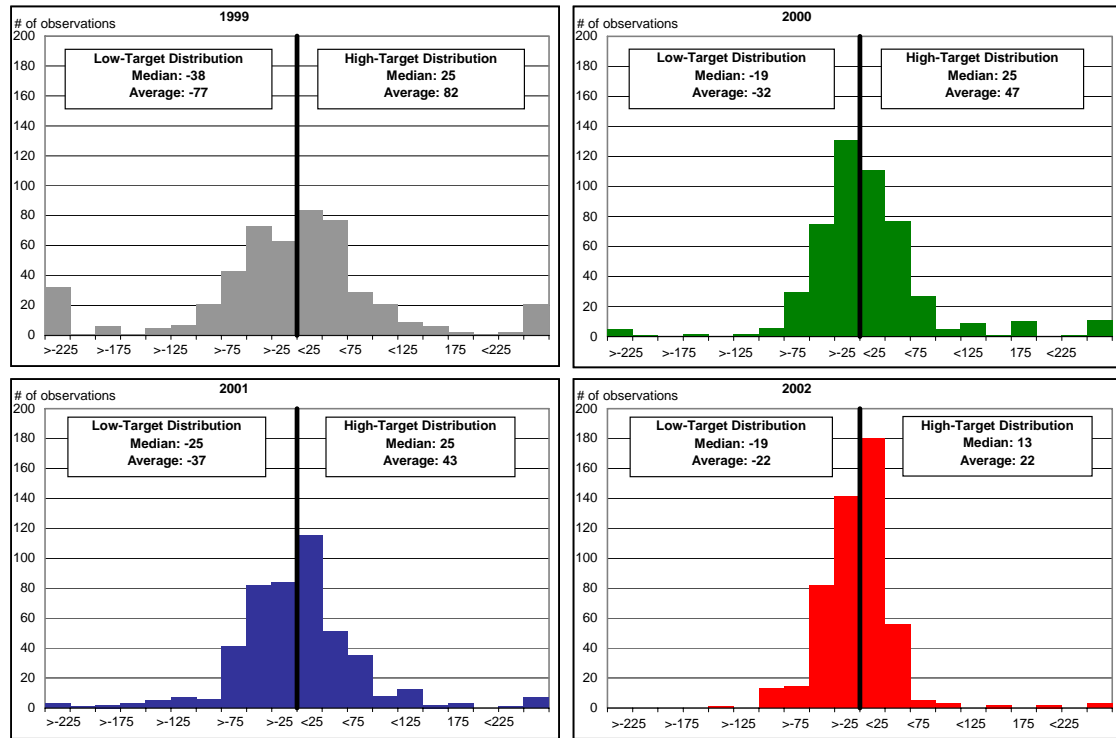
Note: 2001 statistics exclude data from September 11 to October 3.

The very low and stable federal funds target rate that was in place during 2002 was the most important factor contributing to the lower levels of volatility, operating in both an indirect and a direct manner. Indirectly, as was first discussed in Section II, low interest rates led to an increase in the level of total balance requirements. These higher balance requirements in turn gave banks more flexibility to absorb deviations of balance supply from balance demand without putting significant pressure on rates. More directly, the low federal funds target rate simply limits the extent to which the rate can fall relative to the target rate. Since the target rate is closer to the lower bound of zero, the distribution of the daily low rates was necessarily compressed.

Interestingly, the distribution of the daily high rates, which had no similar mechanical ceiling under the then existing discount window framework, showed an even greater compression relative to historical observations. This outcome may be related to a combination of factors. As is discussed in more detail in the following section, there has been a significant decline in the frequency of large adjustment credit borrowing from the discount window, as well as less upward rate pressure on the days when there was elevated levels of discount window lending. During 2002, the federal funds rate exceeded the federal funds target rate by 100 basis points or more only seven times, compared with an average of 33 times per year from 1999 to 2001.

**Chart 18**

**Distribution of Deviations of High and Low Effective Funds Rates from Target**



A number of structural changes in the market, such as improved information flow and industry consolidation, which was first discussed in the 2000 Annual Report, have likely continued to contribute to lower volatility in the federal funds market. A technical reason cited for decreased volatility in the federal funds market at that time was the broad move to 1/32<sup>nd</sup> percentage point trading increments. Similarly, with both interest rates at such low nominal levels this year and measured volatility declining, *decimal* trading has increased and may also have had some influence on the reduction in intraday standard deviations. However, the use of decimals has not yet superseded fractional trading.

All of these factors working together to lower intraday volatility in federal funds trading likely reinforced expectations that rates would trade close to the federal funds target rate and thereby helped keep actual daily effective rates and morning trading levels closer to the target rate.

*High Payment Flow Days*

This general decline in federal funds trading volatility and deviations from the federal funds target rate was particularly evident on high payment flow days in 2002. (Table 4) The Desk has consciously targeted higher levels of excess balances on these days over recent years in an attempt to discourage the upward rate pressures that historically are more prevalent on such days. Morning premiums on high payment flow days

this year showed a significant decline relative to past years, reflecting, at least in part, the impact of these efforts, as well as the impact of the more general trend to lower volatility observed in 2002.

**Table 4: Fed Funds Rate Behavior on High Payment Flow Days  
Medians and Averages of Daily Values**

(in basis points)	1999	2000	2001	2002
<i>Morning Rate less Target</i>				
Median	19	19	16	9
Average	25	19	16	10
<i>Effective Rate less Target</i>				
Median	16	15	16	7
Average	14	12	13	6
<i>Standard Deviation</i>				
Median	20	14	9	7
Average	31	18	12	9

Note: High payment flow days include the first and last business days of the month, the settlement day of the U.S. Treasury's mid-quarter refundings, and major tax dates; 2001 statistics exclude data from September 11 to October 3.

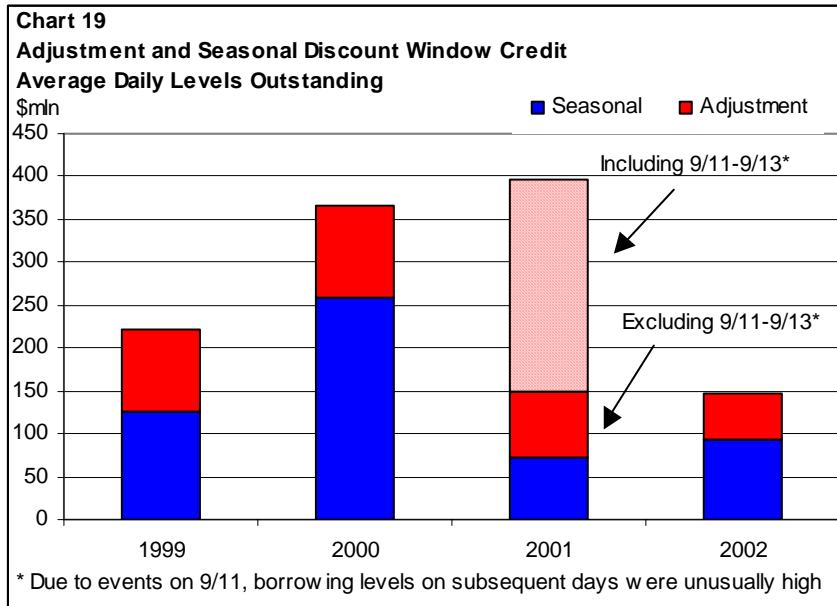
## **B. Discount Window Credit**

Discount window credit is a source of temporary liquidity for depository institutions. On most days, the level of credit extended through the discount window was minimal. (Chart 19) Seasonal borrowing by small banks tends to make up the majority of the credit lent by the discount window; its use is fairly predictable and is not linked to general conditions in financing markets. Adjustment credit, though relatively small, was a discount window facility that banks could use when reasonably priced funds could not be attained in the market or payment system difficulties arose. It was, therefore, of greater importance in the monetary policy implementation framework. Adjustment credit acted as a buffer, reducing upward rate pressure by providing a temporary source of liquidity when there was a shortage of reserves in the market that left an institution either in an overdraft position at the end of the day or deficient in meeting its balance requirement on a settlement day.

In recent years, the level and frequency of adjustment credit borrowing has trended downward. Banks borrowed funds in excess of \$500 million on only six occasions in 2002, compared to 11 occasions in 2001 and 14 occasions in 2000.<sup>22</sup> (Chart 20) A more substantial decline was registered with respect to adjustment credit borrowings in excess of \$100 million, which occurred on a total of only 11 occasions this year, less than half of what it has been in recent years.

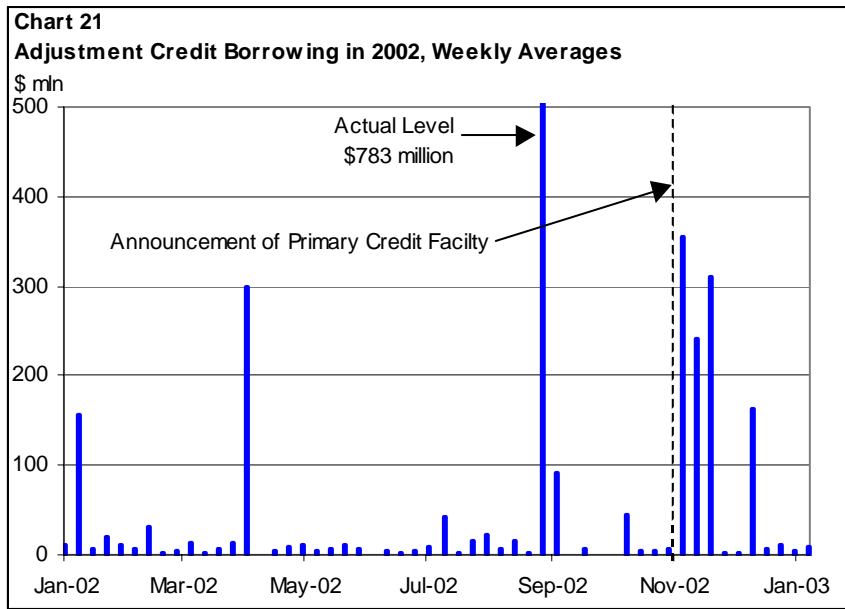
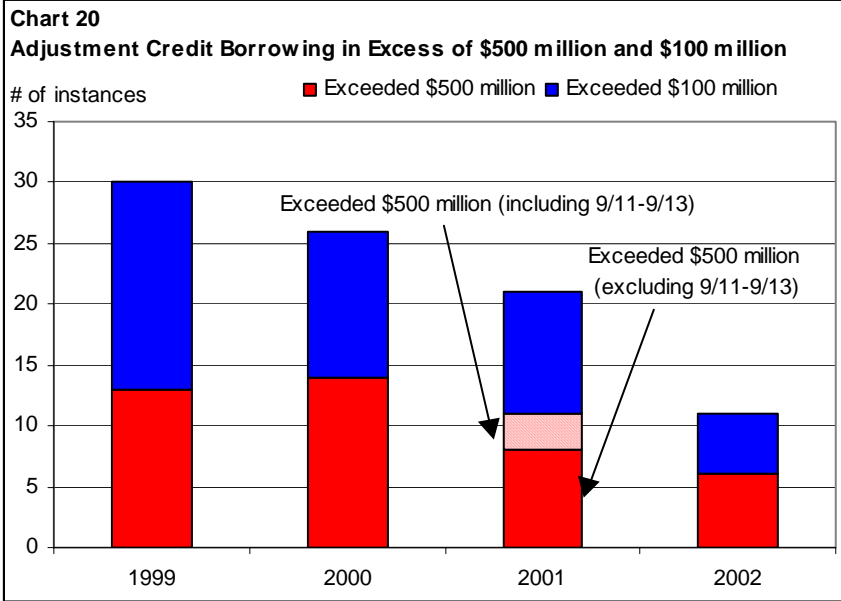
<sup>22</sup> When sizable amounts of adjustment credit were extended it was typically driven by larger institutions. Excluding the September 11-13, 2001 period, the occasions of adjustment credit borrowing in 2001 in excess of \$500 million was eight.

During 2002, the instances of large adjustment credit borrowings were associated with less firmness in the federal funds market, as the deviations of effective rates from target rate on these days was typically very small. On only three instances when there were large borrowings did the federal funds market trade more than 100 basis points over the federal funds target rate, and, incidentally, all three occasions were on maintenance period settlement days. Large adjustment credit borrowing was usually driven by technical problems isolated at particular institutions and, in general, had little impact on market conditions.



*Announcement of Primary Credit Facility*

As mentioned in Section I, the discount window adjustment credit facility was replaced with the primary credit facility effective January 9, 2003. Since the October 31, 2002 announcement of the revisions to the discount window credit program, the frequency and weekly average levels of adjustment credit borrowing has increased. (Chart 21) Some market participants have commented that banks appeared to “take advantage” of the still available below-market rate. When analysis is restricted to the average weekly borrowing levels that are available to the public, it is understandable why such a conclusion was drawn. However, the elevated levels of borrowings in the last few weeks of 2002 were largely the result of internal technical problems at a few institutions on isolated days and were not accompanied by spikes in the federal funds rate.



## 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 2002 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 temporarily 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 reaffirmed in January 2002 until the FOMC's first meeting in 2003.

### *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.