

Monetary Policy and Open Market Operations during 1992

Overview

During 1992, monetary policy was directed toward promoting and extending the economic recovery that had begun the previous year and toward achieving a further moderation of inflationary pressures. Following a series of moves to ease reserve pressures in the second half of 1991, policy in 1992 was initially placed on hold. A burst of growth in the monetary aggregates and in consumer outlays early in the year suggested that the basis for a solid economic recovery might be in place. Nonetheless, because economic prospects remained uncertain, the Federal Open Market Committee eased reserve pressures slightly in April when it observed a fallback in the broader monetary aggregates and signs of a weakening economic expansion. Two further easing steps were implemented over the summer as evidence accumulated that the recovery was losing momentum. A move in July was associated with a ½ percentage point cut in the discount rate to 3 percent. Over the last several months of the year, labor market and other economic indicators showed renewed strength. In these circumstances, and with price data pointing to a continued trend to lower inflation, the Committee left monetary policy unchanged.

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The three moves to reduce reserve pressures induced a 1 percentage point reduction in the federal funds rate and contributed to a modest decline in other short-term interest rates during the year. Yields on short-term fixed-income securities fell in line with the funds rate during the middle of the year, but then rose in the final quarter as the expansion strengthened and as expectations of further monetary policy accommodation diminished. Meanwhile, longer term rates moved up early in the year, fell at midyear, and then rose again in advance of the presidential election. These yields moderated once more after the election, ending the year about where they began. Although long-term rates were supported by encouraging inflation statistics, uneasiness about future inflation lingered and sometimes impeded rate declines. Particularly during the election campaign, anxieties concerning the implications for federal budget deficits of possible future fiscal stimulus measures helped to lift longer term rates.

Declining short-term interest rates, a steep yield curve, and heavy mortgage refinancing activity stimulated rapid growth in M1 deposits during 1992. In contrast, the broader monetary aggregates increased only very slowly, with both M2 and M3 ending the year below the bottom of their annual growth ranges. The weakness was associated to an important extent with the continuing efforts of households to move funds out of depository institutions and into market instruments offering more attractive returns. At the same time, weak loan demand was discouraging banks from competing actively for time deposits.

Financial strains in major sectors of the economy generally eased during 1992, assisted by declining

interest rates, economic expansion, and increased equity issuance. Falling short-term interest rates facilitated a widening of bank profit margins and, through the refinancing of outstanding debt, helped to reduce debt service burdens on households, businesses, and municipalities. The improving domestic economy helped to increase business profitability, and heavy equity issuance also strengthened the balance sheets of banks and nonfinancial businesses. Financial strains in Japan and Europe at times raised concerns but generally had only a marginal impact on U.S. financial markets.

In implementing the monetary policy directives of the Federal Open Market Committee (FOMC), the Open Market Trading Desk continued to formulate its objectives for reserves by specifying an allowance for adjustment and seasonal borrowing from the discount window that was believed to be consistent with an expected range of federal funds trading. The volume of adjustment credit continued to be restrained by the ongoing reluctance of many depository institutions to tap the discount facility and by generally narrow spreads between the federal funds rate and the discount rate. As a result, adjustment borrowing typically hovered around exceptionally low levels, although it occasionally jumped when shortages of reserves in the market or temporary disruptions to normal payment flows forced depositories to turn to the window to meet reserve requirements or avoid overdrafts in their accounts with the Federal Reserve. In addition, a shift in seasonal credit pricing procedures from the basic discount rate to a market-related rate, effective in early January, contributed to a low level of seasonal borrowing in 1992. Against this background, the Desk continued to view its allowance for borrowing very flexibly.

In April, the Federal Reserve implemented a cut in reserve requirement ratios on transactions deposits to 10 percent from 12 percent. In planning for the change, efforts were made to ensure that reserve management would proceed smoothly. The change was announced in February, well before it took effect, giving depository institutions time to prepare for it. In addition, the implementation was timed to coincide with a seasonal peak in the level of required reserves. Other developments in 1991 and 1992 raised reserve balances and offset some of the reduction from cuts in reserve requirements. Banks substantially increased their required clearing balances (described in the final section), and rapid growth in the components of the money supply subject to reserve requirements significantly lifted the level of required reserves.

Nonetheless, the reserve requirement cuts of the past two years left reserve levels at the Fed in 1992 considerably below their 1990 levels. Many depositories

responded to this environment of lower reserve balances by holding fewer reserves early in a maintenance period to avoid accumulating an excess position that could be difficult to work off later without risking end-of-day overdrafts. This behavior contributed to a tendency towards softness in the funds rate early in a maintenance period, even when large reserve deficiencies existed. Even now, the smooth functioning of banks' payment operations remains susceptible to developments that would further reduce the level of reserve balances held at the Fed.

As in the preceding year, the federal funds rate and reserve estimates frequently gave conflicting signals about reserve availability. Some of these discrepancies resulted from market expectations of possible easings in monetary policy. Other conflicts arose from substantial misses in reserve projections (either by the Desk or by banks), or from some banks' efforts to concentrate their reserve holdings late in a period to avoid finishing with unusable excess reserves. With the funds rate widely viewed as a key monetary policy indicator and expectations of a possible easing in policy often running high, the Desk took account of these discrepancies in formulating its reserve operations. To minimize the possibility that the Fed's current policy stance would be misconstrued, the Desk sometimes waited until late in a period to address sizable reserve deficiencies, it even absorbed reserves in a few instances despite estimates showing a shortage. As a result, the Desk occasionally had to arrange very large repurchase agreement (RP) operations late in a period when demands for reserves eventually showed through. Toward the end of the year, expectations of further policy easings faded, and the Desk, in formulating operations, was able to take somewhat greater account of its reserve estimates when discrepancies arose between these estimates and the funds rate. It used these opportunities to reestablish a degree of tolerance, eroded in preceding years, for deviations in the funds rate from the expected level.

The setting for policy

The economy

The economic recovery that had begun in the spring of 1991 continued through 1992, although growth was uneven over the year. The pace of the expansion picked up somewhat in the early months of the year following very low growth in the fourth quarter of 1991 (Chart 1). The economy grew at a 2.9 percent annual rate during the first quarter, the highest rate in more than three years, encouraging expectations that the expansion was gaining momentum. Most of the strength came from an acceleration in consumer expenditures, with lower mortgage rates also leading to faster growth of residential construction activity. Inventories fell during the quarter

as the increase in spending was accompanied by a decline in industrial production (Table 1).

The expansion faltered during the second quarter, with GDP increasing at only a 1.5 percent annual rate. Consumer spending was about flat for the quarter, with expenditures on durable goods declining after their double-digit increase in the first quarter. Net exports also fell as imports grew strongly and as continued weak demand from abroad constrained exports. Although industrial production rebounded during the quarter, the labor market softened. The June employment report was particularly weak, and it was accompanied by a large jump in the unemployment rate (Chart 2).

The economy grew more rapidly in the third quarter, with real GDP rising at a 3.4 percent annual rate, although much of the economic data reported during the quarter had suggested a more sluggish performance. The strength came from all major categories of consumer spending, particularly the volatile durable expenditures component. The evident areas of lingering weakness included industrial production, which advanced rather slowly, and the labor market. Although the unemployment rate declined somewhat over the quarter, labor market conditions continued to look rather soft when assessed in terms of the proportion of

the working age population with jobs (Chart 2). And despite the strong spending numbers, consumer confidence measures also fell during the quarter (Chart 3), again calling into question the sustainability of the expansion.

In the fourth quarter, the economy grew rapidly, with real GDP increasing at a 4.7 percent annual rate. Consumer confidence measures advanced strongly as the resolution of the uncertainty surrounding the presidential election contributed to an improving national mood. Retail sales expanded briskly in October, and the holiday shopping season was stronger than it had been in several years. The employment numbers also showed some strength during the last two months of the year.

Inflation

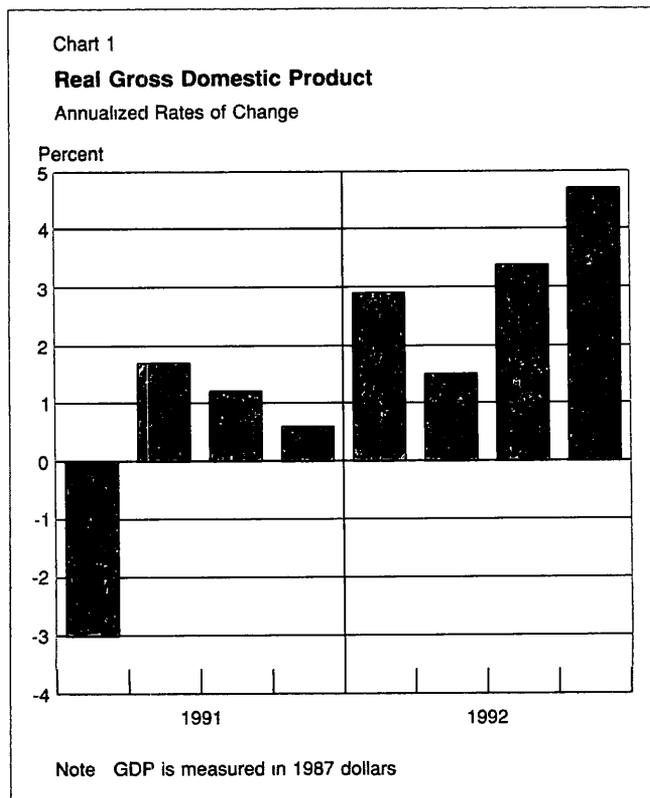
Progress in reducing inflation continued in 1992, in part reflecting the benefits of past monetary policy efforts. Persistent softness in the labor market and the uneven pace of recovery contributed to restrained wage and price pressures. While large swings in energy prices, related to the Iraqi invasion of Kuwait, had a big influence on price indexes in 1990 and 1991, this factor was less important during 1992. The core components of both the consumer price index (CPI) and the producer price index (PPI), which exclude food and energy prices, suggested a drop in underlying inflation; the annual rates of increase in the core CPI and PPI fell to 3.4 and 1.8 percent in 1992, from 4.5 and 3.1 percent, respectively, in 1991 (Table 2). Progress was especially visible in the second half of the year when the PPI rose at an annual rate of less than 1 percent.

Monetary aggregates

The broader monetary aggregates crept upward during 1992. After advancing at close to expected rates in the first quarter, both M2 and M3 grew considerably more slowly over the rest of the year, even declining at times, and finished the year below their respective annual growth ranges (Chart 4).¹ In contrast, M1 grew very rapidly over the year. From the fourth quarter of 1991 to the fourth quarter of 1992, M1 grew 14.2 percent, M2 advanced 2.1 percent, and M3 increased 0.5 percent.²

¹The FOMC also establishes a monitoring range for the growth of domestic nonfinancial debt. From the fourth quarter of 1991 to the fourth quarter of 1992, this aggregate grew 4.6 percent (as of February 11, 1993). It was revised subsequently to 4.9 percent (as of April 8, 1993).

²Data on the monetary aggregates are as of January 28, 1993. These data do not incorporate the annual benchmark and seasonal factor revisions of February 4, 1993, or subsequent revisions because the earlier data more closely approximate the information that the Committee had available when it was making its decisions. Net revisions through April 8, 1993, lifted M1 growth by 0.1



The opportunity cost of holding M1 deposits decreased substantially over the middle part of the year because rates on checkable deposits fell to a lesser degree than yields on short-term market instruments. A lower opportunity cost explains some of the strong growth recorded for the narrow aggregate. Lower mortgage rates in late 1991 and again during the spring and summer of 1992 spurred a high volume of mortgage refinancing during the subsequent quarters. There is a

strong link between the volume of mortgage refinancing and demand deposit growth because the servicers of refinanced mortgages typically hold the prepayments in demand deposits before disbursing the funds to the owners of mortgage-backed securities. Currency grew moderately over most of 1992, with more rapid growth in the third quarter as demand from abroad picked up temporarily.

Growth in the broader aggregates was restrained in 1992, as it had been in the previous year.³ Both the

Footnote 2 continued

percentage point and depressed M2 and M3 growth by 0.3 percentage point and 0.2 percentage point, respectively. The revisions also redistributed some of the growth in all of the aggregates from the first and fourth quarters to the second and third quarters.

³Much of the discussion of the weakness of the broader aggregates is drawn from Joshua N. Feinman and Richard D. Porter, "The

Table 1

Real Gross Domestic Product and Its Components
Seasonally Adjusted Annual Rates of Change, Except as Noted

	1991-IV	1992				1990-IV to 1991-IV	1991-IV to 1992-IV
		I	II	III	IV		
Real GDP	0.6	2.9	1.5	3.4	4.7	0.1	3.1
Consumption	-0.3	5.1	-0.1	3.7	5.1	0.0	3.4
Durables	-3.1	16.5	-2.1	9.4	14.0	-2.5	9.2
Nondurables	-3.5	5.5	-1.5	2.5	6.8	-1.5	3.3
Services	2.3	2.2	1.2	3.1	2.1	1.6	2.2
Fixed investment	-1.2	7.4	15.2	2.3	13.8	-5.3	9.6
Producer durables	-2.4	3.2	24.1	9.5	14.5	-3.5	12.6
Nonresidential construction	-11.5	2.7	-0.8	-11.3	-1.9	-14.3	-3.0
Residential construction	11.3	20.1	12.6	0.2	25.1	-0.1	14.1
Change in inventories (billions of 1987 dollars)	7.5	-12.6	7.8	15.0	9.8	-37.4	20.0
Change in net exports (billions of 1987 dollars)	11.1	-1.0	-22.4	-8.8	3.7	12.2	-28.5
Exports	17.2	4.0	-2.0	12.5	12.4	38.8	26.9
Imports	6.0	5.0	20.5	21.3	8.7	26.5	55.5
Government purchases	-3.0	1.7	-1.2	3.8	-2.6	-0.6	0.4
Real GNP	0.4	3.6	0.7	3.9	4.1	-0.3	3.0
<i>Addenda</i>							
Index of industrial production	-0.7	-3.1	5.2	2.3	4.3	-0.5	2.2
Change in nonfarm payroll employment (thousands)	-56	-46	285	93	131	-1,118	463
Civilian unemployment rate (level)	7.0	7.2	7.5	7.6	7.3	1.0 [†]	0.3 [†]

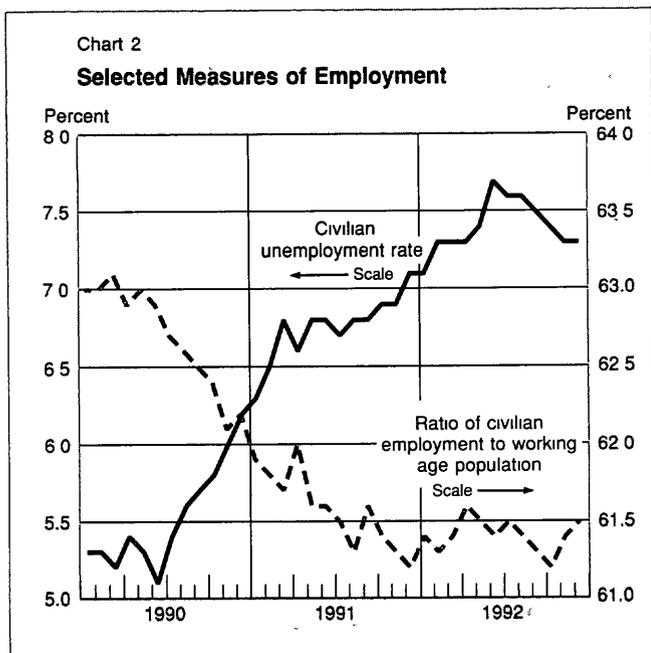
Note: Data are as of April 12, 1993.

[†]Change in rate.

nontransaction component of M2 and the non-M2 portion of M3 fell quite steadily throughout the year, declining in all months but one. Several influences combined to reduce the growth rate of the depository sector and hence the broader aggregates. One important contributing factor was the increased public awareness of bond and equity funds and other alternatives to bank and thrift deposits. Because interest rates on longer maturity assets remained high relative to returns on bank deposits, these alternatives became increasingly attractive.

In addition, the continuing reductions in indebtedness by both households and nonfinancial corporations discouraged growth in the broader aggregates. Some firms raised funds directly in the capital market instead of depending on bank credit. Households also lowered their demand for new credit and refinanced existing debt, which banks and other intermediaries increasingly securitized. Furthermore, depository institutions increased the spreads between consumer loan rates and time deposit rates in recent years. After-tax spreads rose further as a result of the phaseout of the interest deductibility of consumer borrowing between 1986 and 1991. The wider spreads encouraged households to reduce their levels of bank loans and dis-

Footnote 3 continued
 Continuing Weakness in M2," Board of Governors of the Federal Reserve System, Division of Monetary Affairs, Finance and Economic Discussion Series, no. 209, September 1992. The paper develops a new money demand model with an alternative opportunity cost measure to help explain the recent behavior of M2

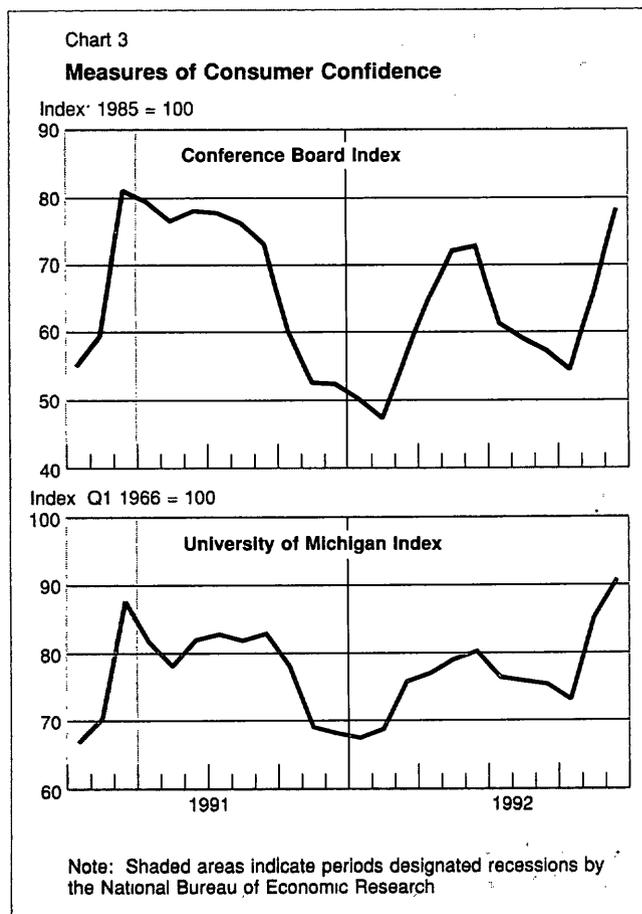


couraged the accumulation of deposits. These balance sheet developments contributed to the downsizing of the depository sector.

Another factor may have been a declining willingness to lend on the part of the financial institutions, resulting from legislation passed both to deal with the troubles of the thrift industry and to strengthen the banking industry. Financial institutions now face stiffer capital requirements, higher deposit insurance premiums, and more stringent lending standards, all of which drive up the cost of depository intermediation and lead to reduced growth in the depository sector.

Financial and business developments

Yield movements Short-term interest rates fell during 1992, while for the most part, yields on securities maturing in three or more years ended the year about where they had started (Chart 5). Early in the year, short-term rates were steady, while longer term yields moved higher amid signs of a pickup in economic growth. Longer term yields were also influenced during the first



quarter by talk of a fiscal stimulus package, which raised concerns about further expansion of the budget deficit and contributed to renewed inflation worries. As the quarter progressed, increases in yields were tempered because it appeared increasingly unlikely that a fiscal stimulus package would be adopted.

Over the second and third quarters, short-term rates fell in concert with the three easing moves by the Federal Reserve. Treasury bill rates were generally fairly steady between the monetary policy changes, although additional rate declines followed the third easing move on September 4 when signs of economic weakness increased and further easing seemed likely. Meanwhile, coupon yields moved gradually lower over this period amid continued good news on inflation and indications that the economic recovery was sluggish. The Treasury yield curve steepened somewhat as investors began to focus on the political and economic uncertainty associated with the presidential election and worried once more about the potential for a costly fiscal stimulus package (Chart 6).

In the fourth quarter, short-term rates rose as the economy showed signs of strengthening, gradually leading the market to expect no further monetary policy easing. Long-term rates also rose in advance of the election as the likelihood of a Clinton victory grew along with concerns about the impact of his presidency on the budget deficit and inflation. After the election, coupon yields fell back somewhat when inflation remained subdued and stronger economic data appeared to reduce

the likelihood of a large fiscal stimulus package from the new administration.

Treasury finance During the year, the topic of the appropriate maturity mix of Treasury debt issuance received considerable attention. Discussion of possible changes in the mix influenced yields and revived old debates about debt management strategies and the term structure of interest rates. Suggestions were made early in the year that the Treasury might reduce the volume of long-term bonds and redirect more of its issuance to shorter term issues. Those supporting the shift argued that by taking advantage of the steep yield curve, the Treasury could reduce its borrowing costs. Others suggested that any initial savings could be wiped out by higher costs incurred when the debt was rolled over.

Analysts also debated whether a shift toward shorter maturity funding of the public debt would significantly flatten the yield curve and perhaps, by lowering long-term interest rates, also stimulate the economy. Proponents argued that lower long-term rates would induce private firms to issue more long-term debt and increase investment.⁴

⁴The effect of the issuance patterns on the yield curve depends critically on the degree of substitutability among Treasury securities of different maturities. High substitutability would make it difficult to influence the yield curve over any meaningful time horizon. But if substitutability is more limited, then Treasury issuance patterns could play a more important role.

Table 2

Price Information

Seasonally Adjusted Annual Rates of Change

	1991-IV	1992				1990-IV to 1991-IV	1991-IV to 1992-IV
		I	II	III	IV		
Consumer price index							
Total	3.3	3.3	3.1	2.7	3.2	3.0	3.1
Excluding food and energy	3.7	4.2	3.4	2.7	3.4	4.5	3.4
Energy	2.8	-2.5	4.5	5.9	1.7	-8.1	2.4
Producer price index							
Total	1.8	0.6	3.2	1.6	0.5	-0.1	1.5
Excluding food and energy	2.5	3.4	2.8	0.7	0.8	3.1	1.8
Energy	3.0	-8.0	11.3	4.5	-2.9	-10.2	1.0
Implicit GDP deflator	2.4	3.1	2.7	2.0	2.3	3.4	2.5
Fixed-weight GDP index	2.4	3.7	3.0	2.0	3.3	3.5	3.0
Employment cost index [†]	3.6	4.0	2.9	3.6	3.5	4.2	3.5

Note: GDP series are as of April 12, 1993.

[†]This index, which covers civilian workers, is computed for the final month of each quarter. The growth rates therefore represent growth from the final month of the previous quarter, rather than quarterly average rates.

Chart 4A

M2: Levels and Target Ranges

Cones and Parallel Bands

Billions of dollars

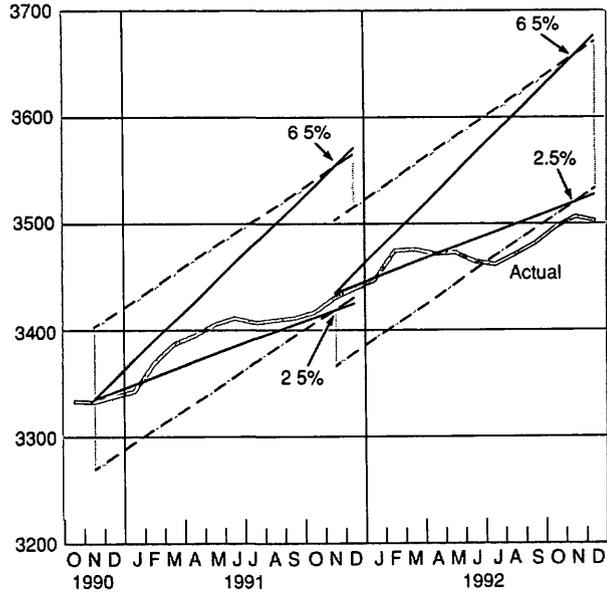


Chart 4B

M3: Levels and Target Ranges

Cones and Parallel Bands

Billions of dollars

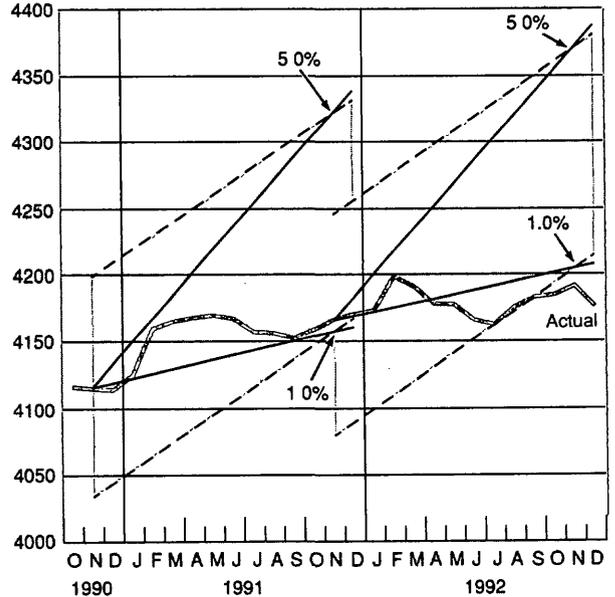


Chart 4C

M1: Levels and Growth Rates

Billions of dollars

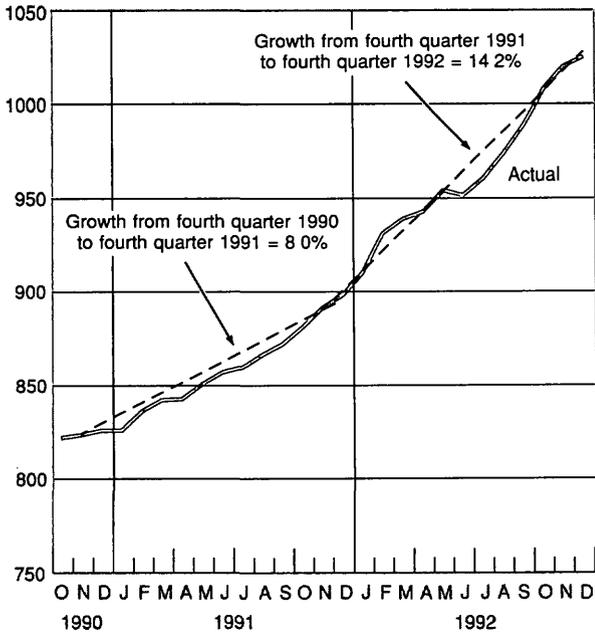
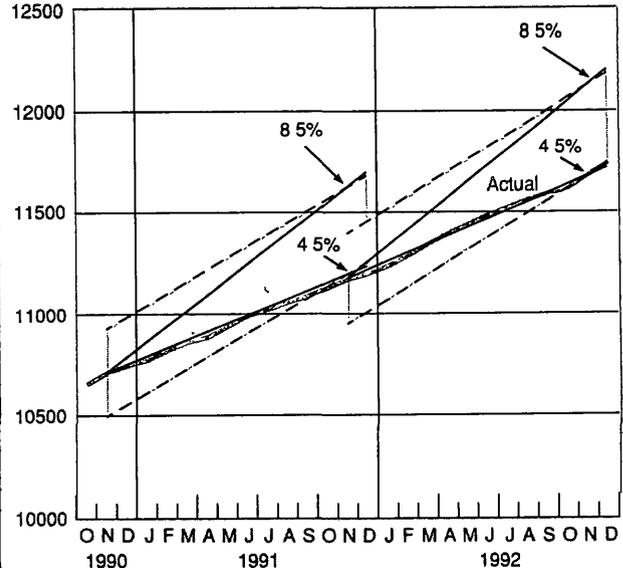


Chart 4D

Total Domestic Nonfinancial Debt: Levels and Monitoring Ranges

Cones and Parallel Bands

Billions of dollars

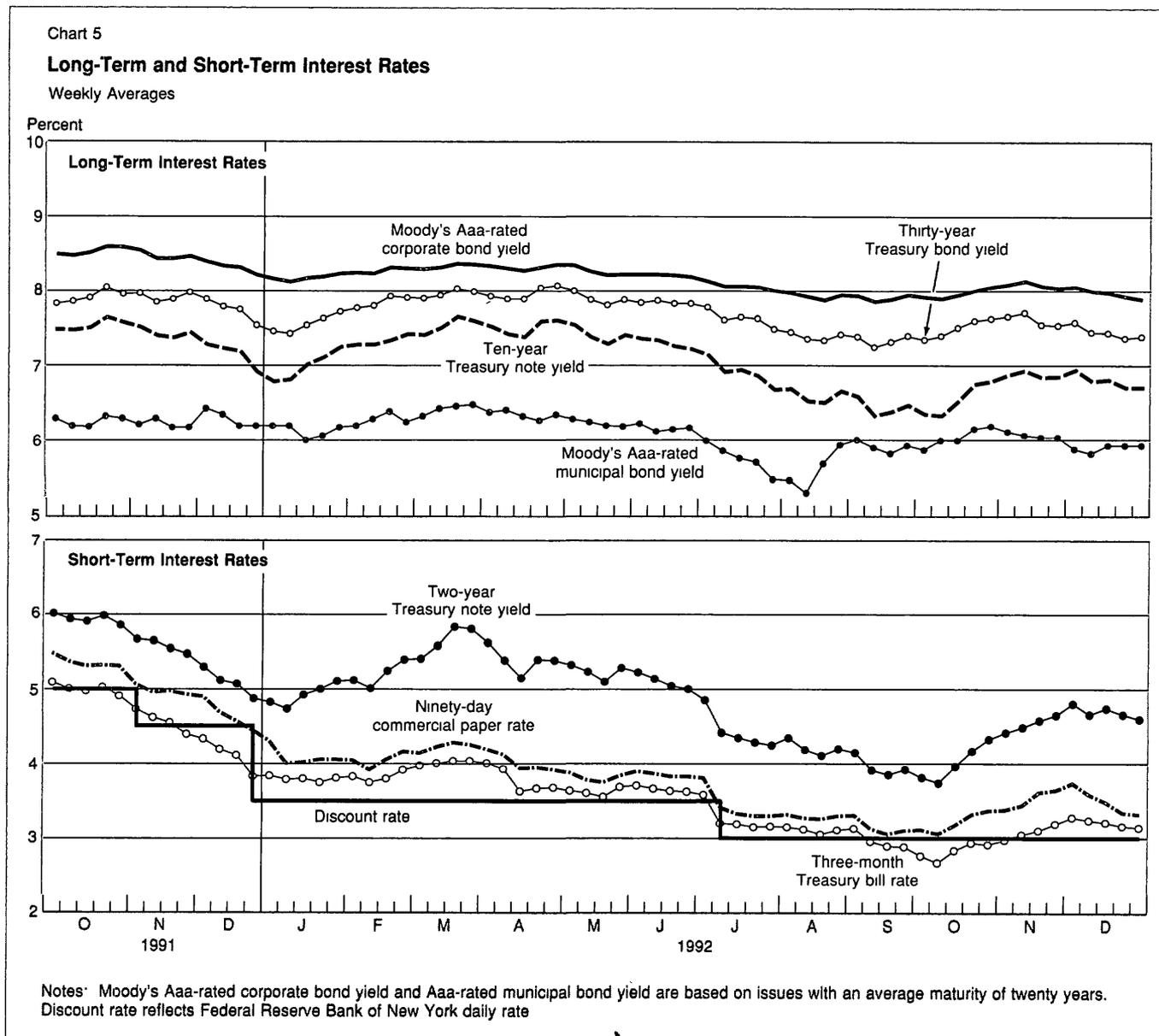


At the February midquarter refunding, the Treasury cut the sizes of the thirty- and ten-year issues by \$2 billion and \$1 billion, respectively. It also announced that it planned to maintain the revised proportions among the three-, ten-, and thirty-year issues at upcoming refundings.

The topic of debt management was revived during the presidential election campaign when the candidates discussed the merits of selling less long-term debt. Expectations of smaller thirty-year bond issues may have slightly lowered yields on outstanding long-term

bonds at times and also may have pushed up shorter term yields, although it was difficult to distinguish these effects from the consequences of changing economic and inflation prospects.

The Treasury began a year-long experiment with single-price auctions in the third quarter, using the new technique in monthly auctions of its two- and five-year notes. By applying the same price to all successful bids, the technique eliminates the so-called winner's curse, in which some of those with winning bids find that they have paid more than necessary. Proponents



argue that the change has the potential to encourage a broader base of bidders at auctions, an outcome that could lower average yields and save money for the Treasury. As of the end of 1992, it was too early to judge the experiment either a success or a failure.

The *Joint Report on the Government Securities Market*,⁵ published in January, had recommended occasional reopenings of Treasury debt issues in the event of shortages that could be disruptive to the smooth functioning of the secondary markets. The heavy financing activity of corporations, municipalities, and foreign governments in 1992 frequently caused temporary Treasury price movements as underwriters hedged their positions. Hedgers sold Treasury securities short and then borrowed the securities to meet delivery obligations. The impact was felt to a limited extent in the "cash" market, where securities are traded outright. It was more conspicuous in the repurchase markets, where dealers borrowed the securities they had sold short. In October, the hedging of corporate debt contributed to what was deemed an acute, protracted shortage of ten-year Treasury notes. The Treasury responded by reopening the latest ten-year note at the November

⁵Prepared by the Department of the Treasury, the Securities and Exchange Commission, and the Board of Governors of the Federal Reserve System

refunding⁶

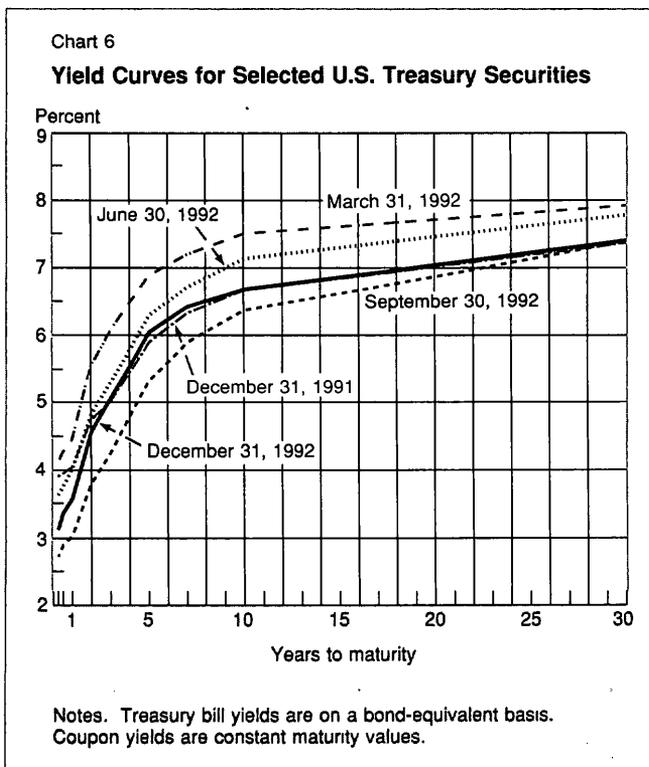
Financial strains The financial stress that had restrained economic activity since 1990 abated during 1992 in major sectors of the economy, although vulnerabilities remained. Bank balance sheets, helped by increased profitability and new equity issuance, improved substantially. Falling interest rates enabled banks to profit from widening interest rate margins and rising security values. Delinquency rates declined because of the improving economic conditions and more conservative lending practices. Better loan quality also contributed to higher profits. In addition, banks actively raised new equity, reflecting the increasing importance attached to capital in the new regulatory environment of stiffer capital requirements.⁷ All of these developments sharply increased the average ratio of equity to assets and improved the asset quality of banks during 1992.

The debt burden of households decreased during the year as many households refinanced existing debt at lower interest rates and reduced their use of credit. Lower interest rates spurred large-scale mortgage refinancing during 1992 (Chart 7). Consumer instalment credit, excluding mortgages, decreased sharply as a share of personal disposable income (Chart 8). Nonetheless, total household liabilities, a measure that includes mortgage debt, decreased only modestly as a fraction of personal disposable income and remained high by historical standards.

Some positive developments also were noted in the corporate sector, but the evidence was uneven. Profits increased as the restructuring moves of previous years began to be reflected in productivity gains, and economic activity picked up (Chart 9). Cash flow improved as a result of the higher profits and the lower interest payments associated with refinancing. Accordingly, the average ratio of net interest payments to cash flow for nonfinancial corporations, a measure of financial strain, decreased markedly. By contrast, the average ratio of

⁶The reopening was made possible by a recent Internal Revenue Service ruling exempting the Treasury from the usual restrictions on original issue discounts when it reopens an issue in order to eliminate an "acute, protracted" shortage. Normally, an issue sold with a discount greater than ¼ point for each full year remaining to maturity—the situation for the note in question—would be subject to different tax treatment than an issue that was sold closer to par. Without the tax ruling, it would have been necessary to treat the newly issued notes and the outstanding notes as separate issues.

⁷Banks were required to achieve capital ratios for risk-weighted assets of 4 percent for tier 1 capital and 8 percent for tier 1 plus tier 2 capital by the end of 1992. In addition, the Federal Deposit Insurance Corporation announced a new pricing scheme charging a lower deposit insurance premium to well-capitalized banks starting January 1993.

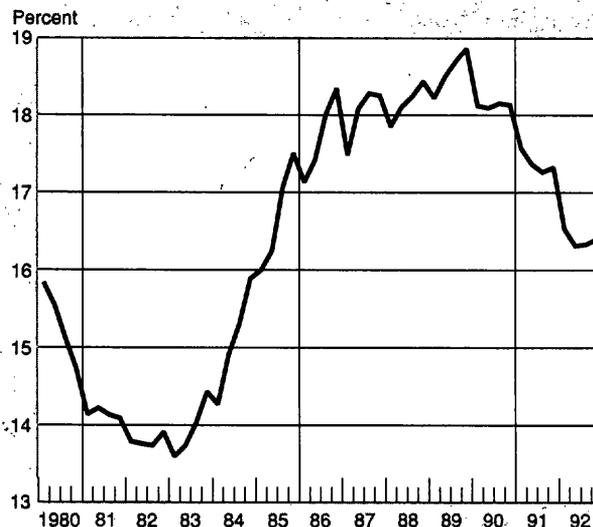


total assets to net worth, a measure of leverage, showed little sign of decline. Furthermore, prolonged financial strains forced some major corporations such as General Motors, Westinghouse, Sears, and IBM to announce restructuring moves that involved downsizing. The airline industry also continued to experience financial difficulties. Overall, financial conditions improved somewhat, and yields on corporate debt relative to those on Treasury issues declined modestly, reflecting increased investor confidence in the corporate sector.

Municipalities also took advantage of low interest rates to refinance their debt. Municipal debt issuance was particularly strong toward the end of the year as market participants perceived that the economy was improving and concluded that interest rates might be bottoming out.

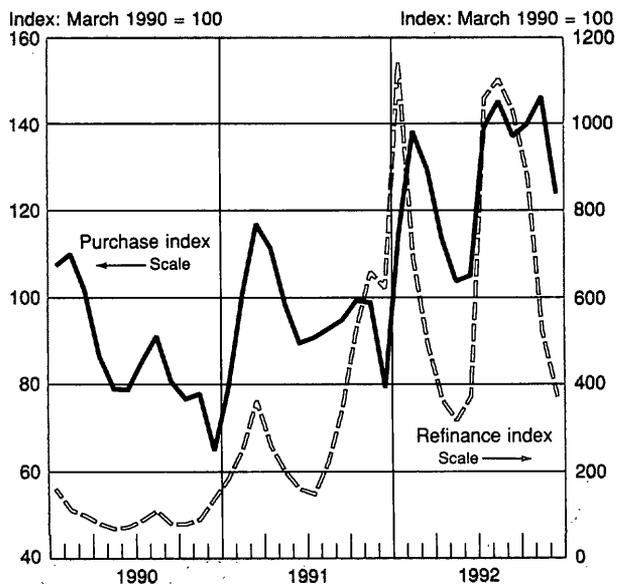
Special factors also affected the municipal market over the course of the year. One influence was the expectation that property and casualty insurance companies would sell a portion of their inventory of municipal securities in absorbing the heavy level of claims associated with Hurricane Andrew's devastation of south Florida. Spreads of yields on municipal securities below comparable taxable yields narrowed consider-

Chart 8
Consumer Instalment Credit as a Percentage of Personal Disposable Income



Sources: Bureau of Economic Analysis; Board of Governors of the Federal Reserve System.

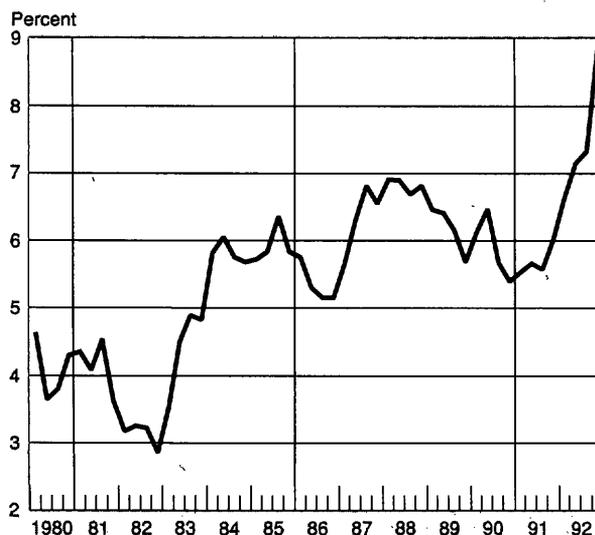
Chart 7
Mortgage Application Indexes



Source: Mortgage Bankers Association of America.

Note: Purchase index is seasonally adjusted; refinance index is not seasonally adjusted.

Chart 9
Corporate Profitability



Sources: Bureau of Economic Analysis; Board of Governors of the Federal Reserve System.

Note: Chart shows corporate profits as a percentage of net worth.

ably in mid- and late August because of this expectation and the influence of heavy municipal issuance. Late in the year, some of the expected hurricane-related sales by insurance companies reportedly did take place, again putting upward pressure on municipal yields.

A factor working in the other direction, especially after the presidential election, was the expectation of an increase in marginal tax rates on high-income taxpayers sometime during 1993. This expected policy change increased the demand for municipal securities, pushing their yields downward relative to yields on taxable securities and more than offsetting the upward pressure from the sales by insurance companies.

International developments. Europe and Japan both experienced considerable financial stress during 1992, but this development had only limited impact on the demand for dollar-denominated debt. In June, Danish voters rejected the Maastricht treaty on European economic and monetary union. The referendum result, which dimmed the prospect of European financial integration, led to a decline in European stock market prices and an appreciation of the German mark, the strongest European Community currency, against other European currencies.

In July, domestic inflationary pressures induced the German central bank to raise its discount rate sharply. A large gap between U.S. and German short-term interest rates put upward pressure on U.S. interest rates and sent the dollar lower against the mark. Other European currencies then lost value against the mark as investors doubted the commitment and ability of the governments to maintain the value of their currencies against the mark. Subsequent devaluations of some European currencies led to heightened variability in exchange rates, but otherwise had little direct effect on U.S. financial markets.

In Japan, stock prices were often under downward pressure and were volatile at times. In August, the Nikkei average temporarily slipped below 15,000 for the first time in six years. Large capital losses in the Japanese stock market further curtailed the ability of some Japanese investors to invest abroad and hence limited their participation in U.S. financial markets. However, large and growing Japanese current account surpluses required offsetting capital outflows, which came mainly in the form of repayment of foreign currency deposits by Japanese banks.

Course of policy

Monetary policy in 1992 was conducted in an environment of uneven economic growth and continued moderation of inflationary pressures. The FOMC responded to indications of fragility in the economic expansion by easing reserve pressures on three occa-

sions, leading to a cumulative reduction of 1 percentage point in the federal funds rate (Table 3). Meanwhile, the Board of Governors approved a ½ percentage point cut in the discount rate, bringing that rate to 3 percent. The policy moves in 1992 extended the string of easing steps begun in mid-1989. Since that time, the federal funds rate has fallen by nearly 7 percentage points while the discount rate has declined by 4 percentage points.

During the winter and early spring, most economic indicators suggested that an economic expansion of modest dimensions was under way. A pickup in retail spending and consumer sentiment and faster growth in the broader monetary aggregates early in the year were encouraging. Moreover, the FOMC during this time felt that enough stimulus probably had been provided through the series of easing steps implemented in the second half of 1991 to foster an upturn in economic activity consistent with a continued moderation of inflation pressures. Nonetheless, with the outlook still so uncertain, the Committee remained alert to signs that the economic expansion might falter. In mid-April, as the economy showed some signs of softening and after the broader monetary aggregates had contracted in March, the FOMC implemented a slight easing in reserve pressures that lowered the federal funds rate by ¼ percentage point. In addition, the Board of Governors announced early in the year that it would reduce the reserve ratio on net transaction accounts to strengthen the financial condition of depositories and to put them in a better position to extend credit.⁹

During the late spring and over the summer, evidence accumulated that the expansion might be losing momentum, and the FOMC eased reserve pressures further. By early summer it was becoming apparent that the strength in final demand seen earlier in the year would not be sustained. The unemployment rate rose, and consumer demand appeared to be restrained by continued weakness in the labor market. At the same time, the broader aggregates were about flat in May and June, and incoming data suggested that inflation was slowing further. Against this background, the Board of Governors approved a ½ percentage point cut in the discount rate in early July, and the FOMC allowed the full amount of this cut to show through to the funds rate. Economic data over the summer suggested that the expansion was continuing, but at a subdued rate. In early September, the FOMC implemented another slight easing of reserve pressures following a smaller than anticipated pickup in growth of the broader monetary aggregates, another reported decline in nonfarm

⁹The cut was announced in February and became effective in April. Details of the cut in reserve requirements appear in the following section.

payrolls, and the release of other data showing unexpected sluggishness in economic activity.

As autumn unfolded, the Committee was encouraged

by the gradually improving tone of economic reports. Private payroll employment posted faster growth, and aggregate hours rose. A wide variety of indicators

Table 3

Specifications from Directives of the Federal Open Market Committee and Related Information

Date of Meeting	Specified Short-Term Growth Rates (Percent)		Discount Rate (Percent)	Borrowing Assumption for Deriving Nonborrowed Reserve Path (Millions of Dollars)	Associated Federal Funds Rate ^f (Percent)	Effect on Degree of Reserve Pressure	Guidelines for Modifying Reserve Pressure between Meetings ^g
	M2	M3					
12/17/91	November to March 3	1½	4½ 3½ on 12/20	75 100 on 12/20 ^h 75 on 1/16 ^h	4½ 4	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Somewhat lesser reserve restraint <i>would</i> be acceptable.
2/4 to 2/5/92	December to March 3	1½	3½	75 100 on 2/6 ^h	4	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
3/31/92	March to June 3½	1½	3½	100 75 on 4/9 ^{h†} 100 on 4/30 ^h	4 3¾	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
5/19/92	April to June 2½	1½	3½	100 125 on 5/21 ^h 150 on 5/28 ^h 225 on 6/25 ^h	3¾	Maintain	Slightly greater or slightly lesser reserve restraint <i>might</i> be acceptable.
6/30 to 7/1/92	June to September 2	½	3½ 3 on 7/2	225 225 on 7/2 ^{h††} 250 on 7/30 ^h	3¾ 3¾	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
8/18/92	June to December 2	½	3	250 225 on 9/3 ^h 200 on 9/4 ^{h††}	3¾ 3	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
10/6/92	September to December 2	1	3	200 175 on 10/8 ^h 150 on 10/15 ^h 125 on 10/22 ^h 100 on 10/29 ^h 75 on 11/5 ^h	3	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
11/17/92	September to December 3½	1	3	75 50 on 12/10 ^h	3	Maintain	Slightly greater reserve restraint <i>might</i> be acceptable. Slightly lesser reserve restraint <i>would</i> be acceptable.
12/22/92	November to March 1½	0	3	50	3	Maintain	Slightly greater reserve restraint or slightly lesser reserve restraint <i>would</i> be acceptable.

^fThe federal funds rate trading area that is expected to be consistent with the borrowing assumption

^gModifications to reserve pressures are evaluated "in the context of the Committee's long-run objectives for price stability and sustainable economic growth" and "giving careful consideration to economic, financial, and monetary developments"

^hThis increase was made so that only part of the accommodation from the cut in the discount rate showed through to the market

^{h†}Change in borrowing assumption reflects technical adjustment to account for actual or prospective behavior of seasonal borrowing

^{h††}Change in borrowing assumption reflects adjustment to reserve pressures

^{h†††}The assumption was unchanged because the full effect of the discount rate cut was allowed to show through to the market

pointed to improvements in retail sales, accompanied by a rebound in consumer confidence. Meanwhile, data suggested a continuing trend to lower inflation and some pickup in the growth of the monetary aggregates (although the broader aggregates weakened again in December). On balance, available evidence suggested that a moderate but sustainable expansion was under way. In this environment, the FOMC adopted a posture of watchful waiting and left monetary policy unchanged.

Policy implementation

Operating procedures

Borrowed reserves. In 1992, the FOMC continued to formulate its policy objectives in terms of the "desired degree of reserve pressure," an approach it had first adopted almost ten years earlier. Formally, the concept of reserve pressure is specified in terms of an assumed amount of adjustment plus seasonal borrowing from the discount window. (These assumed levels of borrowing and other reserve measures for 1992 are presented in Table 4.) This borrowing allowance is associated with federal funds trading within an acceptable band around an expected level.⁹ The Desk's reserve operations are designed to provide a level of nonborrowed reserves that just meets the estimated demand for total reserves less the allowance for borrowing and that is expected to be consistent with federal funds trading within the desired range.

The effectiveness of this approach to reserve management requires a reasonably predictable link between adjustment borrowing and the spread between the federal funds rate and the discount rate. This relation, however, eroded in the 1980s. When faced with apparent inconsistencies between the assumed behavior of borrowing and the federal funds rate, the Desk has in recent years generally modified its reserve objectives for the two-week maintenance period in a way designed to keep the funds rate within the desired range.

The decline in adjustment borrowing was encouraged by several developments. Beginning in the 1980s, the widespread publicity given to banks experiencing funding difficulties made many other banks reluctant to turn to the discount window out of concern that any borrowing could raise questions about their financial health.¹⁰ Some reluctance to tap the discount facility persisted in

1992, even though many banks were able to strengthen their capital positions and improve their profitability.

A generally low level of adjustment borrowing was also encouraged by continued narrow spreads between the federal funds and discount rates. In 1992, the average effective federal funds rate exceeded the discount rate by just 27 basis points, little changed from the average spread of 24 basis points in 1991. In 1990 and 1989, this spread averaged 112 and 228 basis points, respectively. In fact, the expected levels of the funds rate and the discount rate were identical during the final four months of 1992. When the funds rate was equal to or below the discount rate in the past, borrowing was generally near frictional levels and the predicted relationships did not hold well.¹¹ A narrow rate spread, combined with the reluctance of many depositories to borrow, contributed to a similar situation in 1992. Adjustment borrowing was heavily concentrated on days when reserves were particularly scarce (most commonly on settlement days) or when unusual circumstances, such as interruptions to normal payments flows, forced some banks to turn to the window.

Reflecting these developments, adjustment credit averaged just \$76 million a day in 1992, compared with \$140 million in 1991 and \$234 million in the preceding year.¹² Adjustment borrowing dropped to \$13 million in the period ended November 11, when the average effective funds rate and the discount rate were virtually the same.¹³ (Actual levels of borrowing and the effective federal funds and discount rates are presented in Chart 10.)

In addition, seasonal borrowing activity in 1992 was well below the levels of recent years. In part, seasonal credit was held down by the introduction of a market-related discount rate for this type of borrowing, effective in the maintenance period ended January 22. The rate charged on seasonal borrowing in a maintenance period is now determined by the average of the effective federal funds rate and the ninety-day composite certificate of deposit (CD) rate from the preceding period. Previously, the basic discount rate had been charged on seasonal credit. Moving to a market-based rate removed much of the price incentive for using seasonal credit that would otherwise have been present during the part of the year when the federal funds rate

⁹The association between borrowing and the funds rate is based on the historical relation between discount window borrowing—particularly adjustment credit—and the spread between the federal funds rate and the discount rate

¹⁰The reluctance to borrow was discussed in "Monetary Policy and Open Market Operations during 1990," Federal Reserve Bank of New York *Quarterly Review*, Spring 1991, and "Monetary Policy and Open Market Operations during 1991," Federal Reserve Bank of New York *Quarterly Review*, Spring 1992

¹¹On a number of occasions in the 1970s and for a few months in 1980, the funds rate was about the same as or below the discount rate

¹²Excluding special situation borrowing by banks with financial difficulties, the averages for 1991 and 1990 were \$123 million and \$164 million, respectively

¹³This was the lowest average level of borrowing for a maintenance period since the July 9, 1980, week-long period. Adjustment borrowing averaged \$14 million in the period ended November 13, 1991

exceeded the discount rate ¹⁴

The average level of seasonal borrowing in every maintenance period in 1992 was below the level in the corresponding period in 1991. The impact of the new pricing procedure on seasonal credit became increasingly apparent in late spring, when the rise in seasonal borrowing typical at that time of year was slower than in previous years. For the year as a whole, seasonal credit averaged \$97 million, compared with \$155 million in 1991 and \$223 million in 1990.¹⁵

Despite the lower average level of seasonal credit, the general behavior of this borrowing conformed to its

usual pattern—rising through the summer and falling thereafter. To keep pace with these movements in seasonal borrowing, the Desk made six upward technical adjustments to the borrowing allowance between February and July, and afterwards made seven technical reductions to the allowance.¹⁶

Adjustments to recent cuts in reserve requirements
On February 18, the Board of Governors announced that it would reduce the reserve ratio on net transactions accounts from 12 percent to 10 percent, effective April 2. This reduction was the first major change in the reserve ratio on transactions accounts since the Monetary Control Act was adopted in 1980, and it followed the elimination of reserve requirements on nontransac-

¹⁴Declines in seasonal borrowing in other recent years resulted from a narrowing spread between the federal funds and discount rates and from reduced total credit needs.

¹⁵Seasonal borrowing peaked at \$226 million in the period ended September 2, its lowest average level was \$12 million in the period ended January 22.

¹⁶In addition, one downward technical adjustment was made to the allowance during the maintenance period in January when the switch to the new pricing procedure took effect.

Table 4
1992 Reserve Levels
Millions of Dollars

Period Ended	Required Reserves (Current)	Required Reserves (First Published)	Excess Reserves (Current)	Excess Reserves (First Published)	Total Reserves	Adjustment and Seasonal Borrowed Reserves	Nonborrowed Reserves plus Extended Credit Borrowed Reserves (Current)	Nonborrowed Reserves plus Extended Credit Borrowed Reserves (First Published)	Nonborrowed Reserves Interim Objective	Initial Assumed Excess Reserves	Final Assumed Excess Reserves	Extended Credit Borrowing
1992												
Jan 8	56,020	55,979	1,138	1,206	57,158	521	56,637	56,666	57,098	1,200	1,200	1
22	54,966	54,925	913	935	55,879	136	55,743	55,725	55,850	1,000	1,000	0
Feb 5	53,488	53,432	1,023	1,088	54,511	128	54,381	54,394	54,538	1,000	1,200	2
19	54,435	54,489	1,168	1,177	55,602	68	55,533	55,600	55,226	1,000	1,000	2
Mar 4	54,151	54,130	941	958	55,091	61	55,028	55,028	55,030	1,000	1,000	3
18	56,001	56,149	508	395	56,509	74	56,434	56,470	57,002	1,000	1,000	2
Apr 1	54,788	54,872	1,616	1,586	56,403	117	56,286	56,342	55,772	1,000	1,000	1
15	49,174	49,247	1,065	1,085	50,238	55	50,183	50,277	50,140	1,400	1,000	1
29	49,150	49,283	1,212	1,123	50,362	115	50,244	50,292	50,160	1,000	1,000	4
May 13	48,209	48,247	628	541	48,836	153	48,683	48,636	49,147	1,000	1,000	0
27	47,277	47,314	1,497	1,488	48,774	158	48,617	48,645	48,271	1,000	1,000	0
June 10	48,492	48,492	474	482	48,965	152	48,814	48,823	49,354	1,000	1,000	0
24	48,521	48,602	1,171	1,162	49,692	188	49,504	49,576	49,459	1,000	1,000	0
July 8	48,884	48,832	1,041	1,158	49,924	455	49,469	49,536	49,600	1,000	1,000	1
22	49,106	49,041	950	1,061	50,056	215	49,841	49,887	49,816	1,000	1,000	0
Aug 5	48,447	48,295	922	1,074	49,369	241	49,128	49,129	49,041	1,000	1,000	0
19	49,856	49,833	825	837	50,681	249	50,432	50,421	50,585	1,000	1,000	0
Sept 2	48,820	48,721	1,067	1,172	49,887	258	49,629	49,635	49,426	1,000	1,000	0
16	51,081	51,153	795	681	51,876	321	51,556	51,514	51,927	1,000	1,000	0
30	50,217	50,102	1,182	1,290	51,399	258	51,140	51,134	50,848	1,000	1,000	0
Oct 14	52,099	52,127	1,149	1,115	53,248	185	53,064	53,057	52,781	1,000	1,000	0
28	51,750	51,792	1,071	891	52,821	118	52,704	52,566	52,675	1,000	1,000	0
Nov 11	53,346	53,365	728	754	54,074	66	54,008	54,052	54,204	1,000	1,000	0
25	53,485	53,462	1,361	1,367	54,846	138	54,709	54,692	54,363	1,000	1,000	0
Dec 9	54,625	54,563	841	937	55,466	95	55,371	55,406	55,469	1,000	1,000	0
23	55,357	55,545	1,225	1,217	56,582	58	56,522	56,704	56,526	1,000	1,000	2
1993												
Jan 6	56,288	56,253	1,385	1,437	57,674	269	57,405	57,422	57,254	1,000	1,000	0

tions deposits in December 1990. This latest cut lowered required reserves an estimated \$8 billion, almost all of which was met through a reduction in required reserve balances—the reserves that depository institutions hold at Federal Reserve Banks to meet

their reserve requirements.¹⁷

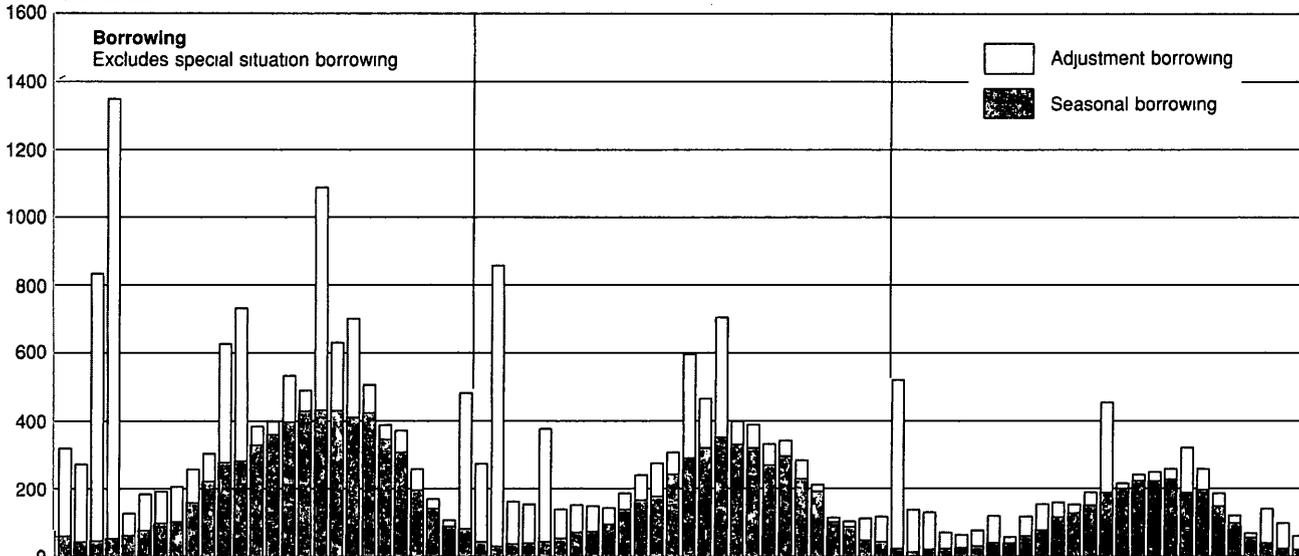
¹⁷Required reserve balances are defined as required reserves less applied vault cash. A small portion of the April cut in reserve requirements was accomplished through reductions in applied vault cash.

Chart 10

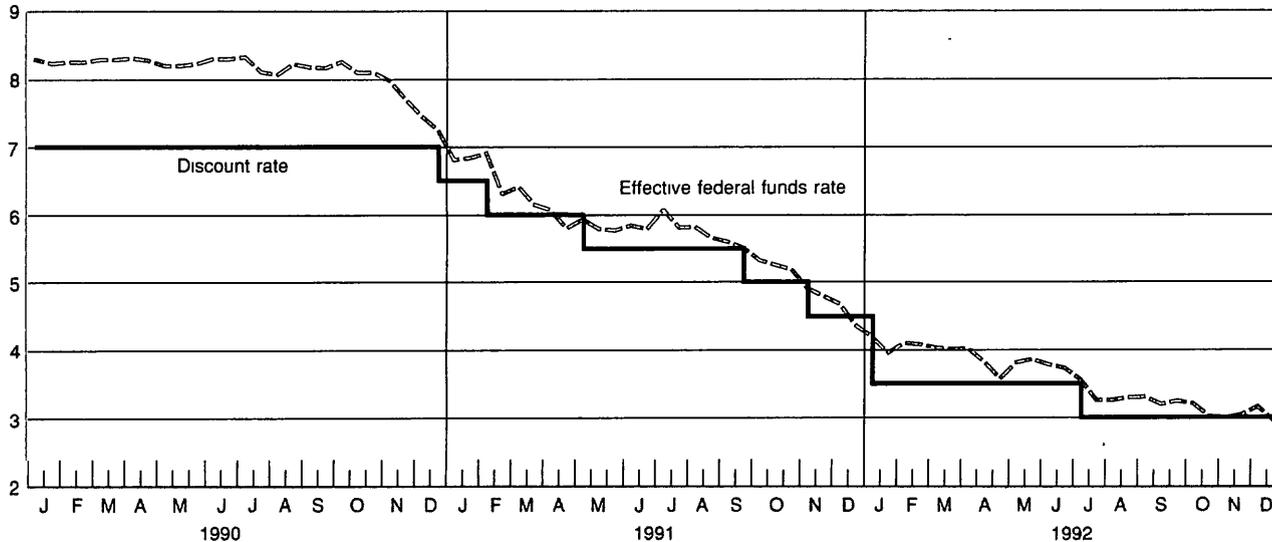
Borrowing and the Behavior of the Federal Funds Rate and the Discount Rate

Maintenance Period Averages

Millions of dollars



Percent



Note: Discount rate reflects Federal Reserve Bank of New York daily rate

Reserve balances at the Fed are used by depositories not only to meet reserve requirements, but also to process the heavy volume of daily transactions between financial institutions and to guard against unexpected late-day deposit withdrawals that could send a bank into overdraft.¹⁸ Because a steep penalty is imposed whenever a depository institution ends the day overdrawn, considerable effort is made to avoid such overdrafts.¹⁹ The demand for reserve balances for this purpose is especially high at the larger banks. Following the December 1990 cut to reserve requirements, depositories had struggled to adapt their reserve management practices to a sharply lower level of reserve balances, thereby complicating the Desk's efforts to formulate open market operations early in 1991.²⁰ Later in that year, the Desk was confronted with occasional difficulties as it sought to ensure that reserve supplies were both sufficient to meet requirements on a period average basis and adequate to support banks' daily clearing operations.

In April 1992, by contrast, serious difficulties in conducting operations were avoided, in large measure because the cut in requirements was implemented at a time when seasonal factors were working to elevate the level of required reserves. The high seasonal level of reserves helped to provide the liquidity needed to support clearing operations, despite the substantial cut in requirement ratios.²¹ The timing of the cut was chosen because of the problems faced by the Desk the previous year when the reduction of reserve requirements preceded a pronounced seasonal decline in required reserve balances.²²

Several other factors also eased the Desk's reserve management problems immediately following the April 1992 cut in reserve requirements and mitigated reserve management difficulties later in the year. Rapid growth in M1 deposits in 1991 and 1992 lifted the underlying level of required reserves. In the fourteen months between the two rounds of reserve requirement cuts, the reservable portion of M1 rose at an annualized rate of 13 percent (calculated using seasonally adjusted data), and it continued to expand at a similar pace over the remainder of 1992. In addition, depositories significantly increased their required clearing balances.²³ These balances stood at \$1.8 billion just before the December 1990 cut in reserve requirements, little changed from their level one year earlier. By April 1992, clearing balances had risen to \$4.7 billion, and by the end of 1992 these balances had reached \$5.9 billion. Most of this growth occurred at the larger institutions, which faced the most severe difficulties operating with low balances at the Fed.²⁴ Growth in required clearing balances has widened the gap between total reserves at the Fed and required reserve balances over the past two years (Chart 11).²⁵

These developments partly offset the impact of the cuts in reserve requirements on the level of reserve balances at the Fed. Nonetheless, throughout 1992, reserve levels at the Fed remained below the levels reached ahead of the December 1990 cut in requirements, while the need for bank liquidity to support clearing operations remained high (Chart 12).²⁶ To date, reserve management difficulties of the magnitude witnessed in early 1991 when reserve balances fell to exceptionally low levels have been avoided; however,

¹⁸A discussion of the varied uses of reserve balances at the Fed appears in Ann-Marie Meulendyke, "Monetary Policy Implementation and Reserve Requirements," in *Reduced Reserve Requirements: Alternatives for the Conduct of Monetary Policy and Reserve Management*, Federal Reserve Bank of New York, April 1993.

¹⁹The charge for an overnight overdraft is the greater of 2 percentage points above that day's effective federal funds rate or 10 percent. Currently, daylight overdrafts that are covered before the close of business are not subject to a monetary penalty, although the Board announced that it plans to begin charging for such overdrafts in April 1994.

²⁰During the initial adjustment period, the federal funds rate was unusually volatile, and excess reserve demand was highly uncertain. The adjustment to the December 1990 cut in requirement ratios was described in last year's report.

²¹The rapid buildup in transaction deposits, which raises the level of required reserves just ahead of the major April tax date, accounts for most of the seasonal increase in required reserve balances in April.

²²Required reserve balances in early February 1991 averaged \$16 billion in one maintenance period. They averaged about \$22 billion in April 1992.

²³A depository can establish a clearing balance by specifying an average level of reserves that it will hold at the Fed for clearing purposes. In exchange, it receives credits that it can use to pay for priced services provided by the Fed at a rate determined by the effective funds rate. A discussion of the required clearing balance program appears in Spence Hilton, Ari Cohen, and Ellen Koonmen, "Expanding Clearing Balances," in *Reduced Reserve Requirements: Alternatives for the Conduct of Monetary Policy and Reserve Management*, Federal Reserve Bank of New York, April 1993.

²⁴For many banks, an expansion in required clearing balances was made economical by further declines in the federal funds rate that raised the maximum useful clearing balance associated with a given use of priced services.

²⁵The gap between total reserves at the Fed and required reserve balances is also affected by excess reserves and various "as-of" adjustments.

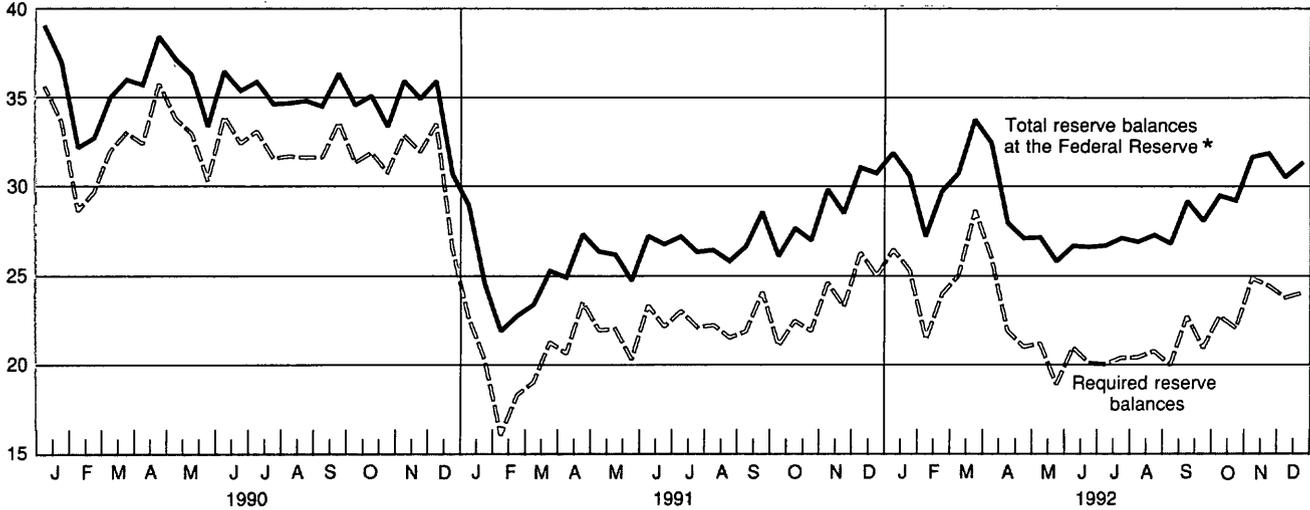
²⁶In the two maintenance periods just before the December 1990 reserve requirement cut, reserves maintained at the Fed (including required clearing balances) averaged a bit more than \$35 billion. In the corresponding periods in 1992, reserves at the Fed averaged just over \$31 billion.

Chart 11

Reserve Balances

Maintenance Period Averages, Not Seasonally Adjusted

Billions of dollars

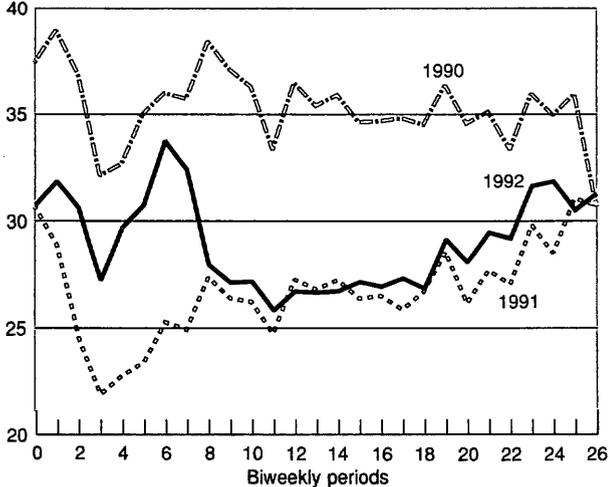


* Includes excess reserves and required clearing balances.

Chart 12

Total Reserve Balances at the Federal Reserve

Billions of dollars



Notes: Data are maintenance period averages and include excess reserves and required clearing balances. For each set of annual observations, period 1 covers the year-end, and period 0 is equal to period 26 from the preceding year.

some of the ways in which depositories have adapted their reserve management practices to cope with a lower level of required reserve balances have had an impact on the Desk's conduct of open market operations. In particular, since the December 1990 cut to reserve requirements, depository institutions have often deferred holding reserves to meet their requirements until late in a maintenance period.²⁷

With a smaller available cushion of reserve balances, many depositories in 1992 chose to concentrate their reserve holdings toward the end of a maintenance period in order to avoid accumulating an excess position early on that could be difficult to run off later without risking an overnight overdraft. This reserve management approach was reflected in a dramatic shift in the distribution of excess reserves within a maintenance period. In the two years before the December 1990 cut in reserve requirements, the average levels of excess reserves in the first and second weeks of a maintenance period were similar in magnitude. In the

²⁷Depositories as a group also slightly increased their average holdings of excess reserves, perhaps to help meet their liquidity needs. The implicit interest cost of holding reserve excesses, however, has discouraged depositories from significantly enlarging these balances.

following year or so, average holdings of excess reserves became skewed toward the second week of a period, and this imbalance became even more pronounced after the April 1992 cut in reserve requirements.²⁸ In many maintenance periods, a reduced demand for reserves early in the period contributed to a tendency for the federal funds rate to be on the low side of its expected trading range until late in the period, often despite a large need to add reserves during the period. In periods when the need to add was great, this intraperiod pattern of reserve demand interfered with the Desk's ability to provide reserves smoothly.²⁹

The Board undertook some measures during 1992 to limit the difficulties faced by depository institutions and the Desk when working with low reserve balances at the Fed. Effective September 3, the limit on reserve excesses or deficiencies that could be carried forward for one maintenance period was doubled to the larger of 4 percent of a depository's required reserve level or \$50,000. The enlarged carryover allowance would provide depositories with more flexibility to manage their reserve positions so as to meet reserve requirements and hold adequate balances for clearing purposes. Beginning with the period ended November 25, vault cash holdings were applied toward meeting reserve requirements with a one-period lag, a reduction from two periods. This shift was intended to raise the level of the seasonal trough that required reserve balances reach early each year.³⁰ Nonetheless, despite these measures and the other factors that have lifted reserve

balances over the past two years, the level of balances maintained at the Fed remains low. Any developments that might further reduce reserve levels could weaken the Desk's ability to meet reserve needs smoothly.

Discrepancies between the federal funds rate and the reserve estimates. The Desk's temporary open market operations each period are designed to close the gap between the objective for nonborrowed reserves and the available estimates of nonborrowed reserve supplies.³¹ Trading conditions in the money market typically reflect the general reserve picture, with reserve shortages (surpluses) associated with a tendency towards firmness (softness) in the funds rate. In 1992, conflicts between the federal funds rate in the morning and the reserve estimates for the period continued to arise frequently. The conflicts usually resulted from widespread market expectations of a possible change in Federal Reserve policy, incorrect estimates (available either to the Desk or to bank reserve managers) of the reserve need, or the reserve management strategy of depositories that wished to avoid accumulating excess reserves early in a period.³²

The federal funds rate has taken on a high degree of visibility in recent years. Significant moves of the rate away from the level perceived to be the focus of policy can be misinterpreted as signaling a change in policy stance. In 1992, the close focus of market participants on the funds rate meant that the Desk often felt the need to take account of trading conditions in the money market in formulating its actions, even when doing so was likely to cause sharp movements in the funds rate later in the day or period. During much of the year, market participants believed that the FOMC was likely to adopt a more accommodative policy. Against this background, on a number of days when the funds rate was to the low side of its expected trading level despite a period need to add reserves, the Desk planned its course of action in a way that would clarify the stance of policy, or at least avoid sending misleading signals. Indeed, softness in the funds rate on many of these occasions resulted from widespread speculation about a near-term easing move. The Desk sometimes deferred meeting an add need, or substituted a smaller, less aggressive, customer-related operation in place of the System operation that the reserve profile suggested would be more appropriate. As a result, the funds rate sometimes firmed substantially in later trading, and on

²⁸From January 1989 to December 1990, excess reserves in the first and second weeks of all maintenance periods averaged \$950 million and \$910 million, respectively (The averages exclude the period covering the 1990 year-end, when excess reserves in the first week exceeded \$10 billion.) From January 1991 through March 1992, the average levels in the first and second weeks of periods were \$500 million and \$1,790 million, respectively. From April through December 1992, the corresponding averages were \$280 million and \$1,740 million. Several factors could contribute to the depositories' tendency to hold more excess reserves in the second week of a period, including the expectation that interest rates might decline. Such an expectation would make depositories postpone holding reserves in the hope of acquiring them more cheaply later. However, the size of the imbalances and the fact that the expectations effect was also present in 1989 and 1990 strongly suggest that the effort to work with lower reserve balances played an important role.

²⁹Of course, in the absence of sizable discount window borrowing, the Desk's operations will largely determine the level of excess reserves in a period ex post; however, in structuring its actions, the Desk often responds to indications of the immediate demand for reserves as reflected in current trading conditions in the money market. The following section addresses the discrepancies between the federal funds rate and reserve estimates in 1992 and the Desk's responses to these discrepancies.

³⁰Both measures described in this paragraph were first proposed for public comment when the April 1992 cut in reserve requirements was announced.

³¹The nonborrowed reserve objective or "path" is derived by subtracting the borrowing allowance from estimates of the total demand for reserves (required plus excess).

³²"Monetary Policy and Open Market Operations during 1991" examined in more detail why conflicts arise between the funds rate and the reserve estimates and how the Desk responds to these conflicts.

some settlement days borrowing was elevated³³ On several occasions when an add need was seen, the Desk even drained a small amount of reserves to make clear the current stance of policy.³⁴

Ideally, temporary conflicts between the funds rate and the reserve profile should not unduly complicate the Desk's approach to addressing reserve needs. Greater flexibility in formulating operations would allow the Desk to meet reserve needs in a period more gradually instead of having to address most of a need late in a period when arranging large-scale reserve operations can be difficult. Over time, greater tolerance for movements of the funds rate around an expected trading level might also decrease some of the attention market participants give to the rate as they try to interpret whether a movement signals a change in policy stance.

Over the final few months of 1992, market anticipation of an easing in policy diminished; however, incongruities between a soft funds rate and an estimated reserve shortage still occasionally arose. The Desk sought to use these opportunities to reestablish a degree of tolerance, eroded in the preceding few years, for discrepancies between estimates of the reserve need and trading conditions in the money market. The Desk took somewhat greater heed of the estimated reserve profile in formulating its operations, although it was careful to consider the possible information about the true reserve picture contained in market trading conditions. On several occasions, the Desk added reserves as called for by the reserve estimates even when the funds rate was a bit on the low side of the expected trading level, and at other times it took no action when the rate slipped to levels that previously might have moved it to drain reserves.

Open market operations and reserve management³⁵

Changes in the System portfolio The System's portfolio of U.S. government securities grew by \$30.2 billion in 1992, an increase just slightly below the previous year's record expansion and well above most increases in the preceding decade. As in most years, outright purchases

³³On several settlement days during the year, funds were firm even though reserves were estimated to be in surplus or at least adequate. There was little likelihood that a failure to add reserves in these circumstances would be misinterpreted as a signal that policy was being tightened. Still, the Desk usually provided extra reserves on these occasions to meet the apparent need reflected in the firm funds rate.

³⁴These operations occurred during the maintenance periods ended February 5, February 19, March 18, April 15, April 29, June 24, and August 5.

³⁵Details of portfolio changes in 1992, their causes, and the accuracy of the available forecasts of reserve supply and demand are presented in the appendix.

were concentrated in the market, although the Desk still bought a sizable amount of securities from foreign accounts. A moderate amount of securities was sold or redeemed in 1992.

The expansion of the portfolio was used almost entirely to offset the reserve drain arising from changes in operating factors. Increases in currency in circulation accounted for most of the net drain in reserves from market factors. The Federal Reserve also continued to reduce its holdings of foreign currency, a strategy that drained reserves. Required reserves were little changed on balance during the year. The impact of strong growth in the reservable components of the money supply on the level of required reserves was largely offset by the April cut in requirement ratios.

Maturity structure of the System portfolio. The composition of the Federal Reserve's portfolio of Treasury securities came under scrutiny in 1992, in part because of the attention focused on Treasury debt management strategies, described earlier. In these circumstances, the FOMC reviewed the history of the maturity structure and the principles that have guided the Desk's purchase and sale decisions.

The Federal Reserve manages its portfolio of Treasury securities in order to achieve its objectives for

Table 5

Weighted Average Maturity of Marketable Treasury Debt

Months

Year-End	Federal Reserve Holdings [†]	Total Outstanding
1960	19.3	55
1965	16.1	60
1970	23.9	40
1975	31.2	33
1976	34.2	36
1977	38.0	38
1978	47.4	44
1979	46.9	47
1980	53.7	48
1981	52.2	50
1982	48.6	47
1983	48.0	51
1984	50.4	55
1985	47.3	59
1986	43.7	62
1987	42.6	66
1988	40.5	67
1989	41.2	69
1990	38.7	68
1991	35.3	68
1992	36.2	67

[†]The effects of all outstanding temporary transactions—including repurchase agreements and matched sale-purchase transactions with foreign accounts—are excluded from the calculation of the average maturity of the portfolio.

monetary policy. The securities purchased over time have largely supported the expansion of currency, although the size of the portfolio has also been adjusted in response to changes in the level of required reserves and to movements in other factors that have absorbed or supplied reserves. During the latter half of the 1970s and early 1980s, the average maturity of the System portfolio was fairly similar to the maturity of all Treasury debt outstanding (Table 5). This similarity occurred because the composition of the Desk's purchases was shaped to some extent by the relative supplies of Treasury securities in the market. This approach also represented a fairly neutral posture in relation to the yield curve.

In the mid-1980s, the Federal Reserve considered whether its liquidity needs might be better served by holding a proportionately greater amount of short-term securities. Although the Federal Reserve rarely had occasion to sell a large volume of securities from its portfolio, it needed to provide for possible contingencies. The Fed was reminded of the value of a liquid portfolio in 1984 when Continental Illinois National Bank faced a collapse of confidence. To keep operating, the bank borrowed a massive volume of reserves from the Federal Reserve's discount window. In response, the Fed reduced its holdings of Treasury bills to avoid an undesired increase in reserves in the banking system.

For several years thereafter, the Fed managed its portfolio in a way that gradually shortened the average maturity, while the Treasury was engaged in gradually lengthening the average maturity of its debt. The Desk concentrated its market purchases in bills, and it favored shorter term issues when rolling over maturing coupon securities. The Desk's effort to enlarge its bill holdings was interrupted in 1989 when the Federal Reserve's heavy purchases of foreign currencies provided more reserves than were consistent with policy objectives. The Desk offset that reserve creation by using a combination of redemptions and outright sales to reduce its bill holdings, a process made simpler by its highly liquid portfolio.³⁶ Over the next 1½ years, the Desk replenished its bill holdings by arranging all of its market purchases in bills (although it continued to acquire coupon securities from official foreign accounts).

In 1992, the Federal Reserve concluded that the desired buildup of liquid holdings had been achieved. Consequently, the Desk began to redirect slightly more of its purchases and rollovers to the longer maturities and to purchase a more even mix of bills and coupon issues in the market; however, the changes were

intended to be modest. Consistent with this strategy, the Desk bought a record \$19 billion of Treasury coupon securities in 1992, accounting for almost two-thirds of the total net increase in the System's portfolio.³⁷ Most of the growth in coupon securities was still in issues maturing within five years, but with longer dated issues making up a somewhat greater share of issues acquired in outright market purchases of coupon securities, holdings of longer term debt also increased. As a result of these efforts, the average maturity of the System's portfolio of Treasury securities ended its downward trend and rose by about one month.³⁸

Forecasting reserves and operating factors. In formulating its reserve strategy, the Desk makes use of estimates of the demand for and supply of reserves. Forecasts of the demand for reserves are based on estimates of required reserves and expectations for excess reserve demands. Projections of the available supply of reserves are derived from forecasts of various operating factors. The accuracy of forecasts for most factors affecting reserve needs in each maintenance period usually improves as the period progresses, reflecting the availability of additional information. Still, large revisions coming late in the period do sometimes complicate the Desk's reserve management efforts.

In 1992, the accuracy of staff forecasts of operating factors generally improved moderately. Projections of the Treasury's Fed balance showed the most improvement. Staff members projecting reserves in 1992 did not have to contend with large foreign payments into the Treasury's Defense Cooperation Account for Desert Shield/Desert Storm contributions, which had proved difficult to anticipate in 1991. As usual, the largest projection errors of the Treasury balance in 1992 occurred around major tax dates.

Estimates of excess reserves were modestly better in 1992. However, if we exclude the early maintenance periods of 1991, when depositories were adjusting to sharply lower required reserve balances, the accuracy of excess reserves forecasts in 1992 was similar to that of forecasts in 1991. Meanwhile, forecast errors for required reserves were a bit larger at the beginning and in the middle of maintenance periods in 1992 than in 1991.

³⁷Because of some outright sales and redemptions of bills, the figure for coupon purchases as a share of total purchases was somewhat lower (There were no sales or redemptions of coupons.) Coupon purchases represented a considerably higher share of the total net increase in the System portfolio in 1987, when about \$17 billion of coupon securities were purchased out of a total increase of \$21 billion in the System's portfolio.

³⁸A modest extension of the average maturity of new issues acquired by the Desk in exchanges at some Treasury coupon auctions also contributed to this lengthening of the average maturity of the System's Treasury holdings.

³⁶In 1989, Treasury coupon holdings rose slightly, while the total value of the portfolio fell on net by \$10 billion. Bill sales and redemptions that year totaled \$25.5 billion (offset by \$14.5 billion of purchases)

Appendix: Desk Activity for the System Open Market Account

This appendix reviews the Trading Desk's activities on behalf of the System open market account during 1992. It begins with a discussion of the outright changes made in the System portfolio during the year and the reasons for these transactions. Then it reviews the temporary transactions that were used to affect reserve levels. Finally it reports on the accuracy of staff estimates of the demand for and supply of reserves.

Outright changes in the System portfolio

Total System holdings of U.S. government securities rose by \$30.2 billion in 1992 (Table A1), slightly below the record increase of \$31.0 billion in 1991, but well above the average annual increase over the preceding decade (even excluding 1989, when the portfolio fell). About two-thirds of the net increase was in coupon securities, reflecting an effort to achieve a modest lengthening of the average maturity of the System's portfolio. At the end of 1992, the System's holdings had reached a total par value of \$308.8 billion. Meanwhile, the Treasury's total marketable debt outstanding was rising at a similar pace, so that the System's share of that debt was about unchanged.

Bank reserve behavior

The expansion of the System's portfolio over the year was largely prompted by declines in reserves arising from movements in various operating factors. On balance, these factors drained almost \$30 billion of reserves between the maintenance periods ended January 8, 1992, and January 6, 1993 (Table A2). Currency growth of \$27 billion accounted for most of this reserve drain. The increase in currency was of record size, although its rate of growth was in line with growth rates during much of the past decade. Demand from abroad remained strong, although it was below the amounts estimated for the previous two years. In addition, strong domestic demand for currency emerged late in the year when the economy strengthened.

Changes in the System's holdings of foreign currency and certificates against special drawing rights (SDRs) also had a significant impact on the supply of reserves. Sales and a "dewarehousing" of foreign currency drained about \$6½ billion of reserves over the year (market value), and net valuation losses on the System's portfolio of foreign assets drained roughly another \$1 billion of reserves.[†] Interest earnings on foreign currency assets

[†]Revaluations of the Fed's foreign currency holdings, which occur monthly, affect the "other items" category in the tables. When the Fed sells foreign currency, the book value of the currency sold is charged against "foreign currency" holdings, and the difference between the market and book values is charged against "other items." In 1992, the market value of foreign currency holdings sold was about \$0.75 billion greater than the acquisition value.

totaling \$2 billion partly offset this drain. A demonetization of SDR certificates initiated by the Treasury in December to meet an International Monetary Fund quota increase drained \$2 billion of reserves.

Most of the decline in the System's foreign currency holdings stemmed from a series of off-market transactions conducted directly between the Federal Reserve and the Bundesbank.[‡] The Treasury's Exchange Stabilization Fund also dewarehoused the remaining \$2 billion equivalent of its foreign currency holdings at the Fed in April. Net intervention in July and August in support of the dollar against the German mark decreased the Fed's foreign currency portfolio by a further \$635 million equivalent (market value).

Responding to cuts in the reserve requirement ratios that occurred in the past two years, depository institutions increased their holdings of required clearing balances by almost \$2 billion during the year in order to increase their reserve balances at the Fed. For convenience, these balances are treated as an operating factor and are included in the "other items" category in Table A2. In this framework, an increase in these balances lowers the supply of reserves coming from "other items." In fact, required clearing balances are a source of demand for reserves.

Other determinants of reserve supply and demand showed more modest changes on balance. Various operating factors provided net additions to reserves. Mean-

[‡]The Federal Reserve sold a total of about \$3.75 billion (market value) of German marks to the Bundesbank on May 20 in a spot and several forward transactions. The details of these transactions are provided in "Treasury and Federal Foreign Exchange Operations, May-July 1992," Federal Reserve Bank of New York *Quarterly Review*, Autumn 1992.

Table A1

Summary of Holdings in System Portfolio

Billions of Dollars

	Year-End 1992	Change during	
		1992	1991
Total holdings	308.8	+30.2	+31.0
Bills	150.2	+11.5	+20.0
Coupons	153.2	+19.4	+11.3
Agency issues	5.4	-0.6	-0.3

Notes: Values are on a commitment basis. Changes in holdings are from year-end to year-end. Figures may not add because of rounding.

Appendix: Desk Activity for the System Open Market Account (Continued)

while, strong growth in the reservable deposit components of M1 during the year largely offset the effects of the April 1992 cut in reserve requirement ratios on the level of required reserves. Consequently, the level of required reserves was about unchanged at the end of 1992 from its year-earlier level. Levels of excess reserves around the last two year-ends were similar.

Adjustment borrowing at the end of 1992 was down from the elevated level over the previous year-end. Seasonal borrowing was relatively low, and borrowing under the extended credit program was virtually nil throughout

the year.

Outright transactions

The Trading Desk conducted outright operations when reserve projections showed a large, sustained need to add or drain reserves. The overall volume of outright transactions in 1992 was well above the volume in the preceding year, even though the net expansion of the System's portfolio in each of the two years was similar (Table A3). The total size of outright transactions in 1991 had been depressed by the almost complete absence of

Table A2

Reserve Measures and Factors Affecting Reserves

Bank Reserves (Millions of Dollars)	Maintenance Period	Change during	
	Ended January 6, 1993	1992†	1991‡
Nonborrowed reserves			
Excluding extended credit	57,405	768	1,858
Including extended credit	57,405	767	1,838
Extended credit borrowing	—	-1	-21
Borrowed reserves			
Including extended credit	269	-252	226
Adjustment plus seasonal	269	-252	247
Adjustment	257	-242	266
Seasonal	12	-10	-19
Required reserves§	56,288	268	4,540
Excess reserves	1,385	247	2,455
System Portfolio and Operating Factors (Billions of Dollars)¶			
System portfolio	308.8	30.2	31.0
Operating factors			
Foreign currency**	18.7	-3.9	-4.9
U.S. currency	334.3	-27.1	-20.6
Treasury balance	7.3	2.2	-2.1
Float	2.5	1.7	-2.0
Special drawing rights	8.0	-2.0	—
Gold deposits	11.1	0.0	—
Foreign deposits	0.2	-0.3	0.2
Applied vault cash	31.1	1.5	0.7
Other items	17.6	-1.2	-2.3
Foreign repurchase agreement pool**	7.3	-0.6	—

Note: Figures may not add because of rounding.

†Change from maintenance period ended January 8, 1992, to that ended January 6, 1993.

‡Change from maintenance period ended January 9, 1991, to that ended January 8, 1992.

§Not adjusted for changes in required reserve ratios.

¶Sign indicates impact of changes in operating factors on bank reserves.

**Acquisition value plus interest earnings. Revaluations of foreign currency holdings are included in "other items."

**Includes customer-related repurchase agreements.

Appendix: Desk Activity for the System Open Market Account (Continued)

outright sales or redemptions of securities to meet the seasonal reserve overage that typically occurs in the first months of calendar years.[§] Early in 1992 the Desk did redeem a modest amount of Treasury bills at some of the weekly auctions and sold some bills to foreign accounts.

Most outright purchases of securities were arranged in the market, and more than half of these were for coupon issues, largely reflecting the desire to achieve a modest extension of the average maturity of the System's portfolio. In fact, coupon purchases accounted for three of the six occasions on which the Desk entered the market to buy securities outright in 1992.^{||} Over the preceding two years, the Desk had arranged to buy coupons in the market only once.

The Desk continued to arrange a sizable amount of its outright transactions with foreign accounts when orders were compatible with estimated reserve needs. However, the volume of these transactions in 1992 was substantially below the previous year's level, which had been lifted by heavy sales of Treasury securities by foreign institutions raising funds to pay for their Desert Shield and Desert Storm obligations. Almost all transactions arranged with foreign institutions in 1992 were for purchases by the Desk. Over one-half of these purchases were of coupon securities.

The Desk restricted its activities in federally sponsored agency securities to rolling over maturing issues if a suitable replacement was available, but it redeemed modest amounts when new issues were not offered or when offerings were smaller in size than the maturing issue. As a result, in 1992 the volume of outstanding federal agency securities in the System's portfolio continued its downward trend for the twelfth consecutive year.

Temporary transactions

The Desk arranges self-reversing transactions to meet temporary reserve needs. The frequency with which

[§]A substantial share of the seasonal reserve surplus forecast for early 1991 had been addressed in late 1990 when the cut in reserve requirements prompted the Desk to drain large amounts of reserves; moreover, an unusually high Treasury balance through February 1991 reduced the size of the reserve surplus at that time.

^{||}The Desk bought \$3.2 billion of bills on May 27, \$3.5 billion of coupons on June 2, \$3.7 billion of coupons on September 1, \$3.9 billion of bills on October 27, \$5.0 billion of coupons on November 18, and \$2.5 billion of bills on December 15. Although the Desk usually buys securities outright in the market in April to meet a seasonal reserve need, the cut in reserve requirement ratios had sharply reduced the size of this need in 1992. Consequently, no outright market purchase took place in the month.

such transactions were arranged in 1992 was in line with earlier experience, but the distribution of their cumulative value was more heavily weighted than usual toward adding rather than draining reserves (Table A4). Furthermore, the Desk arranged multiday System RPs more often than in recent years, and these operations

Table A3

System Outright Operations by Type of Transaction and by Counterparty

Billions of Dollars

	1992	1991
Total outright	37.9	31.8
By type of transaction		
Purchases	34.1	31.4
Bills	14.7	20.2
Coupons	19.4	11.3
Sales	1.6	0.1
Bills	1.6	0.1
Coupons	0.0	0.0
Redemptions	2.2	0.3
Bills	1.6	0.0
Coupons	0.0	0.0
Agency issues	0.6	0.3
By counterparty		
Total outright in market	21.9	10.4
Purchases	21.9	10.4
Bills	9.7	8.1
Coupons	12.3	2.3
Sales	0.0	0.0
Bills	0.0	0.0
Coupons	0.0	0.0
Agency issues	0.0	0.0 [†]
Total outright with foreign accounts	13.8	21.2
Purchases	12.2	21.1
Bills	5.1	12.1
Coupons	7.1	9.0
Sales	1.6	0.1
Bills	1.6	0.1
Coupons	0.0	0.0

Note: Values are on a commitment basis. Figures may not add because of rounding.

[†]One sale totaling \$5 million occurred during the year, but the rounded value is zero.

Appendix: Desk Activity for the System Open Market Account (Continued)

accounted for an unusually large share of the total value of all temporary reserve injections. Often a large portion of the value of these multiday RPs was withdrawn by dealers ahead of the original maturity date, and the Desk frequently had to follow up with another temporary reserve addition as a result. On several occasions when the Desk saw a particularly deep reserve need, a multi-day RP was made nonwithdrawable.^{††}

The number of matched sale-purchase transactions (MSPs) arranged in the market in 1992 was on the low side of the range established in recent years, and the cumulative value of these transactions was well below recent levels. The relatively small number and size of MSPs arranged in 1992 arose in part because few maintenance periods in the year were marked by large reserve surpluses. Only a small number of the MSP transactions had maturities exceeding one business day.

The Desk typically announced to the market at around

11:30 a.m. any intention either to add or drain reserves that day. On one occasion, when high projected levels of the Treasury's Fed balance led to a deep estimated daily reserve deficiency, the Desk acted to ensure adequate propositions by announcing a day in advance its intention to arrange multiday System RPs. On two days ahead of holidays late in the year when the market was scheduled to close early and the Desk faced sizable estimated reserve needs, it entered the market ahead of its usual intervention time to ensure adequate propositions.

Forecasting reserves and operating factors

In formulating a strategy for meeting reserve needs, the Desk took into account potential revisions to the estimated demand for and supply of reserves. Faulty projections can hamper the formulation of an effective strategy, especially when they occur late in a maintenance period, because they can necessitate large reserve operations. During 1992, the accuracy of staff forecasts of excess reserves and of operating factors improved relative to 1991, while required reserve forecasts were less accurate.

^{††}Nine of the fifty-two multiday System RPs arranged in 1992 were nonwithdrawable. The corresponding number in 1991 was three.

Table A4

System Temporary Transactions

Billions of Dollars

	1992		1991	
	Number [†]	Volume	Number [†]	Volume
Repurchase agreements				
System	80	392.9	63	332.9
Maturing next business day	28	120.0	32	167.4
Term	52	273.0	31	165.5
Customer-related	64	140.4	79	175.8
Matched sale-purchase transactions				
In-market	20	28.6	33	75.3
Maturing next business day	17	23.0	29	66.8
Term	3	5.7	4	8.4
With foreign accounts [‡]	253	1453.8	251	1495.2
Total temporary transactions	417	2015.8	426	2079.1
In-market	164	562.0	175	583.9

Note: Figures may not add to totals because of rounding.

[†]Number of rounds. If the Desk arranged repurchase agreements with two different maturities on the same day, the agreements are treated as one round. The Desk arranged such multiple agreements on one day in 1992 and at no time in 1991.

[‡]Volumes exclude amounts arranged as customer-related repurchase agreements.

Appendix: Desk Activity for the System Open Market Account (Continued)

(Table A5) **

On the demand side, the forecast errors for required reserves were a bit larger early and in the middle of maintenance periods than in 1991. By the final day of the period, the size of these projection misses usually had narrowed considerably and, on average, was about unchanged from the previous year. Nonetheless, sizable revisions resulting from unexpected deposit flows around large tax payment dates or holidays occurred very late in several maintenance periods.

The excess reserves forecasting performance improved in 1992, largely because excess demand had been particularly difficult to predict in early 1991 when operating balances had been unusually low ^{§§}. The actual behavior of excess reserves remained uncertain and

volatile in 1992, and numerous informal adjustments were made to the formal allowance during the year ^{¶¶}. An elevated level of carry-ins contributed to this volatility ^{†††}. The formal allowance for excess reserves was held at \$1 billion during most of 1992. It was raised during the February 5 period to reflect expected pressures from low operating balances, and again at the start of the April 15 period when the cut in reserve requirements took effect, although the expected high demand for excess in this later period did not materialize.

On balance, the forecasts of operating factors were more accurate at the beginning and middle of maintenance periods than in 1991, despite a jump in the variability of operating factors from period to period. The accuracy of the forecasts by the final day of the period

**The Trading Desk uses forecasts of required reserves, excess reserves, and operating factors made by staffs at the Federal Reserve Bank of New York and the Board of Governors. The Desk also takes into account a forecast of the Treasury's Federal Reserve balance, an operating factor, made by the Treasury staff.

§§Forecast errors for excess reserves are calculated using projections of the demand for excess reserves made by the New York and Board staffs. These projections are not usually incorporated in the formal allowance for excess reserves built into the Desk's reserve objective. The measurement of the forecast errors of the demand for excess reserves is imprecise because the projections are compared with actual holdings of excess reserves in a period. Excess reserves exposure can be affected by unexpected movements in reserve supplies occurring on the final day, or by the Desk's

Footnote ^{§§} continued

decisions to over- or under-provide reserves in response to other considerations. Finally, the calculation of forecast errors of the demand for excess reserves does not take account of the informal adjustments to the forecasts the Desk frequently makes on the basis of carry-ins or the observed pattern of excess reserve holdings to date in a period.

¶¶The average period-to-period change in excess reserves in 1992 was \$362 million. This amount was well below the level for all of 1991, but a bit above last year's average level if one excludes the first few periods in 1991, when banks were dealing with exceptionally low operating balances.

†††The average absolute level of carry-ins at large banks in 1992 was \$96 million, compared with \$72 million the previous year and \$56 million in 1990.

Table A5

Approximate Mean Absolute Forecast Errors for Various Forecasts of Reserves and Operating Factors

Millions of Dollars

	1992			1991		
	First Day	Midperiod	Final Day	First Day	Midperiod	Final Day
Reserves						
Required	350-365	245-270	80	290-320	165-200	70-80
Excess†	220-245	210	—	300-335	215-250	—
Factors						
Treasury	1005-1095	385-465	60-85	1200-1285	590-815	50-60
Currency	700-830	240-330	45-50	865-885	480-660	40-45
Float	355-430	140-215	20-40	325-410	160-170	15-20
Pool	180-190	135	35-45	230-280	125-150	40-50
Pool	245	140	10	330	115	10

Note: Ranges indicate varying degrees of accuracy by the New York Reserve Bank and Board of Governors Staffs.

†The reported forecast errors overstate the degree of uncertainty about excess reserves. The Desk supplements beginning-of-period and midperiod forecasts with informal adjustments that are based on the observed pattern of estimated excess reserve holdings as each maintenance period unfolds.

Appendix: Desk Activity for the System Open Market Account (Continued)

was about the same as in the previous year.

Most of the improvement in the forecast accuracy for total market factors resulted from more accurate projections of the Treasury's balance at the Federal Reserve. The improvement was achieved even though the mean absolute period-to-period change in the Treasury's Fed account was about the same in 1992 as in the previous year. Some of the improvement in these forecasts stemmed from the absence in 1992 of large foreign official payments into the Treasury's Defense Cooperation Account for Desert Shield and Desert Storm expenses; uncertainty over the timing of these payments contributed to large errors in 1991. In addition, Resolution Trust Corporation outlays, which have proved to be very unpredictable, declined in 1992.

As usual, the majority of the largest projection misses occurred following major filing deadlines for individual nonwithheld and corporate taxes. The timing and size of the Treasury's revenue flows were often uncertain during these periods; moreover, the Treasury's total cash holdings often exceeded the capacity of the Treasury's tax and loan accounts in the banking system, thus causing large remittances that swelled the Fed balance^{***}. By far, the largest start-of-the-period projection miss in 1992 occurred in September, when unexpectedly high tax receipts led to a \$6 billion period-average error.

To deal with the greater volatility in cash balances after tax dates and to guard against inadvertent overdrafts, the Fed and Treasury changed their standard procedure for administering the Treasury's Fed account in the two weeks following major tax deadlines. The change was precipitated by an exceptionally large daily forecast miss one day in the period ended April 29 that left the Treasury balance at a very low level (\$1.9 billion). For the remainder of that period, the Treasury and the Desk raised the "targeted" level of the Treasury balance at the Fed from its usual \$5 billion level to \$6 billion. Subse-

quently, the Fed and the Treasury agreed to lift the targeted level of the Treasury balance to \$7 billion for the two weeks or so following all major tax dates.

Initial errors in forecasting the size of the pool of temporary foreign investments decreased in 1992 from 1991. During 1991, foreign official institutions had often invested funds in the temporary pool with little advance notice, and had later paid the funds to the Treasury's Defense Cooperation Account. These unexpected investments had caused some large projection misses. In the absence of these payments in 1992, the forecast accuracy returned to more normal levels.

An additional factor that contributed to forecast errors in 1992 was the premium or discount paid on reserve transactions undertaken by the Desk. A premium or discount arises when the par value of the securities exchanged in either a temporary or an outright transaction differs from the market value. The actual reserve impact is determined by the market value of the securities—price plus accrued interest—less a margin to protect against price declines in the case of RPs. The formal measure of the reserve impact of an operation is based on the par value of the securities traded. The difference between the par value and the cash amount shows up as a forecast miss in the "other items" component of non-borrowed reserves on the day following a reserve operation. At the start of each maintenance period, the projections of this market factor make no allowance for any possible discount or premium, even in periods when large reserve operations are anticipated. Falling interest rates during the past two years lifted the prices of many outstanding issues with large coupons above par, enlarging the average premium in 1992. Consequently, the actual reserve impact of reserve addition operations often exceeded by a substantial margin the initial calculation based on the par value of securities acquired. In 1992, net premiums on securities held under RP averaged about 5 percent of the value of these operations. When deciding the par value of securities to accept under RP, the Desk often made an informal allowance for the likely size of the premium.

^{***}The Treasury's Fed balance was above its "target" level because of capacity limitations on about twenty business days in 1992, down considerably from about fifty days in 1991. In 1990, the number was fifteen.