Monetary Policy and Open Market Operations during 1987

Monetary policy in 1987 sought to sustain moderate economic growth against a backdrop that often included heightened concerns about inflation, stimulated in part by sharp declines in the dollar in foreign exchange markets, and considerable volatility in equity and bond markets, dramatized by the unprecedented decline in stock prices in October. The movements in the dollar reflected disappointment that the U.S. trade deficit was not yet declining in nominal terms despite the earlier weakening of the dollar, and limited success in adjusting fiscal policy in the U S. and economic policies abroad to restore better balance to the world economy. Reserve pressures were increased somewhat between April and September from their minimal 1986 levels to counter inflationary developments, while also helping to stabilize the dollar in the foreign exchange markets. In addition, in early September, the discount rate was raised by one-half percentage point to 6 percent.

The policy climate was dramatically altered by the steep decline in stock prices on October 19. There was unusual uncertainty about the implications for future economic activity, and financial market volatility intensified. The desire for safety and liquidity supported the Treasury market, but normal position financing was disrupted by concerns over the financial condition of securities houses and others seeking to borrow. In the weeks that followed, the Desk responded by reducing the degree of reserve pressure noticeably and providing reserves flexibly, consistent with Chairman Greenspan's pledge that the Federal Reserve would ensure adequate liquidity in the markets in the unsettled environment. Greater weight than usual was given to money market conditions to help facilitate the return to a more normal functioning of financial markets. Growth in nonborrowed reserves surged in late October as open market operations accommodated a large increase in required reserves associated with a sharp rise in transactions deposits, substantially enlarged desires for excess reserves, and an increased reluctance to use the discount window. By late December, policy implementation began to work back towards a more normal approach to reserve provisions oriented toward achieving the reserve objectives However, reserve management remained sensitive to a lingering reluctance to borrow and the fragile conditions in the financial markets.

Growth of the monetary aggregates decelerated in 1987 from the rapid rates of 1986, in part reflecting higher market interest rates. The higher interest rates helped income velocity of the monetary aggregates to rise after declining in recent years. From 1986-IV to 1987-IV, M2 and M3 expanded 4.1 and 5.4 percent, respectively, placing M2 substantially below, and M3 close to the bottom of, their corresponding growth ranges established by the FOMC, while M1 expanded

Adapted from a report submitted to the Federal Open Market Committee by Peter D Sternlight, Executive Vice President of the Bank and Manager for Domestic Operations of the System Open Market Account Sandra Krieger, Chief, Open Market Analysis Division, was primarily responsible for preparation of this report, working under the guidance of Ann-Marie Meulendyke, Manager, Open Market Operations Department Jeremy Gluck, an economist in the Open Market Analysis Division, also contributed to the writing of the report Other members of the Open Market Analysis Division assisting in the preparation were Robert Van Wicklen, Jack Krafcheck, Debra Chrapaty and Martin Gonzalez Peter Rappoport, an economist from the Domestic Research Department, also assisted in the production of the report

5.9 percent.[1] The slower growth of the broader aggregates was viewed as acceptable, given the course of economic activity, inflation, and exchange rates. Growth of real GNP picked up to 4.0 percent on a fourth quarter over fourth quarter basis, extending the latest economic expansion into its fifth year. The rate of inflation accelerated relative to 1986, although it showed some moderation over the second half of the year. Measured from year-end to year-end, the trade-weighted value of the dollar fell about 18 percent over 1987.

Concerns over the outlook for inflation and for the demand for dollar-denominated assets lifted yields, on balance, in 1987. Yields on most fixed-income securities rose between late March and mid-October with only a temporary respite midway through the year, while they reversed course following the steep drop in equity prices. Inflation apprehensions heightened in late March and again in late summer in the face of rising levels of resource utilization and sharp declines in the dollar. Increases in prices of oil and other commodities contributed to the inflation concerns. There were also worries about protectionist measures, brought to the surface in March by the announcement of certain U.S. trade sanctions against Japan. Yields continued to rise after the Federal Reserve's firming actions in September as market participants appeared to anticipate further domestic monetary tightening in an environment of firmer policies abroad and pessimistic outlooks for the dollar and inflation.

Yields on investment-grade securities fell precipitously after the mid-October drop in equity prices. Although the markets were quite volatile for a time, overall, yields held much of their declines through year-end as most participants revised down their outlooks for economic growth and inflation. Rate cuts abroad also helped to reduce tensions in the financial markets. While Congress' struggles to bring down future budget deficits also were viewed positively, additional rate declines were tempered by the limited results of its efforts. The dollar came under renewed downward pressure in late December, setting new lows by year-end, but upward pressure on yields was checked by the uncertain prospects for economic growth in 1988 and the growing belief that in such circumstances the Federal Reserve would not respond to the dollar weakness by raising interest rates.

Some special factors affected the technical implementation of policy during the year. Reserve management was complicated by wide and uncertain swings in the Treasury's balance at the Federal Reserve. An unprecedented increase in April tax payments and heightened uncertainty over corporate tax flows at other times during the year contributed to the volatility and uncertainty surrounding Treasury cash balances; tax flow patterns were distorted by adjustments to the Tax Reform Act of 1986. Congress' delay in taking action to raise the debt ceiling also complicated reserve management, as the Desk had to respond to the indeterminate scheduling of postponed auctions and take account of the reserve effects of security paydowns.

The monetary aggregates

Growth of the monetary aggregates slowed markedly in 1987. Demand for monetary assets and credit moderated as interest rates rose, rate incentives favored market instruments, and businesses and consumers adjusted to the new tax laws. The slower growth was associated with a strengthening of velocity and was acceptable to the Committee in view of the continuing expansion in business activity and concerns about potential inflationary pressures. Over the four quarters of the year, M2 and M3 grew 4.1 and 5.4 percent, respectively, while M1 grew 5.9 percent (Chart 1). The debt aggregate grew 9.6 percent. The income velocities of M2 and M3, after declining by 4.1 percent in 1986, grew 3.2 and 1 9 percent, respectively, while M1 velocity grew 1.4 percent (Chart 2). The rate of decline of the velocity of the debt aggregate moderated relative to 1985 and 1986 to 2.0 percent.

Monetary policy in 1987 was guided by the desire to foster monetary growth consistent with continued progress over time in reducing the underlying rate of inflation while supporting orderly economic growth and contributing to an improved pattern of international transactions. In line with these objectives, in the February evaluation of the 1987 monetary growth ranges that were set tentatively the preceding July, the FOMC affirmed the one-half percentage point reduction from the previous year's growth ranges for M2 and M3, to $5\frac{1}{2}$ to $8\frac{1}{2}$ percent, measured from 1986-IV to 1987-IV. The actual outcome was expected initially to be close to the middle of the ranges and near the anticipated growth in nominal income, assuming reasonably stable

[1]All money growth rates cited in this report are based on the data available before the benchmark and seasonal revisions in February 1988 The earlier data were used because they represent the information available to the FOMC members at the time that their decisions were being made Over the four quarters of 1987, the revisions raised the growth rate of M1 by 0 3 percentage point to 6 2 percent, lowered the growth rate of M2 by 0 1 percentage point to 4 0 percent, and left the growth rate of M3 at 5 4 percent The relatively large revision to M1 primarily reflected redefinitions to make the treatment of thrift institutions identical with that of commercial banks in the construction of the monetary aggregates Under the new definitions, all vault cash at thrifts and thrift transactions deposits held at banks are excluded from M1 The redefinitions had no effect on levels of M2 and M3

The intra-yearly growth patterns of the aggregates were modified slightly by the revisions When the revised data were used, quarterly M1 growth was weaker in the first quarter and stronger thereafter, while quarterly growth rates of M2 and M3 were stronger in the first half of the year and weaker in the second

Chart 1A

M2: Levels and Target Ranges

Cones and Tunnels

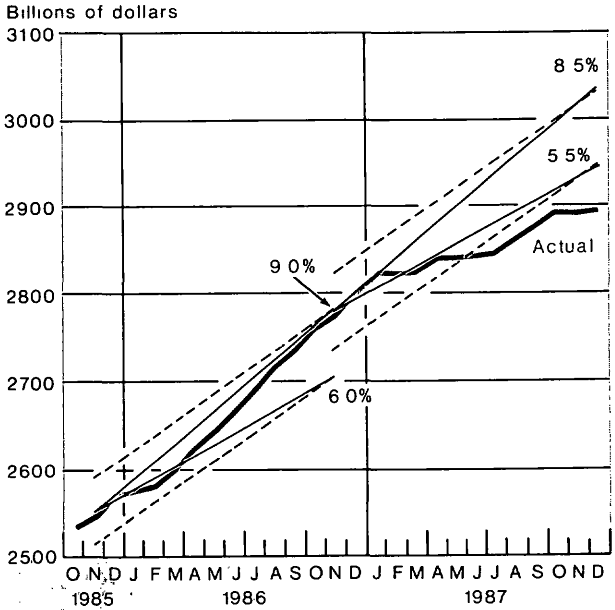


Chart 1B

M3: Levels and Target Ranges

Cones and Tunnels

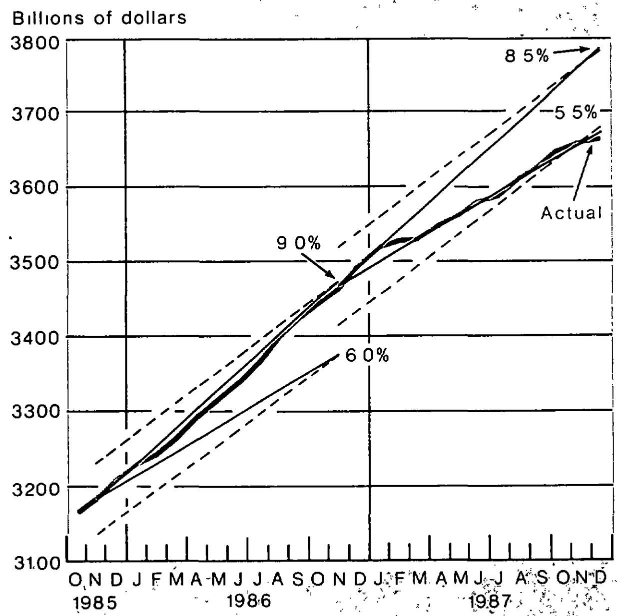


Chart 1C

Total Domestic Nonfinancial Debt Levels and Monitoring Ranges

Cones and Tunnels

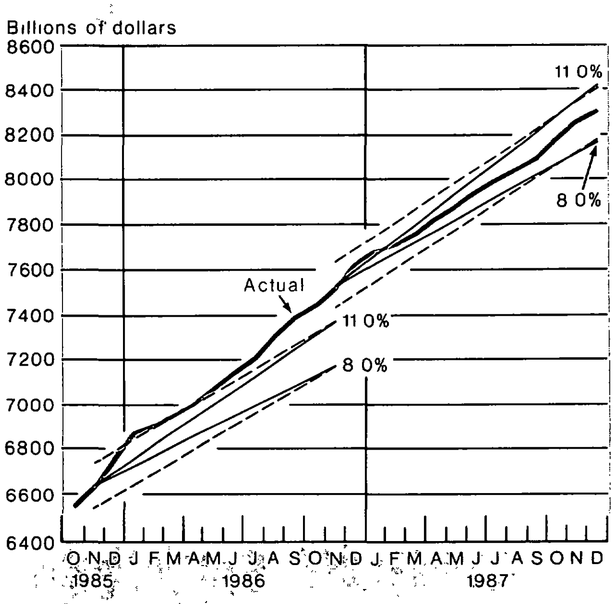


Chart 1D

M1 Levels

Cones and Tunnels

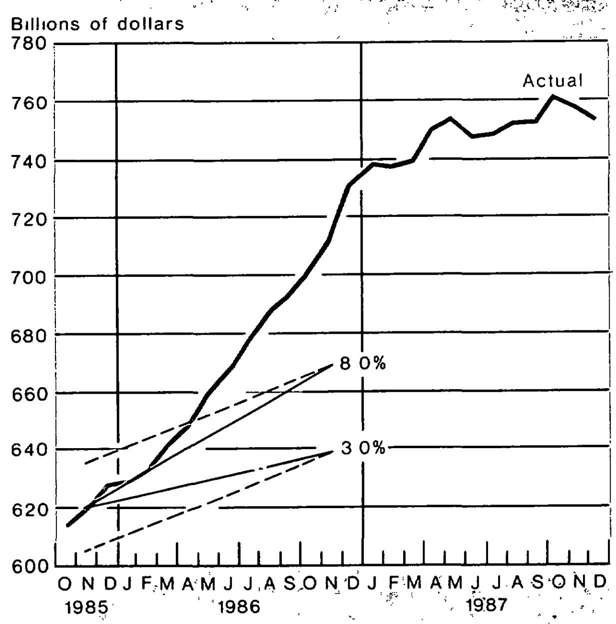
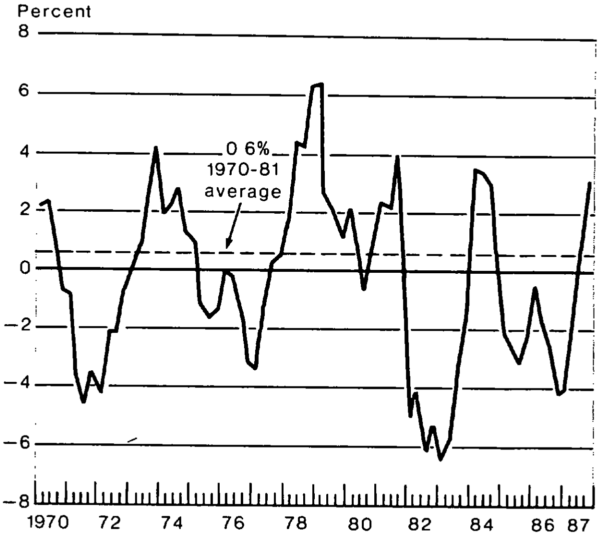


Chart 2A

M2 Velocity Growth*

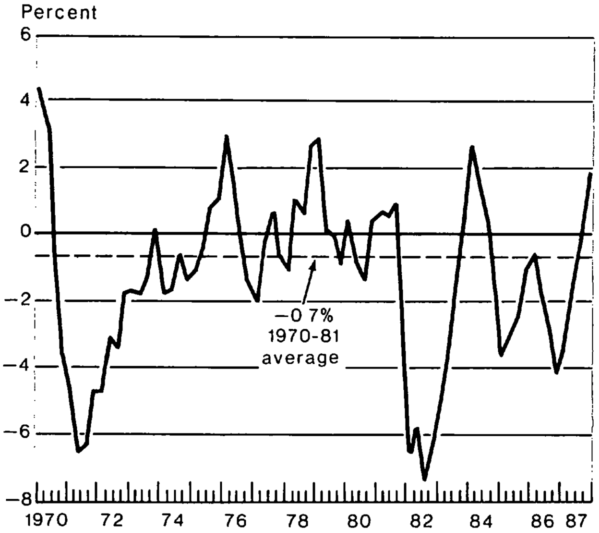


*Growth from four quarters earlier

Shaded areas represent periods of recession as defined by the National Bureau of Economic Research

Chart 2B

M3 Velocity Growth*

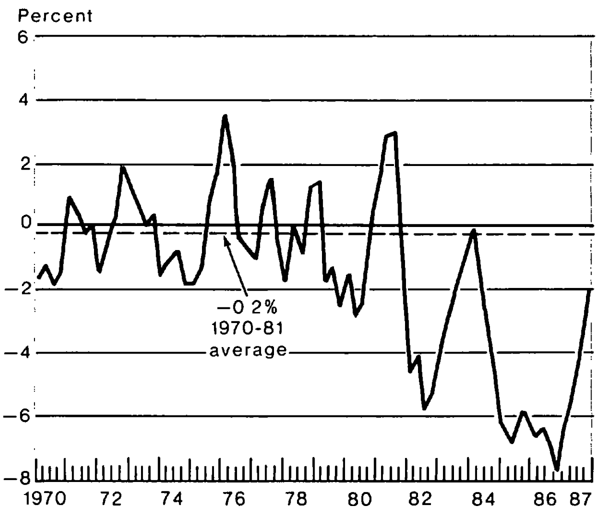


*Growth from four quarters earlier

Shaded areas represent periods of recession as defined by the National Bureau of Economic Research

Chart 2C

Total Domestic Nonfinancial Debt Velocity Growth*

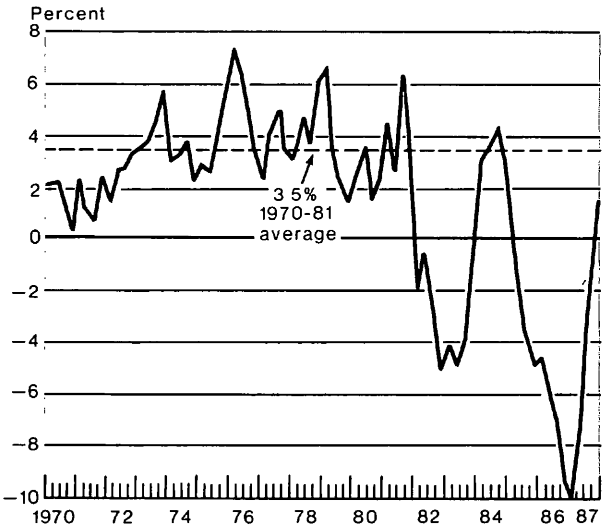


*Growth from four quarters earlier

Shaded areas represent periods of recession as defined by the National Bureau of Economic Research

Chart 2D

M1 Velocity Growth*



*Growth from four quarters earlier

Shaded areas represent periods of recession as defined by the National Bureau of Economic Research interest rates. The Committee continued to monitor the growth of total domestic nonfinancial debt and reaffirmed the range of 8 to 11 percent for 1987 set tentatively the previous July. It noted that growth of total debt was likely to moderate considerably in 1987 while remaining in excess of the expansion in nominal GNP.

The FOMC anticipated that M1 growth would slow in 1987 from its very rapid pace in 1986 but elected not to establish a numerical range for it, given the earlier unpredictability of M1 behavior relative to economic activity. This development reflected the aggregate's heightened sensitivity to interest rates since the deregulation of deposit rates and the related increase in the use of interest-bearing components of M1 as a repository for savings as well as transactions funds. The Committee agreed to evaluate the appropriateness of changes in M1 in the context of developments in the economy and financial markets. It also foresaw the possibility of targeting M1 growth from time to time during the year, depending on the circumstances prevailing then, including the behavior of the broader monetary aggregates.

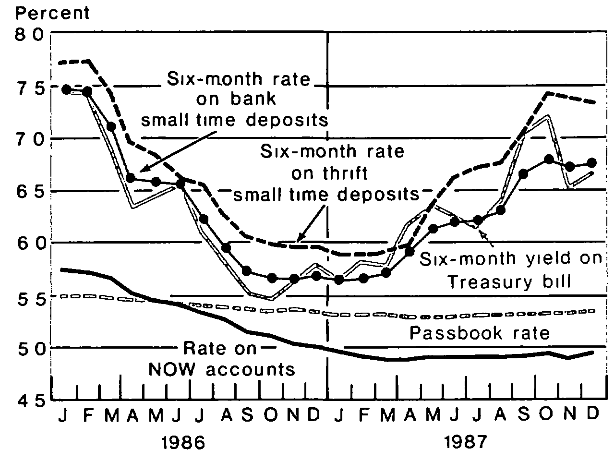
As anticipated, growth of the monetary aggregates slowed over the first half of the year, partly reflecting an unwinding of the late 1986 buildup in transactions deposits and bank credit that had been prompted by incentives to complete certain types of transactions before the new tax law took effect in January 1987. The reduced demand for household-type M2 assets may also have reflected adjustment to changes in the tax treatment of interest on installment credit to the extent that it encouraged individuals to pay down most types of consumer debt and to finance expenditures out of liquid assets rather than with credit. The moderation in monetary growth also reflected the lagged response of bank deposit rates to the upward movements in market rates that began in April. Growth of M3 was affected additionally by banks' increased reliance on funding sources outside of this aggregate, such as foreign branch deposits and balances in the accounts held for the Treasury.

During May, deposits within M2 began to shift towards longer term retail accounts as rates on time deposits adjusted more promptly to rising market rates than did returns on more liquid instruments (Chart 3) Small time deposits began to build up, after having declined for about a year in a climate of generally falling rates. Inflows to small time deposits were strongest at thrift institutions, reflecting relatively more attractive offering rates and, in some cases, aggressive bidding from institutions encountering difficulties in issuing large uninsured time deposits. Meanwhile, growth in savings deposits slowed, while money market deposit accounts continued to post declines as had been their pattern since February.

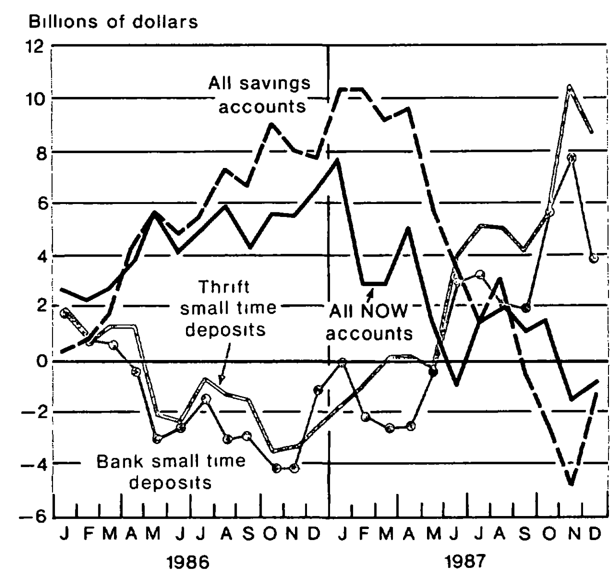
Growth in transactions deposits slowed over the first part of the year to a pace not seen since 1984, the last time interest rates had risen on a sustained basis. Between January and March, demand deposits reversed their extraordinary rise of late 1986 while inflows to other checkable deposits moderated. In April, a surge in M1 deposits appeared to reflect a buildup of checking balances by individuals to pay tax liabilities that were

Chart 3

Consumer Deposit Rates versus Treasury Bill Rates



Changes in Selected Consumer Deposits



enlarged by the extra capital gains realized in late 1986. Once tax payments were completed, M1 growth slowed again, reflecting the increases in money market rates that raised the opportunity cost of holding checkable deposits and reduced business' compensating balance requirements. From 1986-IV through June, M1 grew at a 7.6 percent annual rate and the rate of decline of its income velocity slowed compared to 1985 and 1986.

By June, M2 was below, and M3 about at the bottom of, the Committee's annual growth ranges. Over the first half of the year, growth in M2 and M3 fell short of the expansion of nominal GNP, and their velocities consequently rose (1987-II over 1986-IV) after having declined sharply in 1986. Growth of the debt aggregate, which was within its monitoring range, outpaced that of GNP but was more moderate than in 1986.

When monetary behavior was reviewed at midyear, the Committee did not change the annual growth ranges for 1987. It noted that growth in the broader aggregates around the lower ends of their annual ranges might be appropriate, and even slower growth in M2 might be acceptable, depending on developments with respect to velocity and inflation and provided that economic activity was expanding at an acceptable pace. With regard to M1, the Committee decided not to set a specific target range for the second half of the year It noted the aggregate's continued sensitivity to changes in interest rates, illustrated by its sharp deceleration in the first half of the year, and the still limited experience with the behavior of deregulated transactions accounts. However, it agreed to take account of M1 growth, in the context of prevailing circumstances, in reaching operational decisions over the balance of the year.

The aggregates grew modestly on balance over the second half of the year. In August, the decline in demand deposits moderated, while inflows to other checkable deposits increased. M2 was lifted relative to M1 by strength in overnight repurchase agreements (RPs) at banks and renewed growth in noninstitutional money funds, with the latter continuing into September. Banks increased their overnight RP commitments sharply in August in line with growth in their acquisition of Treasury securities for trading accounts. M3 was supported by stronger M2 as well as by faster growth in term Eurodollars in August and September.

Growth of the aggregates was boosted again in October as the drop in stock prices prompted moves to short-term liquid assets. Demand deposits surged in association with the huge increase in financial transactions that accompanied the turmoil in the markets. Inflows to time deposits and money market funds swelled, presumably with money withdrawn from the stock market. Meanwhile, MMDAs and savings deposits declined further.

As market conditions steadied over the remainder of the year, weakness in the underlying demand for most types of deposits and credit became apparent again. Checkable deposits more than reversed their October increase, and M1 declined in November and December. M2 ended the year substantially below its annual range, while M3 was about at the bottom of its range. Domestic debt remained within its monitoring range.

The economy and financial markets

The economy

Growth in economic activity accelerated in 1987, the fifth year of one of the longest expansions in U.S. history. Real growth was better balanced across sectors than in 1985 and 1986, with agriculture, mining, and manufacturing benefiting from improvements in their competitive positions in overseas markets. From 1986-IV to 1987-IV, real GNP increased by 4.0 percent, compared to 2 2 percent in 1986. Business inventory investment surged, after having declined somewhat in 1986, and accounted for almost half of the increase in total output. By contrast, final sales slowed dramatically after having outpaced the increase in total output a year earlier. Overall growth was fairly evenly distributed across the four quarters of the year, in contrast to 1986 when growth spurted in the first quarter and was quite modest thereafter.

Final sales added 2.0 percentage points to real GNP over the four quarters of 1987, compared with 2.6 percentage points a year earlier. Over the four quarters of the year, consumption rose by a modest 1.0 percent compared with a 4.1 percent gain in 1986, reflecting in part smaller increases in real disposable income. Consumer spending pulled back somewhat in the first quarter after a strong showing in 1986, ahead of changes in 1987 tax laws that ended sales tax deductions for income tax purposes in addition to limiting tax deductions for installment credit interest. A renewed retrenchment was apparent as the fourth quarter of the year began but likely was deepened by the subsequent scaling back of some auto sales incentives and the decline in the stock market.

Net exports and nonresidential fixed investment increased over the four quarters of 1987, after having declined in 1986. Export growth picked up strongly through another year of dollar depreciation. On an annual average basis, the growth of total imports slowed, reflecting a decline in the first quarter and relatively moderate growth thereafter. Government purchases in 1987 increased by less than in 1986, although they rose sharply in the fourth quarter, boosted by year-end placement of crops with the Commodity Credit Corporation.

Employment on a fourth quarter over fourth quarter basis increased 2.8 percent in 1987, moderately more than in 1986, and grew substantially faster than the civilian labor force. Manufacturing employment showed strong gains in the second half of the year, following modest increases beginning in late 1986 and declines between about mid-1984 and mid-1986. The civilian unemployment rate declined from 6 8 percent in the fourth quarter of 1986 to 5.9 percent in the final quarter of 1987. Despite the tightening labor market, wage pressures remained subdued, with nonfarm business compensation per hour increasing only by 2.8 percent, less than the 3.4 percent increase the previous year. Meanwhile, nonfarm business output per hour grew by 1.2 percent, somewhat less than in 1986.

The rate of price increase in 1987 exceeded that in 1986, but after a sharp rise in the first quarter, inflation moderated. Over the four quarters of 1987, the implicit GNP deflator rose 3.3 percent compared with an increase of 2.2 percent in the previous year. The consumer price index rose by a more substantial 4 4 percent, well above the 1.3 percent pace of 1986, when it had been held down by declining energy prices

The 1987 fiscal year Federal budget deficit declined to $150 billion from $221 billion in 1986. However, slightly more than half of the decline came from one-time effects, including transitional aspects of tax reform and asset sales. Stronger growth in the economy increased income-related revenues in fiscal year 1987 while declines in interest rates and restrained cost-of-living adjustments helped to control the increase in outlays.

Measured in current dollars, the merchandise trade deficit increased by $11 billion to $154 billion in 1987, but in real terms it diminished for the first time since 1980, from $176 billion in 1986 to $163 billion in 1987[2] The trade-weighted value of the U.S. dollar declined by about 18 percent from year-end 1986 to year-end 1987, despite substantial official intervention to support the dollar and some widening of the spread of U.S. real long-term interest rates over comparable rates of other major industrialized countries.

Domestic financial markets

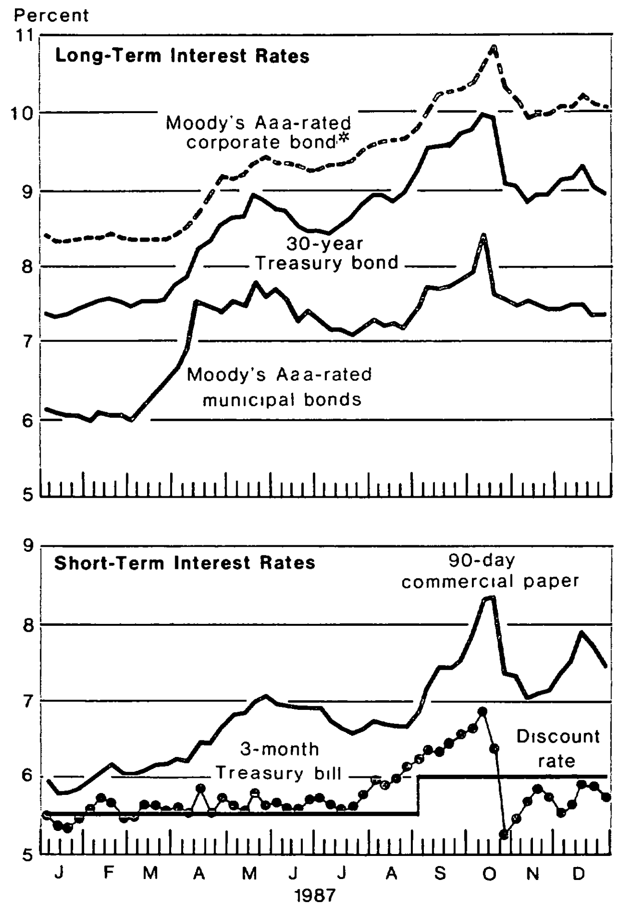
Long-term interest rates rose markedly during 1987, while short-term rates increased less dramatically (Chart 4). The increase in long-term rates was concentrated in two periods. From late March to mid-May, Treasury coupon yields rose by roughly 150 basis points. After declining by about 65 basis points through late June, these yields climbed around 180 basis points until the October 19 stock market crash, when they dropped precipitously. Over the year, long-term Treasury coupon yields increased by about 145 basis points.

[2]Source National Income and Product Accounts

Short-term rates also rose during 1987 but by somewhat less than long-term rates. As a consequence, the yield curve steepened, particularly in the one- to three-year maturity range (Chart 5). Through the first half of the year, short-term Treasury bill rates generally fluctuated in a narrow band somewhat above the 5.5 percent discount rate. Over that time, these rates were held down by the relative scarcity of bills, a product of net paydowns at most of the Treasury's weekly bill auctions. Intervention-related demand for bills by foreign central banks also provided periodic support. Rate movements of most other short-term market instruments followed the general climb of longer term rates between late March and mid-May. By late July, short-term Treasury bill rates also began to rise, and increased roughly 165 to 200 basis points by mid-October. In the abnormal conditions

Chart 4

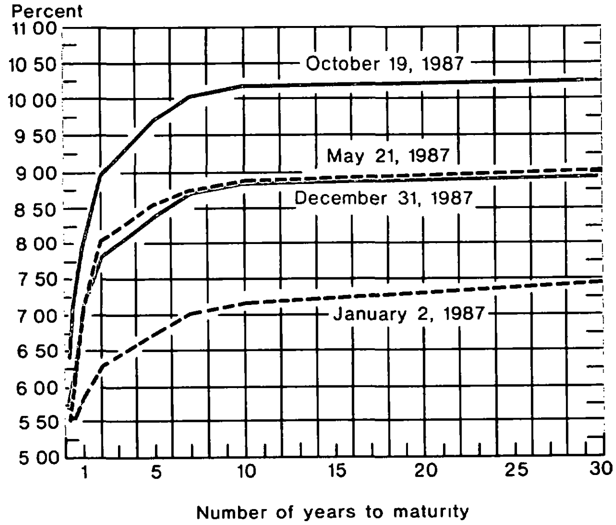
Long-Term and Short-Term Interest Rates



*20-year maturity

Chart 5

Yield Curves for Selected U.S. Treasury Securities

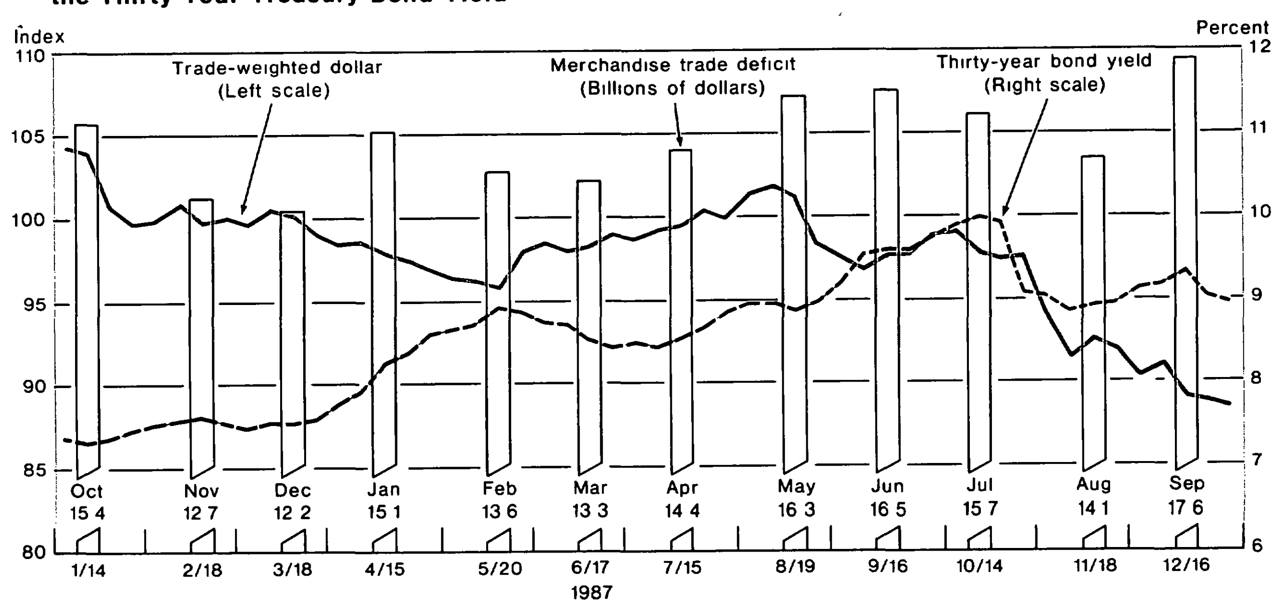


following the stock market crash, the three-month bill rate plunged, briefly approaching its October 1986 low of around 5 percent, while other short-term rates fell less sharply. For the year as a whole, three-month bill rates were up about 35 basis points, excluding year-end pressures. Other short-term rates rose a net 70 to 110 basis points over the year.

The enduring influence on U.S. securities markets through most of 1987 was the condition of the dollar in the foreign exchange markets. The dollar dropped to new lows of 121 Japanese yen and 1.57 deutsche marks on December 31, with most of the decline occurring in the last four months of the year (Chart 6). The fall in the dollar frequently engendered fears among market participants of rising inflation, possible Federal Reserve tightening, and diminished foreign demand for dollar-denominated assets. As the year progressed, the view solidified that adjustments of external imbalances in the context of acceptable overall performance of domestic economies would require international policy coordination, including a concerted effort to cut future U.S. government deficits. In this environment, the monthly announcements of the U.S merchandise trade deficit and the extent of cooperation among G-7 governments and central banks were watched closely by

Chart 6

Merchandise Trade Deficit, the Trade-weighted Value of the Dollar and the Thirty-Year Treasury Bond Yield*



* Merchandise trade deficits recorded in period when they were announced

financial market participants.[3] Disappointing news on both these fronts preceded the massive October sell-off on world stock exchanges

Yields on Treasury securities showed modest net changes through late March. Rates responded favorably to Chairman Volcker's February "Humphrey-Hawkins" testimony, which affirmed that the FOMC had not tightened its policy, and to the steadying of the dollar following the Louvre Accord in February, which was aimed at stabilizing exchange rates among six of the G-7 nations. However, activity in the fixed-income markets was lethargic over the first few months of the year, and attention turned to other markets, such as those for equities and mortgage-backed securities.

The inertia in the markets broke in late March when the dollar weakened sharply. The falling dollar, combined with data suggesting higher inflation and rising commodities prices, caused Treasury coupon yields to climb through mid-May. Yields on municipal and mortgage-backed securities experienced sharp volatility at times, the latter reflecting changing assumptions about prepayments and duration. Worries about protectionist measures, heightened by the U S. imposition of limited trade sanctions on Japan in late March, also weighed on market sentiment. Statements by U.S. and Japanese officials that the dollar had fallen sufficiently and Chairman Volcker's acknowledgment of a "slight snugging" were outweighed by the perception that only fundamental fiscal and monetary policy changes could prevent further dollar depreciation. Nevertheless, by the end of June, against the background of the System's firming actions, complementary actions abroad, and evidence of improvement in the merchandise trade deficit, the dollar had stabilized somewhat and coupon yields had eased, benefiting not only from the dollar development but also from more favorable inflation data.

The sharp run-up of yields from mid-July until the stock market crash seemed to be the product of heightened inflationary concerns and perceptions of tightening monetary policies in the United States and abroad. These perceptions were fostered by high May and June trade deficits, stronger economic data, and rising yields in Japan, Germany, and Great Britain. The bond market seemed to pay little attention to the notable improvement in the dollar that continued through mid-August, but the subsequent weakening of the dollar contributed to rising yields. In the bearish atmosphere for fixed-income securities, investor interest was increasingly attracted to the stock market where prices had been rallying since June. Interest rates continued to rise after the 50 basis-point increase in the discount rate on September 4, which apparently failed to counter the widespread view that the dollar was likely to fall further. Interest rate increases overseas contributed to the pessimistic outlook for the dollar.

Against this backdrop of rising world interest rates and the high level of stock prices in relation to earnings, the more immediate catalysts of the sharp stock market sell-off were evidently the release of the disappointing August trade deficit data and the perception of a breakdown of international economic cooperation Following the stock market break, yields on Treasury securities dropped dramatically in the ensuing "flight-to-quality." Even after the initial flight, Treasury issues continued to rally in anticipation of weaker economic growth, more accommodative monetary policies in the United States and abroad, and improved international policy coordination. The declines were most noticeable for short-term bills. In the nine days following October 19, three-month bill rates plunged as much as 200 basis points from mid-October highs. However, as the crisis atmosphere abated, bill rates and coupon yields backed up somewhat and the yield curve flattened.

Yields continued to be buffeted over the balance of the year, although the extreme nervousness in the financial markets gradually subsided. Yields backed up when Congress experienced difficulty in reaching its bipartisan agreement to lower budget deficits. Yields also rose in response to strong November employment data, a huge October trade deficit, and weakness in the dollar, but eased towards year-end amid a growing market belief that the Federal Reserve would not tighten in order to support the dollar in the face of uncertain economic prospects.

Some federally sponsored agencies experienced solvency-related problems during 1987. Early in the year, the Federal Farm Credit Banks System (FFCB) reported a \$1.9 billion loss for 1986 and the prospect of \$4.7 billion of additional losses for 1987-90, contributing to the widening of yield spreads of FFCB debt over comparable Treasury securities during the first half of the year. The FFCB first requested assistance from Congress in March, and by August, a bailout package appeared likely, causing spreads over Treasuries to decline somewhat. The insolvency of the Federal Land Bank of Jackson, Mississippi, in December was followed by Congressional approval of a rescue package at year-end. The bill authorizes the Farm Credit System (FCS) to issue \$4 billion of 15-year bonds, of which \$2.8 billion may be offered in 1988. The Treasury will share the interest burden, though the FCS is expected to reimburse the Treasury once the FCS regains its health.[4]

[3]The G-7 (Group of Seven) nations are Canada, France, Italy, Japan, the United Kingdom, the United States, and West Germany

[4]The bill also authorized the creation of the Federal Agricultural Mortgage Corporation, which will underwrite secondary market sales of packages of small rural mortgages and loans by banks, thrifts, and insurance companies The Corporation was given a \$1 5 billion line of credit with the Treasury

Congress and the Administration also approved a recapitalization plan for the Federal Savings and Loan Insurance Corporation (FSLIC) in August. FSLIC had ended 1986 technically insolvent. Under the plan, a new subsidiary of the Federal Home Loan Bank Board (FHLBB), the Financing Corporation (FICO), was authorized to issue up to $10.8 billion of debt over three years to recapitalize FSLIC but no more than $3.75 billion per year. (The FHLBB oversees FSLIC.) Principal payments on FICO issues are backed by zero-coupon Treasury bonds, and interest payments are secured by a first lien on insurance premia paid to FSLIC. Between September and year-end, FICO sold $1.2 billion of 30-year bonds at spreads of about 90 basis points over comparable Treasury securities.

Corporate bonds

Public offerings of domestic corporate bonds fell somewhat in 1987 to around $210 billion. Although issuance began the year at a pace even higher than the record set in 1986, it slackened in April as interest rates began to rise. Issuance fell off most noticeably in long-term securities, while corporations pulled back as rates rose, investor interest also waned amid considerable uncertainty about the outlook for interest rates. As rates rose above 1986 levels, the volume of refinancings dropped; however, refinancing picked up after the post stock crash decline in rates, pulling the ratio of net to total issuance including private placements below the 1986 ratio. The spreads between yields on high-grade corporate securities and Treasury bonds narrowed with the light issuance in the spring but widened briefly in the fall as Treasuries benefited more from the flight from stocks; the spreads ended the year with small net changes.

"Junk bonds," or bonds issued in the below investment-grade category, accounted for roughly 30 percent of new issuance of rated bonds during 1987, according to Moody's Investors Service. They continued to attract investors through much of the year, in spite of ongoing investigations by the Securities and Exchange Commission and the U.S. Attorney General's office into insider-trading related issues, including some inquiries that were perceived as having possibly adverse implications for a leading underwriter of junk bonds. However, unlike other fixed-income securities, junk bonds were adversely affected by the stock market collapse, and spreads to Treasuries widened by 150 basis points or more during the last days of October. Newly offered leveraged buyout issues were particularly hard hit, since their success was predicated on raising cash from asset sales to cover their obligations. Spreads of junk bond issues over Treasuries narrowed toward year-end after the supply of new issues all but dried up.

Bank earnings, and in some cases ratings on bank paper, were hurt by problem loans to LDCs. Soon after Brazil suspended interest payments in March, two major banks transferred their Brazilian loans to nonaccrual status. During the second quarter, a number of banks took the additional step of increasing their loan loss reserves, with the money center banks reclassifying roughly $12 billion of loans, equivalent to about 25 percent of outstanding LDC exposure. A few large regional banks boosted their loan loss reserves further to about 50 percent of LDC exposure during the fourth quarter, but most money center banks, with substantially higher LDC exposure, did not follow suit. The strain on balance sheets from loans to LDCs led rating agencies to downgrade the paper of several banks during the year. Generally, the moves did not surprise financial market participants and had limited impact on the banks' funding ability. The increased provisioning for loan losses in the second quarter tended to lift bank stock prices. Over the year, however, stock prices of most money center banks were significantly lower, showing greater weakness than the Dow-Jones Industrial Average and Standard and Poor's 500 stock index.

Municipal bonds

The municipal bond market experienced turbulent times in 1987. The effects of past tax legislation were felt as the volume of new issues declined and banks ceased to be major purchasers of municipal bonds. Several underwriters withdrew from the market, citing falling profits as the cause. Late in the year, the market was disturbed further by a Congressional proposal to tax unrealized capital gains on bonds sold at a discount, although it recovered when the legislation was dropped. The unsettled condition of the market reduced liquidity and caused a marked increase in the volatility of yields. Although yield spreads of Treasury issues over tax-exempt issues widened over the year as a whole, they were dramatically negative relative to revenue bonds in April, apparently because a number of individual investors sold tax-exempt issues to raise cash for income tax payments and equity investments.

Market sources report that municipal issuance fell for the second year in succession, from around $145 billion in 1986 to about $100 billion. Part of the decline may have been the consequence of heavy issuance in advance of tax legislation taking effect in 1986, but there was also a drop in refunding issues in 1987 as interest rates rose. Refunding volume fell from roughly $55 billion in 1986 to approximately $40 billion in 1987. Over half of the 1987 refundings occurred in the first quarter of the year, prior to the jump in yields in April and May.

The new tax laws also resulted in changes in ownership of municipal bonds. Commercial banks were less active buyers of municipal bonds after the Tax Reform Act of 1986 eliminated the deductibility of carrying costs. Their share of outstanding municipal issues fell to 25 percent in 1987-IV from about 30 percent in 1986-IV. Individuals' share of municipal holdings (including mutual funds) rose to 49 percent in 1987-IV from about 43 percent in 1986-IV. Also, insurance companies re-emerged as major buyers.

Policy implementation

The thrust of the FOMC's policy remained essentially unchanged from late 1986 through March 1987. (Notes on the FOMC directives and the assumptions used in constructing the reserve paths are in Table 1.) Beginning in April, in light of downward pressure on the dollar in the foreign exchange markets and heightened concerns about inflation, the Desk exercised increasing caution in providing reserves. Open market operations were adjusted to impose a somewhat greater, but still limited,

Table 1

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

Date of Meeting	Short-Term Annualized Rate of Growth Specified for Period Indicated: M2	M3	Borrowing Assumption for Deriving Nonborrowed Reserve Path (Millions of Dollars)	Discount Rate (Percent)	Notes
	(Percent)				
2/10 to 2/11/87	January to March: 6 to 7	6 to 7	300	$5^1/_2$	The Committee sought to maintain the existing degree of pressure on reserve positions. Somewhat greater reserve restraint would, or slightly lesser reserve restraint might, be acceptable depending on the behavior of the aggregates, taking into account the strength of business expansion, developments in foreign exchange markets, progress against inflation, and conditions in domestic and international credit markets.
	Growth in M1 was expected to slow substantially from the high rate of earlier months.				
3/31/87	March to June: 6 or less	6 or less	300 400 on April 30	$5^1/_2$	The Committee agreed to maintain the existing degree of pressure on reserve positions. Somewhat greater reserve restraint might be acceptable depending on developments in foreign exchange markets, taking into account the behavior of the aggregates, the strength of business expansion, progress against inflation, and conditions in credit markets.
	Growth in M1 was expected to remain substantially below its pace in 1986.				
5/19/87	March to June: 6 or less	6 or less	400 500 on May 21	$5^1/_2$	The Committee sought to increase somewhat the degree of reserve pressure from that sought in recent weeks, taking into account the possibility of a change in the discount rate. Somewhat greater reserve restraint would, or somewhat lesser reserve restraint might, be acceptable depending on indications of inflationary pressures and on developments in foreign exchange markets as well as the behavior of the aggregates and the strength of business expansion.
	Growth in M1 was expected to remain well below its pace in 1986.				
7/7 to 7/8/87	June to September: 5 to $7^1/_2$	5 to $7^1/_2$	500	$5^1/_2$	The Committee sought to maintain the existing degree of pressure on reserve positions. Somewhat greater/lesser reserve restraint would be acceptable depending on indications of inflationary pressures and on developments in foreign exchange markets, as well as the behavior of the aggregates and the strength of the business expansion.
	Growth in M1, while picking up from recent levels, was expected to remain well below its pace in 1986.				

Table 1

Specifications from Directives of the Federal Open Market Committee and Related Information *(continued)*

8/18/87	June to September 5 5 Growth in M1, while picking up from recent levels, was expected to remain well below its pace in 1986	500 600 on Sept 3	5½ 6 on Sept 4-11	The Committee sought to maintain the existing degree of pressure on reserve positions Somewhat greater reserve restraint would, or slightly lesser reserve restraint might, be acceptable depending on indications of inflationary pressures, the strength of the business expansion, developments in foreign exchange markets, as well as the behavior of the aggregates
9/22/87	August to December 4 6 M1 was expected to continue to grow relatively slowly	600 500 on Oct 23 450 on Oct 28	6	The Committee sought to maintain the slightly firmer degree of pressure on reserve positions that had been sought in recent weeks Somewhat greater/lesser reserve restraint would be acceptable depending on the indications of inflationary pressures, the strength of the business expansion, developments in foreign exchange markets, as well as the behavior of the aggregates
11/3/87	September to December 6 to 7 6 to 7 It was noted that more rapid growth in the broader aggregates was possible should preferences for liquidity be particularly strong Growth in M1 was expected to be well above its average pace in the previous several months	450 400 on Nov 4 300 on Dec 4	6	The Committee sought to maintain the degree of pressure on reserve positions that had been sought in recent days The Committee recognized that the volatile conditions in financial markets and uncertainties in the economic outlook might continue to call for a special degree of flexibility in open market operations, depending, in particular, on demands for liquidity growing out of recent or prospective developments in financial markets Apart from such considerations, somewhat lesser reserve restraint would, or slightly greater reserve restraint might, be acceptable depending on the strength of business expansion, indications of inflationary pressures, developments in foreign exchange markets, as well as the behavior of the monetary aggregates
12/15 to 12/16/87	November to March 5 6 Growth in M1 was expected to remain relatively limited	300	6	The Committee sought to maintain the existing degree of pressure on reserve positions and to phase open market operations into a more normal approach to policy implementation keyed increasingly to a desired degree of reserve pressure while giving less emphasis than recently to money market conditions The Committee recognized that still sensitive conditions in financial markets and uncertainties in the economic outlook may continue to call for a special degree of flexibility in open market operations Taking account of conditions in financial markets, somewhat lesser or somewhat greater reserve restraint would be acceptable depending on the strength of the business expansion, indications of inflationary pressures, developments in foreign exchange markets, as well as the behavior of the monetary aggregates

degree of pressure on reserve positions. These factors continued to be present during the summer, and the economic data were relatively strong However, monetary growth was weak except for the brief spurt in April. In light of these factors, the same degree of pressure was maintained through August as the dollar firmed. By late August and early September, the dollar was again under attack in the foreign exchange markets, economic data continued to point towards moderate growth, and the growth of the monetary aggregates picked up in August. In light of these developments, which heightened the potential for greater inflation, the Desk further increased the degree of reserve pressure and, on September 4, the Board of Governors approved an increase in the discount rate from 5½ to 6 percent.

This gradual firming of reserve pressures was dramatically reversed after the October 19 plunge in stock prices worldwide. The Committee agreed on the need to assure adequate liquidity in order to facilitate the return to a more normal functioning of financial markets. Consistent with this policy, following the drop in stock prices, open market operations were directed toward an easing of reserve pressures and were conducted with special flexibility. Indeed, actual operations were guided by day-to-day developments since strict adherence to the earlier reserve targets would have resulted in a greater degree of money market pressure than the FOMC desired. As evidence of a reduced willingness to borrow from the discount window accumulated, the lesser demands for borrowing were accommodated through a relatively greater provision of nonborrowed reserves in order to keep money market conditions from firming. As market conditions settled down, the Desk sought by late December to work back toward a more normal approach to managing reserves but without seeking to restore the degree of restraint intended before the stock market break.

Through most of the year, the FOMC directed the Desk to implement policy in 1987 essentially as it has since early 1983. In carrying out the technique, the Desk targeted levels of nonborrowed reserves over two-week reserve maintenance periods that were believed to be consistent with achieving the degree of reserve pressure sought by the FOMC The nonborrowed reserve target was derived in the following way: total reserves for each maintenance period were estimated as the sum of the demands for reserves to satisfy requirements and a cushion of excess reserves. The FOMC indicated the amount of discount window borrowing that it expected would be consistent with the desired level of reserve pressure. The assumed borrowing level was then subtracted from the total reserve estimate, leaving the nonborrowed reserve objective. Since banks' access to the discount window is restricted by amount and frequency, forcing higher borrowing acts to increase reserve pressures. A lower intended borrowing level would translate into a more ample provision of nonborrowed reserves, tending to reduce money market pressures. The Desk assessed the need to add or drain nonborrowed reserves by comparing the objective with projections of the average supply of nonborrowed reserves in each maintenance period, which were prepared daily by staff members at the Federal Reserve Bank of New York and the Federal Reserve Board

In its daily implementation of the nonborrowed reserve objectives, the Desk took account of both the expected duration and day-to-day pattern of reserve availability. In choosing between permanent and temporary reserve operations, it considered the projected reserve needs for the maintenance period in progress and the two subsequent periods. In general, if a sizable need to add (or, conversely, to drain) reserves was projected for a few consecutive maintenance periods, the Desk would typically opt to meet a portion of the need with outright purchases or sales of securities. Although these persistent needs to add or remove reserves have tended to follow a distinct seasonal pattern, that pattern was somewhat distorted in 1987 by the effects of the Tax Reform Act of 1986.

When the Desk added reserves by outright purchases of Treasury issues in 1987, it leaned much more heavily towards coupon issues than bills, reversing the pattern of recent years. On net, the Desk added $17.4 billion of Treasury coupon issues and $3.9 billion of bills to its portfolio and redeemed $276 million of Federal agency issues. The shift toward coupon purchases was motivated by the relative scarcity of Treasury bills through much of the year, which reflected both Treasury bill paydowns and purchases by foreign official accounts. By year-end, the System's portfolio consisted of $112.5 billion of bills, $111.2 billion of coupon issues, and $7.6 billion of Federally sponsored agency issues. The expansion in the System's outright holdings helped to meet reserve needs arising from an $18 billion rise in currency in circulation, a $2 billion decline in the Federal Reserve's holdings of foreign currency, and a $2 billion increase in required reserves (all measured between the final maintenance period averages for 1986 and 1987), while increases in applied vault cash offset some of the reserve drains from other operating factors.

The distribution of reserve needs within each period was an important factor in determining the Desk's choice of days on which to enter the market and the duration of temporary operations to add or drain reserves. The Desk sought to avoid extraordinary reserve surpluses or deficiencies on individual days since both held the potential to induce unusual movements in the funds rate that could give misleading signals about the general intent of policy. Moreover, a sizable daily reserve deficiency might leave the banking system with inadequate reserves for transactions clearing purposes and force undesirable spikes in discount window borrowing. The holding of these Federal Reserve clearing balances was motivated by the requirement that banks avoid overnight overdrafts and keep "daylight" overdrafts below levels specified by the Federal Reserve.[5]

In forming its reserve strategy, the Desk recognized the potential for revisions of the reserve projections. On the demand side, revisions of either estimated required reserves or the desired level of excess reserves could change the reserve outlook. On the supply side, revisions of estimated sources of nonborrowed reserves other than the Desk's open market operations—referred to as "operating factors"—held the same potential. Regardless of whether revisions originated on the demand or the supply side, those that occurred late in a maintenance period were most troublesome, as the Desk had relatively little remaining time over which to bring reserves in line with the objective. Achievement of the objective, in an effort to avoid sharp swings in borrowing or money market conditions, could necessitate very large reserve operations. Such large operations could be difficult to accomplish. Even if feasible, they could make reserves undesirably scarce or plentiful on the day.

Estimates of required reserves for each maintenance period were formed by applying a reserve ratio to the estimated level of transactions deposits. Since transactions deposits expanded at a somewhat slower-than-anticipated pace in 1987, there was a tendency to overestimate required reserves; on average, beginning-of-period and midperiod estimates ran about $100 million above actual levels of required reserves. And while estimates on the final day on average were close to the actual levels, on occasion significant revisions of required reserve estimates occurred after a maintenance period ended. For example, a large *ex post* downward revision to required reserves in the September 9 maintenance period revealed that the Desk had overprovided reserves, partly accounting for the failure of borrowing to attain its new $600 million target level. By contrast, notable underestimates of required reserves occurred in late April, reflecting the much larger-than-anticipated transactions balances that taxpayers built up in advance of payments and in late October, when liquid balances were particularly attractive in the wake of the stock market collapse. Overall, required reserves forecast accuracy in 1987 was slightly better than in 1986, with average absolute forecast errors of about $390 million at the beginning of the period and $100 million on the final day. (Actual reserve data appear in Table 2.)

Excess reserve demand tended to run high when the distribution of reserves was skewed towards smaller institutions. These smaller banks and thrifts were generally less aggressive in their reserve management than larger institutions and often failed to run off accumulations of excess reserves. For example, excess reserves have shown a tendency to rise during periods in which social security payments are made—these payments are often disproportionately deposited at small banks. Excess reserves were also boosted in January and February when, following a typical pattern, small banks did not cut their reserve holdings enough to match the seasonal decline in required reserves or failed to employ the reserves created as currency returned from circulation after the year-end holidays. The Desk attempted to allow for these distributional effects, but the appropriate added allowance for excess reserves was subject to significant uncertainty.

In contrast, excess reserve demand ran lower during the final phase-in of reserve requirements on balances held at nonmember institutions under the Monetary Control Act of 1980. From September 1986 until September 1987, nonmember institutions needed to hold only 7/8 of the specified required reserves ratios against their deposits. The phase-up to 100 percent holding of required reserves raised the overall level of required reserves by an estimated $1.7 billion. Following the pattern of recent years, some institutions did not fully adjust to the higher level of required reserves during the maintenance period in which the phase-in took place, causing excess reserves to run unusually low in that period. On balance, actual excess reserves deviated further from the beginning-of-period estimates in 1987 than they did in 1986.

On the supply side, the contribution of "operating factors" to nonborrowed reserves was particularly difficult to forecast in 1987. Much of this difficulty stemmed from uncertainty about the level of the Treasury's balance at the Federal Reserve—the average absolute period-to-period change in the Treasury balance was $3.8 billion in 1987, more than double the 1986 figure. Not surprisingly, the absolute error in predicting this change on the first day of each maintenance period also rose, averaging $885 million in 1987 as compared to $510 million in 1986. However, if the exceptional April-May episode were excluded, the average error for 1987 would be reduced to $565 million.

Other market factors also proved to be less predictable in 1987 than in 1986, but the differences were less dramatic. The mean absolute first-day error in estimating currency in circulation was $290 million, compared to $225 million in 1986, while the first-day errors in pre-

[5]For more detail on daylight overdrafts, see "Monetary Policy and Open Market Operations in 1986," this *Quarterly Review*, Spring 1987, pp. 35-56.

dicting float in 1987 and 1986 were $310 million and $225 million, respectively. Overall, the mean absolute first-day error in estimating the impact of all operating factors was about $1,255 million in 1987, far above the $510 million level of 1986. By the final day, this error had been reduced to about $90 million, unchanged from 1986. Excluding the April-May period, the average absolute operating factor forecast error would be $930 million, while the last-day error would be about $80 million.

With revisions to the reserve outlook quite common over the typical maintenance period, and several periods in which the Desk had to add a substantial volume of reserves rapidly, the Desk relied relatively heavily on temporary reserve injections in 1987, particularly on System RPs. While customer-related and System RPs have the same reserve impact, the Desk has historically executed System, rather than customer-related, RPs when it has wanted to inject a relatively large quantity of reserves or to inject reserves for more than a single business day; injections via customer-related RPs are constrained by the volume and the one-business-day horizon of foreign investment orders. Over the year, the Desk arranged $395 billion of System RPs and passed through to the market $155 billion of customer-related RPs The Desk made limited use of matched sale-purchase agreements in the market to drain reserves, arranging a relatively small $19 billion. The Desk preferred to avoid both adding and draining reserves within a maintenance period, although revisions to the reserve outlook or sharp turnarounds in reserve needs from one part of the period to another led the Desk to do so a few times in 1987.

As noted above, a major obstacle to policy implementation in 1987 was the difficult task of projecting the impact of the Treasury balance on reserve needs. In large part, the unusually high level of uncertainty surrounding the Treasury balance could be traced to two factors the effect of the Tax Reform Act of 1986 on tax collections and the disruption of the timing of Treasury

Table 2

1987 Reserve Levels

In Millions of Dollars, Not Seasonally Adjusted

Period Ended	RR Current	RR First Published	ER Current	ER First Published	TR	Adj and Seas BR	NBR plus Extended Credit BR Current	NBR plus Extended Credit BR First Published	NBR Interim Objective*	Extended Credit BR
Jan 14	60,680	60,822	845	707	61,525	290	61,235	61,239	61,381	215
28	57,033	57,045	1,206	1,170	58,239	462	56,791	57,754	57,782	227
Feb 11	56,208	56,373	1,459	1,387	57,667	160	57,508	57,601	57,059	265
25	55,530	55,513	1,070	1,025	56,599	381	56,219	56,158	56,160	299
Mar 11	56,021	56,174	961	851	56,982	191	56,791	56,835	56,814	275
25	55,866	55,966	981	868	56,847	265	56,582	56,569	56,581	263
Apr 8	57,029	56,943	679	840	57,708	393	57,315	57,390	57,444	248
22	59,703	59,559	804	928	60,506	689	59,817	59,798	60,105	267
May 6	58,115	58,129	1,016	979	59,131	1,111	58,020	57,998	58,530	299
20	57,066	56,907	1,063	1,221	58,128	554	57,575	57,575	57,305	276
June 3	57,042	56,939	1,134	1,327	58,176	797	57,379	57,469	57,220	297
17	58,313	58,344	804	836	59,117	381	58,736	58,798	58,659	254
July 1	56,947	56,961	1,620	1,692	58,567	567	58,000	58,087	57,677	289
15	59,081	59,173	472	428	59,553	435	59,118	59,167	59,512	261
29	57,240	57,252	983	958	58,223	519	57,704	57,692	57,613	133
Aug 12	57,488	57,597	801	725	58,289	444	57,845	57,878	57,968	120
26	57,116	57,107	1,173	1,145	58,288	591	57,698	57,662	57,480	128
Sept 9	57,546	57,660	1,194	1,188	58,740	474	58,266	58,374	58,365	173
23	59,825	59,784	515	565	60,340	470	59,870	59,878	60,057	531
Oct 7	59,306	59,232	833	937	60,139	726	59,413	59,443	59,477	469
21	60,115	59,970	967	1,134	61,082	525	60,557	60,580	60,102	482
Nov 4	60,256	60,182	1,561	1,751	61,817	287	61,530	61,646	60,976	390
18	60,655	60,660	492	485	61,147	227	60,921	60,919	61,100	334
Dec 2	59,855	59,901	1,213	1,223	61,068	218	60,850	60,906	60,342	465
16	60,890	60,959	1,206	1,192	62,095	162	61,934	61,989	61,576	653
30	61,354	61,300	806	920	62,160	355	61,805	61,865	61,828	316

*As of final Wednesday of reserve period debt auctions by legislative delays in raising the Treasury debt ceiling.

The Tax Reform Act of 1986 significantly raised tax flows over the year. The Act spurred individuals to liquidate assets in late 1986 in advance of the elimination of the preferential treatment of capital gains the following year. These asset sales generated huge tax liabilities that were to be paid in 1987. The historical patterns of the size and timing of individual nonwithheld income tax payments were badly distorted in January and April, making it particularly difficult to project the Treasury balance and reserve needs over these periods. Uncertainty about the impact of tax reforms on corporate tax payments (due in March, April, June, September, and December) added to the difficulty of forecasting Treasury receipts, but the forecasts of corporate payments wound up near enough to the mark that this uncertainty did not cause the Desk to miss its intended reserve provision.[6]

When the Treasury's overall cash balances exceeded the capacity of the commercial banks to hold those deposits, the excess would spill over into the Treasury's Federal Reserve balance, draining reserves from the banking system.[7] Thus when individual nonwithheld tax payments reached record levels in January, the Desk's usual seasonal need to drain reserves was postponed. Indeed, the Treasury balance did not fall to normal levels until early February when Social Security payments were made.[8] Frequent upward revisions of Treasury balance estimates in January required ongoing reserve injections by the Desk and led to somewhat greater-than-intended money market firmness.

Both the Federal Reserve and the Treasury anticipated unusually high April tax receipts Indeed, the Treasury took account of the "windfall" tax collection when it cut back the size of its bill auctions and, to a lesser extent, its coupon offerings earlier in the year. By early April, corporate and individual withheld tax payments of around $17 billion were anticipated during the month, along with an unprecedented $55-60 billion of nonwithheld individual income tax receipts.

As events unfolded, actual corporate tax payments came in close to expectations while individual nonwithheld tax receipts were greatly underestimated, running $13-20 billion above Treasury and Federal Reserve estimates and $25 billion above the 1986 level. The enormous unanticipated inflow complicated reserve management in two ways. First, as individuals built up larger-than-expected checking balances in order to pay taxes, the level of required reserves grew beyond expectations The high checking balances persisted until a substantial portion of tax returns were processed. Second, and more important from the perspective of reserve management, the tax receipts boosted the Treasury's Federal Reserve balance to record levels. On April 30, the balance reached a high of $29.7 billion; the previous high had been $19.9 billion two years earlier. Together, the rise in the Treasury's balance and required reserves created an average reserve need of $7.8 billion in the April 22 and May 6 reserve maintenance periods

The Treasury's soaring Federal Reserve balance and higher-than-expected levels of required reserves frustrated the Desk's attempts to meet reserve needs in the April 22 and May 6 maintenance periods. The problem was exacerbated by the Desk's initially cautious provision of reserves in view of the fragility of the dollar in the foreign exchange markets and a related heightening of inflation concerns. In the April 22 period, the actual need to add reserves exceeded the need estimated at the beginning of the period by around $2-3 billion per day. On the last day of that period, the remaining need called for $10-11 billion of overnight RPs. Dealers presented fewer than $6 billion of orders, so the reserve injection fell far short of the intended level and discount window borrowing spiked that day to $5.3 billion. The need to add reserves in the May 6 period exceeded the levels forecast at the beginning of the period by an even greater amount—about $7-8 billion per day. The Desk fell behind in meeting the growing need, and at mid-period, borrowing bulged After adjusting for that bulge by treating a portion of it as nonborrowed reserves, the Desk was able to meet most of the period's need, in part by arranging $45.8 billion of RPs, a record at that point In both periods, discount window borrowing wound up well above the path allowances, averaging about $690 million in the April 22 period and $1 1 billion in the May 6 period.

The second major impediment to forecasting the size of the Treasury's Federal Reserve balance was the ongoing legislative controversy over the Treasury's authority to issue debt in the second half of 1987. The cancelation of scheduled auctions had two possible

[6]An IRS ruling that allowed corporations to pay 120 percent of year-earlier payments in April and June in the absence of detailed information on tax liabilities gave forecasters some help in estimating corporate receipts

[7]Treasury cash in excess of working balances held at the Federal Reserve is channeled into so-called Treasury tax and loan note option (TT&L) accounts at depository institutions that have elected to accept them The banks set caps on the TT&L accounts because they are required to hold collateral against them and pay interest on them At times when the Treasury is particularly flush with cash, the TT&L accounts may fill to their capacities Banks remit the excess of their receipts over their caps to the Treasury's account at the Federal Reserve Thus, deposits flow out of the banking system, draining reserves

[8]The Treasury attempts to maintain a working balance at the Federal Reserve of around $3 billion or so and normally will either call money from or make direct investments to TT&L accounts in order to keep its Federal Reserve balance near $3 billion

impacts on reserve supply: If the Treasury paid down maturing issues because of an inability to issue new debt, it might have drawn down its Federal Reserve balance (when it was above normal levels), adding to the supply of reserves. On the other hand, the maturing of outstanding issues without replacement would have prevented the Fed from rolling over its holding of the maturing issues, thereby draining reserves

The issue first arose during the July 29 maintenance period in which the debt ceiling, temporarily boosted to \$2.3 trillion, was scheduled to revert to its earlier \$2.1 trillion level. During the first week of that period, the Desk worked with two sets of forecasts, one assuming another extension, the other assuming no action.[9] A failure to extend the ceiling would have forced the Treasury to pay down the bills maturing on July 26, \$4 billion of which were held by the System. At the same time, the Treasury would have had to call in funds from its accounts at commercial banks to make the payments, since its Federal Reserve balance was only modestly above the routine working balance level. On net, the paydown implied a substantial reserve drain from the redemption of the System's holdings that would only have been partially offset by lower Treasury balances. However, an extension of the debt ceiling would have left nonborrowed reserves near their estimated path level. Anticipating a reserve surplus the first week under both assumptions, the Desk initially drained reserves. But as it became evident that the \$2 3 trillion debt ceiling would lapse, the Desk was forced to add reserves to achieve the reserve path.

The \$2.3 trillion debt ceiling was temporarily extended on July 30 and again on August 7 to carry through September 23. Thus, estimates of reserve needs were quite tentative in the October 7 maintenance period as well. Bills that were paid down on the first day of the period were replaced on a later date than initially assumed. In this case, the paydowns actually helped reduce the need to add reserves since it brought the Treasury balance down from the high levels that followed the September corporate tax receipts by more than the drain from paying down Federal Reserve holdings. Legislation permanently raising the ceiling to \$2 8 trillion was signed on September 29.

The policy priorities changed dramatically following the worldwide plunge in stock prices on October 19. With the financial markets in turmoil, the Desk responded by providing liquidity generously and approaching policy flexibly in the weeks following the stock market crash. The approach involved giving greater weight to money market conditions in order to facilitate the return to a more normal functioning of financial markets and to minimize the chances that the Committee's policy intentions would be misinterpreted.

Though the level of borrowing assumed in the construction of the nonborrowed reserve path was formally lowered in three steps from \$600 million to \$400 million by November 4, actual borrowing fell further. The Desk did not attempt to force heavy late-period borrowing to achieve the assumed levels.[10] In the tumultuous environment, not only did banks generally seem less inclined than normal to use the discount window, but the demand for excess reserves seemed to escalate; had the Desk forced borrowing up to the assumed levels, the result would have been a greater degree of reserve pressure than the FOMC desired. Also, required reserve estimates were quite tentative since it was not clear how long the postcrash bulge in deposits would persist.

In light of these uncertainties about reserve needs and of the generally fragile atmosphere, the Desk provided reserves generously in the November 4 maintenance period. It sought to allay market fears by entering the market before its customary intervention time on three occasions and, on one occasion, by announcing its intention to execute System RPs a day ahead of time. The System RPs helped dealers who were having trouble financing positions of Treasury and Federal agency securities through normal channels. The Desk could not help directly in the financing of mortgage-backed and other securities not eligible for System purchase, but its actions assured that, at least in the aggregate, liquidity would be ample. After showing firmness for a few days, Federal funds rates fell significantly below the levels seen prior to the stock market crash, reflecting the abundance of reserves. Excess reserves wound up at an exceptionally high \$1.6 billion level, and borrowing declined by over \$200 million from its recent average level to a level about \$100 million below the downward revised allowance.

The pattern of light borrowing continued into the next two maintenance periods. In view of the reduced demand for borrowed reserves, the Desk provided relatively more nonborrowed reserves in order to keep money market conditions from firming, and the allowance was lowered by another \$100 million on December 4 to reflect this. However, borrowing fell still further, dropping below even the lowered allowance in the December 16 maintenance period, perhaps partly reflecting concern over potential year-end funding

[9]The reserve projection error statistics cited earlier are based on the assumption that the correct scheduling of Treasury auctions was known

[10]Borrowing did bulge on the final day of the October 21 maintenance period, as nonborrowed reserves fell short of the intended level Just after the Desk arranged RPs that day, reserves were plentiful The funds rate fell in response, encouraging early withdrawals from previous days' multiday RPs The early withdrawals reduced the surplus Furthermore, reserve needs were greater than the Desk had realized since required reserves were higher than forecast

pressures.[11]

Some Treasury issues became quite scarce in the market in late October because of the heightened demands for safety and liquidity and a reluctance on the part of some financial institutions to lend securities in light of concerns over the financial condition of prospective counterparties. With the concurrence of the FOMC, the Desk temporarily broadened primary dealers' access to the System's lending facilities as of October 22 in order to ease delivery problems. Specifically, the Desk suspended its normal size limitations and was willing to lend against short sales, provided that the needed securities were in the System portfolio. Dealers made moderate use of the program, increasing the average volume of securities on loan from the System to about 20 percent above the 1987 norm. The program was terminated effective November 19 when market circumstances no longer appeared to require this assistance.

[11]In the previous year, demand for bank loans had soared near year-end as businesses and investors rushed to complete transactions that would receive less favorable tax treatment beginning in 1987. Uncertain about their needs, banks became more cautious about releasing funds. Together, these factors placed extreme upward pressures on the cost of borrowing money in the market over the year-end. Thus, in 1987, banks may have been especially careful to avoid borrowing in the weeks leading up to year-end so that they could more freely access the discount window at year-end if such pressures again surfaced.