

# Monetary Trends



## September 11, 2001

The September 11 terrorist attack on the World Trade Center and the Pentagon was not only a human tragedy but also an event with potentially serious ramifications for the economy. Although the airline and insurance industries face severe long-term problems as a result of the attack, the event posed an immediate threat to the entire economy by disrupting the payments and financial systems. Specifically, while the attack increased firms' and individuals' demand for liquidity, heightened uncertainty and the possibility of falling asset prices also threatened to reduce lending by banks and other intermediaries. Significant disruption to the payments system or lending has the potential to slow economic activity markedly.

In response to the attack, the Federal Reserve provided additional liquidity through several channels to help restore confidence and ensure the continued functioning of the financial and payments systems. First, the Fed's New York Trading Desk injected an unusual amount of liquidity through repurchase agreements (repos). The accompanying table shows that the Fed held \$61 billion of securities acquired under repurchase agreements on September 12, versus an average of \$27 billion on the previous ten Wednesdays (see table) and about \$12 billion on September 13, 2000.

Second, the Federal Reserve lent money directly to banks through the discount window. The \$45 billion in discount loans outstanding on September 12 dwarfed the \$59 million average of the previous 10 Wednesdays.

Third, the Federal Reserve—along with the Comptroller of the Currency—urged banks to restructure loans for borrowers with temporary liquidity problems. To assist such restructuring, the Fed stood ready with additional funds.

Fourth, because transportation difficulties prevented checks from being cleared in a timely manner, the Federal Reserve extended almost \$23 billion in check "float" on September 12, some 30 times the average float over each of the 10 previous Wednesdays.

Fifth, the Federal Reserve quickly established or

extended "swap lines" with foreign central banks, such as the European Central Bank, the Bank of England, and the Bank of Canada. These accords enable central banks to temporarily exchange currencies to meet liquidity needs in foreign currencies. For example, the Fed and the European Central Bank might swap dollars for euros for a specified period of time, to enable the ECB to loan dollars to branches of European banks operating in the United States.

Finally, the FOMC reduced the federal funds rate target by 1/2 percentage point, to 3 percent, early on Monday, September 17, while retaining the balance of risks toward economic weakness in its public statement. This action was interpreted as a confidence-boosting measure for the reopening of the New York Stock Exchange later that morning.

Deposits at Federal Reserve Banks conveniently summarize the liquidity provided to the economy. On September 12, this measure stood at \$102 billion, more than 5 times the average of the previous 10 Wednesdays. As in previous periods of financial stress (e.g., the crash of 1987, the Russian default of 1998, and the Y2K scare) the Federal Reserve's actions helped ensure the smooth functioning of the payments and financial systems, thereby minimizing the economic repercussions of the tragedy.

—Christopher J. Neely

### Monetary Conditions

|  | Repos | Discount window lending | Float | Deposits at Federal Reserve Banks |
|--|-------|-------------------------|-------|-----------------------------------|
| Average of Wednesdays from July 4 to September 5, 2001 | 27298 | 59                      | 720   | 19009                             |
| September 12, 2001                                     | 61005 | 45528                   | 22929 | 102704                            |
| September 19, 2001                                     | 39600 | 2587                    | 2345  | 13169                             |

NOTE: Data were taken from the H.4.1 statistical release from the Board of Governors. Only weekly averages and Wednesday figures are available in that report. Figures are reported in millions of U.S. dollars. Deposits at Federal Reserve Banks is the sum of "service related balances and adjustments" and "reserve balances with FR Banks."



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## ***Conventions used in this publication:***

1. Unless otherwise indicated, data are monthly.
2. Shaded areas indicate recessions, as dated by the National Bureau of Economic Research.
3. The *percent change at an annual rate* is the simple, not compounded, monthly percent change multiplied by 12. For example, using consecutive months, the percent change at an annual rate in  $x$  between month  $t-1$  and the current month  $t$  is:  $[(x_t / x_{t-1}) - 1] \times 1200$ . Note that this differs from *National Economic Trends*. In that publication monthly percent changes are compounded and expressed as annual growth rates.
4. The *percent change from year ago* refers to the percent change from the same period in the previous year. For example, the percent change from year ago in  $x$  between month  $t-12$  and the current month  $t$  is:  $[(x_t / x_{t-12}) - 1] \times 100$ .

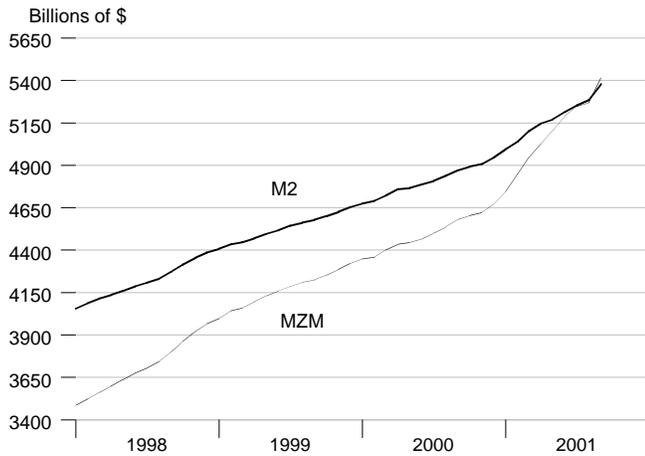
We welcome your comments addressed to:

Editor, *Monetary Trends*  
Research Division  
Federal Reserve Bank of St. Louis  
P.O. Box 442  
St. Louis, MO 63166

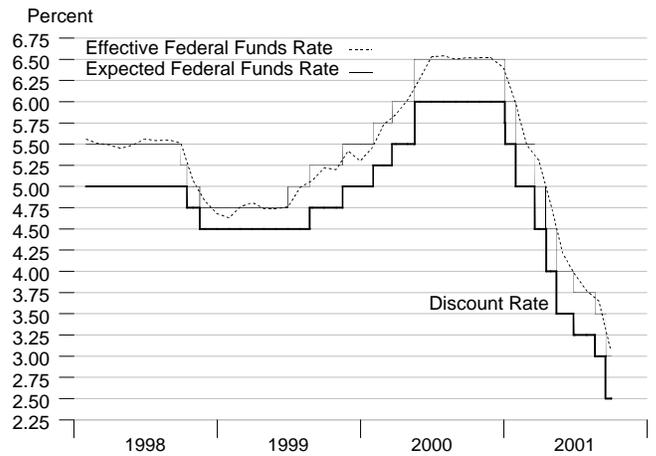
or to:

[webmaster@stls.frb.org](mailto:webmaster@stls.frb.org)

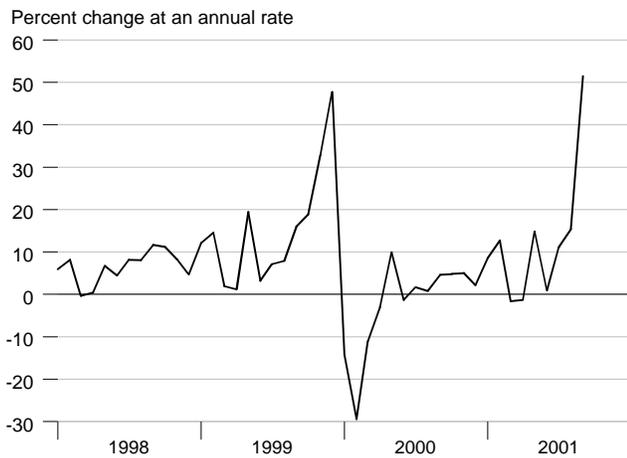
**M2 and MZM**



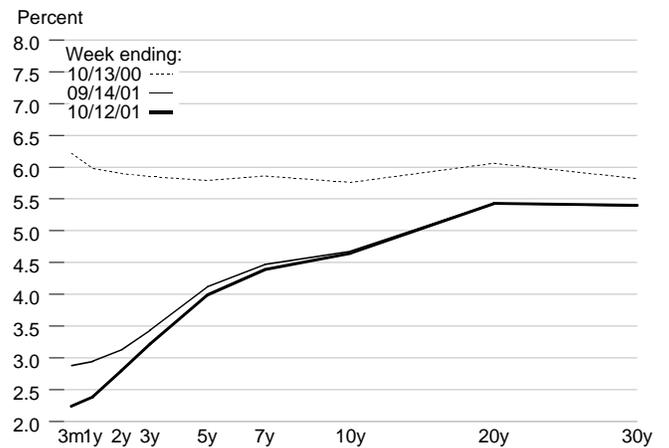
**Reserve Market Rates**



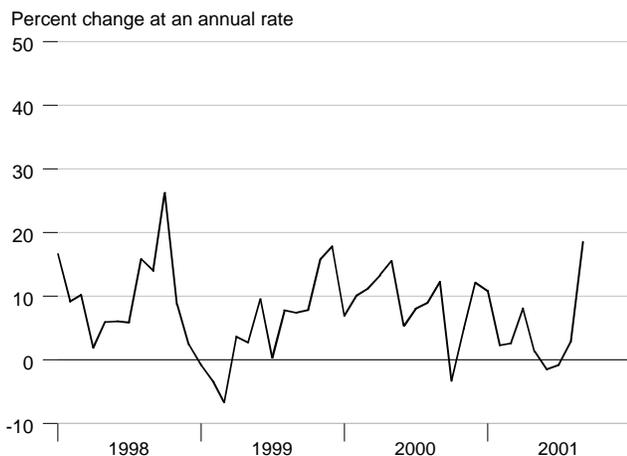
**Adjusted Monetary Base**



**Treasury Yield Curve**



**Total Bank Credit**

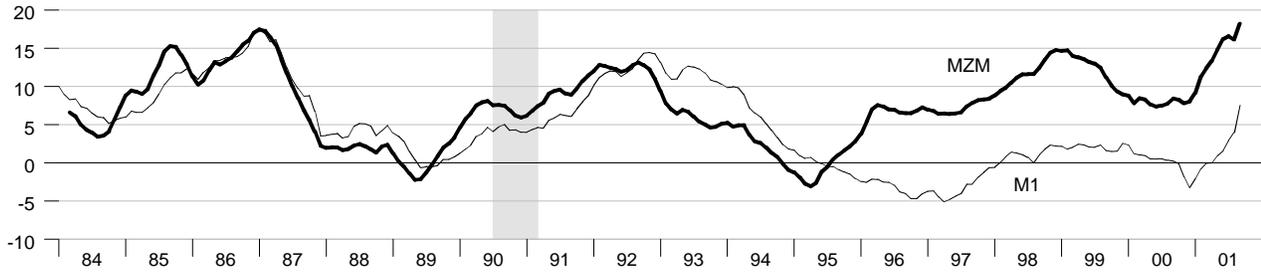


**Interest Rates**

|                            | Jul 01 | Aug 01 | Sep 01 |
|----------------------------|--------|--------|--------|
| Federal Funds Rate         | 3.77   | 3.65   | 3.07   |
| Discount Rate              | 3.25   | 3.16   | 2.77   |
| Prime Rate                 | 6.75   | 6.67   | 6.28   |
| Conventional Mortgage Rate | 7.13   | 6.95   | 6.82   |
| <b>Treasury Yields:</b>    |        |        |        |
| 3-month constant maturity  | 3.59   | 3.44   | 2.69   |
| 6-month constant maturity  | 3.56   | 3.39   | 2.71   |
| 1-year constant maturity   | 3.62   | 3.47   | 2.82   |
| 3-year constant maturity   | 4.31   | 4.04   | 3.45   |
| 5-year constant maturity   | 4.76   | 4.57   | 4.12   |
| 10-year constant maturity  | 5.24   | 4.97   | 4.73   |
| 30-year constant maturity  | 5.61   | 5.48   | 5.48   |

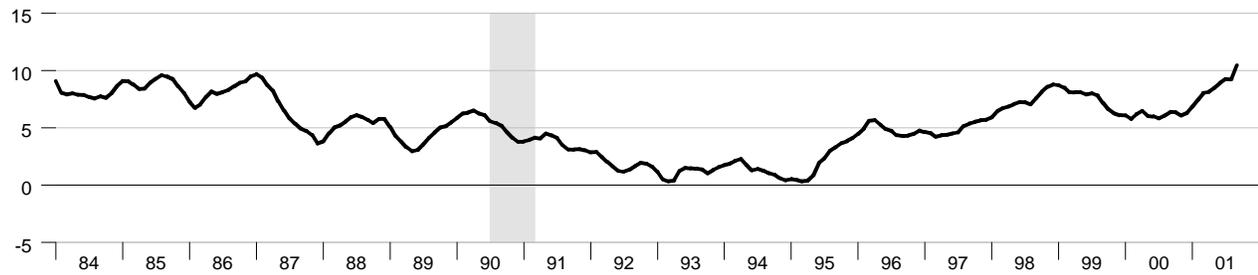
**MZM and M1**

Percent change from year ago



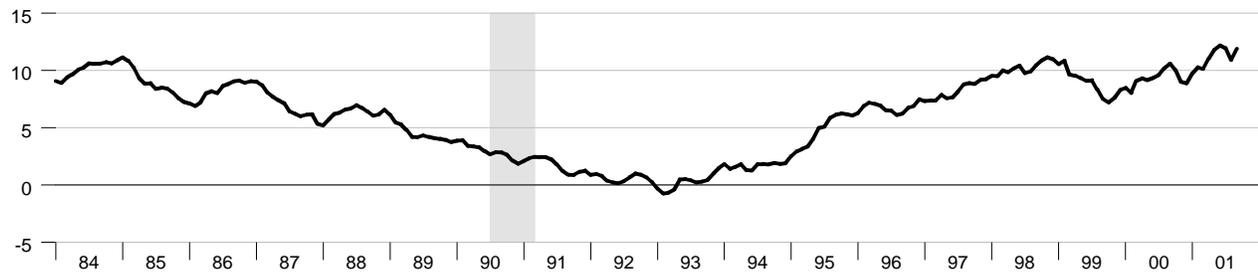
**M2**

Percent change from year ago



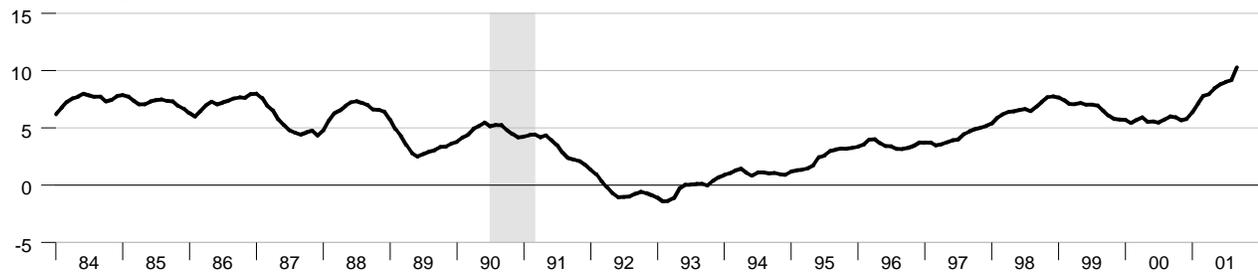
**M3**

Percent change from year ago



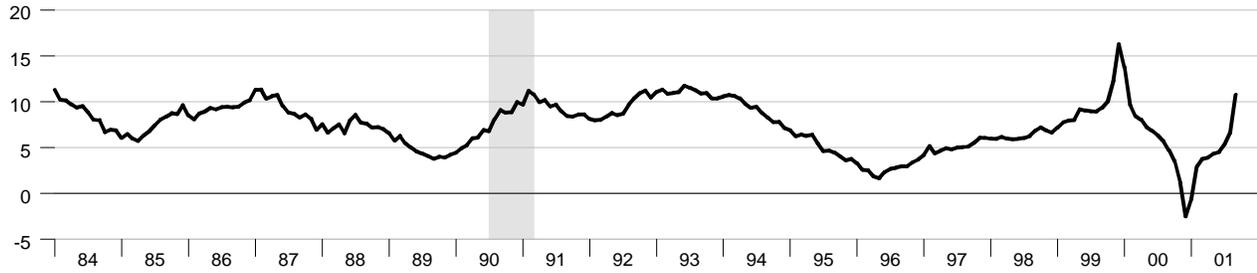
**Monetary Services Index - M2**

Percent change from year ago



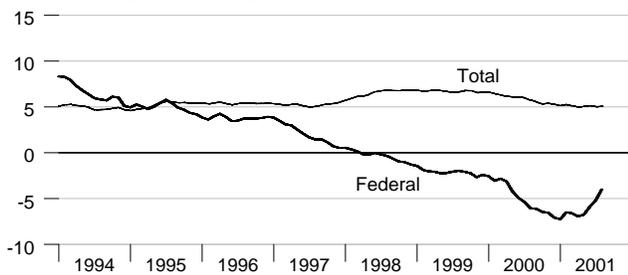
### Adjusted Monetary Base

Percent change from year ago



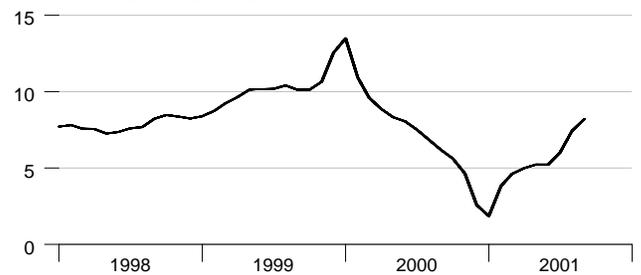
### Domestic Nonfinancial Debt

Percent change from year ago



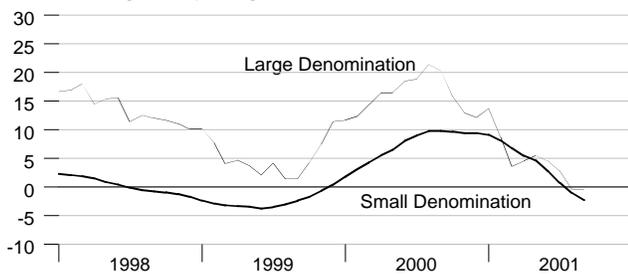
### Currency Held by the Nonbank Public

Percent change from year ago



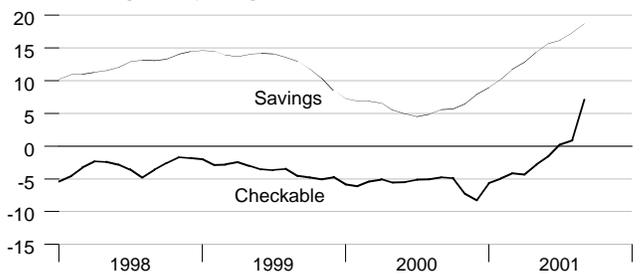
### Time Deposits

Percent change from year ago



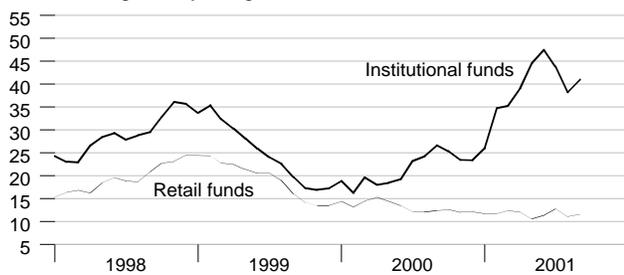
### Checkable and Savings Deposits

Percent change from year ago



### Money Market Mutual Fund Shares

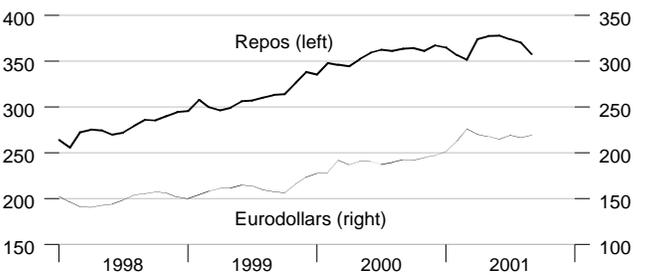
Percent change from year ago



### Repurchase Agreements and Eurodollars

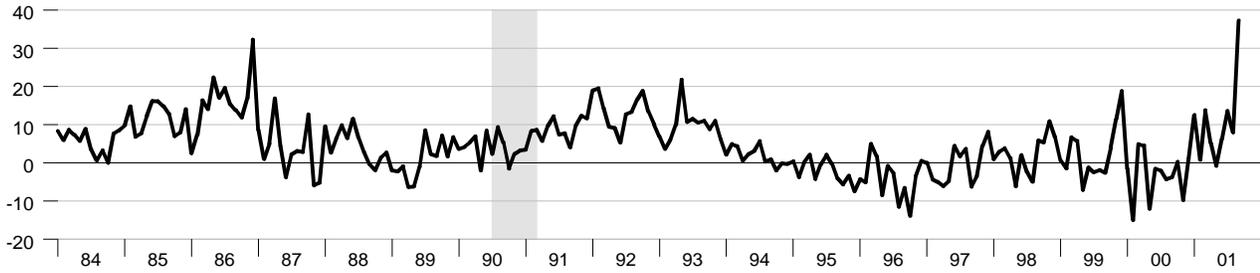
Billions of dollars

Billions of dollars



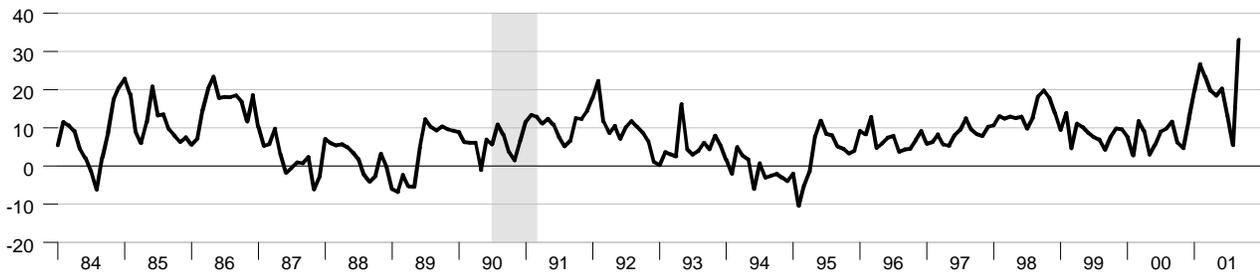
**M1**

Percent change at an annual rate



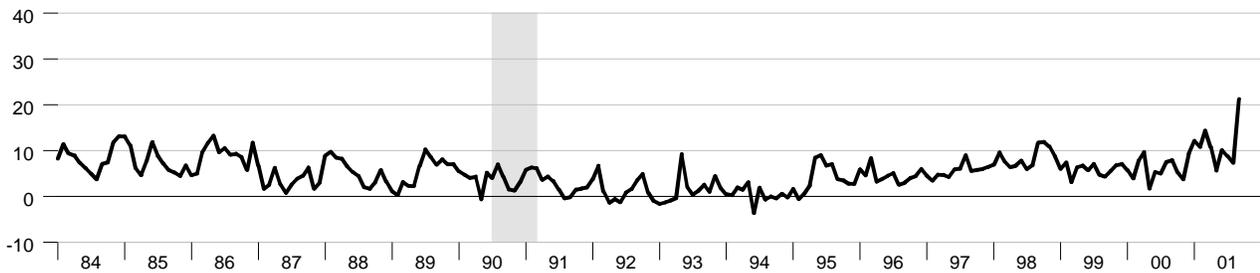
**MZM**

Percent change at an annual rate



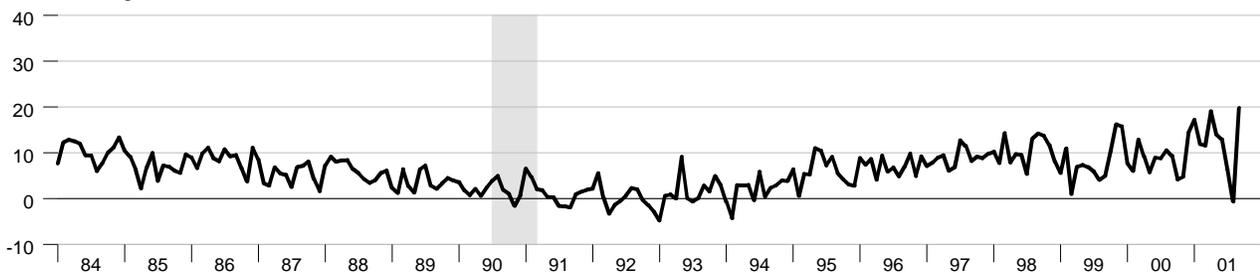
**M2**

Percent change at an annual rate

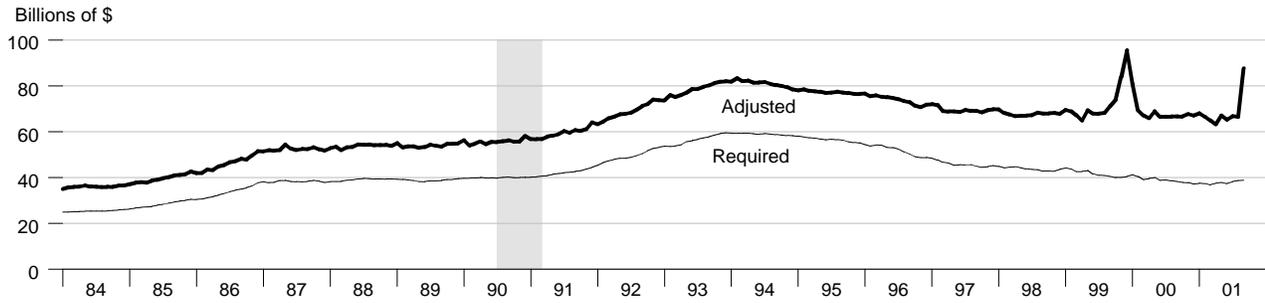


**M3**

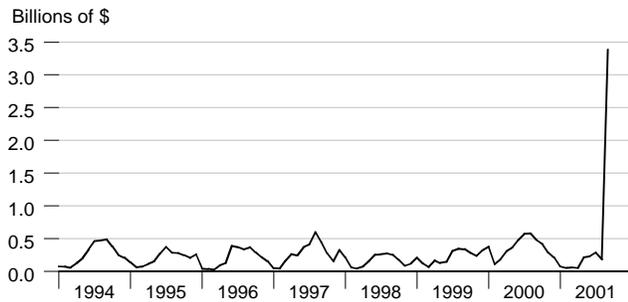
Percent change at an annual rate



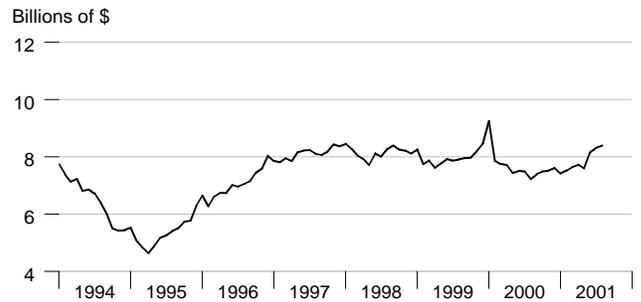
### Adjusted and Required Reserves



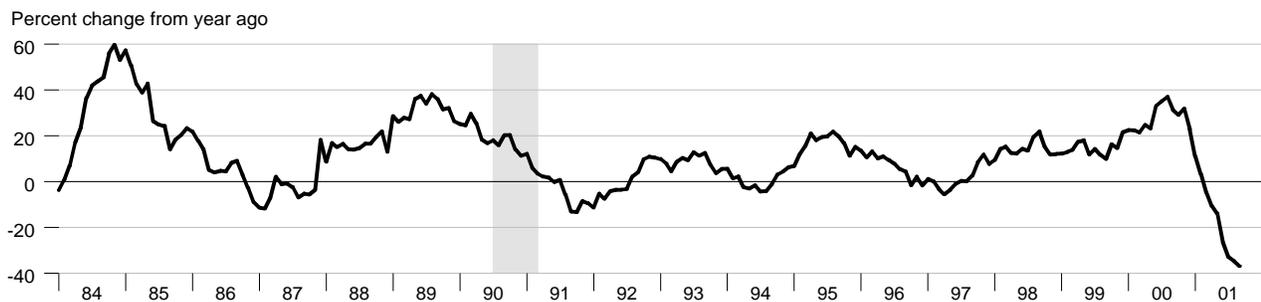
### Total Borrowings, nsa



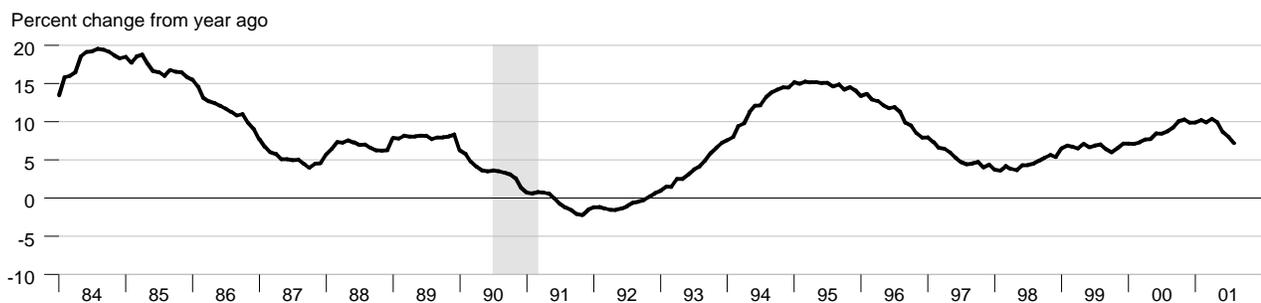
### Excess Reserves plus RCB Contracts



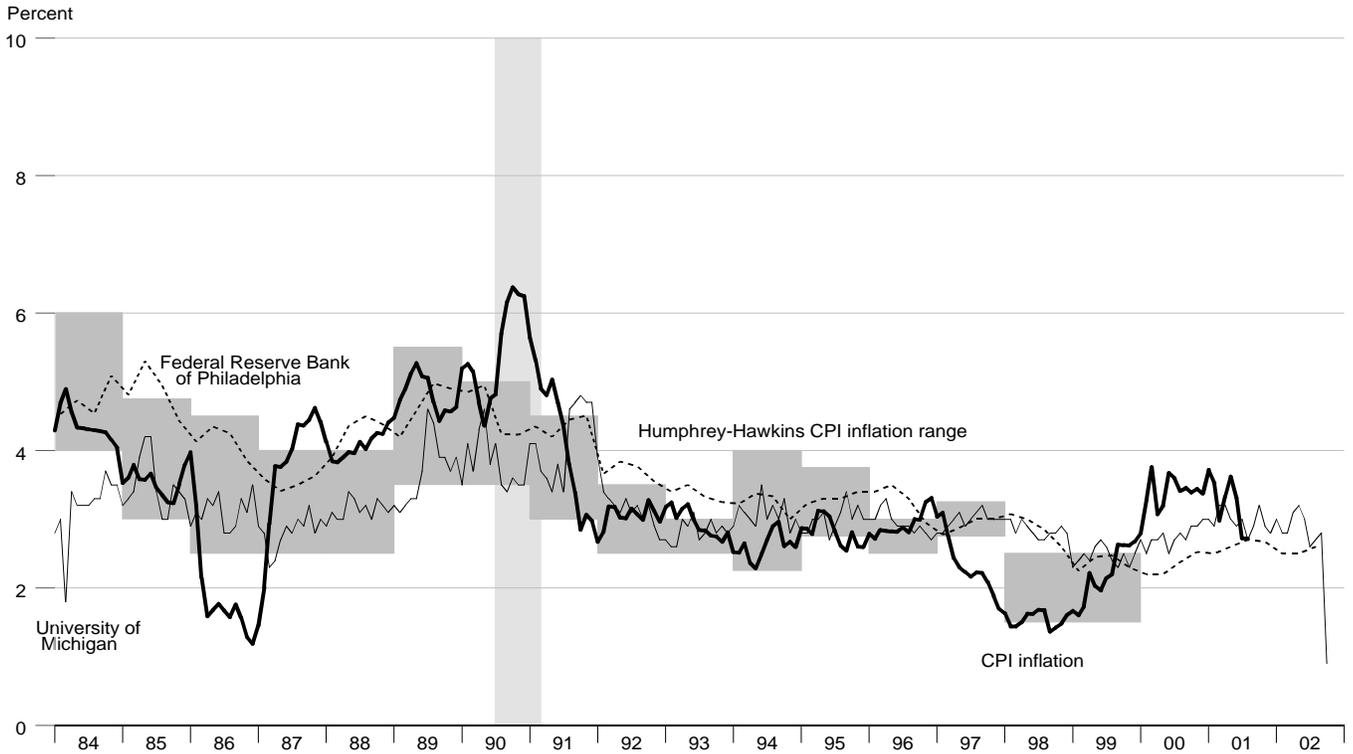
### Nonfinancial Commercial Paper



### Consumer Credit

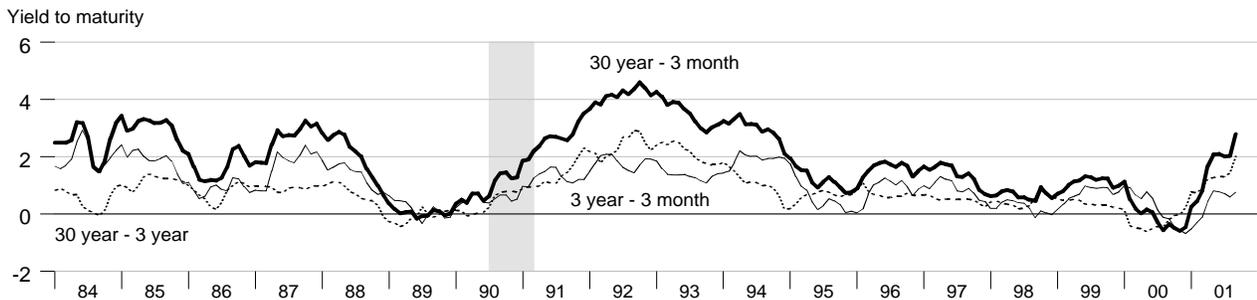


### Inflation and Inflation Expectations

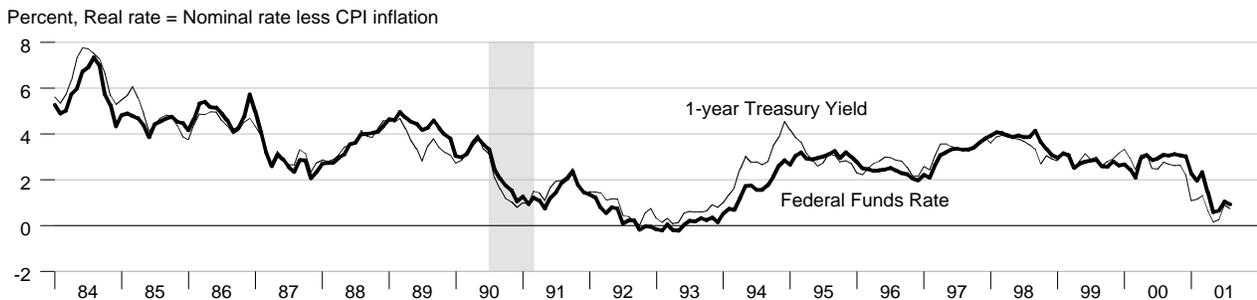


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

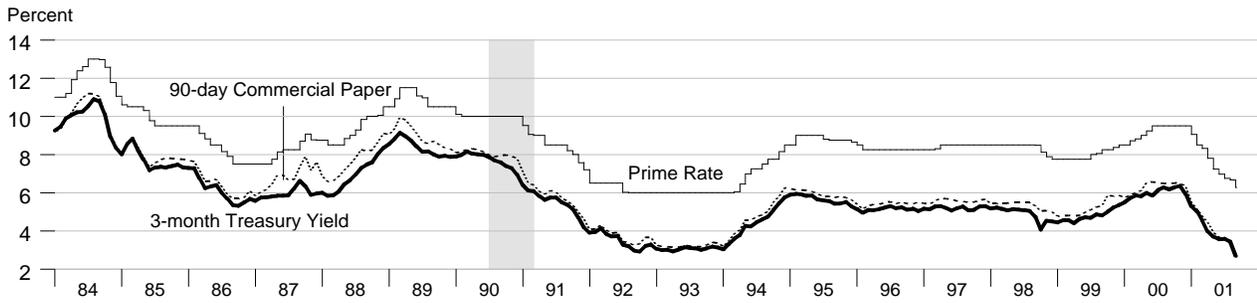
### Treasury Security Yield Spreads



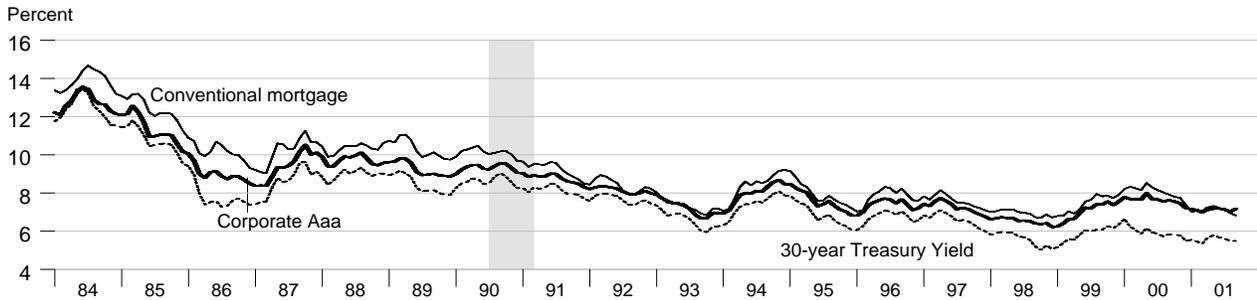
### Real Interest Rates



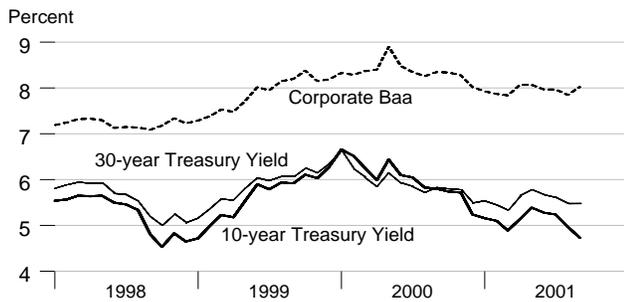
**Short Term Interest Rates**



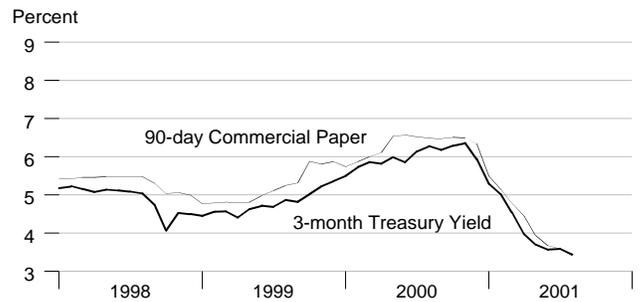
**Long Term Interest Rates**



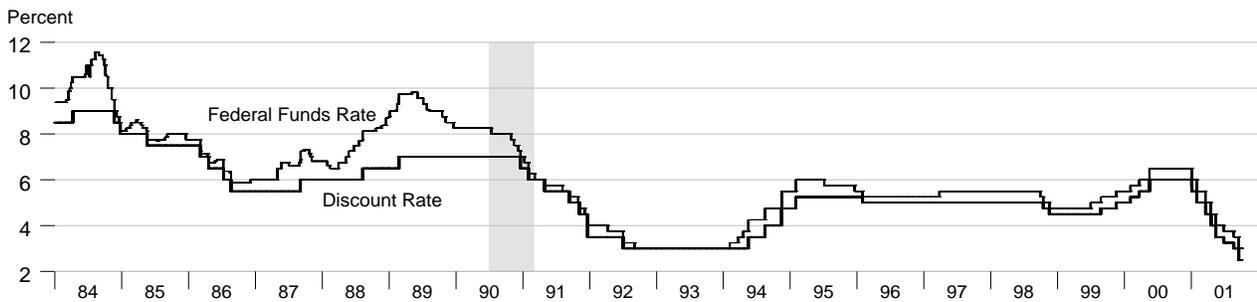
**Long Term Interest Rates**



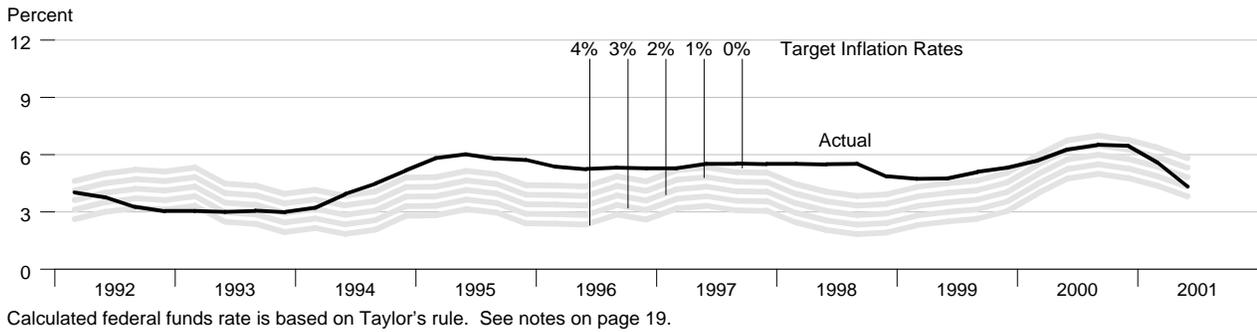
**Short Term Interest Rates**



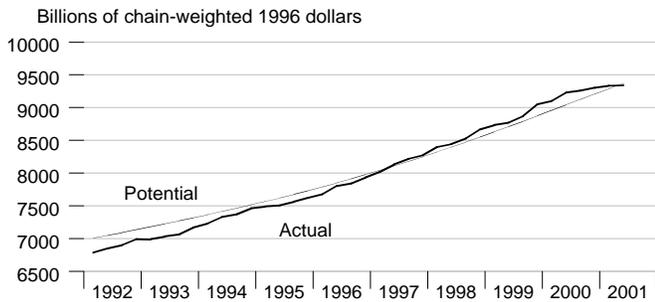
**FOMC Expected Federal Funds Rate and Discount Rate**



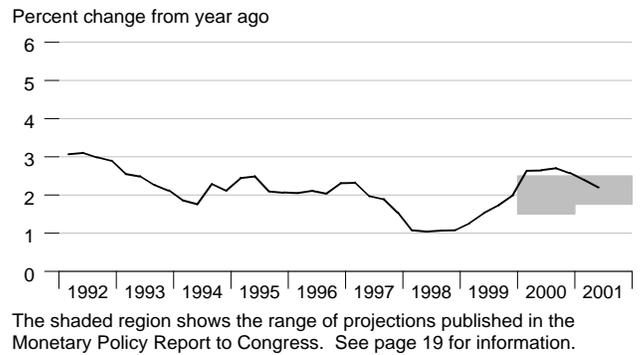
### Federal Funds Rate and Inflation Targets



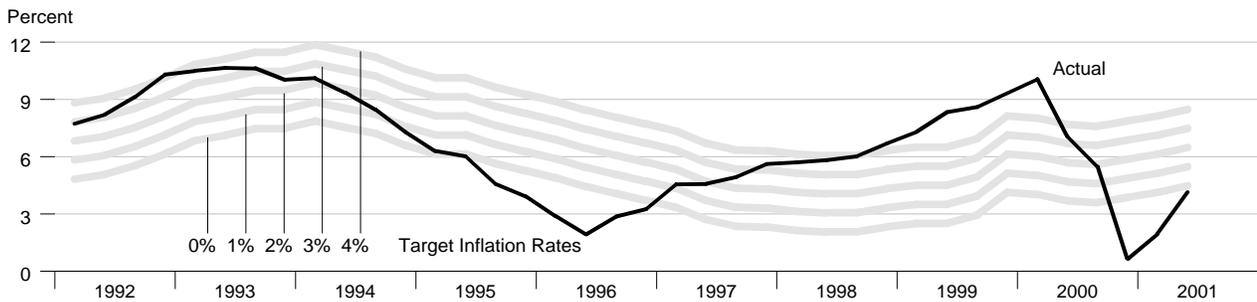
### Actual and Potential Real GDP



### PCE Inflation and Projections

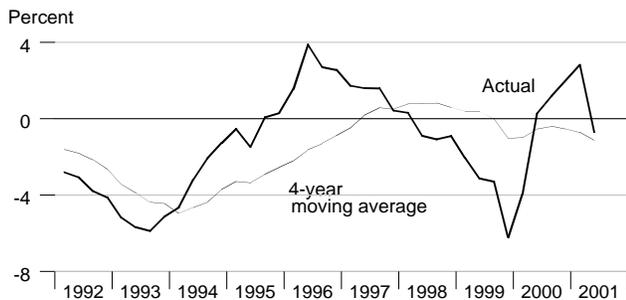


### Monetary Base Growth\* and Inflation Targets

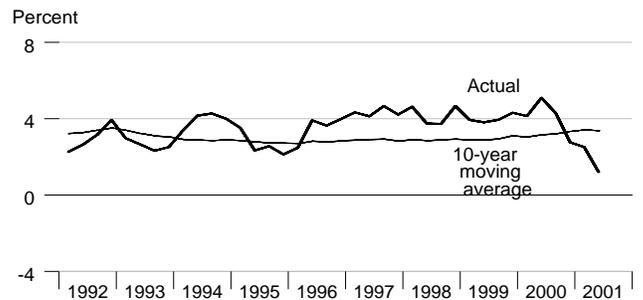


\*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

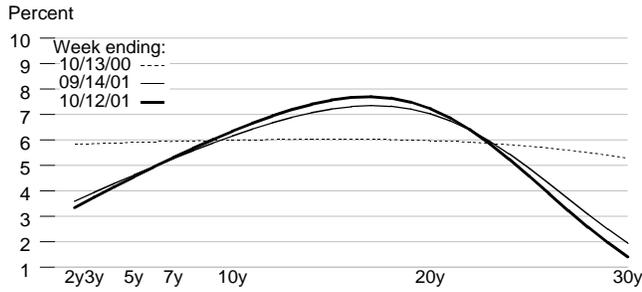
### Monetary Base Velocity Growth



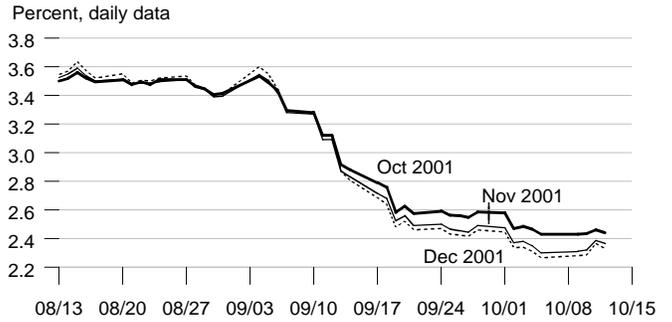
### Real Output Growth



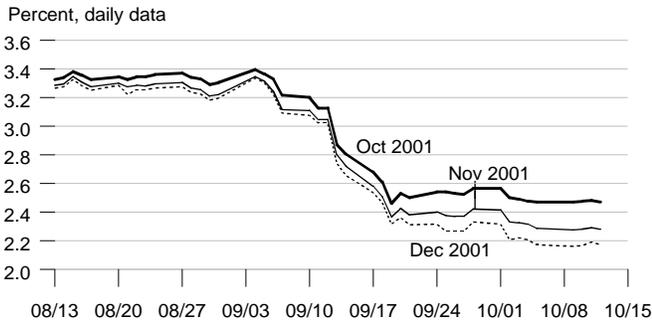
**Implied One-Year Forward Rates**



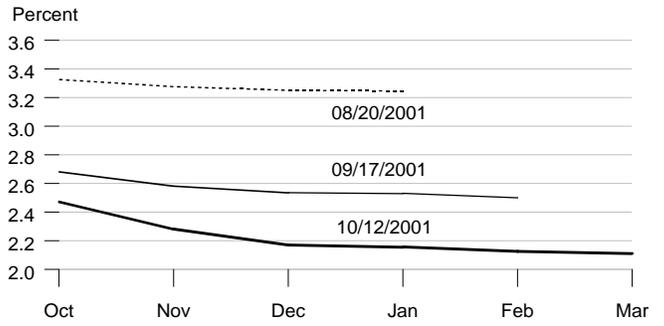
**Rates on 3-Month Eurodollar Futures**



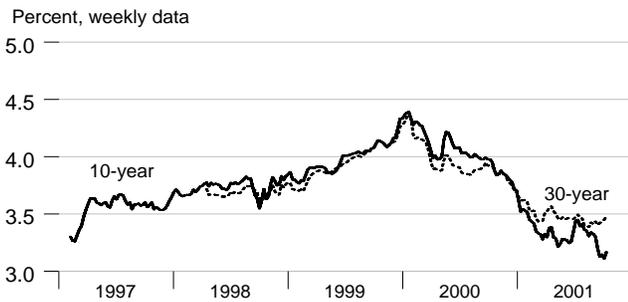
**Rates on Selected Fed Funds Futures Contracts**



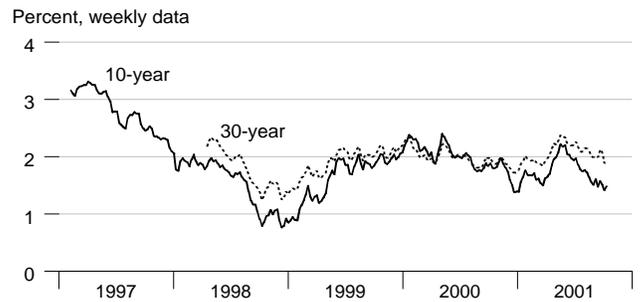
**Implied Yields on Fed Funds Futures**



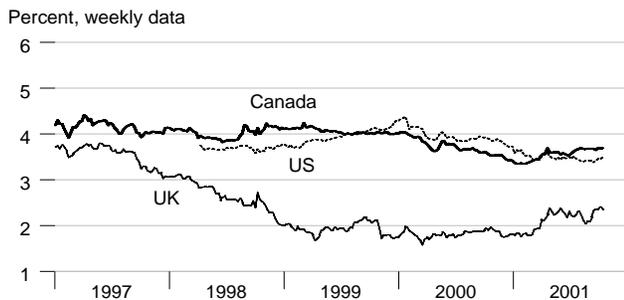
**Inflation-Protected Treasury Yields**



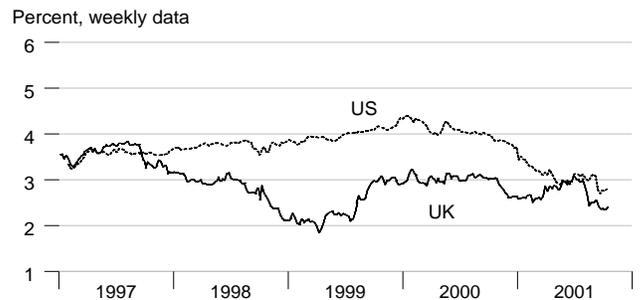
**Inflation-Protected Treasury Yield Spreads**



**Inflation-Indexed 30-Year Bonds**



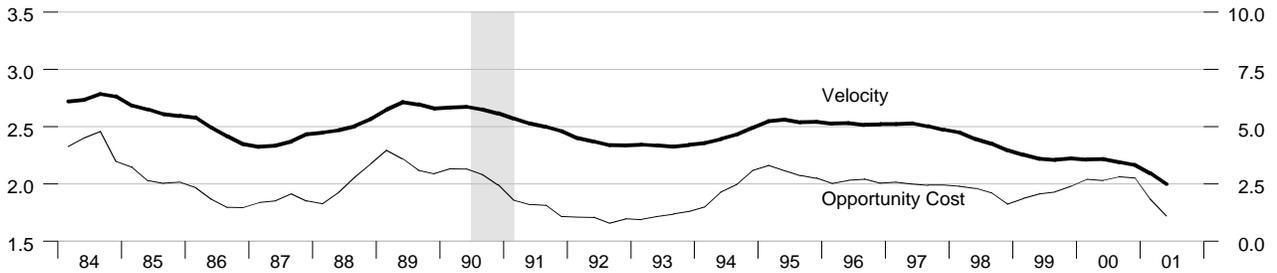
**Inflation-Indexed 10-Year Bonds**



### MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

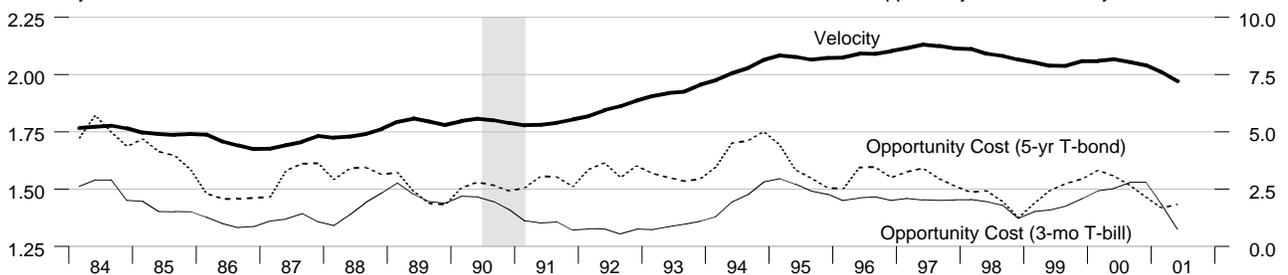
Opportunity Cost = 3 month T-bill rate less MZM own rate



### M2 Velocity and Opportunity Cost

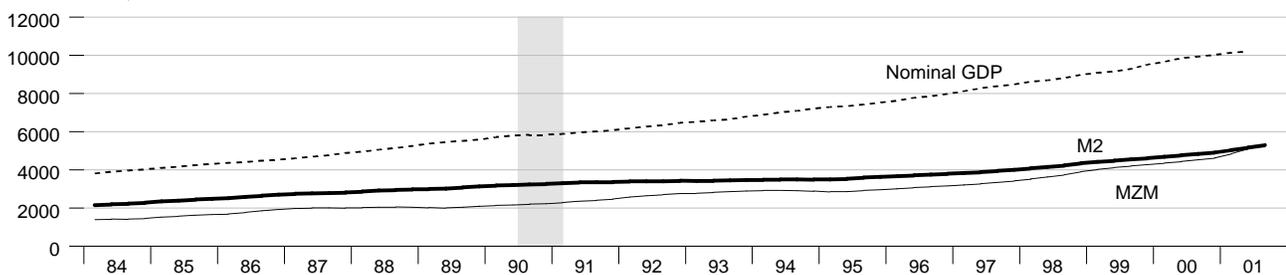
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



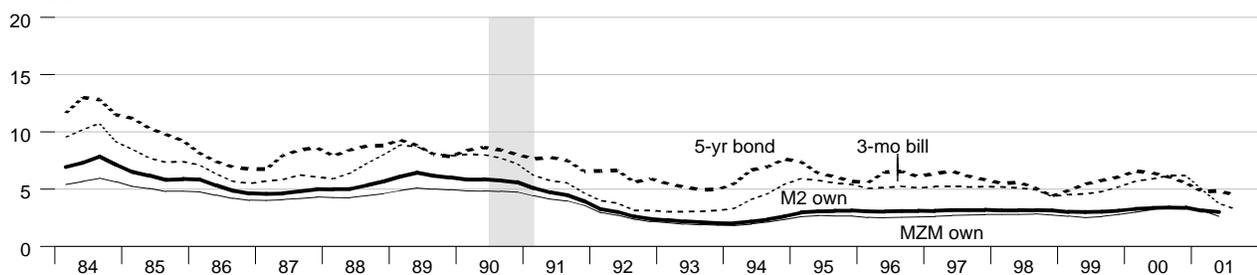
### M2, MZM and Nominal GDP

Billions of \$



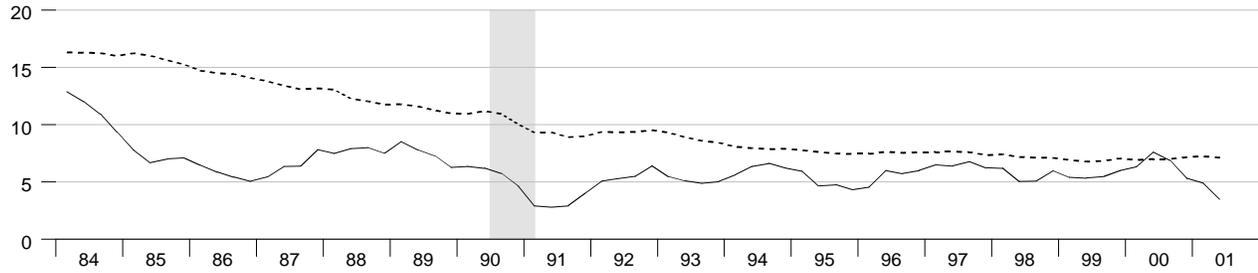
### Interest Rates

Percent



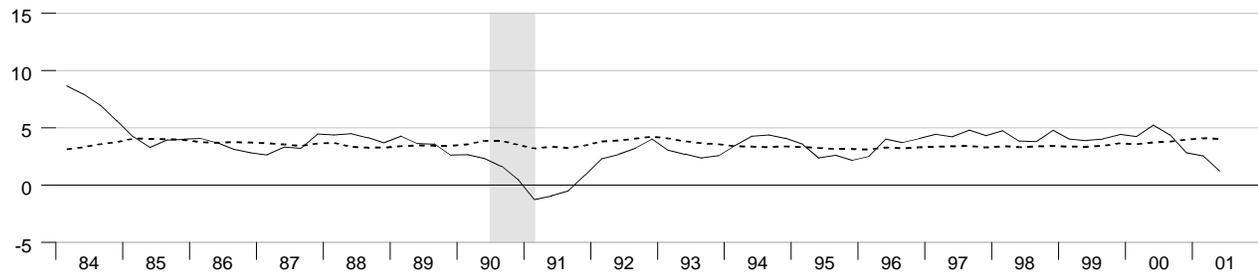
### Gross Domestic Product

Percent change from year ago



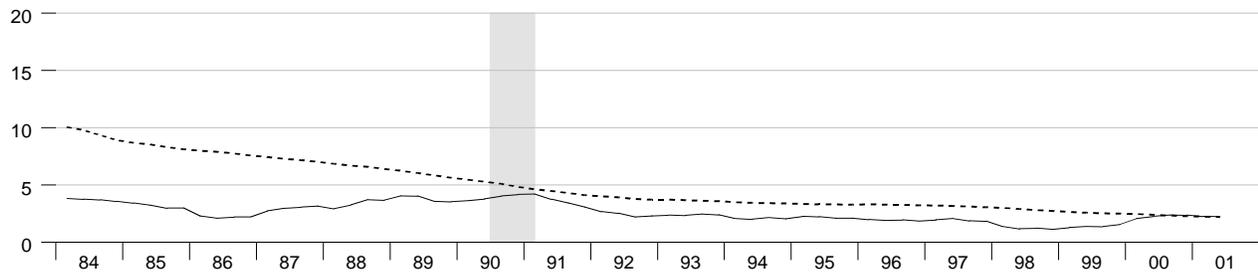
### Real Gross Domestic Product

Percent change from year ago



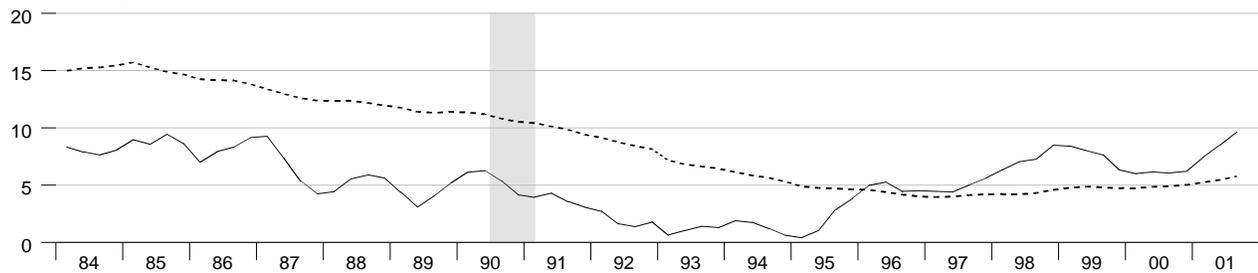
### Gross Domestic Product Price Index

Percent change from year ago



### M2

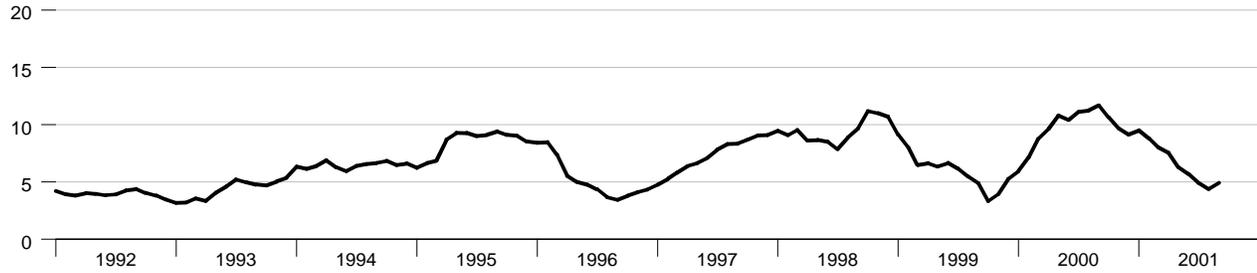
Percent change from year ago



Dashed lines indicate 10-year moving averages

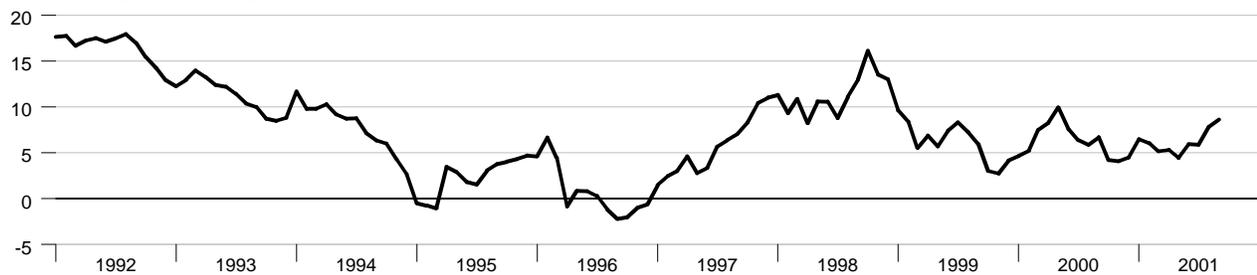
**Bank Credit**

Percent change from year ago



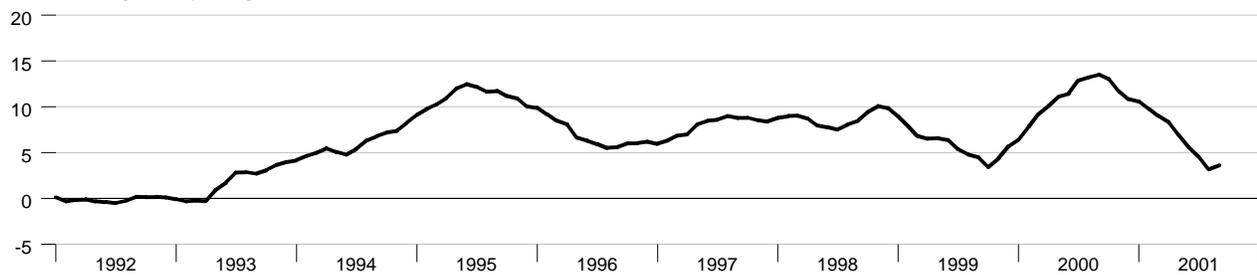
**Investment Securities in Bank Credit at Commercial Banks**

Percent change from year ago



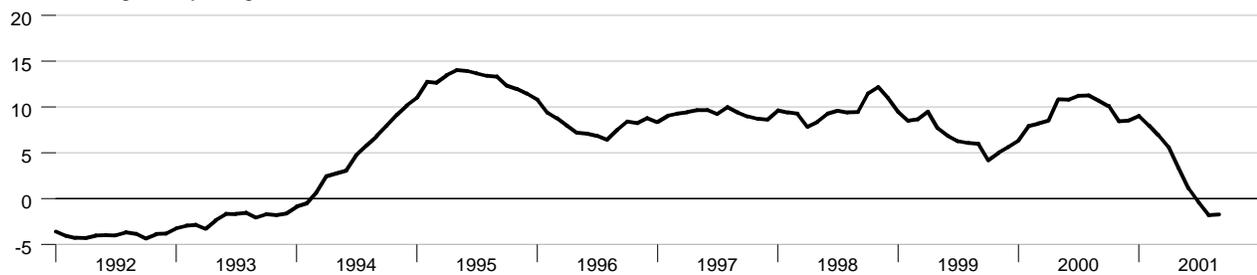
**Total Loans and Leases in Bank Credit at Commercial Banks**

Percent change from year ago

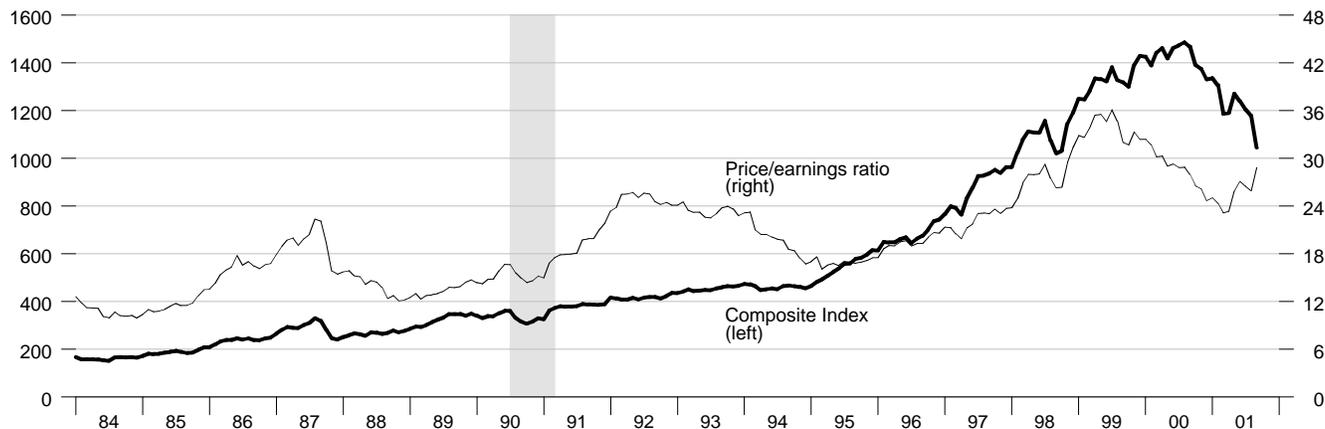


**Commercial and Industrial Loans at Commercial Banks**

Percent change from year ago



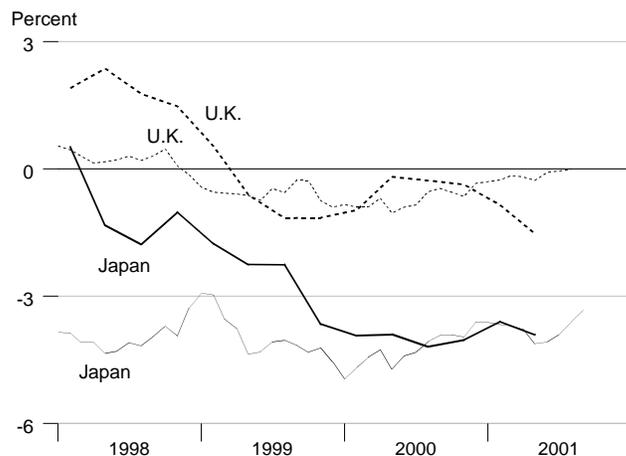
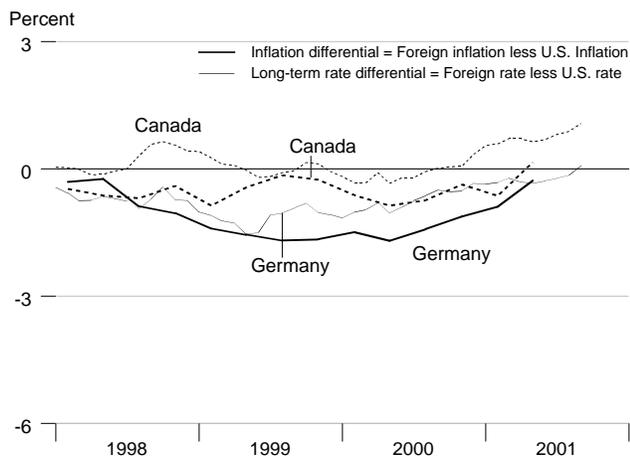
### Standard and Poor's 500



### Inflation and Long-Term Interest Rates

|                | Trend in Consumer Price Inflation Rates<br>Percent change from year ago |        |        |        | Recent Long-Term Government Bond Rates<br>Percent |       |       |       |
|----------------|---|--------|--------|--------|---|-------|-------|-------|
|                | 2000Q3  | 2000Q4 | 2001Q1 | 2001Q2 | Jun01   | Jul01 | Aug01 | Sep01 |
| United States  | 3.47  | 3.44   | 3.41   | 3.44   | 5.28  | 5.24  | 4.97  | 4.73  |
| Canada         | 2.73  | 3.08   | 2.77   | 3.60   | 5.97  | 6.05  | 5.85  | 5.80  |
| France         | 1.89  | 1.89   | 1.29   | 2.02   | 5.57  | 5.46  | 5.29  | .     |
| Germany        | 2.05  | 2.32   | 2.52   | 3.16   | 5.00  | 5.02  | 4.82  | 4.81  |
| Italy          | 2.32  | 2.67   | 2.89   | 3.05   | 5.39  | 5.40  | 5.22  | 5.20  |
| Japan          | -0.72   | -0.59  | -0.20  | -0.46  | 1.20  | 1.33  | 1.36  | 1.40  |
| United Kingdom | 3.20  | 3.07   | 2.55   | 1.91   | 5.20  | 5.19  | 4.96  | .     |

### Inflation and Long-Term Interest Rates Differentials



|      |       | Money Stock |          |          |          | Bank     |               |          |         |
|------|-------|-------------|----------|----------|----------|----------|---------------|----------|---------|
|      |       | M1          | MZM      | M2       | M3       | Credit   | Monetary Base | Reserves | MSI M2  |
|      | 1996  | 1105.818    | 3096.125 | 3739.297 | 4811.846 | 3685.243 | 455.572       | 73.952   | 217.463 |
|      | 1997  | 1069.145    | 3318.867 | 3921.981 | 5206.953 | 3953.493 | 478.708       | 69.523   | 226.608 |
|      | 1998  | 1079.795    | 3706.274 | 4208.613 | 5740.107 | 4326.599 | 508.942       | 67.808   | 241.647 |
|      | 1999  | 1101.661    | 4163.696 | 4527.993 | 6251.212 | 4585.144 | 557.865       | 72.360   | 258.034 |
|      | 2000  | 1103.866    | 4496.753 | 4805.105 | 6834.212 | 5029.014 | 590.821       | 68.319   | 272.755 |
|      | <hr/> |             |          |          |          |          |               |          |         |
| 1999 | 1     | 1098.625    | 4032.495 | 4429.975 | 6094.477 | 4517.050 | 536.334       | 68.521   | 252.787 |
|      | 2     | 1102.740    | 4128.668 | 4494.332 | 6188.695 | 4528.386 | 545.912       | 67.392   | 256.223 |
|      | 3     | 1095.559    | 4207.215 | 4561.360 | 6278.751 | 4586.091 | 557.969       | 69.050   | 259.750 |
|      | 4     | 1109.718    | 4286.407 | 4626.303 | 6442.925 | 4709.048 | 591.246       | 84.477   | 263.377 |
| 2000 | 1     | 1115.416    | 4368.912 | 4695.981 | 6615.463 | 4845.618 | 593.102       | 72.390   | 266.963 |
|      | 2     | 1109.967    | 4448.594 | 4771.350 | 6763.296 | 4993.643 | 586.045       | 67.097   | 270.750 |
|      | 3     | 1099.561    | 4538.641 | 4838.632 | 6915.511 | 5106.142 | 589.054       | 66.636   | 274.657 |
|      | 4     | 1090.519    | 4630.863 | 4914.457 | 7042.577 | 5170.653 | 595.084       | 67.150   | 278.650 |
| 2001 | 1     | 1104.185    | 4846.699 | 5045.396 | 7281.216 | 5269.948 | 604.850       | 66.513   | 285.920 |
|      | 2     | 1119.066    | 5105.925 | 5177.059 | 7553.925 | 5318.028 | 610.943       | 65.171   | 293.497 |
|      | 3     | 1152.217    | 5309.961 | 5305.332 | 7717.410 | 5347.763 | 633.685       | 73.636   | 300.727 |
|      | <hr/> |             |          |          |          |          |               |          |         |
| 1999 | Sep   | 1093.388    | 4225.147 | 4578.436 | 6303.230 | 4614.814 | 564.135       | 71.113   | 260.750 |
|      | Oct   | 1096.970    | 4251.923 | 4599.722 | 6357.521 | 4645.008 | 572.990       | 73.928   | 261.920 |
|      | Nov   | 1107.434    | 4286.589 | 4625.905 | 6443.344 | 4706.170 | 588.675       | 84.023   | 263.320 |
|      | Dec   | 1124.750    | 4320.709 | 4653.281 | 6527.911 | 4775.967 | 612.073       | 95.479   | 264.890 |
| 2000 | Jan   | 1123.267    | 4348.064 | 4675.512 | 6569.730 | 4803.561 | 604.796       | 80.824   | 266.040 |
|      | Feb   | 1109.242    | 4358.041 | 4690.942 | 6602.927 | 4843.990 | 589.984       | 69.258   | 266.710 |
|      | Mar   | 1113.739    | 4400.631 | 4721.490 | 6673.732 | 4889.303 | 584.525       | 67.089   | 268.140 |
|      | Apr   | 1117.934    | 4434.341 | 4759.663 | 6725.071 | 4943.559 | 583.053       | 65.913   | 270.090 |
|      | May   | 1106.712    | 4445.362 | 4766.589 | 6757.266 | 5007.542 | 587.863       | 68.889   | 270.450 |
|      | Jun   | 1105.255    | 4466.080 | 4787.799 | 6807.550 | 5029.827 | 587.220       | 66.490   | 271.710 |
|      | Jul   | 1103.351    | 4499.522 | 4807.879 | 6857.459 | 5063.438 | 588.032       | 66.555   | 272.930 |
|      | Aug   | 1099.380    | 4536.293 | 4838.017 | 6917.651 | 5101.463 | 588.435       | 66.664   | 274.640 |
|      | Sep   | 1095.953    | 4580.107 | 4870.001 | 6971.423 | 5153.525 | 590.694       | 66.689   | 276.400 |
|      | Oct   | 1096.147    | 4603.242 | 4891.430 | 6995.687 | 5139.456 | 593.064       | 66.687   | 277.470 |
|      | Nov   | 1087.217    | 4621.121 | 4906.816 | 7023.679 | 5160.209 | 595.549       | 67.685   | 278.240 |
|      | Dec   | 1088.194    | 4668.227 | 4945.124 | 7108.366 | 5212.293 | 596.639       | 67.079   | 280.240 |
| 2001 | Jan   | 1099.502    | 4744.973 | 4995.163 | 7210.103 | 5259.468 | 600.887       | 67.999   | 282.980 |
|      | Feb   | 1100.229    | 4850.193 | 5040.334 | 7281.669 | 5269.467 | 607.236       | 66.558   | 285.720 |
|      | Mar   | 1112.823    | 4944.930 | 5100.692 | 7351.875 | 5280.910 | 606.426       | 64.981   | 289.060 |
|      | Apr   | 1117.625    | 5025.857 | 5146.302 | 7468.660 | 5316.413 | 605.803       | 63.241   | 291.580 |
|      | May   | 1116.884    | 5102.936 | 5170.662 | 7555.790 | 5322.173 | 613.264       | 67.022   | 293.300 |
|      | Jun   | 1122.690    | 5188.982 | 5214.212 | 7637.324 | 5315.498 | 613.761       | 65.249   | 295.610 |
|      | Jul   | 1135.361    | 5245.788 | 5252.578 | 7677.910 | 5311.909 | 619.434       | 66.748   | 297.540 |
|      | Aug   | 1142.899    | 5269.521 | 5284.883 | 7673.930 | 5324.639 | 627.364       | 66.488   | 299.820 |
|      | Sep   | 1178.391    | 5414.574 | 5378.535 | 7800.390 | 5406.741 | 654.256       | 87.672   | 304.820 |

\*All values are given in billions of dollars

|      |     | Federal | Discount | Prime | 3-mo | Treasury Yields |      |      | Corporate | S & L     | Conventional |
|------|-----|---------|----------|-------|------|-----------------|------|------|-----------|-----------|--------------|
|      |     | Funds   | Rate     | Rate  |      | CDs             | 3 mo | 3 yr | 30 yr     | Aaa Bonds |              |
| 1996 |     | 5.30    | 5.02     | 8.27  | 5.39 | 5.15            | 5.99 | 6.70 | 7.37      | 5.52      | 7.80         |
| 1997 |     | 5.46    | 5.00     | 8.44  | 5.62 | 5.20            | 6.10 | 6.61 | 7.26      | 5.32      | 7.60         |
| 1998 |     | 5.35    | 4.92     | 8.35  | 5.47 | 4.91            | 5.14 | 5.58 | 6.53      | 4.93      | 6.94         |
| 1999 |     | 4.97    | 4.62     | 7.99  | 5.33 | 4.78            | 5.49 | 5.87 | 7.04      | 5.28      | 7.43         |
| 2000 |     | 6.24    | 5.73     | 9.23  | 6.46 | 6.00            | 6.22 | 5.94 | 7.62      | 5.58      | 8.06         |
| 1999 | 1   | 4.73    | 4.50     | 7.75  | 4.90 | 4.53            | 4.87 | 5.37 | 6.42      | 4.87      | 6.88         |
|      | 2   | 4.75    | 4.50     | 7.75  | 4.98 | 4.59            | 5.35 | 5.80 | 6.93      | 5.05      | 7.20         |
|      | 3   | 5.09    | 4.60     | 8.10  | 5.38 | 4.79            | 5.71 | 6.04 | 7.33      | 5.42      | 7.80         |
|      | 4   | 5.31    | 4.87     | 8.37  | 6.06 | 5.20            | 6.00 | 6.25 | 7.49      | 5.79      | 7.83         |
| 2000 | 1   | 5.68    | 5.19     | 8.69  | 6.03 | 5.70            | 6.56 | 6.30 | 7.71      | 5.82      | 8.26         |
|      | 2   | 6.27    | 5.74     | 9.25  | 6.57 | 5.89            | 6.52 | 5.98 | 7.77      | 5.72      | 8.32         |
|      | 3   | 6.52    | 6.00     | 9.50  | 6.63 | 6.20            | 6.16 | 5.80 | 7.61      | 5.45      | 8.03         |
|      | 4   | 6.47    | 6.00     | 9.50  | 6.59 | 6.20            | 5.63 | 5.69 | 7.40      | 5.32      | 7.64         |
| 2001 | 1   | 5.59    | 5.11     | 8.62  | 5.26 | 4.95            | 4.64 | 5.44 | 7.08      | 5.03      | 7.01         |
|      | 2   | 4.33    | 3.83     | 7.34  | 4.10 | 3.75            | 4.43 | 5.70 | 7.22      | 5.11      | 7.13         |
|      | 3   | 3.50    | 3.06     | 6.57  | 3.34 | 3.24            | 3.93 | 5.52 | 7.11      | 4.87      | 6.97         |
| 1999 | Sep | 5.22    | 4.75     | 8.25  | 5.50 | 4.82            | 5.75 | 6.07 | 7.39      | 5.56      | 7.82         |
|      | Oct | 5.20    | 4.75     | 8.25  | 6.13 | 5.02            | 5.94 | 6.26 | 7.55      | 5.78      | 7.85         |
|      | Nov | 5.42    | 4.86     | 8.37  | 6.00 | 5.23            | 5.92 | 6.15 | 7.36      | 5.77      | 7.74         |
|      | Dec | 5.30    | 5.00     | 8.50  | 6.05 | 5.36            | 6.14 | 6.35 | 7.55      | 5.82      | 7.91         |
| 2000 | Jan | 5.46    | 5.00     | 8.50  | 5.95 | 5.50            | 6.49 | 6.63 | 7.78      | 5.91      | 8.21         |
|      | Feb | 5.73    | 5.24     | 8.73  | 6.01 | 5.73            | 6.65 | 6.23 | 7.68      | 5.88      | 8.33         |
|      | Mar | 5.85    | 5.34     | 8.83  | 6.14 | 5.86            | 6.53 | 6.05 | 7.68      | 5.68      | 8.24         |
|      | Apr | 6.02    | 5.50     | 9.00  | 6.28 | 5.82            | 6.36 | 5.85 | 7.64      | 5.60      | 8.15         |
|      | May | 6.27    | 5.71     | 9.24  | 6.71 | 5.99            | 6.77 | 6.15 | 7.99      | 5.87      | 8.52         |
|      | Jun | 6.53    | 6.00     | 9.50  | 6.73 | 5.86            | 6.43 | 5.93 | 7.67      | 5.69      | 8.29         |
|      | Jul | 6.54    | 6.00     | 9.50  | 6.67 | 6.14            | 6.28 | 5.85 | 7.65      | 5.53      | 8.15         |
|      | Aug | 6.50    | 6.00     | 9.50  | 6.61 | 6.28            | 6.17 | 5.72 | 7.55      | 5.43      | 8.03         |
|      | Sep | 6.52    | 6.00     | 9.50  | 6.60 | 6.18            | 6.02 | 5.83 | 7.62      | 5.40      | 7.91         |
|      | Oct | 6.51    | 6.00     | 9.50  | 6.67 | 6.29            | 5.85 | 5.80 | 7.55      | 5.46      | 7.80         |
|      | Nov | 6.51    | 6.00     | 9.50  | 6.65 | 6.36            | 5.79 | 5.78 | 7.45      | 5.38      | 7.75         |
|      | Dec | 6.40    | 6.00     | 9.50  | 6.45 | 5.94            | 5.26 | 5.49 | 7.21      | 5.11      | 7.38         |
| 2001 | Jan | 5.98    | 5.52     | 9.05  | 5.62 | 5.29            | 4.77 | 5.54 | 7.15      | 4.99      | 7.03         |
|      | Feb | 5.49    | 5.00     | 8.50  | 5.26 | 5.01            | 4.71 | 5.45 | 7.10      | 5.09      | 7.05         |
|      | Mar | 5.31    | 4.81     | 8.32  | 4.89 | 4.54            | 4.43 | 5.34 | 6.98      | 5.00      | 6.95         |
|      | Apr | 4.80    | 4.28     | 7.80  | 4.53 | 3.97            | 4.42 | 5.65 | 7.20      | 5.14      | 7.08         |
|      | May | 4.21    | 3.73     | 7.24  | 4.02 | 3.70            | 4.51 | 5.78 | 7.29      | 5.15      | 7.15         |
|      | Jun | 3.97    | 3.47     | 6.98  | 3.74 | 3.57            | 4.35 | 5.67 | 7.18      | 5.03      | 7.16         |
|      | Jul | 3.77    | 3.25     | 6.75  | 3.66 | 3.59            | 4.31 | 5.61 | 7.13      | 4.79      | 7.13         |
|      | Aug | 3.65    | 3.16     | 6.67  | 3.48 | 3.44            | 4.04 | 5.48 | 7.02      | 4.89      | 6.95         |
|      | Sep | 3.07    | 2.77     | 6.28  | 2.87 | 2.69            | 3.45 | 5.48 | 7.17      | 4.93      | 6.82         |

\*All values are given as a percent at an annual rate

|                                     |     | M1    | MZM   | M2   | M3    |
|-------------------------------------|-----|-------|-------|------|-------|
| Percent change from previous period |     |       |       |      |       |
| 1996                                |     | -3.21 | 6.56  | 4.80 | 6.75  |
| 1997                                |     | -3.32 | 7.19  | 4.89 | 8.21  |
| 1998                                |     | 1.00  | 11.67 | 7.31 | 10.24 |
| 1999                                |     | 2.02  | 12.34 | 7.59 | 8.90  |
| 2000                                |     | 0.20  | 8.00  | 6.12 | 9.33  |
| <hr/>                               |     |       |       |      |       |
| 1999                                | 1   | 0.83  | 2.97  | 1.80 | 1.89  |
|                                     | 2   | 0.37  | 2.38  | 1.45 | 1.55  |
|                                     | 3   | -0.65 | 1.90  | 1.49 | 1.46  |
|                                     | 4   | 1.29  | 1.88  | 1.42 | 2.61  |
| 2000                                | 1   | 0.51  | 1.92  | 1.51 | 2.68  |
|                                     | 2   | -0.49 | 1.82  | 1.60 | 2.23  |
|                                     | 3   | -0.94 | 2.02  | 1.41 | 2.25  |
|                                     | 4   | -0.82 | 2.03  | 1.57 | 1.84  |
| 2001                                | 1   | 1.25  | 4.66  | 2.66 | 3.39  |
|                                     | 2   | 1.35  | 5.35  | 2.61 | 3.75  |
|                                     | 3   | 2.96  | 4.00  | 2.48 | 2.16  |
| <hr/>                               |     |       |       |      |       |
| 1999                                | Sep | -0.22 | 0.35  | 0.36 | 0.41  |
|                                     | Oct | 0.33  | 0.63  | 0.46 | 0.86  |
|                                     | Nov | 0.95  | 0.82  | 0.57 | 1.35  |
|                                     | Dec | 1.56  | 0.80  | 0.59 | 1.31  |
| <hr/>                               |     |       |       |      |       |
| 2000                                | Jan | -0.13 | 0.63  | 0.48 | 0.64  |
|                                     | Feb | -1.25 | 0.23  | 0.33 | 0.51  |
|                                     | Mar | 0.41  | 0.98  | 0.65 | 1.07  |
|                                     | Apr | 0.38  | 0.77  | 0.81 | 0.77  |
|                                     | May | -1.00 | 0.25  | 0.15 | 0.48  |
|                                     | Jun | -0.13 | 0.47  | 0.44 | 0.74  |
|                                     | Jul | -0.17 | 0.75  | 0.42 | 0.73  |
|                                     | Aug | -0.36 | 0.82  | 0.63 | 0.88  |
|                                     | Sep | -0.31 | 0.97  | 0.66 | 0.78  |
|                                     | Oct | 0.02  | 0.51  | 0.44 | 0.35  |
|                                     | Nov | -0.81 | 0.39  | 0.31 | 0.40  |
|                                     | Dec | 0.09  | 1.02  | 0.78 | 1.21  |
| <hr/>                               |     |       |       |      |       |
| 2001                                | Jan | 1.04  | 1.64  | 1.01 | 1.43  |
|                                     | Feb | 0.07  | 2.22  | 0.90 | 0.99  |
|                                     | Mar | 1.14  | 1.95  | 1.20 | 0.96  |
|                                     | Apr | 0.43  | 1.64  | 0.89 | 1.59  |
|                                     | May | -0.07 | 1.53  | 0.47 | 1.17  |
|                                     | Jun | 0.52  | 1.69  | 0.84 | 1.08  |
|                                     | Jul | 1.13  | 1.09  | 0.74 | 0.53  |
|                                     | Aug | 0.66  | 0.45  | 0.62 | -0.05 |
|                                     | Sep | 3.11  | 2.75  | 1.77 | 1.65  |

## Definitions

**M1:** The sum of currency held outside the vaults of depository institutions, Federal Reserve Banks, and the U.S. Treasury; travelers checks; and demand and other checkable deposits issued by financial institutions (except demand deposits due to the Treasury and depository institutions), minus cash items in process of collection and Federal Reserve float.

**MZM:** M2 minus small denomination time deposits, plus institutional money market mutual funds. The label MZM was coined by William Poole (1991) for this aggregate, proposed earlier by Motley (1988).

**M2:** M1 plus savings deposits (including money market deposit accounts) and small-denomination (less than \$100,000) time deposits issued by financial institutions; and shares in retail money market mutual funds (funds with initial investments of less than \$50,000), net of retirement accounts.

**M3:** M2 plus large-denomination (\$100,000 or more) time deposits; repurchase agreements issued by depository institutions; Eurodollar deposits, specifically, dollar-denominated deposits due to nonbank U.S. addresses held at foreign offices of U.S. banks worldwide and all banking offices in Canada and the United Kingdom; and institutional money market mutual funds (funds with initial investments of \$50,000 or more).

**Bank Credit:** All loans, leases, and securities held by commercial banks.

**Domestic Nonfinancial Debt:** Total credit market liabilities of the U.S. Treasury, federally sponsored agencies, state and local governments, households, and firms (except depository institutions and money market mutual funds).

**Adjusted Monetary Base:** The sum of currency in circulation outside Federal Reserve Banks and the U.S. Treasury, deposits of depository financial institutions at Federal Reserve Banks, and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories. This series is a spliced chain index; see Anderson and Rasche (1996a,b).

**Adjusted Reserves:** The sum of vault cash and Federal Reserve Bank deposits held by depository institutions and an adjustment for the effects of changes in statutory reserve requirements on the quantity of base money held by depositories. This series, a spliced chain index, is numerically larger than the Board of Governors' measure, which excludes vault cash not used to satisfy statutory reserve requirements and Federal Reserve Bank deposits used to satisfy required clearing balance contracts; see Anderson and Rasche (1996a) and [www.stls.frb.org/research/newbase.html](http://www.stls.frb.org/research/newbase.html).

**Monetary Services Index:** An index that measures the flow of monetary services received by households and firms from their holdings of liquid assets; see Anderson, Jones, and Nesmith (1997). Indexes are shown for the assets included in M2; additional data are available at [www.stls.frb.org/research/msi/index.html](http://www.stls.frb.org/research/msi/index.html).

*Note:* M1, M2, M3, Bank Credit, and Domestic Nonfinancial Debt are constructed and published by the Board of Governors of the Federal Reserve System. For details, see *Federal Reserve Bulletin*, tables 1.21 and 1.26. MZM, Adjusted Monetary Base, Adjusted Reserves, and Monetary Services Index are constructed and published by the Research Division of the Federal Reserve Bank of St. Louis.

## Notes

*Page 3:* **MZM**, or "Money, Zero Maturity," includes the zero maturity, or immediately available, components of M3. MZM equals M2 minus small-denomination time deposits, plus institutional money market mutual funds (that is, the money market mutual funds included in M3 but excluded from M2). Readers are cautioned that since early 1994 the level and growth of M1 have been depressed by retail sweep programs that reclassify transactions deposits (demand deposits and other checkable deposits) as savings deposits overnight, thereby reducing banks' required reserves; see Anderson and Rasche (2001) and

[www.stls.frb.org/research/swdata.html](http://www.stls.frb.org/research/swdata.html). For analytical purposes, MZM largely replaces M1. The **Discount Rate** and **Expected Federal Funds Rate** shown in the chart **Reserve Market Rates** are plotted as of the date of the change, while the **Effective Federal Funds Rate** is plotted as of the end of the month. Interest rates in the table are monthly averages from the Board of Governors H.15 Statistical Release. The **Treasury Yield Curve** shows constant maturity yields calculated by the U.S. Treasury Department for securities with 3 months and 1, 2, 3, 5, 7, 10, 20, and 30 years to maturity. Daily data and descriptions are available at [www.stls.frb.org/fred/data/wkly.html](http://www.stls.frb.org/fred/data/wkly.html). See also *Federal Reserve Bulletin*, table 1.35.

*Page 5:* **Total Checkable Deposits** is the sum of demand and other checkable deposits. **Total Savings Deposits** is the sum of money market deposit accounts and passbook and statement savings. **Time Deposits** have a minimum initial maturity of 7 days. **Large Time Deposits** are deposits of \$100,000 or more. **Retail** and **Institutional Money Market Mutual Funds** are as included in M2 and the non-M2 component of M3, respectively.

*Page 7:* **Excess Reserves plus RCB (Required Clearing Balance) Contracts** equals the amount of deposits at Federal Reserve Banks held by depository institutions but not applied to satisfy statutory reserve requirements. (This measure excludes the vault cash held by depository institutions that is not applied to satisfy statutory reserve requirements.) **Consumer Credit** includes most short- and intermediate-term credit extended to individuals. See *Federal Reserve Bulletin*, table 1.55.

*Page 8:* **Inflation Expectations** measures include the quarterly Federal Reserve Bank of Philadelphia *Survey of Professional Forecasters*, the monthly University of Michigan Survey Research Center's *Surveys of Consumers*, and the annual Federal Open Market Committee range as reported to the Congress in the February Humphrey-Hawkins Act testimony each year. Beginning February 2000, the FOMC began using the Personal Consumption Expenditures (PCE) price index to report its inflation range and therefore is not shown on this graph. **CPI Inflation** is the percentage change from a year ago in the CPI for all urban consumers. **Real Interest Rates** are ex post measures, equal to nominal rates minus CPI inflation.

*Page 9:* **FOMC Expected Federal Funds Rate** is the level (or midpoint of the range, if applicable) of the federal funds rate that the staff of the Federal Open Market Committee expected to be consistent with the desired degree of pressure on bank reserve positions.

*Page 10:* **Federal Funds Rate and Inflation Targets** shows the observed federal funds rate, quarterly, and the level of the funds rate implied by applying Taylor's (1993) equation

$$f_t^* = 2.5 + \pi_{t-1} + (\pi_{t-1} - \bar{\pi})/2 + 100 \times (y_{t-1} - y_{t-1}^p)/2$$

to five alternative target inflation rates,  $\bar{\pi} = 0, 1, 2, 3, 4$  percent, where  $f_t^*$  is the implied federal funds rate,  $\pi_{t-1}$  is the previous period's inflation rate (PCE) measured on a year-over-year basis,  $y_{t-1}$  is the log of the previous period's level of real GDP, and  $y_{t-1}^p$  is the log of an estimate of the previous period's level of potential output. **Potential Real GDP** is as estimated by the Congressional Budget Office.

**Monetary Base Growth and Inflation Targets** shows the quarterly growth of the adjusted monetary base (modified to include an estimate of the effect of sweep programs) implied by applying McCallum's (1988, 1993) equation

$$\Delta MB_t^* = \bar{\pi} + (10\text{-year moving average growth of real GDP}) \\ - (4\text{-year moving average of base velocity growth})$$

to five alternative target inflation rates,  $\bar{\pi} = 0, 1, 2, 3, 4$  percent, where  $\Delta MB_t^*$  is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter "t" is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula  $((y_t - y_{t-40})/40) \times 4 \times 100$ , where  $y_t$  is the log of real GDP. The four-year moving average of base velocity growth is calculated similarly. To adjust the monetary base for the effect of retail-deposit sweep programs, we add to the monetary base an amount equal to 10 percent of the total amount swept, as estimated by the Federal Reserve Board staff. These estimates are imprecise, at best. Sweep program data are available at [www.stls.frb.org/research/swdata.html](http://www.stls.frb.org/research/swdata.html).

Page 11: **Implied One-Year Forward Rates** are calculated by this Bank from Treasury constant maturity yields. Yields to maturity,  $R(m)$ , for securities with  $m = 1, \dots, 30$  years to maturity are obtained by linear interpolation between reported yields. These yields are smoothed by fitting the regression suggested by Nelson and Siegel (1987),

$$R(m) = a_0 + (a_1 + a_2)(1 - e^{-m/50})/(m/50) - a_2 \times e^{-m/50},$$

and forward rates are calculated from these smoothed yields using equation (a) in table 13.1 of Shiller (1990),

$$f(m) = [D(m)R(m) - D(m-1)] / [D(m) - D(m-1)],$$

where duration is approximated as  $D(m) = (1 - e^{-R(m) \times m}) / R(m)$ . These rates are linear approximations to the true instantaneous forward rates; see Shiller (1990). For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Eurodollar Futures and Rates on Selected Fed Funds Futures Contracts** each trace through time the yield on three specific contracts. **Implied Yields on Fed Funds Futures** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Protected Treasury Yields** are yields on the most recently issued inflation-protected securities of 10- and 30-year original maturity. **Inflation-Protected Treasury Yield Spreads** equal the differences between the Treasury constant maturity yields and yields on the most recently issued inflation-protected securities of similar original maturity. **Inflation-Indexed Bonds** are, for Canada, the 31-year bond with a maturity date of 12/01/2026; for the U.K., the 37.5-year bond with a maturity date of 07/17/2024 and the 12.1-year bond with a maturity date of 10/21/2004; and, for the U.S., the 30-year bond with a maturity date of 04/15/2028 and the 10-year bond with a maturity date of 01/15/2007.

Page 12: **Velocity** (for MZM and M2) equals the ratio of GDP, measured in current dollars, to the level of the monetary aggregate. **MZM** and **M2 Own Rates** are weighted averages of the rates received by households and firms on the assets included in the aggregates. Two alternative opportunity costs are shown, one relative to the 3-month Treasury constant-maturity yield, the other to the 5-year constant-maturity yield.

Page 13: **Real Gross Domestic Product** is GDP as measured in chained 1996 dollars. The **Gross Domestic Product Price Index** is the implicit price deflator for GDP, which is defined by the Bureau of Economic Analysis, U.S. Department of Commerce, as the ratio of GDP measured in current dollars to GDP measured in chained 1996 dollars.

Page 14: **Investment Securities** are all securities held by commercial banks in both investment and trading accounts.

## Sources

### Bank of Canada

Canadian inflation-linked bond yields.

### Bank of England

U.K. inflation-linked bond yields.

### Board of Governors of the Federal Reserve System

Monetary aggregates and components, nonfinancial debt: H.6 release. Bank credit and components: H.8 release. Consumer credit: G.19 release. Required reserves, excess reserves, clearing balance contracts, and discount window borrowing: H.4.1 and H.3 releases. Interest rates: H.15 release. Nonfinancial commercial paper: Board of Governors web site. M2 own rate.

### Bureau of Economic Analysis

Gross domestic product.

### Bureau of Labor Statistics

Consumer price index.

### Federal Reserve Bank of Philadelphia

Survey of Professional Forecasters inflation expectations.

### Federal Reserve Bank of St. Louis

Adjusted monetary base and adjusted total reserves, monetary services index, MZM own rate, one-year forward rates.

Organization for Economic Cooperation and Development  
International interest and inflation rates.

### University of Michigan Survey Research Center

Median expected price change.

### Congressional Budget Office

Potential real GDP.

### Dow Jones and Co. (Wall Street Journal)

Federal funds futures contracts, Eurodollar futures.

### Standard and Poors Inc.

Stock price-earnings ratio, stock price composite index.

### U.S. Department of the Treasury

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Note: Articles from this Bank's *Review* are available on the Internet at [www.stls.frb.org/research/index.html](http://www.stls.frb.org/research/index.html).