

## An Elastic Currency

Before the establishment of the Federal Reserve System in 1913, the banking system was occasionally beset by currency shortages, particularly in times of bank panics when currency demand rose sharply. Hence, one of the key mandates in the original Federal Reserve Act was "to provide an elastic currency."

In this day and age, concerns about providing an adequate supply of currency are much less prominent. As the Federal Reserve prepared for the recent century date change (aka Y2K), however, the issue came to the forefront once again. The concern was that the publiclacking confidence in the ability of the banking system to handle Y2K-related computer problems-would withdraw funds from their deposit accounts. Although the Fed and the banking system hold sufficient reserves of currency to accommodate higher demand over holidays and long weekends, the possibility of unusually large cash withdrawals prompted special preparations.

The Fed took several measures to address this potential problem, starting with a high-profile public relations campaign to assure the public of the preparedness of the banking system to handle potential computer problems. In anticipation of the potential for strong currency demand, the Fed also accumulated a stockpile of extra currency to have on hand. As of the beginning of October, the System had over $\$ 200$ billion in the vaults of Federal Reserve Banks and their branches.

In addition, the Fed set up additional inventory locations throughout the U.S. for rapid distribution of currency. In case banks ran unexpectedly low on available reserves, streamlined procedures for discount borrowing from the Fed also were established.

In the event, the extra currency demand at year-end was modest and presented few problems. As shown in the chart, currency in the hands of the public (as measured in the M1
aggregate) rose only about $\$ 20$ billion above trend. Although individual institutions may have encountered temporary shortfalls in available reserves, the banking system as a whole retained reserves that were more than adequate to meet demand. Much of the increase in total currency in circulation reflected banks' higher cash holdings in preparation for possible customer withdrawals. Total cash in bank vaults peaked at about $\$ 90$ billion during the week that ended January 3 about $\$ 40$ billion more than would have been expected in the absence of Y2K concerns. Both the public and the banking system lowered cash holdings sharply after the New Year, with currency aggregates returning to near trend by the end of January.

In the wake of crisis concerns that never actually developed, it is tempting to question the merit of elaborate preparations. Awareness of those preparations, however, surely contributed to public confidence in the integrity of the banks' data systems and may have prevented the emergence of anything resembling an oldfashioned bank panic. By helping to insure the banking system's Y2K readiness, the Fed successfully acted to fulfill one of its original mandates.
-Michael R. Pakko


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## Conventions used in this public ation:

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: $\left[\left(\mathrm{x}_{\mathrm{t}} / \mathrm{x}_{\mathrm{t}-1}\right)-1\right] \times 1200$. 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: $\left[\left(\mathrm{x}_{\mathrm{t}} / \mathrm{x}_{\mathrm{t}-12}\right)-1\right] \times 100$.

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## Reserve Market Rates



## Adjusted Monetary Base



## Total Bank Credit



## Interest Rates

|  | Nov 99 | Dec 99 | Jan 00 |
| :--- | :---: | :---: | :---: |
| Federal Funds Rate | 5.42 | 5.30 | 5.45 |
| Discount Rate | 4.86 | 5.00 | 5.00 |
| Prime Rate | 8.37 | 8.50 | 8.50 |
| Conventional Mortgage Rate | 7.74 | 7.91 | 8.21 |
|  |  |  |  |
| Treasury Yields: |  |  |  |
| 3-month constant maturity | 5.23 | 5.36 | 5.50 |
| 6-month constant maturity | 5.43 | 5.68 | 5.76 |
| 1-year constant maturity | 5.55 | 5.84 | 6.12 |
| 3-year constant maturity | 5.92 | 6.14 | 6.49 |
| 5-year constant maturity | 5.97 | 6.19 | 6.58 |
| 10-year constant maturity | 6.03 | 6.28 | 6.66 |
| 30-year constant maturity | 6.15 | 6.35 | 6.63 |

## MZM and M1

Percent change from year ago


M2
Percent change from year ago


Dotted lines indicate the FOMC target ranges.

M3
Percent change from year ago


Dotted lines indicate the FOMC target ranges.

## 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
15 -



Time Deposits


## Money Market Mutual Fund Shares



## Currency Held by the Nonbank Public

Percent change from year ago


## Checkable and Savings Deposits



Repurchase Agreements and Eurodollars


## M1

Percent change at an annual rate


## MEM

Percent change at an annual rate


## M2



## M3

Percent change at an annual rate
40 -
$30-$
(h)


## Adjusted and Required Reserves

Billions of \$


Total Borrowings, nsa
Billions of \$ 0.8 -


## Excess Reserves plus RCB Contracts

Billions of \$


## Nonfinancial Commercial Paper

Percent change from year ago


## Consumer Credit



Inflation and Inflation Expectations
Percent

## Treasury Security Yield Spreads

Yield to maturity


## Real Interest Rates

Percent, Real rate $=$ Nominal rate less CPI inflation


## Short Term Interest Rates



## Long Term Interest Rates



## Long Term Interest Rates



## Short Term Interest Rates

Percent
$9-$
$8-$
7 -
6 90-day Commercial Paper
4 3-month Treasury Yield

## FOMC Expected Federal Funds Rate and Discount Rate

Percent


Federal Reserve Bank of St. Louis

## Federal Funds Rate and Inflation Targets

Percent


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

## Actual and Potential Real GDP



Actual CPI Inflation
Percent change from year ago


## 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. See notes on page 19.

## Monetary Base Velocity Growth



Real Output Growth
Percent



## Implied One-Year Forward Rates

Percent


Rates on 3-Month Eurodollar Futures


## Rates on Selected Fed Funds Futures Contracts

Percent, daily data


## Inflation-Protected Treasury Yields



## Inflation-Indexed 30-Year Bonds



Implied Yields on Fed Funds Futures


## Inflation-Protected Treasury Yield Spreads

Percent, weekly data


## Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost
Velocity = Nominal GDP / MZM
$3.5-$
$3.0-1$

## M2 Velocity and Opportunity Cost



## M2, MZM and Nominal GDP



## Interest Rates



## Gross Domestic Product



## Real Gross Domestic Product

Percent change from year ago


## Gross Domestic Product Price Index



## M2



## Bank Credit



Investment Securities in Bank Credit at Commercial Banks
Percent change from year ago


Total Loans and Leases in Bank Credit at Commercial Banks


## Commercial and Industrial Loans at Commercial Banks



Standard and Poor's 500


## Inflation and Long-Term Interest Rates

Trend in Consumer Price Inflation Rates
Percent change from year ago
Recent Long-Term Government Bond Rates

1999Q2 1999Q3
United States
Canada
France
Germany
Italy
Japan
United Kingdom

| 1999Q1 | 1999Q2 | 1999Q3 | 1999Q4 | Oct99 | Nov99 | Dec99 | Jan00 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| 1.73 | 2.09 | 2.32 | 2.62 | 6.60 | 6.42 | 6.63 | 6.81 |
| 0.80 | 1.59 | 2.18 | 2.36 | 6.26 | 6.15 | 6.22 | 6.48 |
| 0.26 | 0.36 | 0.53 | 1.00 | 5.67 | 5.66 | 5.81 | 6.11 |
| 0.26 | 0.48 | 0.64 | 0.96 | 5.29 | 5.04 | 5.15 | 5.54 |
| 1.39 | 1.44 | 1.72 | 2.06 | 5.56 | 5.29 | 5.40 | 5.79 |
| -0.10 | -0.22 | 0.07 | -1.04 | 1.79 | 1.81 | 1.74 | 1.71 |
| 2.20 | 1.42 | 1.17 | 1.47 | 5.83 | 5.28 | 5.38 | 5.82 |

Inflation and Long-Term Interest Rates Differentials

## Percent

$3-\quad$ - Inflation differential = Foreign inflation less U.S. Inflation —— Long-term rate differential = Foreign rate less U.S. rate

$-3-$

|  |  |  |  |
| :--- | :--- | :--- | :--- |
| 7 | 1997 | 1999 |  |

Percent
3


|  |  | Money Stock |  |  |  | Bank <br> Credit | Monetary Base | Reserves | MSI M2 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | M1 | MZM | M2 | M3 |  |  |  |  |
|  | 1995 | 1143.037 | 2906.093 | 3575.434 | 4500.288 | 3501.096 | 443.511 | 76.849 | 210.451 |
|  | 1996 | 1106.428 | 3096.347 | 3747.395 | 4796.863 | 3684.031 | 455.586 | 73.415 | 217.848 |
|  | 1997 | 1069.928 | 3318.613 | 3931.933 | 5179.573 | 3952.233 | 478.753 | 68.918 | 227.069 |
|  | 1998 | 1080.851 | 3705.090 | 4221.490 | 5710.905 | 4324.891 | 508.981 | 66.963 | 242.228 |
|  | 1999 | 1102.574 | 4160.230 | 4541.154 | 6211.377 | 4583.496 | 557.858 | 71.381 | 258.622 |
| 1997 | 1 | 1076.355 | 3222.658 | 3850.581 | 5013.301 | 3830.528 | 470.027 | 70.409 | 222.859 |
|  | 2 | 1065.335 | 3275.272 | 3897.351 | 5112.773 | 3911.279 | 473.896 | 68.177 | 225.233 |
|  | 3 | 1069.092 | 3349.688 | 3959.375 | 5235.401 | 3991.694 | 480.946 | 68.565 | 228.455 |
|  | 4 | 1068.930 | 3426.834 | 4020.424 | 5356.815 | 4075.431 | 490.143 | 68.518 | 231.730 |
| 1998 | 1 | 1076.718 | 3523.710 | 4097.751 | 5498.386 | 4188.627 | 498.386 | 67.710 | 235.915 |
|  | 2 | 1078.686 | 3637.300 | 4176.066 | 5638.533 | 4244.182 | 502.060 | 66.085 | 239.944 |
|  | 3 | 1076.071 | 3746.116 | 4249.253 | 5763.392 | 4343.683 | 511.594 | 66.953 | 243.731 |
|  | 4 | 1091.928 | 3913.234 | 4362.890 | 5943.310 | 4523.073 | 523.881 | 67.105 | 249.321 |
| 1999 | 1 | 1097.235 | 4033.500 | 4444.508 | 6064.884 | 4519.495 | 536.335 | 67.691 | 253.373 |
|  | 2 | 1103.078 | 4127.362 | 4511.474 | 6155.831 | 4526.141 | 545.912 | 66.526 | 257.008 |
|  | 3 | 1097.752 | 4201.131 | 4573.520 | 6234.494 | 4580.197 | 557.969 | 68.179 | 260.353 |
|  | 4 | 1112.231 | 4278.926 | 4635.112 | 6390.299 | 4708.149 | 591.218 | 83.126 | 263.756 |
| 1998 | Jan | 1073.724 | 3485.692 | 4065.935 | 5450.732 | 4159.652 | 496.198 | 68.917 | 234.242 |
|  | Feb | 1076.110 | 3522.418 | 4098.736 | 5487.458 | 4188.132 | 499.554 | 67.413 | 235.959 |
|  | Mar | 1080.319 | 3563.019 | 4128.581 | 5556.968 | 4218.098 | 499.407 | 66.800 | 237.545 |
|  | Apr | 1081.657 | 3601.717 | 4152.912 | 5594.709 | 4221.203 | 499.601 | 66.000 | 238.892 |
|  | May | 1076.489 | 3637.081 | 4174.983 | 5638.310 | 4243.301 | 502.386 | 66.136 | 239.821 |
|  | Jun | 1077.912 | 3673.103 | 4200.304 | 5682.580 | 4268.041 | 504.194 | 66.119 | 241.120 |
|  | Jul | 1076.877 | 3700.662 | 4218.927 | 5703.553 | 4287.942 | 507.679 | 66.368 | 242.266 |
|  | Aug | 1073.126 | 3739.452 | 4242.999 | 5762.219 | 4347.715 | 511.095 | 67.436 | 243.438 |
|  | Sep | 1078.211 | 3798.233 | 4285.832 | 5824.404 | 4395.391 | 516.009 | 67.055 | 245.488 |
|  | Oct | 1084.671 | 3860.123 | 4327.305 | 5887.794 | 4490.574 | 520.806 | 67.058 | 247.528 |
|  | Nov | 1093.736 | 3915.842 | 4364.343 | 5945.180 | 4529.764 | 524.379 | 67.182 | 249.420 |
|  | Dec | 1097.377 | 3963.737 | 4397.021 | 5996.956 | 4548.880 | 526.458 | 67.074 | 251.014 |
| 1999 | Jan | 1095.988 | 3998.719 | 4422.371 | 6028.795 | 4539.480 | 531.761 | 68.517 | 252.265 |
|  | Feb | 1094.305 | 4039.752 | 4447.689 | 6078.028 | 4524.252 | 538.190 | 68.067 | 253.460 |
|  | Mar | 1101.412 | 4062.028 | 4463.463 | 6087.829 | 4494.753 | 539.053 | 66.488 | 254.393 |
|  | Apr | 1107.247 | 4099.574 | 4490.381 | 6123.806 | 4507.611 | 539.609 | 64.109 | 255.904 |
|  | May | 1101.773 | 4129.201 | 4513.077 | 6156.328 | 4516.925 | 548.331 | 68.424 | 257.078 |
|  | Jun | 1100.213 | 4153.311 | 4530.965 | 6187.358 | 4553.888 | 549.797 | 67.046 | 258.041 |
|  | Jul | 1099.423 | 4177.895 | 4553.550 | 6211.873 | 4549.912 | 553.061 | 66.882 | 259.246 |
|  | Aug | 1098.329 | 4202.750 | 4572.866 | 6231.605 | 4583.003 | 556.713 | 67.350 | 260.311 |
|  | Sep | 1095.504 | 4222.747 | 4594.145 | 6260.003 | 4607.677 | 564.133 | 70.306 | 261.503 |
|  | Oct | 1101.159 | 4247.111 | 4612.102 | 6311.358 | 4636.720 | 572.986 | 72.806 | 262.483 |
|  | Nov | 1110.186 | 4275.372 | 4632.152 | 6388.116 | 4704.165 | 588.662 | 82.709 | 263.592 |
|  | Dec | 1125.348 | 4314.296 | 4661.082 | 6471.422 | 4783.561 | 612.005 | 93.863 | 265.193 |
| 2000 | Jan | 1121.698 | 4347.134 | 4683.948 | 6513.407 | 4796.453 | 604.552 | 79.433 | 266.320 |

*All values are given in billions of dollars

|  |  | Federal <br> Funds | Discoun <br> Rate | Prime <br> Rate | 3-mo CDs | Treasury Yields |  |  | Corporate Aaa Bonds | S \& L <br> Aaa Bonds | Conventional <br> Mortgage |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | 3 mo |  |  |  | 3 yr | 30 yr |  |  |  |
|  | 1995 |  | 5.84 | 5.21 | 8.83 | 5.92 | 5.66 | 6.26 | 6.88 | 7.59 | 5.80 | 7.95 |
|  | 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 |
| 1997 | 1 | 5.28 | 5.00 | 8.27 | 5.44 | 5.20 | 6.19 | 6.82 | 7.43 | 5.44 | 7.79 |
|  | 2 | 5.52 | 5.00 | 8.50 | 5.69 | 5.19 | 6.42 | 6.93 | 7.57 | 5.49 | 7.93 |
|  | 3 | 5.53 | 5.00 | 8.50 | 5.60 | 5.18 | 6.01 | 6.53 | 7.17 | 5.23 | 7.47 |
|  | 4 | 5.51 | 5.00 | 8.50 | 5.73 | 5.23 | 5.78 | 6.14 | 6.88 | 5.14 | 7.20 |
| 1998 | 1 | 5.52 | 5.00 | 8.50 | 5.55 | 5.19 | 5.46 | 5.88 | 6.67 | 4.94 | 7.05 |
|  | 2 | 5.50 | 5.00 | 8.50 | 5.59 | 5.11 | 5.57 | 5.85 | 6.64 | 5.00 | 7.09 |
|  | 3 | 5.53 | 5.00 | 8.50 | 5.53 | 4.96 | 5.11 | 5.47 | 6.49 | 4.95 | 6.87 |
|  | 4 | 4.86 | 4.66 | 7.92 | 5.20 | 4.37 | 4.41 | 5.11 | 6.33 | 4.82 | 6.76 |
| 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 |
| 1998 | Jan | 5.56 | 5.00 | 8.50 | 5.54 | 5.18 | 5.38 | 5.81 | 6.61 | 4.88 | 6.99 |
|  | Feb | 5.51 | 5.00 | 8.50 | 5.54 | 5.23 | 5.43 | 5.89 | 6.67 | 4.92 | 7.04 |
|  | Mar | 5.49 | 5.00 | 8.50 | 5.58 | 5.16 | 5.57 | 5.95 | 6.72 | 5.03 | 7.13 |
|  | Apr | 5.45 | 5.00 | 8.50 | 5.58 | 5.08 | 5.58 | 5.92 | 6.69 | 5.00 | 7.14 |
|  | May | 5.49 | 5.00 | 8.50 | 5.59 | 5.14 | 5.61 | 5.93 | 6.69 | 5.04 | 7.14 |
|  | Jun | 5.56 | 5.00 | 8.50 | 5.60 | 5.12 | 5.52 | 5.70 | 6.53 | 4.97 | 7.00 |
|  | Jul | 5.54 | 5.00 | 8.50 | 5.59 | 5.09 | 5.47 | 5.68 | 6.55 | 5.01 | 6.95 |
|  | Aug | 5.55 | 5.00 | 8.50 | 5.58 | 5.04 | 5.24 | 5.54 | 6.52 | 5.01 | 6.92 |
|  | Sep | 5.51 | 5.00 | 8.49 | 5.41 | 4.74 | 4.62 | 5.20 | 6.40 | 4.84 | 6.72 |
|  | Oct | 5.07 | 4.86 | 8.12 | 5.21 | 4.07 | 4.18 | 5.01 | 6.37 | 4.76 | 6.71 |
|  | Nov | 4.83 | 4.63 | 7.89 | 5.24 | 4.53 | 4.57 | 5.25 | 6.41 | 4.87 | 6.87 |
|  | Dec | 4.68 | 4.50 | 7.75 | 5.14 | 4.50 | 4.48 | 5.06 | 6.22 | 4.83 | 6.72 |
| 1999 | Jan | 4.63 | 4.50 | 7.75 | 4.89 | 4.45 | 4.61 | 5.16 | 6.24 | 4.85 | 6.79 |
|  | Feb | 4.76 | 4.50 | 7.75 | 4.90 | 4.56 | 4.90 | 5.37 | 6.40 | 4.80 | 6.81 |
|  | Mar | 4.81 | 4.50 | 7.75 | 4.91 | 4.57 | 5.11 | 5.58 | 6.62 | 4.96 | 7.04 |
|  | Apr | 4.74 | 4.50 | 7.75 | 4.88 | 4.41 | 5.03 | 5.55 | 6.64 | 4.89 | 6.92 |
|  | May | 4.74 | 4.50 | 7.75 | 4.92 | 4.63 | 5.33 | 5.81 | 6.93 | 5.05 | 7.15 |
|  | Jun | 4.76 | 4.50 | 7.75 | 5.13 | 4.72 | 5.70 | 6.04 | 7.23 | 5.22 | 7.55 |
|  | Jul | 4.99 | 4.50 | 8.00 | 5.24 | 4.69 | 5.62 | 5.98 | 7.19 | 5.24 | 7.63 |
|  | Aug | 5.07 | 4.56 | 8.06 | 5.41 | 4.87 | 5.77 | 6.07 | 7.40 | 5.47 | 7.94 |
|  | 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 | 5.45 | 5.00 | 8.50 | 5.95 | 5.50 | 6.49 | 6.63 | 7.78 | 5.91 | 8.21 |

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

|  |  | M1 | MZM | M2 | M3 |
| :---: | :---: | :---: | :---: | :---: | :---: |
| Percent change from previous period |  |  |  |  |  |
|  | 1995 | -0.21 | -0.46 | 2.06 | 4.56 |
|  | 1996 | -3.20 | 6.55 | 4.81 | 6.59 |
|  | 1997 | -3.30 | 7.18 | 4.92 | 7.98 |
|  | 1998 | 1.02 | 11.65 | 7.36 | 10.26 |
|  | 1999 | 2.01 | 12.28 | 7.57 | 8.76 |
| 1997 | 1 | -0.53 | 1.79 | 1.19 | 1.90 |
|  | 2 | -1.02 | 1.63 | 1.21 | 1.98 |
|  | 3 | 0.35 | 2.27 | 1.59 | 2.40 |
|  | 4 | -0.02 | 2.30 | 1.54 | 2.32 |
| 1998 | 1 | 0.73 | 2.83 | 1.92 | 2.64 |
|  | 2 | 0.18 | 3.22 | 1.91 | 2.55 |
|  | 3 | -0.24 | 2.99 | 1.75 | 2.21 |
|  | 4 | 1.47 | 4.46 | 2.67 | 3.12 |
| 1999 | 1 | 0.49 | 3.07 | 1.87 | 2.05 |
|  | 2 | 0.53 | 2.33 | 1.51 | 1.50 |
|  | 3 | -0.48 | 1.79 | 1.38 | 1.28 |
|  | 4 | 1.32 | 1.85 | 1.35 | 2.50 |
| 1998 | Jan | -0.02 | 0.93 | 0.62 | 0.90 |
|  | Feb | 0.22 | 1.05 | 0.81 | 0.67 |
|  | Mar | 0.39 | 1.15 | 0.73 | 1.27 |
|  | Apr | 0.12 | 1.09 | 0.59 | 0.68 |
|  | May | -0.48 | 0.98 | 0.53 | 0.78 |
|  | Jun | 0.13 | 0.99 | 0.61 | 0.79 |
|  | Jul | -0.10 | 0.75 | 0.44 | 0.37 |
|  | Aug | -0.35 | 1.05 | 0.57 | 1.03 |
|  | Sep | 0.47 | 1.57 | 1.01 | 1.08 |
|  | Oct | 0.60 | 1.63 | 0.97 | 1.09 |
|  | Nov | 0.84 | 1.44 | 0.86 | 0.97 |
|  | Dec | 0.33 | 1.22 | 0.75 | 0.87 |
| 1999 | Jan | -0.13 | 0.88 | 0.58 | 0.53 |
|  | Feb | -0.15 | 1.03 | 0.57 | 0.82 |
|  | Mar | 0.65 | 0.55 | 0.35 | 0.16 |
|  | Apr | 0.53 | 0.92 | 0.60 | 0.59 |
|  | May | -0.49 | 0.72 | 0.51 | 0.53 |
|  | Jun | -0.14 | 0.58 | 0.40 | 0.50 |
|  | Jul | -0.07 | 0.59 | 0.50 | 0.40 |
|  | Aug | -0.10 | 0.59 | 0.42 | 0.32 |
|  | Sep | -0.26 | 0.48 | 0.47 | 0.46 |
|  | Oct | 0.52 | 0.58 | 0.39 | 0.82 |
|  | Nov | 0.82 | 0.67 | 0.43 | 1.22 |
|  | Dec | 1.37 | 0.91 | 0.62 | 1.30 |
| 2000 | Jan | -0.32 | 0.76 | 0.49 | 0.65 |

## 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). Due to distortions caused by regulatory changes, the largest of which was the introduction of money market accounts, data for MZM begin March 1983 in this publication.

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
http://www.stls.frb.org/research/newbase.html.
Monetary Services Index: an index which 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 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 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. 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 a description are available at
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 (MMDA), 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. 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

$$
\mathrm{f}_{\mathrm{t}}^{*}=2.0+\pi_{\mathrm{t}-1}+\left(\pi_{\mathrm{t}-1}-\pi^{*}\right) / 2+100 \times\left(\mathrm{y}_{\mathrm{t}-1}-\mathrm{y}_{\mathrm{t}-1}{ }^{\mathrm{P}}\right) / 2
$$

to five alternative target inflation rates $\pi^{*}=0,1,2,3,4$ percent, where $f_{t}^{*}$ is the implied federal funds rate, $\pi_{t-1}$ is the previous period's inflation rate (CPI), $y_{t-1}$ is the log of the previous period's level of real GDP, and $y_{t-1}{ }^{\mathrm{P}}$ is the $\log$ of an estimate of the previous period's level of potential output. Potential real output 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

$$
\Delta \mathrm{MB}_{\mathrm{t}}^{*}=\pi^{*}+(10 \text {-year moving average growth of real GDP })
$$ - (4-year moving average of base velocity growth) to five alternative target inflation rates $\pi^{*}=0,1,2,3,4$ percent, where $\Delta \mathrm{MB}_{\mathrm{t}}^{*}$ 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 $\left(\left(y_{t}-y_{t-40}\right) / 40\right) \times 4 \times 100$, 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 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 $m=1, \ldots, 30$ 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)

$$
R(m)=\mathrm{a}_{0}+\left(\mathrm{a}_{1}+\mathrm{a}_{2}\right)\left(1-\mathrm{e}^{-m / 50}\right) /(m / 50)-\mathrm{a}_{2} \times \mathrm{e}^{-m / 50},
$$

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 $D(m)=\left(1-\mathrm{e}^{-R(m) \times m}\right) / R(m)$. These rates are linear approximations to the true instantaneous forward rates; see Shiller. 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 Yield Spreads equal, for 5, 10, and 30 year maturities, the difference between the Treasury constant maturity yield and the yield on the most recently issued inflation-protected security. Inflation-Indexed Bonds for Canada are 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 01/15/2008.
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 constantmaturity 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 and G. 13 releases; nonfinancial commercial paper: Board of Governors web site; M2 and MZM own rates.

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, 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
U.S. inflation-protected security yields.

## References

Anderson, Richard G. and Robert H. Rasche (1996a). "A Revised Measure of the St. Louis Adjusted Monetary Base," Federal Reserve Bank of St. Louis Review, March/April 1996, pp. 3-13.
and $\qquad$ (1996b). "Measuring the Adjusted Monetary Base in an Era of Financial Change," Federal Reserve Bank of St. Louis Review, November/December 1996, pp. 3-37.
, Barry E. Jones and Travis D. Nesmith (1997). "Special Report: The Monetary Services Indexes Project of the Federal Reserve Bank of St. Louis," Federal Reserve Bank of St. Louis Review, January/ February 1997, pp. 31-82.

McCallum, Bennett T. (1988). "Robustness Properties of a Monetary Policy Rule," Carnegie-Rochester Conference Series on Public Policy, vol. 29, pp. 173-204.
(1993). "Specification and Analysis of a Monetary Policy Rule for Japan," Bank of Japan Monetary and Economic Studies, November, pp. 1-45.

Motley, Brian (1988). "Should M2 Be Redefined?" Federal Reserve Bank of San Francisco Economic Review, Winter, pp. 33-51.

Nelson, Charles R. and Andrew F. Siegel (1987). "Parsimonious Modeling of Yield Curves," Journal of Business, October, pp. 473-89.

Poole, William (1991). Statement before the Subcommittee on Domestic Monetary Policy of the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, November 6, 1991. Government Printing Office, Serial No. 102-82.

Sharpe, William F. (1997). Macro-Investment Analysis, on-line textbook available at www-sharpe.stanford.edu/mia.htm.

Shiller, Robert (1990). "The Term Structure of Interest Rates," Handbook of Monetary Economics, vol. 1, B. Friedman and F. Hahn, eds., pp. 627-722.

Taylor, John B. (1993). "Discretion versus Policy Rules in Practice," Carnegie-Rochester Conference Series on Public Policy, vol. 39, pp. 195-214.

Note: Articles from this Bank's Review are available on the Internet at www.stls.frb.org/research/reviewdat.html.


[^0]:    *Data on total currency in circulation are from Federal Reserve Statistical Release H.4.1. The data are seasonally adjusted using seasonal factors from the currency component of MI.

[^1]:    Monetary Trends is published monthly by the Research Division of the Federal Reserve Bank of St. Louis. Single-copy subscriptions are available free of charge by writing Public Affairs Office, Federal Reserve Bank of St. Louis, Post Office Box 442, St. Louis, MO 63166-0442 or by calling (314) 444-8808 or (314) 444-8809. Subscription forms can also be filled out electronically at http://www.stls.frb.org/research/order/pubform.html. For more information on data, please call (314) 444-8590. Information in this publication is also included in the Federal Reserve Economic Data (FRED) electronic bulletin board at (314) 621-1824 or internet World Wide Web server at http://www.stls.frb.org/fred. The entire publication is also available electronically at http://www.stls.frb.org/publications/mt.

