

# Monetary Trends



## The Long and the Short of the Federal Funds Target Cuts

In an attempt to jump-start a lagging economy, the Federal Reserve lowered its federal funds rate target six times between January and June 2001—a cumulative 275 basis point decrease—to an annualized rate of 3.75 percent. The federal funds rate is the interest rate paid by banks for overnight loans from other banks. Therefore, lowering the target reduces the cost of acquiring funds to make up for reserve shortfalls, which in turn makes banks more willing to lend. Conventional wisdom suggests that such periods of policy easing would aid interest-sensitive sectors of the economy such as housing. However, the accompanying chart shows that yields on long-term securities such as 10-year Treasury securities were actually higher in June 2001 than in December 2000, before the Fed began lowering the target. Although long-term rates generally declined with the Fed's target cuts from January to March, long-term rates increased even as the Fed continued to ease in the following months.

Changes in expected inflation can explain why long-term interest rates sometimes rise when the Fed cuts its federal funds target. Although the Fed can exert considerable influence on short-term interest rates, changes in inflation expectations can confound the effect of the federal funds target changes on longer-term interest rates. Easier monetary policy lowers short-term rates now, often at the expense of higher prices in the future. If the market-expected rate of future inflation rises—perhaps because of easing monetary policy—long rates will rise as purchasers of long-term securities demand compensation for rising prices.

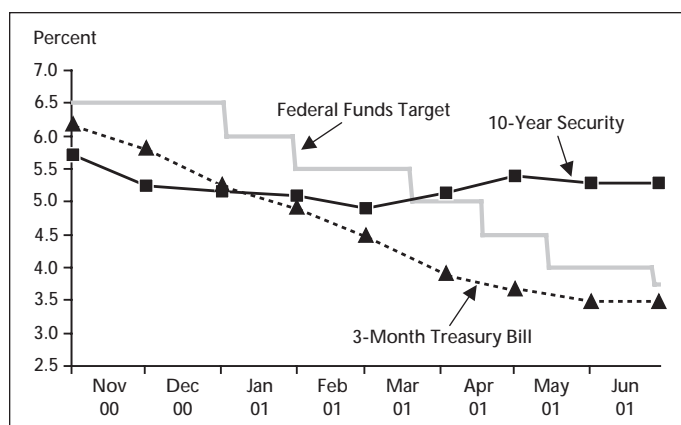
Further complicating the analysis of the effects of Fed policy changes on long-term interest rates is the

fact that markets often anticipate forthcoming actions by the Fed. For example, prior to the June 2001 FOMC meeting, the market assigned roughly equal probability to a rate cut of either 25 or 50 basis points, and long-term interest rates reflected this expectation. Hence, the FOMC's cut in the funds rate target of only 25 basis points was lower than the average of the possible expected cuts. Moreover, the 25-point reduction was interpreted widely as signaling the end of the Fed's period of expansionary monetary policy. Fears that the Fed would ease too much and induce inflation subsided and long rates fell.

One additional consideration is the slope of the yield curve. Typically, there is a premium on longer-term securities and the yield curve slopes up. Before April, however, the yield on 3-month T-bills exceeded that of longer-term securities. Long rates may have risen because the market could not sustain an inverted yield curve.

The moral of the story is that the Fed has no direct control over long rates. Therefore, waiting for the Fed to cut interest rates before buying or refinancing a home or engaging in any other long-term debt contract might be misguided, since financing for long-term investments can suffer the whims of inflationary expectations.

—Michael T. Owyang



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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:  $[(x_t / x_{t-12}) - 1] \times 100$ .

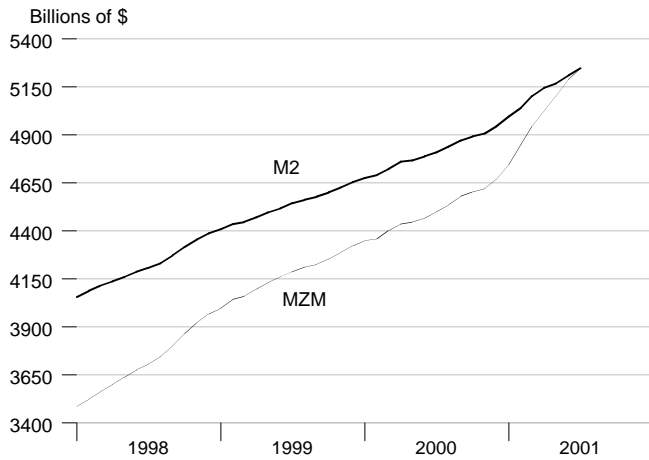
We welcome your comments addressed to:

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St. Louis, MO 63166

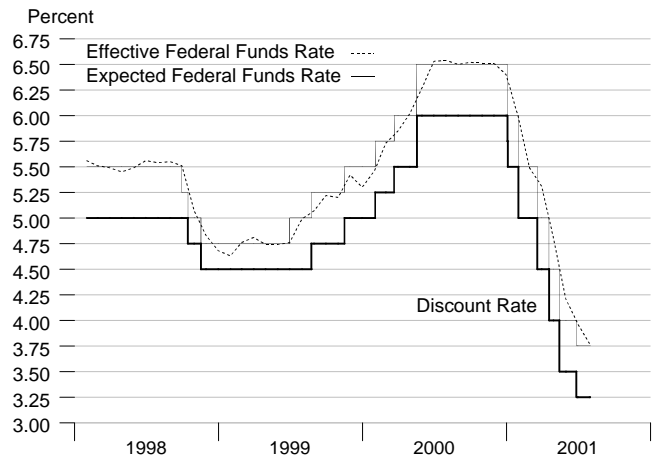
or to:

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

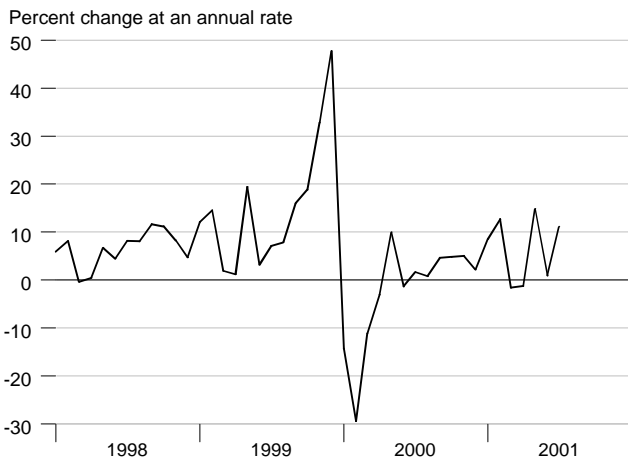
**M2 and MZM**



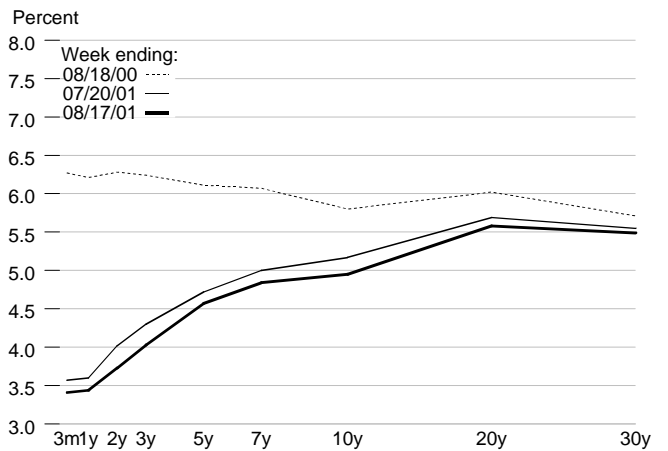
**Reserve Market Rates**



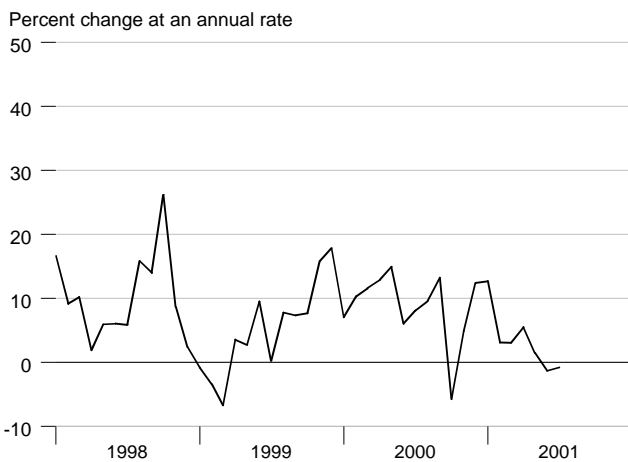
**Adjusted Monetary Base**



**Treasury Yield Curve**



**Total Bank Credit**

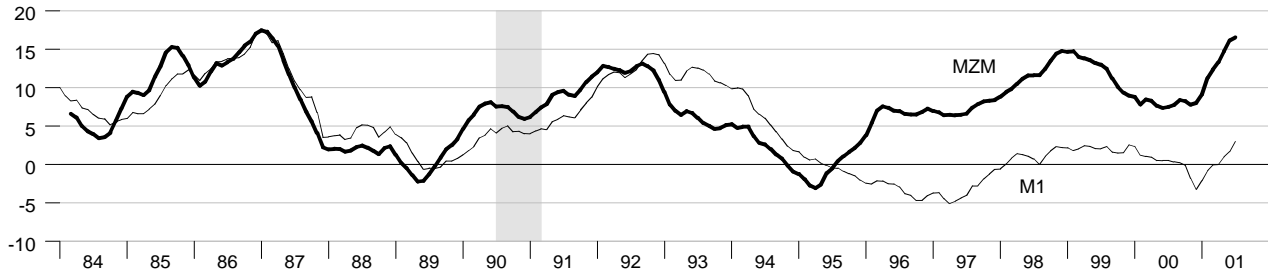


**Interest Rates**

	May 01	Jun 01	Jul 01
Federal Funds Rate	4.21	3.97	3.77
Discount Rate	3.73	3.47	3.25
Prime Rate	7.24	6.98	6.75
Conventional Mortgage Rate	7.15	7.16	7.13
<b>Treasury Yields:</b>			
3-month constant maturity	3.70	3.57	3.59
6-month constant maturity	3.74	3.56	3.56
1-year constant maturity	3.78	3.58	3.62
3-year constant maturity	4.51	4.35	4.31
5-year constant maturity	4.93	4.81	4.76
10-year constant maturity	5.39	5.28	5.24
30-year constant maturity	5.78	5.67	5.61

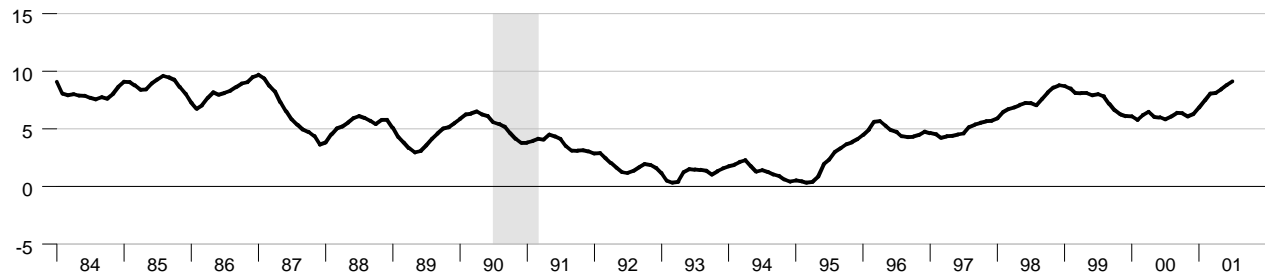
### MZM and M1

Percent change from year ago



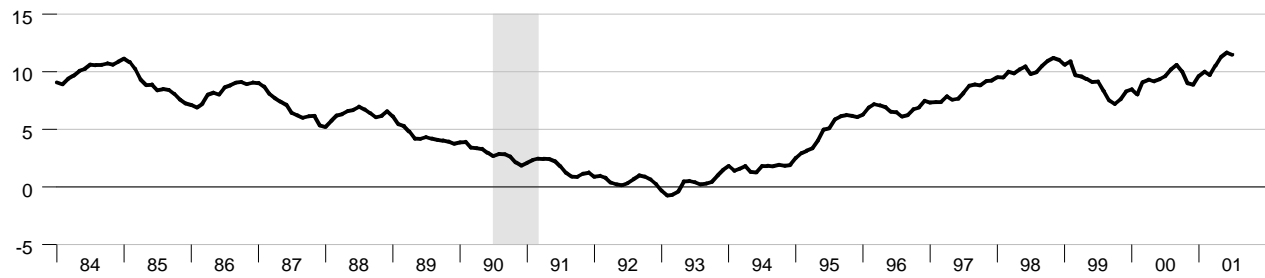
### M2

Percent change from year ago



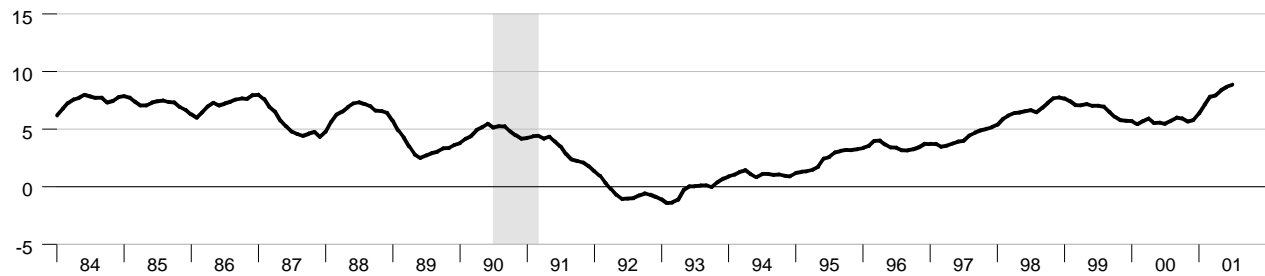
### M3

Percent change from year ago



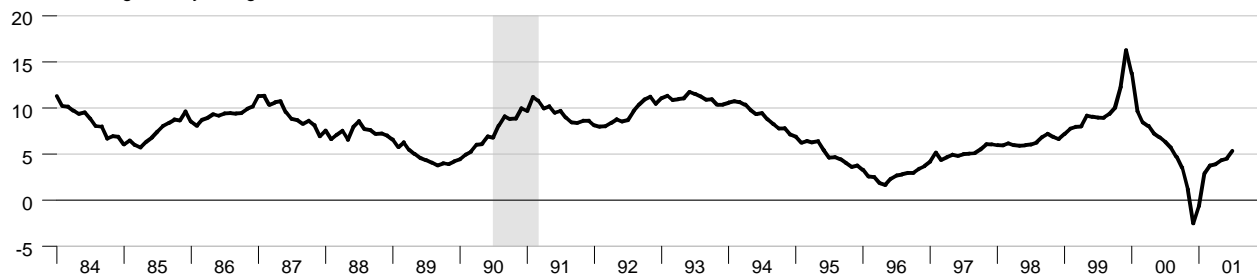
### Monetary Services Index - M2

Percent change from year ago



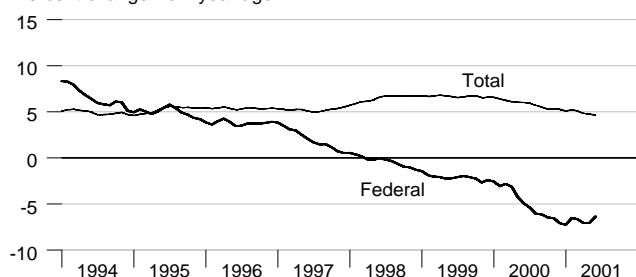
### Adjusted Monetary Base

Percent change from year ago



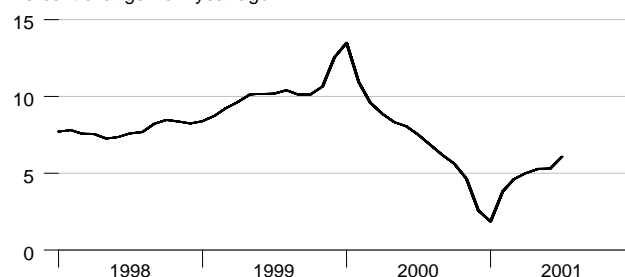
### Domestic Nonfinancial Debt

Percent change from year ago



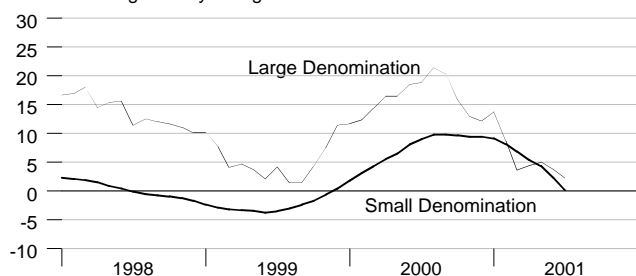
### Currency Held by the Nonbank Public

Percent change from year ago



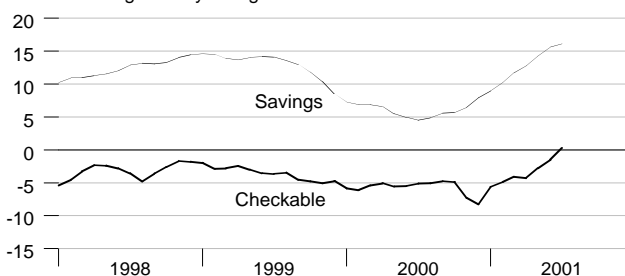
### Time Deposits

Percent change from year ago



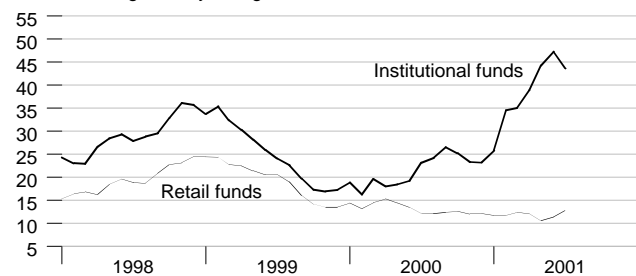
### Checkable and Savings Deposits

Percent change from year ago



### Money Market Mutual Fund Shares

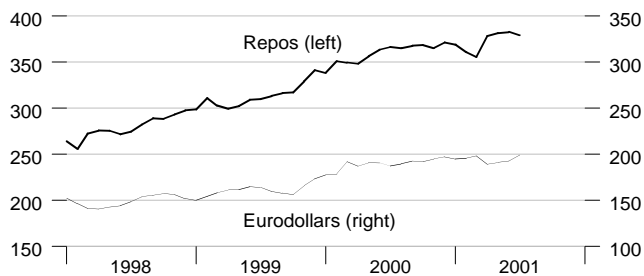
Percent change from year ago



### Repurchase Agreements and Eurodollars

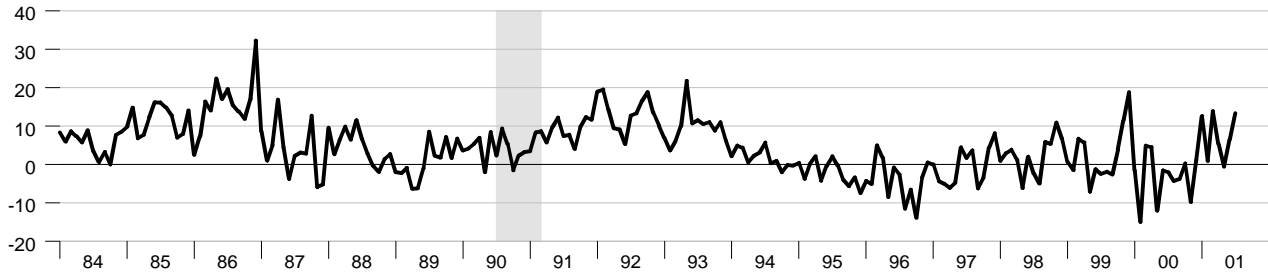
Billions of dollars

Billions of dollars



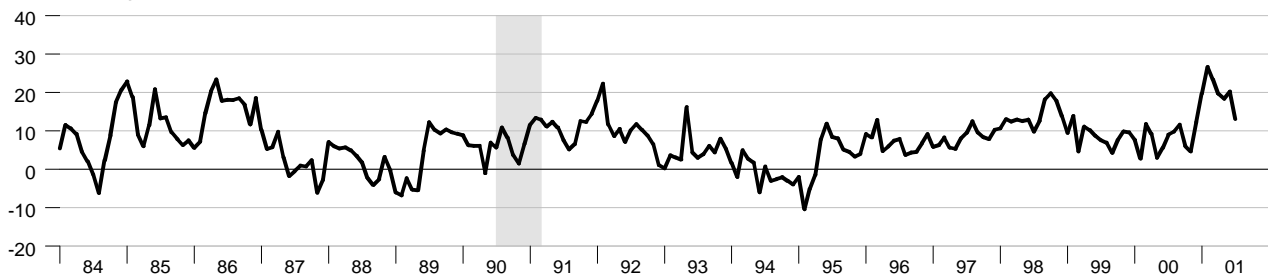
**M1**

Percent change at an annual rate



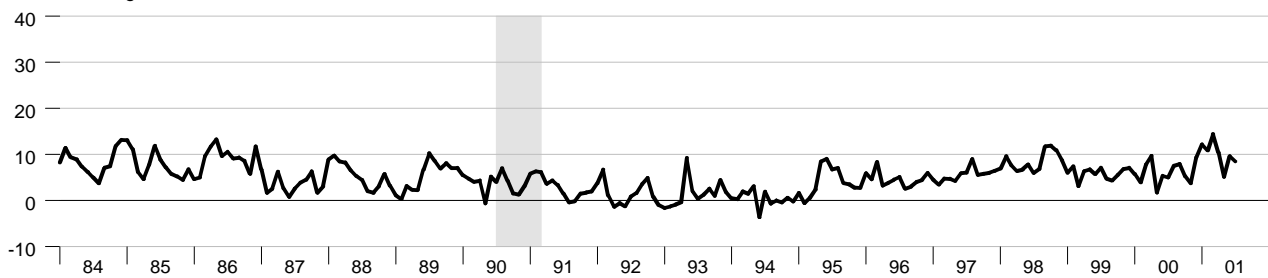
**MZM**

Percent change at an annual rate



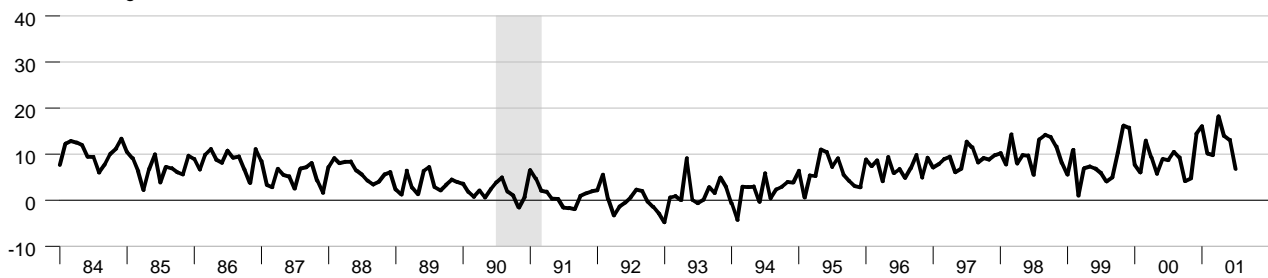
**M2**

Percent change at an annual rate

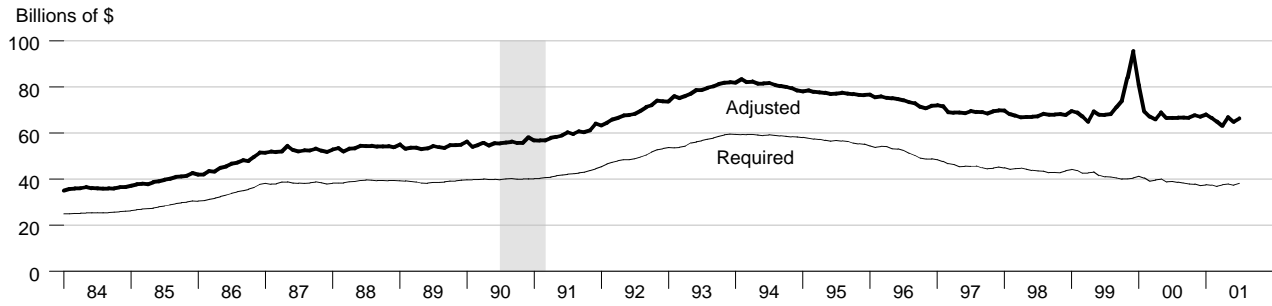


**M3**

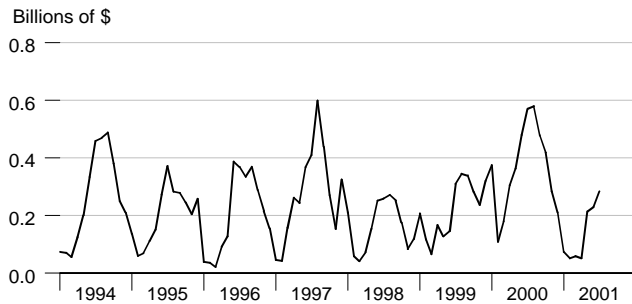
Percent change at an annual rate



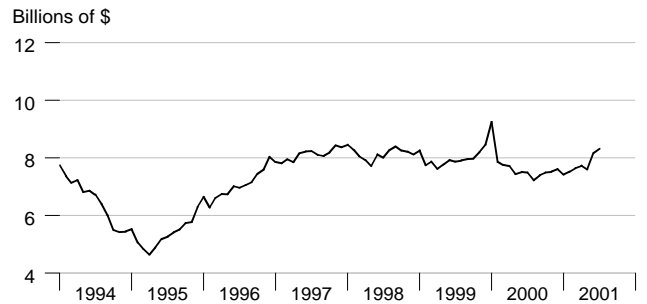
### Adjusted and Required Reserves



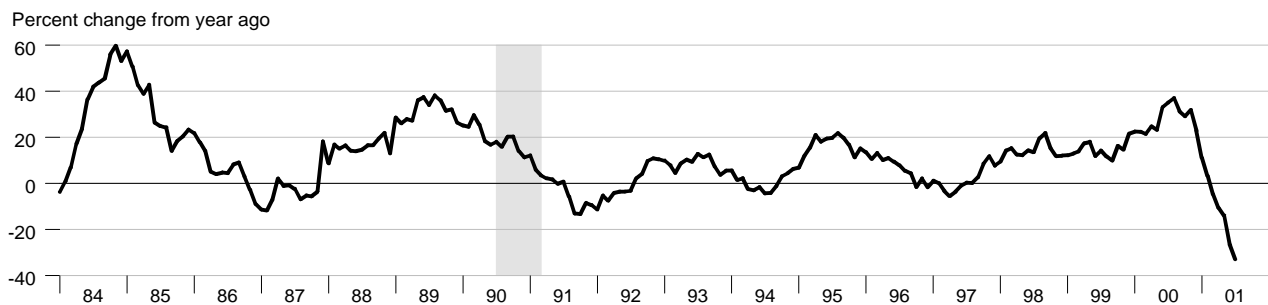
### Total Borrowings, nsa



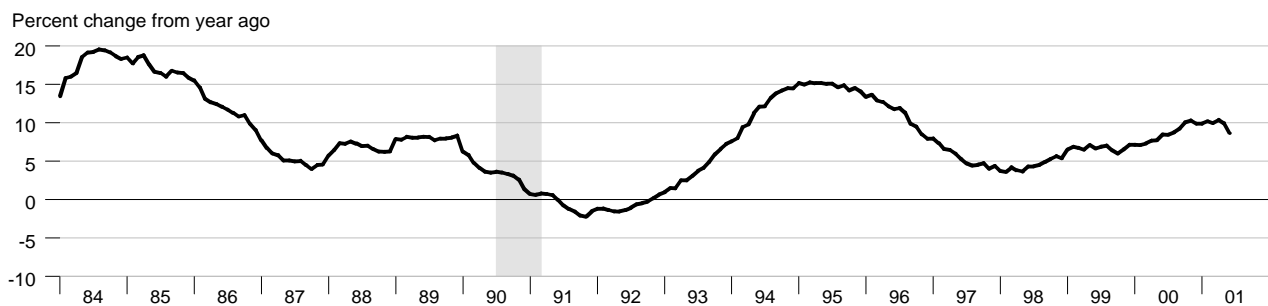
### Excess Reserves plus RCB Contracts



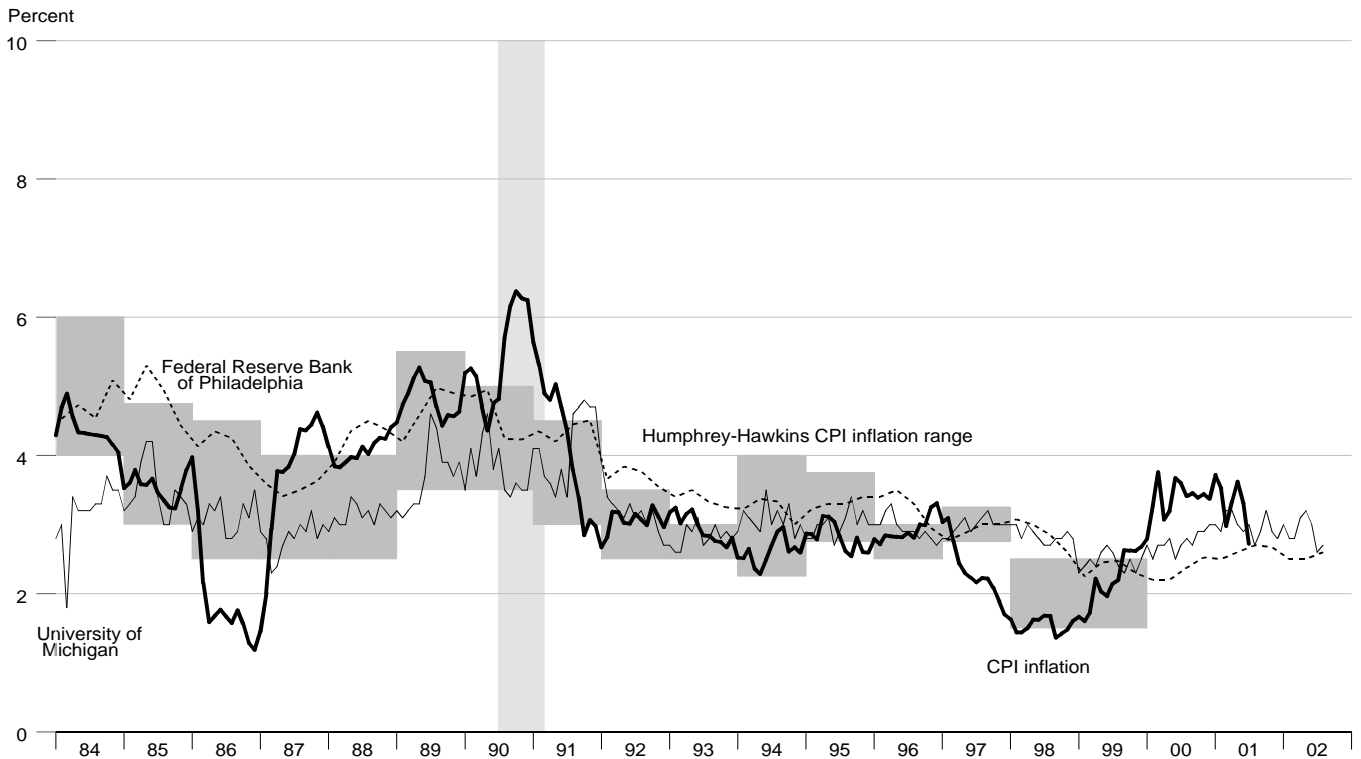
### Nonfinancial Commercial Paper



### Consumer Credit

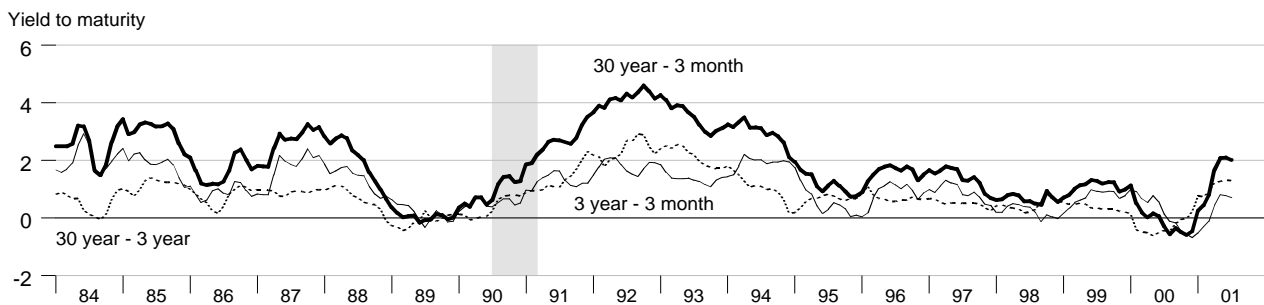


### Inflation and Inflation Expectations

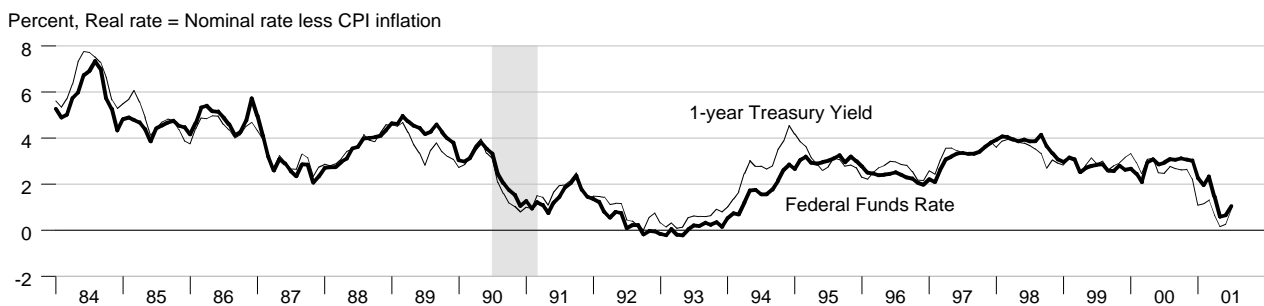


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

### Treasury Security Yield Spreads

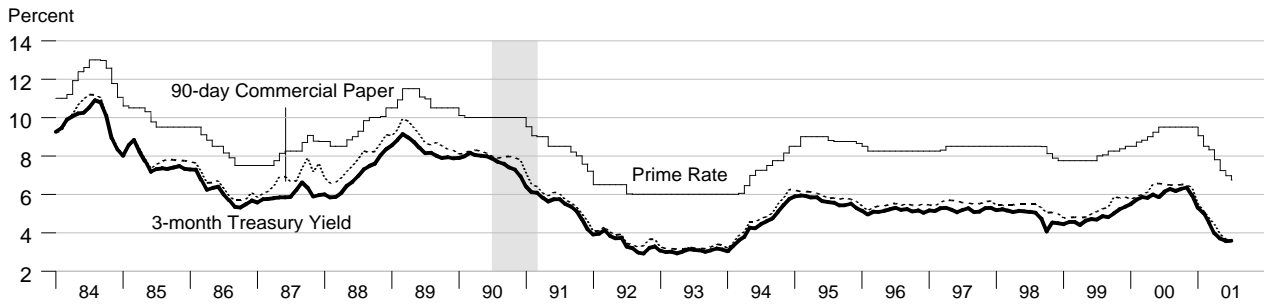


### Real Interest Rates

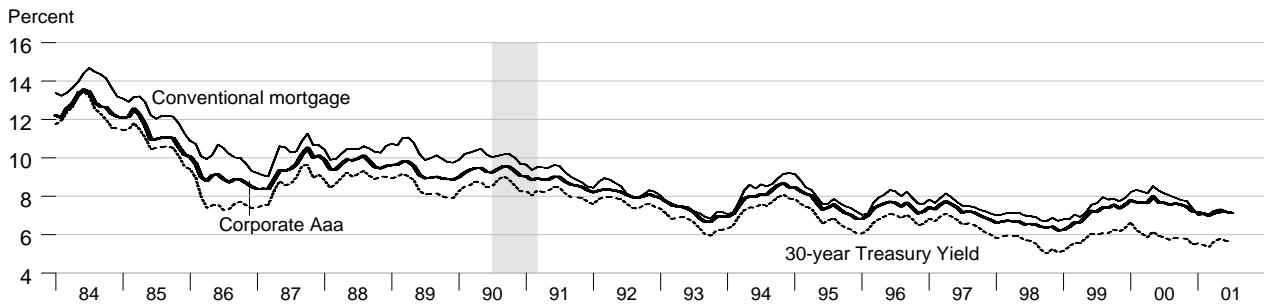




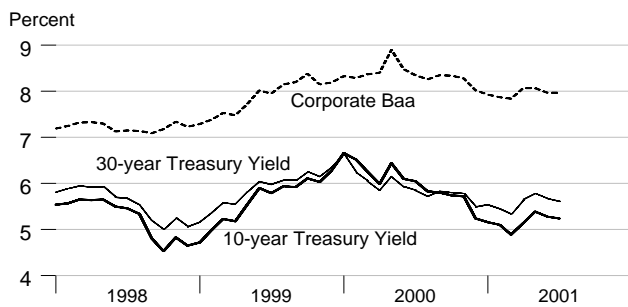
**Short Term Interest Rates**



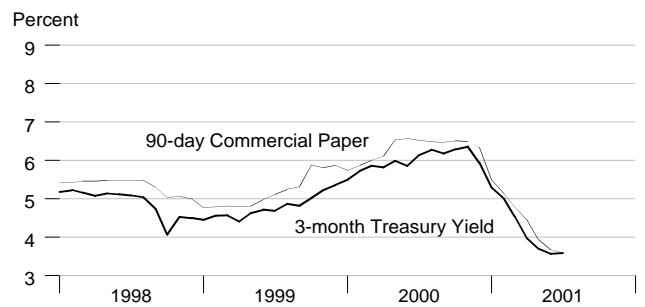
**Long Term Interest Rates**



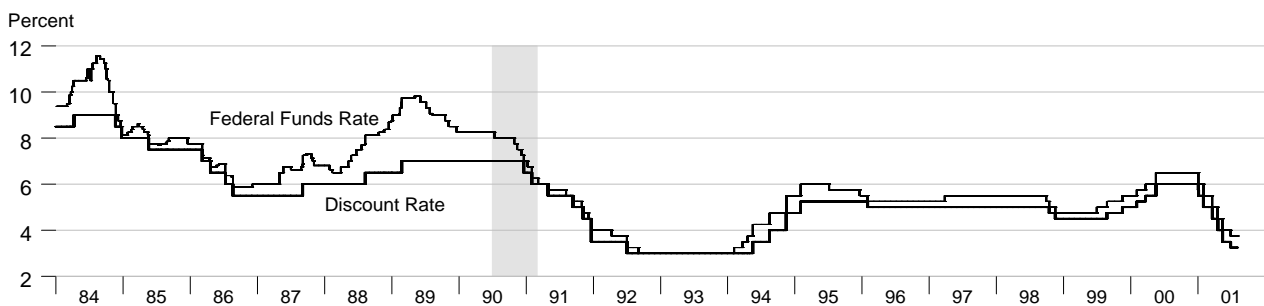
**Long Term Interest Rates**



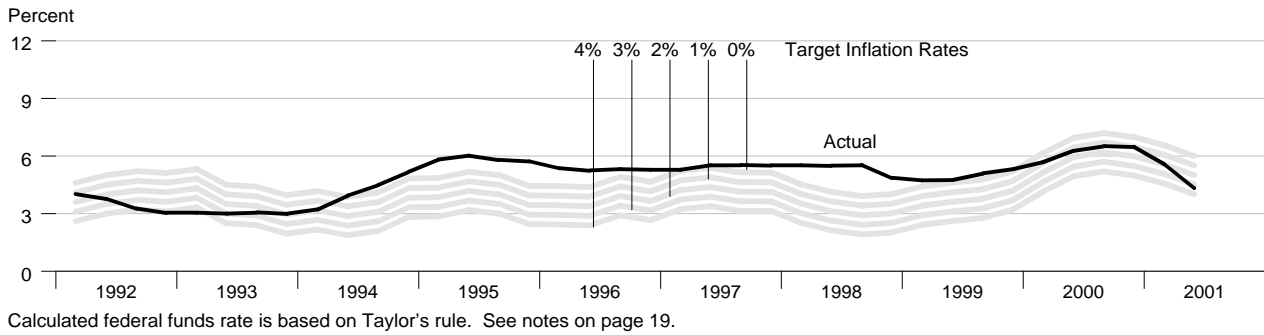
**Short Term Interest Rates**



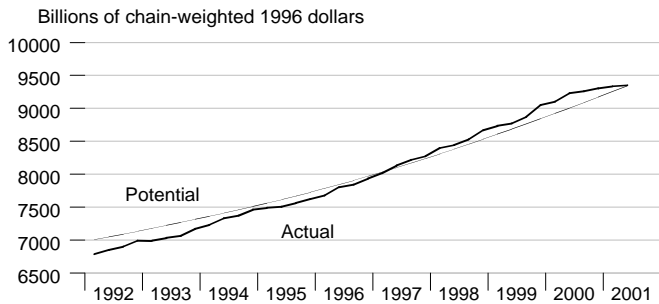
**FOMC Expected Federal Funds Rate and Discount Rate**



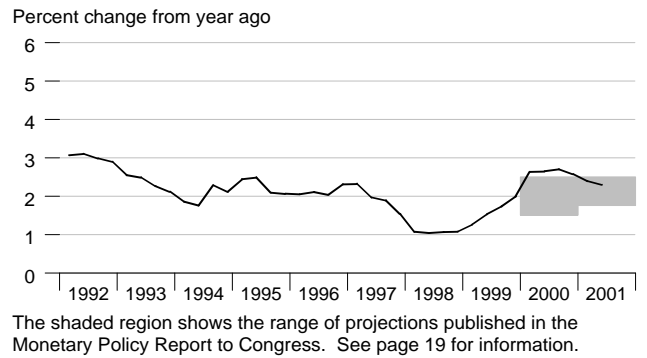
### Federal Funds Rate and Inflation Targets



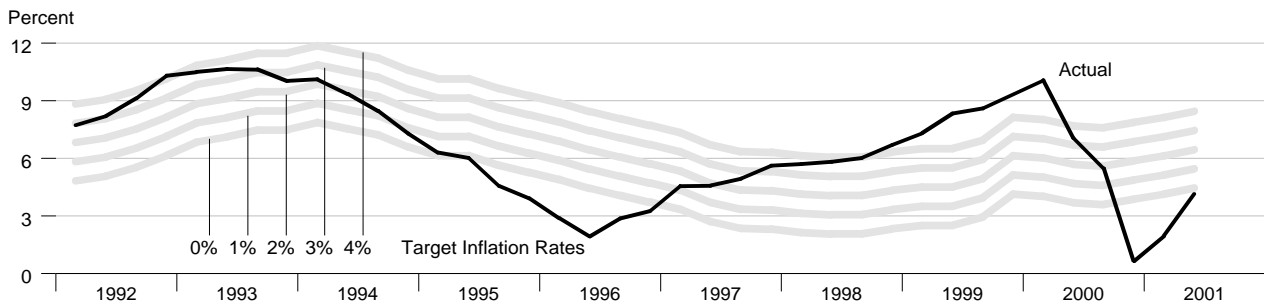
### Actual and Potential Real GDP



### PCE Inflation and Projections

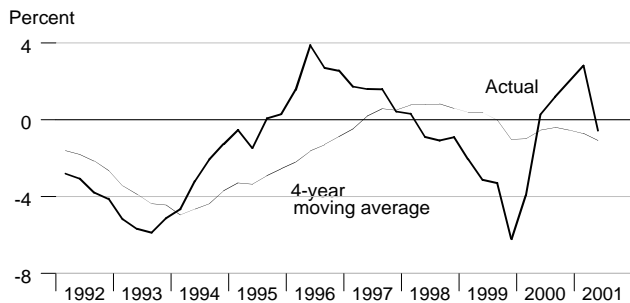


### Monetary Base Growth\* and Inflation Targets

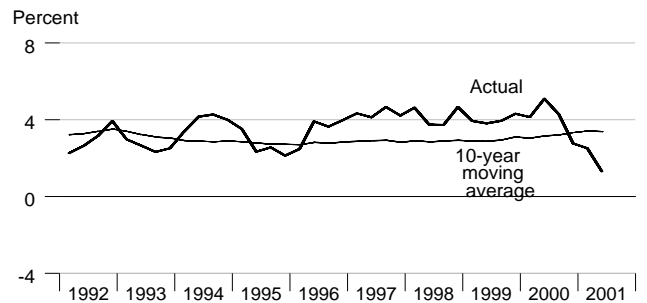


\*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

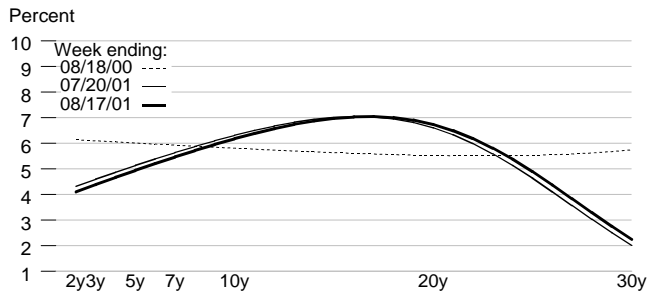
### Monetary Base Velocity Growth



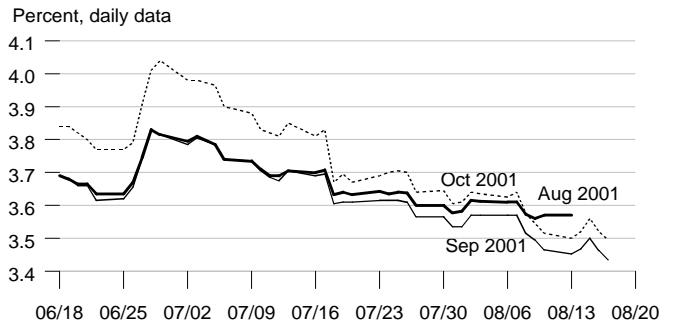
### Real Output Growth



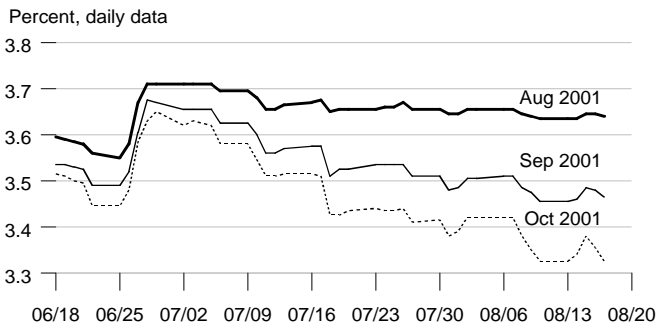
**Implied One-Year Forward Rates**



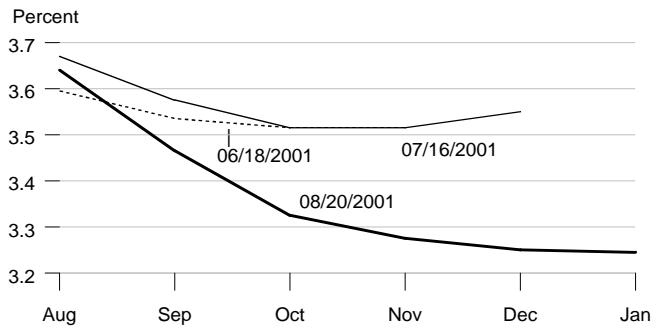
**Rates on 3-Month Eurodollar Futures**



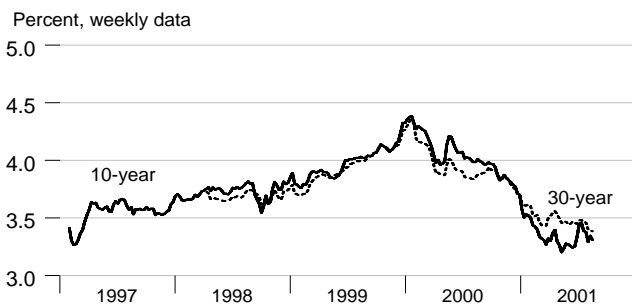
**Rates on Selected Fed Funds Futures Contracts**



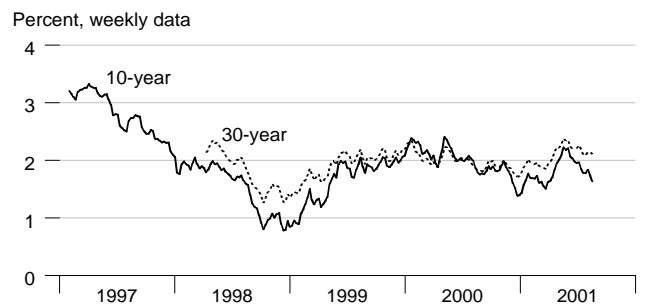
**Implied Yields on Fed Funds Futures**



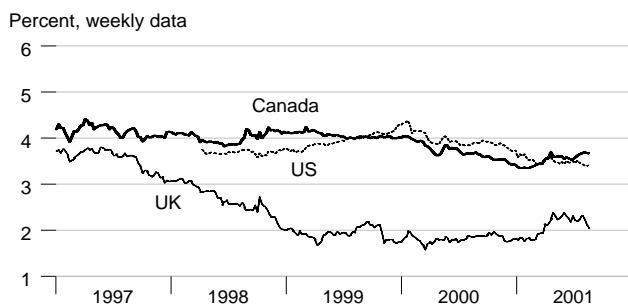
**Inflation-Protected Treasury Yields**



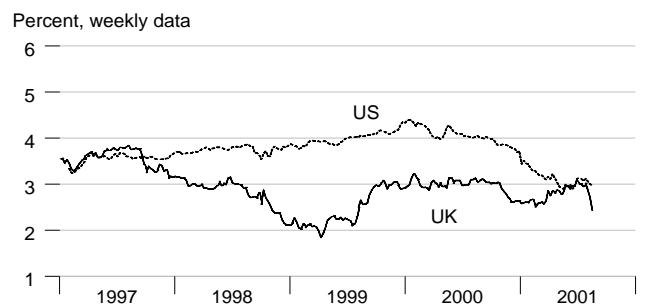
**Inflation-Protected Treasury Yield Spreads**



**Inflation-Indexed 30-Year Bonds**



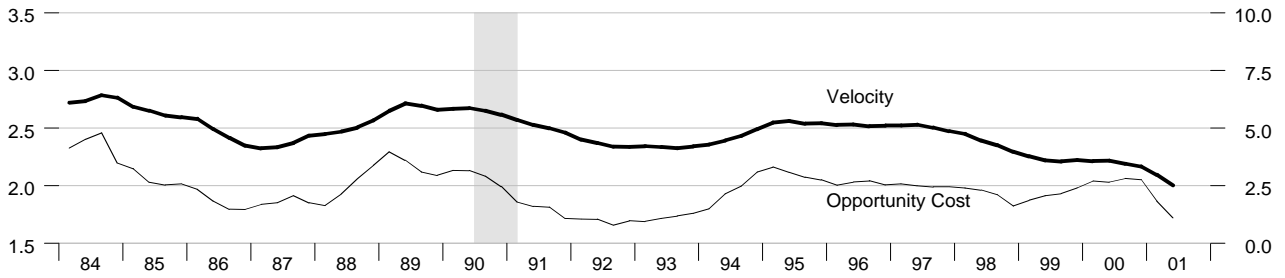
**Inflation-Indexed 10-Year Bonds**



### MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

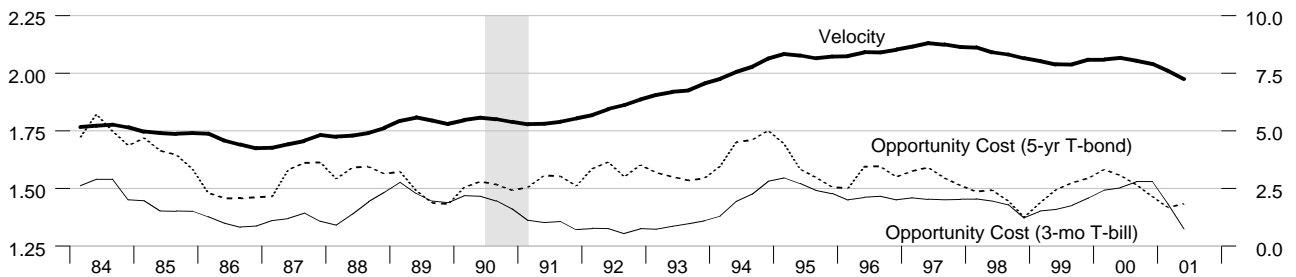
Opportunity Cost = 3 month T-bill rate less MZM own rate



### M2 Velocity and Opportunity Cost

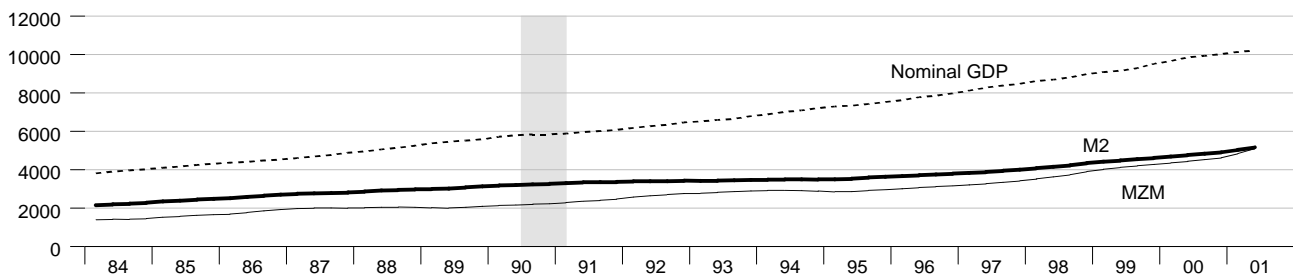
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



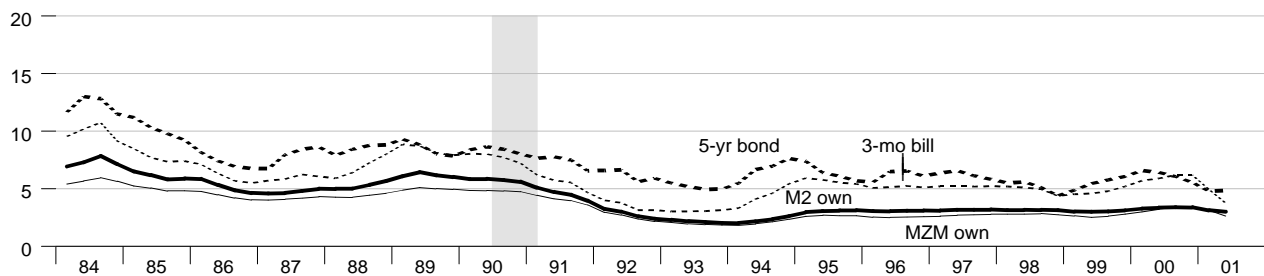
### M2, MZM and Nominal GDP

Billions of \$



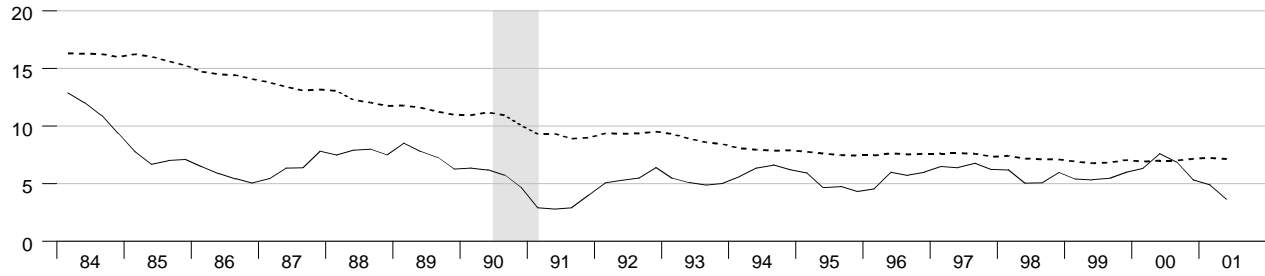
### Interest Rates

Percent



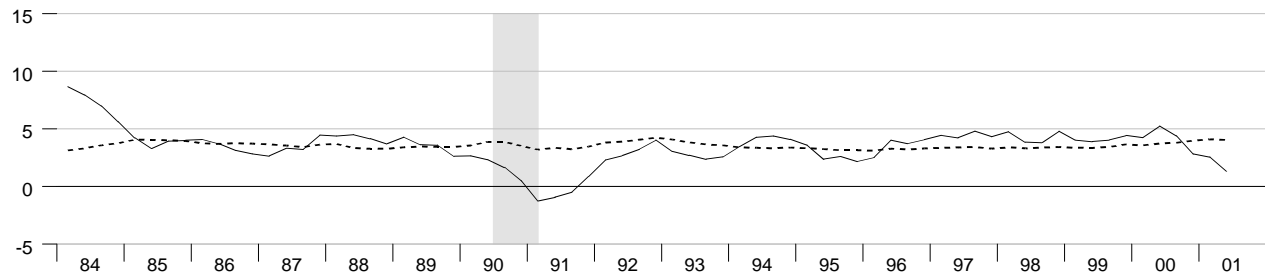
### Gross Domestic Product

Percent change from year ago



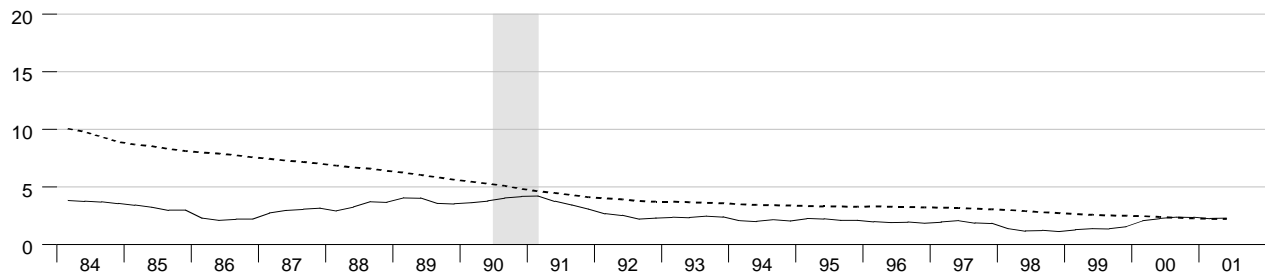
### Real Gross Domestic Product

Percent change from year ago



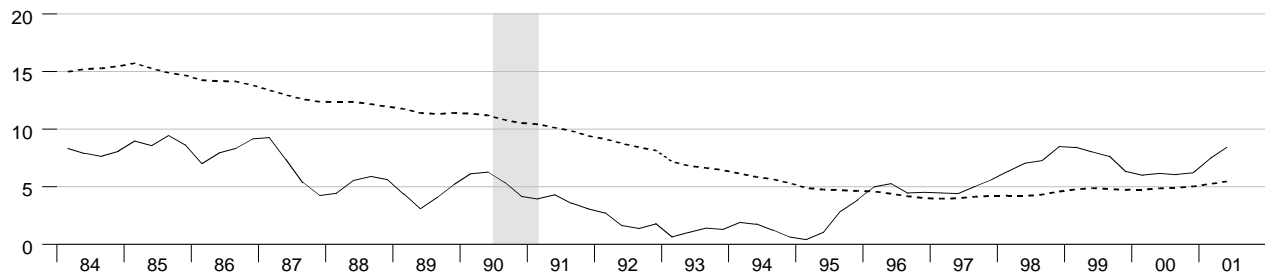
### Gross Domestic Product Price Index

Percent change from year ago



### M2

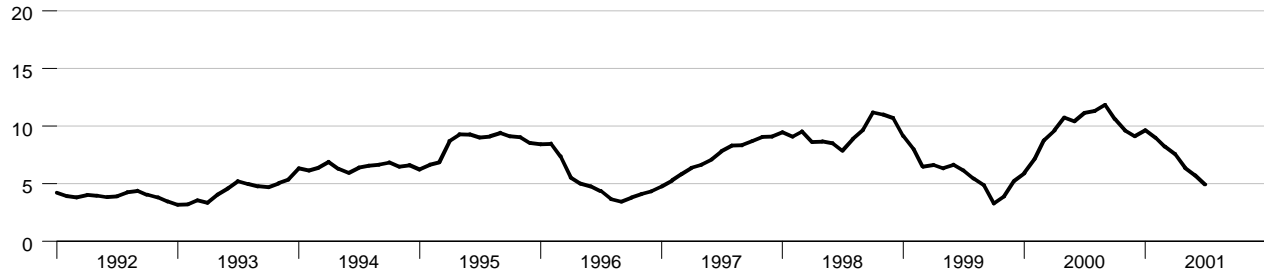
Percent change from year ago



Dashed lines indicate 10-year moving averages

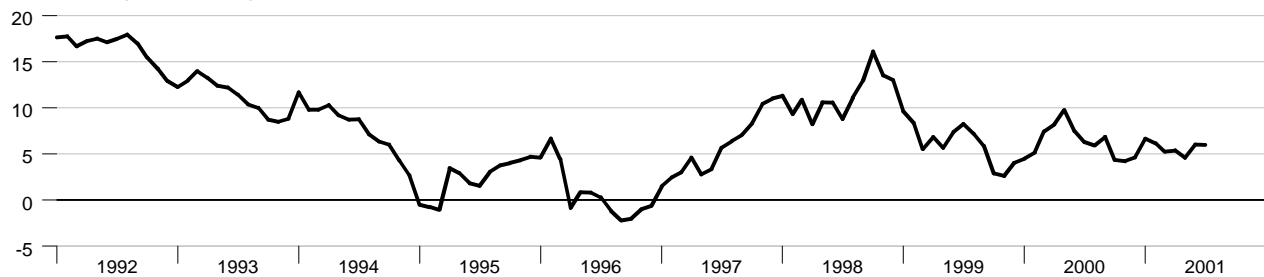
**Bank Credit**

Percent change from year ago



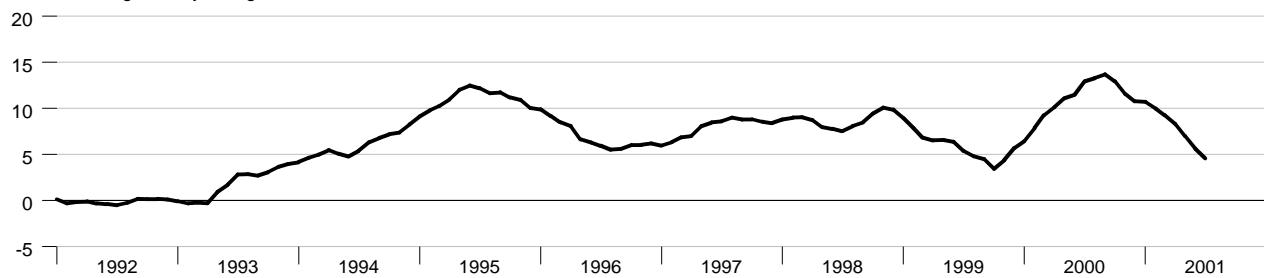
**Investment Securities in Bank Credit at Commercial Banks**

Percent change from year ago



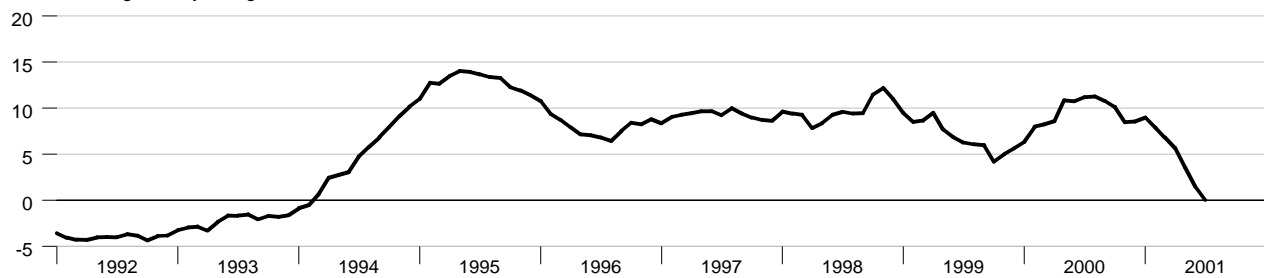
**Total Loans and Leases in Bank Credit at Commercial Banks**

Percent change from year ago

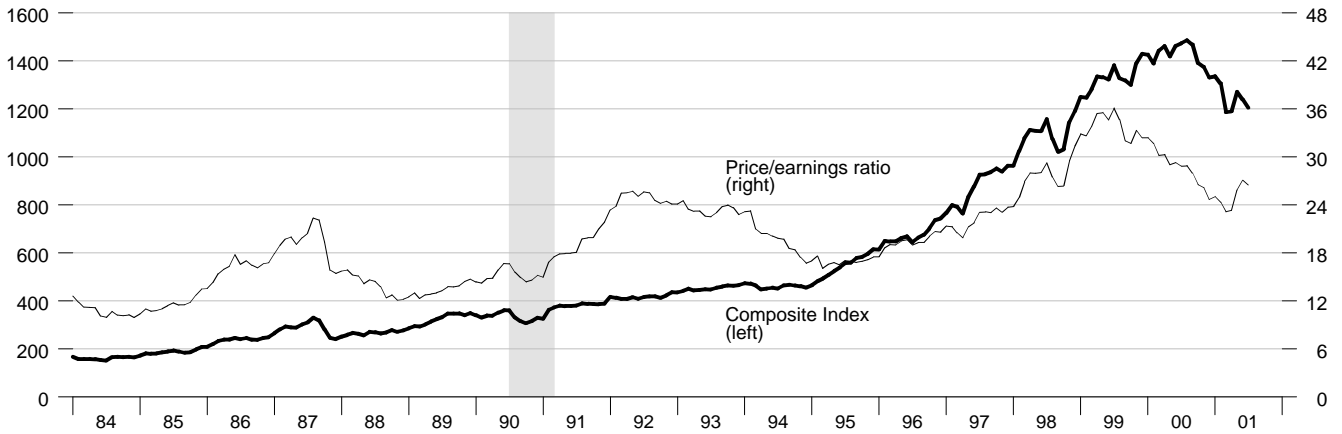


**Commercial and Industrial Loans at Commercial Banks**

Percent change from year ago



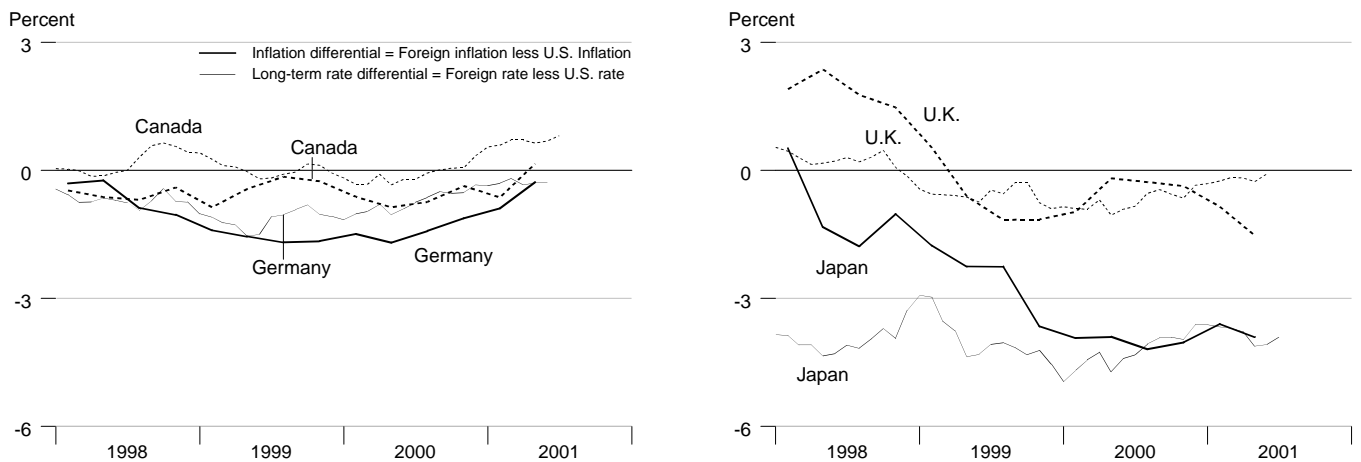
**Standard and Poor's 500**



**Inflation and Long-Term Interest Rates**

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	2000Q3	2000Q4	2001Q1	2001Q2	Apr01	May01	Jun01	Jul01
United States	3.47	3.44	3.41	3.44	5.14	5.39	5.28	5.24
Canada	2.73	3.08	2.77	3.60	5.85	6.03	5.97	6.05
France	1.89	1.89	1.29	2.02	5.47	5.60	5.57	.
Germany	2.05	2.32	2.52	3.16	4.80	5.10	5.00	.
Italy	2.32	2.67	2.89	3.05	5.28	5.45	5.39	.
Japan	-0.72	-0.59	-0.20	-0.46	1.36	1.27	1.20	1.33
United Kingdom	3.20	3.07	2.55	1.91	4.96	5.13	5.20	.

**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	3685.257	455.572	73.952	217.463
1997		1069.145	3318.867	3921.981	5206.953	3953.491	478.708	69.523	226.608
1998		1079.795	3706.274	4208.613	5741.811	4326.572	508.942	67.808	241.647
1999		1101.661	4163.696	4527.993	6254.212	4584.426	557.865	72.360	258.034
2000		1103.865	4496.396	4805.102	6837.661	5028.570	590.821	68.319	272.755
1999	1	1098.625	4032.495	4429.975	6097.456	4517.022	536.334	68.521	252.787
	2	1102.740	4128.668	4494.332	6191.677	4527.962	545.912	67.392	256.223
	3	1095.559	4207.215	4561.360	6281.766	4585.307	557.969	69.050	259.750
	4	1109.718	4286.407	4626.303	6445.949	4707.412	591.246	84.477	263.377
2000	1	1115.417	4368.911	4695.981	6618.547	4845.522	593.102	72.390	266.963
	2	1109.966	4448.527	4771.349	6767.210	4992.276	586.045	67.097	270.750
	3	1099.560	4538.176	4838.631	6919.098	5109.215	589.054	66.636	274.657
	4	1090.518	4629.971	4914.447	7045.790	5167.268	595.084	67.150	278.650
2001	1	1104.370	4845.474	5045.650	7266.919	5278.391	604.850	66.513	285.930
	2	1119.712	5104.023	5174.027	7522.947	5318.524	610.943	64.937	293.307
1999	Jul	1097.526	4186.230	4543.828	6258.814	4556.280	553.060	67.879	258.740
	Aug	1095.762	4210.268	4561.817	6280.224	4585.782	556.711	68.158	259.760
	Sep	1093.388	4225.147	4578.436	6306.259	4613.860	564.135	71.113	260.750
	Oct	1096.970	4251.923	4599.722	6360.559	4643.338	572.990	73.928	261.920
	Nov	1107.435	4286.590	4625.906	6446.348	4704.505	588.675	84.023	263.320
	Dec	1124.750	4320.708	4653.280	6530.941	4774.392	612.073	95.479	264.890
2000	Jan	1123.268	4348.064	4675.513	6572.695	4802.493	604.796	80.824	266.040
	Feb	1109.244	4358.040	4690.941	6605.889	4843.676	589.984	69.258	266.710
	Mar	1113.740	4400.630	4721.489	6677.057	4890.396	584.525	67.089	268.140
	Apr	1117.934	4434.339	4759.661	6728.863	4942.857	583.053	65.913	270.090
	May	1106.711	4445.330	4766.588	6761.182	5004.365	587.863	68.889	270.450
	Jun	1105.253	4465.912	4787.797	6811.585	5029.605	587.220	66.490	271.710
	Jul	1103.349	4499.203	4807.877	6861.170	5063.522	588.032	66.555	272.930
	Aug	1099.379	4535.829	4838.015	6921.231	5103.967	588.435	66.664	274.640
	Sep	1095.953	4579.495	4870.000	6974.894	5160.157	590.694	66.689	276.400
	Oct	1096.146	4602.485	4891.426	6999.048	5135.538	593.064	66.687	277.470
	Nov	1087.213	4620.224	4906.805	7026.866	5156.518	595.549	67.685	278.240
	Dec	1088.194	4667.203	4945.110	7111.456	5209.748	596.639	67.079	280.240
2001	Jan	1099.581	4743.843	4995.246	7206.566	5264.825	600.887	67.999	282.980
	Feb	1100.417	4848.983	5040.601	7267.380	5278.414	607.236	66.558	285.730
	Mar	1113.113	4943.596	5101.104	7326.812	5291.935	606.426	64.981	289.080
	Apr	1118.055	5024.248	5145.480	7437.918	5316.155	605.803	63.143	291.530
	May	1117.534	5101.012	5167.604	7524.381	5322.637	613.264	66.820	293.110
	Jun	1123.546	5186.809	5208.996	7606.543	5316.779	613.761	64.849	295.280
	Jul	1136.015	5243.213	5245.942	7649.665	5313.237	619.434	66.349	297.130

\*All values are given in billions of dollars



		Federal Funds	Discount Rate	Prime Rate	3-mo CDs	Treasury Yields			Corporate Aaa Bonds	S & L Aaa Bonds	Conventional Mortgage
						3 mo	3 yr	30 yr			
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
1999	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	5.46	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

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

		M1	MZM	M2	M3
<b>Percent change from previous period</b>					
<hr/>					
	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	10.27
	1999	2.02	12.34	7.59	8.92
	2000	0.20	7.99	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	1.45
	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	2.25
	3	-0.94	2.02	1.41	2.24
	4	-0.82	2.02	1.57	1.83
2001	1	1.27	4.65	2.67	3.14
	2	1.39	5.34	2.54	3.52
<hr/>					
1999	Jul	-0.20	0.63	0.59	0.50
	Aug	-0.16	0.57	0.40	0.34
	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	1.08
	Apr	0.38	0.77	0.81	0.78
	May	-1.00	0.25	0.15	0.48
	Jun	-0.13	0.46	0.44	0.75
	Jul	-0.17	0.75	0.42	0.73
	Aug	-0.36	0.81	0.63	0.88
	Sep	-0.31	0.96	0.66	0.78
	Oct	0.02	0.50	0.44	0.35
	Nov	-0.81	0.39	0.31	0.40
	Dec	0.09	1.02	0.78	1.20
<hr/>					
2001	Jan	1.05	1.64	1.01	1.34
	Feb	0.08	2.22	0.91	0.84
	Mar	1.15	1.95	1.20	0.82
	Apr	0.44	1.63	0.87	1.52
	May	-0.05	1.53	0.43	1.16
	Jun	0.54	1.68	0.80	1.09
	Jul	1.11	1.09	0.71	0.57

## 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 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. 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

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

to five alternative target inflation rates  $\pi^* = 0, 1, 2, 3, 4$  percent, where  $r_t^*$  is the implied federal funds rate,  $\pi_{t-1}$  is the previous period's inflation rate (PCE),  $y_{t-1}$  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 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

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

to five alternative target inflation rates  $\pi^* = 0, 1, 2, 3, 4$  percent, where  $\Delta MB_i^*$  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 <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. For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Euro-dollar 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 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 01/15/2007.

**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 1992 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 1992 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.

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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).

