July 2001

MonetaryTrends

THE FEDERAL RESERVE BANK of ST. LOUIS

Expectations and Fundamentals

Secondary-market yields on Treasury Inflation-Indexed Securities (TIIS) increased during the months prior to January 2000, and have declined since then (see chart). This pattern resembles the time path of the Nasdaq Composite Index and other major stock-market indexes. Both patterns may reflect investors' increasing optimism about near-term economic fundamentals leading up to early 2000, followed by a shift toward pessimism.

Financial-asset prices and yields provide important insights into investor expectations about the economy. Market yields on TIIS represent investors' required annual real return during the life of the security. This yield approximates the *ex ante* (i.e., forward-looking) riskless real interest rate because the holder faces no default risk or inflation risk.

What factors determine the *ex ante* riskless real interest rate? Federal Reserve Bank of St. Louis President William Poole explained the relatively high real interest rate observed in late 1999 as follows:

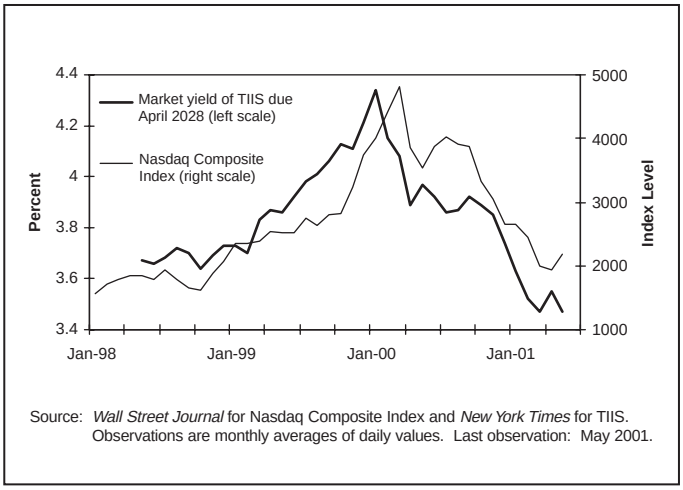
> Funds invested in the bond market have to compete with funds invested in productive businesses. . . . [B]usiness investment spending is strong; . . . corporate earnings have grown smartly; . . . stock market valuations reflect confidence in the future; . . . economy-wide productivity growth has surged since 1995. These are all signs of a high return on invested capital. . . . [T]he high real rate in the bond market reflects the fundamentals . . .[1]

Consequently, the decline in TIIS yields since January 2000 suggests that future returns on invested capital now are not expected to be as high as was the case just a few quarters ago. Indeed, business investment spending has decelerated, corporate earnings have fallen, stock-market valuations have diminished, and the measured labor-productivity growth rate was negative during the first quarter of 2001. These and other signs point to a greatly reduced level of confidence in at least the near-term performance of the U.S. economy. As the chart indicates, stock-market indicators such as the Nasdaq Composite Index may reflect essentially the same ebb and flow of investor expectations of future economic performance that determine TIIS yields.

Long-term (i.e., several-year) forecasts of economic growth, productivity growth, business investment spending, and corporate earnings growth are virtually impossible to make with consistent accuracy. Therefore, the short-term volatility we observe in TIIS yields and other indicators of *ex ante* real expected returns probably reflects, in large part, the changing forecasts by investors of the economic fundamentals expected during the immediate future.

—William R. Emmons

[1] Poole, William, "Are Real Interest Rates Too High?" Speech delivered to the Money Marketeers of New York University, September 21, 1999, www.stls.frb.org/general/speeches/990921.html.



Source: *Wall Street Journal* for Nasdaq Composite Index and *New York Times* for TIIS. Observations are monthly averages of daily values. Last observation: May 2001.

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

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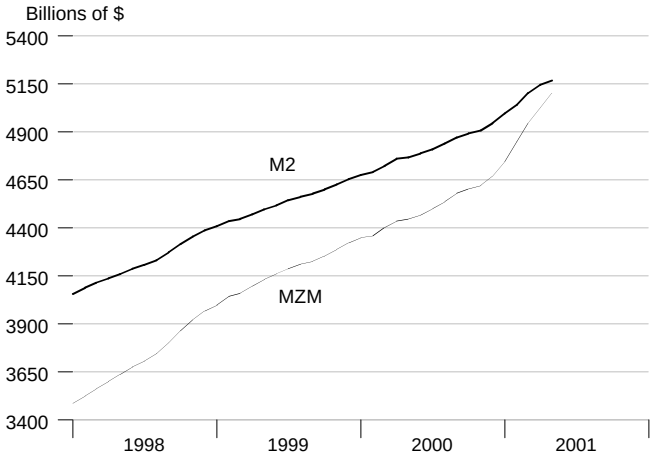
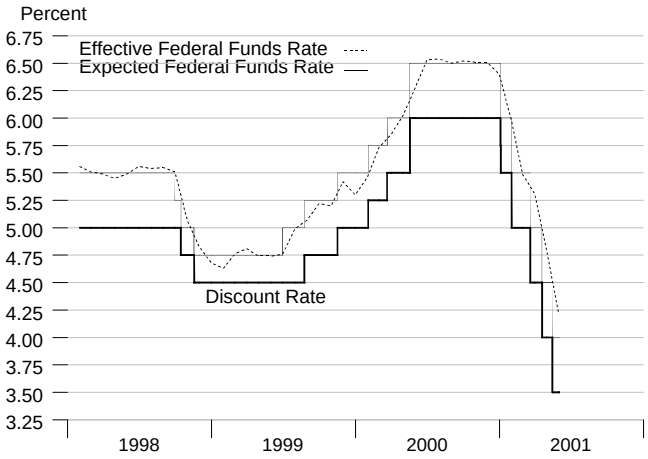
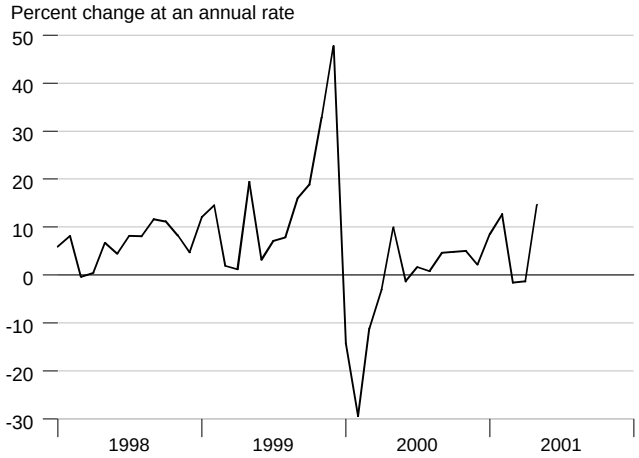
M2 and MZM



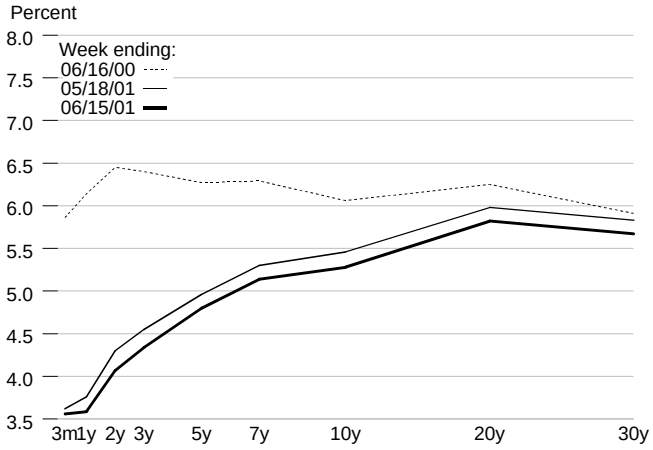
Reserve Market Rates



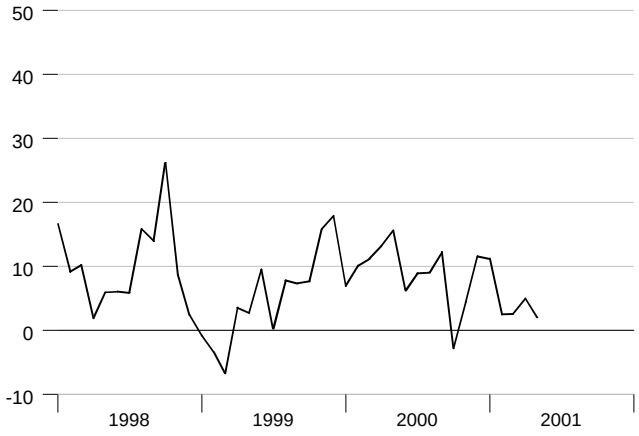
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

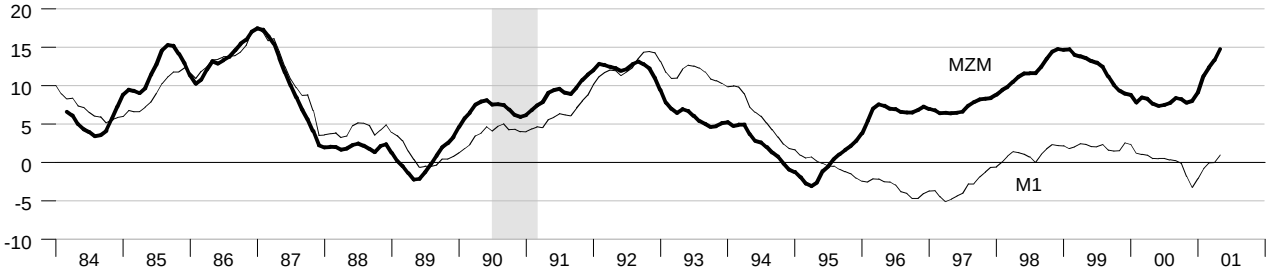


Interest Rates

	Mar 01	Apr 01	May 01
Federal Funds Rate	5.31	4.80	4.21
Discount Rate	4.81	4.28	3.73
Prime Rate	8.32	7.80	7.24
Conventional Mortgage Rate	6.95	7.08	7.15
Treasury Yields:			
3-month constant maturity	4.54	3.97	3.70
6-month constant maturity	4.44	3.99	3.74
1-year constant maturity	4.30	3.98	3.78
3-year constant maturity	4.43	4.42	4.51
5-year constant maturity	4.64	4.76	4.93
10-year constant maturity	4.89	5.14	5.39
30-year constant maturity	5.34	5.65	5.78

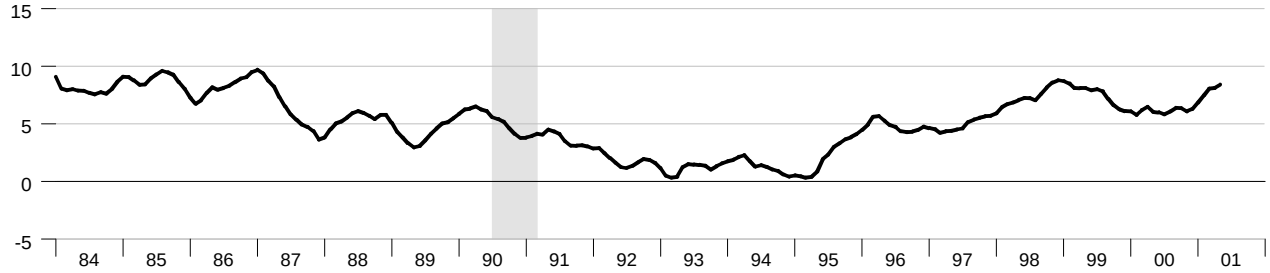
MZM and M1

Percent change from year ago



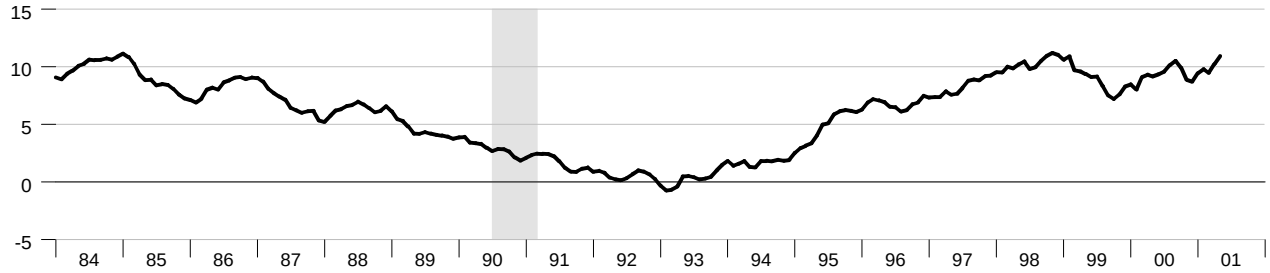
M2

Percent change from year ago



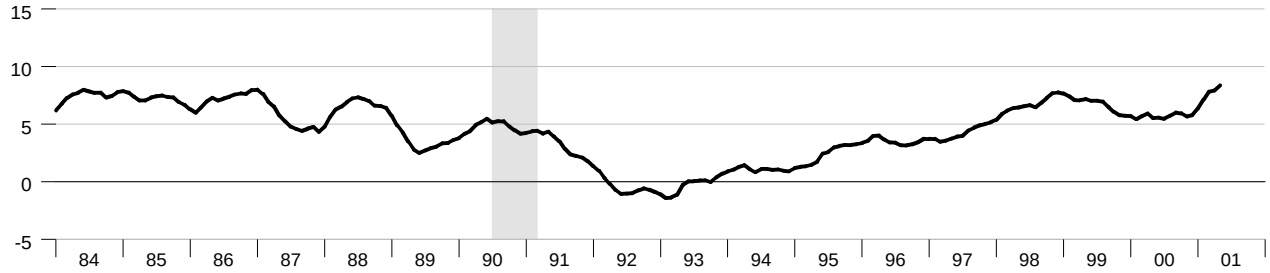
M3

Percent change from year ago

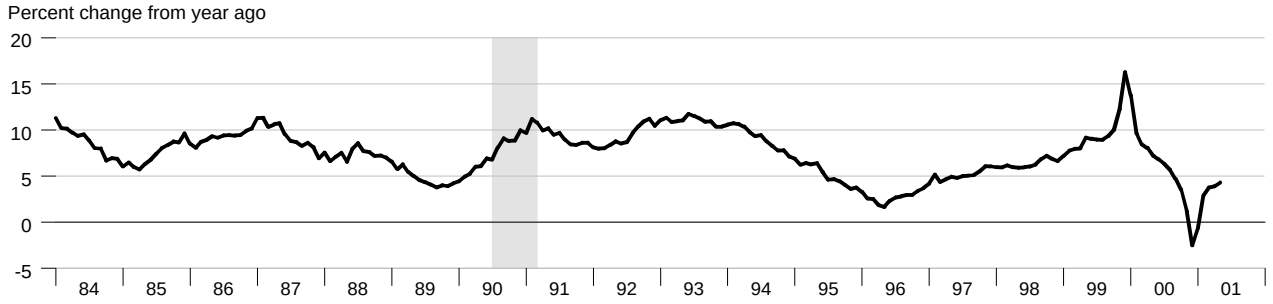


Monetary Services Index - M2

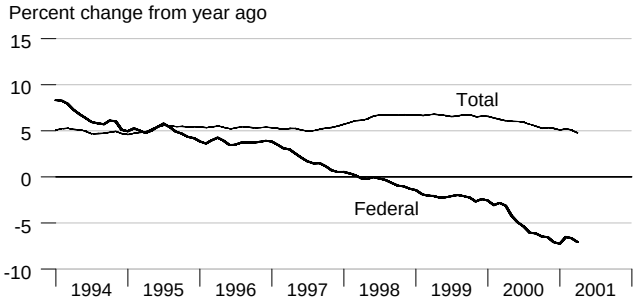
Percent change from year ago



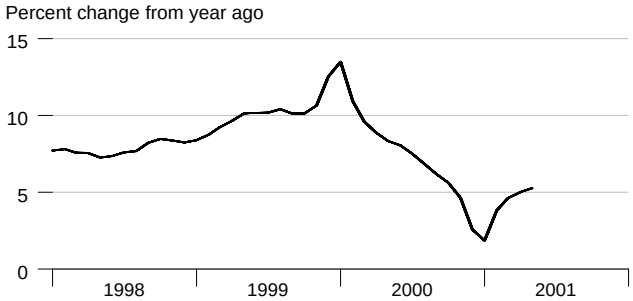
Adjusted Monetary Base



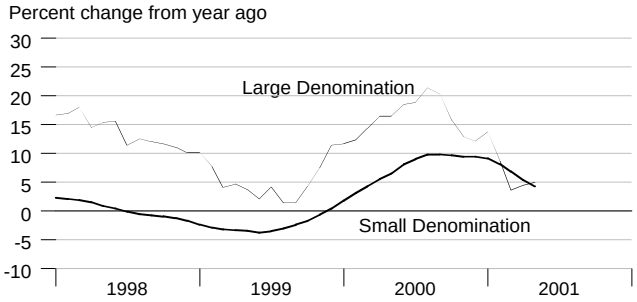
Domestic Nonfinancial Debt



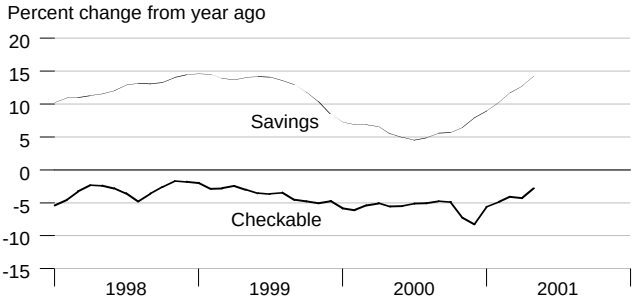
Currency Held by the Nonbank Public



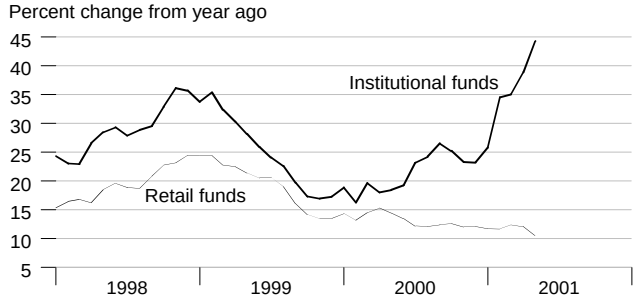
Time Deposits



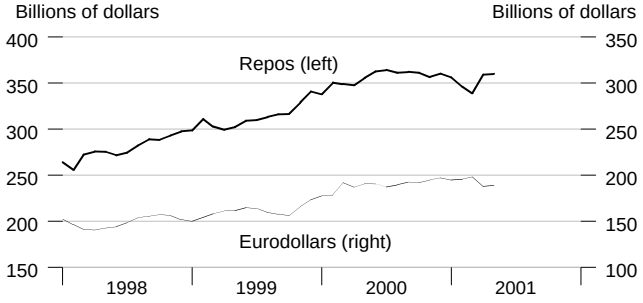
Checkable and Savings Deposits



Money Market Mutual Fund Shares

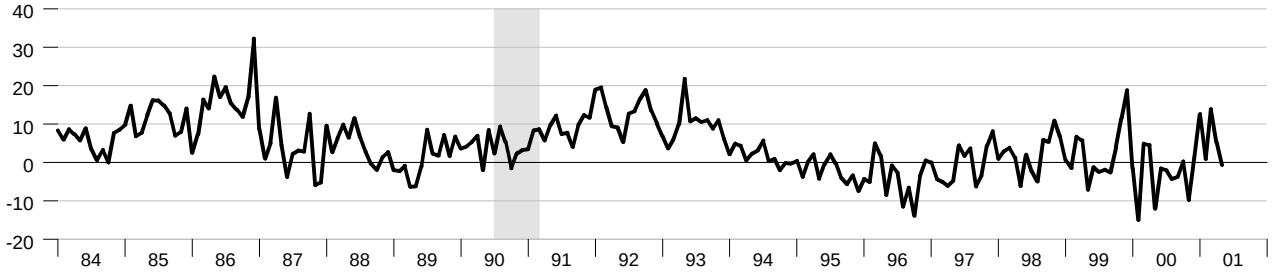


Repurchase Agreements and Eurodollars



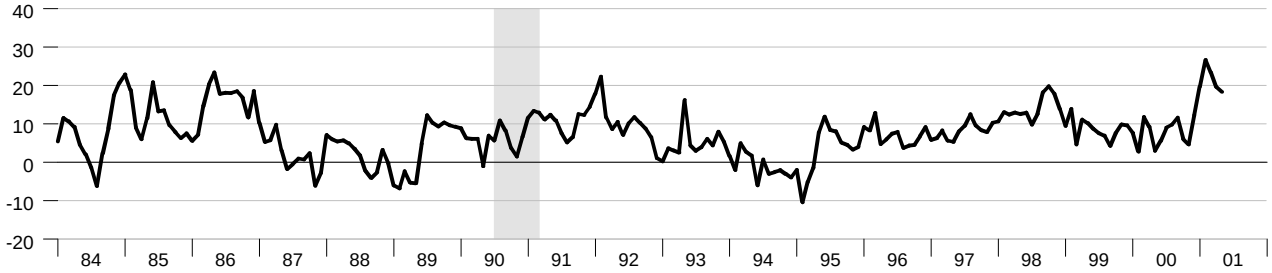
M1

Percent change at an annual rate



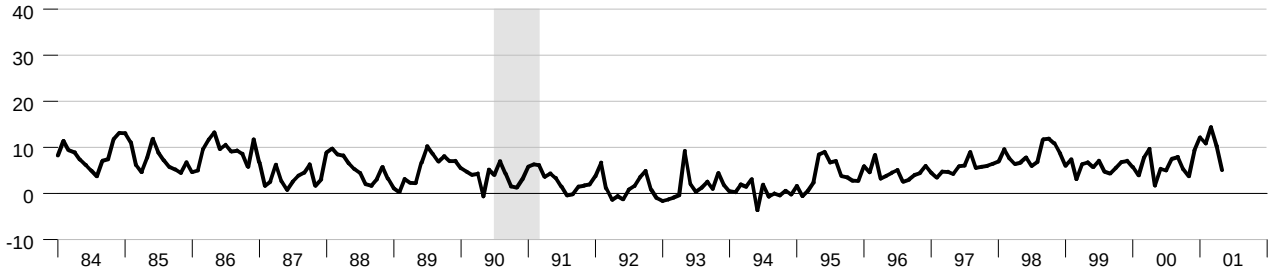
MZM

Percent change at an annual rate



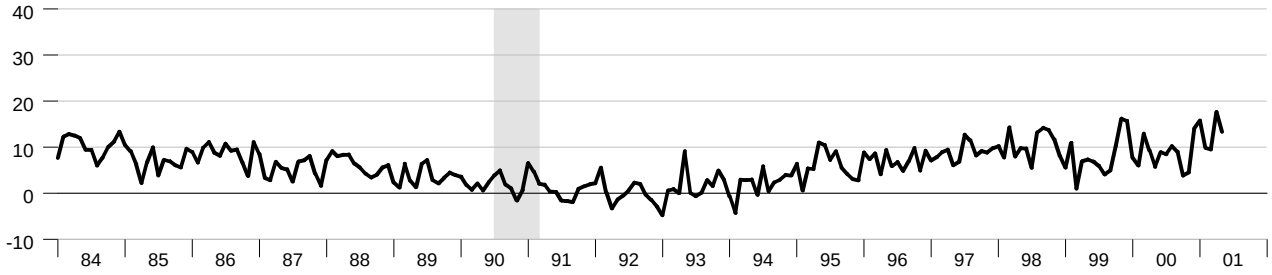
M2

Percent change at an annual rate

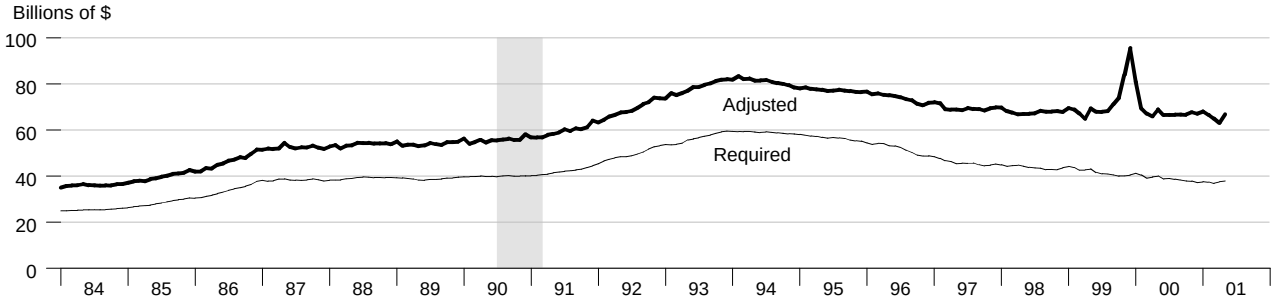


M3

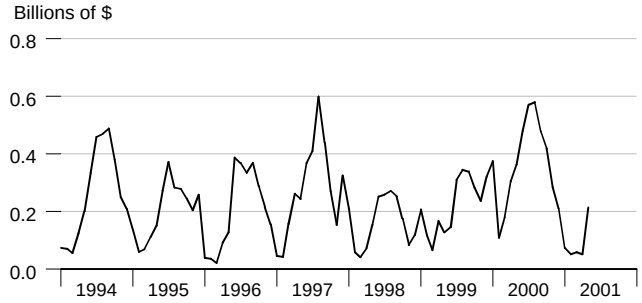
Percent change at an annual rate



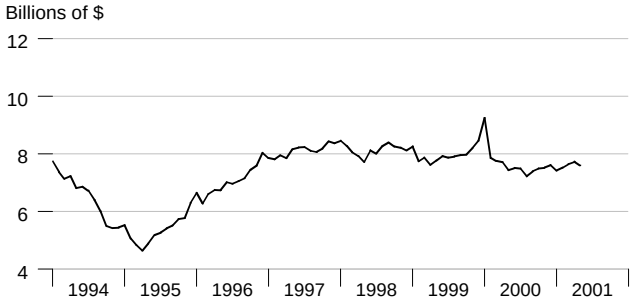
Adjusted and Required Reserves



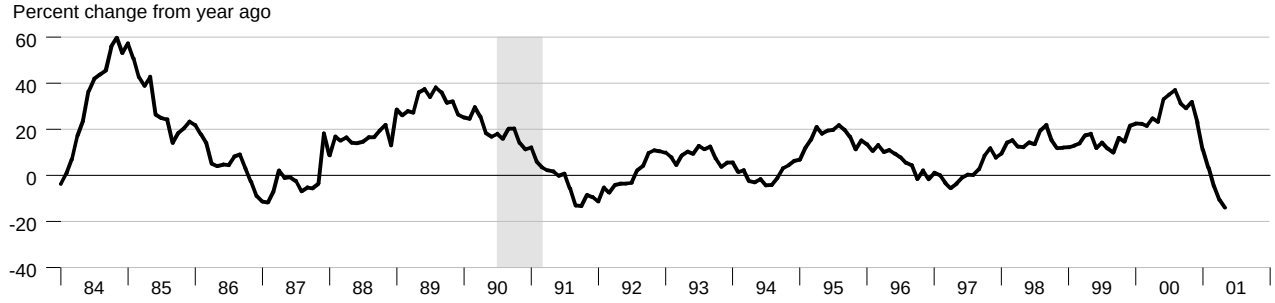
Total Borrowings, nsa



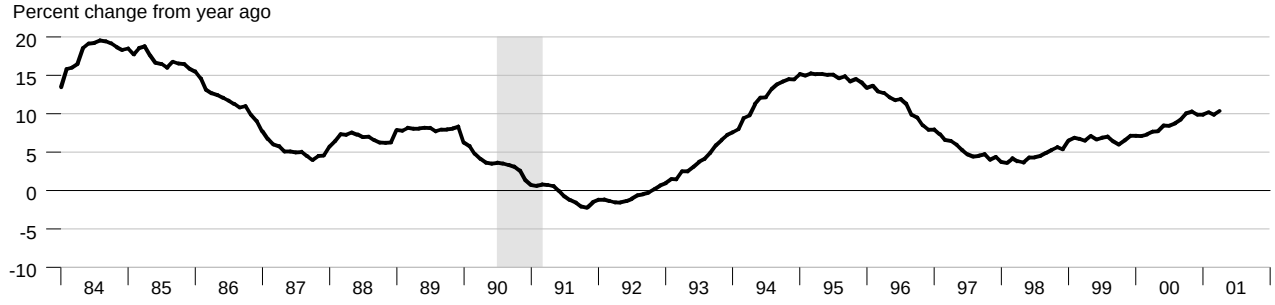
Excess Reserves plus RCB Contracts



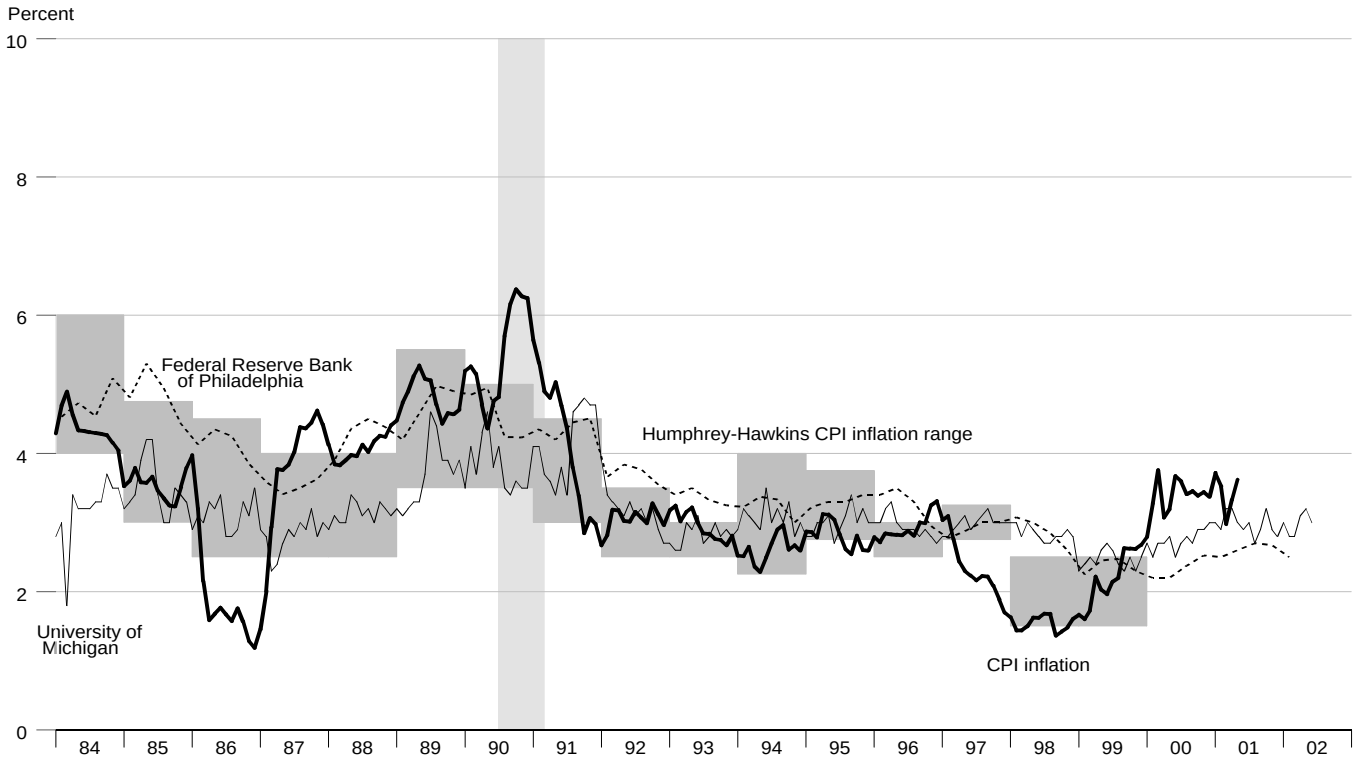
Nonfinancial Commercial Paper



Consumer Credit

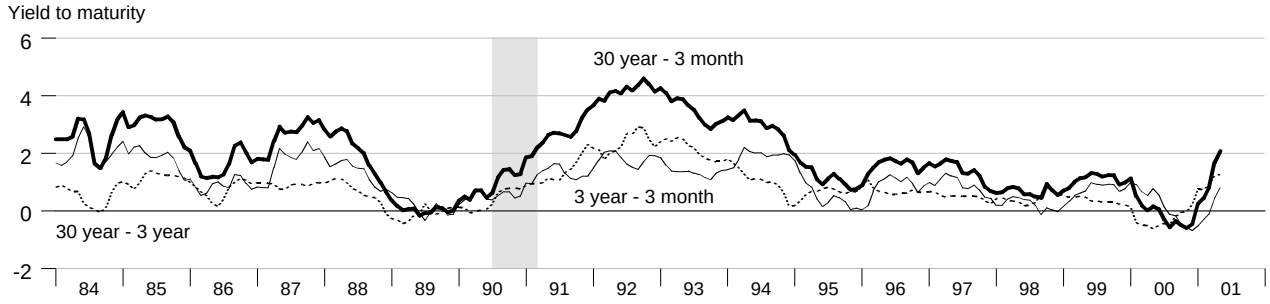


Inflation and Inflation Expectations

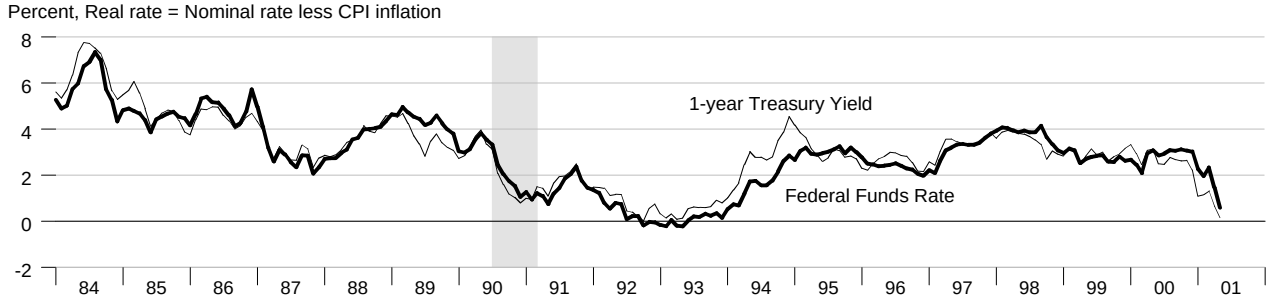


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

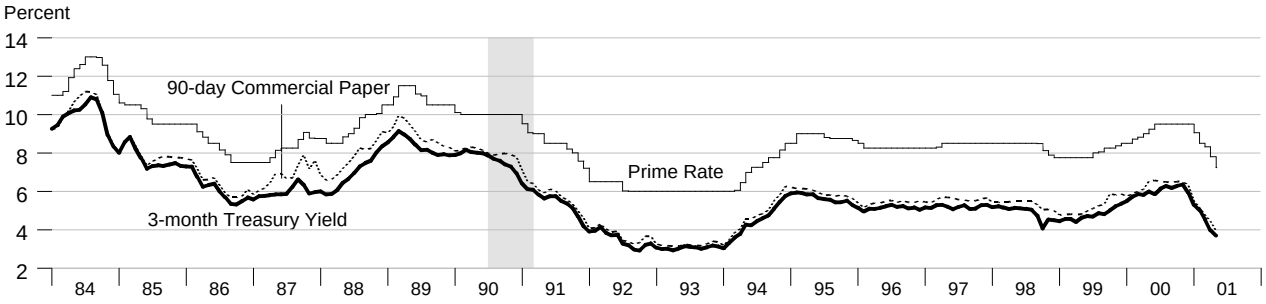
Treasury Security Yield Spreads



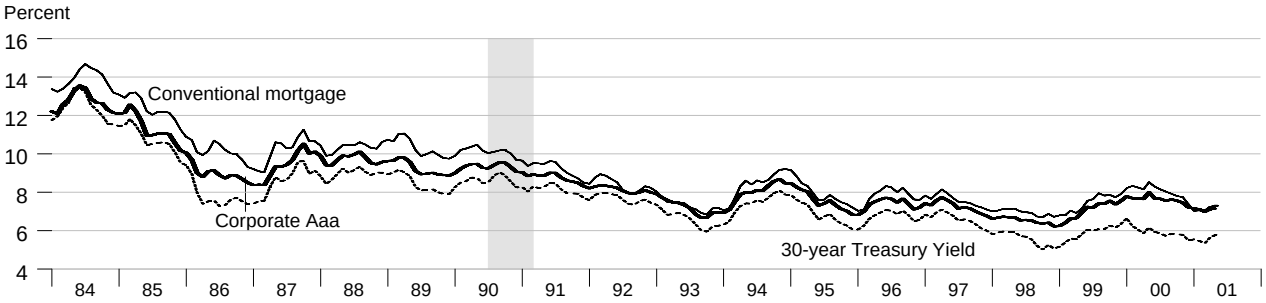
Real Interest Rates



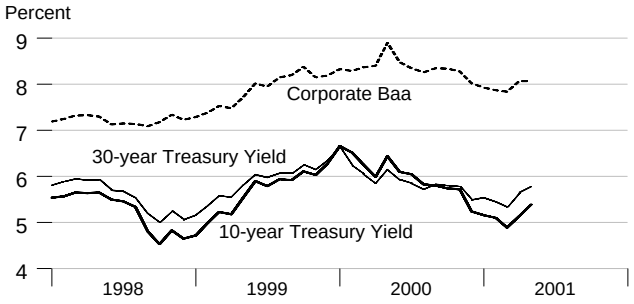
Short Term Interest Rates



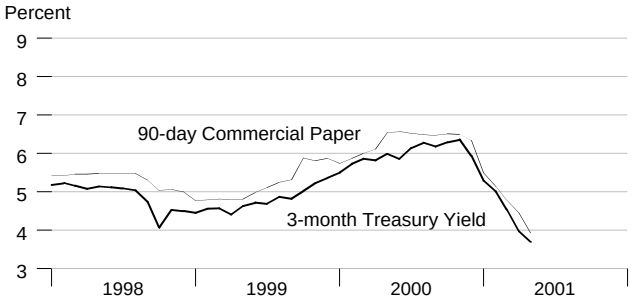
Long Term Interest Rates



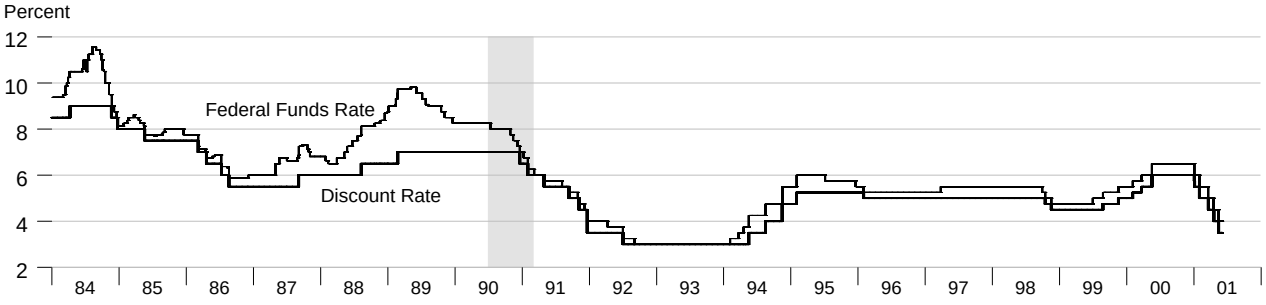
Long Term Interest Rates



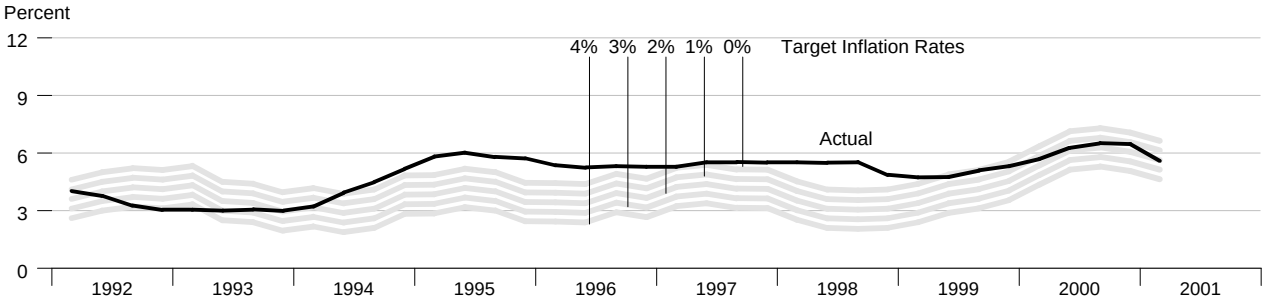
Short Term Interest Rates



FOMC Expected Federal Funds Rate and Discount Rate

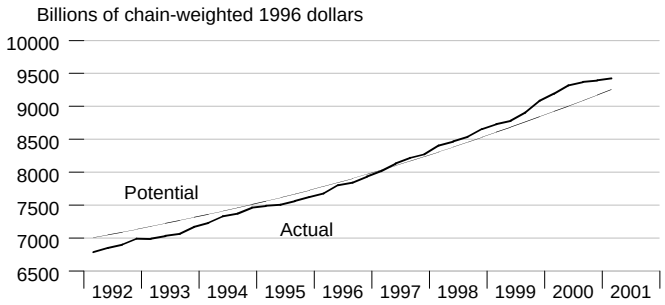


Federal Funds Rate and Inflation Targets

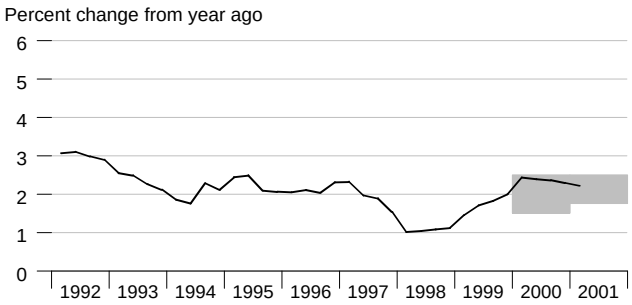


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Actual and Potential Real GDP

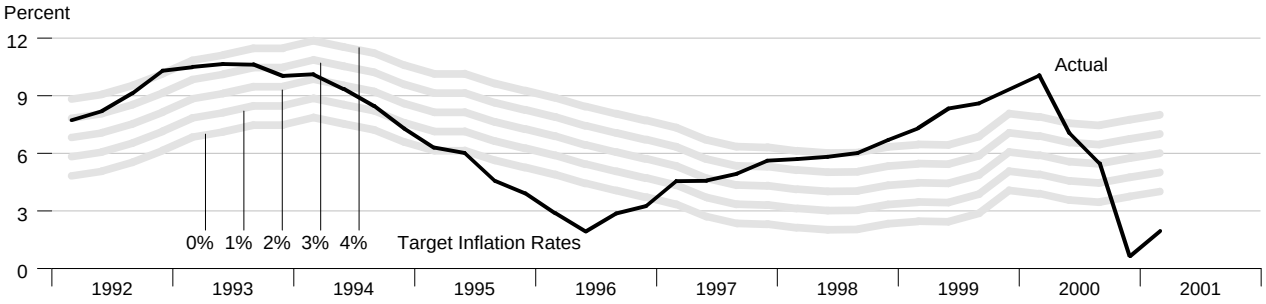


PCE Inflation and Projections



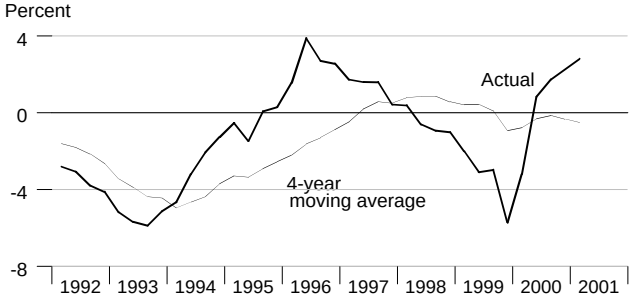
The shaded region shows the range of projections published in the Monetary Policy Report to Congress. See page 19 for information.

Monetary Base Growth* and Inflation Targets

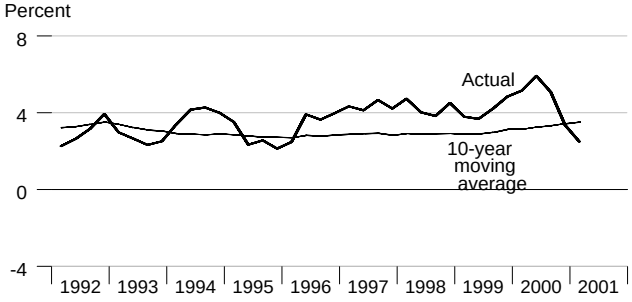


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

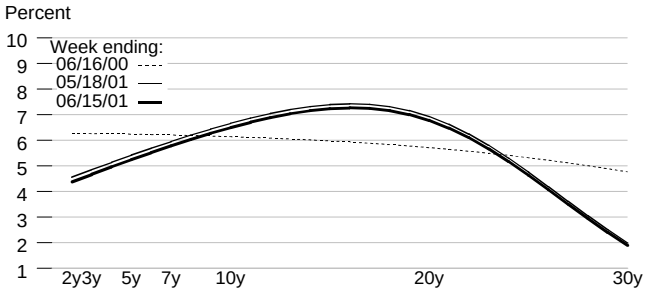
Monetary Base Velocity Growth



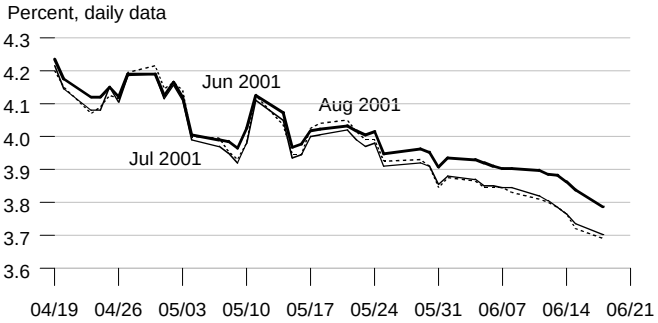
Real Output Growth



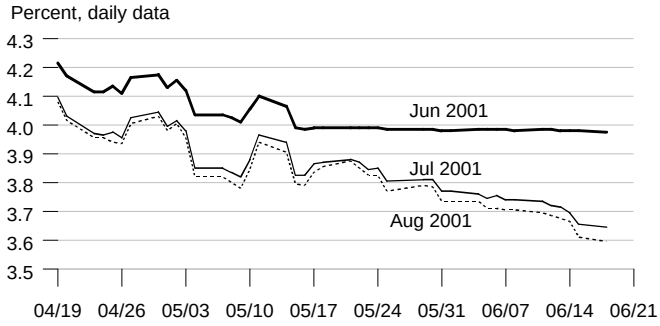
Implied One-Year Forward Rates



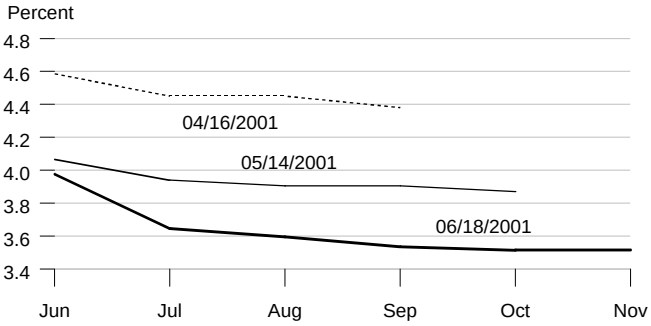
Rates on 3-Month Eurodollar Futures



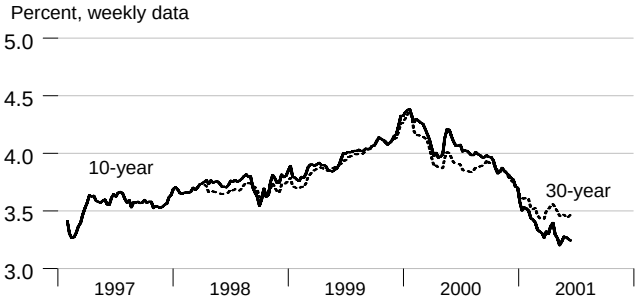
Rates on Selected Fed Funds Futures Contracts



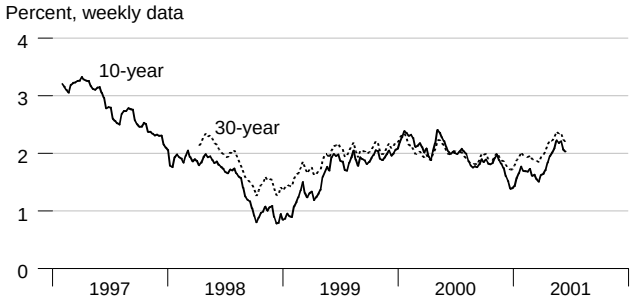
Implied Yields on Fed Funds Futures



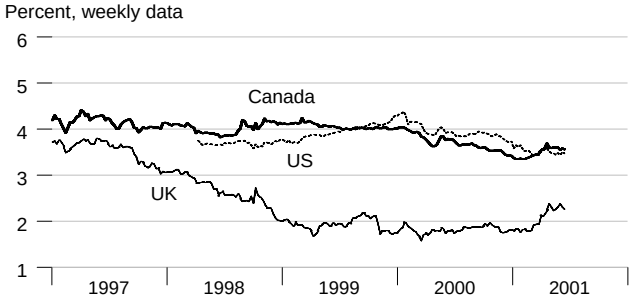
Inflation-Protected Treasury Yields



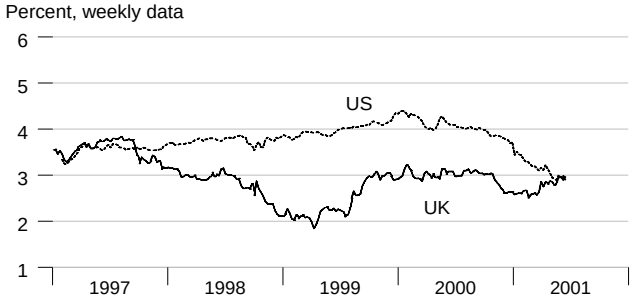
Inflation-Protected Treasury Yield Spreads



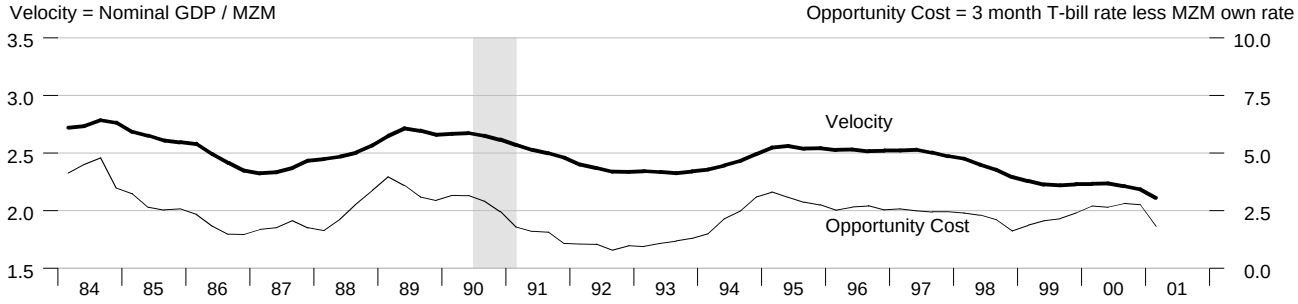
Inflation-Indexed 30-Year Bonds



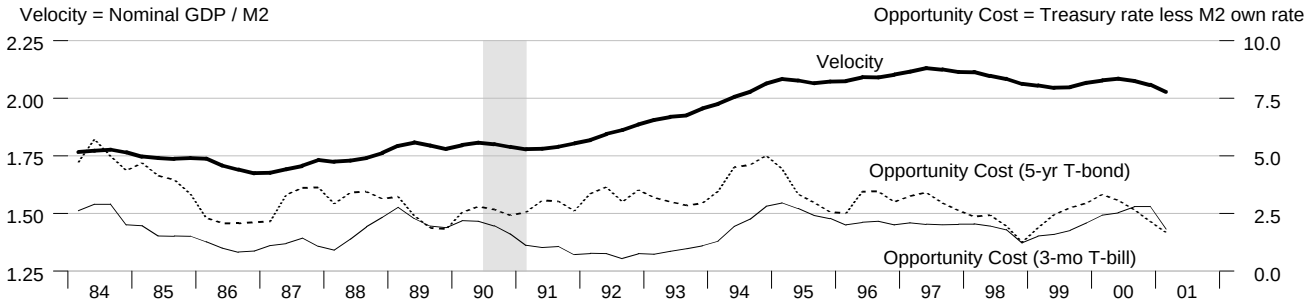
Inflation-Indexed 10-Year Bonds



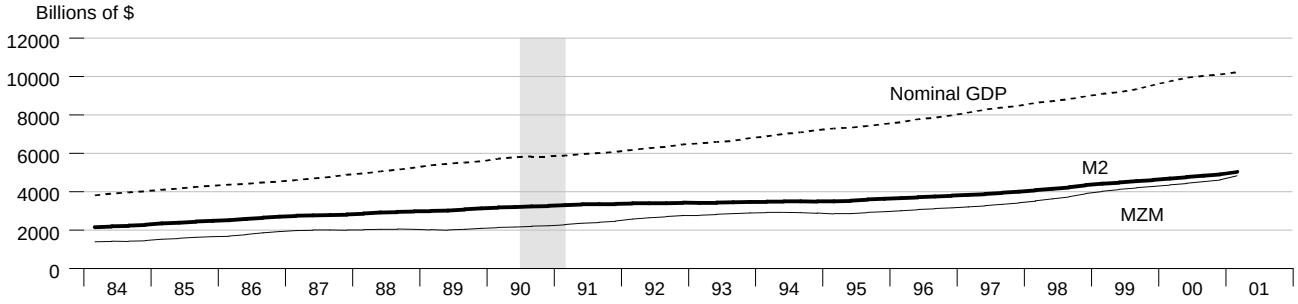
MZM Velocity and Opportunity Cost



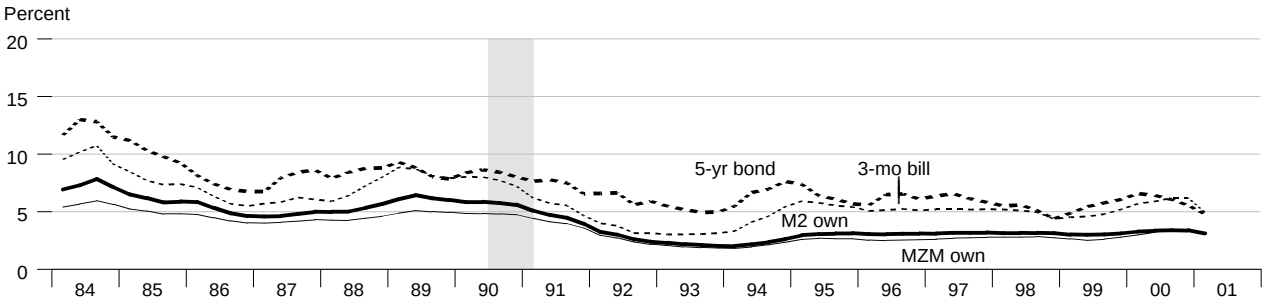
M2 Velocity and Opportunity Cost



M2, MZM and Nominal GDP

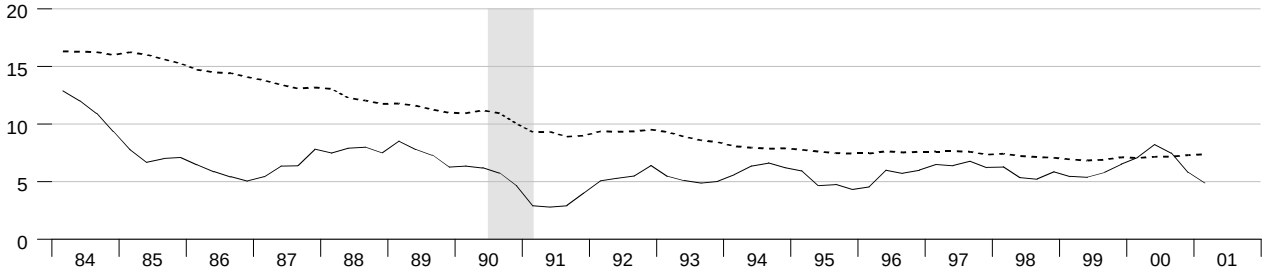


Interest Rates



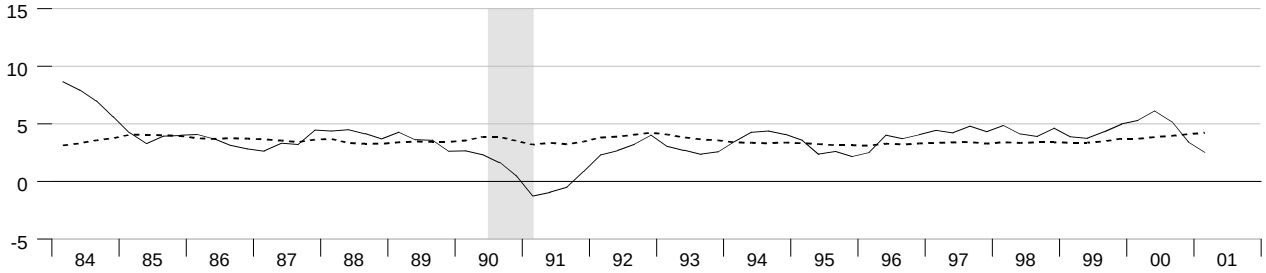
Gross Domestic Product

Percent change from year ago



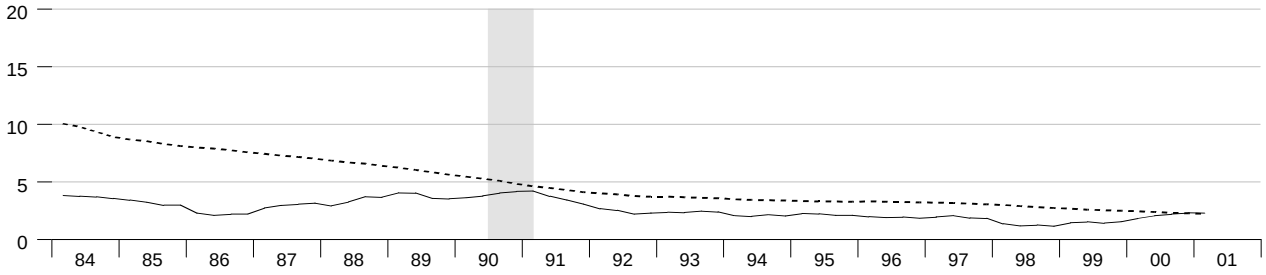
Real Gross Domestic Product

Percent change from year ago



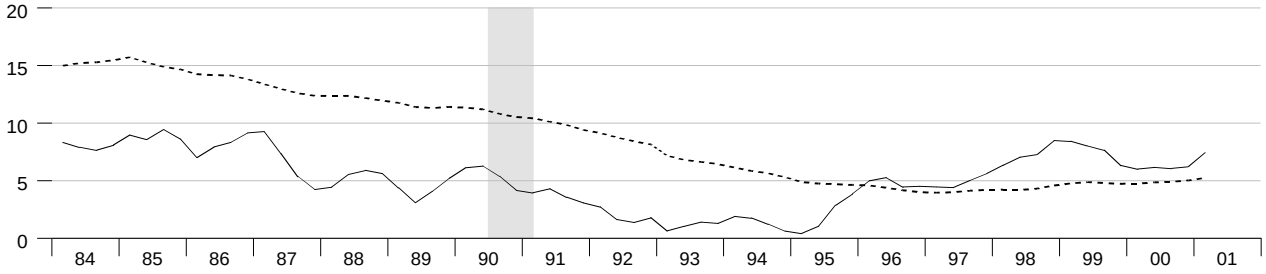
Gross Domestic Product Price Index

Percent change from year ago



M2

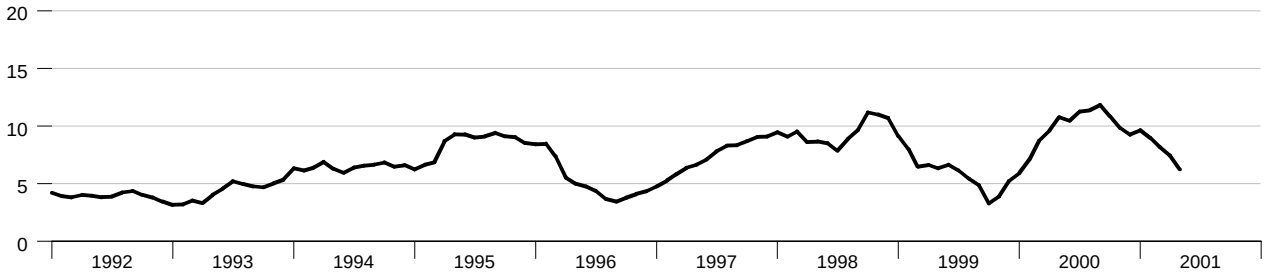
Percent change from year ago



Dashed lines indicate 10-year moving averages

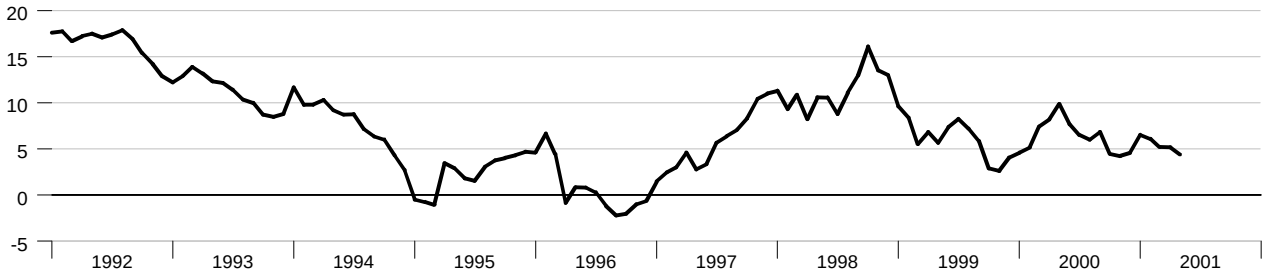
Bank Credit

Percent change from year ago



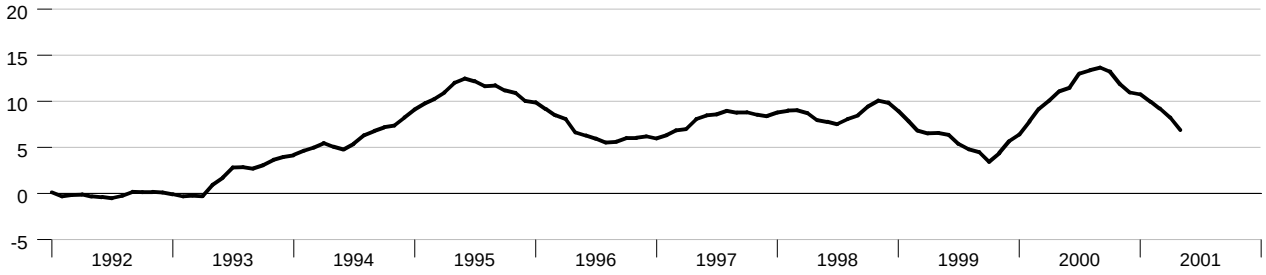
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



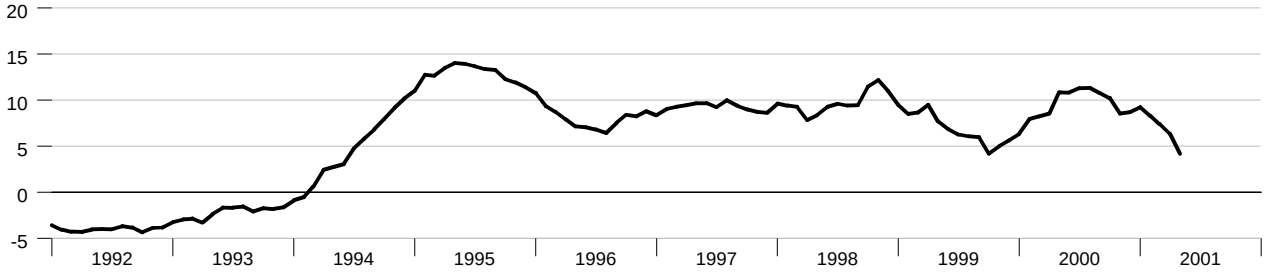
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

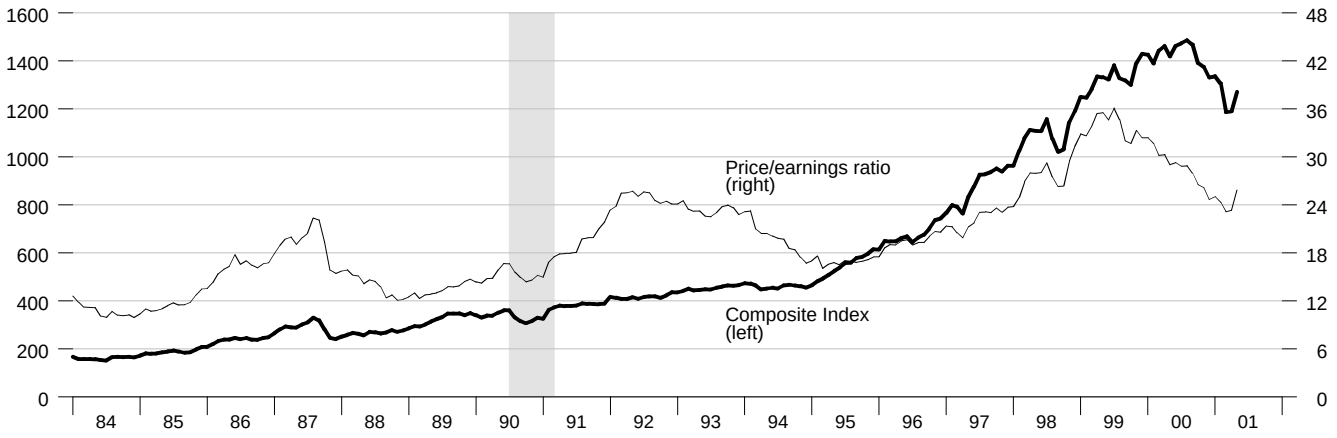


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



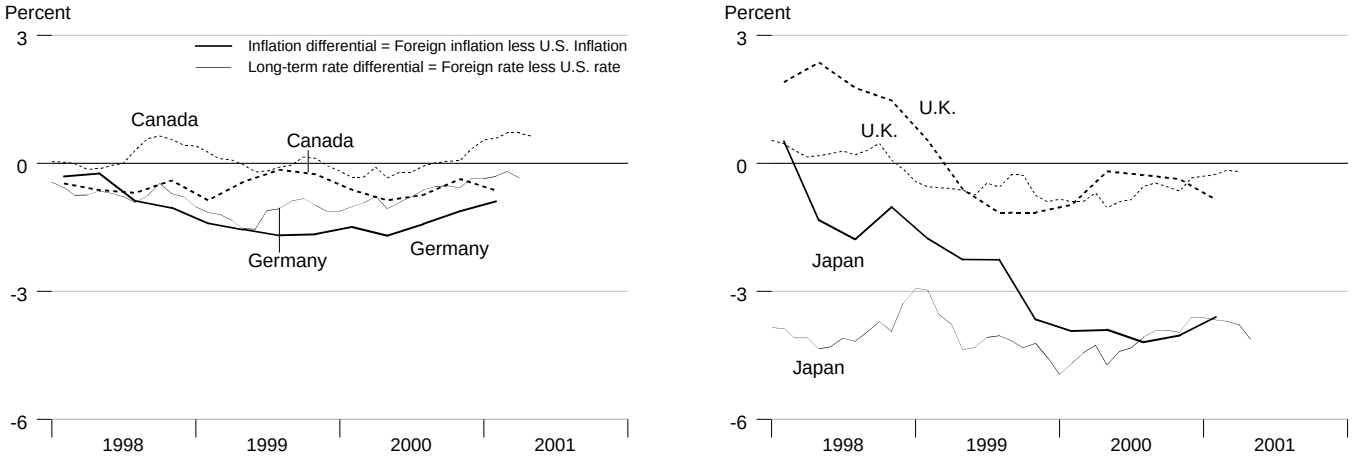
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	2000Q2	2000Q3	2000Q4	2001Q1	Feb01	Mar01	Apr01	May01
United States	3.31	3.47	3.44	3.41	5.10	4.89	5.14	5.39
Canada	2.45	2.73	3.08	2.77	5.69	5.60	5.85	6.03
France	1.49	1.89	1.89	1.29	5.60	5.36	5.47	.
Germany	1.62	2.05	2.32	2.52	4.80	4.70	4.80	.
Italy	2.50	2.63	2.67	2.89	5.19	5.13	5.27	5.44
Japan	-0.59	-0.72	-0.59	-0.20	1.43	1.19	1.36	1.27
United Kingdom	3.13	3.20	3.07	2.55	4.84	4.73	4.95	.

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	3685.270	455.572	73.952	217.463
	1997	1069.145	3318.867	3921.981	5206.953	3953.540	478.708	69.523	226.608
	1998	1079.795	3706.274	4208.613	5741.811	4326.659	508.942	67.808	241.647
	1999	1101.661	4163.696	4527.993	6254.116	4584.526	557.865	72.360	258.034
	2000	1103.866	4496.397	4805.150	6834.168	5031.576	590.821	68.319	272.757
1999	1	1098.625	4032.495	4429.975	6097.456	4517.111	536.334	68.521	252.787
	2	1102.740	4128.668	4494.332	6191.677	4527.990	545.912	67.392	256.223
	3	1095.559	4207.215	4561.360	6281.670	4585.427	557.969	69.050	259.750
	4	1109.718	4286.407	4626.303	6445.659	4707.577	591.246	84.477	263.377
2000	1	1115.417	4368.911	4695.981	6618.070	4844.284	593.102	72.390	266.963
	2	1109.966	4448.527	4771.349	6766.514	4993.126	586.045	67.097	270.750
	3	1099.560	4538.175	4838.700	6915.279	5112.091	589.054	66.636	274.657
	4	1090.520	4629.973	4914.568	7036.811	5176.803	595.084	67.150	278.657
2001	1	1104.367	4845.465	5045.690	7252.173	5276.031	604.850	66.513	285.933
1999	May	1100.945	4130.288	4495.545	6192.369	4519.525	548.331	69.334	256.290
	Jun	1099.774	4160.142	4517.098	6227.926	4555.280	549.796	67.944	257.380
	Jul	1097.526	4186.230	4543.828	6258.784	4556.348	553.060	67.879	258.740
	Aug	1095.762	4210.268	4561.817	6280.129	4585.937	556.711	68.158	259.760
	Sep	1093.388	4225.147	4578.436	6306.098	4613.995	564.135	71.113	260.750
	Oct	1096.970	4251.923	4599.722	6360.332	4643.464	572.990	73.928	261.920
	Nov	1107.435	4286.590	4625.906	6446.060	4704.635	588.675	84.023	263.320
	Dec	1124.750	4320.708	4653.280	6530.585	4774.631	612.073	95.479	264.890
2000	Jan	1123.268	4348.064	4675.513	6572.278	4802.301	604.796	80.824	266.040
	Feb	1109.244	4358.040	4690.941	6605.414	4842.705	589.984	69.258	266.710
	Mar	1113.740	4400.630	4721.489	6676.517	4887.847	584.525	67.089	268.140
	Apr	1117.934	4434.339	4759.661	6728.250	4941.651	583.053	65.913	270.090
	May	1106.711	4445.330	4766.588	6760.518	5005.843	587.863	68.889	270.450
	Jun	1105.253	4465.912	4787.799	6810.774	5031.883	587.220	66.490	271.710
	Jul	1103.349	4499.204	4807.908	6858.989	5069.260	588.032	66.555	272.930
	Aug	1099.379	4535.828	4838.086	6917.397	5107.473	588.435	66.664	274.640
	Sep	1095.953	4579.494	4870.107	6969.451	5159.540	590.694	66.689	276.400
	Oct	1096.147	4602.486	4891.543	6991.811	5147.577	593.064	66.687	277.480
	Nov	1087.216	4620.227	4906.927	7018.239	5166.529	595.549	67.685	278.240
	Dec	1088.197	4667.206	4945.235	7100.383	5216.304	596.639	67.079	280.250
2001	Jan	1099.583	4743.846	4995.340	7193.618	5265.001	600.887	67.999	282.990
	Feb	1100.414	4848.973	5040.643	7252.661	5275.900	607.236	66.558	285.730
	Mar	1113.103	4943.575	5101.087	7310.240	5287.191	606.426	64.981	289.080
	Apr	1117.981	5024.063	5145.087	7417.659	5309.033	605.754	63.094	291.500
	May	1117.352	5100.764	5166.904	7500.144	5318.014	613.137	66.792	293.070

*All values are given in billions of dollars

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

*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	10.27
	1999	2.02	12.34	7.59	8.92
	2000	0.20	7.99	6.12	9.27
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	2.67
	2	-0.49	1.82	1.60	2.24
	3	-0.94	2.02	1.41	2.20
	4	-0.82	2.02	1.57	1.76
2001	1	1.27	4.65	2.67	3.06
1999	May	-0.59	0.85	0.56	0.61
	Jun	-0.11	0.72	0.48	0.57
	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
2000	Jan	-0.13	0.63	0.48	0.64
	Feb	-1.25	0.23	0.33	0.50
	Mar	0.41	0.98	0.65	1.08
	Apr	0.38	0.77	0.81	0.77
	May	-1.00	0.25	0.15	0.48
	Jun	-0.13	0.46	0.44	0.74
	Jul	-0.17	0.75	0.42	0.71
	Aug	-0.36	0.81	0.63	0.85
	Sep	-0.31	0.96	0.66	0.75
	Oct	0.02	0.50	0.44	0.32
	Nov	-0.81	0.39	0.31	0.38
	Dec	0.09	1.02	0.78	1.17
2001	Jan	1.05	1.64	1.01	1.31
	Feb	0.08	2.22	0.91	0.82
	Mar	1.15	1.95	1.20	0.79
	Apr	0.44	1.63	0.86	1.47
	May	-0.06	1.53	0.42	1.11

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

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where f_t^* is the implied federal funds rate, π_{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

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where ΔMB_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

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 $m = 1,...,$ 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)

$$f(m) = [D(m)R(m) - D(m\text{-}1)] / [D(m) - D(m\text{-}1)]$$

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 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 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.