

Monetary Trends



Interpreting Monetary Growth

As the economy slipped into recession last year, the FOMC reduced its target level for the overnight federal funds rate by 475 basis points to 1.75 percent. Also during the year, growth of the monetary aggregates jumped sharply. Fourth quarter to fourth quarter, M2 and MZM increased approximately 10 and 20 percent, respectively. M2's growth was two-thirds more than its average during the previous two years and MZM's more than twice its average. Such rapid growth has led some analysts to express concern that the past two decades' progress toward low, stable inflation may be at risk.

Last year's increase in money growth was largely consistent with historical money-demand behavior. During the year, both the aggregates' opportunity costs and velocities fell sharply (see page 12). Aside from changes in interest rates and opportunity costs, special factors such as the September 11 attacks likely played little, if any, role in the acceleration. Further, the composition of the aggregates shifted toward liquidity, in the past a harbinger of planned spending. Currency plus checkable and savings deposits accounted for all of the growth in M2 and approximately half the growth in MZM. Within M2, small-denomination time deposits decreased. This, also, was not surprising. The demand for time deposits is sensitive to their opportunity costs, that is, to current and expected future differentials between deposit rates and yields on other investments. Many investors perhaps were reluctant to enter into time deposits, expecting that a near-term rebound in economic activity would spur sluggish bank lending and lead to higher offering rates. At the same time, strong inflows of liquid deposits and robust sales of large CDs to money market mutual funds likely tempered banks' offering rates.

A surge in institutional-type money market mutual funds accounted for half the growth of MZM. It seems doubtful, however, that these flows have any macroeconomic significance. Due to their accounting practices, changes in the

yields on institutional-type money market mutual funds tend to lag changes in available yields on market instruments. In particular, inflows to these funds may increase sharply when market yields fall quickly. Because of this lag, it seems likely that a significant part of last year's inflows will exit the funds later this year as market yields stabilize and, perhaps, increase. Nevertheless, even absent the inflows to institutional-type funds, MZM's growth exceeded 10 percent last year.

Sustained money growth at 10 percent per year is not consistent with long-run price stability. To avoid an acceleration of inflation, money growth must be slowed promptly as the economy rebounds. Recent empirical studies suggest that FOMC policy actions during the last two decades may be well approximated by a Taylor-type rule with interest rate smoothing where the smoothing reflects, in part, uncertainty regarding the behavior of the economy. Even though the growth of monetary aggregates has no current, formal near-term policymaking role, last year's rapid money growth suggests that the FOMC must be on guard against waiting too long to remove the punch-bowl at this year's economic recovery party.

—Richard G. Anderson

	Growth rate, 2000:Q4 to 2001:Q4 (percent annual rate)	Contribution to growth of (percentage points)	
		M2	MZM
M2	10.2		
MZM	20.4		
Currency	9.0	1.0	0.9
Saving and checkable deposits	17.8	9.0	8.8
Small-denomination time deposits	-6.8	-1.3	—
Retail-type money market mutual funds	8.4	1.5	1.5
Institution-type money market mutual funds	50.5	—	9.1



Table of Contents

Page	
3	Monetary and Financial Indicators at a Glance
4-5	Monetary Aggregates and Their Components
6	Monetary Aggregates: Monthly Growth
7	Reserves Markets and Short-Term Credit Flows
8	Measures of Expected Inflation
9	Interest Rates
10	Policy-Based Inflation Indicators
11	Implied Forward Rates, Futures Contracts, and Inflation-Protected Securities
12-13	Velocity, Gross Domestic Product, and M2
14	Bank Credit
15	Stock Market Index, and Foreign Inflation and Interest Rates
16-18	Reference Tables
18-20	Definitions, Notes, and Sources

Conventions used in this publication:

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

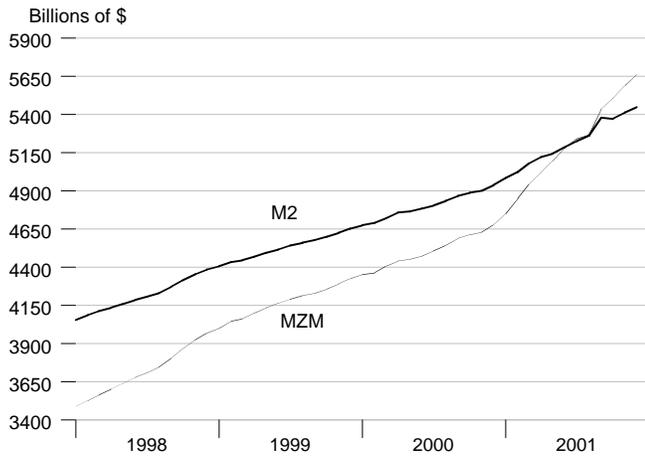
We welcome your comments addressed to:

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

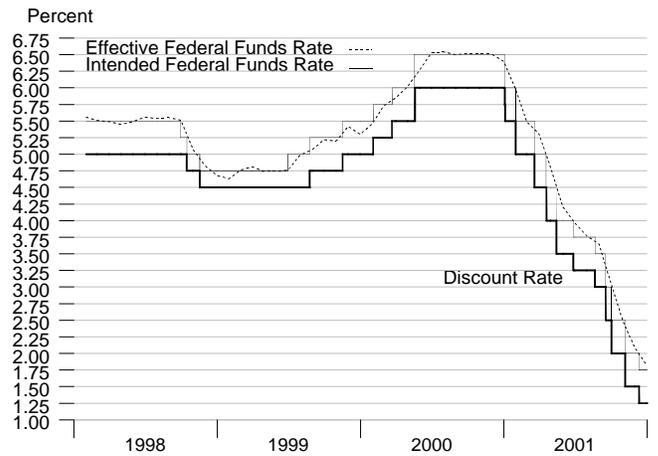
or to:

webmaster@stls.frb.org

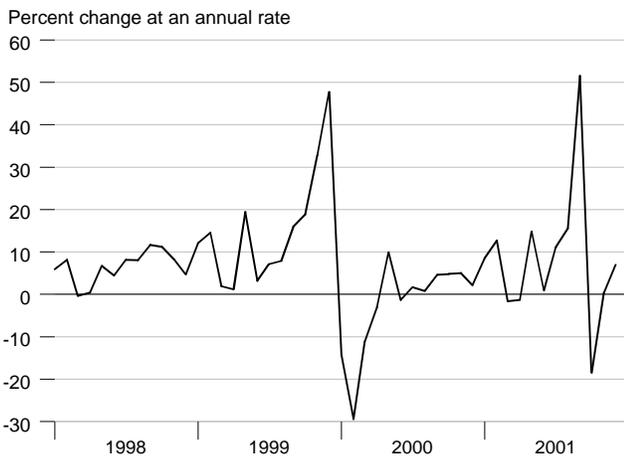
M2 and MZM



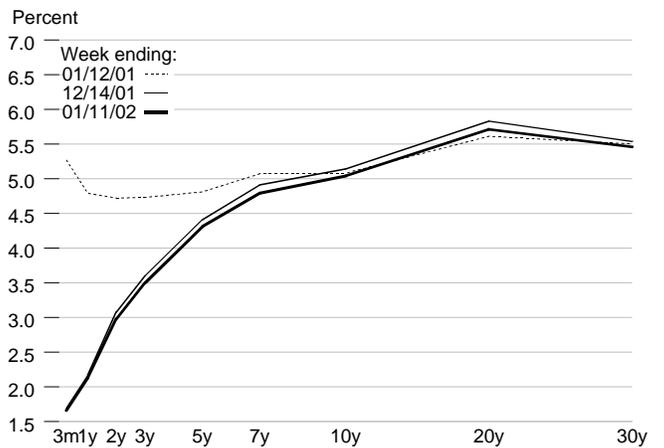
Reserve Market Rates



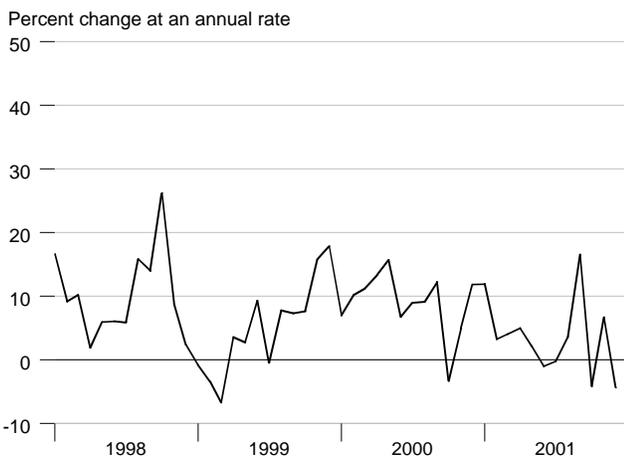
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

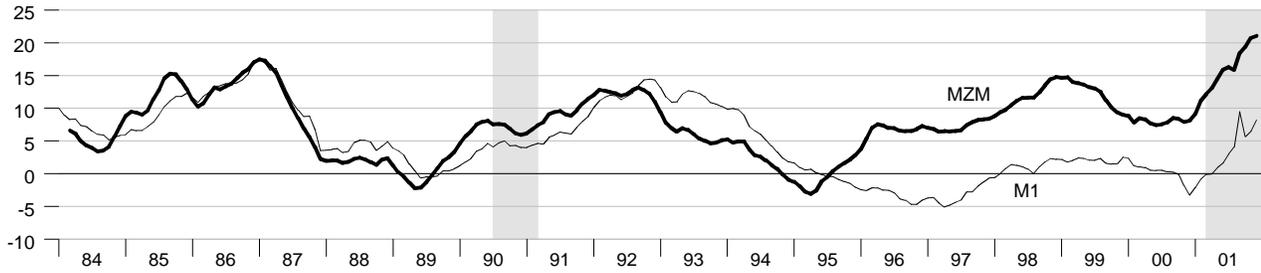


Interest Rates

	Oct 01	Nov 01	Dec 01
Federal Funds Rate	2.49	2.09	1.82
Discount Rate	2.02	1.58	1.33
Prime Rate	5.53	5.10	4.84
Conventional Mortgage Rate	6.62	6.66	7.07
Treasury Yields:			
3-month constant maturity	2.20	1.91	1.72
6-month constant maturity	2.17	1.92	1.82
1-year constant maturity	2.33	2.18	2.22
3-year constant maturity	3.14	3.22	3.62
5-year constant maturity	3.91	3.97	4.39
10-year constant maturity	4.57	4.65	5.09
30-year constant maturity	5.32	5.12	5.48

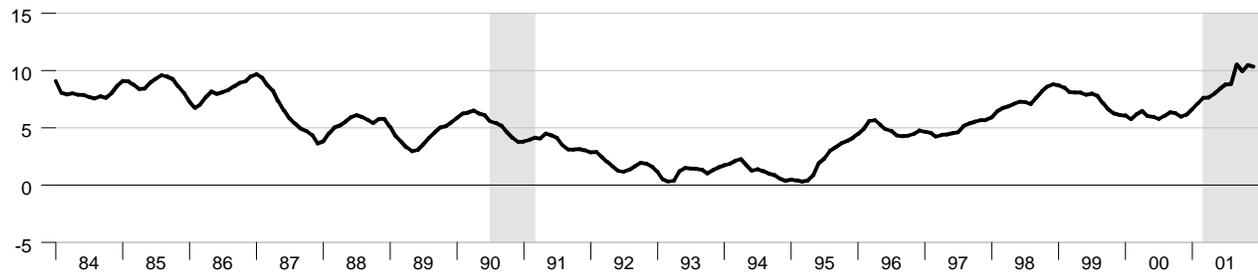
MZM and M1

Percent change from year ago



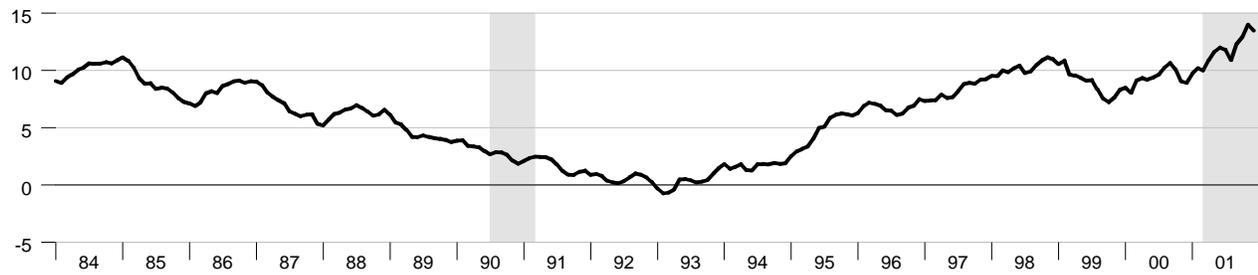
M2

Percent change from year ago



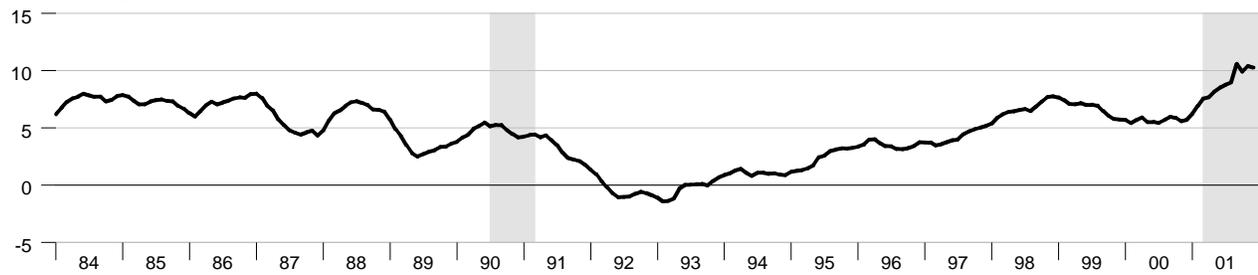
M3

Percent change from year ago



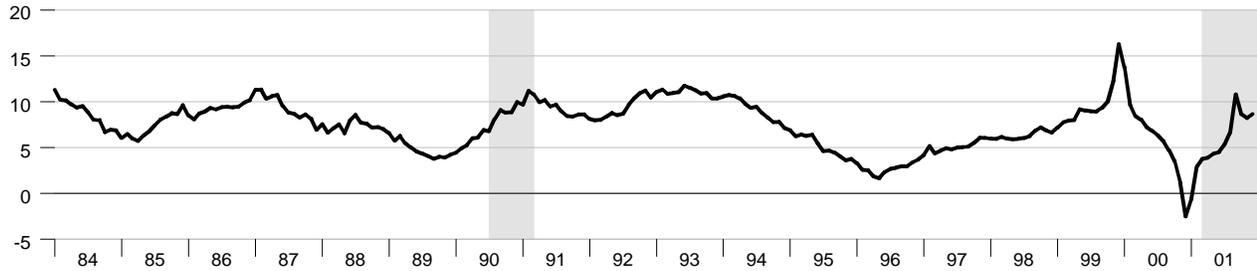
Monetary Services Index - M2

Percent change from year ago



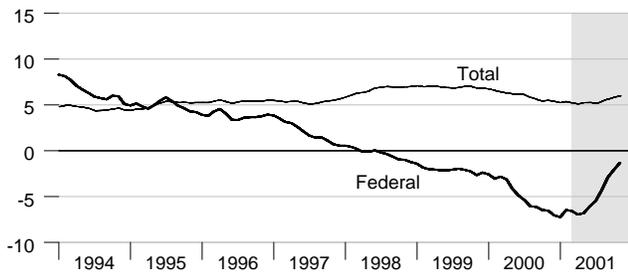
Adjusted Monetary Base

Percent change from year ago



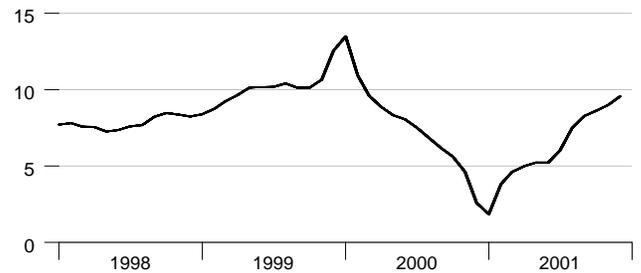
Domestic Nonfinancial Debt

Percent change from year ago



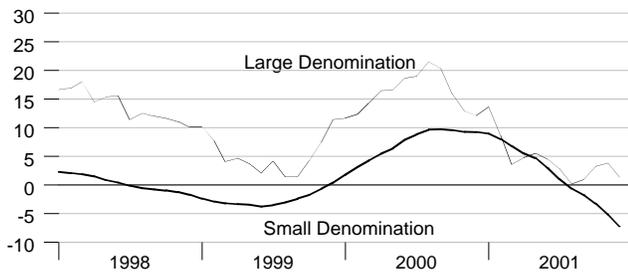
Currency Held by the Nonbank Public

Percent change from year ago



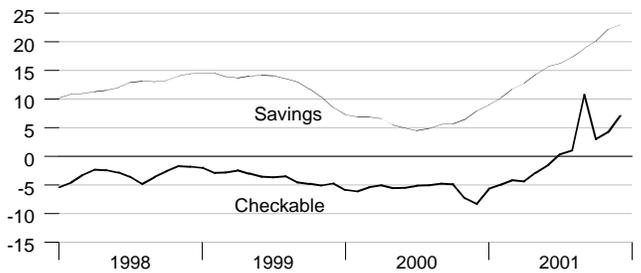
Time Deposits

Percent change from year ago



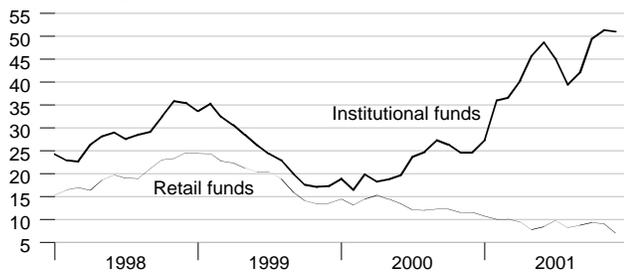
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

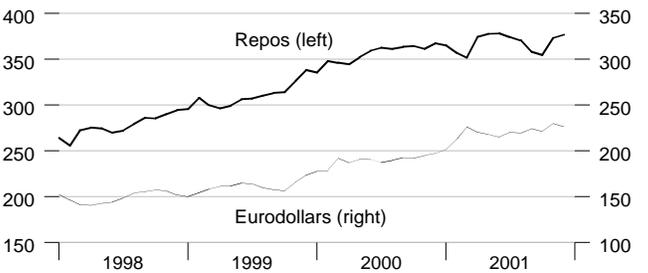
Percent change from year ago



Repurchase Agreements and Eurodollars

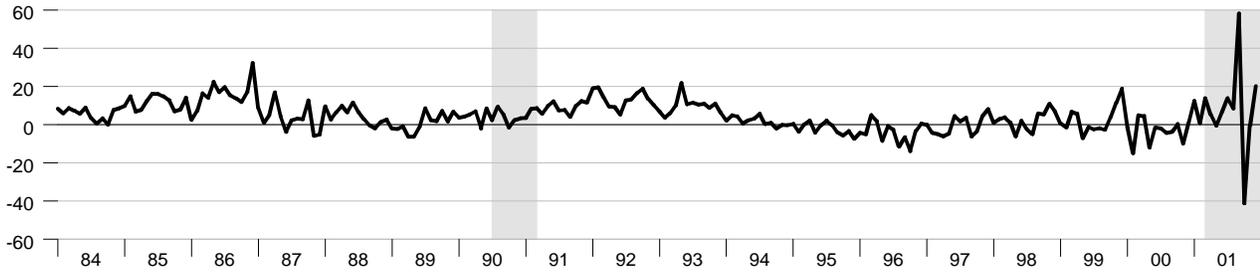
Billions of dollars

Billions of dollars



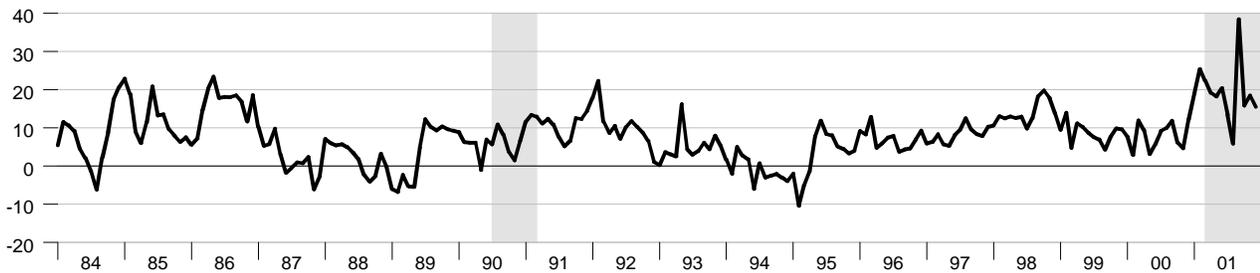
M1

Percent change at an annual rate



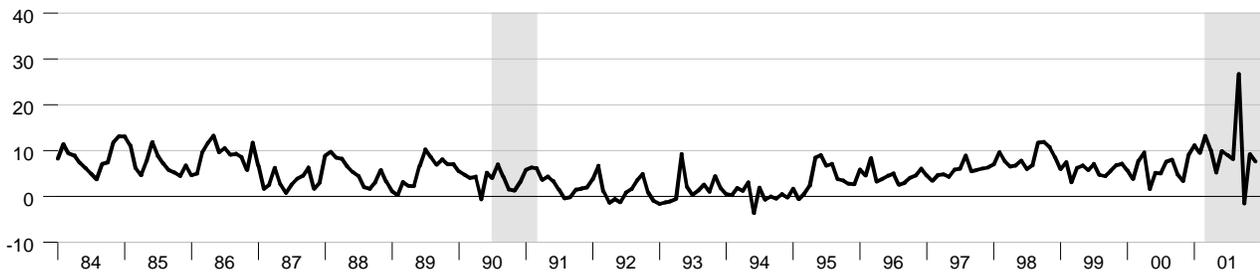
MZM

Percent change at an annual rate



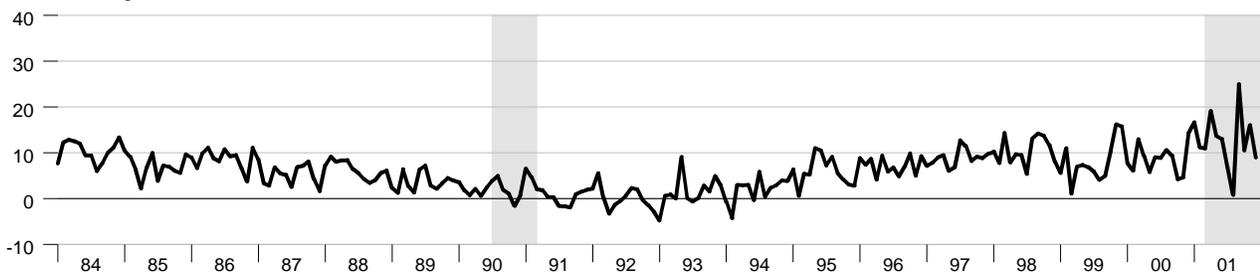
M2

Percent change at an annual rate

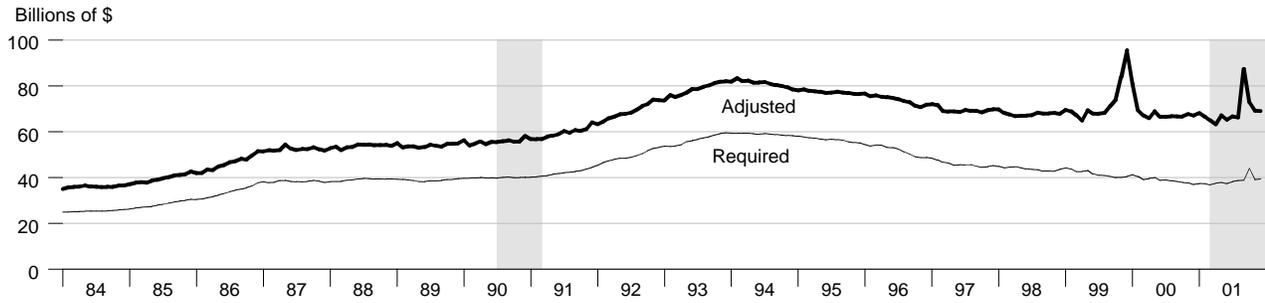


M3

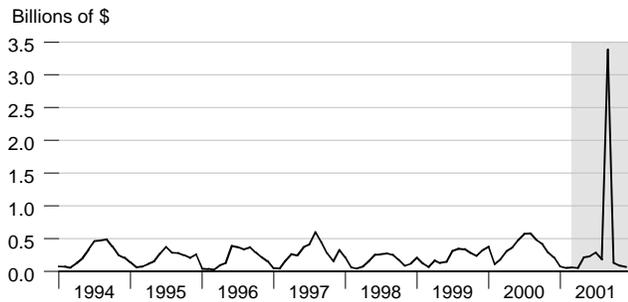
Percent change at an annual rate



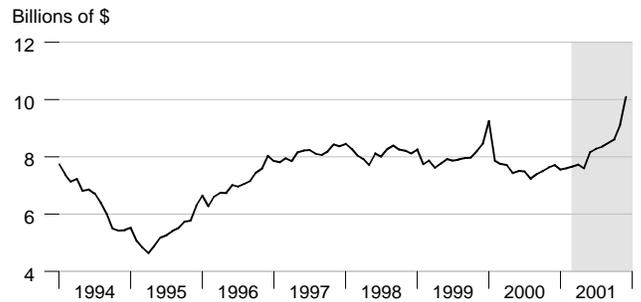
Adjusted and Required Reserves



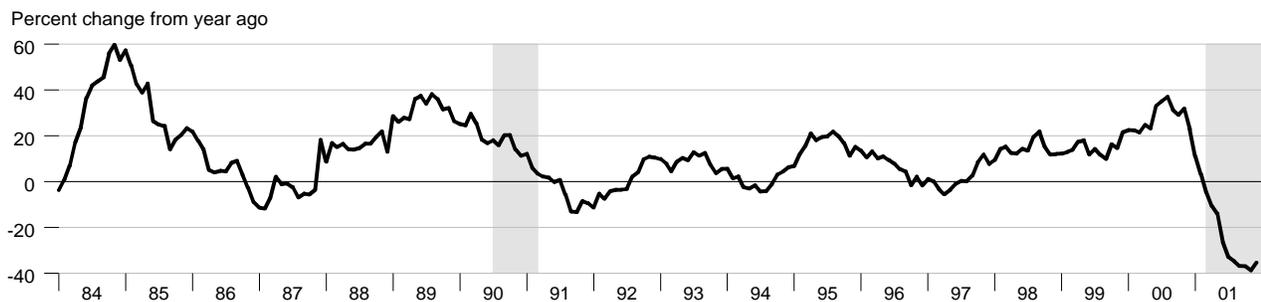
Total Borrowings, nsa



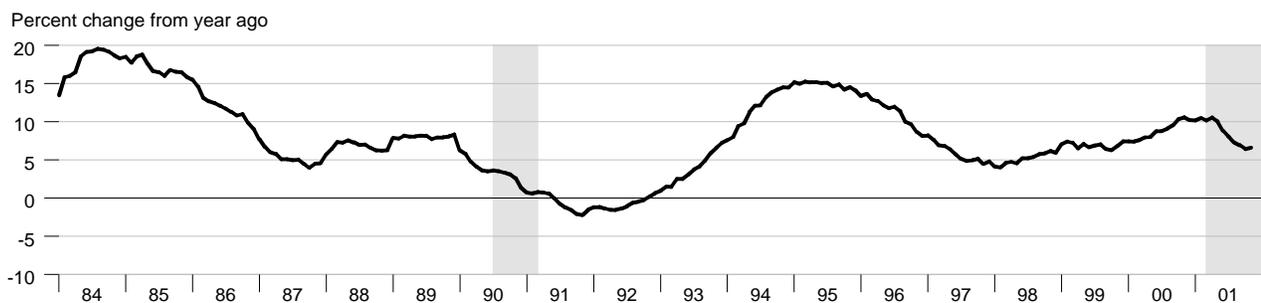
Excess Reserves plus RCB Contracts



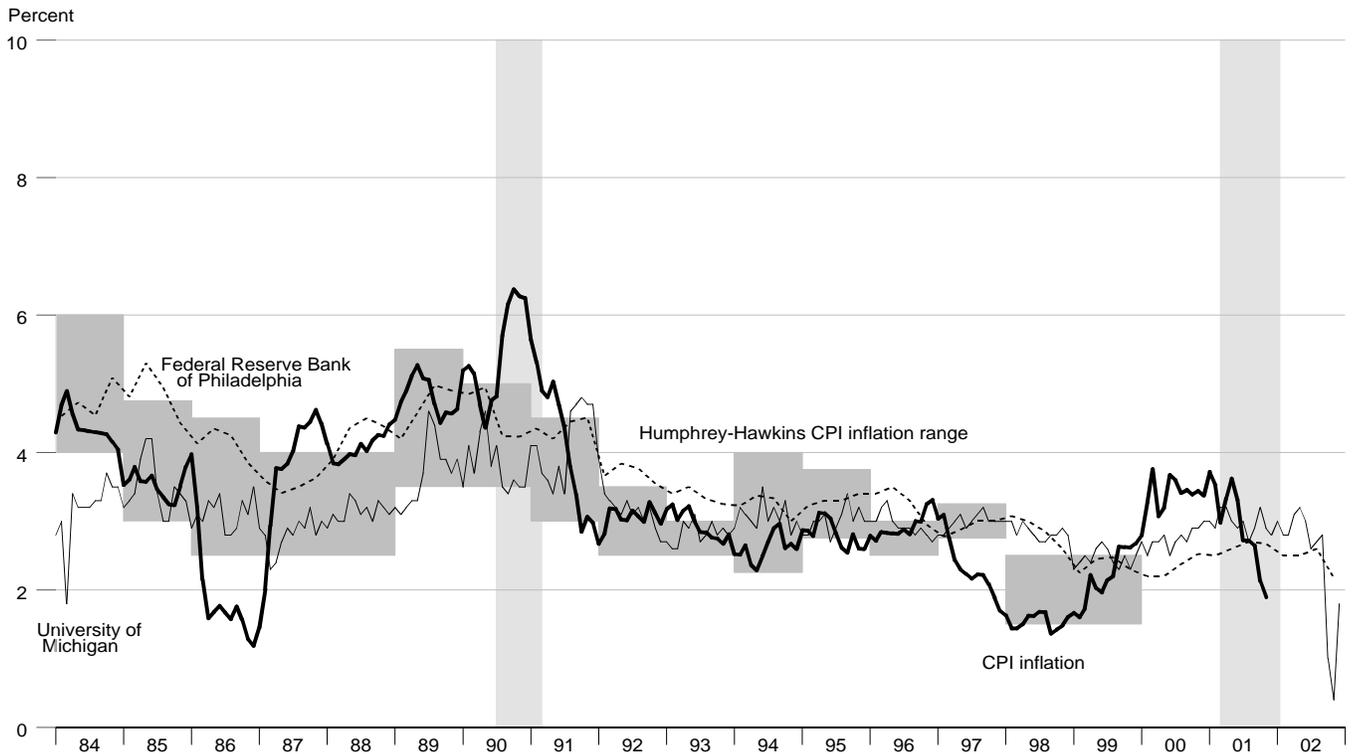
Nonfinancial Commercial Paper



Consumer Credit



Inflation and Inflation Expectations

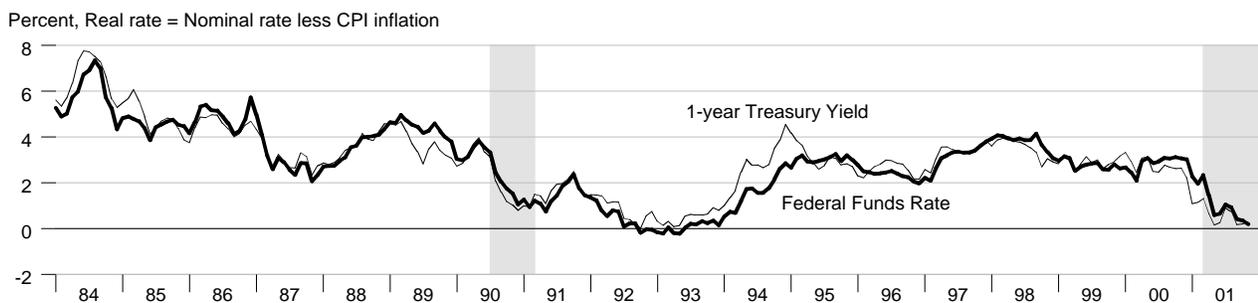


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

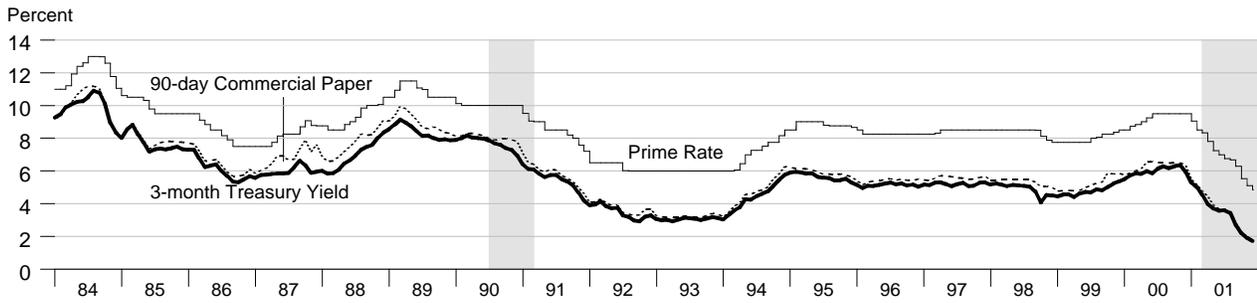
Treasury Security Yield Spreads



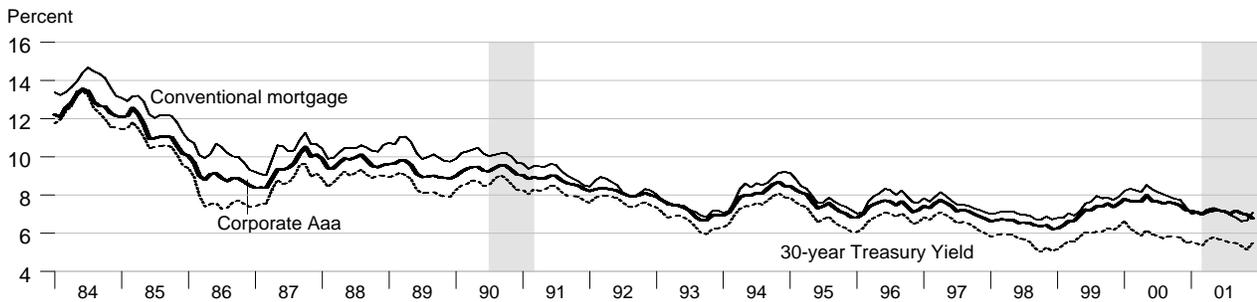
Real Interest Rates



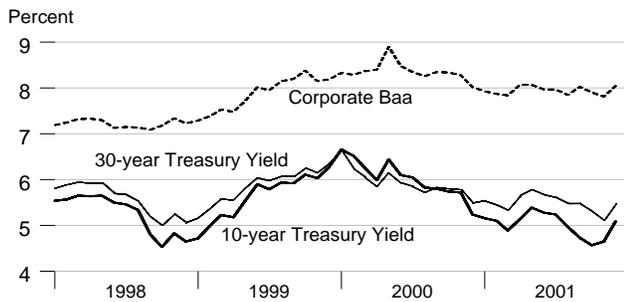
Short Term Interest Rates



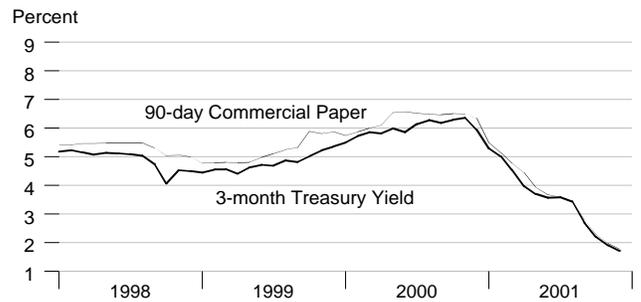
Long Term Interest Rates



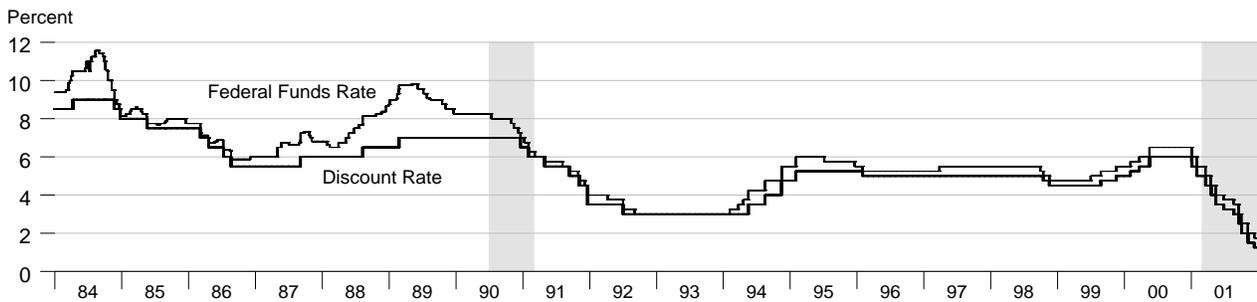
Long Term Interest Rates



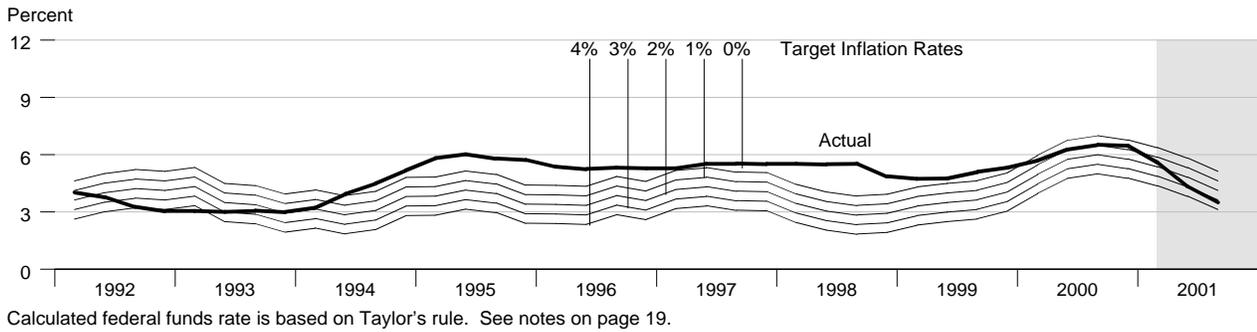
Short Term Interest Rates



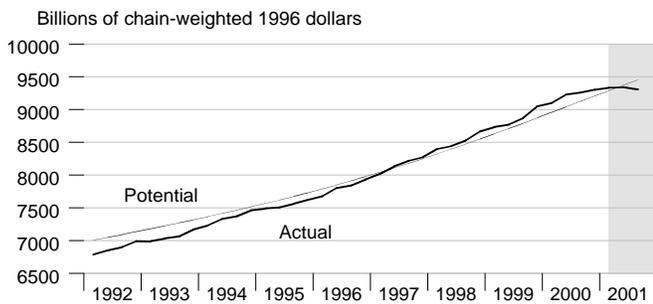
FOMC Intended Federal Funds Rate and Discount Rate



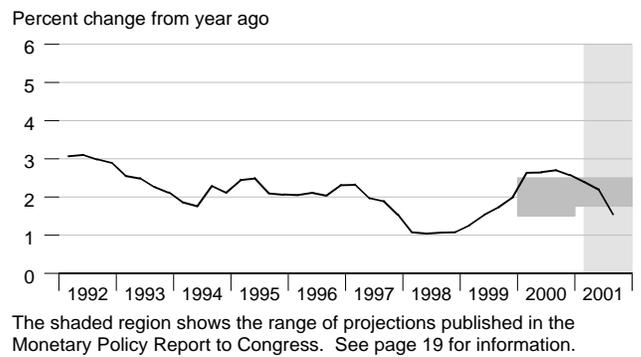
Federal Funds Rate and Inflation Targets



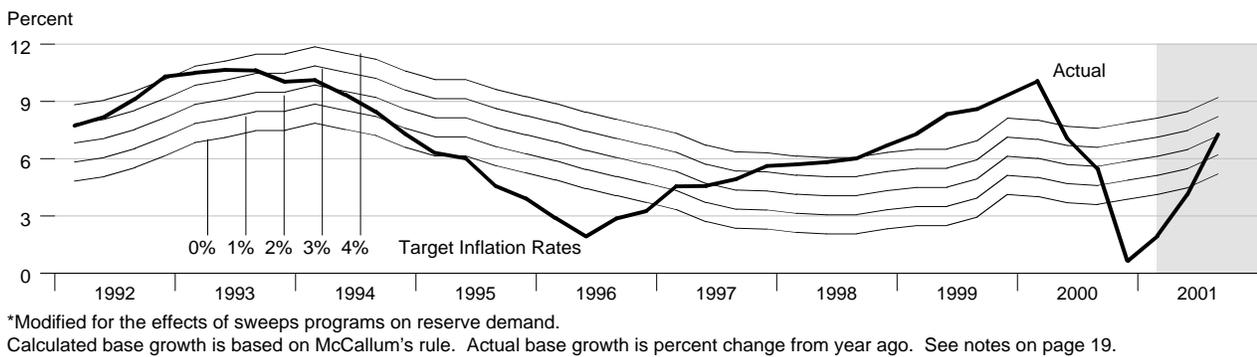
Actual and Potential Real GDP



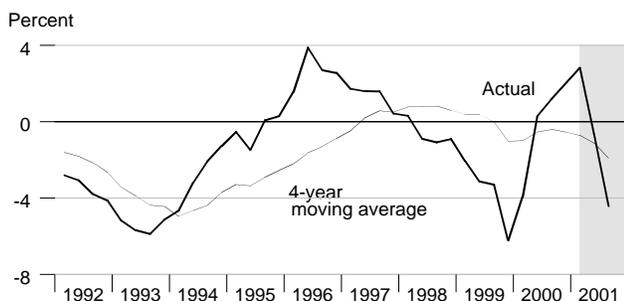
PCE Inflation and Projections



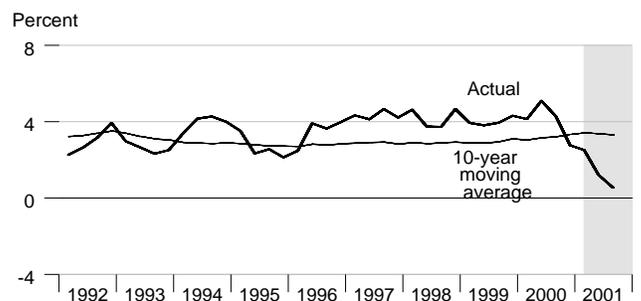
Monetary Base Growth* and Inflation Targets



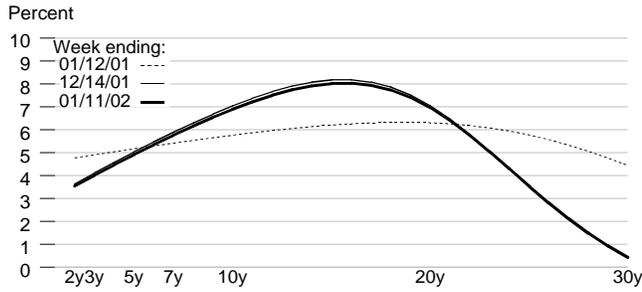
Monetary Base Velocity Growth



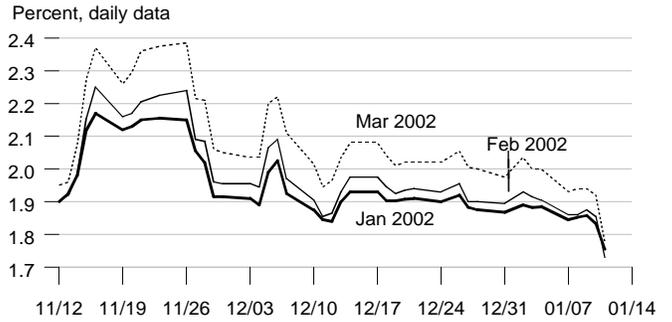
Real Output Growth



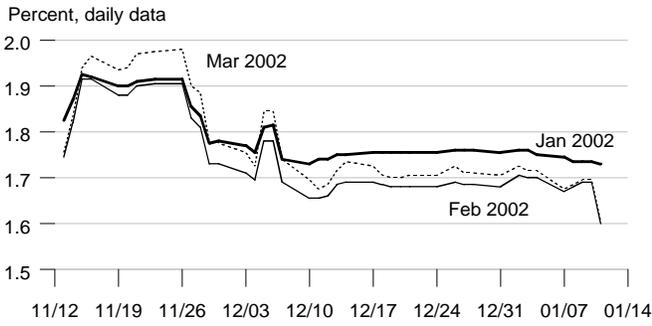
Implied One-Year Forward Rates



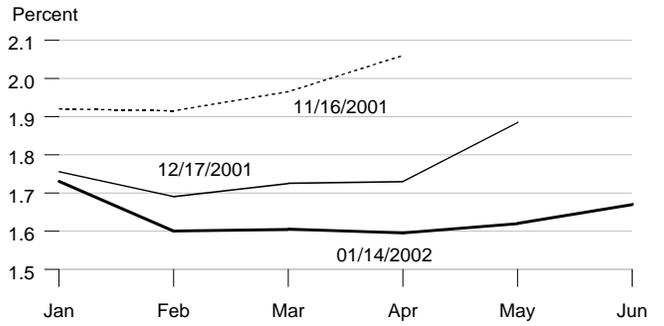
Rates on 3-Month Eurodollar Futures



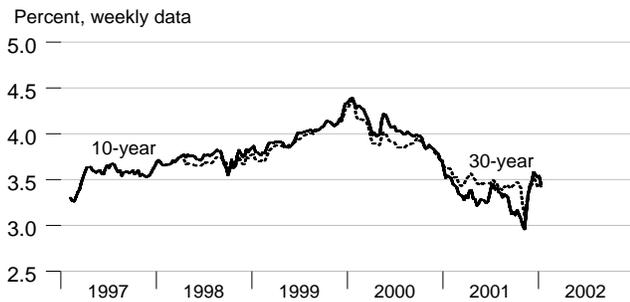
Rates on Selected Fed Funds Futures Contracts



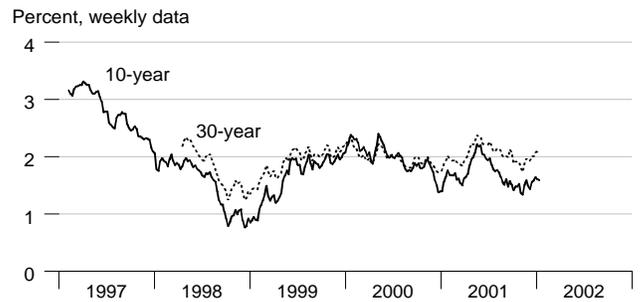
Implied Yields on Fed Funds Futures



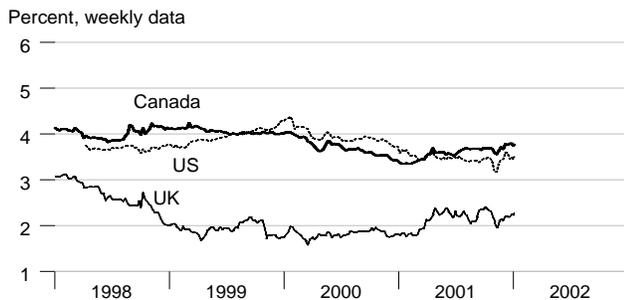
Inflation-Protected Treasury Yields



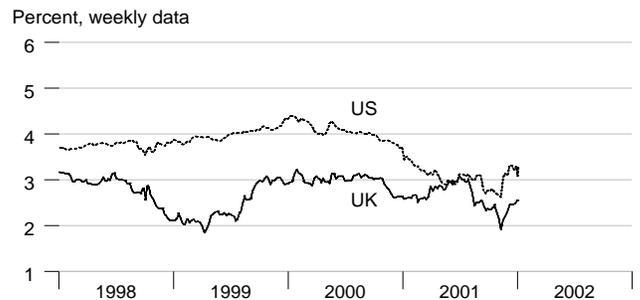
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds



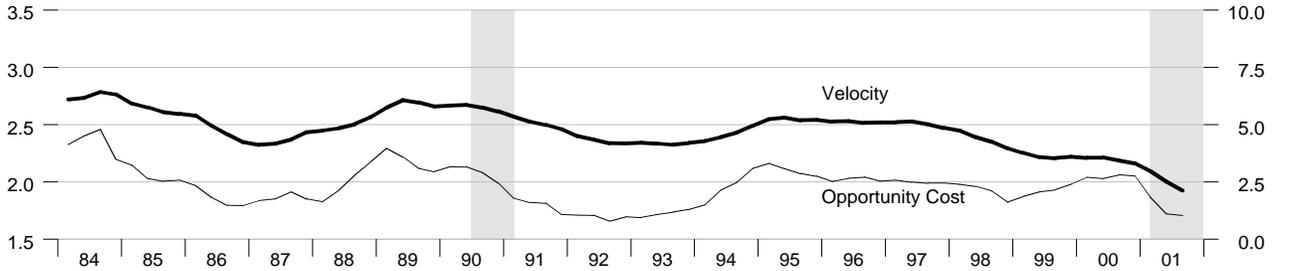
Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

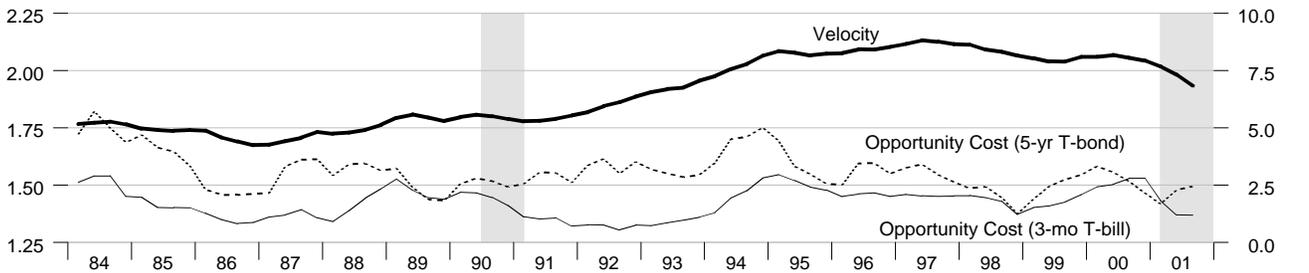
Opportunity Cost = 3 month T-bill rate less MZM own rate



M2 Velocity and Opportunity Cost

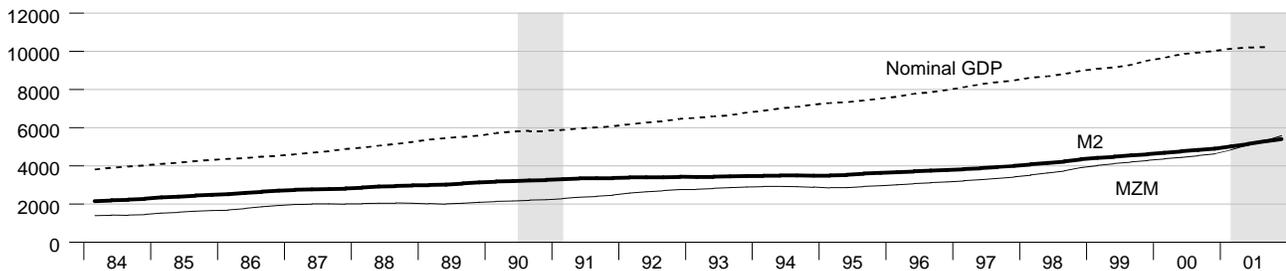
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



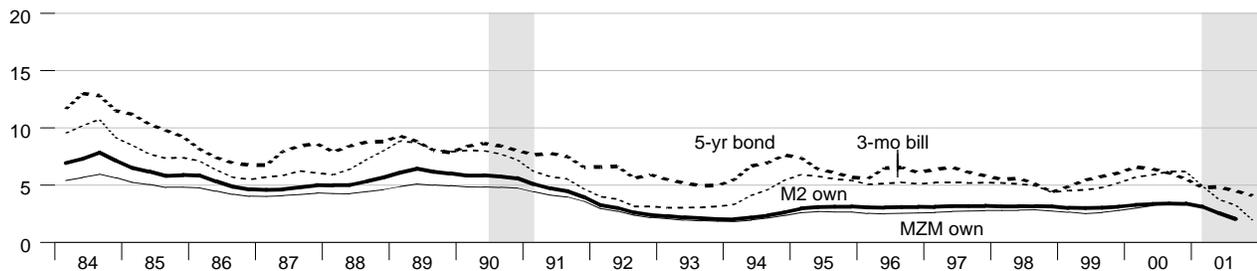
M2, MZM and Nominal GDP

Billions of \$



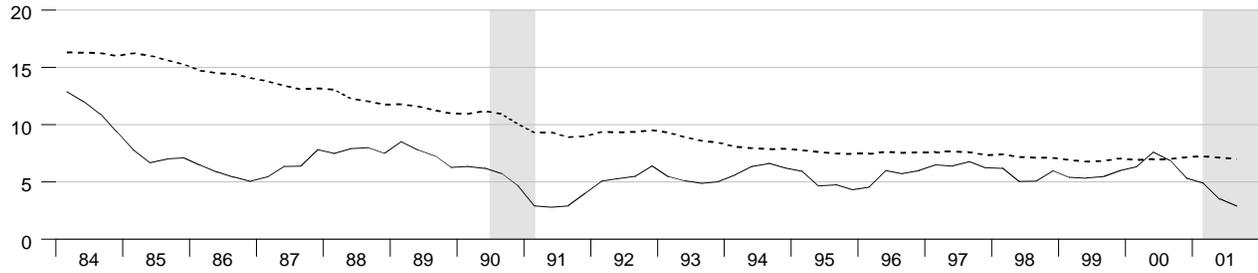
Interest Rates

Percent



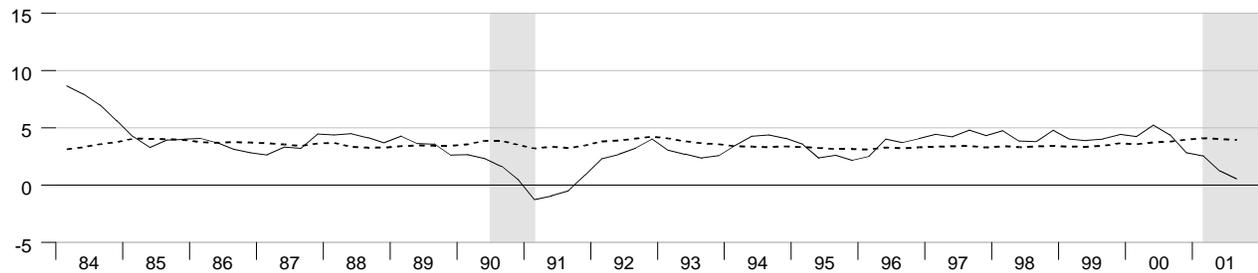
Gross Domestic Product

Percent change from year ago



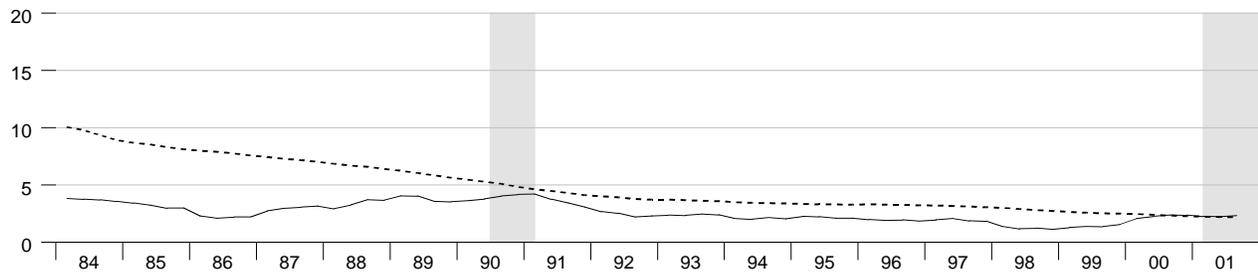
Real Gross Domestic Product

Percent change from year ago



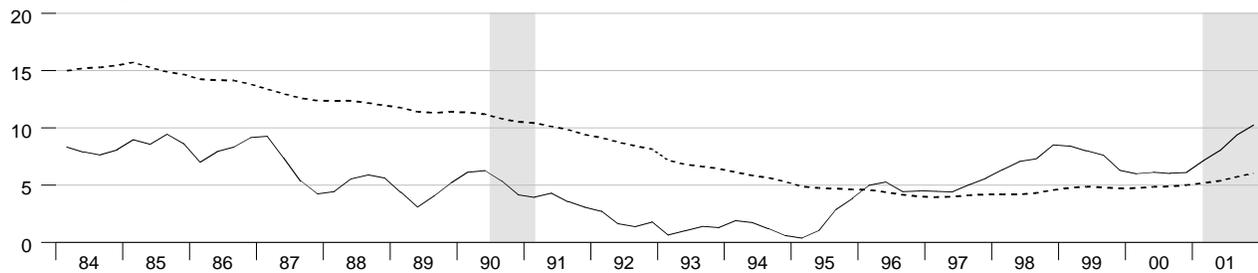
Gross Domestic Product Price Index

Percent change from year ago



M2

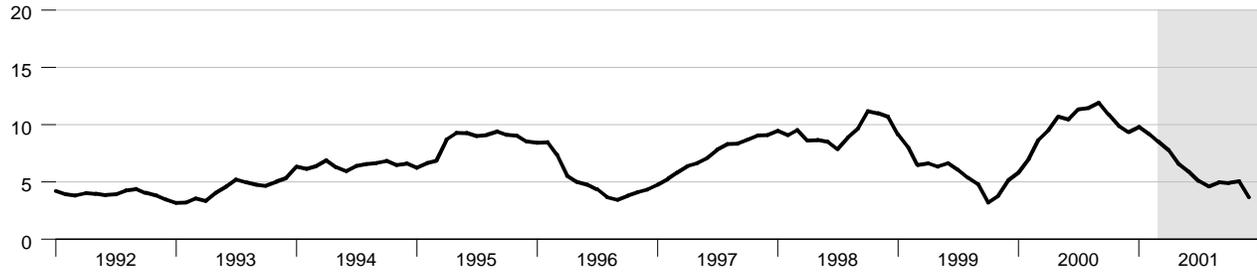
Percent change from year ago



Dashed lines indicate 10-year moving averages

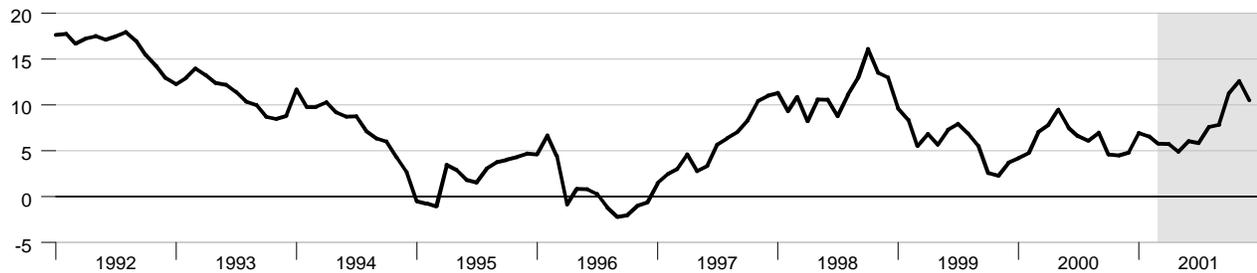
Bank Credit

Percent change from year ago



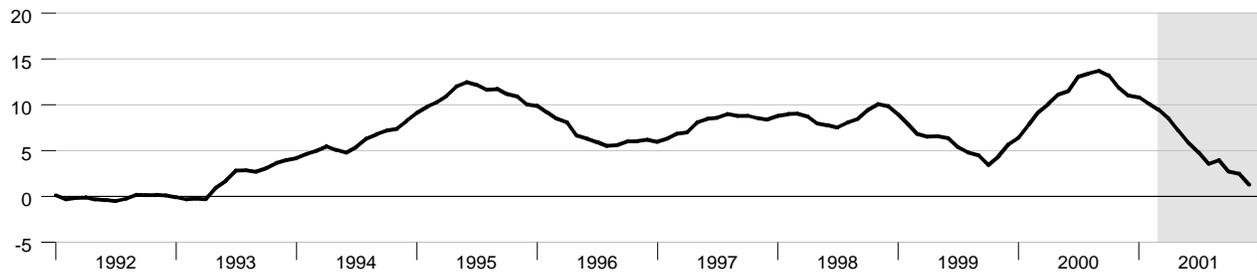
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



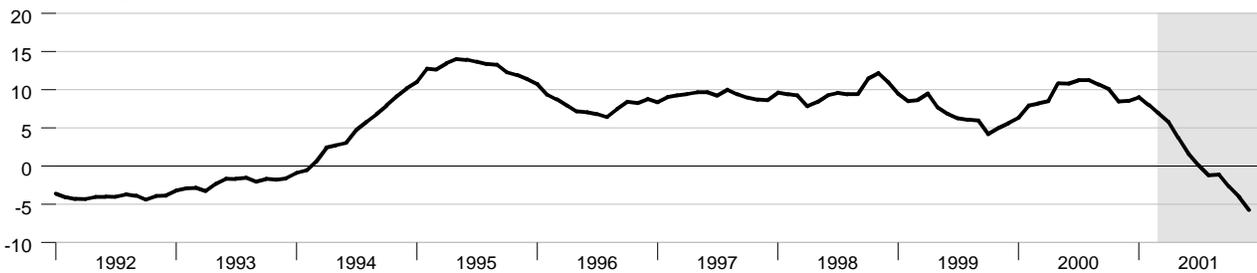
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

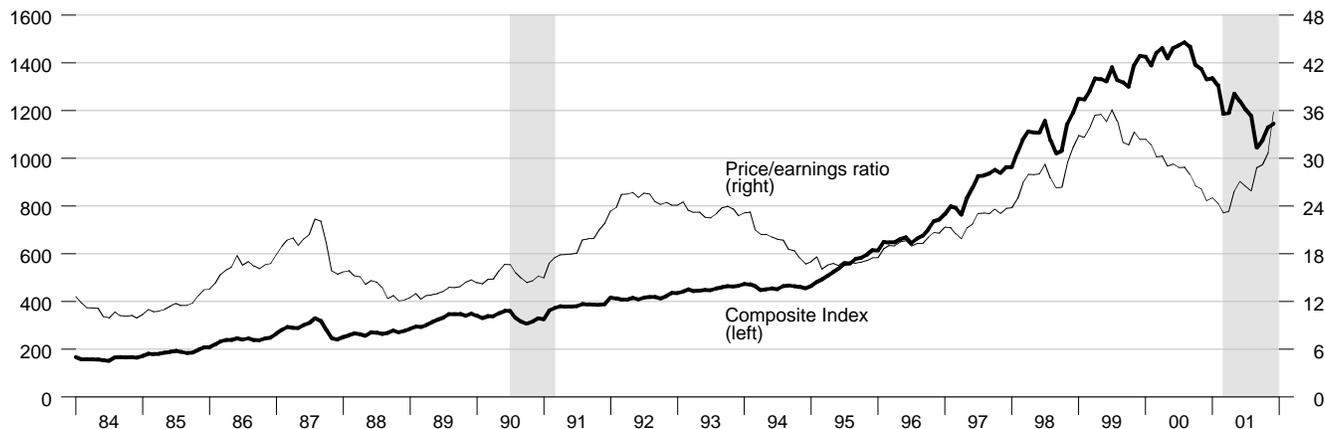


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



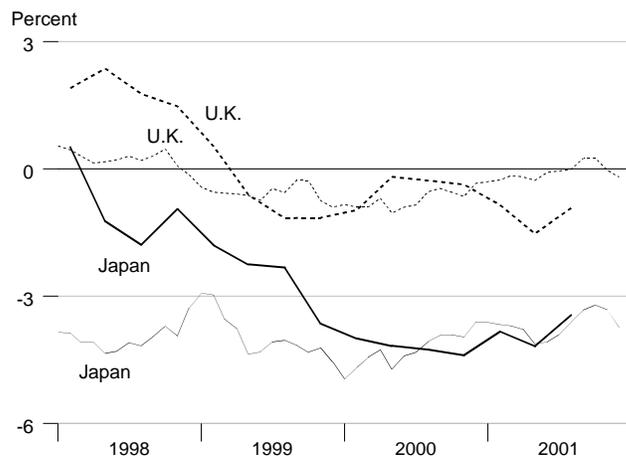
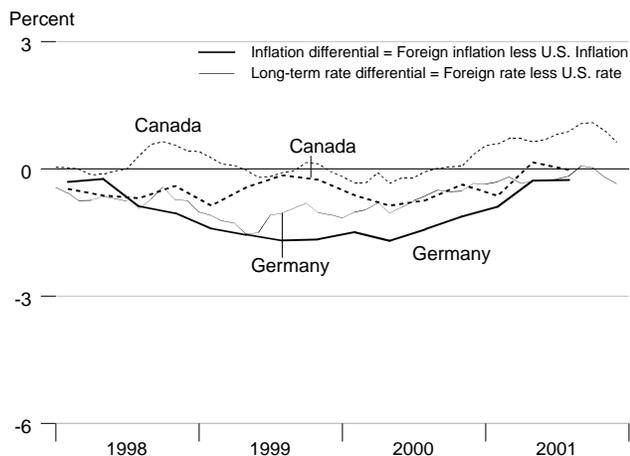
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	2000Q4	2001Q1	2001Q2	2001Q3	Sep01	Oct01	Nov01	Dec01
United States	3.44	3.41	3.44	2.72	4.73	4.57	4.65	5.09
Canada	3.08	2.77	3.60	2.69	5.80	5.66	5.55	5.72
France	1.89	1.29	2.02	1.79	5.26	5.04	5.07	.
Germany	2.32	2.52	3.16	2.46	4.80	4.60	4.45	4.74
Italy	2.67	2.89	3.05	2.80	5.20	4.96	4.80	5.05
Japan	-0.95	-0.43	-0.74	-0.73	1.40	1.36	1.33	1.35
United Kingdom	3.07	2.55	1.91	1.80	4.98	4.83	4.62	4.90

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1997		1069.145	3320.337	3920.325	5208.386	3953.513	478.708	69.523	226.528
1998		1079.795	3708.093	4207.429	5741.889	4326.580	508.942	67.808	241.581
1999		1101.661	4166.476	4526.145	6253.952	4582.498	557.865	72.360	257.950
2000		1103.865	4502.621	4801.277	6839.653	5029.309	590.821	68.327	272.583
2001		1136.902	5210.426	5219.450	7639.580	5345.374	623.811	68.873	296.276
1999	1	1098.625	4034.795	4428.191	6096.737	4517.041	536.334	68.521	252.707
	2	1102.740	4131.461	4492.285	6191.448	4527.726	545.912	67.392	256.130
	3	1095.560	4210.155	4559.442	6281.652	4581.705	557.969	69.050	259.667
	4	1109.719	4289.492	4624.663	6445.971	4703.521	591.246	84.477	263.297
2000	1	1115.417	4372.669	4693.995	6619.138	4840.269	593.102	72.390	266.870
	2	1109.975	4453.851	4768.125	6768.374	4990.340	586.045	67.097	270.597
	3	1099.581	4545.424	4835.035	6921.989	5111.161	589.054	66.670	274.483
	4	1090.488	4638.538	4907.955	7049.111	5175.465	595.084	67.151	278.383
2001	1	1104.036	4846.579	5028.278	7280.027	5283.581	604.848	66.543	285.307
	2	1119.217	5098.352	5150.435	7547.854	5326.889	610.939	65.201	292.590
	3	1159.852	5312.104	5288.329	7731.375	5361.006	633.752	73.436	300.437
	4	1164.503	5584.670	5410.757	7999.066	5410.018	645.704	70.310	306.770
1999	Dec	1124.751	4323.846	4651.800	6531.008	4770.401	612.073	95.479	264.810
2000	Jan	1123.266	4351.373	4673.848	6572.984	4798.160	604.796	80.824	265.960
	Feb	1109.245	4361.759	4688.853	6606.563	4838.752	589.984	69.258	266.610
	Mar	1113.739	4404.876	4719.283	6677.866	4883.896	584.525	67.089	268.040
	Apr	1117.937	4439.171	4756.990	6729.762	4937.990	583.053	65.913	269.970
	May	1106.717	4450.590	4763.501	6762.314	5002.456	587.863	68.889	270.300
	Jun	1105.271	4471.791	4783.884	6813.046	5030.575	587.220	66.490	271.520
	Jul	1103.378	4505.778	4804.025	6863.549	5068.086	588.032	66.555	272.750
	Aug	1099.390	4542.943	4834.381	6924.094	5106.706	588.436	66.765	274.460
	Sep	1095.976	4587.551	4866.699	6978.325	5158.690	590.694	66.689	276.240
	Oct	1096.197	4610.961	4886.312	7002.862	5144.476	593.064	66.688	277.260
	Nov	1087.147	4628.737	4900.134	7030.164	5165.500	595.549	67.686	277.960
	Dec	1088.120	4675.917	4937.419	7114.308	5216.419	596.639	67.078	279.930
2001	Jan	1099.341	4749.629	4983.399	7212.974	5268.191	600.886	68.095	282.530
	Feb	1100.081	4849.931	5023.074	7280.254	5282.387	607.234	66.556	285.100
	Mar	1112.687	4940.176	5078.362	7346.852	5300.164	606.425	64.979	288.290
	Apr	1117.516	5018.886	5121.309	7463.793	5322.092	605.800	63.239	290.720
	May	1116.993	5094.900	5143.748	7548.969	5331.545	613.259	67.119	292.380
	Jun	1123.141	5181.269	5186.247	7630.800	5327.031	613.759	65.246	294.670
	Jul	1136.034	5239.002	5225.467	7674.491	5325.911	619.434	66.649	296.690
	Aug	1144.057	5264.489	5261.159	7679.917	5341.785	627.449	66.271	299.150
	Sep	1199.466	5432.821	5378.362	7839.716	5415.322	654.373	87.387	305.470
	Oct	1158.211	5504.384	5371.702	7908.693	5396.610	644.311	72.814	304.760
	Nov	1157.940	5588.741	5413.001	8014.278	5426.561	644.534	69.094	306.870
	Dec	1177.357	5660.885	5447.568	8074.228	5406.883	648.267	69.022	308.680

*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			
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
2001		3.89	3.41	6.92	3.69	3.47	4.08	5.49	7.08	4.99	6.97
1999	1	4.73	4.50	7.75	4.90	4.53	4.87	5.37	6.42	4.87	6.88
	2	4.75	4.50	7.75	4.98	4.59	5.35	5.80	6.93	5.05	7.20
	3	5.09	4.60	8.10	5.38	4.79	5.71	6.04	7.33	5.42	7.80
	4	5.31	4.87	8.37	6.06	5.20	6.00	6.25	7.49	5.79	7.83
2000	1	5.68	5.19	8.69	6.03	5.70	6.56	6.30	7.71	5.82	8.26
	2	6.27	5.74	9.25	6.57	5.89	6.52	5.98	7.77	5.72	8.32
	3	6.52	6.00	9.50	6.63	6.20	6.16	5.80	7.61	5.45	8.03
	4	6.47	6.00	9.50	6.59	6.20	5.63	5.69	7.40	5.32	7.64
2001	1	5.59	5.11	8.62	5.26	4.95	4.64	5.44	7.08	5.03	7.01
	2	4.33	3.83	7.34	4.10	3.75	4.43	5.70	7.22	5.11	7.13
	3	3.50	3.06	6.57	3.34	3.24	3.93	5.52	7.11	4.87	6.97
	4	2.13	1.64	5.16	2.06	1.94	3.33	5.31	6.92	4.97	6.78
1999	Dec	5.30	5.00	8.50	6.05	5.36	6.14	6.35	7.55	5.82	7.91
2000	Jan	5.46	5.00	8.50	5.95	5.50	6.49	6.63	7.78	5.91	8.21
	Feb	5.73	5.24	8.73	6.01	5.73	6.65	6.23	7.68	5.88	8.33
	Mar	5.85	5.34	8.83	6.14	5.86	6.53	6.05	7.68	5.68	8.24
	Apr	6.02	5.50	9.00	6.28	5.82	6.36	5.85	7.64	5.60	8.15
	May	6.27	5.71	9.24	6.71	5.99	6.77	6.15	7.99	5.87	8.52
	Jun	6.53	6.00	9.50	6.73	5.86	6.43	5.93	7.67	5.69	8.29
	Jul	6.54	6.00	9.50	6.67	6.14	6.28	5.85	7.65	5.53	8.15
	Aug	6.50	6.00	9.50	6.61	6.28	6.17	5.72	7.55	5.43	8.03
	Sep	6.52	6.00	9.50	6.60	6.18	6.02	5.83	7.62	5.40	7.91
	Oct	6.51	6.00	9.50	6.67	6.29	5.85	5.80	7.55	5.46	7.80
	Nov	6.51	6.00	9.50	6.65	6.36	5.79	5.78	7.45	5.38	7.75
	Dec	6.40	6.00	9.50	6.45	5.94	5.26	5.49	7.21	5.11	7.38
2001	Jan	5.98	5.52	9.05	5.62	5.29	4.77	5.54	7.15	4.99	7.03
	Feb	5.49	5.00	8.50	5.26	5.01	4.71	5.45	7.10	5.09	7.05
	Mar	5.31	4.81	8.32	4.89	4.54	4.43	5.34	6.98	5.00	6.95
	Apr	4.80	4.28	7.80	4.53	3.97	4.42	5.65	7.20	5.14	7.08
	May	4.21	3.73	7.24	4.02	3.70	4.51	5.78	7.29	5.15	7.15
	Jun	3.97	3.47	6.98	3.74	3.57	4.35	5.67	7.18	5.03	7.16
	Jul	3.77	3.25	6.75	3.66	3.59	4.31	5.61	7.13	4.79	7.13
	Aug	3.65	3.16	6.67	3.48	3.44	4.04	5.48	7.02	4.89	6.95
	Sep	3.07	2.77	6.28	2.87	2.69	3.45	5.48	7.17	4.93	6.82
	Oct	2.49	2.02	5.53	2.31	2.20	3.14	5.32	7.03	4.89	6.62
	Nov	2.09	1.58	5.10	2.03	1.91	3.22	5.12	6.97	4.85	6.66
	Dec	1.82	1.33	4.84	1.83	1.72	3.62	5.48	6.77	5.18	7.07

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

		M1	MZM	M2	M3
Percent change from previous period					
<hr/>					
1997		-3.32	7.22	4.90	8.23
1998		1.00	11.68	7.32	10.24
1999		2.03	12.36	7.58	8.92
2000		0.20	8.07	6.08	9.37
2001		2.99	15.72	8.71	11.70
<hr/>					
1999	1	0.83	2.98	1.79	1.89
	2	0.37	2.40	1.45	1.55
	3	-0.65	1.90	1.49	1.46
	4	1.29	1.88	1.43	2.62
2000	1	0.51	1.94	1.50	2.69
	2	-0.49	1.86	1.58	2.25
	3	-0.94	2.06	1.40	2.27
	4	-0.83	2.05	1.51	1.84
2001	1	1.24	4.49	2.45	3.28
	2	1.37	5.19	2.43	3.68
	3	3.63	4.19	2.68	2.43
	4	0.40	5.13	2.32	3.46
<hr/>					
1999	Dec	1.56	0.80	0.60	1.31
<hr/>					
2000	Jan	-0.13	0.64	0.47	0.64
	Feb	-1.25	0.24	0.32	0.51
	Mar	0.41	0.99	0.65	1.08
<hr/>					
	Apr	0.38	0.78	0.80	0.78
	May	-1.00	0.26	0.14	0.48
	Jun	-0.13	0.48	0.43	0.75
<hr/>					
	Jul	-0.17	0.76	0.42	0.74
	Aug	-0.36	0.82	0.63	0.88
	Sep	-0.31	0.98	0.67	0.78
<hr/>					
	Oct	0.02	0.51	0.40	0.35
	Nov	-0.83	0.39	0.28	0.39
	Dec	0.09	1.02	0.76	1.20
<hr/>					
2001	Jan	1.03	1.58	0.93	1.39
	Feb	0.07	2.11	0.80	0.93
	Mar	1.15	1.86	1.10	0.91
<hr/>					
	Apr	0.43	1.59	0.85	1.59
	May	-0.05	1.51	0.44	1.14
	Jun	0.55	1.70	0.83	1.08
<hr/>					
	Jul	1.15	1.11	0.76	0.57
	Aug	0.71	0.49	0.68	0.07
	Sep	4.84	3.20	2.23	2.08
<hr/>					
	Oct	-3.44	1.32	-0.12	0.88
	Nov	-0.02	1.53	0.77	1.34
	Dec	1.68	1.29	0.64	0.75
<hr/>					

Definitions

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

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

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

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

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

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

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

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

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

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

Notes

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

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

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

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

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

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

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

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

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

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

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

to five alternative target inflation rates, $\bar{\pi} = 0, 1, 2, 3, 4$ percent, where 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 www.stls.frb.org/research/swdata.html.

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

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

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

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

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

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

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

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

Sources

Bank of Canada

Canadian inflation-linked bond yields.

Bank of England

U.K. inflation-linked bond yields.

Board of Governors of the Federal Reserve System

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

Bureau of Economic Analysis

Gross domestic product.

Bureau of Labor Statistics

Consumer price index.

Federal Reserve Bank of Philadelphia

Survey of Professional Forecasters inflation expectations.

Federal Reserve Bank of St. Louis

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

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

University of Michigan Survey Research Center

Median expected price change.

Congressional Budget Office

Potential real GDP.

Dow Jones and Co. (Wall Street Journal)

Federal funds futures contracts, Eurodollar futures.

Standard and Poors Inc.

Stock price-earnings ratio, stock price composite index.

U.S. Department of the Treasury

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, pp. 3-13.

____ and ____ (1996b). "Measuring the Adjusted Monetary Base in an Era of Financial Change," Federal Reserve Bank of St. Louis *Review*, November/December, pp. 3-37.

____ and ____ (2001). "Retail Sweep Programs and Bank Reserves, 1994-1999," Federal Reserve Bank of St. Louis *Review*, January/ February, pp. 51-72.

____, 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.stanford.edu/~wsharp/mia/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/index.html.