April 2001

MonetaryTrends

THE FEDERAL RESERVE BANK of ST. LOUIS

What Accounts for the Reduced Frequency of Fed Actions?

Between January 1994 and January 2001, the Fed adjusted its target for the federal funds rate just 22 times, an average of about one change every four months. In contrast, there were 55 target changes during a period of similar length from 1987 through 1993—an average of one change about every month and a half.

The average number of changes per unit of time can be somewhat misleading because several long periods without a target change have been followed by periods of frequent target changes. Consequently, a different, and perhaps somewhat better, measure of the frequency of target changes is the median number of business days between target changes. The median number of business days between target changes since 1994 is 53. Between 1987 and 1993, the median number of business days between changes was just 18. Eight of the 55 target changes in this period were small, 6.25 basis point changes. If these "technical adjustments" are ignored, the median increases only to 19 days. By either measure, target changes were more than 2.8 [53/19] times more frequent before 1994 than after. What accounts for the marked decrease in frequency of Fed actions?

One possibility is that changes in Federal Open Market Committee (FOMC) procedures since 1994 have slowed the FOMC's response to changing economic conditions. At its February 1994 meeting, the FOMC began the practice of announcing adjustments to its federal funds rate target immediately upon making them. About the same time, the Fed began the practice of changing the funds rate target primarily at regularly scheduled meetings. Of the 22 target changes since 1994, all but three were made at regularly scheduled FOMC meetings. In the seven prior years, four changes in five were made between meetings. In addition, since 1994 the Fed has followed the practice of holding a teleconference meeting before making adjustments to its federal funds rate target between regularly scheduled meetings. Previously, intermeeting changes in the funds rate target were made at the discretion of the Chairman with no formal Committee consultation.

It is commonly believed that the Fed adjusts its funds rate target in response to new information about inflation or economic activity. While the procedural changes noted above might have slowed the Fed's response to such shocks, it seems unlikely that they account for the marked reduction in the frequency of target changes. If the Fed responds to information about changing economic conditions in setting its funds rate target, one might expect to see more frequent target adjustments during periods when there are relatively large swings in output growth or inflation, and less frequent adjustments when economic conditions are relatively calm. Hence, the relatively benign economic conditions since 1994 have likely played an important role in the reduced frequency of Fed actions.

The decade of the 1990s was unusually calm.[1] Inflation has been relatively low and steady since 1994, while output growth has been relatively strong and steady. From the end of 1993 to the fourth quarter of 2000, the annualized quarterly growth rate of real GDP was below 2.0 percent in only three quarters, including the 1.1 percent growth in the fourth quarter of 2000. Therefore, until recently, there has been relatively little need to adjust the funds rate target because of a weakening economy. Indeed, the three reductions of the funds rate target in 1998 were prompted by financial market concerns following Russia's announcement that it was defaulting on its sovereign debt. As long as inflation remains relatively low and steady, and the economy remains relatively stable, the Fed would seem to have little need to make frequent adjustments to the funds rate target.

— Daniel L. Thornton

[1] See *National Economic Trends* (March 2000).

Table*of*Contents

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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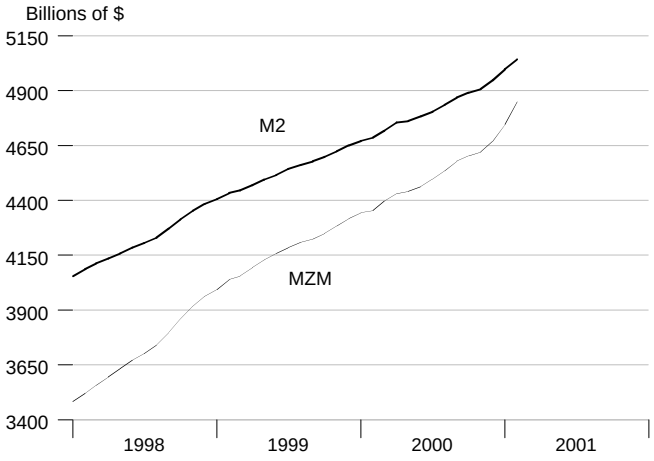
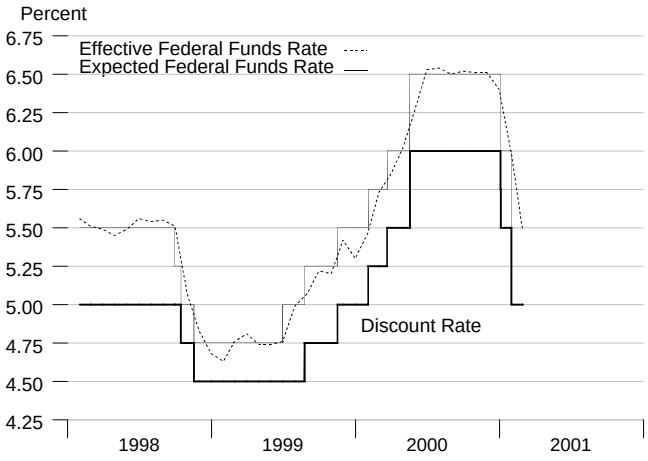
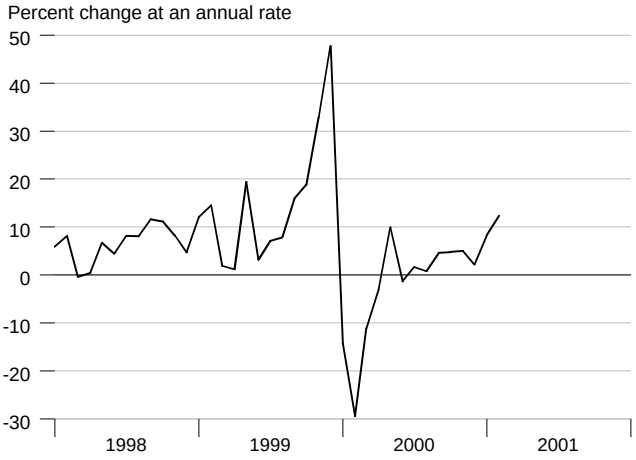
M2 and MZM



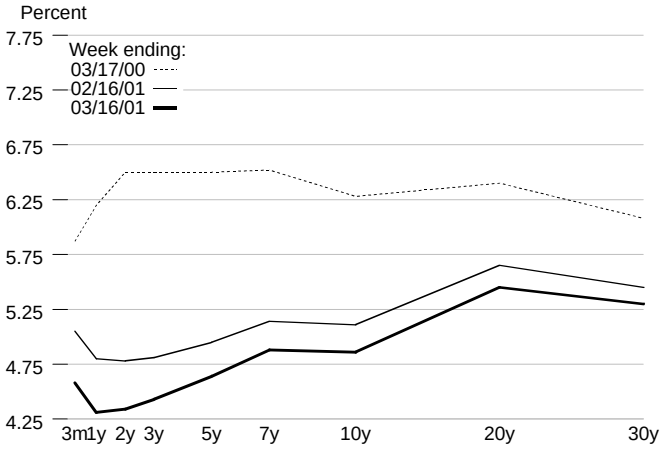
Reserve Market Rates



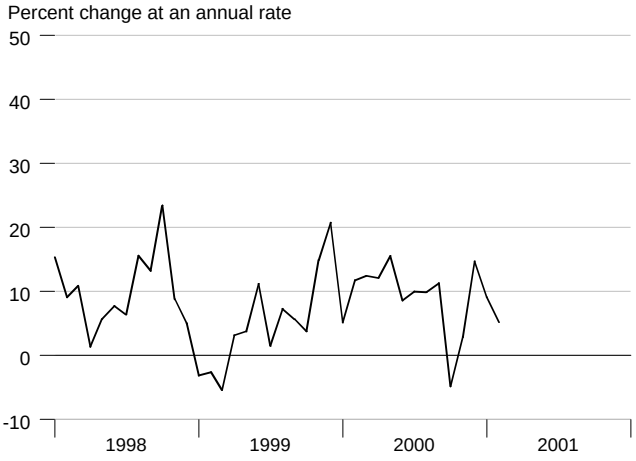
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

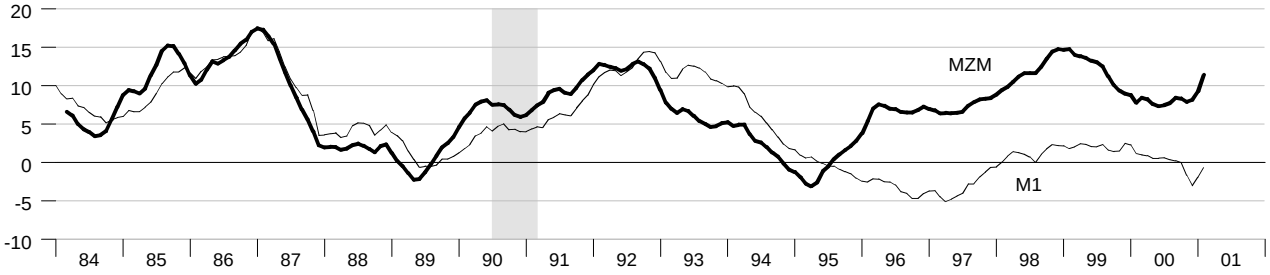


Interest Rates

	Dec 00	Jan 01	Feb 01
Federal Funds Rate	6.40	5.98	5.49
Discount Rate	6.00	5.52	5.00
Prime Rate	9.50	9.05	8.50
Conventional Mortgage Rate	7.38	7.03	7.05
Treasury Yields:			
3-month constant maturity	5.94	5.29	5.01
6-month constant maturity	5.92	5.15	4.89
1-year constant maturity	5.60	4.81	4.68
3-year constant maturity	5.26	4.77	4.71
5-year constant maturity	5.17	4.86	4.89
10-year constant maturity	5.24	5.16	5.10
30-year constant maturity	5.49	5.54	5.45

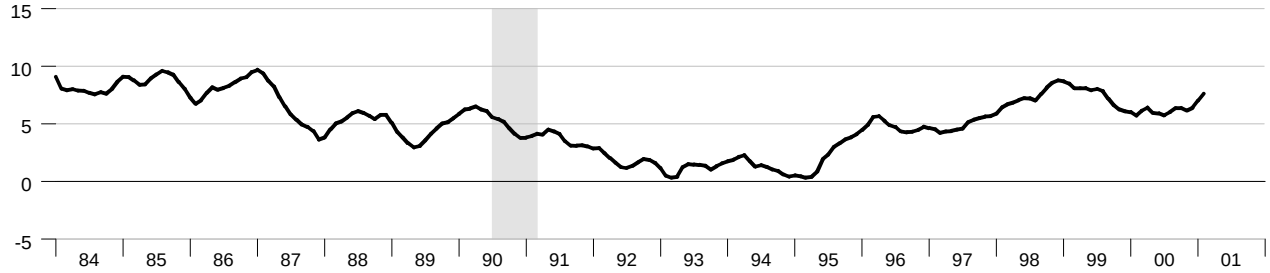
MZM and M1

Percent change from year ago



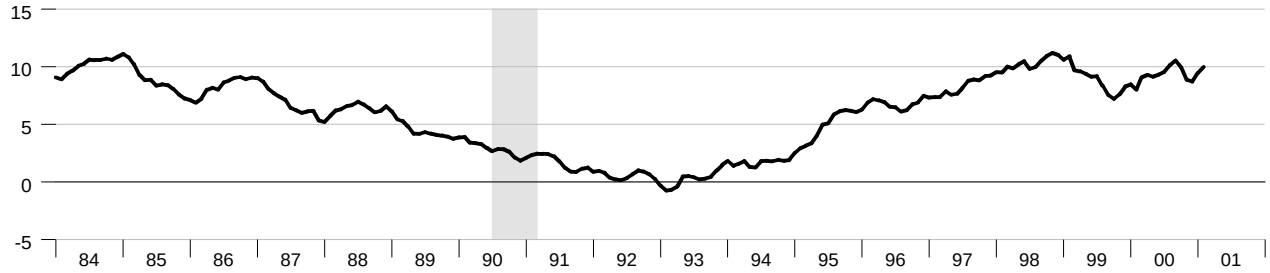
M2

Percent change from year ago



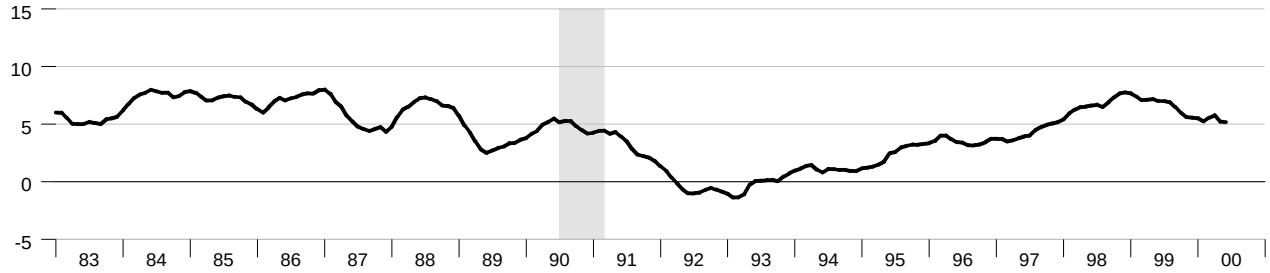
M3

Percent change from year ago

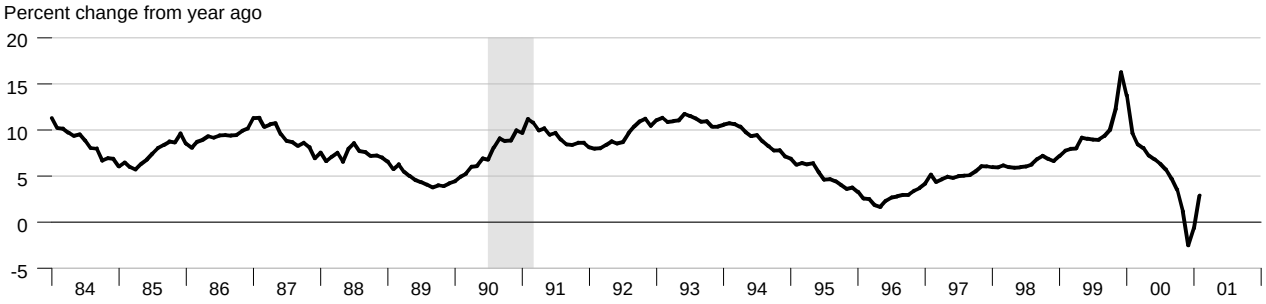


Monetary Services Index - M2

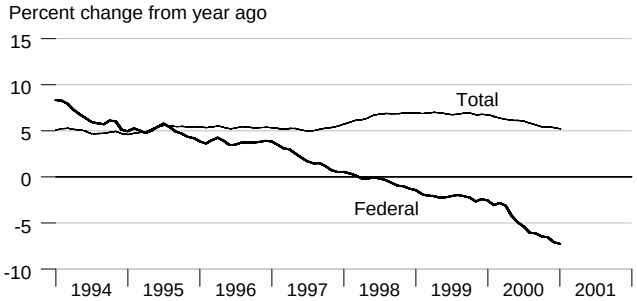
Percent change from year ago



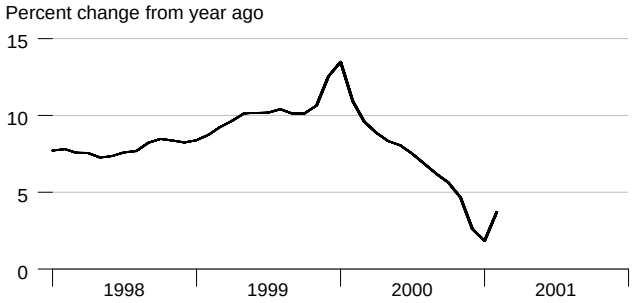
Adjusted Monetary Base



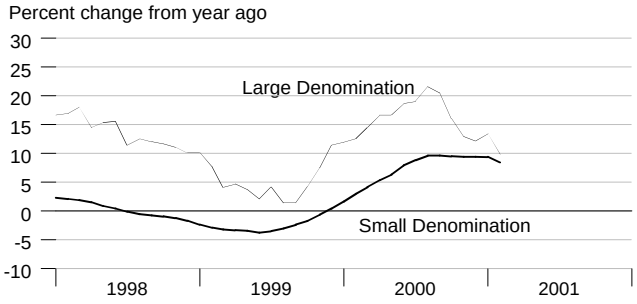
Domestic Nonfinancial Debt



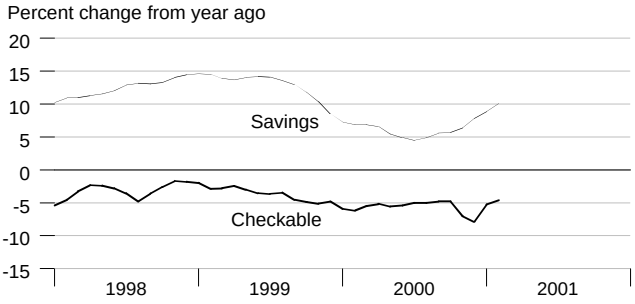
Currency Held by the Nonbank Public



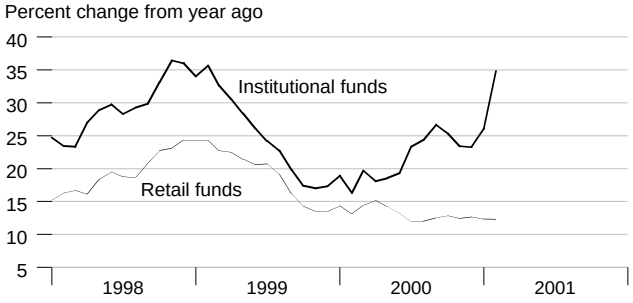
Time Deposits



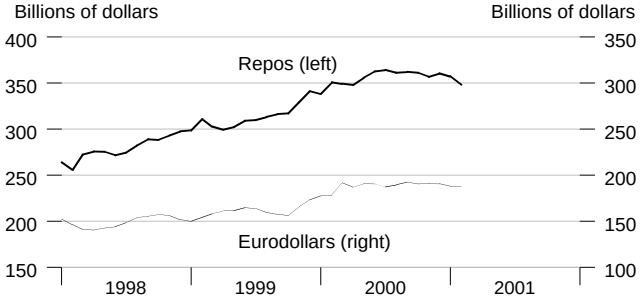
Checkable and Savings Deposits



Money Market Mutual Fund Shares

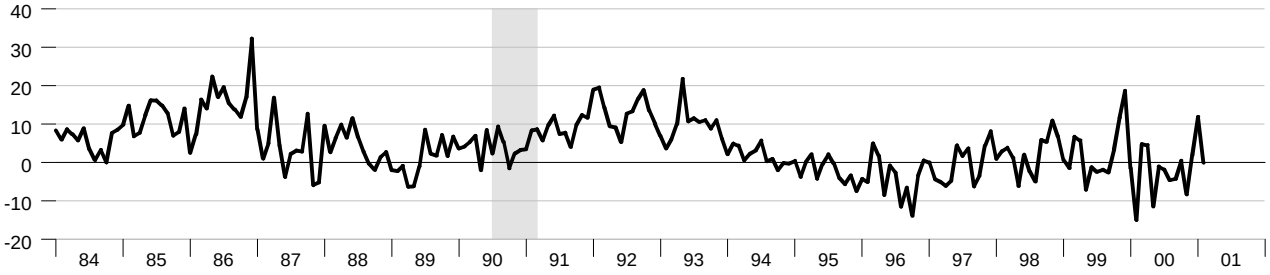


Repurchase Agreements and Eurodollars



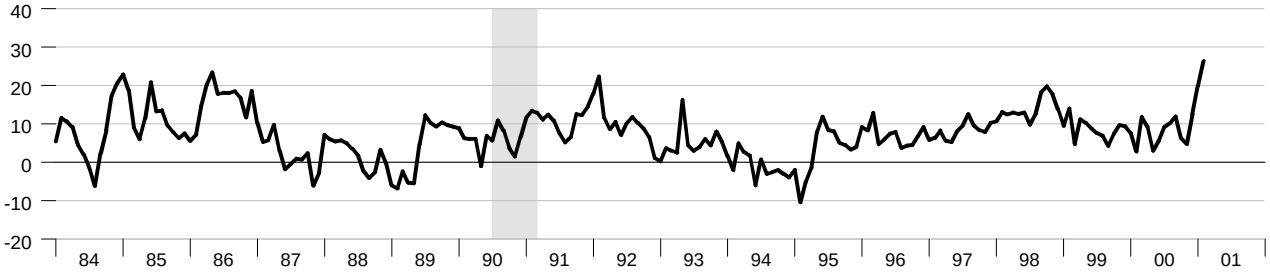
M1

Percent change at an annual rate



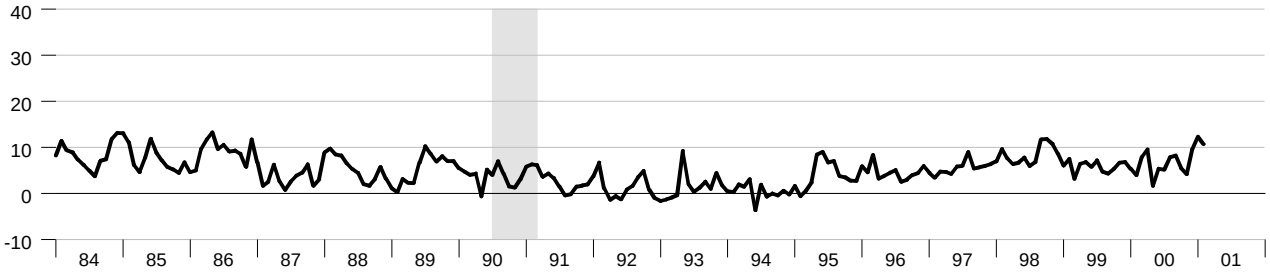
MZM

Percent change at an annual rate



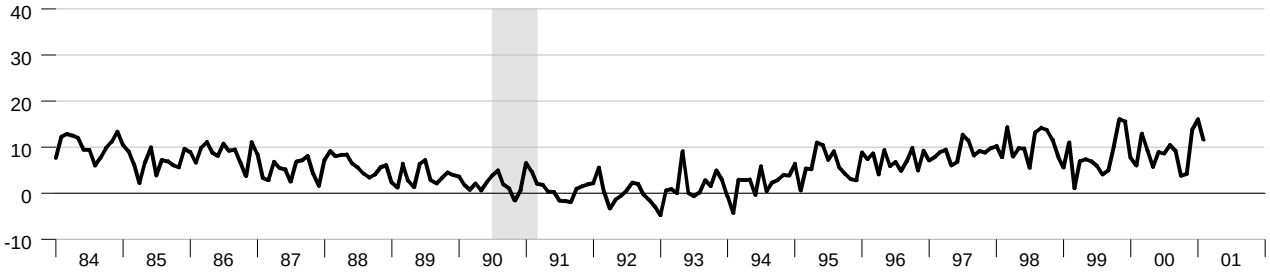
M2

Percent change at an annual rate

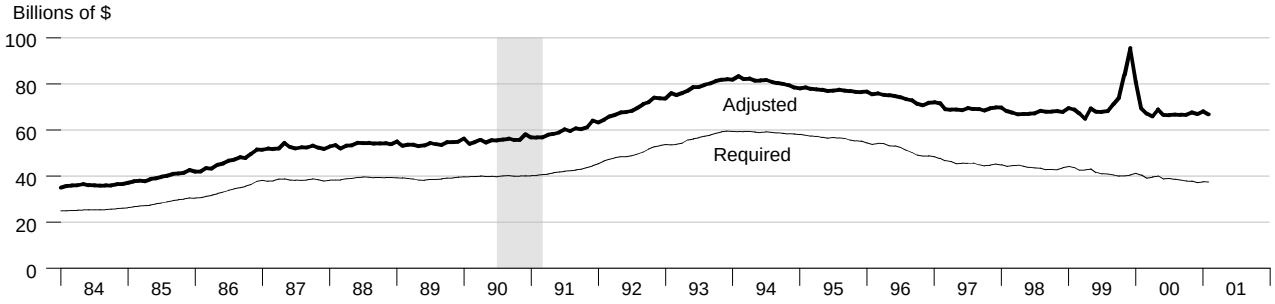


M3

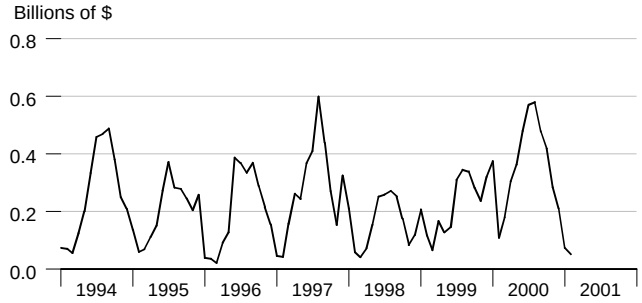
Percent change at an annual rate



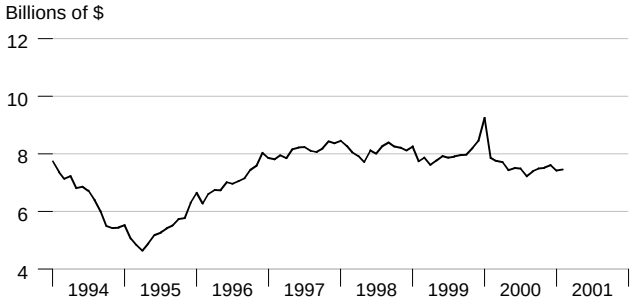
Adjusted and Required Reserves



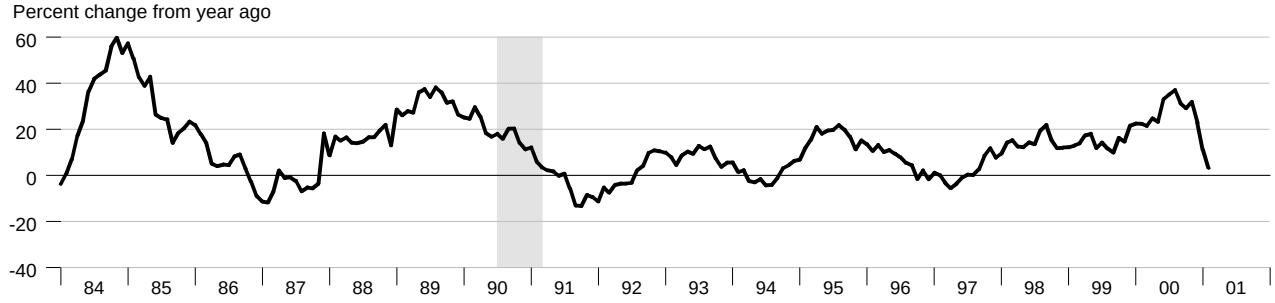
Total Borrowings, nsa



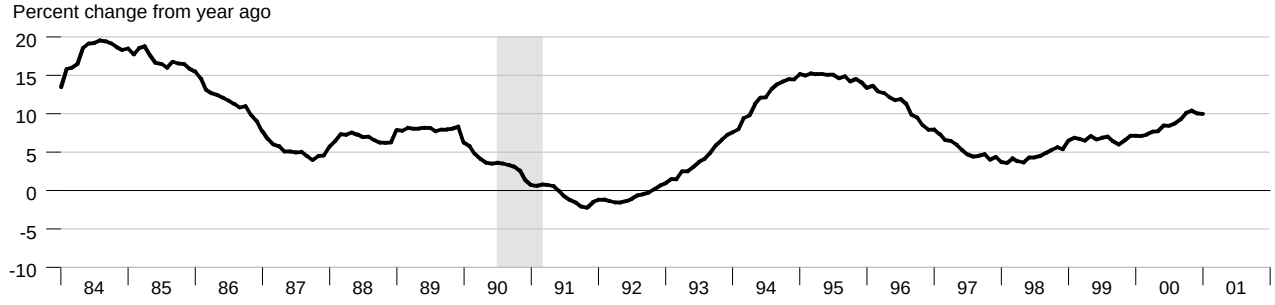
Excess Reserves plus RCB Contracts



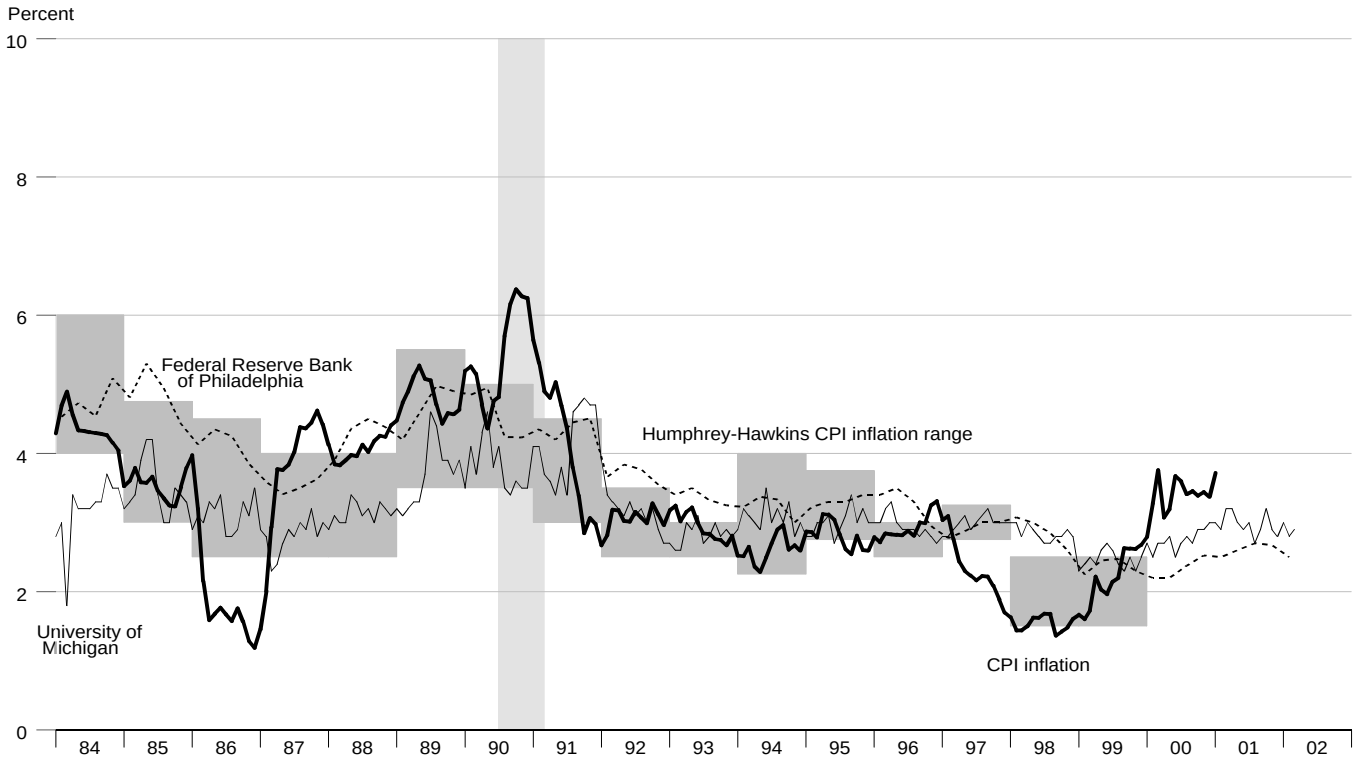
Nonfinancial Commercial Paper



Consumer Credit

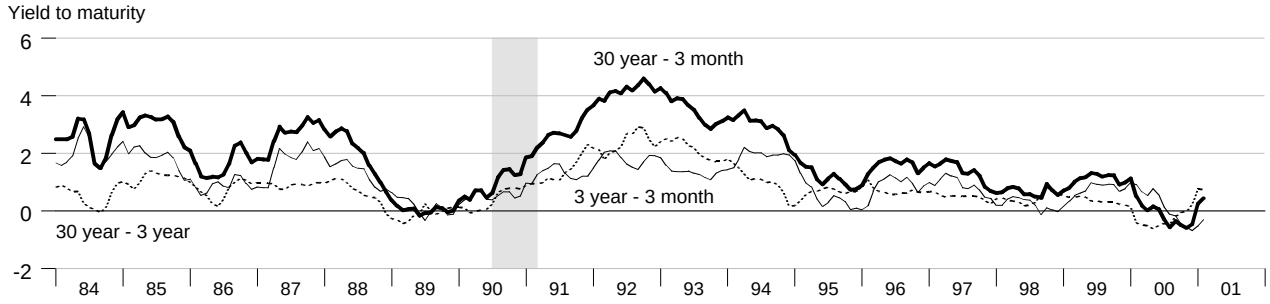


Inflation and Inflation Expectations

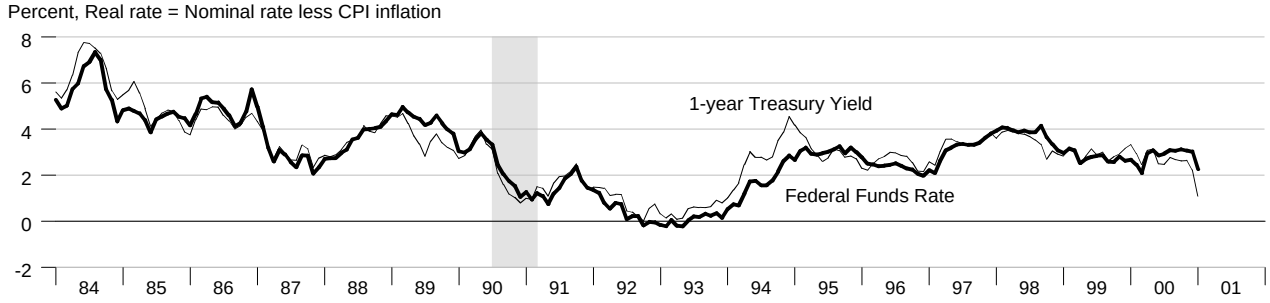


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

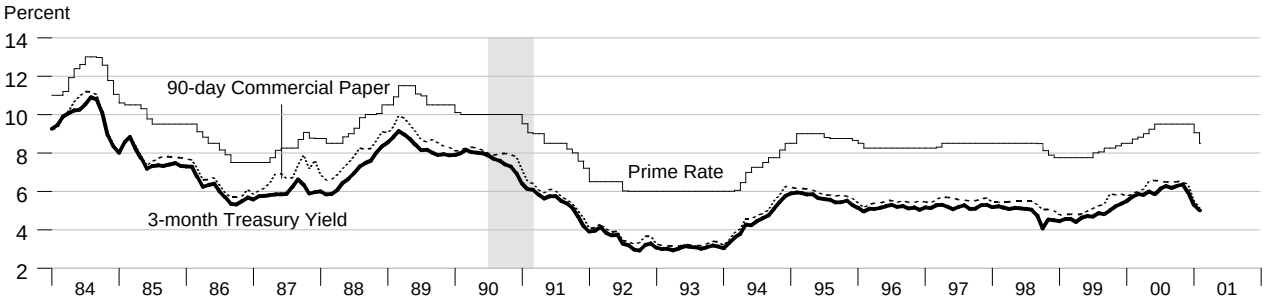
Treasury Security Yield Spreads



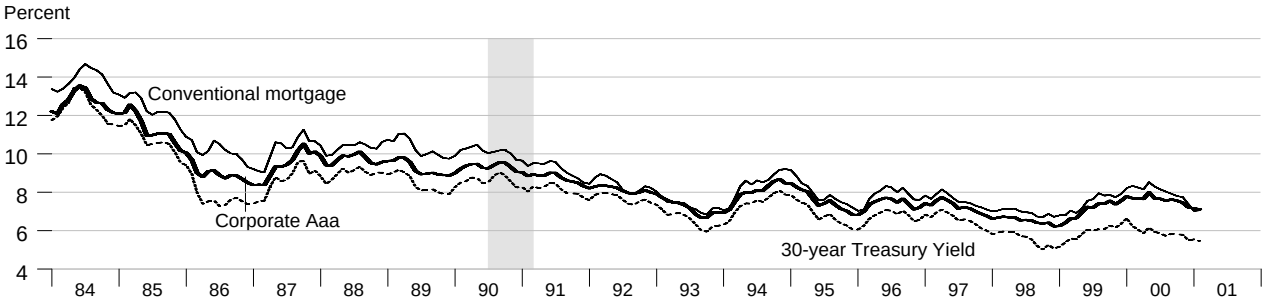
Real Interest Rates



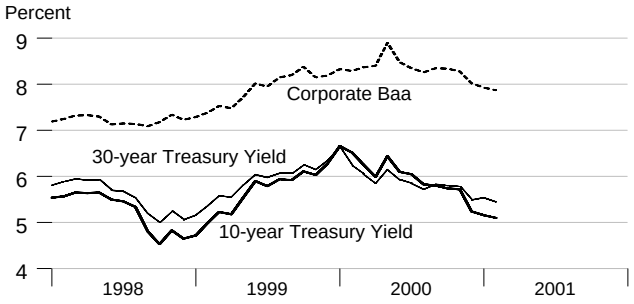
Short Term Interest Rates



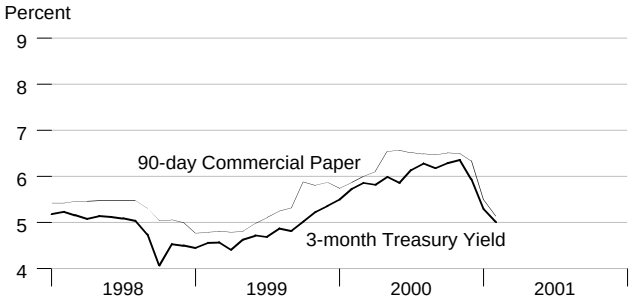
Long Term Interest Rates



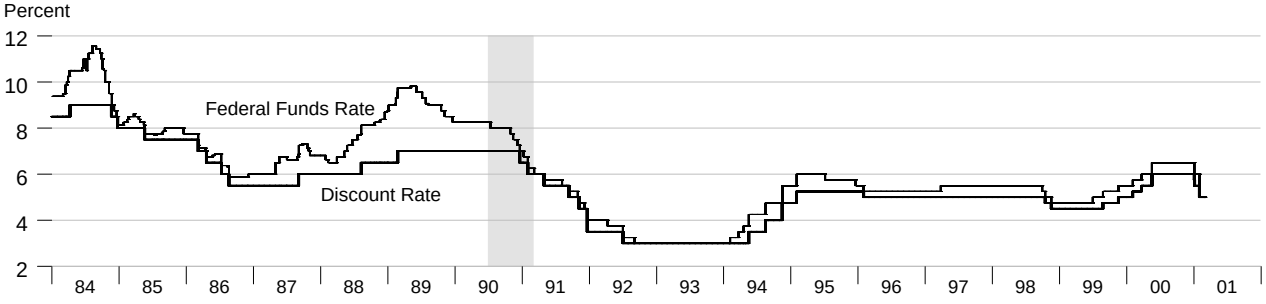
Long Term Interest Rates



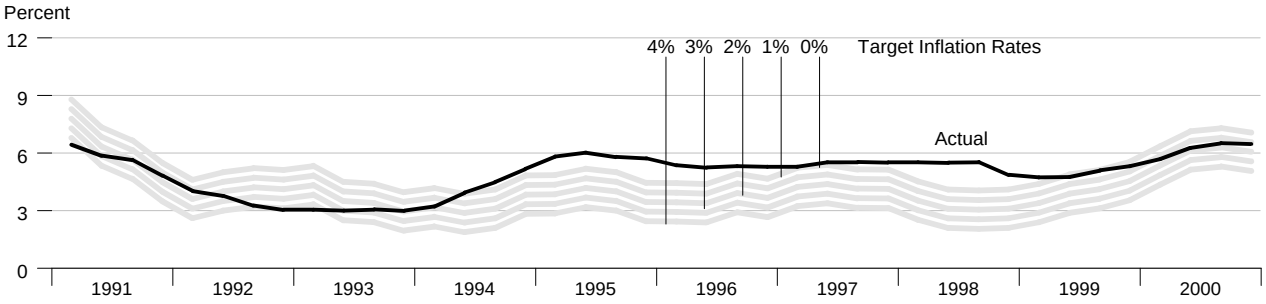
Short Term Interest Rates



FOMC Expected Federal Funds Rate and Discount Rate

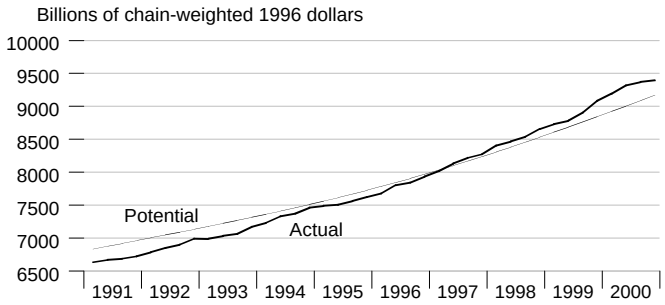


Federal Funds Rate and Inflation Targets

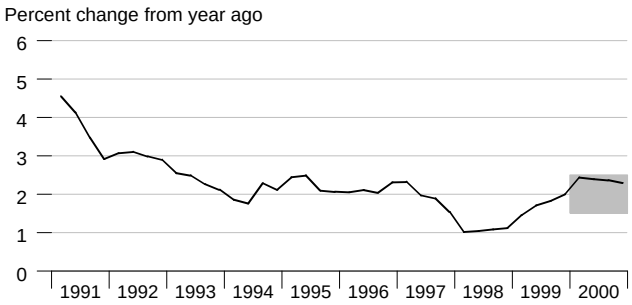


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Actual and Potential Real GDP

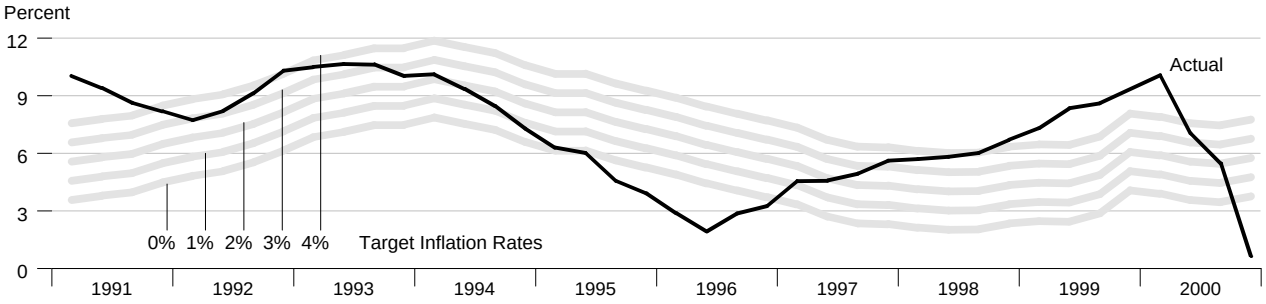


PCE Inflation and Projections



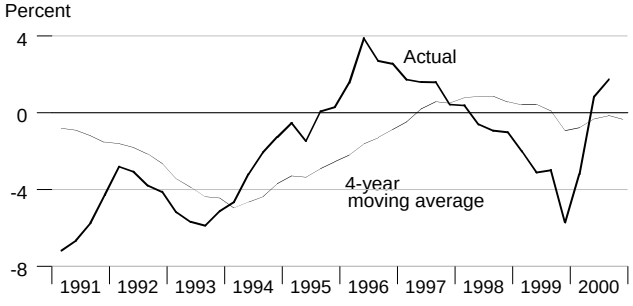
The shaded region shows the range of projections published in the Monetary Policy Report to Congress. See page 19 for information.

Monetary Base Growth* and Inflation Targets

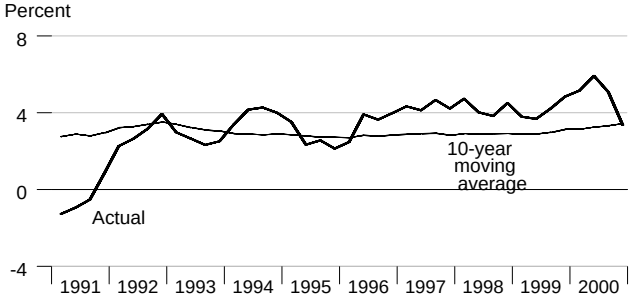


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

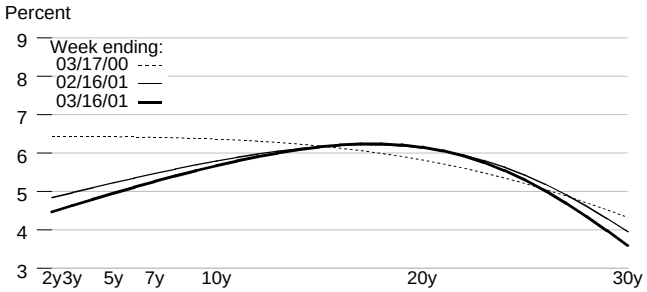
Monetary Base Velocity Growth



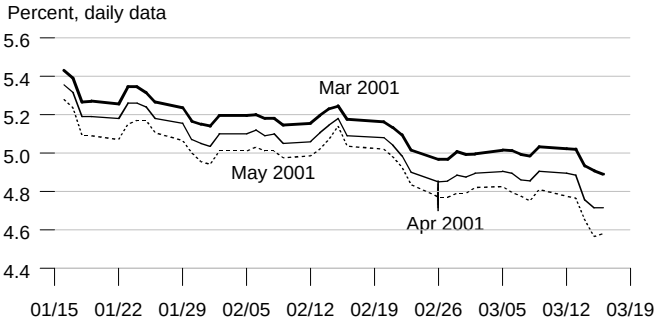
Real Output Growth



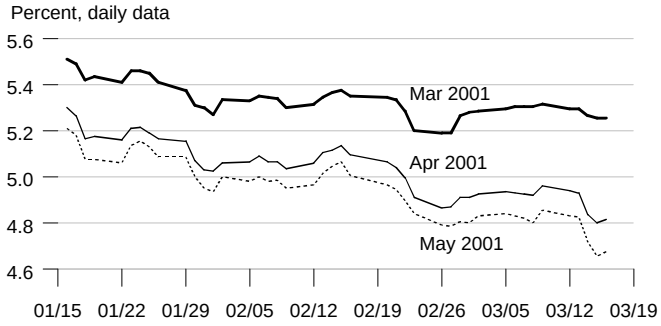
Implied One-Year Forward Rates



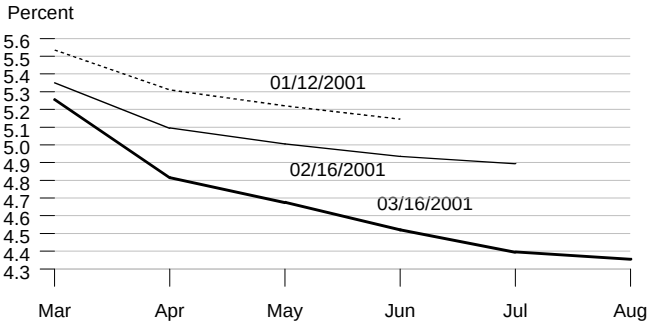
Rates on 3-Month Eurodollar Futures



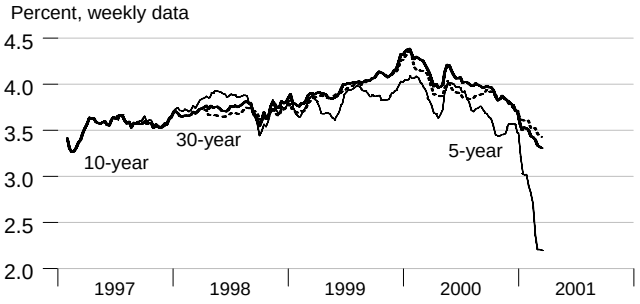
Rates on Selected Fed Funds Futures Contracts



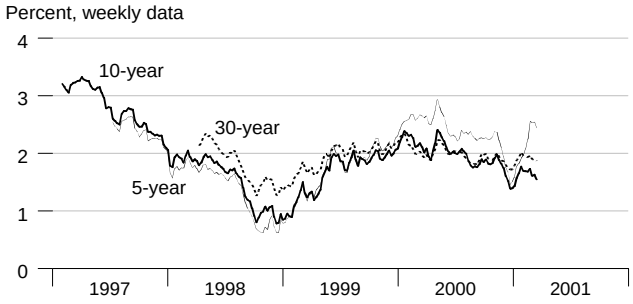
Implied Yields on Fed Funds Futures



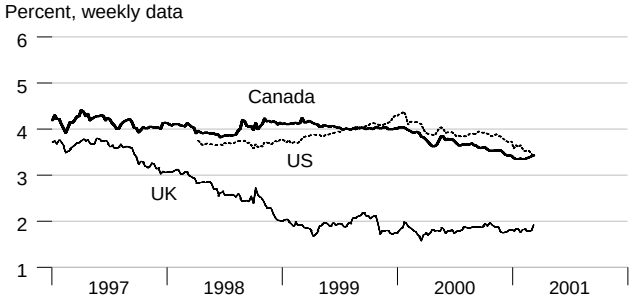
Inflation-Protected Treasury Yields



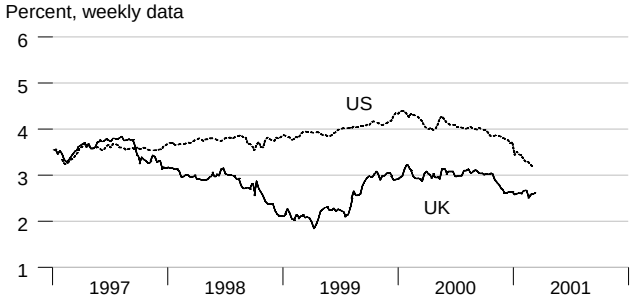
Inflation-Protected Treasury Yield Spreads



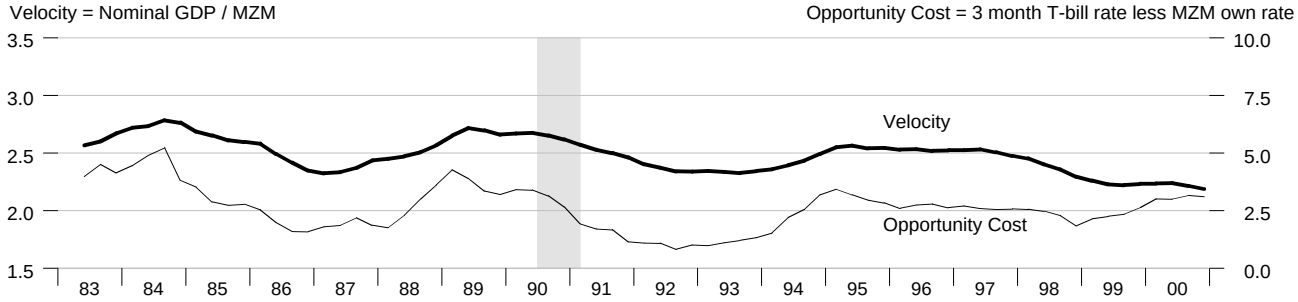
Inflation-Indexed 30-Year Bonds



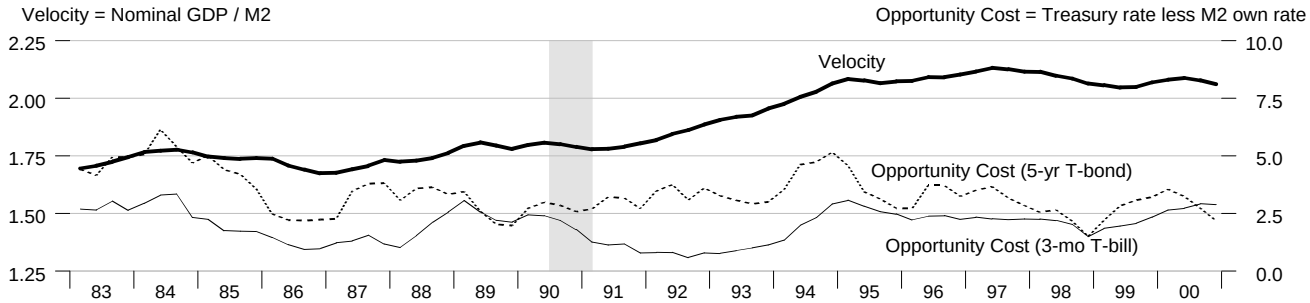
Inflation-Indexed 10-Year Bonds



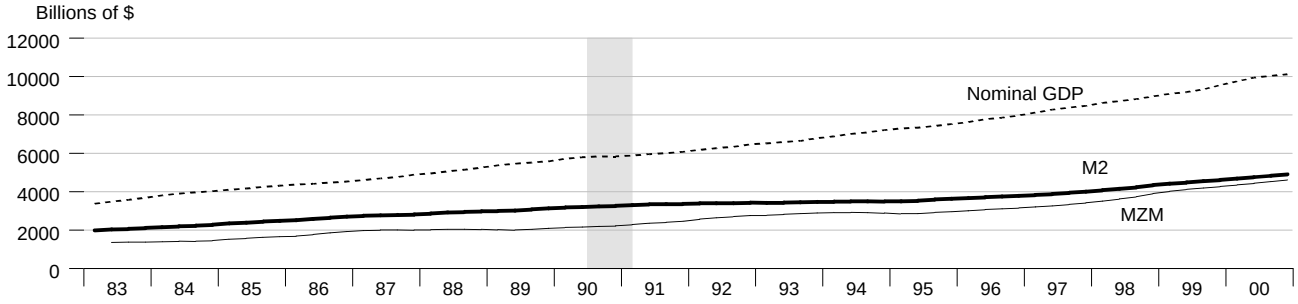
MZM Velocity and Opportunity Cost



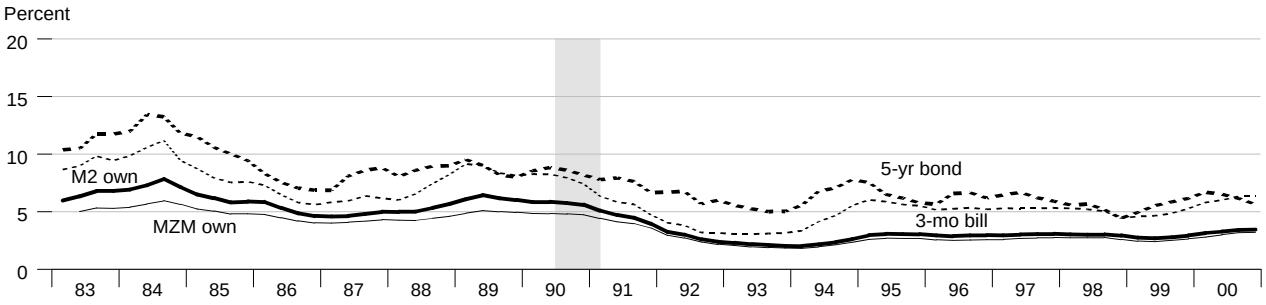
M2 Velocity and Opportunity Cost



M2, MZM and Nominal GDP

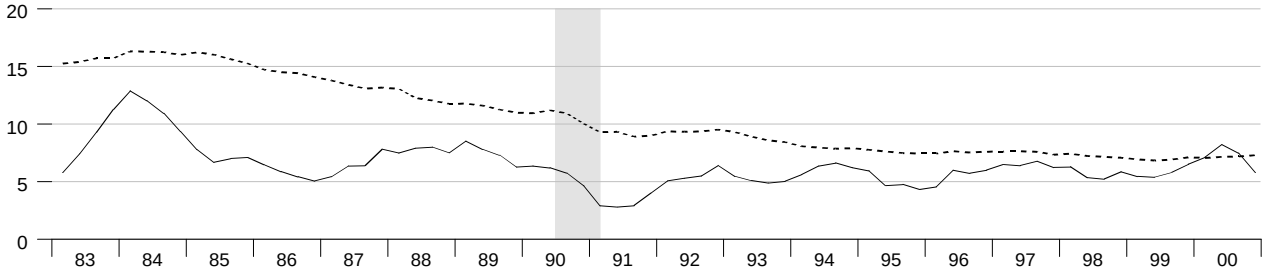


Interest Rates



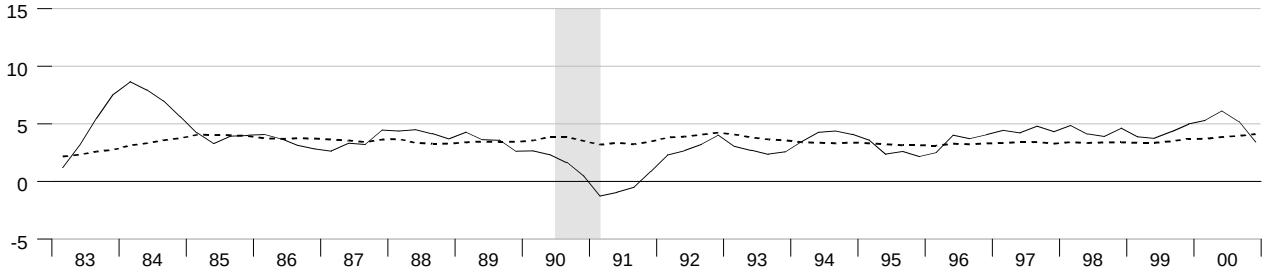
Gross Domestic Product

Percent change from year ago



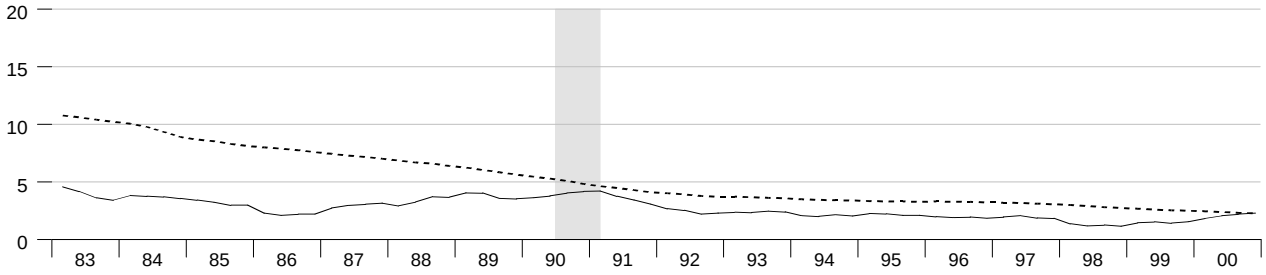
Real Gross Domestic Product

Percent change from year ago



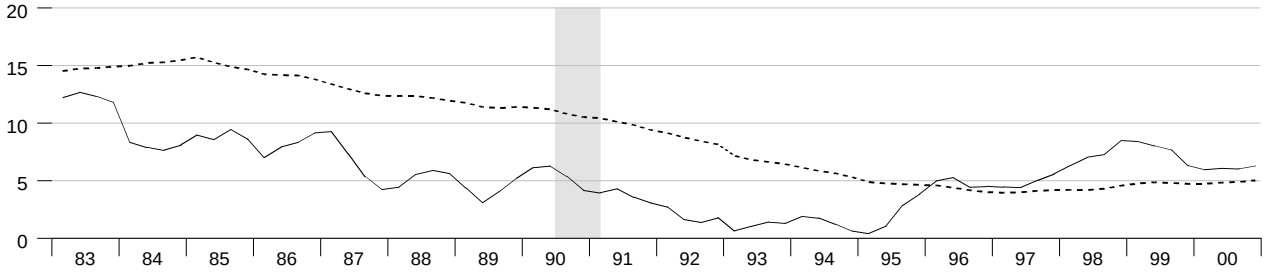
Gross Domestic Product Price Index

Percent change from year ago



M2

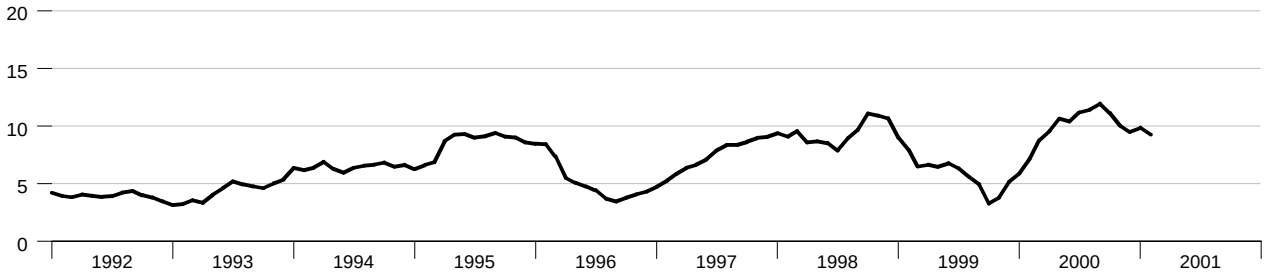
Percent change from year ago



Dashed lines indicate 10-year moving averages

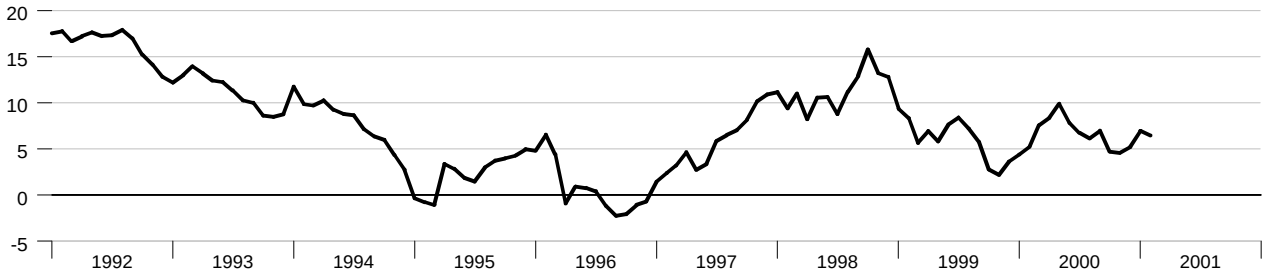
Bank Credit

Percent change from year ago



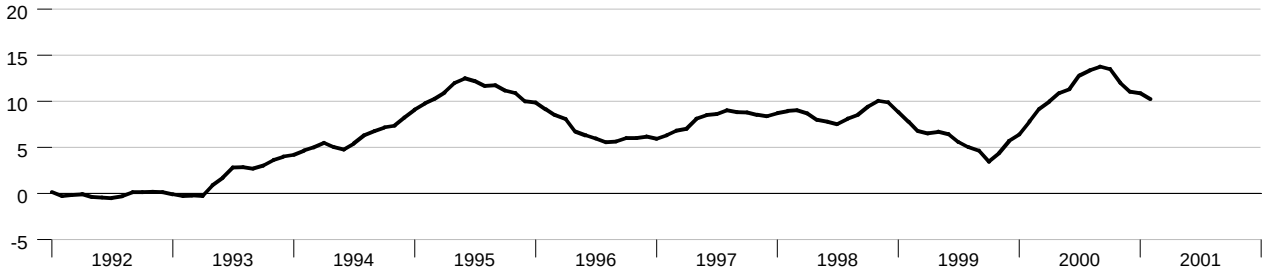
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



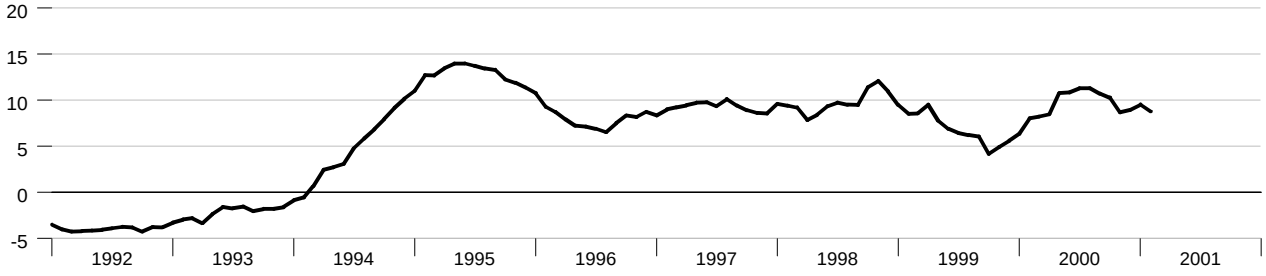
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

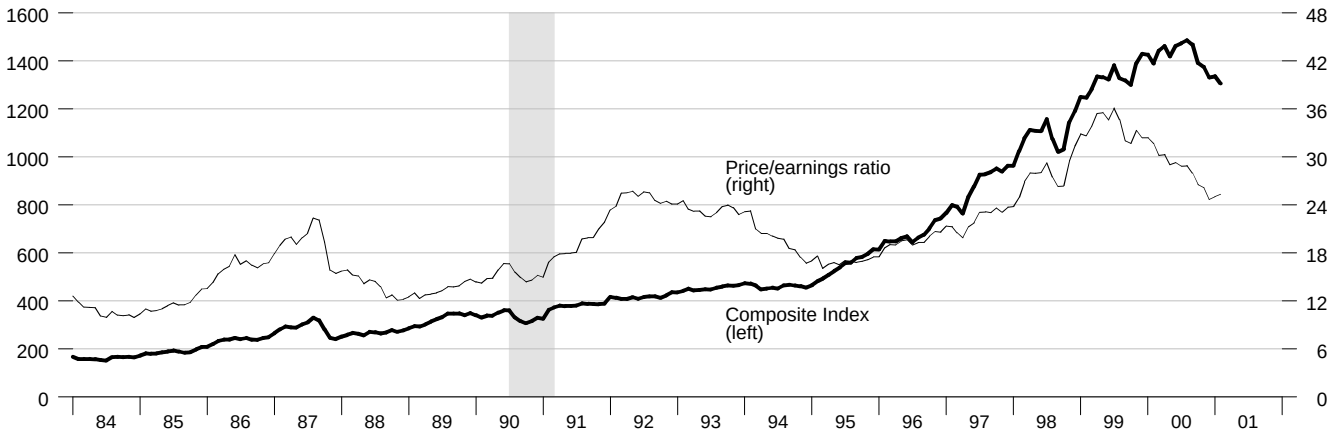


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



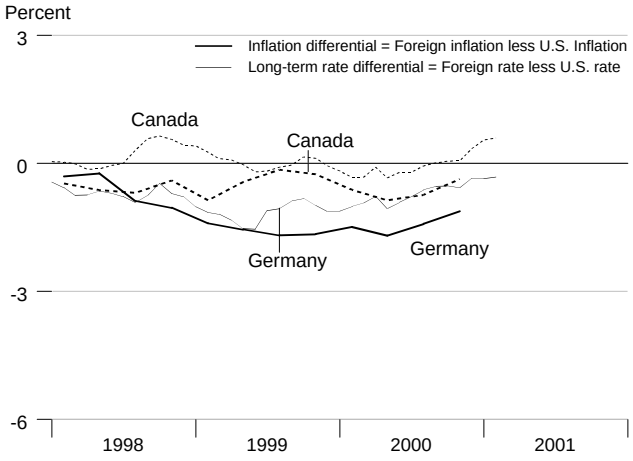
Standard and Poor's 500

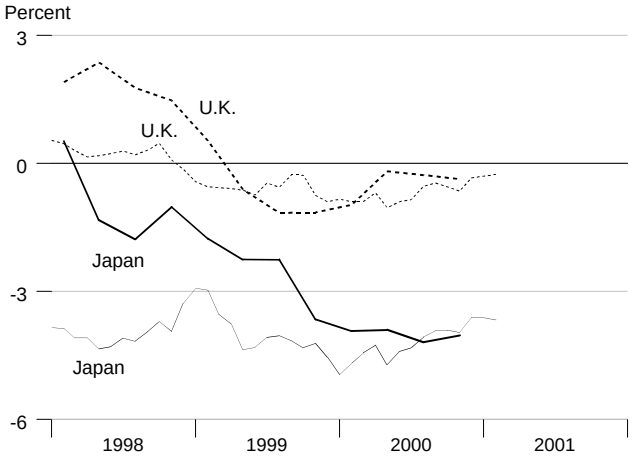


Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	2000Q1	2000Q2	2000Q3	2000Q4	Nov00	Dec00	Jan01	Feb01
United States	3.27	3.31	3.47	3.44	5.72	5.24	5.16	5.10
Canada	2.65	2.45	2.73	3.08	5.78	5.58	5.71	5.69
France	1.50	1.49	1.89	1.89	5.78	5.55	5.48	.
Germany	1.78	1.62	2.05	2.32	5.15	4.89	4.80	4.78
Italy	2.36	2.50	2.63	2.67	5.55	5.30	5.19	5.19
Japan	-0.65	-0.59	-0.72	-0.59	1.76	1.62	1.54	1.43
United Kingdom	2.30	3.13	3.20	3.07	5.07	4.90	4.86	4.84

Inflation and Long-Term Interest Rates Differentials





		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
	1996	1105.818	3093.199	3738.999	4809.090	3685.416	455.572	73.952	217.848
	1997	1069.145	3315.632	3921.118	5203.986	3953.657	478.708	69.523	227.067
	1998	1079.795	3703.061	4207.085	5738.854	4326.043	508.942	67.808	242.237
	1999	1101.546	4160.720	4526.378	6251.496	4585.193	557.864	72.359	258.556
	2000	1104.053	4493.794	4802.223	6830.885	5034.763	590.823	68.271	
1998	1	1077.122	3519.960	4084.264	5519.869	4187.369	498.320	68.478	235.943
	2	1078.248	3633.263	4159.060	5658.527	4250.254	502.020	66.943	239.950
	3	1074.220	3746.399	4235.499	5795.672	4351.030	511.546	67.809	243.733
	4	1089.591	3912.624	4349.517	5981.347	4515.517	523.882	68.002	249.320
1999	1	1098.625	4029.042	4427.907	6094.274	4513.673	536.334	68.521	253.370
	2	1102.740	4126.072	4493.084	6189.352	4531.872	545.912	67.392	257.003
	3	1095.559	4205.053	4560.659	6279.848	4595.860	557.969	69.050	260.280
	4	1109.259	4282.714	4623.862	6442.509	4699.369	591.242	84.473	263.570
2000	1	1114.900	4364.451	4691.482	6614.255	4840.976	593.096	72.385	267.157
	2	1109.873	4444.218	4766.379	6762.299	4993.951	586.041	67.093	270.860
	3	1099.791	4536.031	4835.691	6913.148	5124.839	589.062	66.577	
	4	1091.648	4630.474	4915.341	7033.840	5179.286	595.094	67.029	
1999	Feb	1096.148	4039.213	4433.123	6110.958	4517.154	538.190	68.890	253.460
	Mar	1102.242	4055.074	4444.993	6116.479	4496.765	539.053	67.195	254.390
	Apr	1107.502	4092.708	4468.843	6152.143	4508.499	539.608	64.898	255.900
	May	1100.945	4127.672	4494.313	6190.026	4522.530	548.331	69.334	257.070
	Jun	1099.774	4157.835	4516.095	6225.888	4564.587	549.796	67.944	258.040
	Jul	1097.526	4184.062	4543.190	6256.907	4570.220	553.060	67.879	259.220
	Aug	1095.763	4208.119	4561.128	6278.320	4597.885	556.711	68.158	260.240
	Sep	1093.388	4222.979	4577.659	6304.316	4619.474	564.135	71.113	261.380
	Oct	1096.442	4248.874	4598.039	6357.737	4633.951	572.989	73.928	262.320
	Nov	1107.078	4282.995	4623.578	6443.018	4691.590	588.669	84.017	263.420
	Dec	1124.256	4316.274	4649.968	6526.771	4772.566	612.068	95.475	264.970
2000	Jan	1122.785	4343.580	4670.788	6568.493	4793.045	604.790	80.818	266.190
	Feb	1108.758	4353.617	4686.415	6601.637	4839.872	589.978	69.252	266.760
	Mar	1113.156	4396.156	4717.242	6672.634	4890.010	584.520	67.084	268.520
	Apr	1117.322	4429.962	4754.762	6724.089	4939.427	583.046	65.907	270.670
	May	1106.647	4440.989	4761.520	6756.255	5003.332	587.857	68.883	270.510
	Jun	1105.649	4461.704	4782.855	6806.552	5039.094	587.219	66.490	271.400
	Jul	1103.947	4495.726	4803.631	6855.612	5080.885	588.034	66.457	
	Aug	1099.681	4533.771	4835.129	6915.312	5122.736	588.446	66.674	
	Sep	1095.745	4578.597	4868.313	6968.519	5170.895	590.705	66.599	
	Oct	1096.126	4602.397	4890.747	6990.654	5150.072	593.067	66.589	
	Nov	1088.528	4620.567	4907.975	7015.010	5162.317	595.554	67.591	
	Dec	1090.291	4668.457	4947.300	7095.857	5225.468	596.661	66.907	
2001	Jan	1101.065	4745.687	4998.027	7190.635	5265.059	600.784	68.092	
	Feb	1100.996	4849.823	5042.752	7260.399	5287.871	606.969	66.801	

*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
1998	1	5.52	5.00	8.50	5.55	5.19	5.46	5.88	6.67	4.94	7.05
	2	5.50	5.00	8.50	5.59	5.11	5.57	5.85	6.64	5.00	7.09
	3	5.53	5.00	8.50	5.53	4.96	5.11	5.47	6.49	4.95	6.87
	4	4.86	4.66	7.92	5.20	4.37	4.41	5.11	6.33	4.82	6.76
1999	1	4.73	4.50	7.75	4.90	4.53	4.87	5.37	6.42	4.87	6.88
	2	4.75	4.50	7.75	4.98	4.59	5.35	5.80	6.93	5.05	7.20
	3	5.09	4.60	8.10	5.38	4.79	5.71	6.04	7.33	5.42	7.80
	4	5.31	4.87	8.37	6.06	5.20	6.00	6.25	7.49	5.79	7.83
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
1999	Feb	4.76	4.50	7.75	4.90	4.56	4.90	5.37	6.40	4.80	6.81
	Mar	4.81	4.50	7.75	4.91	4.57	5.11	5.58	6.62	4.96	7.04
	Apr	4.74	4.50	7.75	4.88	4.41	5.03	5.55	6.64	4.89	6.92
	May	4.74	4.50	7.75	4.92	4.63	5.33	5.81	6.93	5.05	7.15
	Jun	4.76	4.50	7.75	5.13	4.72	5.70	6.04	7.23	5.22	7.55
	Jul	4.99	4.50	8.00	5.24	4.69	5.62	5.98	7.19	5.24	7.63
	Aug	5.07	4.56	8.06	5.41	4.87	5.77	6.07	7.40	5.47	7.94
	Sep	5.22	4.75	8.25	5.50	4.82	5.75	6.07	7.39	5.56	7.82
	Oct	5.20	4.75	8.25	6.13	5.02	5.94	6.26	7.55	5.78	7.85
	Nov	5.42	4.86	8.37	6.00	5.23	5.92	6.15	7.36	5.77	7.74
	Dec	5.30	5.00	8.50	6.05	5.36	6.14	6.35	7.55	5.82	7.91
2000	Jan	5.46	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

*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	4.79	6.75
	1997	-3.32	7.19	4.87	8.21
	1998	1.00	11.68	7.29	10.28
	1999	2.01	12.36	7.59	8.93
	2000	0.23	8.01	6.09	9.27
1998	1	0.92	2.77	1.87	2.50
	2	0.10	3.22	1.83	2.51
	3	-0.37	3.11	1.84	2.42
	4	1.43	4.44	2.69	3.20
1999	1	0.83	2.98	1.80	1.89
	2	0.37	2.41	1.47	1.56
	3	-0.65	1.91	1.50	1.46
	4	1.25	1.85	1.39	2.59
2000	1	0.51	1.91	1.46	2.67
	2	-0.45	1.83	1.60	2.24
	3	-0.91	2.07	1.45	2.23
	4	-0.74	2.08	1.65	1.75
1999	Feb	-0.12	1.16	0.62	0.92
	Mar	0.56	0.39	0.27	0.09
	Apr	0.48	0.93	0.54	0.58
	May	-0.59	0.85	0.57	0.62
	Jun	-0.11	0.73	0.48	0.58
	Jul	-0.20	0.63	0.60	0.50
	Aug	-0.16	0.57	0.39	0.34
	Sep	-0.22	0.35	0.36	0.41
	Oct	0.28	0.61	0.45	0.85
	Nov	0.97	0.80	0.56	1.34
	Dec	1.55	0.78	0.57	1.30
2000	Jan	-0.13	0.63	0.45	0.64
	Feb	-1.25	0.23	0.33	0.50
	Mar	0.40	0.98	0.66	1.08
	Apr	0.37	0.77	0.80	0.77
	May	-0.96	0.25	0.14	0.48
	Jun	-0.09	0.47	0.45	0.74
	Jul	-0.15	0.76	0.43	0.72
	Aug	-0.39	0.85	0.66	0.87
	Sep	-0.36	0.99	0.69	0.77
	Oct	0.03	0.52	0.46	0.32
	Nov	-0.69	0.39	0.35	0.35
	Dec	0.16	1.04	0.80	1.15
2001	Jan	0.99	1.65	1.03	1.34
	Feb	-0.01	2.19	0.89	0.97

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 5, 10, and 30 year maturities, the difference between the Treasury constant maturity yield and the yield on the most recently issued inflation-protected security. **Inflation-Indexed Bonds** for Canada are the 31-year bond with a maturity date of 12/01/2026; for the U.K., the 37.5-year bond with a maturity date of 07/17/2024 and the 12.1-year bond with a maturity date of 10/21/2004; and, for the U.S., the 30-year bond with a maturity date of 04/15/2028 and the 10-year bond with a maturity date of 01/15/2007.

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.