May 2001

MonetaryTrends

THE FEDERAL RESERVE BANK of ST. LOUIS

Implications of Financial Sector Consolidation

In a recent report, the Group of Ten (G10) assesses possible effects of financial sector consolidation on financial risk, monetary policy, market structure and the payment system.[1] The financial sector, as defined in the report, comprises commercial banking, investment banking, insurance and, in part, asset management. The report covers the eleven G10 nations, Australia and Spain.

The report was commissioned in September 1999 by the central bank governors and finance ministers of the G10 countries in response to a decade of high and accelerating levels of merger and acquisition (M&A) activity. The strong M&A activity has created a number of large and complex financial services providers—many with multinational operations.

The report views efficiency gains from large-scale operations as the driving force for consolidation in the financial sector. Improvements in information technology have allowed for economies of scale in providing services. Financial deregulation, along with integration of financial markets, has extended the business opportunities for large entities. The impetus for moving to large-scale operations has been reinforced by increased shareholder pressure for more efficient use of capital.

In terms of financial risk, the report notes that larger entities are not necessarily more diversified or less risky than their smaller counterparts. The post-merger portfolio of a financial firm might differ from the sum of the respective pre-merger portfolios as the merger changes market conditions and offers new business opportunities. The report points out that financial "workouts" might be harder to bring about for large distressed institutions than for small ones.

The report also investigates three possible means through which financial sector consolidation could impair the functioning of monetary policy. First, consolidation might affect how monetary policy is implemented. In conducting open market operations, the central bank interacts directly with private sector financial institutions. If market structure changes—for instance through a decrease in the number of market participants—the central bank might have to make institutional changes to these operations. Isolated cases of such changes have been reported.

Second, consolidation might affect the way monetary policy is transmitted to the real sector. For instance, in the "monetary channel," interest rate changes are relayed through financial markets via arbitrage. Larger, more integrated financial institutions might accelerate this process through internal capital markets. On the other hand, less competition among financial institutions might slow down transmission as price changes are passed on in the market to a lesser degree or less rapidly. Similarly, in the "credit channel," changes in monetary policy are transmitted to the real sector through bank lending. Again, increased concentration might weaken competition and lead to incomplete or slower delivery of liquidity supplied by the central bank. As the report points out, so far, there is little evidence that the monetary transmission mechanism has been impaired through consolidation in the financial sector.

Third, when in distress, large and complex financial institutions pose risk to the financial system. By becoming too big to fail, institutions shift risk to the lender of last resort. The central bank, which in some G10 countries supervises banks and serves as the lender of last resort, should bear in mind the moral hazard implied in this activity. The central banks should also consider carefully the consequences of providing emergency liquidity for the stance of monetary policy.

While it is impossible to predict future scenarios, it seems likely that the strong M&A activity in the financial industry will persist. The potential effects of consolidation on financial risk and monetary policy outlined in the report should be monitored as consolidation continues.

—Judith H. Hazen
—Frank A. Schmid

[1] Group of Ten, *Report on Consolidation in the Financial Sector*, January 2001, http://www.bis.org.

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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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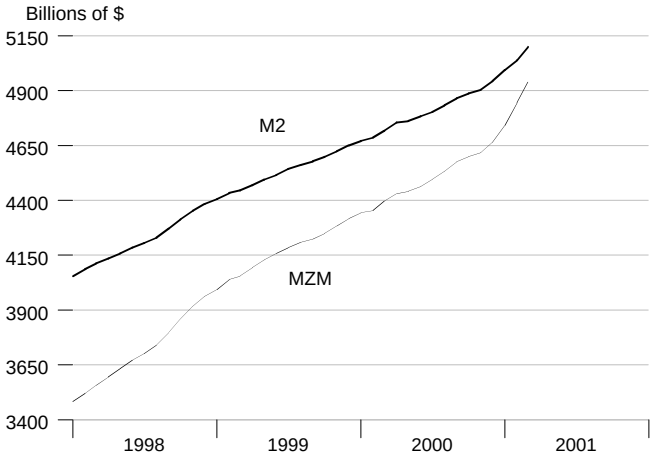
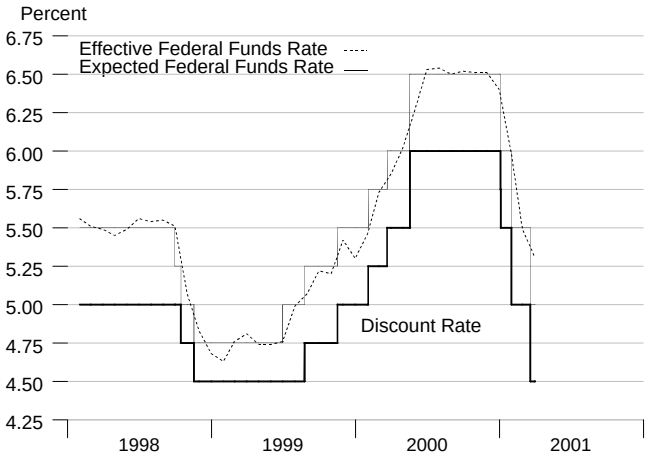
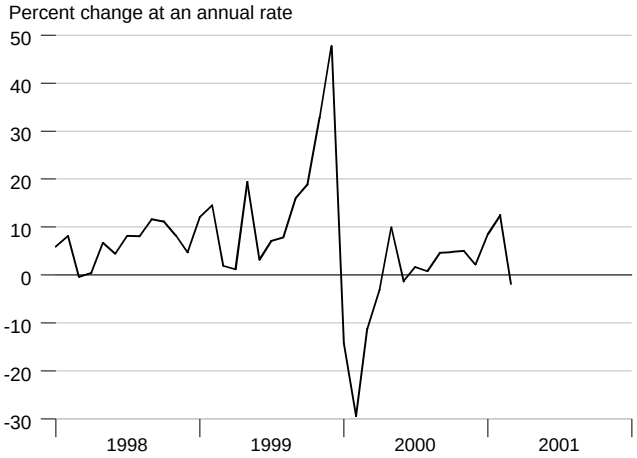
M2 and MZM



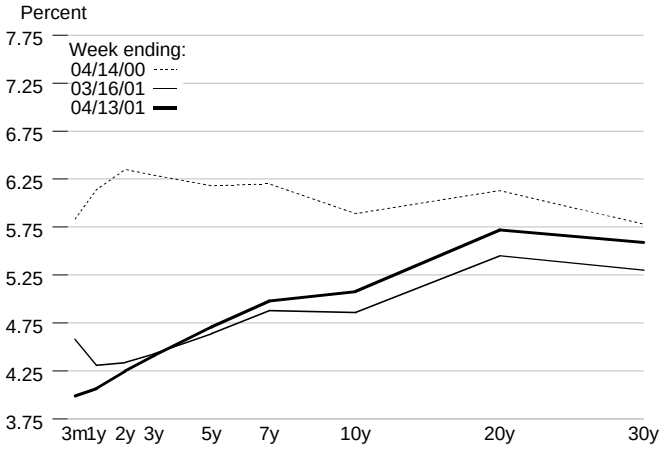
Reserve Market Rates



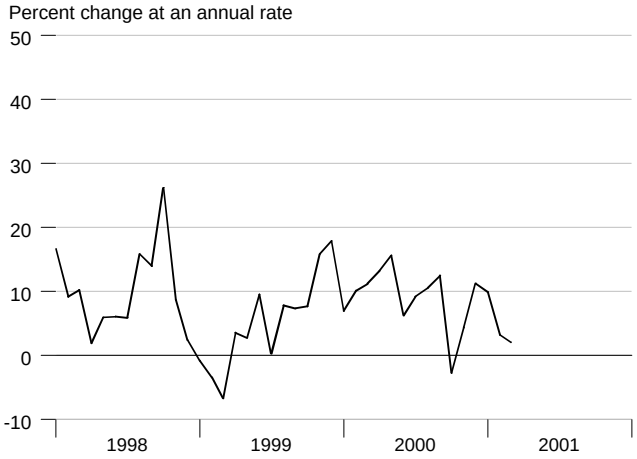
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

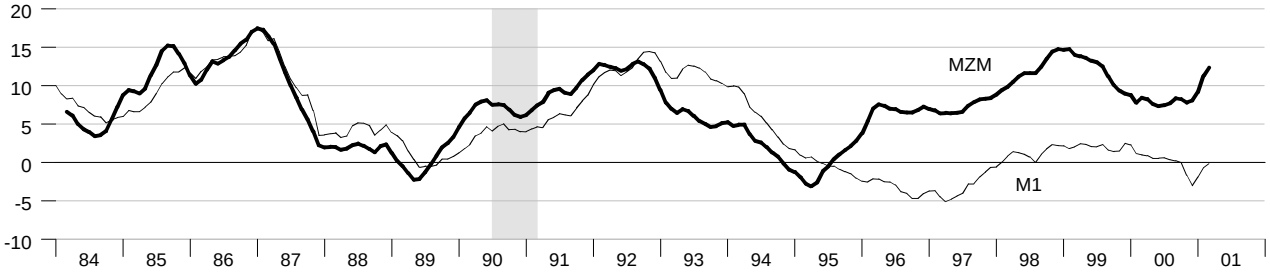


Interest Rates

	Jan 01	Feb 01	Mar 01
Federal Funds Rate	5.98	5.49	5.31
Discount Rate	5.52	5.00	4.81
Prime Rate	9.05	8.50	8.32
Conventional Mortgage Rate	7.03	7.05	6.95
Treasury Yields:			
3-month constant maturity	5.29	5.01	4.54
6-month constant maturity	5.15	4.89	4.44
1-year constant maturity	4.81	4.68	4.30
3-year constant maturity	4.77	4.71	4.43
5-year constant maturity	4.86	4.89	4.64
10-year constant maturity	5.16	5.10	4.89
30-year constant maturity	5.54	5.45	5.34

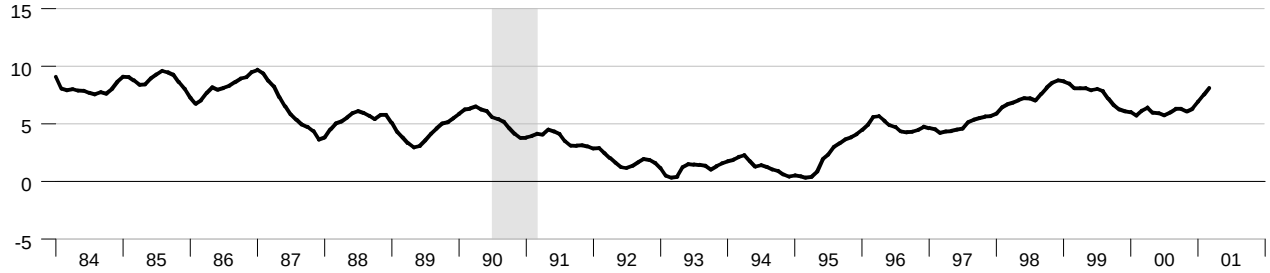
MZM and M1

Percent change from year ago



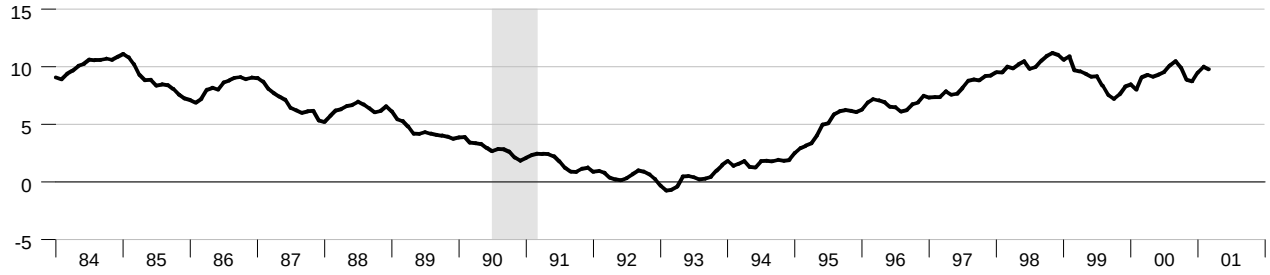
M2

Percent change from year ago



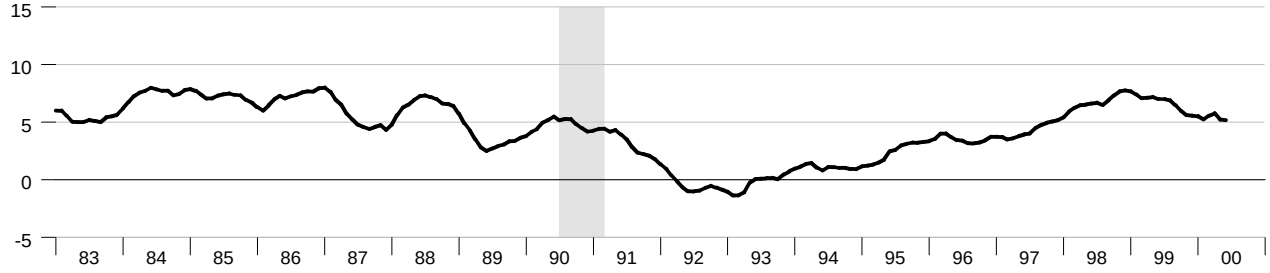
M3

Percent change from year ago

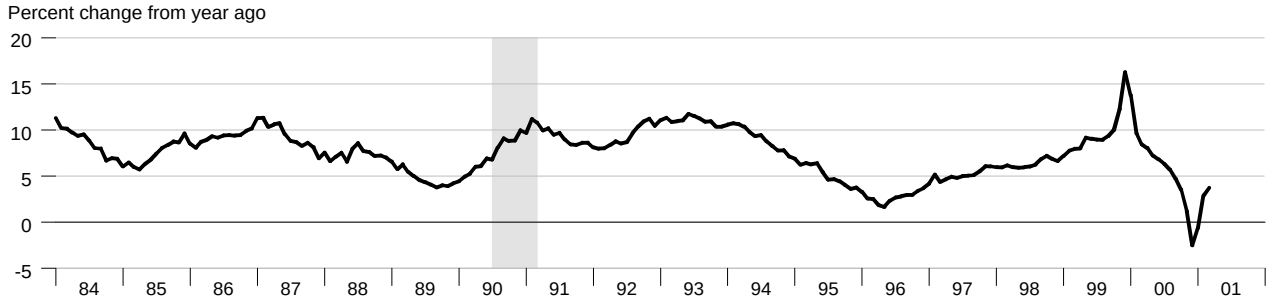


Monetary Services Index - M2

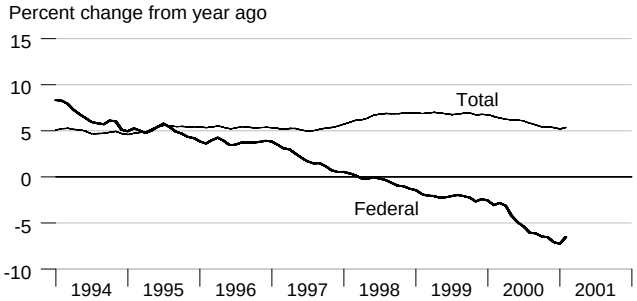
Percent change from year ago



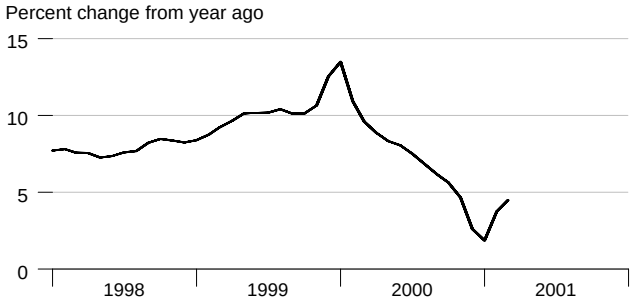
Adjusted Monetary Base



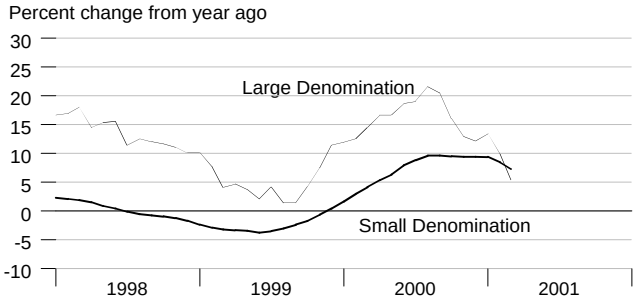
Domestic Nonfinancial Debt



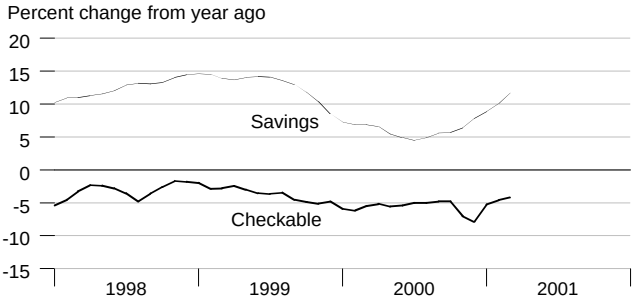
Currency Held by the Nonbank Public



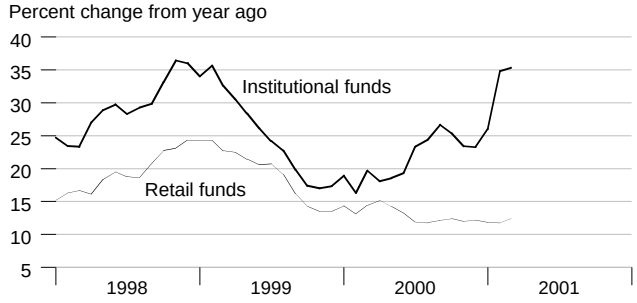
Time Deposits



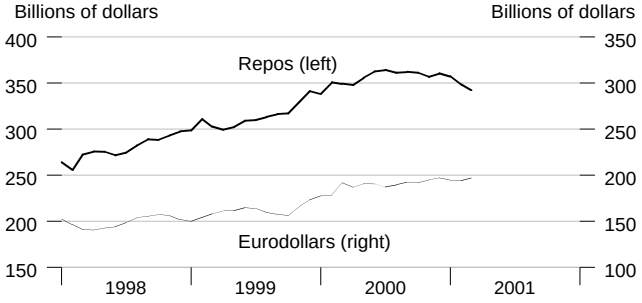
Checkable and Savings Deposits



Money Market Mutual Fund Shares

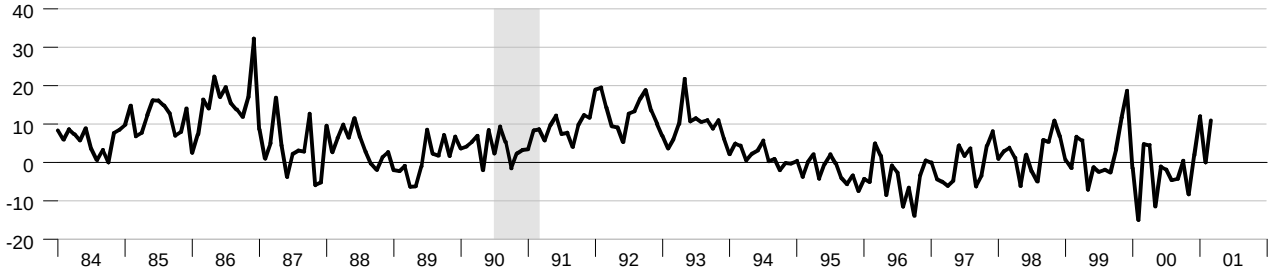


Repurchase Agreements and Eurodollars



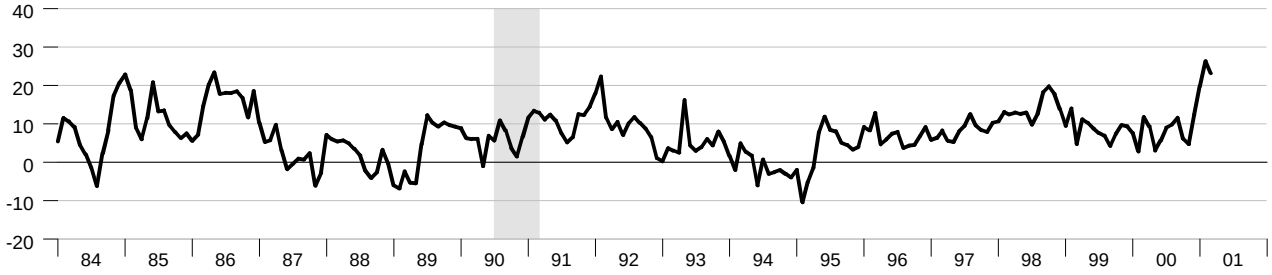
M1

Percent change at an annual rate



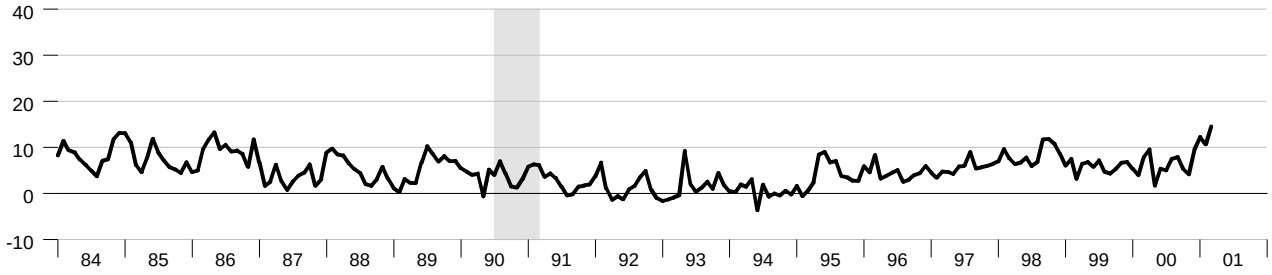
MZM

Percent change at an annual rate



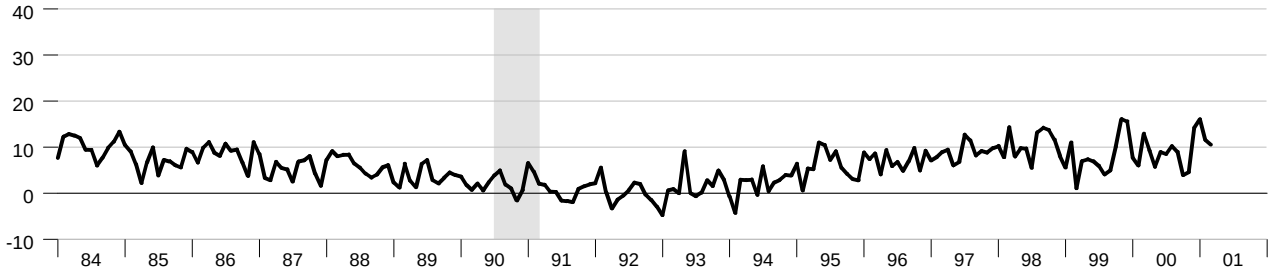
M2

Percent change at an annual rate

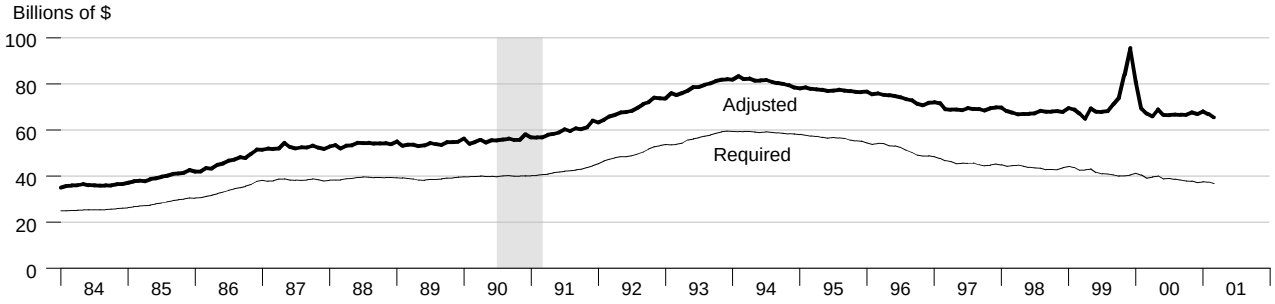


M3

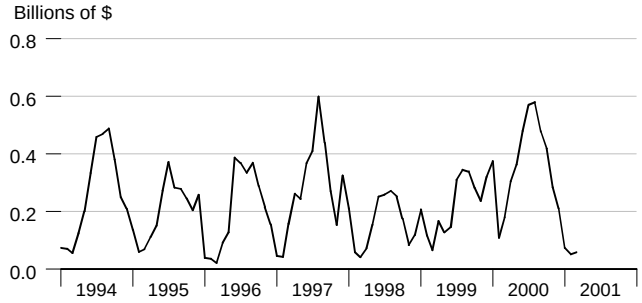
Percent change at an annual rate



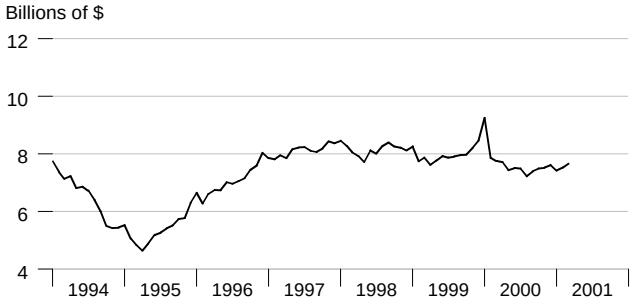
Adjusted and Required Reserves



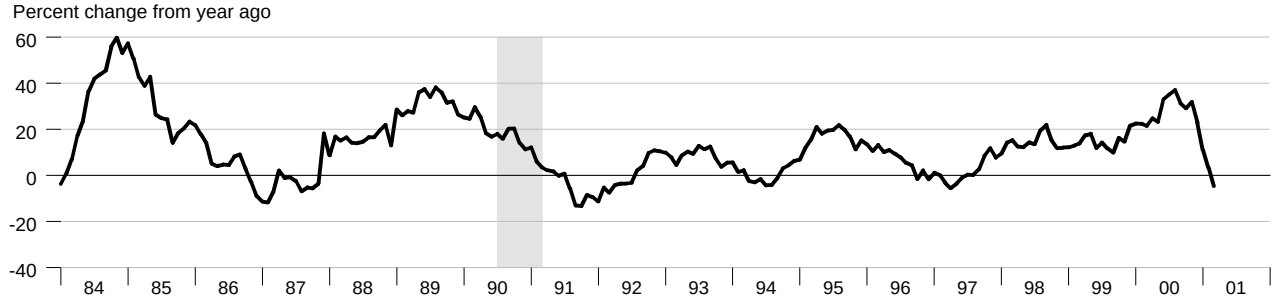
Total Borrowings, nsa



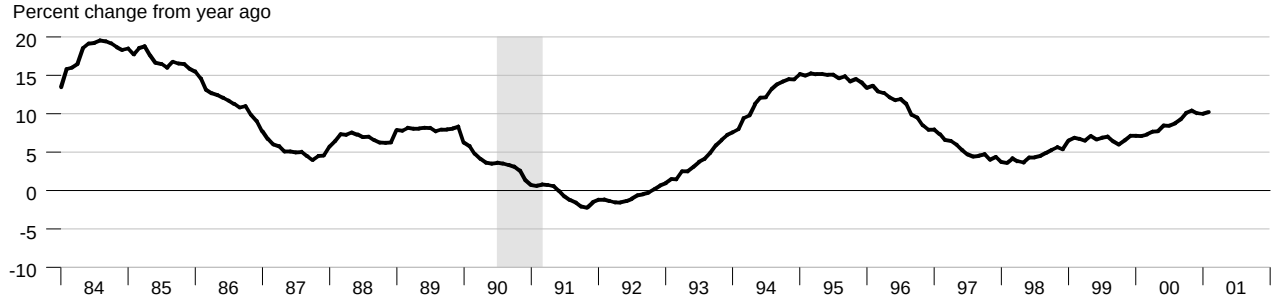
Excess Reserves plus RCB Contracts



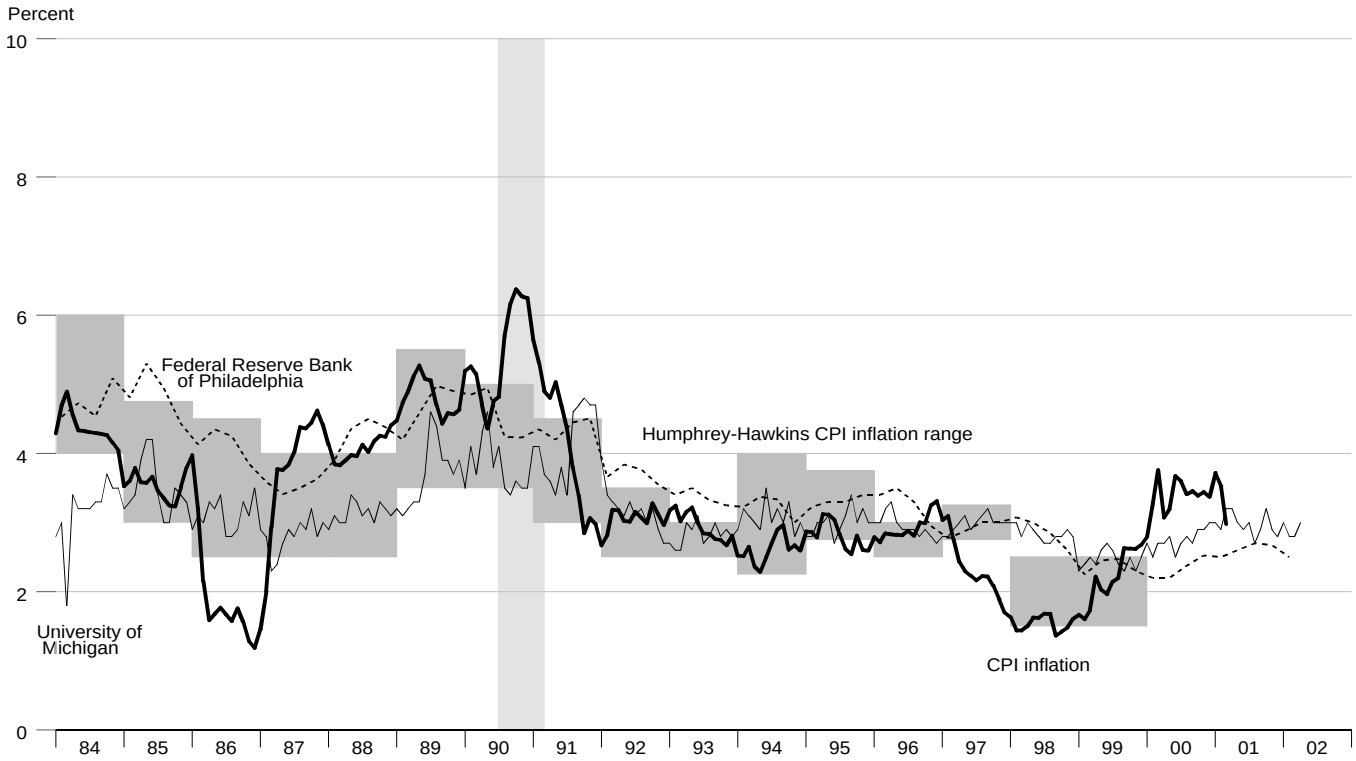
Nonfinancial Commercial Paper



Consumer Credit

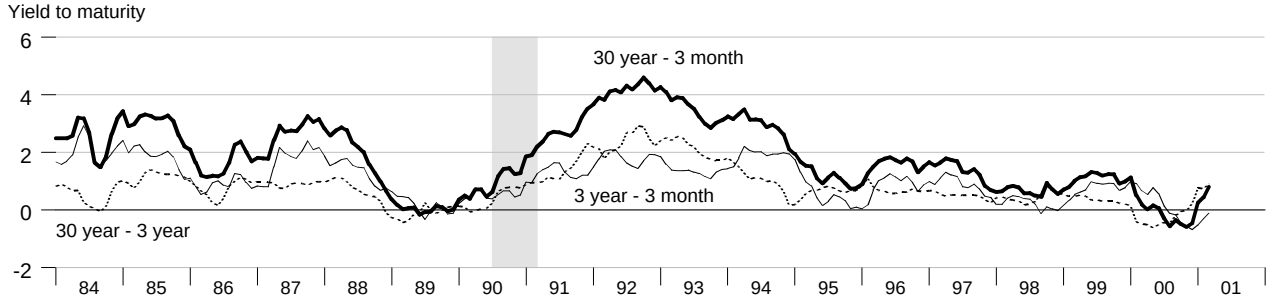


Inflation and Inflation Expectations

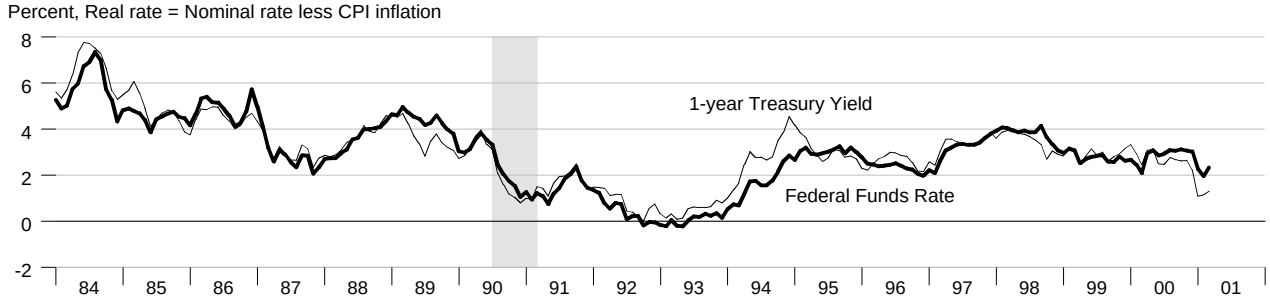


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph.

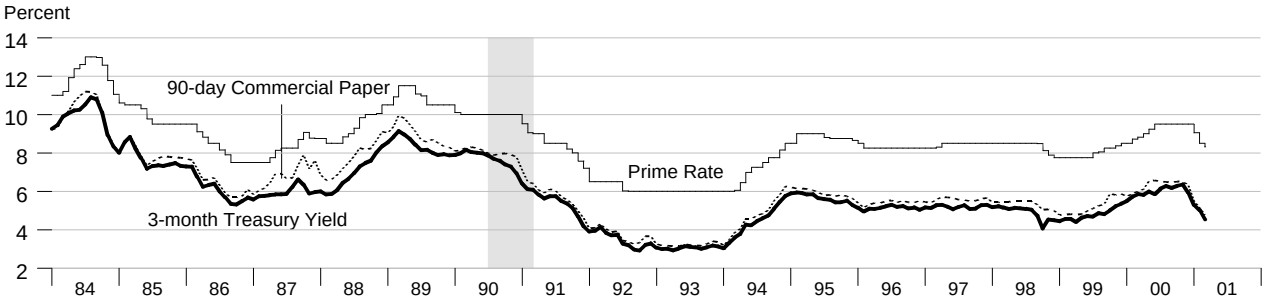
Treasury Security Yield Spreads



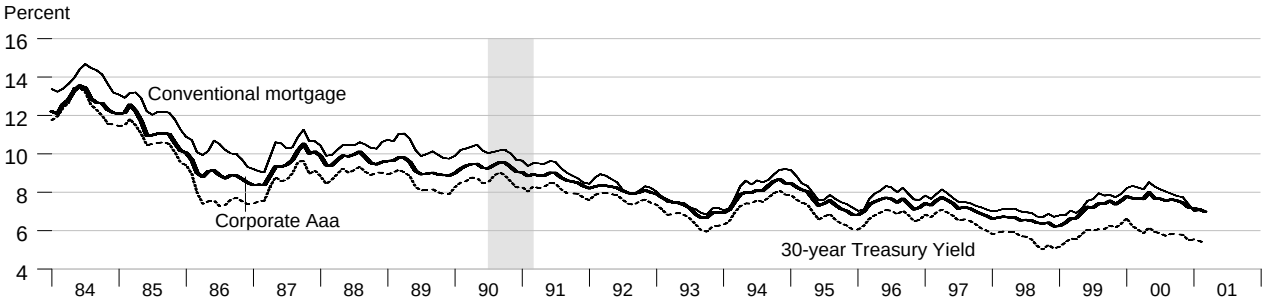
Real Interest Rates



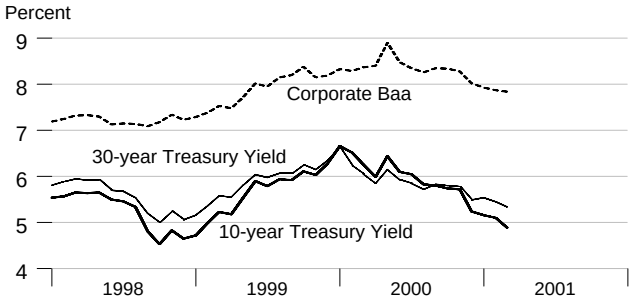
Short Term Interest Rates



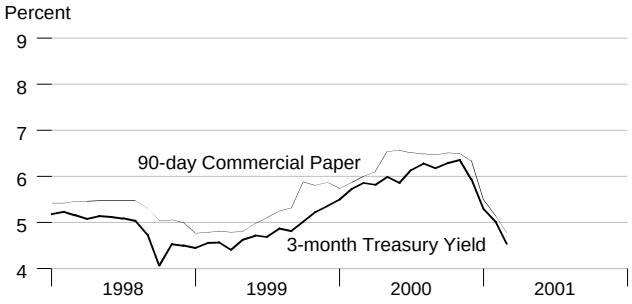
Long Term Interest Rates



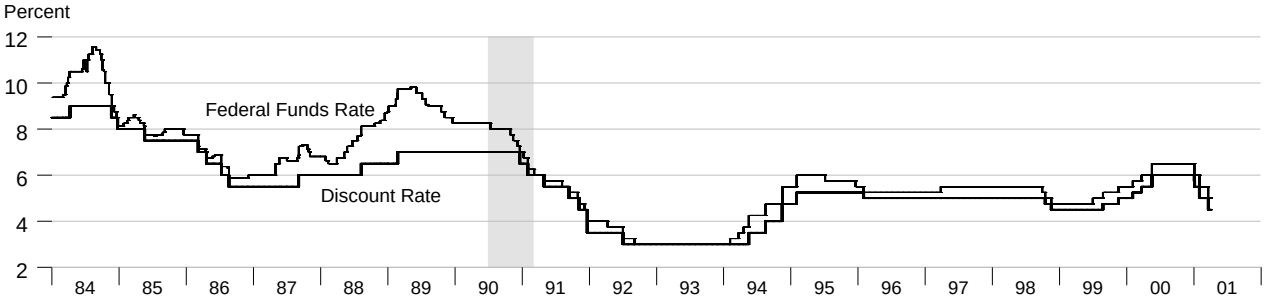
Long Term Interest Rates



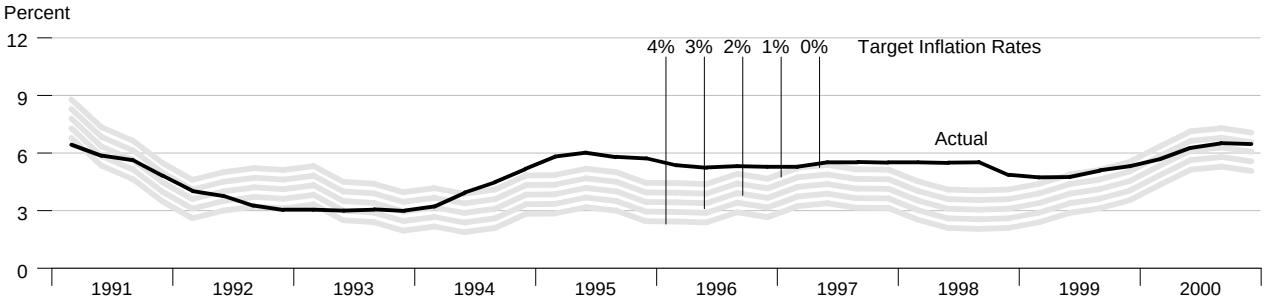
Short Term Interest Rates



FOMC Expected Federal Funds Rate and Discount Rate

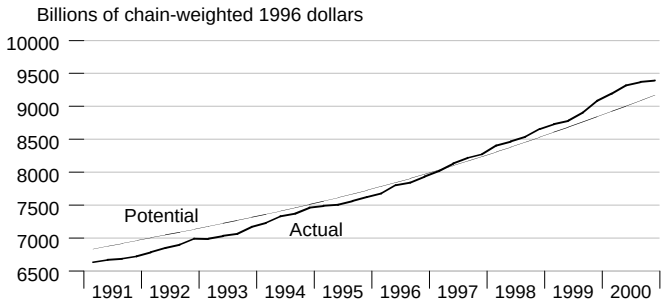


Federal Funds Rate and Inflation Targets

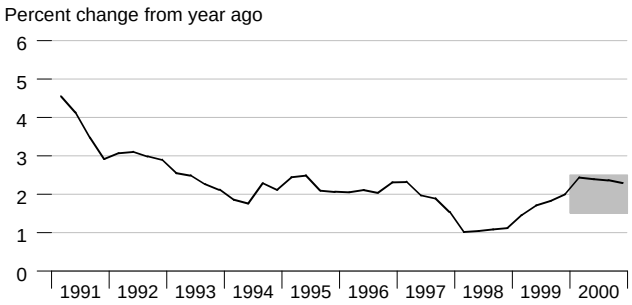


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Actual and Potential Real GDP

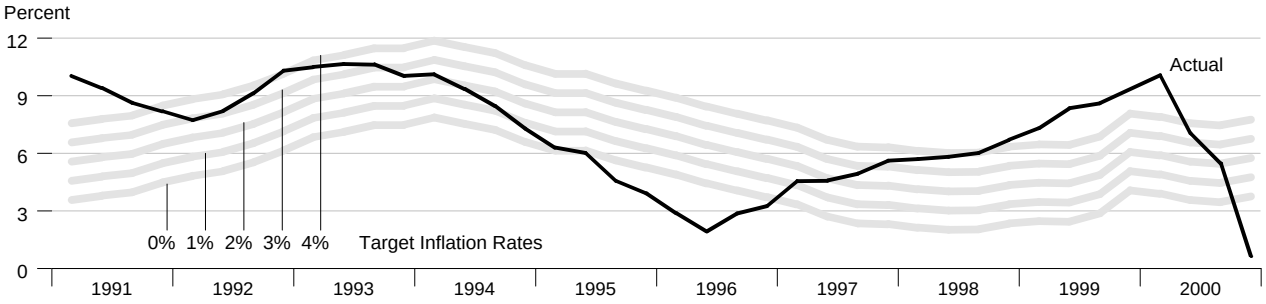


PCE Inflation and Projections



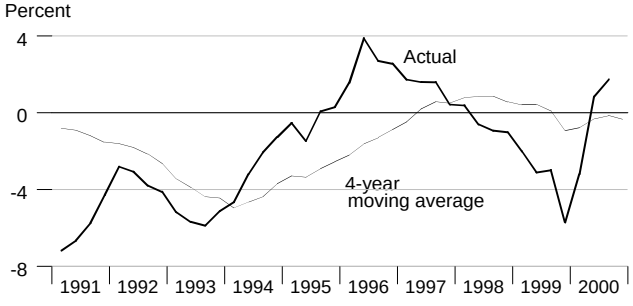
The shaded region shows the range of projections published in the Monetary Policy Report to Congress. See page 19 for information.

Monetary Base Growth* and Inflation Targets

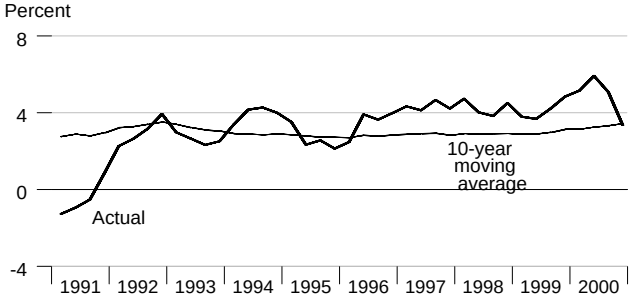


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

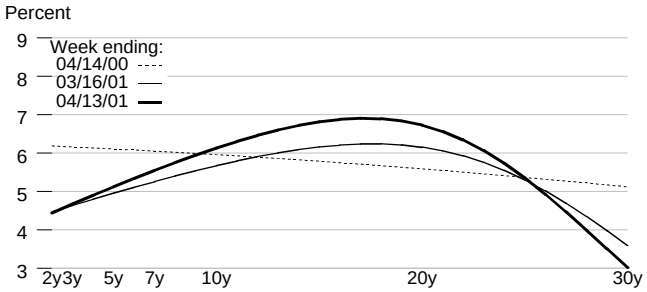
Monetary Base Velocity Growth



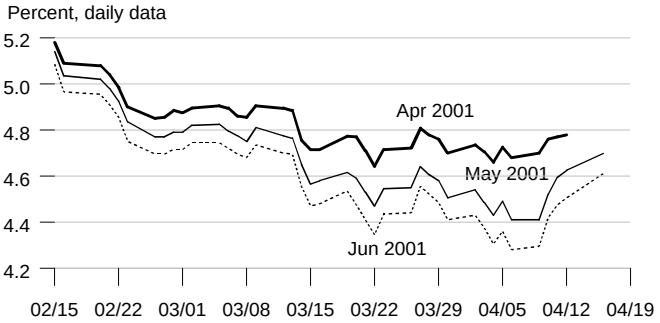
Real Output Growth



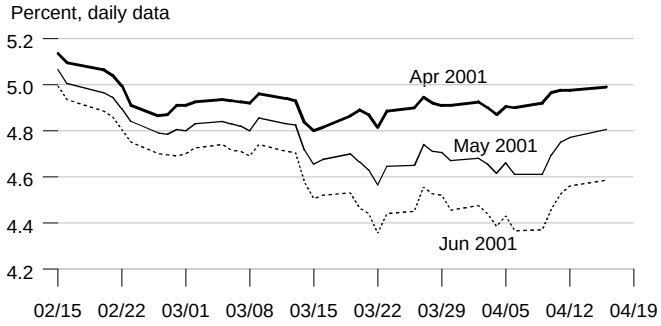
Implied One-Year Forward Rates



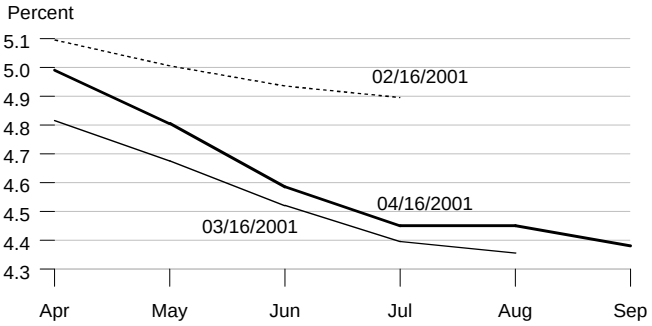
Rates on 3-Month Eurodollar Futures



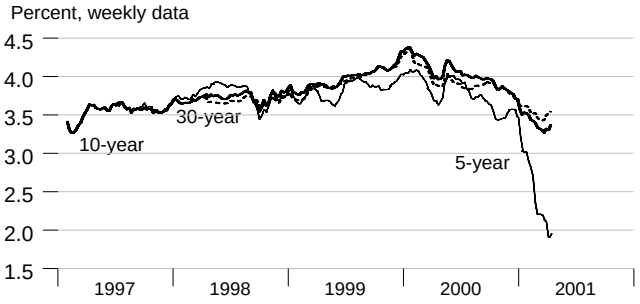
Rates on Selected Fed Funds Futures Contracts



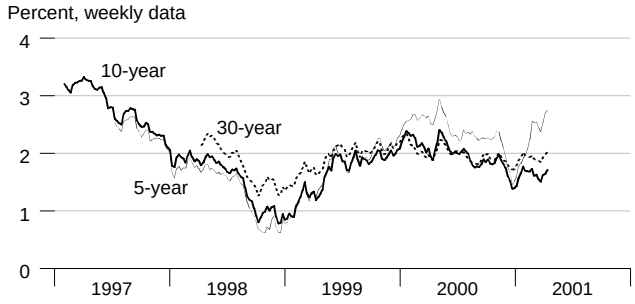
Implied Yields on Fed Funds Futures



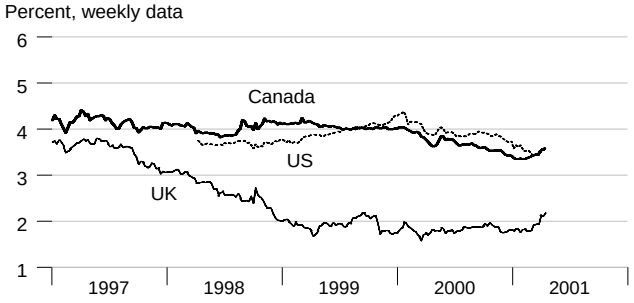
Inflation-Protected Treasury Yields



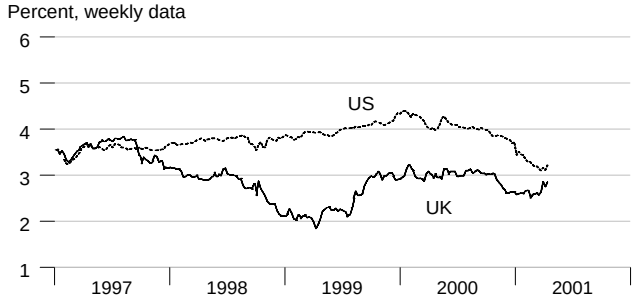
Inflation-Protected Treasury Yield Spreads



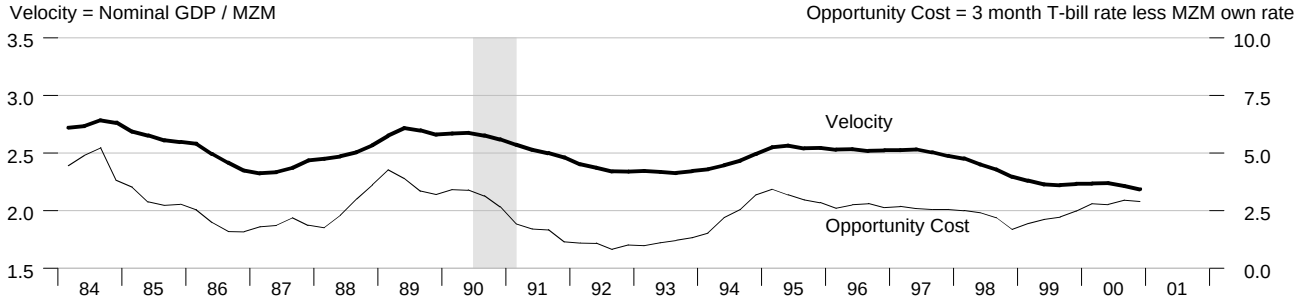
Inflation-Indexed 30-Year Bonds



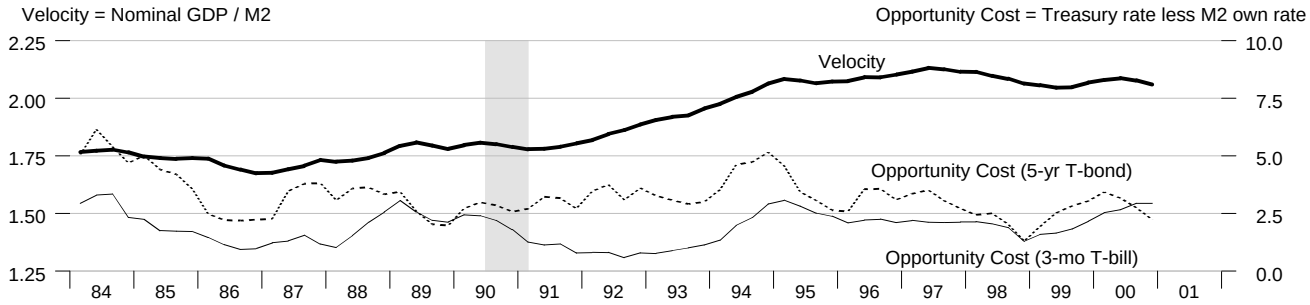
Inflation-Indexed 10-Year Bonds



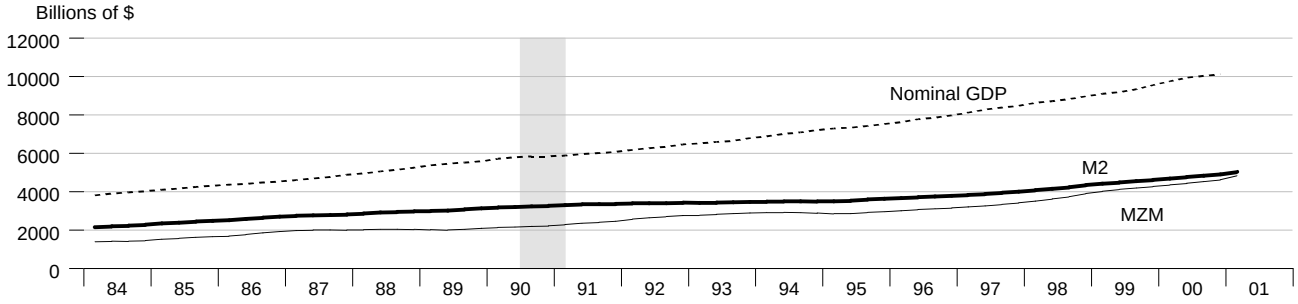
MZM Velocity and Opportunity Cost



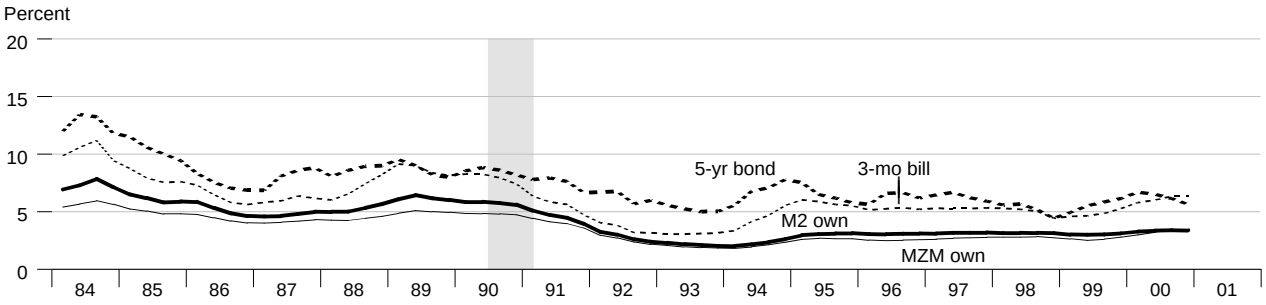
M2 Velocity and Opportunity Cost



M2, MZM and Nominal GDP

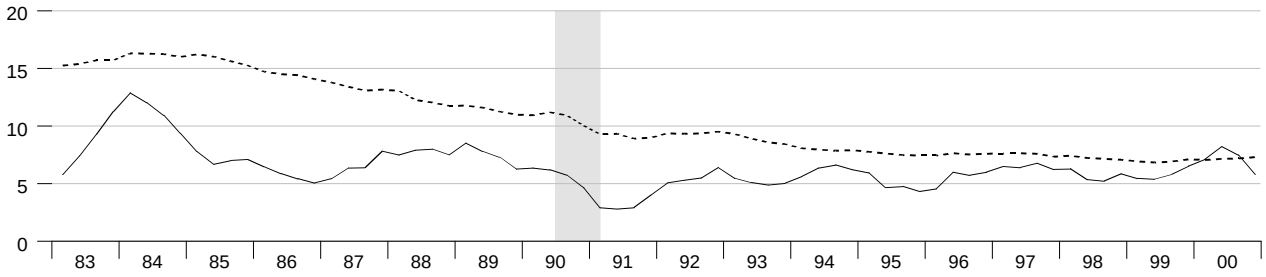


Interest Rates



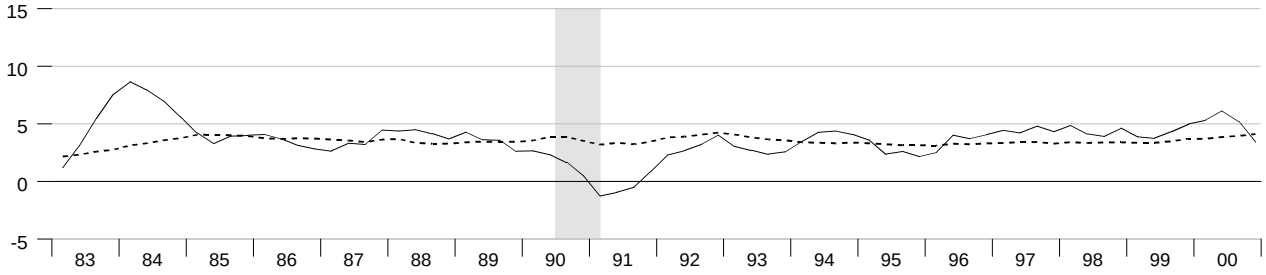
Gross Domestic Product

Percent change from year ago



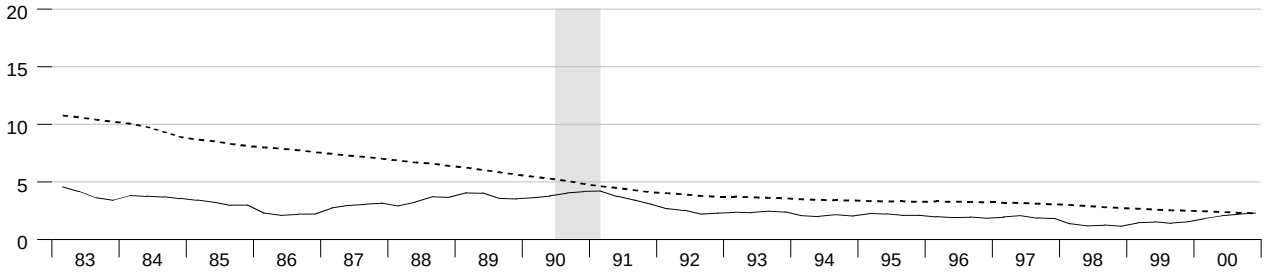
Real Gross Domestic Product

Percent change from year ago



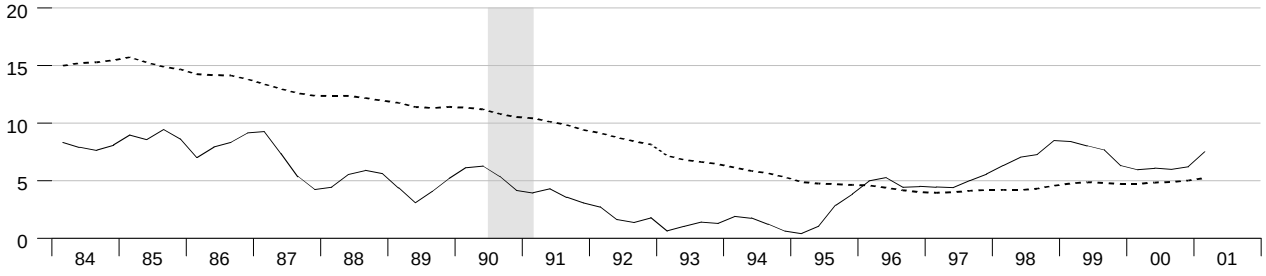
Gross Domestic Product Price Index

Percent change from year ago



M2

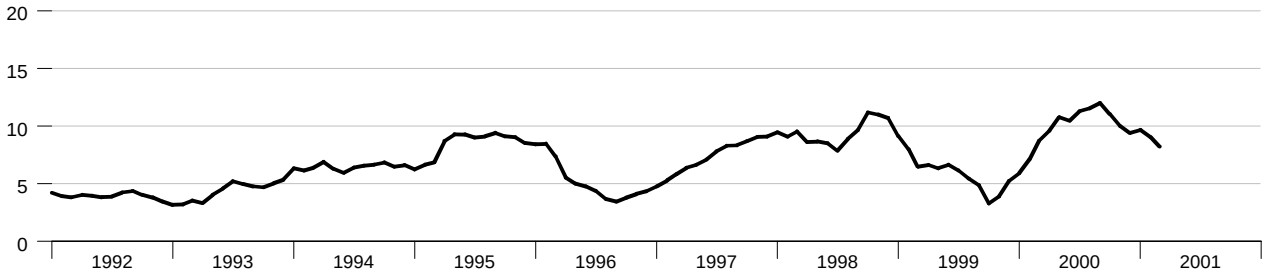
Percent change from year ago



Dashed lines indicate 10-year moving averages

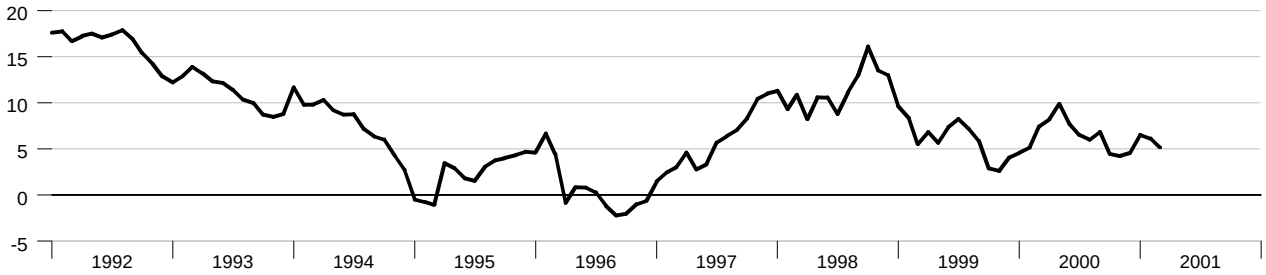
Bank Credit

Percent change from year ago



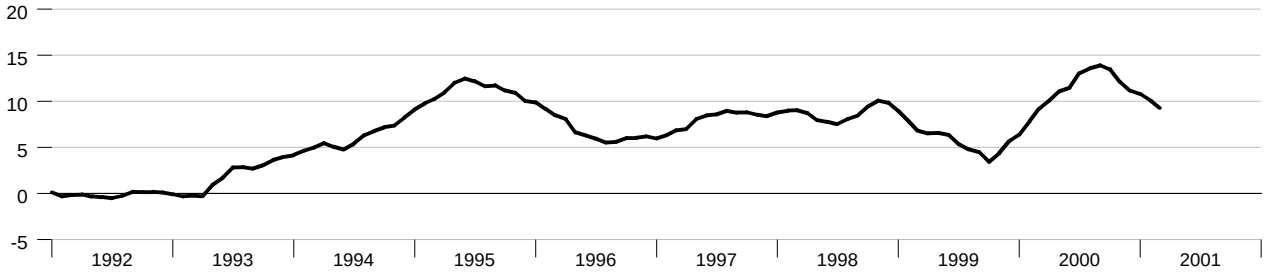
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



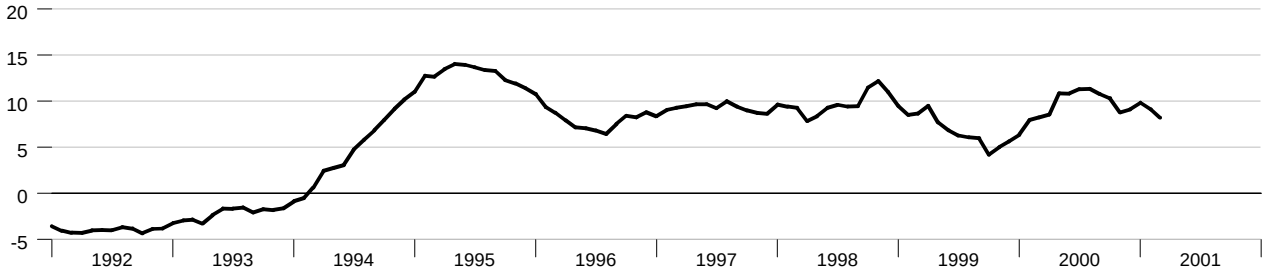
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

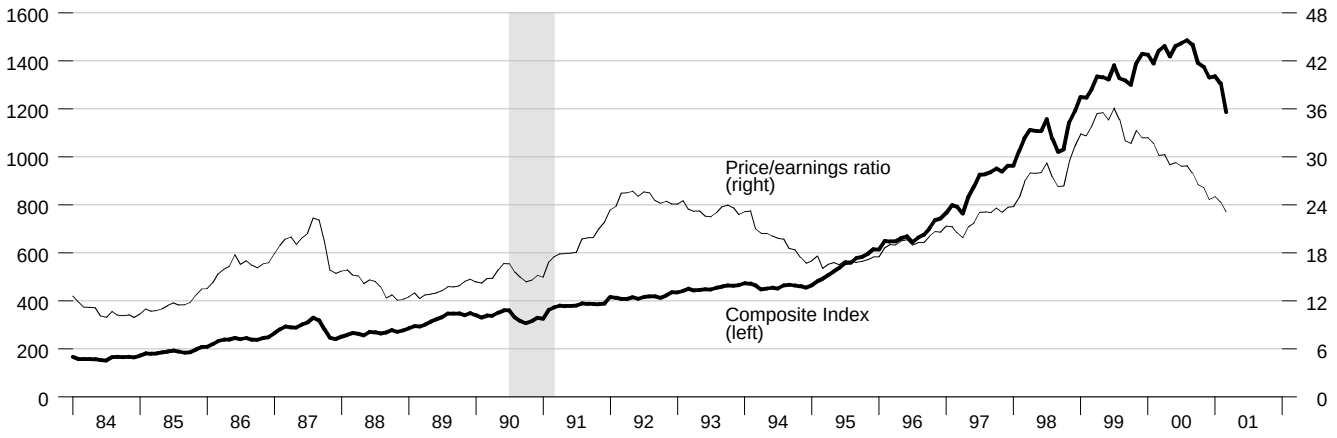


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



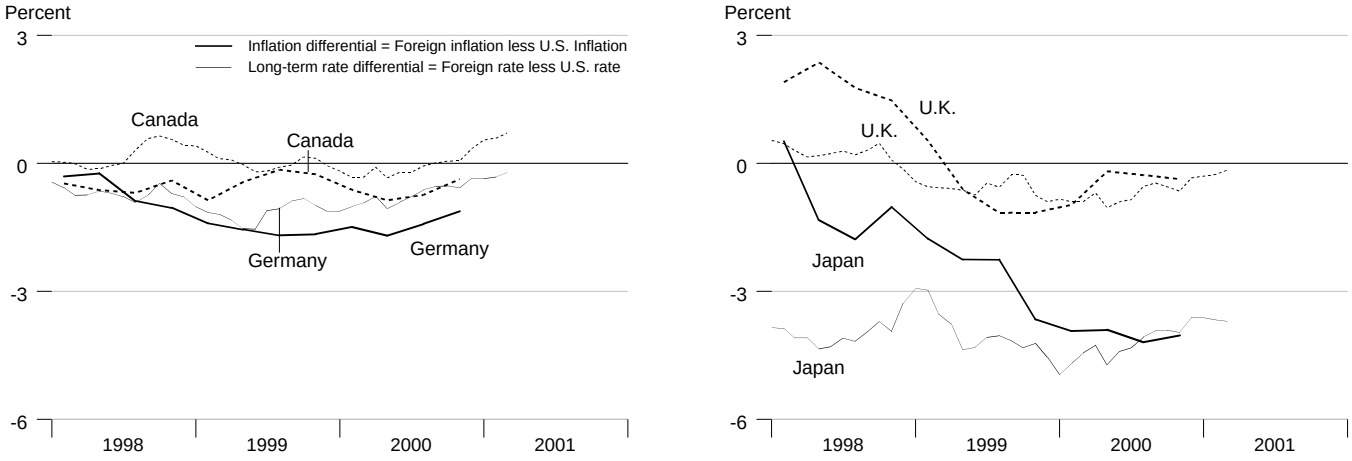
Standard and Poor's 500



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	Dec00	Jan01	Feb01	Mar01
United States	3.31	3.47	3.44	3.41	5.24	5.16	5.10	4.89
Canada	2.45	2.73	3.08	.	5.58	5.71	5.69	5.60
France	1.49	1.89	1.89	.	5.55	5.48	5.60	.
Germany	1.62	2.05	2.32	.	4.89	4.80	4.78	4.67
Italy	2.50	2.63	2.67	2.89	5.30	5.19	5.19	5.13
Japan	-0.59	-0.72	-0.59	.	1.62	1.54	1.43	1.19
United Kingdom	3.13	3.20	3.07	.	4.90	4.86	4.84	4.73

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	3685.392	455.572	73.952	217.848
	1997	1069.145	3315.632	3921.118	5203.986	3953.659	478.708	69.523	227.067
	1998	1079.795	3703.061	4207.085	5738.854	4326.750	508.942	67.808	242.237
	1999	1101.546	4160.720	4526.378	6251.498	4584.569	557.864	72.359	258.556
	2000	1104.054	4492.450	4800.881	6830.527	5034.983	590.823	68.271	
1999	1	1098.625	4029.042	4427.907	6094.274	4517.162	536.334	68.521	253.370
	2	1102.740	4126.072	4493.084	6189.352	4528.032	545.912	67.392	257.003
	3	1095.559	4205.053	4560.659	6279.848	4585.468	557.969	69.050	260.280
	4	1109.259	4282.714	4623.862	6442.520	4707.614	591.242	84.473	263.570
2000	1	1114.900	4364.451	4691.482	6614.255	4844.321	593.096	72.385	267.157
	2	1109.873	4444.384	4766.544	6762.464	4993.155	586.041	67.093	270.860
	3	1099.791	4534.339	4833.999	6911.455	5117.703	589.062	66.577	
	4	1091.651	4626.625	4911.498	7033.932	5184.752	595.094	67.029	
2001	1	1104.543	4841.871	5043.930	7260.485	5278.678	604.767	66.802	
1999	Mar	1102.242	4055.074	4444.993	6116.479	4495.963	539.053	67.195	254.390
	Apr	1107.502	4092.708	4468.843	6152.143	4509.209	539.608	64.898	255.900
	May	1100.945	4127.672	4494.313	6190.026	4519.567	548.331	69.334	257.070
	Jun	1099.774	4157.835	4516.095	6225.888	4555.321	549.796	67.944	258.040
	Jul	1097.526	4184.062	4543.190	6256.907	4556.390	553.060	67.879	259.220
	Aug	1095.763	4208.119	4561.128	6278.320	4585.978	556.711	68.158	260.240
	Sep	1093.388	4222.979	4577.659	6304.316	4614.035	564.135	71.113	261.380
	Oct	1096.442	4248.874	4598.039	6357.737	4643.503	572.989	73.928	262.320
	Nov	1107.078	4282.995	4623.578	6443.019	4704.673	588.669	84.017	263.420
	Dec	1124.256	4316.274	4649.968	6526.803	4774.667	612.068	95.475	264.970
2000	Jan	1122.785	4343.580	4670.788	6568.493	4802.338	604.790	80.818	266.190
	Feb	1108.758	4353.617	4686.415	6601.636	4842.742	589.978	69.252	266.760
	Mar	1113.156	4396.156	4717.242	6672.635	4887.883	584.520	67.084	268.520
	Apr	1117.322	4430.015	4754.815	6724.143	4941.689	583.046	65.907	270.670
	May	1106.647	4441.155	4761.686	6756.421	5005.870	587.857	68.883	270.510
	Jun	1105.649	4461.981	4783.132	6806.829	5031.906	587.219	66.490	271.400
	Jul	1103.947	4495.367	4803.272	6855.253	5070.402	588.034	66.457	
	Aug	1099.681	4532.064	4833.422	6913.605	5114.814	588.446	66.674	
	Sep	1095.745	4575.586	4865.302	6965.508	5167.893	590.705	66.599	
	Oct	1096.126	4598.701	4887.051	6988.375	5156.133	593.067	66.589	
	Nov	1088.531	4616.707	4904.121	7015.134	5174.857	595.554	67.591	
	Dec	1090.297	4664.468	4943.323	7098.286	5223.267	596.661	66.907	
2001	Jan	1101.197	4741.512	4993.863	7193.170	5266.270	600.908	68.020	
	Feb	1101.206	4845.286	5038.380	7262.170	5280.326	607.157	66.889	
	Mar	1111.226	4938.815	5099.547	7326.114	5289.439	606.235	65.496	

*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		7.01
1999	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
	Mar	5.31	4.81	8.32	4.89	4.54	4.43	5.34	6.98		6.95

*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	7.97	6.06	9.26
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	2.02	1.42	2.20
	4	-0.74	2.04	1.60	1.77
2001	1	1.18	4.65	2.70	3.22
1999	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	0.75
	Jul	-0.15	0.75	0.42	0.71
	Aug	-0.39	0.82	0.63	0.85
	Sep	-0.36	0.96	0.66	0.75
	Oct	0.03	0.51	0.45	0.33
	Nov	-0.69	0.39	0.35	0.38
	Dec	0.16	1.03	0.80	1.19
2001	Jan	1.00	1.65	1.02	1.34
	Feb	0.00	2.19	0.89	0.96
	Mar	0.91	1.93	1.21	0.88

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.