

Monetary Trends



Are the Fed and Financial Markets in Sync?

The Federal Reserve has taken a number of steps in recent years to make monetary policy more transparent. For example, since 1994, the Federal Open Market Committee (FOMC) has announced its policy decisions, expressed as changes in the target federal funds rate, immediately upon making them. More recently, these announcements have included the Committee's current assessment of the risks of heightened inflation pressures or economic weakness over the foreseeable future. Also, since 1994, the FOMC has changed its funds rate target only twice between scheduled meetings, and the Committee has made it clear that changes between meetings will occur only in extraordinary circumstances. These disclosure and procedural changes suggest that the size and timing of Fed actions have probably become more predictable.

Evidence on the predictability of Fed actions can be gleaned from trading in the futures market for federal funds on FOMC meeting dates (or on the dates of any target changes between meetings). Large movements in the implied yields on federal funds contracts for the current or one month following an FOMC meeting would indicate that the FOMC's decision at that meeting had not been anticipated by market participants. Between January 1994 and June 2000, the average change in the market implied yield on one-month-ahead futures contracts on dates of FOMC meetings or actions was only 4 basis points (6 basis points on dates of target changes). The largest one-day change on such dates was just 13 basis points (on September 24, 1996). By contrast, the average target change during this period was 32.5 basis points in absolute value (ranging from 25 to 75 basis points). Thus, markets have anticipated FOMC target changes with a high degree of accuracy.

The absence of large changes in the implied funds rate in futures market trading on FOMC meeting dates has

been mirrored by a similar absence of large changes in the yields on Treasury securities on these dates. For example, the average absolute change in the yields of 3-month Treasury securities on dates of FOMC target changes between February 1994 and May 2000 (including the dates of the two target changes made between meetings) was just 7 basis points. Average changes in the yields of longer-term securities were similar.

Some researchers claim that the limited response of market interest rates to FOMC target changes indicates that the Fed merely adjusts its target to prior movements in market rates. William Poole and Robert Rasche, however, contend that the response is small because financial market participants correctly anticipate how the FOMC will react at its next meeting to information about the economy revealed before the meeting. Accordingly, markets adjust to new information about inflation, employment, and other factors that market participants believe will affect FOMC decisions. Poole and Rasche present regression evidence showing that market yields respond only to unanticipated movements in the FOMC target, as measured by FOMC meeting-day changes in the implied yields on one-month-ahead federal funds futures contracts.¹ In addition, for all FOMC meeting dates since 1994, including those at which the FOMC did not change its target, changes in the implied federal funds rate from the futures market and changes in the yields on Treasury securities are highly correlated (e.g., correlation coefficient of 0.66 for the three-month Treasury security). This indicates that market yield changes are larger, the less accurately market participants anticipate FOMC policy. Still, since 1994, FOMC actions generally have not taken markets by surprise—the Fed and financial markets apparently are in sync.

¹Poole, William and Robert H. Rasche. "Perfecting the Market's Knowledge of Monetary Policy," Federal Reserve Bank of St. Louis working paper 2000-010A, April 2000.

—David C. Wheelock



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

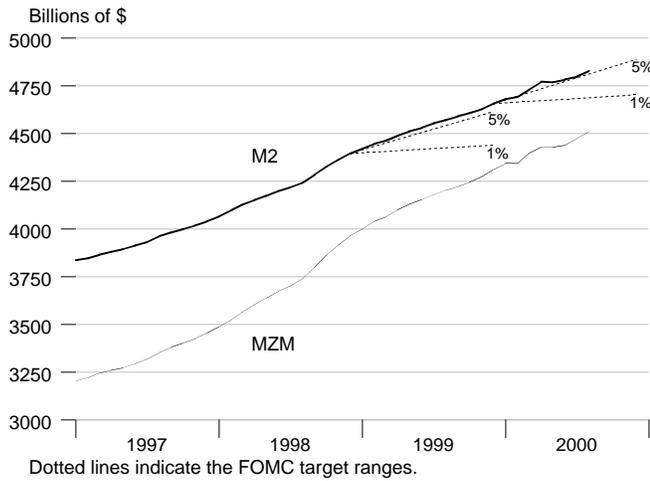
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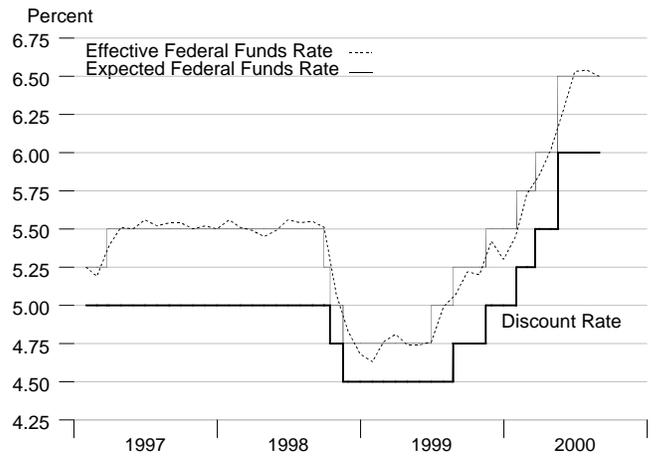
or to:

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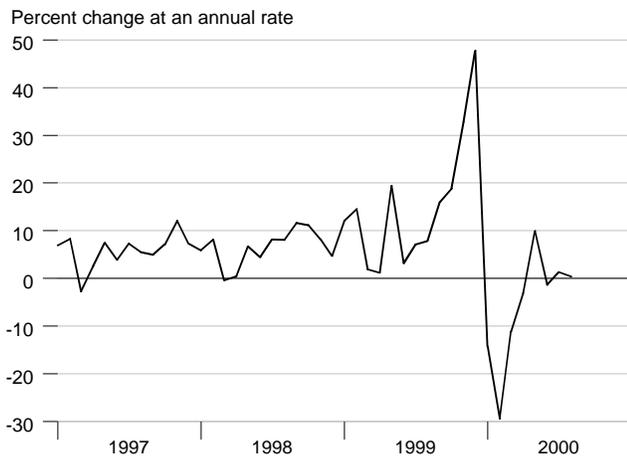
M2 and MZM



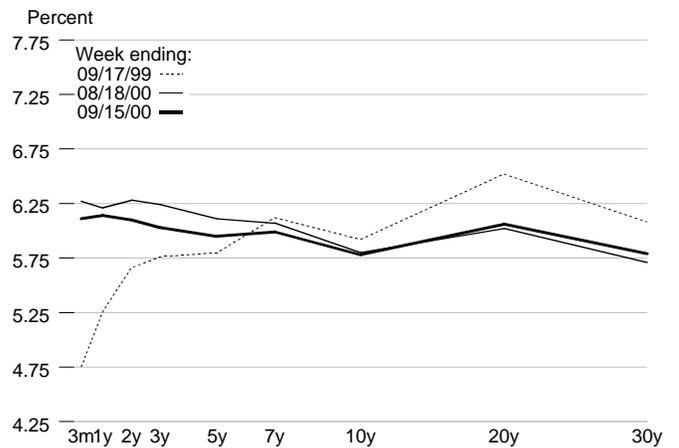
Reserve Market Rates



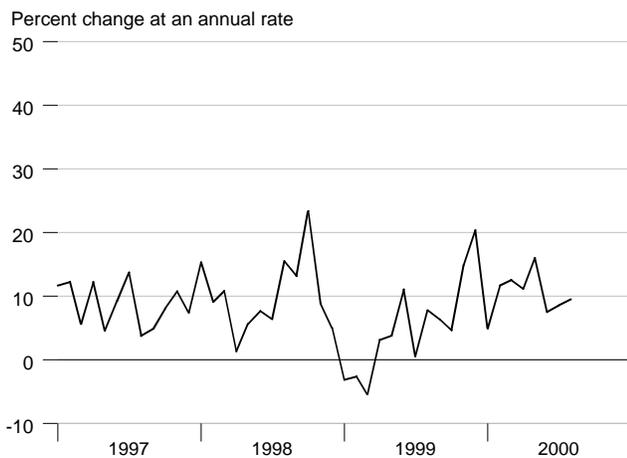
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

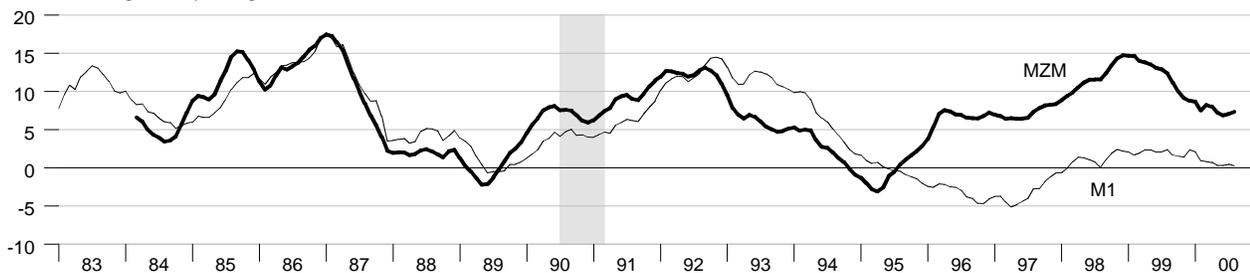


Interest Rates

	Jun 00	Jul 00	Aug 00
Federal Funds Rate	6.53	6.54	6.50
Discount Rate	6.00	6.00	6.00
Prime Rate	9.50	9.50	9.50
Conventional Mortgage Rate	8.29	8.15	8.03
Treasury Yields:			
3-month constant maturity	5.86	6.14	6.28
6-month constant maturity	6.24	6.27	6.35
1-year constant maturity	6.17	6.08	6.18
3-year constant maturity	6.43	6.28	6.17
5-year constant maturity	6.30	6.18	6.06
10-year constant maturity	6.10	6.05	5.83
30-year constant maturity	5.93	5.85	5.72

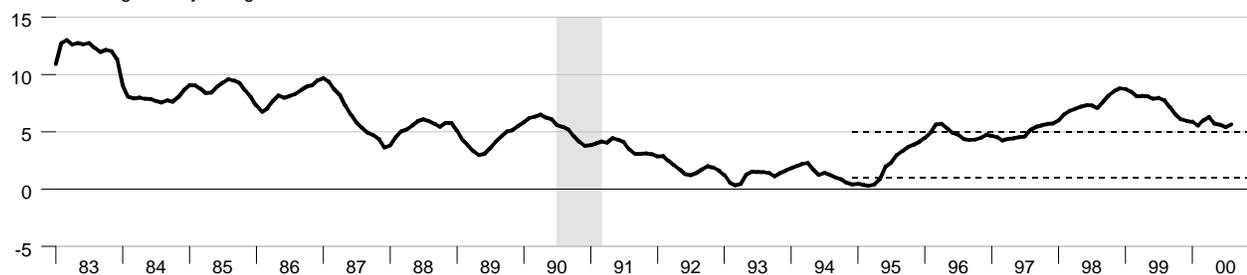
MZM and M1

Percent change from year ago



M2

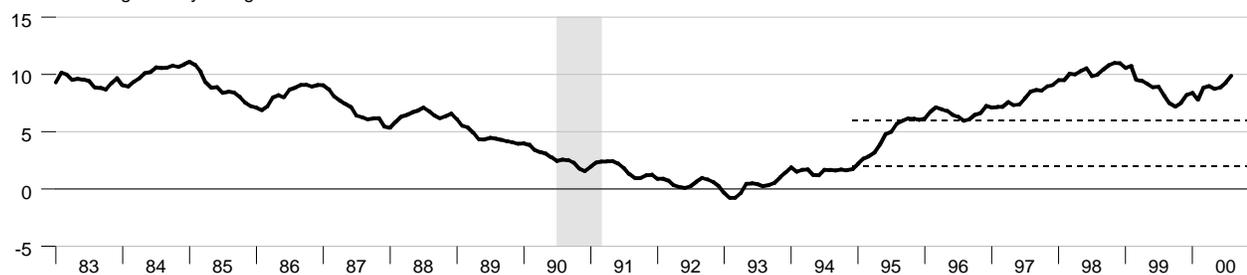
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

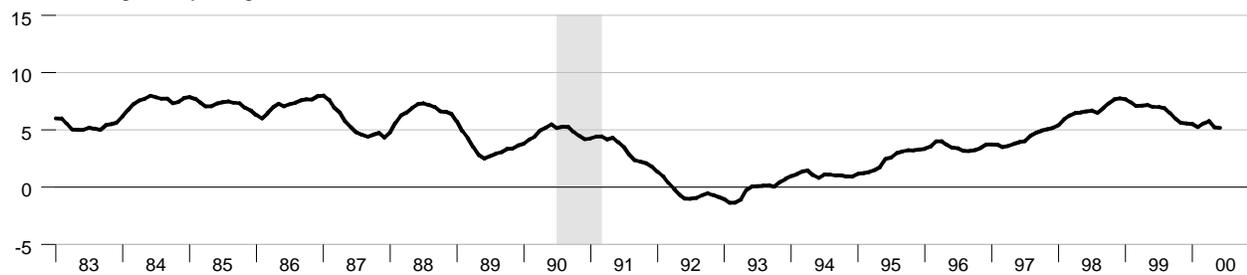
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

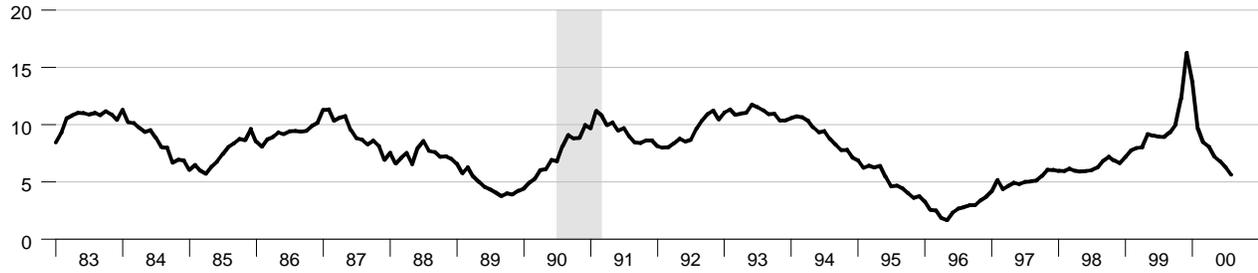
Monetary Services Index - M2

Percent change from year ago



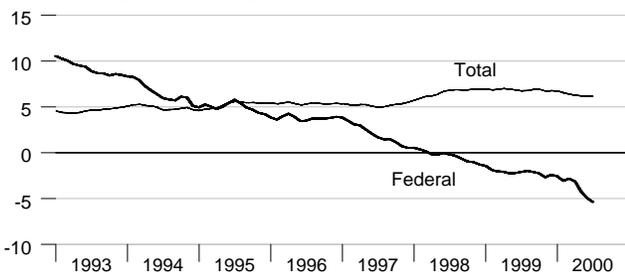
Adjusted Monetary Base

Percent change from year ago



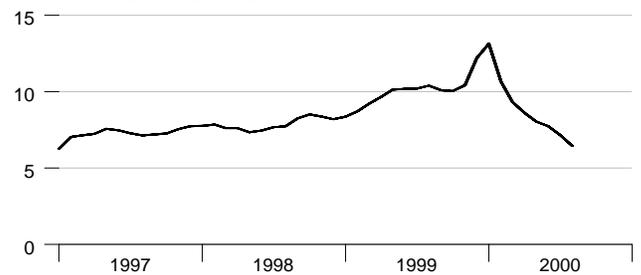
Domestic Nonfinancial Debt

Percent change from year ago



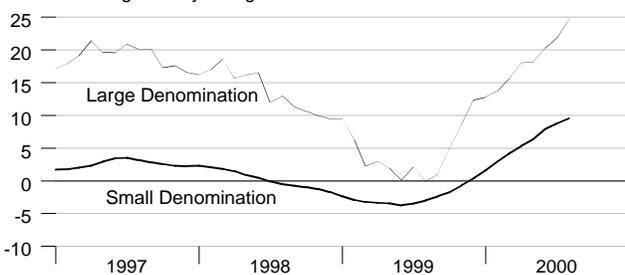
Currency Held by the Nonbank Public

Percent change from year ago



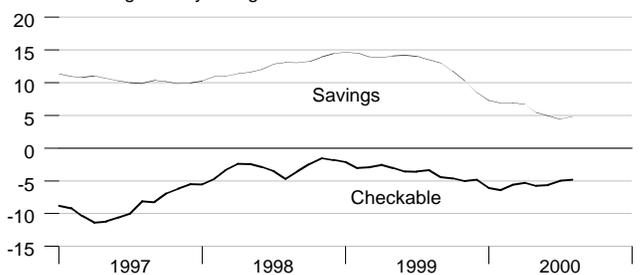
Time Deposits

Percent change from year ago



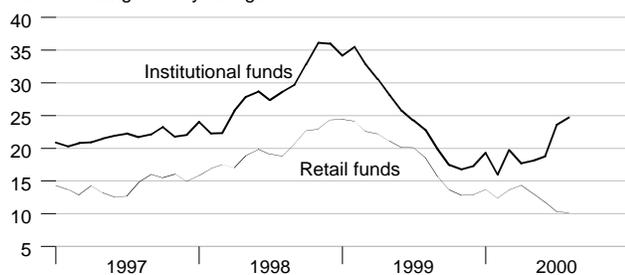
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

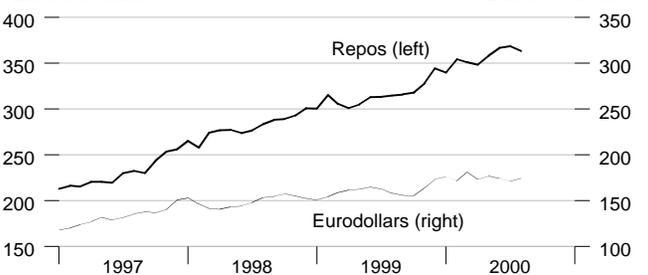
Percent change from year ago



Repurchase Agreements and Eurodollars

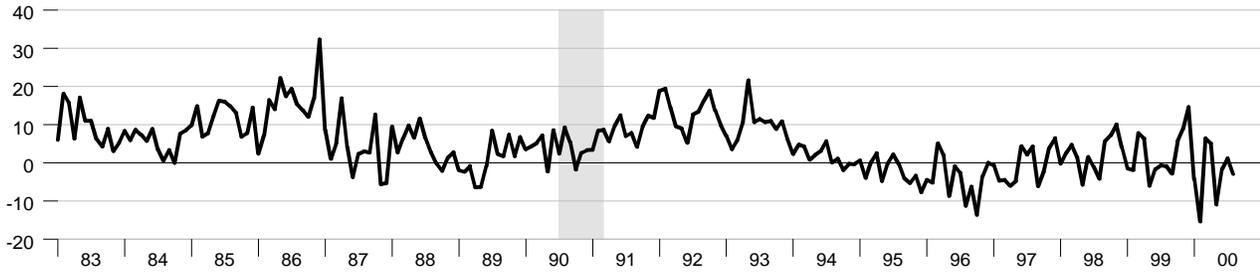
Billions of dollars

Billions of dollars



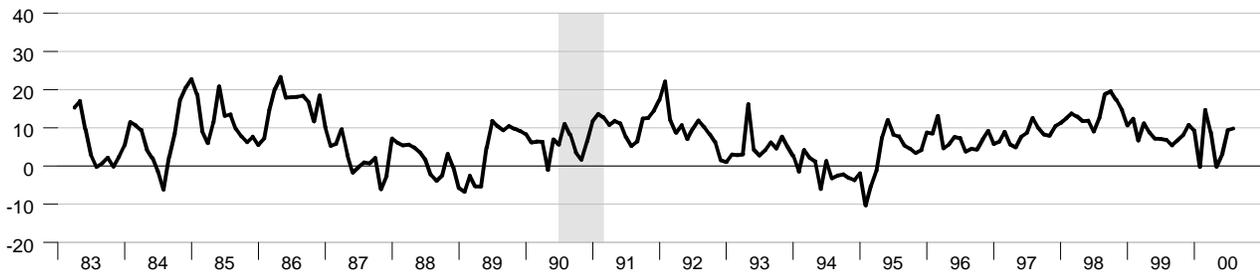
M1

Percent change at an annual rate



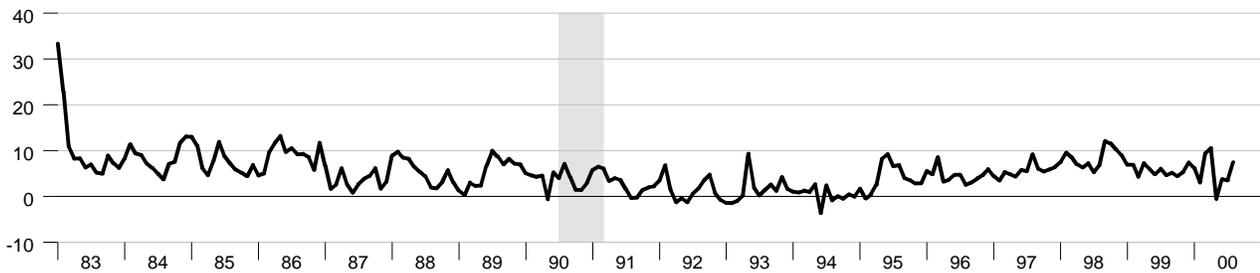
MZM

Percent change at an annual rate



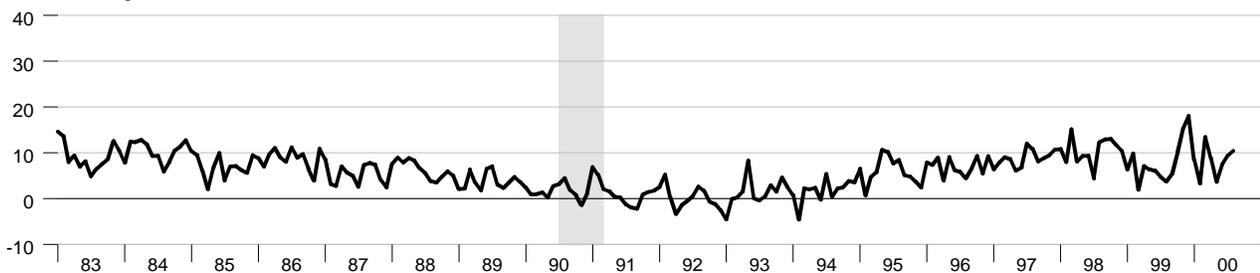
M2

Percent change at an annual rate

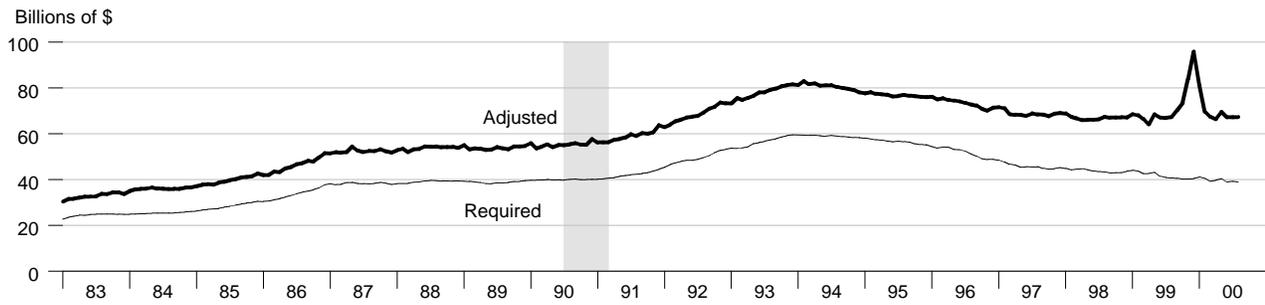


M3

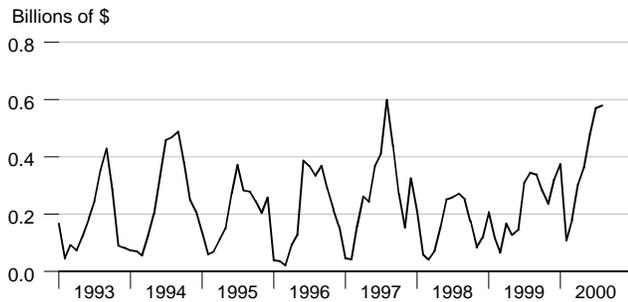
Percent change at an annual rate



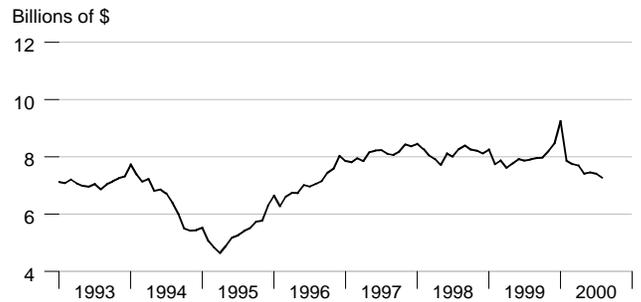
Adjusted and Required Reserves



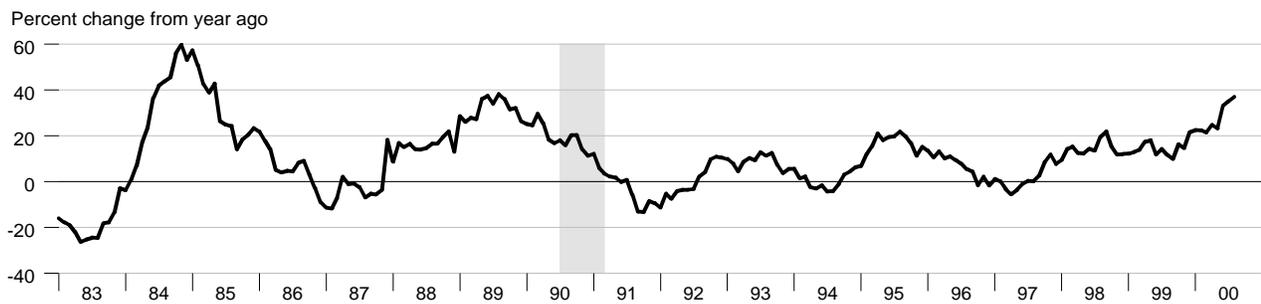
Total Borrowings, nsa



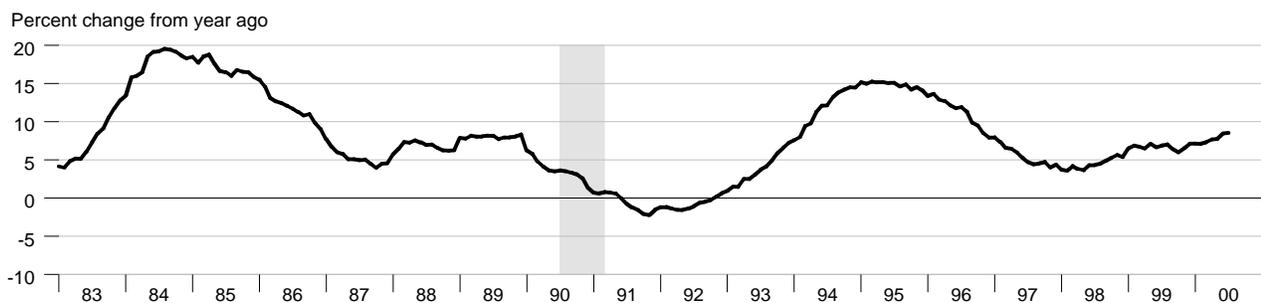
Excess Reserves plus RCB Contracts



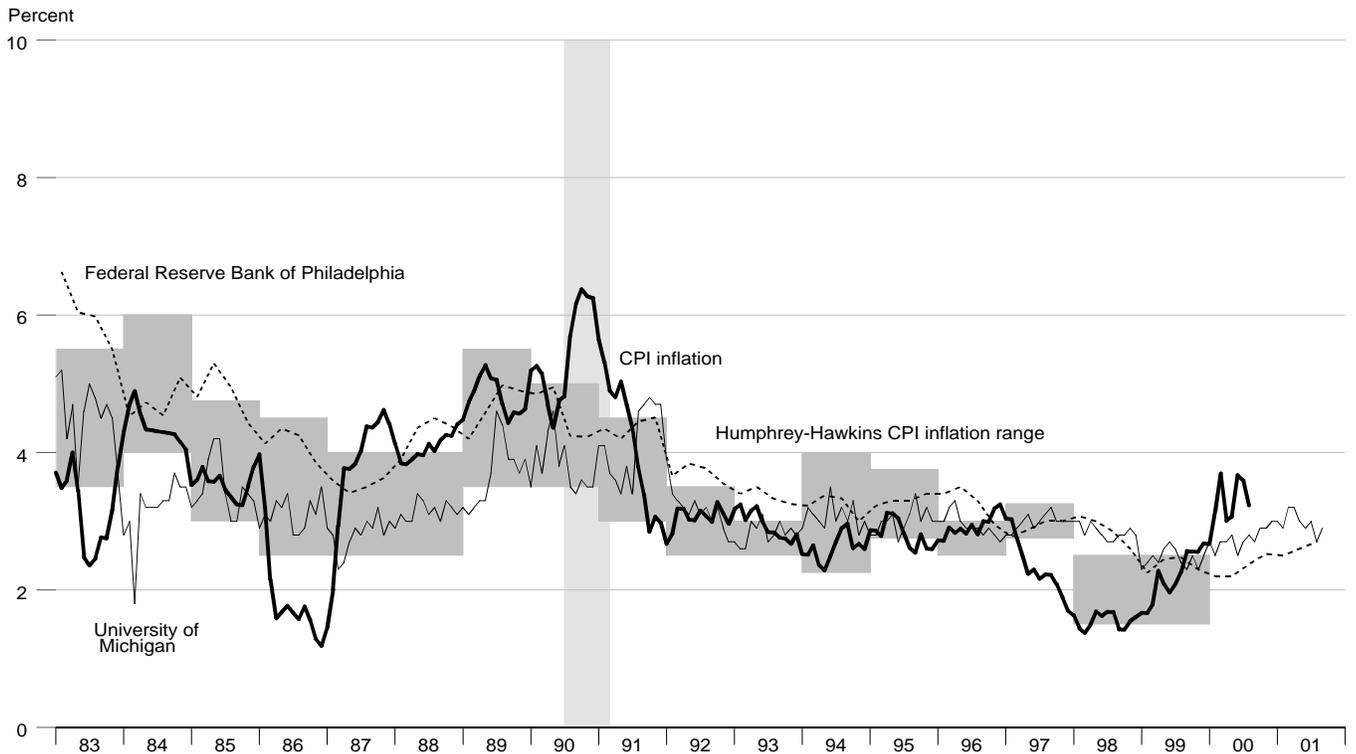
Nonfinancial Commercial Paper



Consumer Credit

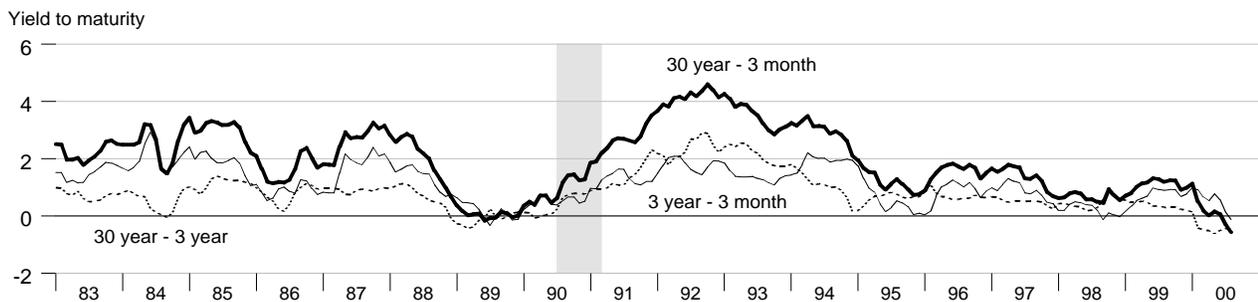


Inflation and Inflation Expectations

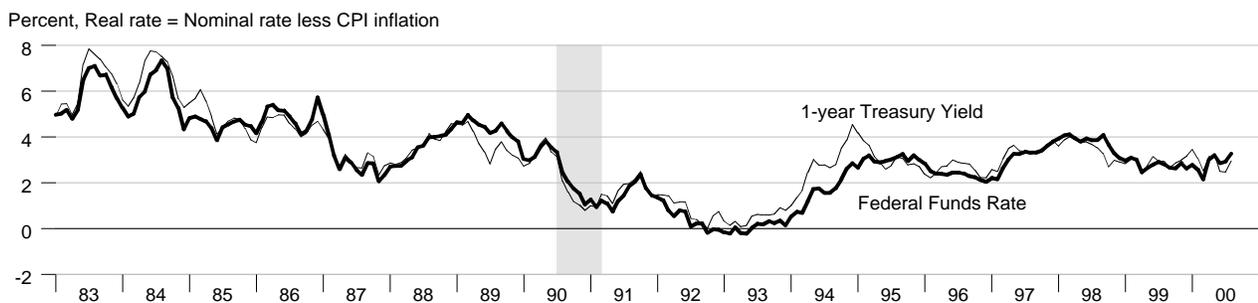


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

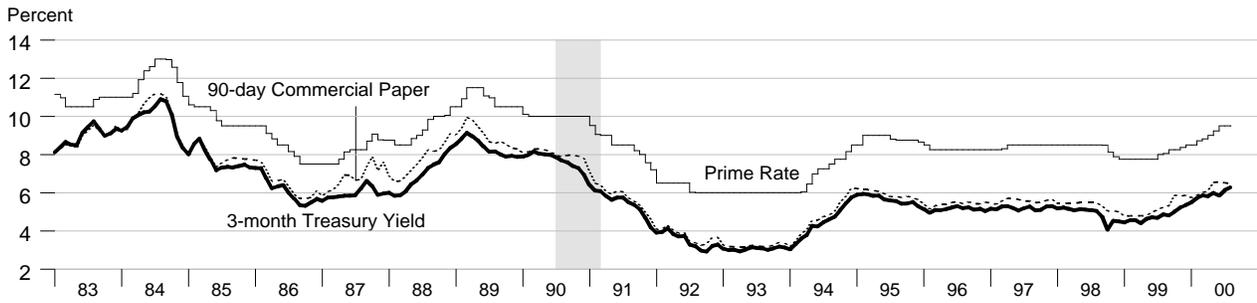
Treasury Security Yield Spreads



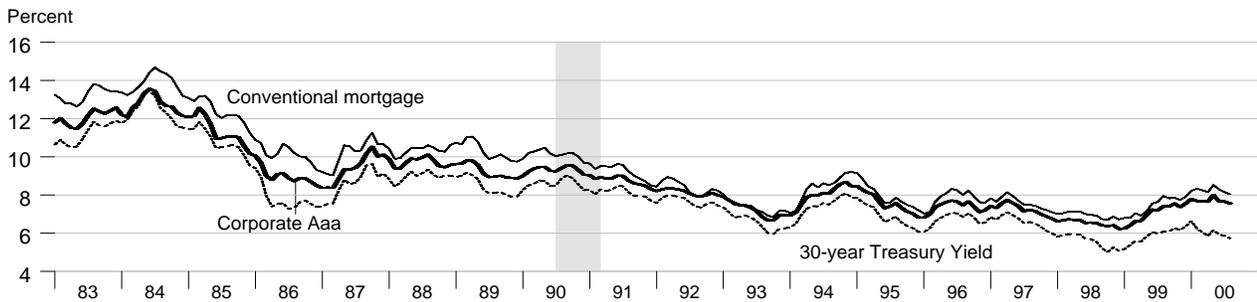
Real Interest Rates



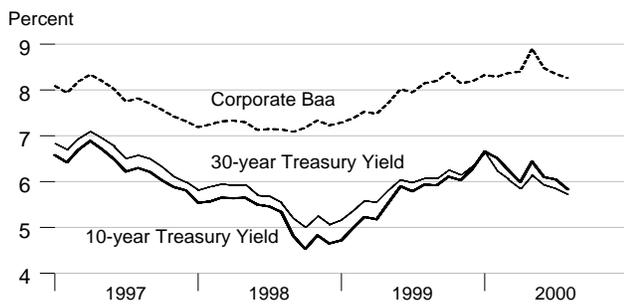
Short Term Interest Rates



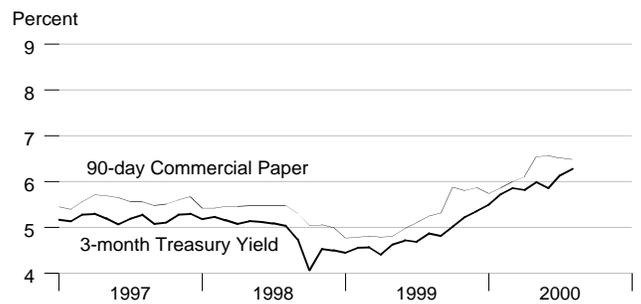
Long Term Interest Rates



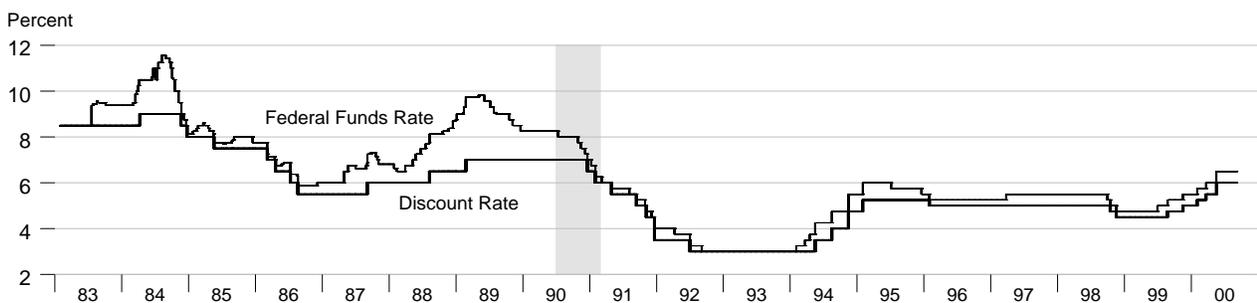
Long Term Interest Rates



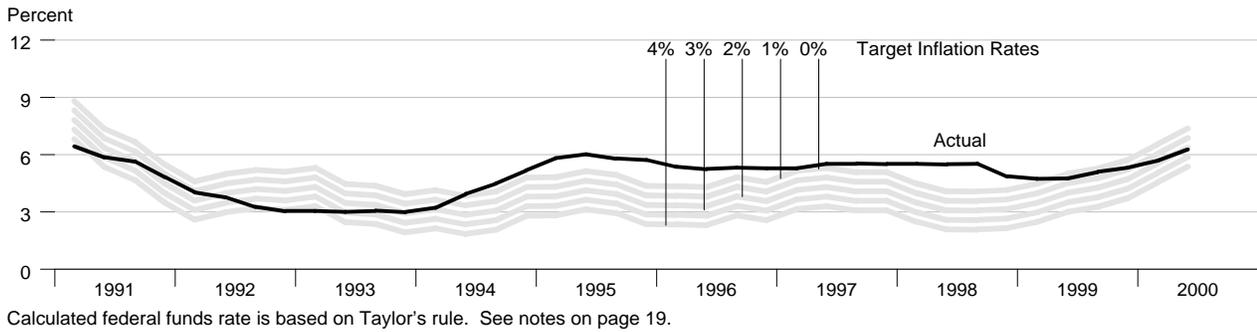
Short Term Interest Rates



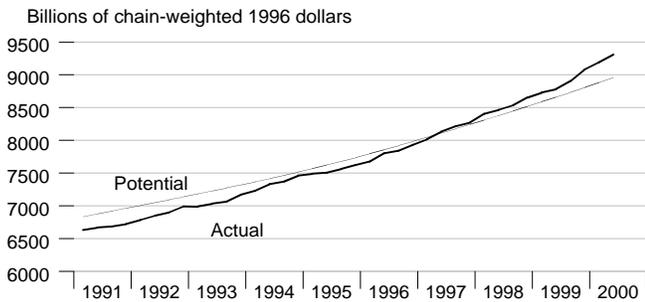
FOMC Expected Federal Funds Rate and Discount Rate



Federal Funds Rate and Inflation Targets



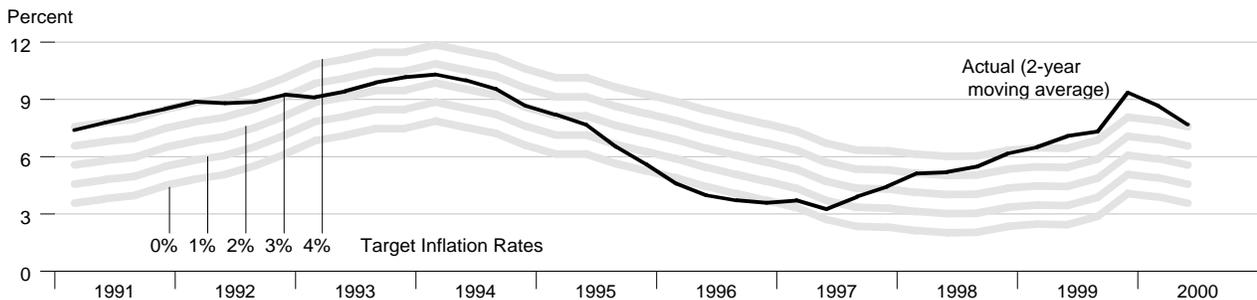
Actual and Potential Real GDP



PCE Inflation

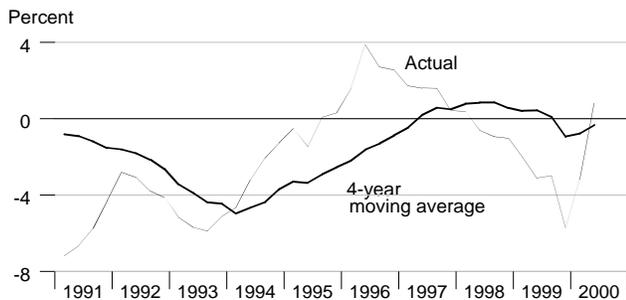


Monetary Base Growth* and Inflation Targets

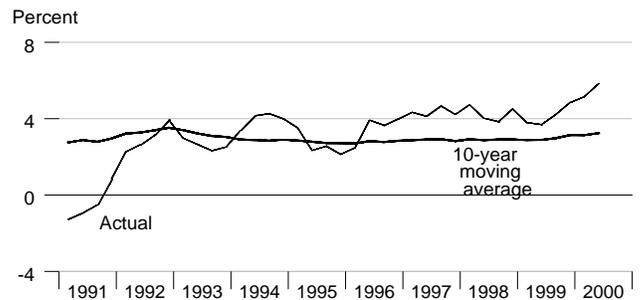


*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. See notes on page 19.

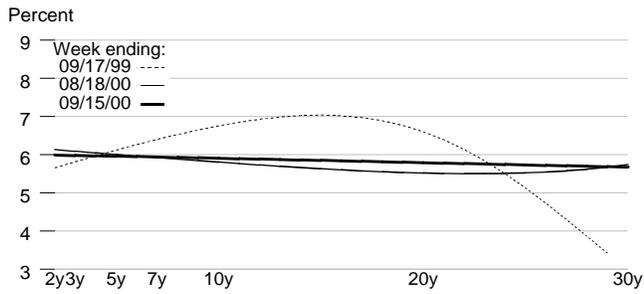
Monetary Base Velocity Growth



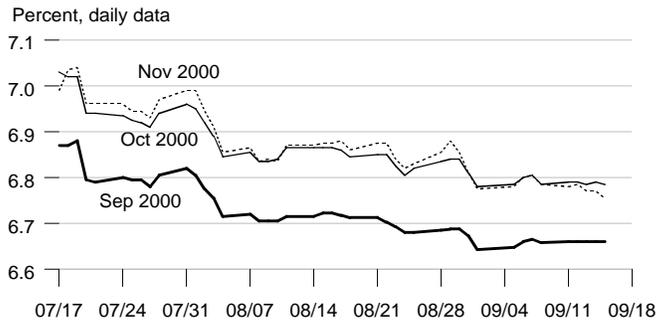
Real Output Growth



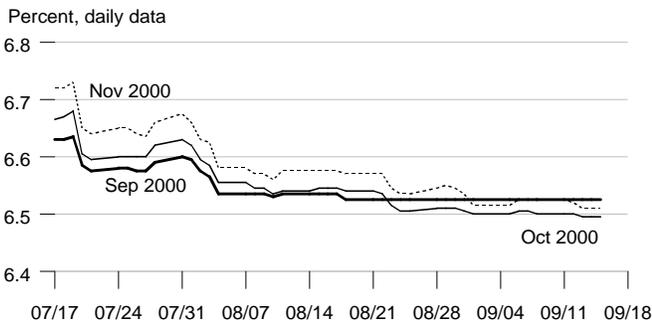
Implied One-Year Forward Rates



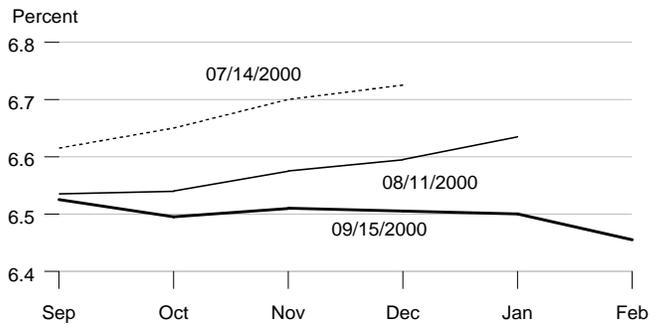
Rates on 3-Month Eurodollar Futures



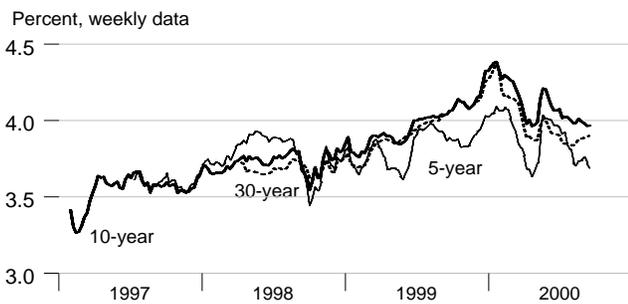
Rates on Selected Fed Funds Futures Contracts



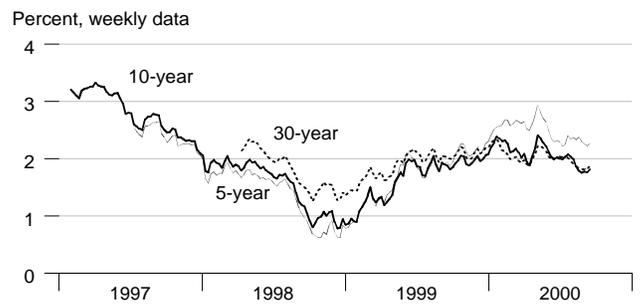
Implied Yields on Fed Funds Futures



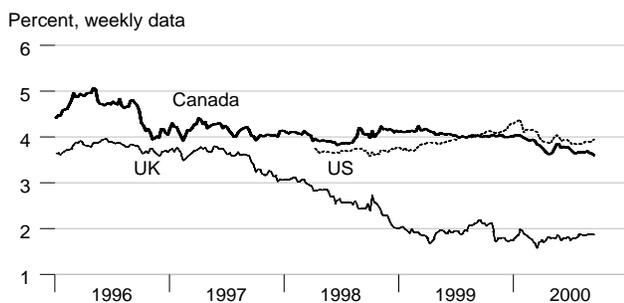
Inflation-Protected Treasury Yields



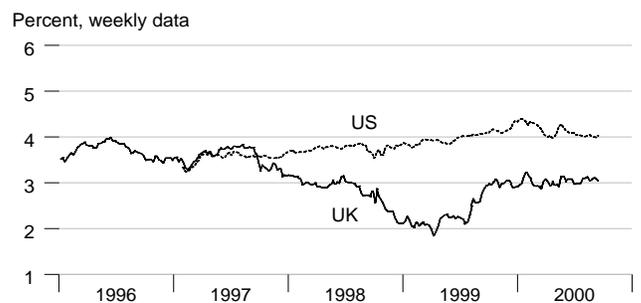
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds



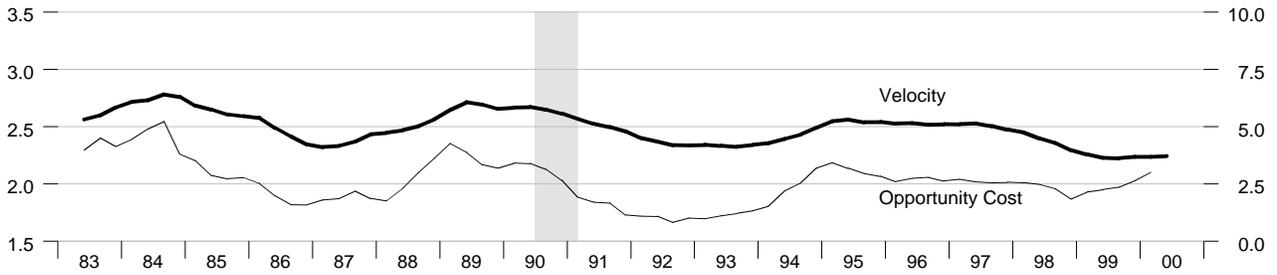
Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

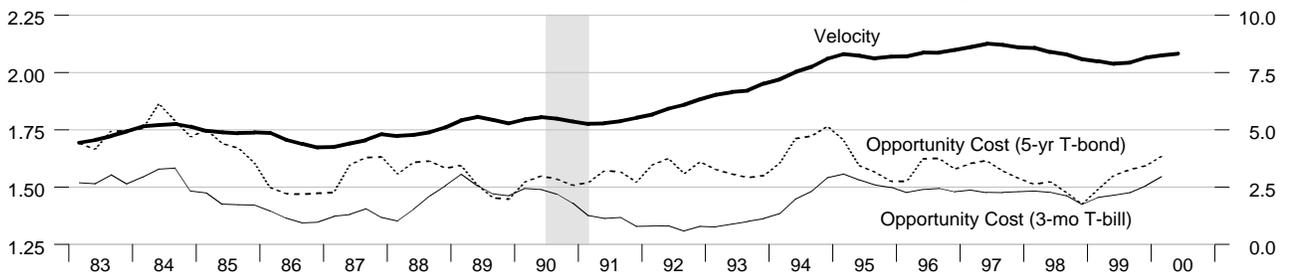
Opportunity Cost = 3 month T-bill rate less MZM own rate



M2 Velocity and Opportunity Cost

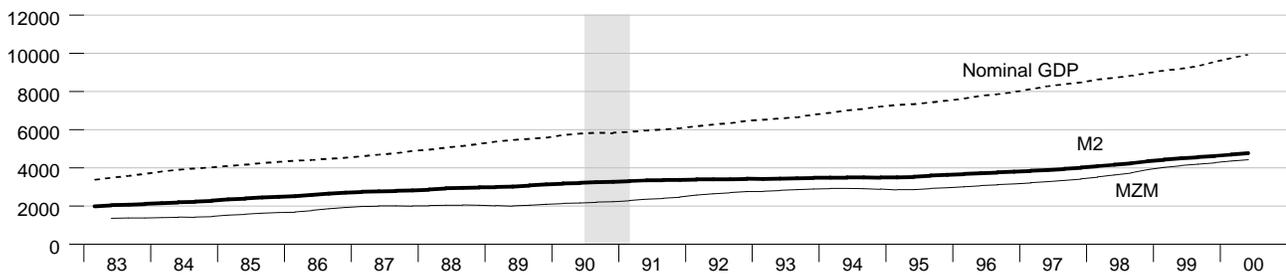
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



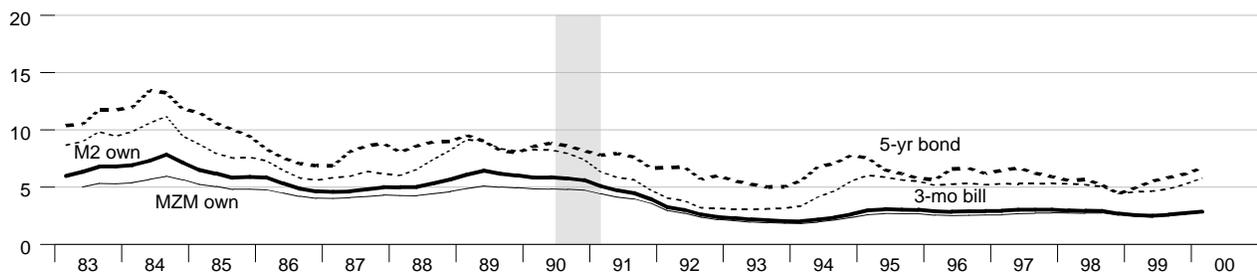
M2, MZM and Nominal GDP

Billions of \$



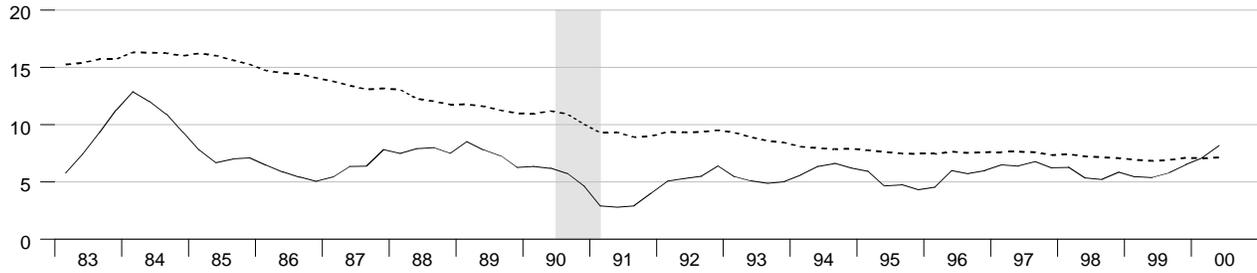
Interest Rates

Percent



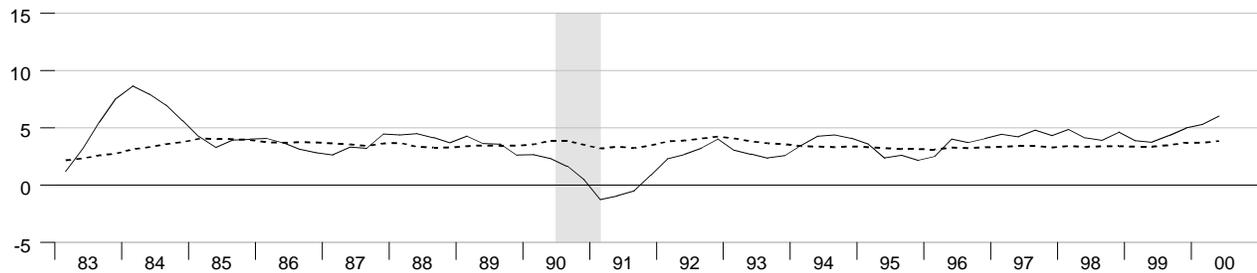
Gross Domestic Product

Percent change from year ago



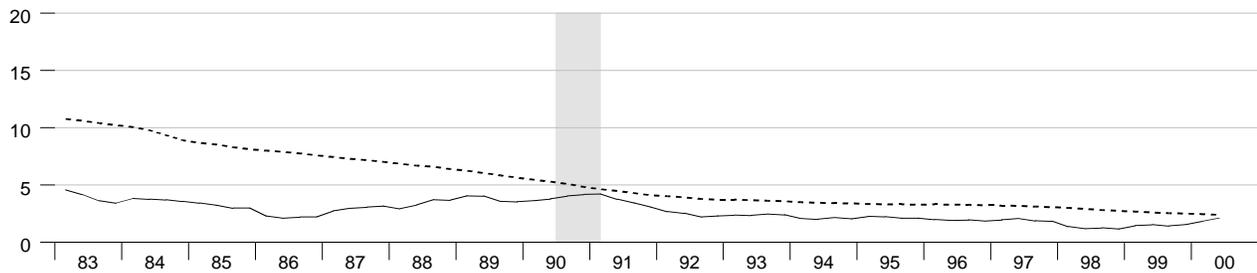
Real Gross Domestic Product

Percent change from year ago



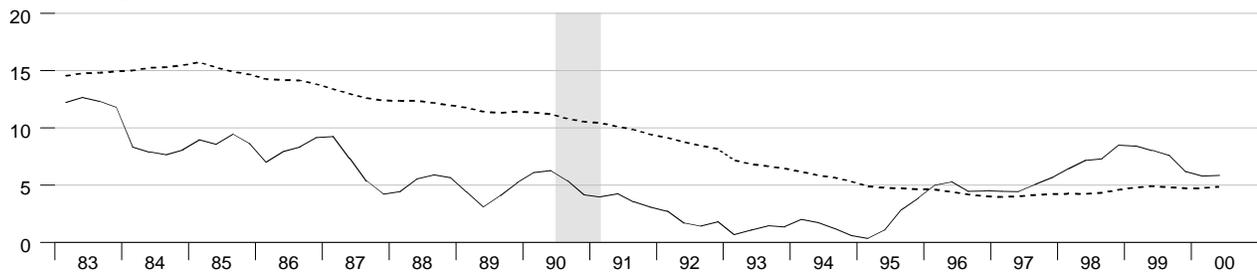
Gross Domestic Product Price Index

Percent change from year ago



M2

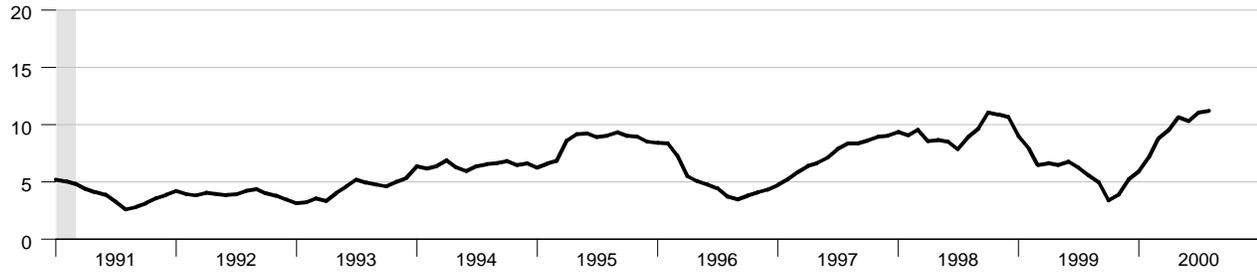
Percent change from year ago



Dashed lines indicate 10-year moving averages

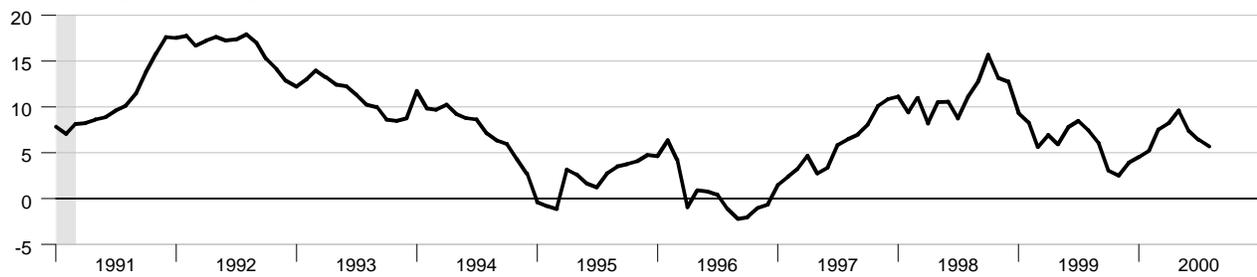
Bank Credit

Percent change from year ago



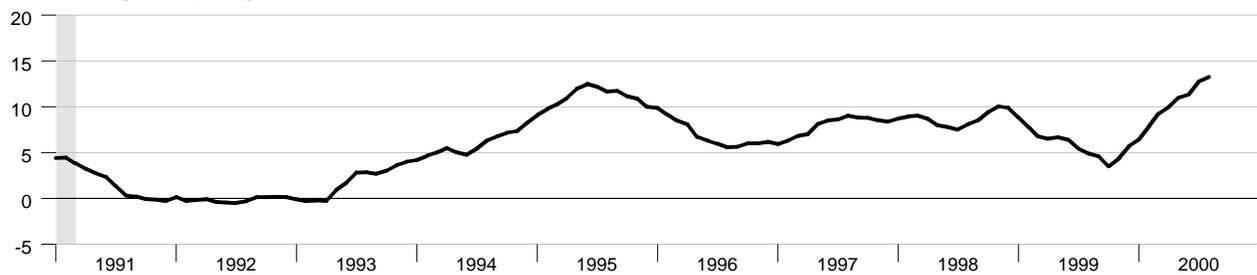
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



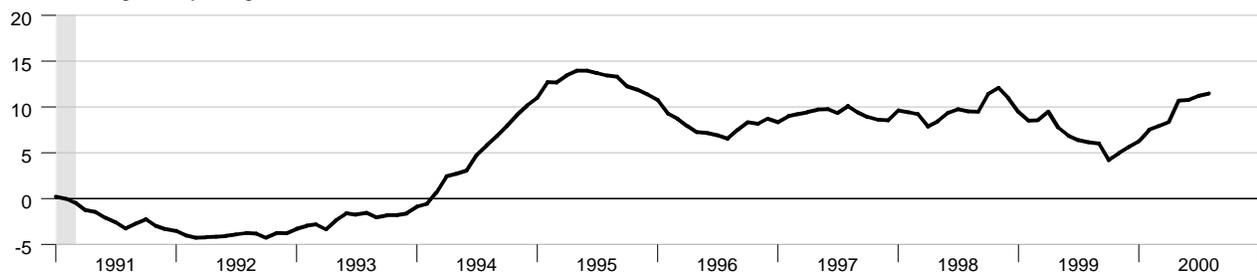
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

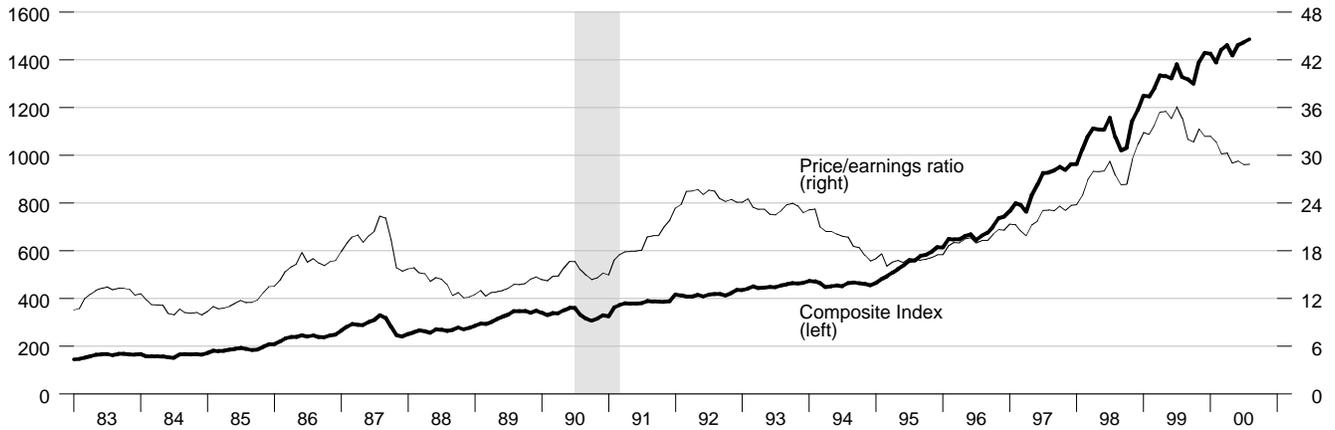


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



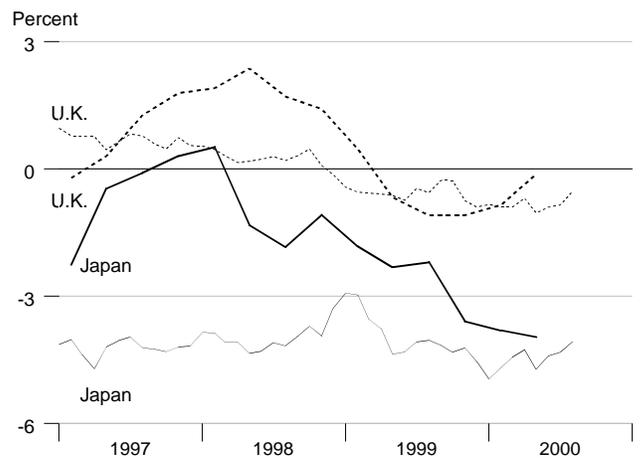
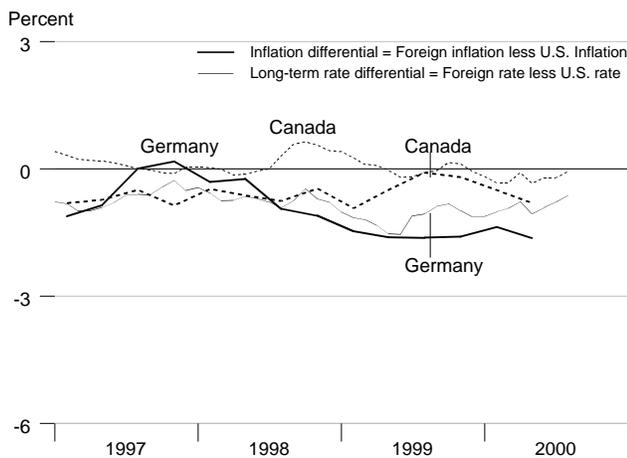
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1999Q3	1999Q4	2000Q1	2000Q2	May00	Jun00	Jul00	Aug00
United States	2.26	2.56	3.15	3.25	6.44	6.10	6.05	5.83
Canada	2.18	2.36	2.65	2.45	6.10	5.89	5.84	5.77
France	0.53	1.00	1.50	1.49	5.92	5.94	6.00	.
Germany	0.64	0.96	1.78	1.62	5.38	5.19	5.27	5.21
Italy	1.72	2.06	2.36	2.50	5.71	5.52	5.60	5.57
Japan	0.07	-1.04	-0.65	-0.72	1.72	1.69	1.73	1.76
United Kingdom	1.17	1.47	2.30	3.13	5.40	5.20	5.20	5.29

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1995		1143.038	2906.094	3574.276	4500.290	3500.537	443.499	76.838	210.451
1996		1106.430	3096.352	3746.144	4796.868	3683.551	455.572	73.401	217.848
1997		1069.929	3318.533	3930.302	5179.493	3951.666	478.708	68.873	227.067
1998		1080.846	3705.324	4219.954	5711.132	4323.367	508.942	66.925	242.237
1999		1102.372	4159.410	4538.465	6213.431	4582.979	557.864	71.674	258.556
1998	1	1076.722	3524.565	4096.845	5499.247	4185.111	498.320	67.645	235.943
	2	1078.669	3637.508	4174.504	5638.739	4247.767	502.020	66.044	239.950
	3	1076.068	3746.166	4247.544	5763.433	4348.130	511.546	66.905	243.733
	4	1091.926	3913.058	4360.922	5943.109	4512.460	523.881	67.105	249.320
1999	1	1097.202	4033.376	4442.672	6064.699	4510.934	536.335	67.691	253.370
	2	1102.976	4127.713	4509.954	6156.002	4529.121	545.912	66.526	257.003
	3	1098.086	4200.425	4570.898	6234.486	4591.487	557.968	68.111	260.280
	4	1111.223	4276.125	4630.335	6398.539	4700.372	591.241	84.366	263.570
2000	1	1111.267	4361.329	4700.581	6571.237	4840.176	593.096	72.685	267.157
	2	1107.827	4431.749	4774.498	6701.959	4989.187	586.037	67.690	270.860
1998	Aug	1073.126	3739.505	4241.323	5762.263	4350.706	511.031	67.371	243.440
	Sep	1078.211	3798.227	4284.059	5824.382	4398.452	515.990	67.036	245.490
	Oct	1084.673	3860.033	4325.422	5887.683	4484.106	520.806	67.058	247.530
	Nov	1093.735	3915.666	4362.357	5944.980	4517.177	524.379	67.182	249.420
	Dec	1097.371	3963.476	4394.986	5996.663	4536.097	526.458	67.074	251.010
1999	Jan	1095.975	3998.490	4420.384	6028.527	4524.253	531.761	68.517	252.260
	Feb	1094.273	4039.625	4445.809	6077.858	4514.451	538.190	68.067	253.460
	Mar	1101.359	4062.014	4461.823	6087.711	4494.099	539.053	66.488	254.390
	Apr	1107.196	4099.680	4488.771	6123.786	4505.790	539.608	64.109	255.900
	May	1101.658	4129.510	4511.396	6156.453	4519.986	548.331	68.423	257.070
	Jun	1100.074	4153.948	4529.695	6187.766	4561.587	549.796	67.045	258.040
	Jul	1099.464	4178.301	4552.514	6212.228	4563.668	553.060	66.880	259.220
	Aug	1098.687	4202.051	4570.218	6231.559	4593.251	556.711	67.248	260.240
	Sep	1096.107	4220.924	4589.961	6259.672	4617.542	564.134	70.206	261.380
	Oct	1101.279	4244.410	4607.093	6312.585	4635.459	572.989	73.419	262.320
	Nov	1109.459	4272.872	4627.687	6393.449	4693.032	588.668	83.916	263.420
	Dec	1122.930	4311.092	4656.226	6489.583	4772.624	612.067	95.764	264.970
2000	Jan	1118.851	4344.299	4680.276	6534.790	4792.239	604.790	81.107	266.190
	Feb	1104.534	4343.366	4692.276	6552.801	4838.841	589.979	69.561	266.760
	Mar	1110.415	4396.321	4729.191	6626.119	4889.448	584.520	67.387	268.520
	Apr	1115.101	4428.533	4770.837	6674.592	4934.897	583.047	66.401	270.670
	May	1104.959	4427.719	4768.833	6694.903	5000.682	587.857	69.490	270.510
	Jun	1103.422	4438.995	4783.823	6736.381	5031.981	587.208	67.179	271.400
	Jul	1104.469	4473.569	4798.015	6788.907	5067.846	587.858	67.179	
	Aug	1101.767	4510.007	4827.911	6847.812	5107.981	588.066	67.302	

*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			
1995		5.84	5.21	8.83	5.92	5.66	6.26	6.88	7.59	5.80	7.95
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
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
1998	Aug	5.55	5.00	8.50	5.58	5.04	5.24	5.54	6.52	5.01	6.92
	Sep	5.51	5.00	8.49	5.41	4.74	4.62	5.20	6.40	4.84	6.72
	Oct	5.07	4.86	8.12	5.21	4.07	4.18	5.01	6.37	4.76	6.71
	Nov	4.83	4.63	7.89	5.24	4.53	4.57	5.25	6.41	4.87	6.87
	Dec	4.68	4.50	7.75	5.14	4.50	4.48	5.06	6.22	4.83	6.72
1999	Jan	4.63	4.50	7.75	4.89	4.45	4.61	5.16	6.24	4.85	6.79
	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	5.45	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

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

		M1	MZM	M2	M3
Percent change from previous period					
1995		-0.21	-0.46	2.05	4.56
1996		-3.20	6.55	4.81	6.59
1997		-3.30	7.18	4.92	7.98
1998		1.02	11.66	7.37	10.26
1999		1.99	12.25	7.55	8.80
<hr/>					
1998	1	0.73	2.84	1.93	2.65
	2	0.18	3.20	1.90	2.54
	3	-0.24	2.99	1.75	2.21
	4	1.47	4.46	2.67	3.12
1999	1	0.48	3.07	1.87	2.05
	2	0.53	2.34	1.51	1.51
	3	-0.44	1.76	1.35	1.27
	4	1.20	1.80	1.30	2.63
2000	1	0.00	1.99	1.52	2.70
	2	-0.31	1.61	1.57	1.99
<hr/>					
1998	Aug	-0.35	1.05	0.57	1.03
	Sep	0.47	1.57	1.01	1.08
	Oct	0.60	1.63	0.97	1.09
	Nov	0.84	1.44	0.85	0.97
	Dec	0.33	1.22	0.75	0.87
<hr/>					
1999	Jan	-0.13	0.88	0.58	0.53
	Feb	-0.16	1.03	0.58	0.82
	Mar	0.65	0.55	0.36	0.16
	Apr	0.53	0.93	0.60	0.59
	May	-0.50	0.73	0.50	0.53
	Jun	-0.14	0.59	0.41	0.51
	Jul	-0.06	0.59	0.50	0.40
	Aug	-0.07	0.57	0.39	0.31
	Sep	-0.23	0.45	0.43	0.45
	Oct	0.47	0.56	0.37	0.85
	Nov	0.74	0.67	0.45	1.28
	Dec	1.21	0.89	0.62	1.50
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2000	Jan	-0.36	0.77	0.52	0.70
	Feb	-1.28	-0.02	0.26	0.28
	Mar	0.53	1.22	0.79	1.12
	Apr	0.42	0.73	0.88	0.73
	May	-0.91	-0.02	-0.04	0.30
	Jun	-0.14	0.25	0.31	0.62
	Jul	0.09	0.78	0.30	0.78
	Aug	-0.24	0.81	0.62	0.87

Definitions

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

MZM: M2 minus small denomination time deposits, plus institutional money market mutual funds. The label MZM was coined by William Poole (1991) for this aggregate, proposed earlier by Motley (1988). Due to distortions caused by regulatory changes, the largest of which the introduction of money market accounts, data for MZM begin March 1983 in this publication.

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

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

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

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

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

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

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

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

Notes

Page 3: **MZM**, or "Money, Zero Maturity" includes the zero maturity, or immediately available, components of M3. MZM equals M2 minus small denomination time deposits, plus institutional money market mutual funds (that is, the money market mutual funds included in M3 but excluded from M2). Readers are cautioned that since early 1994 the level and growth of M1 have been depressed by retail sweep programs that reclassify transactions deposits (demand deposits and other checkable deposits) as savings deposits overnight, thereby reducing banks' required reserves; see <http://www.stls.frb.org/research/swdata.html>. For analytical purposes, MZM largely replaces M1. The **Discount Rate** and **Expected Federal Funds Rate** shown in the chart **Reserve Market Rates**, are plotted as of the date of the change, while the **Effective Federal Funds Rate** is plotted as of the end of the month. Interest rates in the table are monthly averages from the Board of Governors H.15 Statistical Release. **Treasury Yield Curve** shows constant maturity yields calculated by the U.S. Treasury Department for securities with 3 months and 1, 2, 3, 5, 7, 10, 20 and 30 years to maturity. Daily data and a description are available at <http://www.stls.frb.org/fred/data/wkly.html>. See also *Federal Reserve Bulletin*, table 1.35.

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

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

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

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

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

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

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

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where ΔMB_i^* is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter "t" is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula $((y_t - y_{t-40})/40) \times 4 \times 100$, where y_t is the log of real GDP. The four-year moving average of base velocity growth is calculated similarly. To adjust the monetary base for the effect of retail-deposit sweep programs, we add to the monetary base an amount equal to 10 percent of the total amount swept, as estimated by the Federal Reserve Board staff. These estimates are imprecise, at best. Sweep program data are available at <http://www.stls.frb.org/research/swdata.html>.

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

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

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

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

where duration is approximated as $D(m) = (1 - e^{-R(m) \times m}) / R(m)$. These rates are linear approximations to the true instantaneous forward rates; see Shiller. For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Euro-dollar Futures** and **Rates on Selected Fed Funds Futures Contracts** each trace through time the yield on three specific contracts. **Implied Yields on Fed Funds Futures** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Protected Treasury Yield Spreads** equal, for 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.

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 1996, 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 1996, pp. 3 - 37.

____, 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/reviewdat.html.

