

Monetary Trends



Stock Prices and Consumption

By historical standards, equity prices now are exceptionally high in comparison with current corporate earnings. In January 2000, the price-earnings ratio (P/E)—the price of a typical stock to the earnings per share—for the S&P 500 was 32.4. Prior to 1999, the average annual P/E ratio for the S&P 500 had never been this high. Such high valuations might indicate that investors expect that corporate earnings will increase in the future or that investors are now willing to accept a lower average rate of return on equities than in the past.

Policymakers and other analysts have expressed concern that high equity prices could increase current consumption and aggregate demand, which could ignite inflation. This concern about asset prices reflects economic theory, which suggests that people choose to consume according to the present value of their lifetime income. Because wealth can be converted to income, or vice versa, an unexpected rise (fall) in wealth increases (decreases) consumption and aggregate demand. Increased demand might require higher interest rates to balance savings and investment, so as to maintain price stability and sustainable growth. Conversely, a large fall in wealth might conceivably cause a sharp decline in consumption and require lower interest rates.

Because equities are an important—and volatile—component of overall wealth, the link between stock prices and consumption has been carefully studied. Has consumption growth been high historically when equity prices were high, as reflected in the P/E ratio? A very simple examination of this issue would be to compare the January P/E ratio for the S&P 500 with annualized aggregate consumption growth of nondurables and services over that year. It is appropriate to restrict consumption growth to nondurables and services as durable consumption goods provide grati-

fication over a long period of time, rather than in just the current period. The chart plots the annual growth of consumption of nondurables and services against the January S&P 500 P/E ratio of the same year. The sample extends from 1889 to 1999. The chart shows only a tenuous relation between consumption growth and asset prices. A similar exercise plotting changes in P/E ratios during a year against consumption growth also fails to reveal a strong pattern.

These inconclusive illustrations are consistent with a long line of research that has examined the relation between asset prices and consumption with limited success. Although there are sound theoretical reasons to believe that the rise in stock market wealth has fueled high recent consumption growth and that consumption is related to wealth in the long run, neither asset prices nor other variables have proven especially useful in predicting future consumption growth. The weakness of the relation makes it difficult to quantify the extent to which recent stock price increases have fueled consumption or to predict the likely consequences of a sharp drop in stock prices.

—Christopher J. Neely

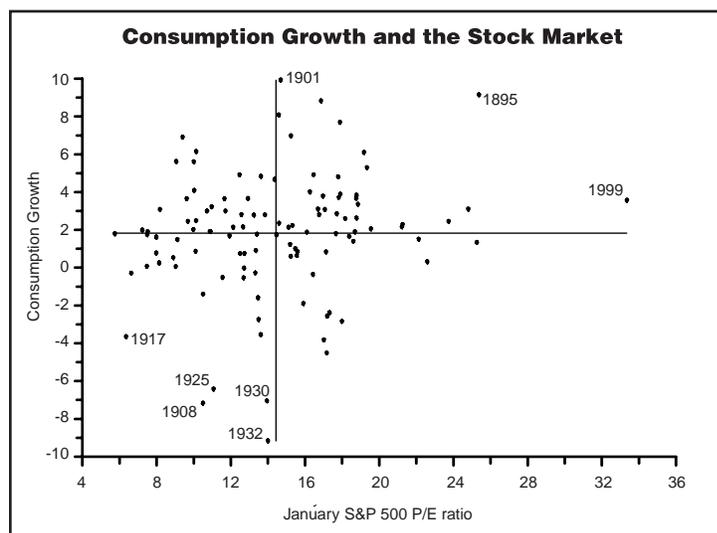


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Conventions used in this publication:

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

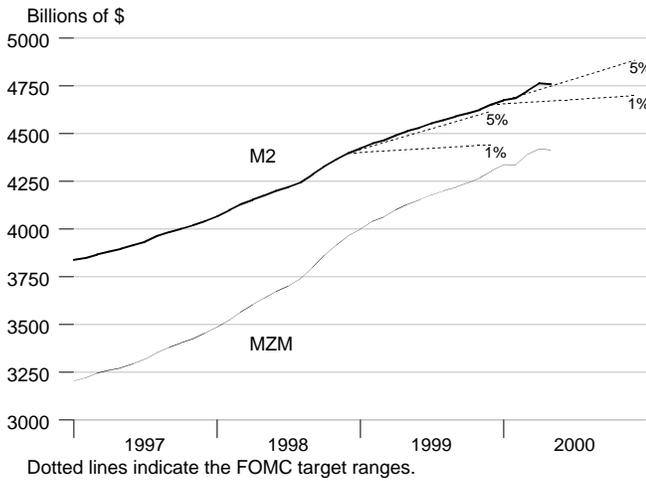
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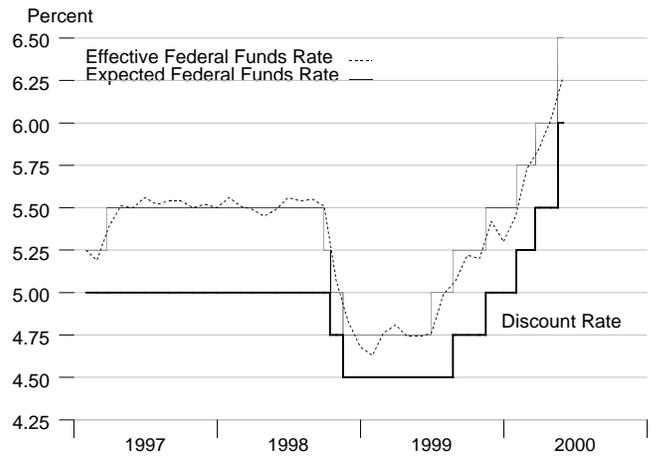
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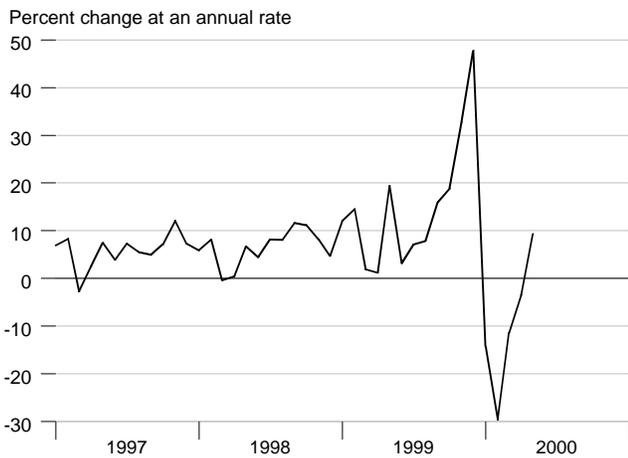
M2 and MZM



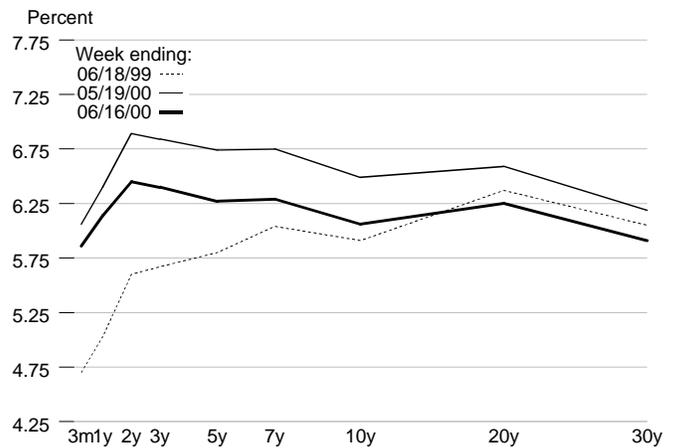
Reserve Market Rates



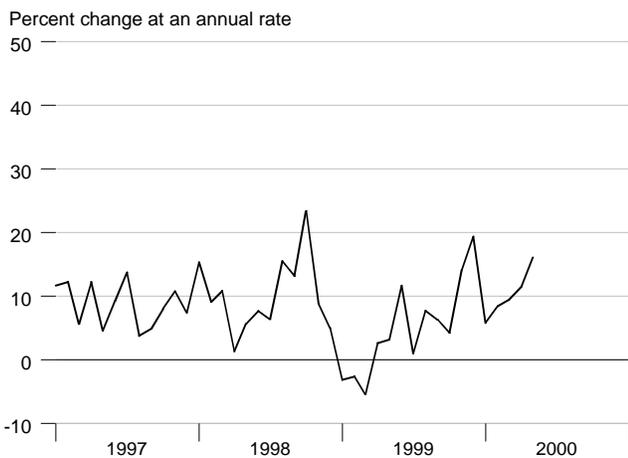
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

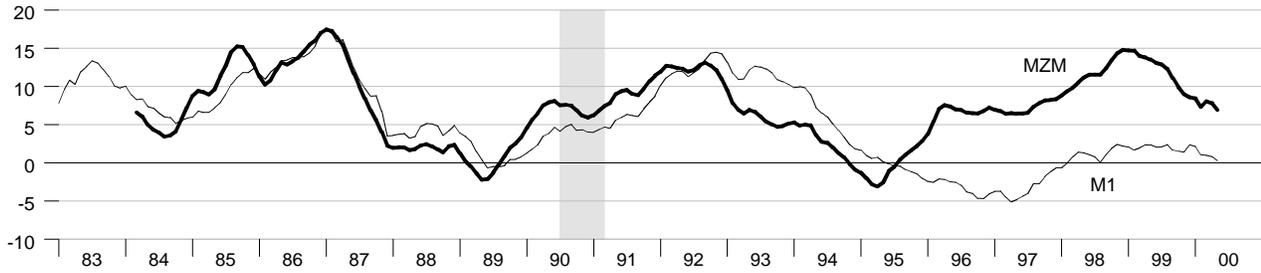


Interest Rates

	Mar 00	Apr 00	May 00
Federal Funds Rate	5.85	6.02	6.27
Discount Rate	5.34	5.50	5.71
Prime Rate	8.83	9.00	9.24
Conventional Mortgage Rate	8.24	8.15	8.52
Treasury Yields:			
3-month constant maturity	5.86	5.82	5.99
6-month constant maturity	6.11	6.07	6.39
1-year constant maturity	6.22	6.15	6.33
3-year constant maturity	6.53	6.36	6.77
5-year constant maturity	6.50	6.26	6.69
10-year constant maturity	6.26	5.99	6.44
30-year constant maturity	6.05	5.85	6.15

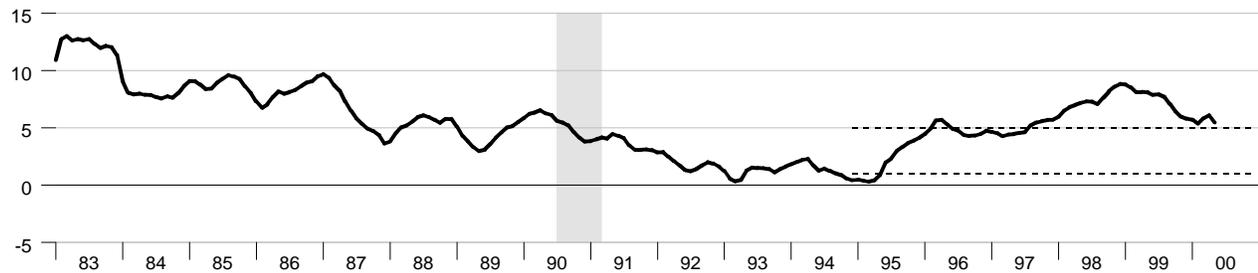
MZM and M1

Percent change from year ago



M2

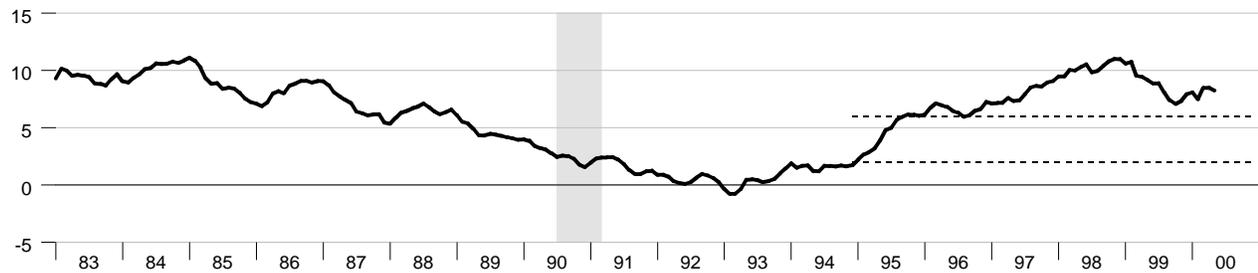
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

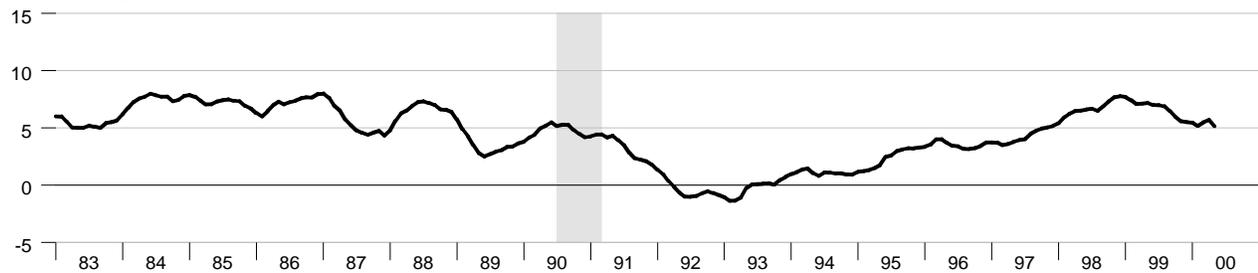
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

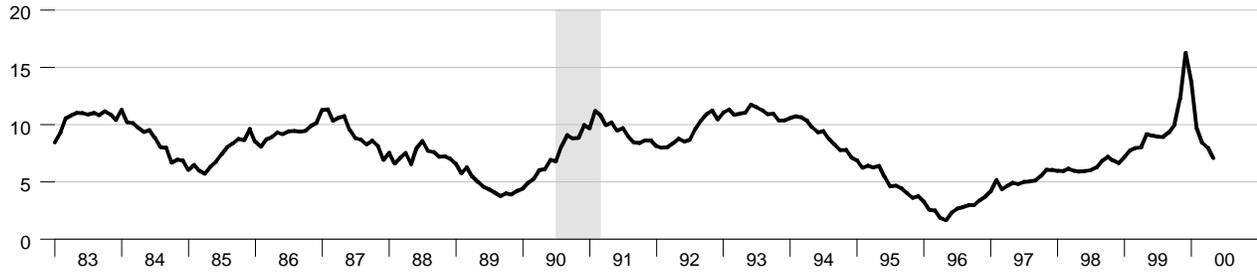
Monetary Services Index - M2

Percent change from year ago



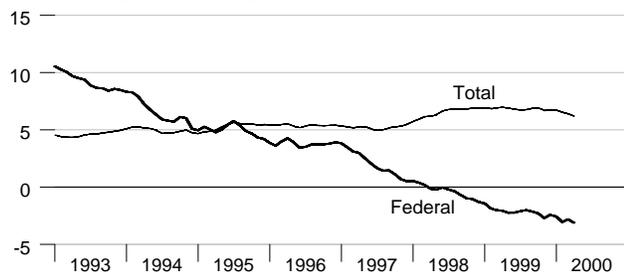
Adjusted Monetary Base

Percent change from year ago



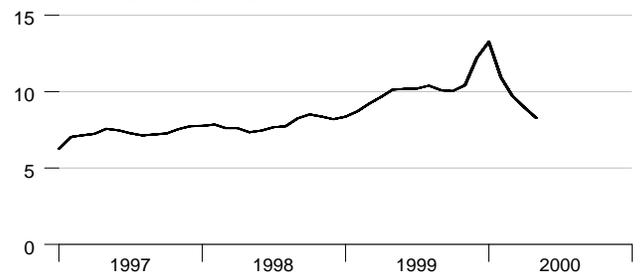
Domestic Nonfinancial Debt

Percent change from year ago



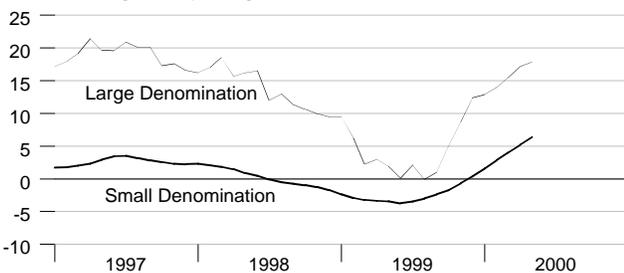
Currency Held by the Nonbank Public

Percent change from year ago



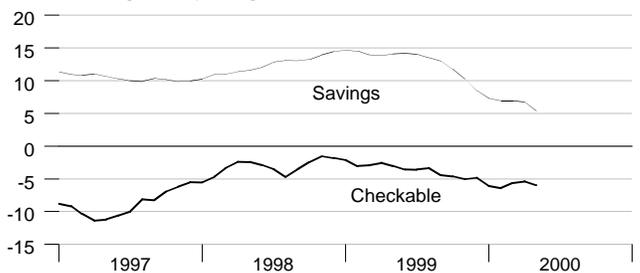
Time Deposits

Percent change from year ago



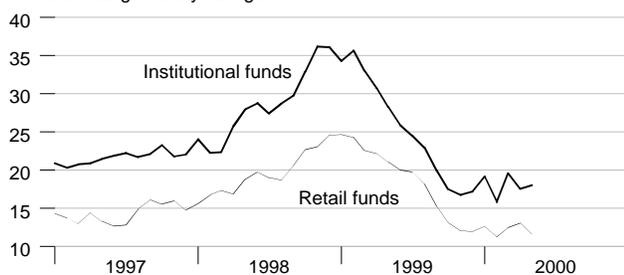
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

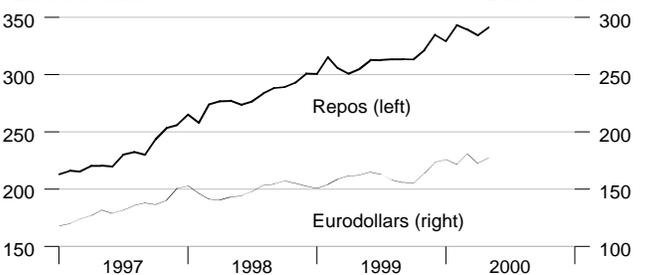
Percent change from year ago



Repurchase Agreements and Eurodollars

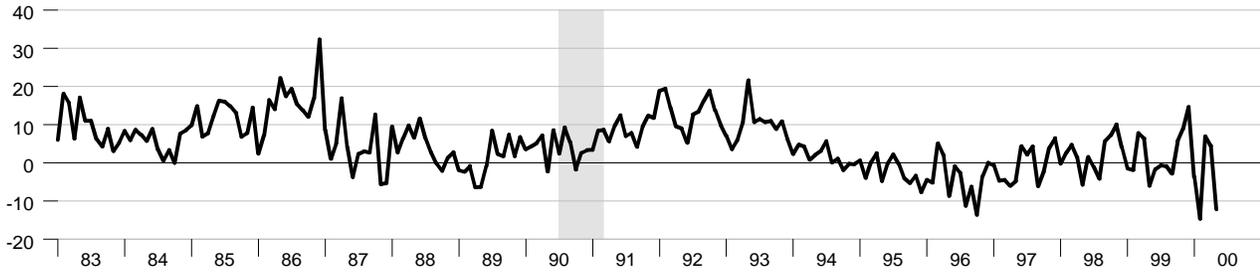
Billions of dollars

Billions of dollars



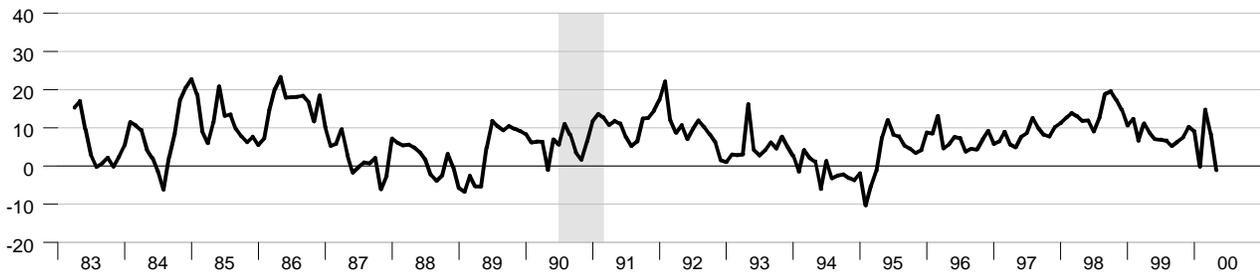
M1

Percent change at an annual rate



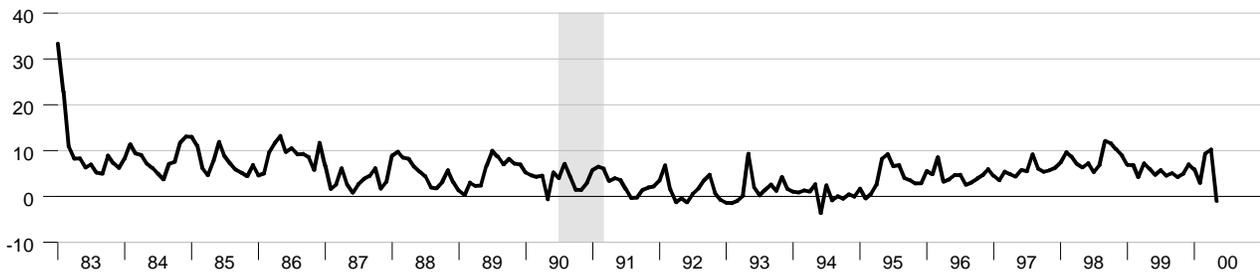
MZM

Percent change at an annual rate



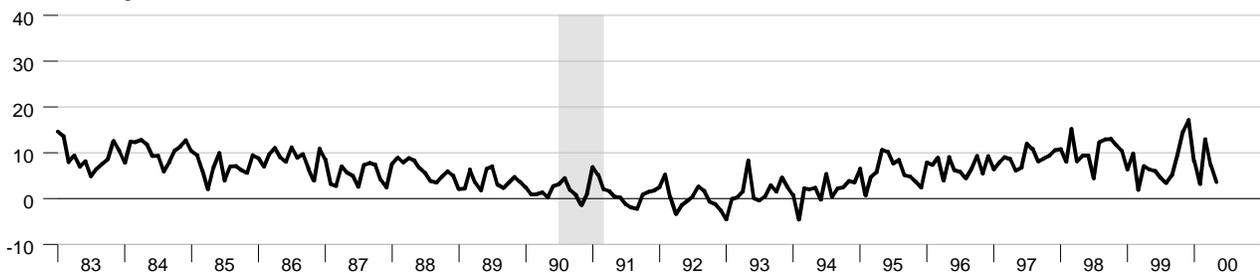
M2

Percent change at an annual rate

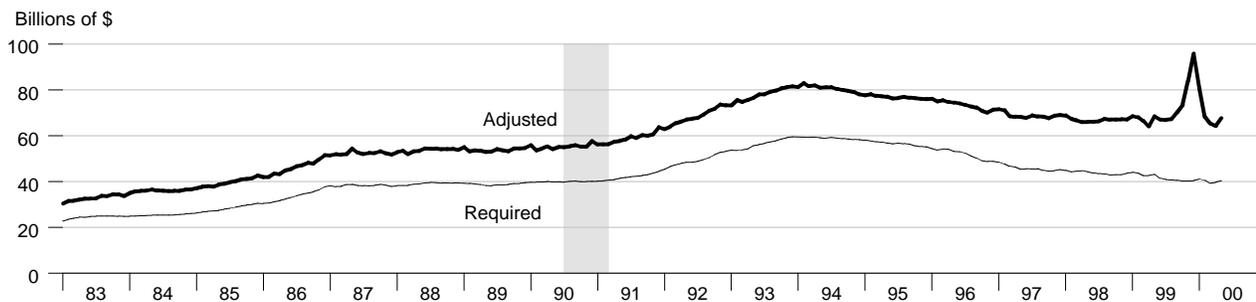


M3

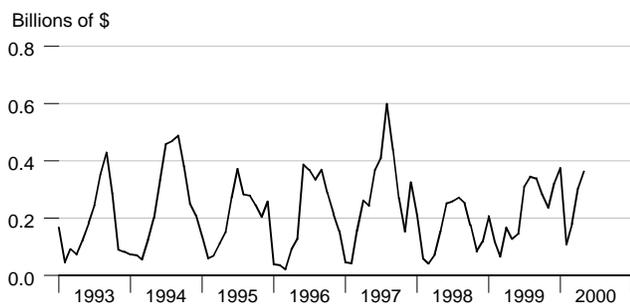
Percent change at an annual rate



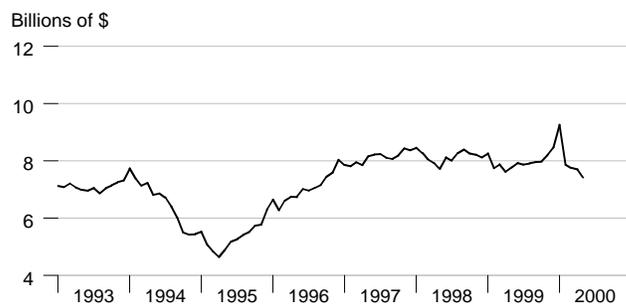
Adjusted and Required Reserves



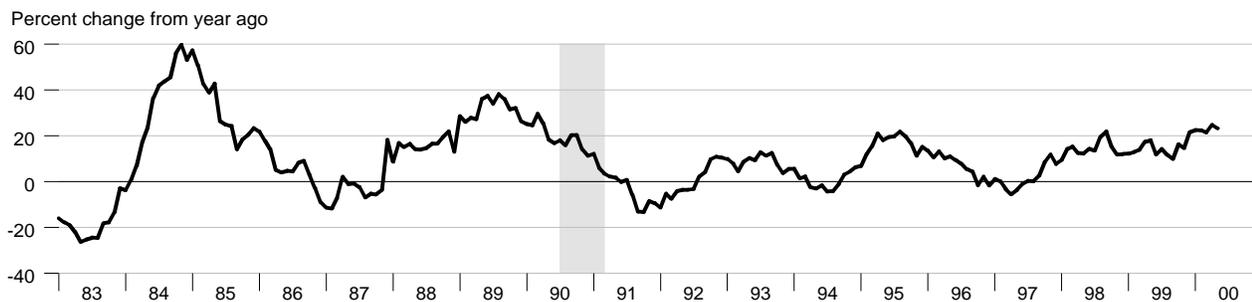
Total Borrowings, nsa



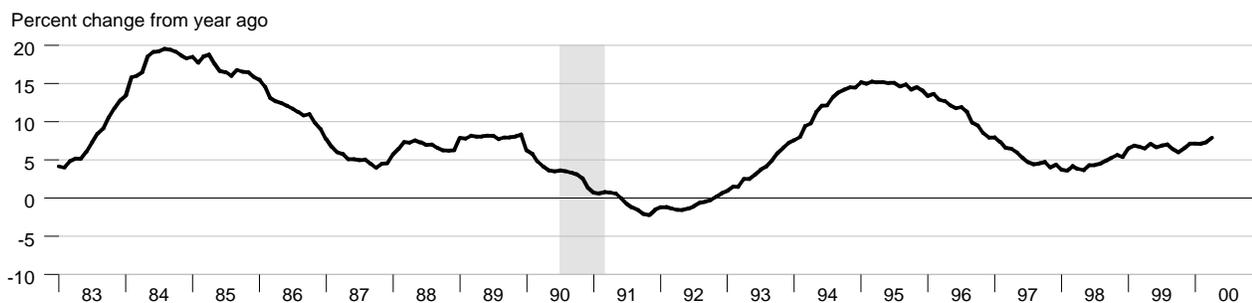
Excess Reserves plus RCB Contracts



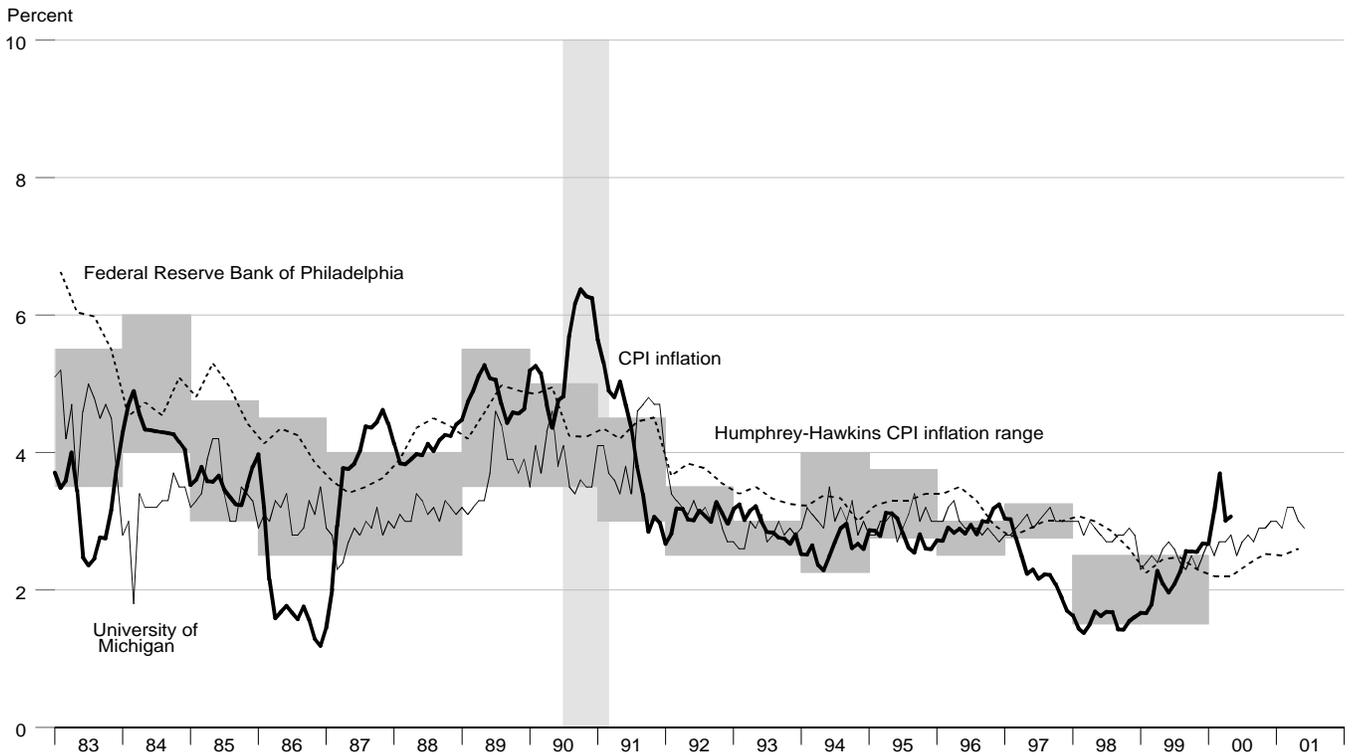
Nonfinancial Commercial Paper



Consumer Credit

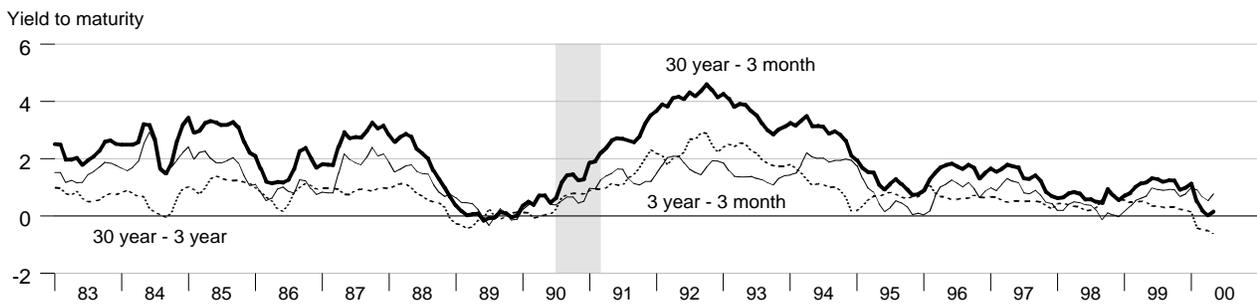


Inflation and Inflation Expectations

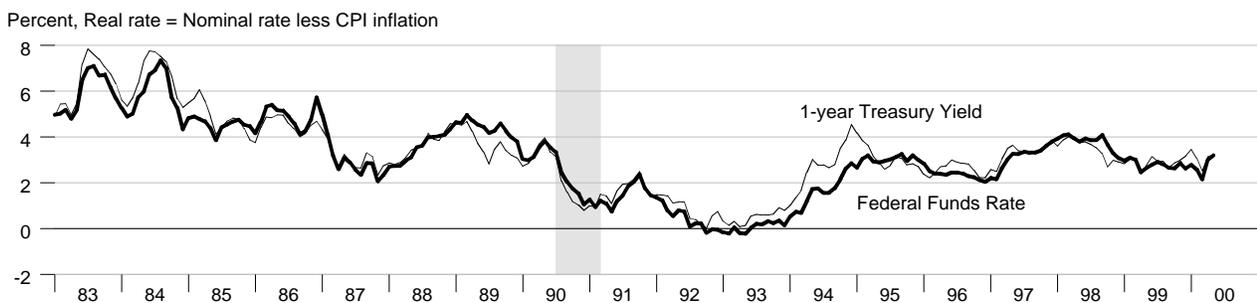


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

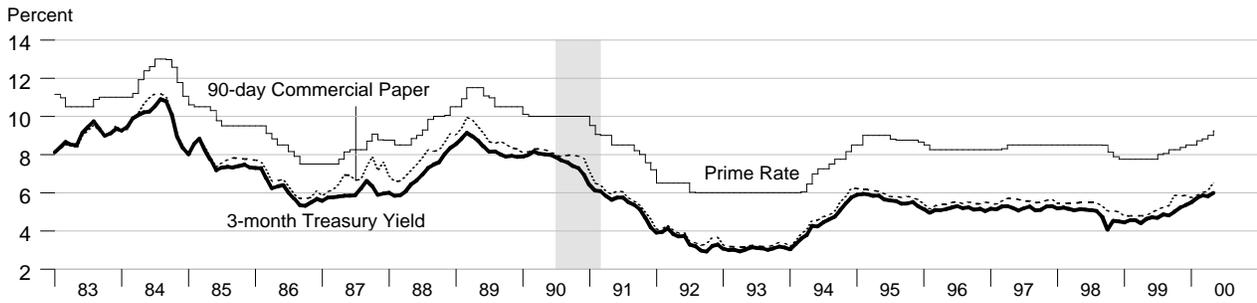
Treasury Security Yield Spreads



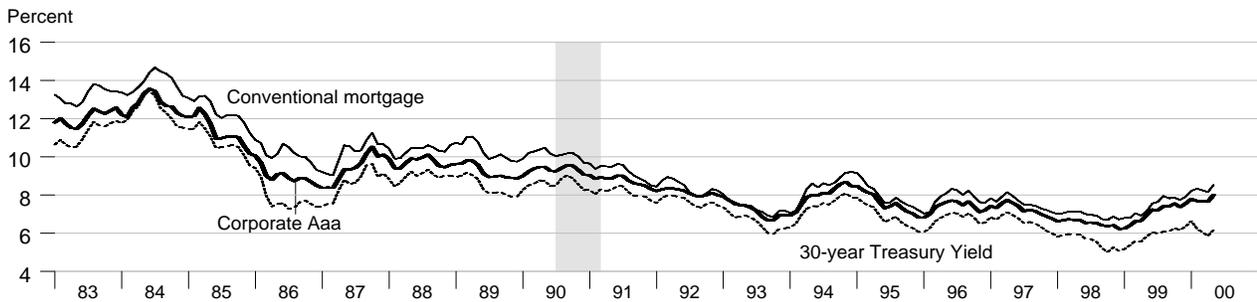
Real Interest Rates



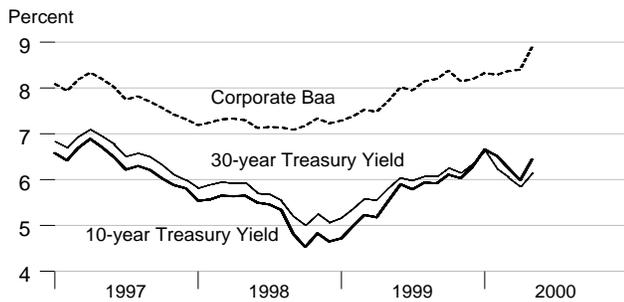
Short Term Interest Rates



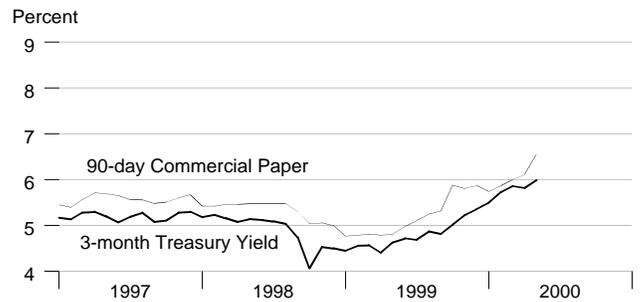
Long Term Interest Rates



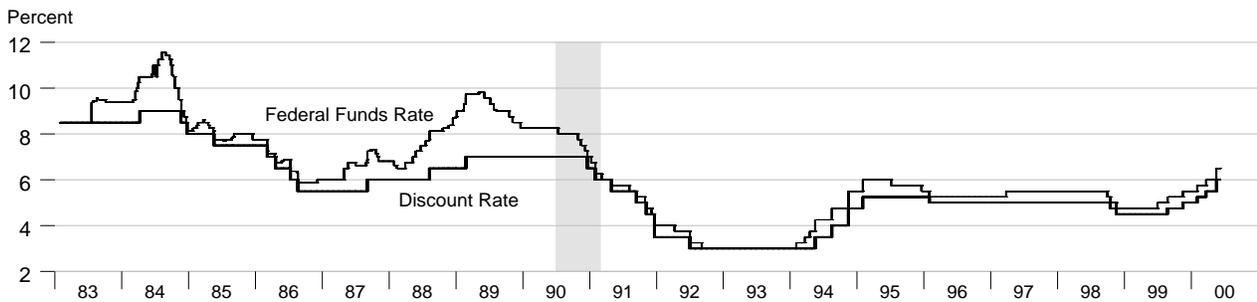
Long Term Interest Rates



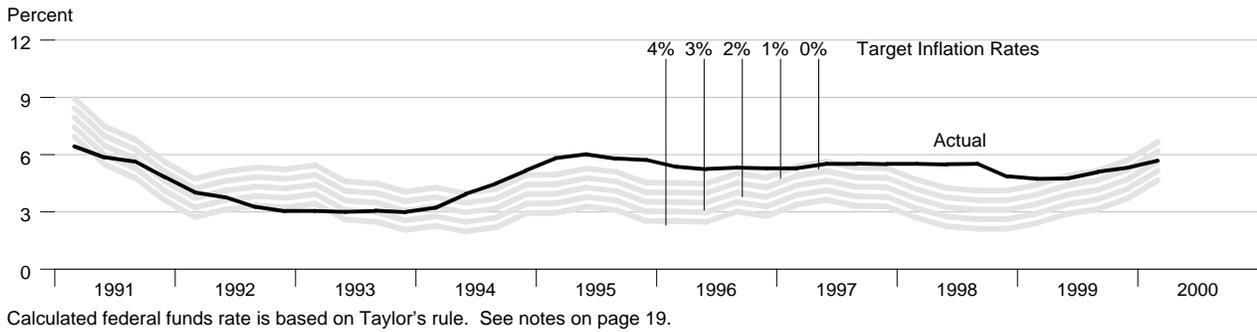
Short Term Interest Rates



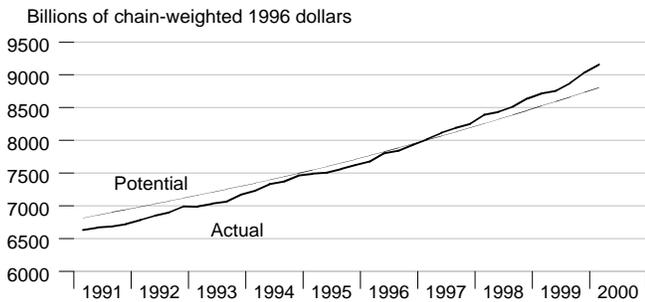
FOMC Expected Federal Funds Rate and Discount Rate



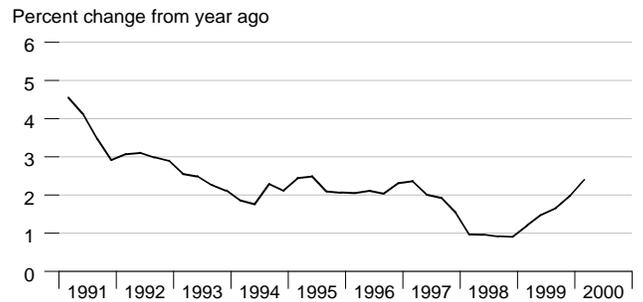
Federal Funds Rate and Inflation Targets



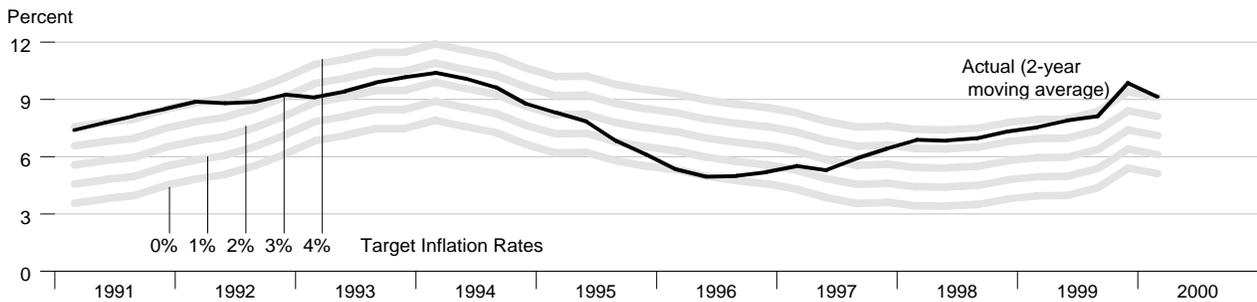
Actual and Potential Real GDP



PCE Inflation

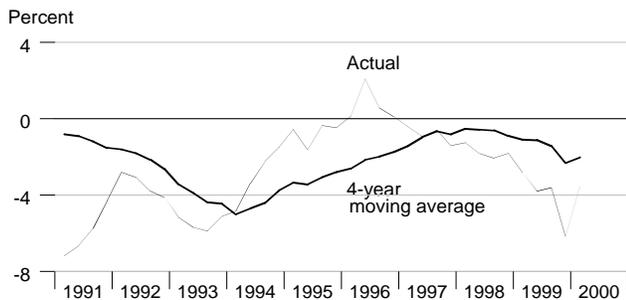


Monetary Base Growth* and Inflation Targets

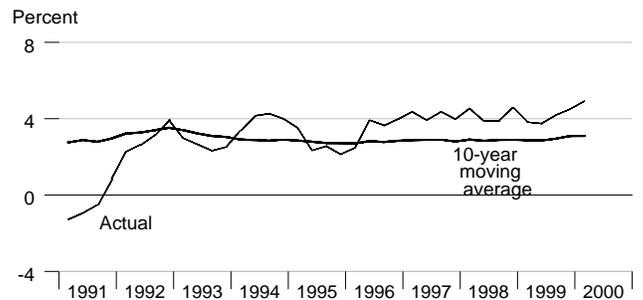


*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. See notes on page 19.

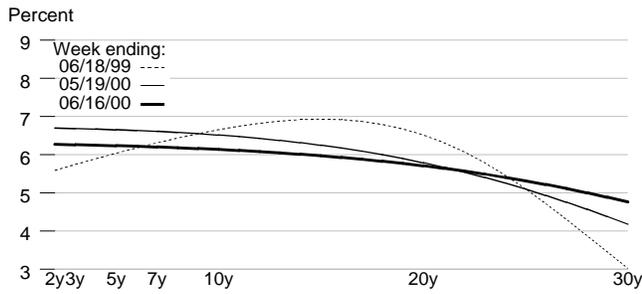
Monetary Base Velocity Growth



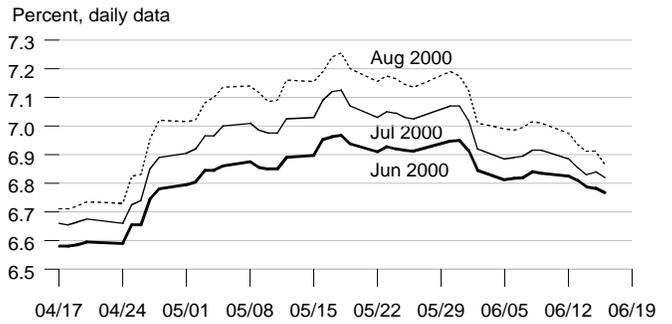
Real Output Growth



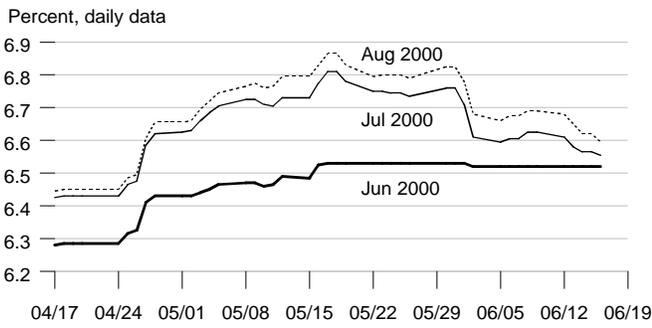
Implied One-Year Forward Rates



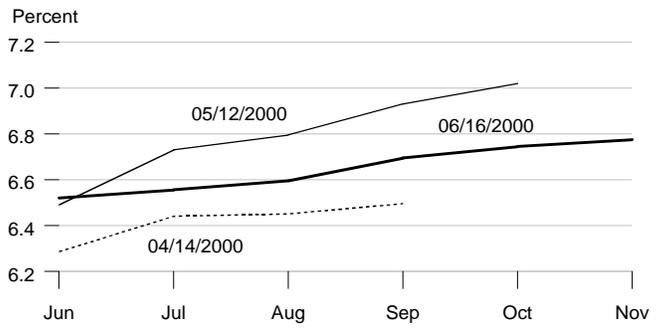
Rates on 3-Month Eurodollar Futures



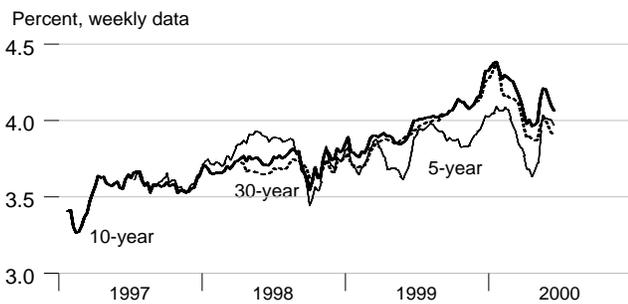
Rates on Selected Fed Funds Futures Contracts



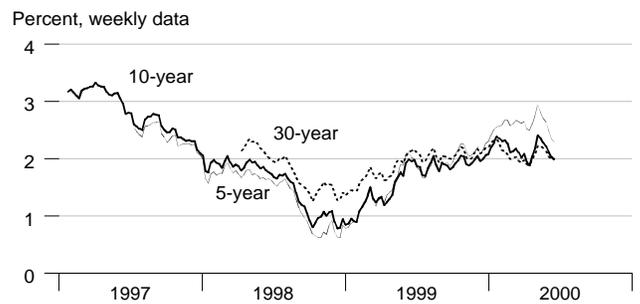
Implied Yields on Fed Funds Futures



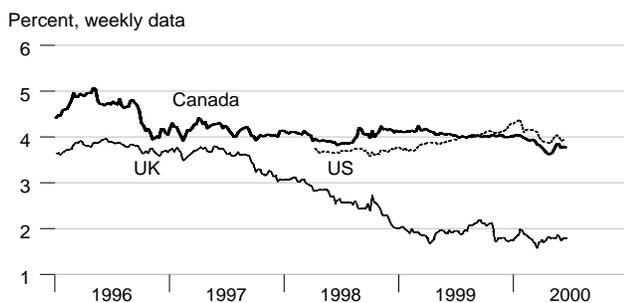
Inflation-Protected Treasury Yields



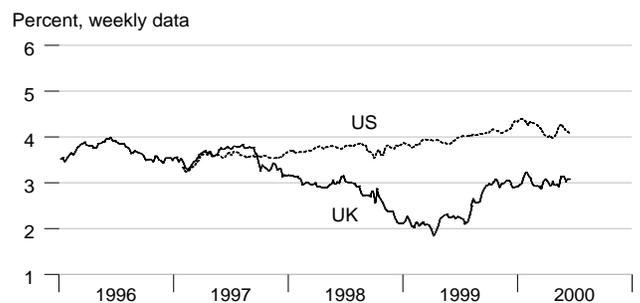
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds



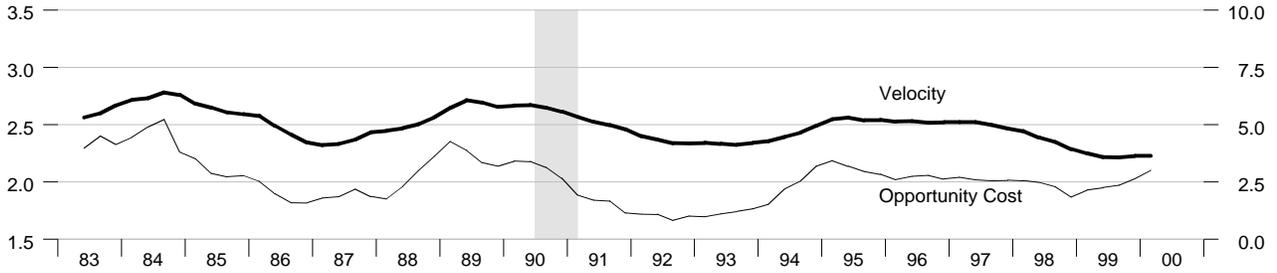
Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

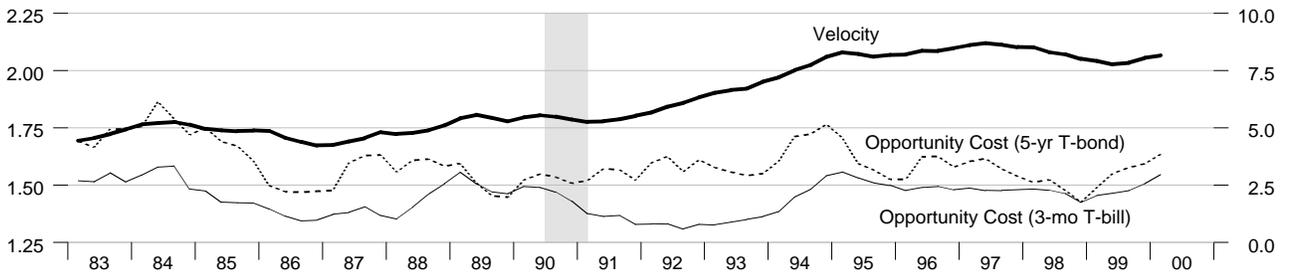
Opportunity Cost = 3 month T-bill rate less MZM own rate



M2 Velocity and Opportunity Cost

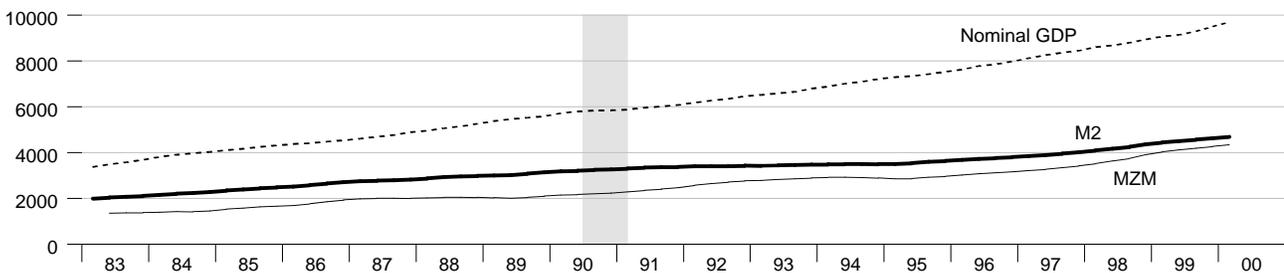
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



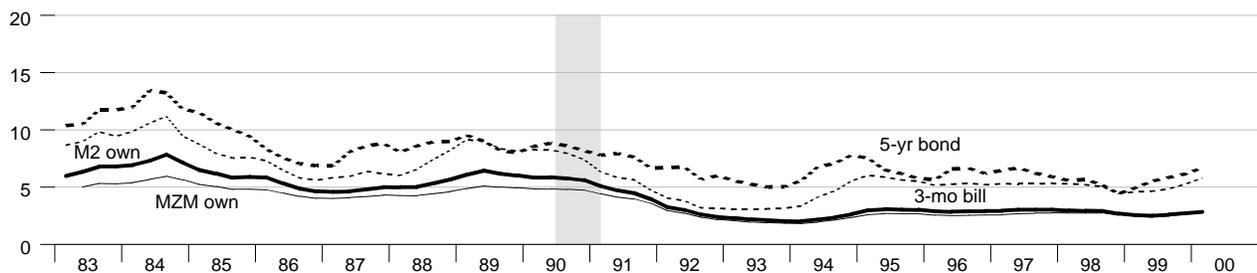
M2, MZM and Nominal GDP

Billions of \$



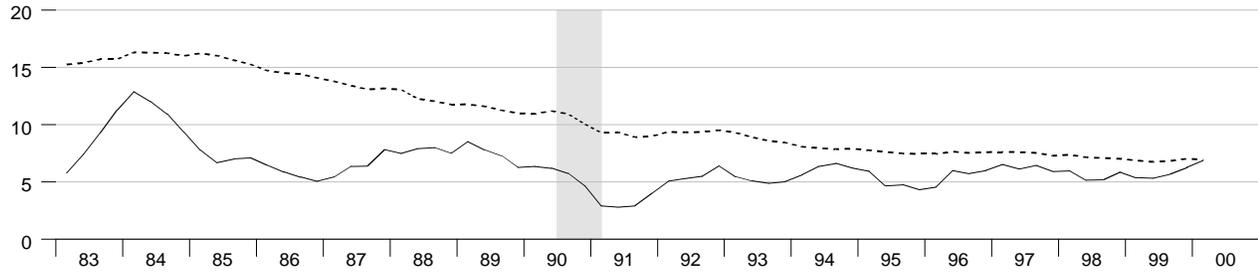
Interest Rates

Percent



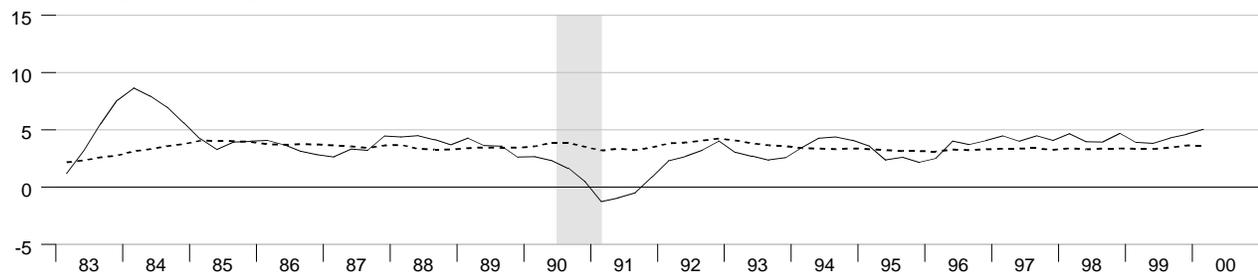
Gross Domestic Product

Percent change from year ago



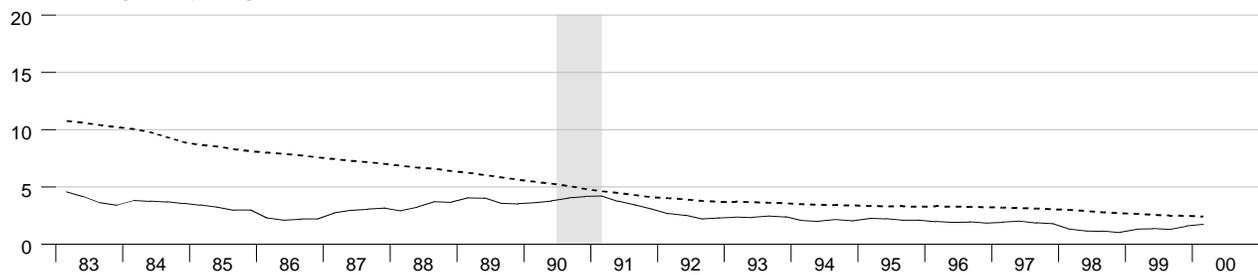
Real Gross Domestic Product

Percent change from year ago



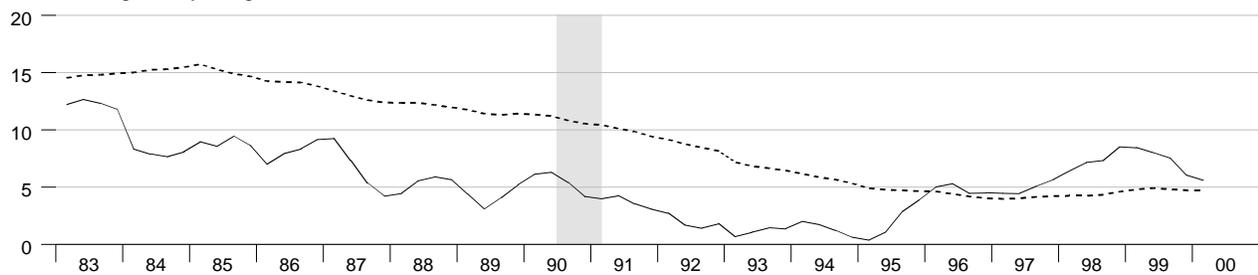
Gross Domestic Product Price Index

Percent change from year ago



M2

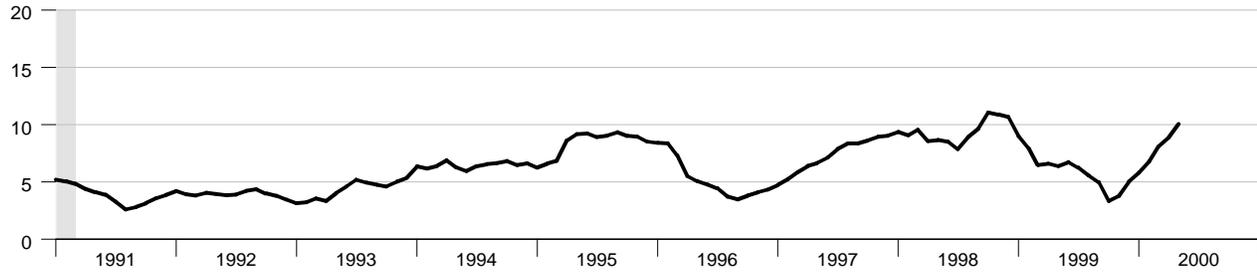
Percent change from year ago



Dashed lines indicate 10-year moving averages

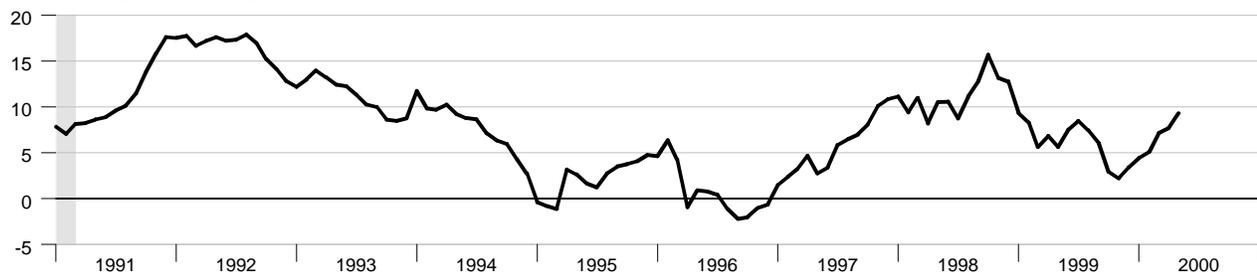
Bank Credit

Percent change from year ago



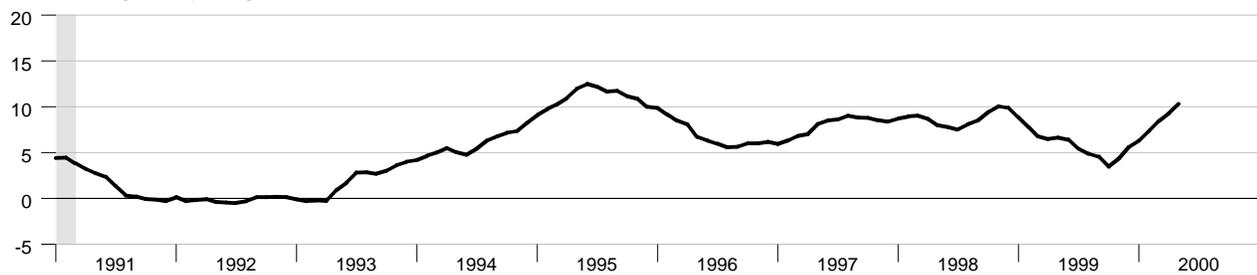
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



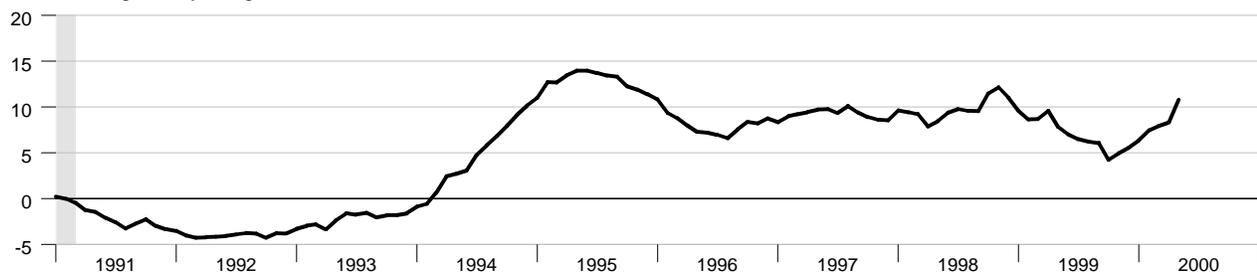
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

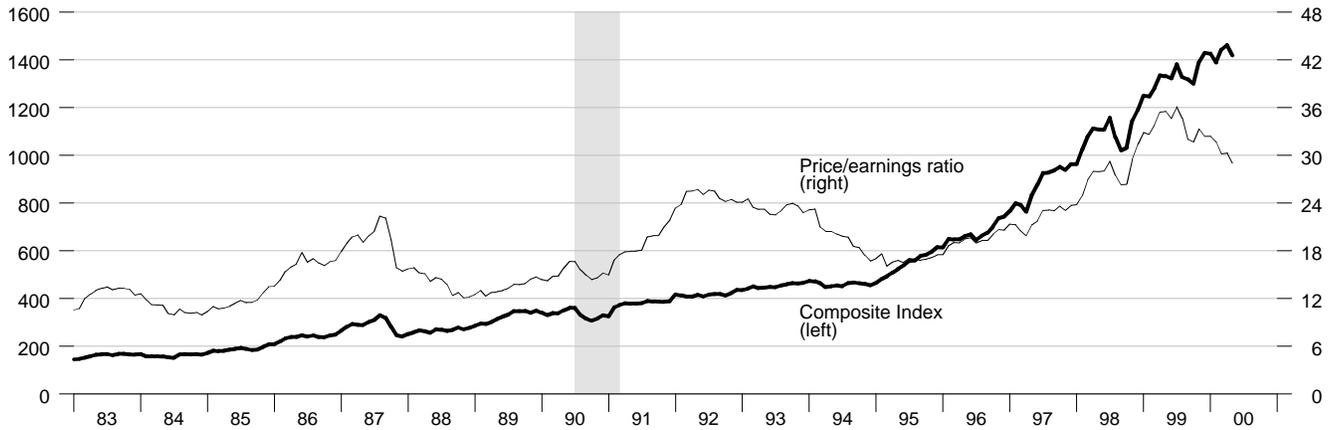


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



Standard and Poor's 500



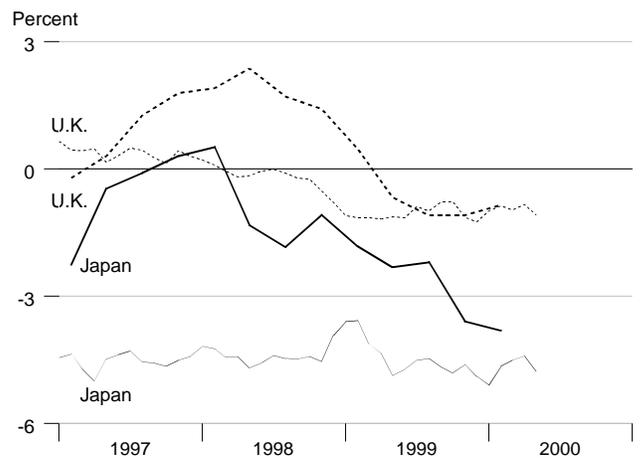
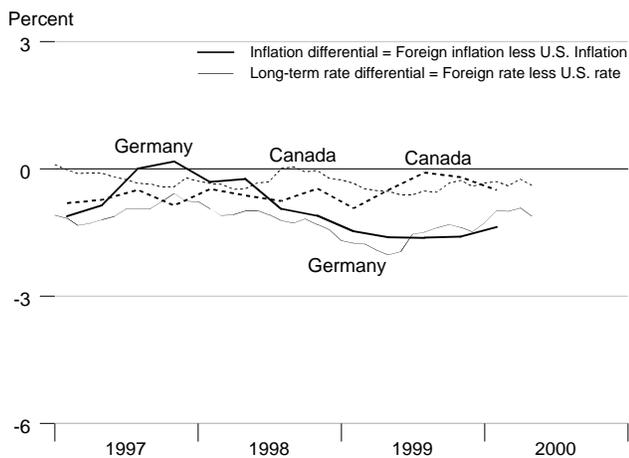
Inflation and Long-Term Interest Rates

Trend in Consumer Price Inflation Rates
Percent change from year ago

Recent Long-Term Government Bond Rates
Percent

	1999Q2	1999Q3	1999Q4	2000Q1	Feb00	Mar00	Apr00	May00
United States	2.09	2.26	2.56	3.15	6.49	6.33	6.14	6.49
Canada	1.59	2.18	2.36	2.65	6.19	5.93	5.90	6.10
France	0.36	0.53	1.00	1.50	5.96	5.73	5.84	.
Germany	0.48	0.64	0.96	1.78	5.51	5.33	5.22	5.38
Italy	1.44	1.72	2.06	2.36	5.77	5.61	5.51	5.71
Japan	-0.22	0.07	-1.04	-0.65	1.84	1.82	1.73	1.72
United Kingdom	1.42	1.17	1.47	2.30	5.62	5.36	5.30	5.40

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	M2M	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1995		1143.038	2906.094	3575.435	4500.289	3500.757	443.499	76.838	210.451
1996		1106.430	3096.350	3747.397	4796.865	3683.818	455.572	73.401	217.848
1997		1069.929	3318.615	3931.935	5179.575	3951.964	478.708	68.873	227.070
1998		1080.846	3705.088	4221.488	5710.895	4323.717	508.942	66.925	242.229
1999		1102.371	4157.469	4538.330	6209.562	4581.114	557.864	71.674	258.528
<hr/>									
1998	1	1076.722	3523.721	4097.767	5498.403	4185.422	498.320	67.645	235.920
	2	1078.669	3637.283	4176.048	5638.514	4248.101	502.020	66.044	239.943
	3	1076.068	3746.113	4249.249	5763.379	4348.495	511.546	66.905	243.733
	4	1091.926	3913.233	4362.886	5943.283	4512.849	523.881	67.105	249.320
1999	1	1097.202	4033.468	4444.482	6064.791	4511.236	536.335	67.691	253.370
	2	1102.976	4127.298	4511.315	6155.613	4526.804	545.912	66.526	257.000
	3	1098.082	4198.572	4570.473	6231.333	4591.434	557.968	68.111	260.260
	4	1111.222	4270.537	4627.051	6386.509	4694.982	591.241	84.366	263.480
2000	1	1112.423	4353.460	4694.474	6551.558	4821.559	592.990	71.365	266.993
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1998	May	1076.491	3637.083	4174.984	5638.311	4245.701	502.322	66.071	239.820
	Jun	1077.854	3673.044	4200.243	5682.519	4272.783	504.200	66.125	241.120
	Jul	1076.867	3700.652	4218.916	5703.539	4295.582	507.618	66.307	242.270
	Aug	1073.126	3739.453	4243.000	5762.211	4351.077	511.031	67.371	243.440
	Sep	1078.211	3798.234	4285.830	5824.388	4398.825	515.990	67.036	245.490
	Oct	1084.673	3860.127	4327.309	5887.777	4484.496	520.806	67.058	247.530
	Nov	1093.735	3915.840	4364.338	5945.154	4517.574	524.379	67.182	249.420
	Dec	1097.371	3963.731	4397.011	5996.919	4536.476	526.458	67.074	251.010
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1999	Jan	1095.975	3998.712	4422.358	6028.750	4524.579	531.761	68.517	252.260
	Feb	1094.273	4039.734	4447.659	6077.967	4514.749	538.190	68.067	253.460
	Mar	1101.359	4061.959	4463.429	6087.656	4494.381	539.053	66.488	254.390
	Apr	1107.196	4099.521	4490.294	6123.627	4504.202	539.608	64.109	255.900
	May	1101.658	4129.139	4512.897	6156.105	4516.211	548.331	68.423	257.070
	Jun	1100.074	4153.235	4530.753	6187.108	4560.000	549.796	67.045	258.030
	Jul	1099.464	4177.092	4552.494	6210.674	4563.865	553.060	66.880	259.210
	Aug	1098.683	4200.206	4569.794	6228.426	4593.181	556.711	67.248	260.220
	Sep	1096.099	4218.417	4589.131	6254.900	4617.257	564.134	70.206	261.350
	Oct	1101.271	4240.735	4605.353	6304.786	4633.571	572.989	73.419	262.260
	Nov	1109.451	4267.276	4624.393	6381.818	4687.917	588.668	83.916	263.330
	Dec	1122.945	4303.599	4651.406	6472.922	4763.458	612.067	95.764	264.850
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2000	Jan	1119.409	4336.189	4674.530	6516.470	4786.539	604.790	80.626	266.040
	Feb	1105.740	4335.542	4686.164	6533.881	4820.117	589.895	68.140	266.600
	Mar	1112.120	4388.649	4722.729	6604.322	4858.020	584.285	65.329	268.340
	Apr	1116.231	4419.070	4762.983	6644.065	4904.325	582.611	64.292	270.480
	May	1104.884	4414.922	4759.077	6664.080	4970.023	587.124	67.637	270.320

*All values are given in billions of dollars

		Federal	Discount	Prime	3-mo	Treasury Yields			Corporate	S & L	Conventional
		Funds	Rate	Rate		CDs	3 mo	3 yr	30 yr	Aaa Bonds	
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
1998	May	5.49	5.00	8.50	5.59	5.14	5.61	5.93	6.69	5.04	7.14
	Jun	5.56	5.00	8.50	5.60	5.12	5.52	5.70	6.53	4.97	7.00
	Jul	5.54	5.00	8.50	5.59	5.09	5.47	5.68	6.55	5.01	6.95
	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

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

		M1	MZM	M2	M3
Percent change from previous period					
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	1995	-0.21	-0.46	2.06	4.56
	1996	-3.20	6.55	4.81	6.59
	1997	-3.30	7.18	4.92	7.98
	1998	1.02	11.65	7.36	10.26
	1999	1.99	12.21	7.51	8.73
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1998	1	0.73	2.83	1.92	2.64
	2	0.18	3.22	1.91	2.55
	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	2.04
	2	0.53	2.33	1.50	1.50
	3	-0.44	1.73	1.31	1.23
	4	1.20	1.71	1.24	2.49
2000	1	0.11	1.94	1.46	2.58
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1998	May	-0.48	0.98	0.53	0.78
	Jun	0.13	0.99	0.61	0.78
	Jul	-0.09	0.75	0.44	0.37
	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	0.86	0.97
	Dec	0.33	1.22	0.75	0.87
1999	Jan	-0.13	0.88	0.58	0.53
	Feb	-0.16	1.03	0.57	0.82
	Mar	0.65	0.55	0.35	0.16
	Apr	0.53	0.92	0.60	0.59
	May	-0.50	0.72	0.50	0.53
	Jun	-0.14	0.58	0.40	0.50
	Jul	-0.06	0.57	0.48	0.38
	Aug	-0.07	0.55	0.38	0.29
	Sep	-0.24	0.43	0.42	0.43
	Oct	0.47	0.53	0.35	0.80
	Nov	0.74	0.63	0.41	1.22
	Dec	1.22	0.85	0.58	1.43
2000	Jan	-0.31	0.76	0.50	0.67
	Feb	-1.22	-0.01	0.25	0.27
	Mar	0.58	1.22	0.78	1.08
	Apr	0.37	0.69	0.85	0.60
	May	-1.02	-0.09	-0.08	0.30

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_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 $m = 1, \dots, 30$ 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.

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Note: Articles from this Bank's *Review* are available on the Internet at www.stls.frb.org/research/reviewdat.html.

