

Monetary Trends



How Expensive Are Stocks?

People buy assets, such as stocks, to obtain future income. A firm's earnings determine its ability to generate income for investors and therefore should influence its stock price. The ratio of a firm's stock price to its recent earnings—called a P/E ratio—is often used to gauge how expensive a stock is. Because earnings fluctuate and have seasonal patterns, recent earnings are usually summed over the past year to smooth this variation.

The upper chart shows that the conventionally calculated P/E ratio for the S&P 500 Composite Index is now unusually high by historical standards. In fact, it is higher than it has been since before World War II. This high P/E ratio implies that stocks are unusually expensive relative to their past values. Many analysts predict that future returns will be low as prices grow slowly—until they get back in line with earnings.

But past performance might not be a good guide to the future. If recent earnings have been unusually high or low, they might not accurately forecast future gains; conventional P/E ratios, then, might be misleading. Indeed, the lower chart illustrates that earnings fell precipitously during last year's recession, which drove up the P/E ratio. Therefore it might be more sensible to calculate P/E ratios with a less volatile earnings measure. One such measure that captures the rise in earnings with the size of the economy is an exponential growth trend (see the lower chart).

The upper chart shows that the

two methods of calculating P/E ratios have usually tracked each other fairly closely because stock prices have typically been more volatile than earnings. One period in which they diverged was 1991-95, when earnings were unusually low, as they are now.

While the current P/E ratio calculated using the exponential growth trend is still fairly high by historical standards, it is not as extreme as the P/E ratio calculated from earnings over the last year. Hence, stocks now seem considerably less expensive when one compares their price with the exponential trend for earnings rather than with earnings of only the past year.

—Christopher J. Neely

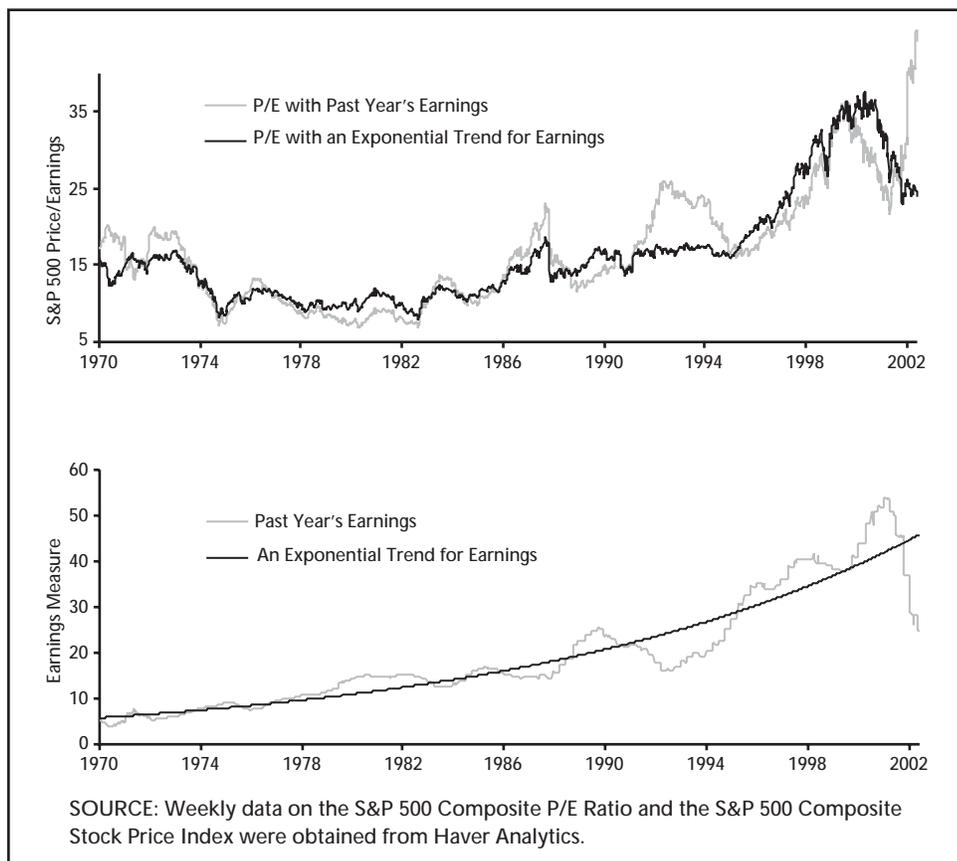


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Conventions used in this publication:

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

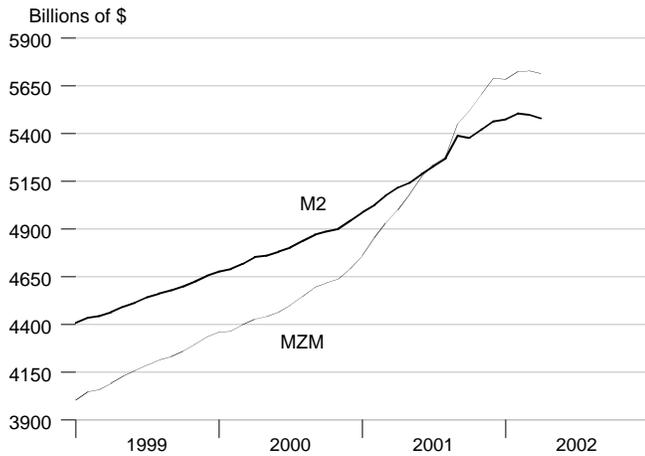
We welcome your comments addressed to:

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

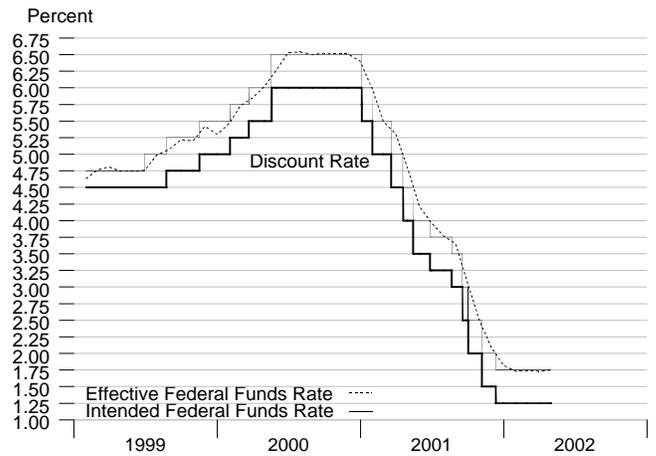
or to:

webmaster@stls.frb.org

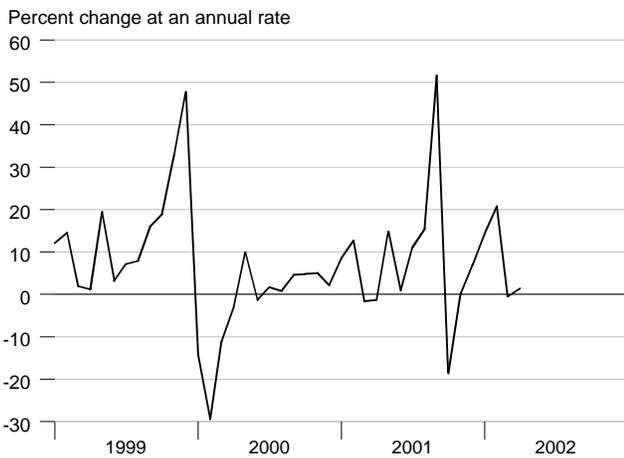
M2 and MZM



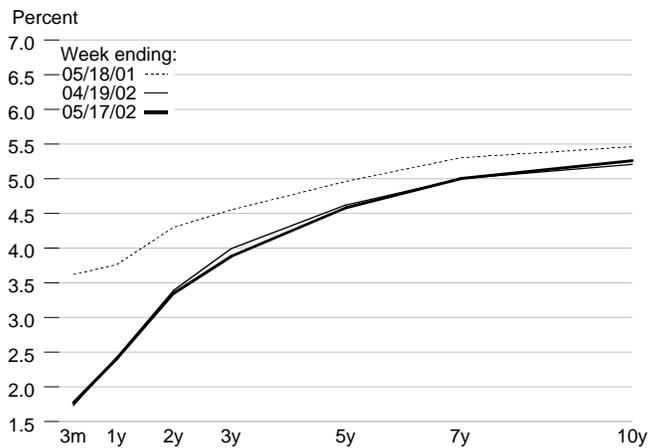
Reserve Market Rates



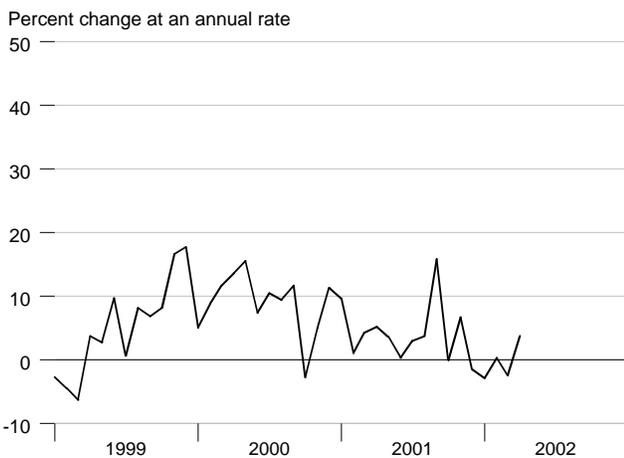
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit



Interest Rates

	Feb 02	Mar 02	Apr 02
Federal Funds Rate	1.74	1.73	1.75
Discount Rate	1.25	1.25	1.25
Prime Rate	4.75	4.75	4.75
Conventional Mortgage Rate	6.89	7.01	6.99
Treasury Yields:			
3-month constant maturity	1.76	1.83	1.75
6-month constant maturity	1.86	2.06	1.98
1-year constant maturity	2.23	2.57	2.48
3-year constant maturity	3.55	4.14	4.01
5-year constant maturity	4.30	4.74	4.65
10-year constant maturity	4.91	5.28	5.21

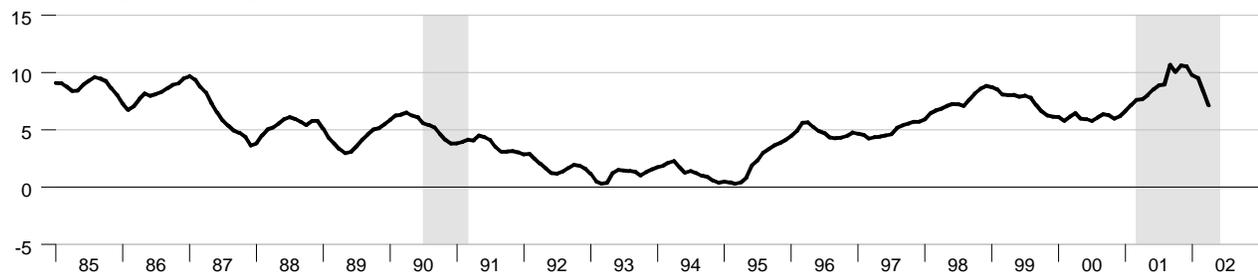
MZM and M1

Percent change from year ago



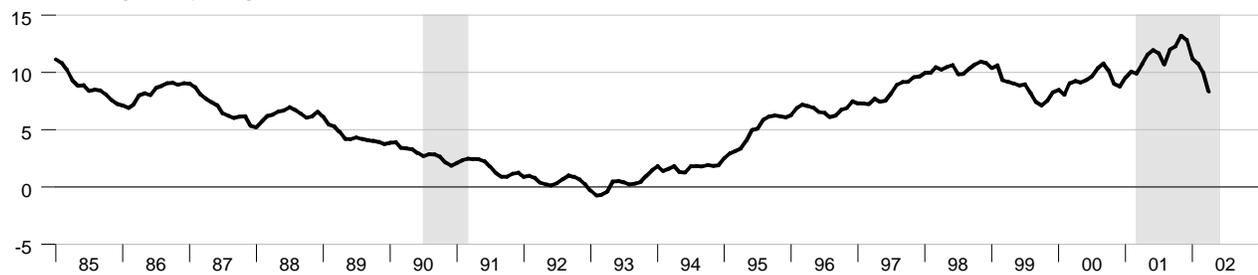
M2

Percent change from year ago



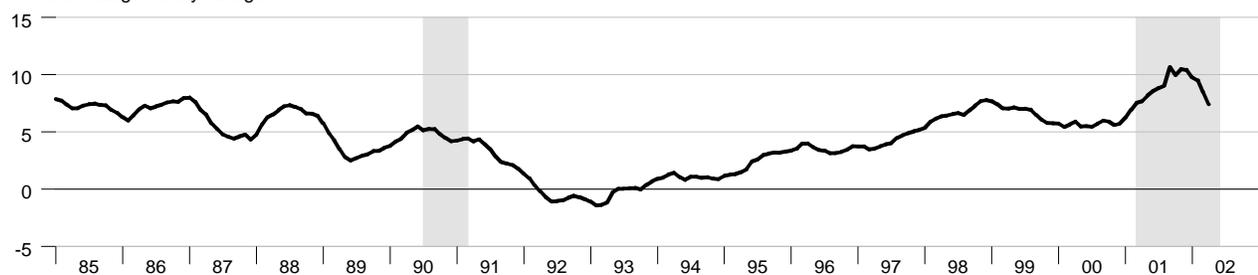
M3

Percent change from year ago



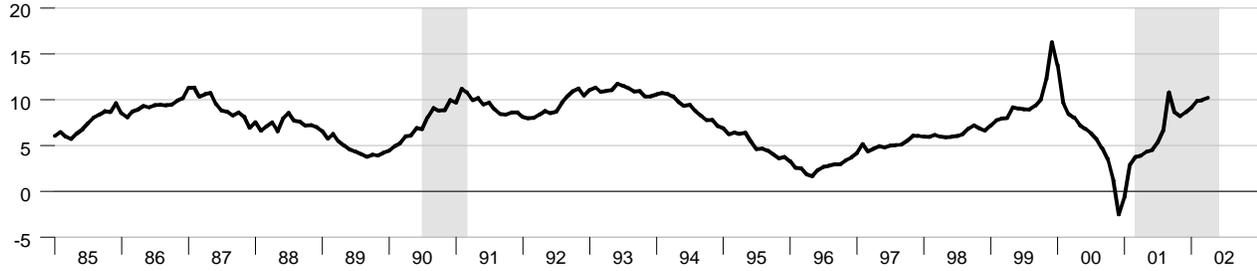
Monetary Services Index - M2

Percent change from year ago



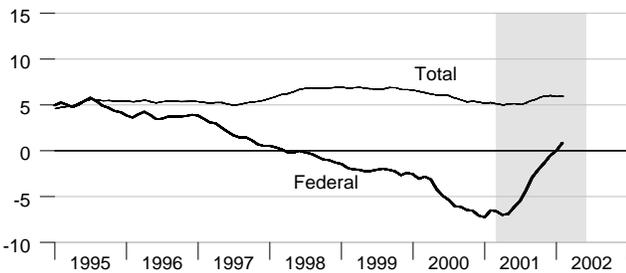
Adjusted Monetary Base

Percent change from year ago



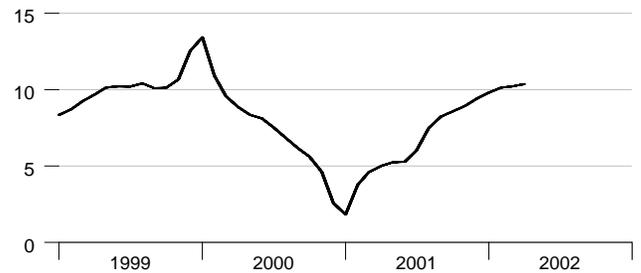
Domestic Nonfinancial Debt

Percent change from year ago



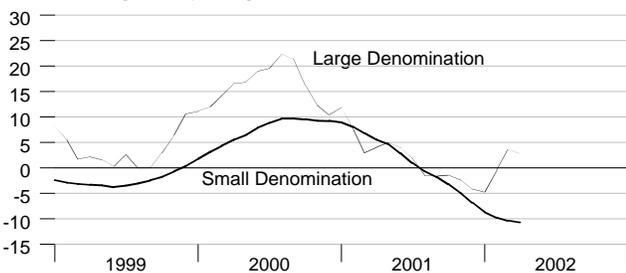
Currency Held by the Nonbank Public

Percent change from year ago



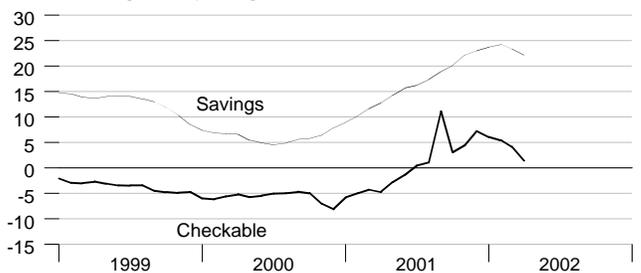
Time Deposits

Percent change from year ago



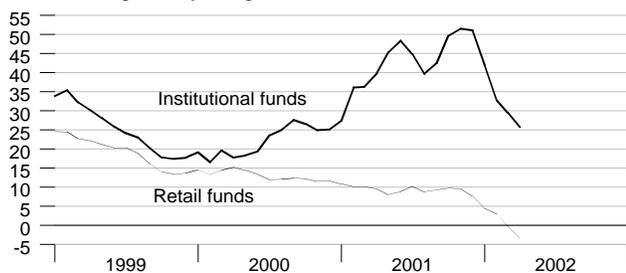
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

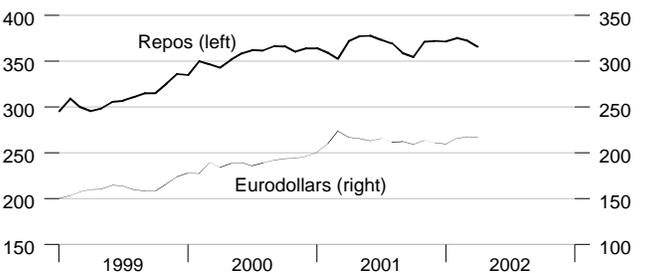
Percent change from year ago



Repurchase Agreements and Eurodollars

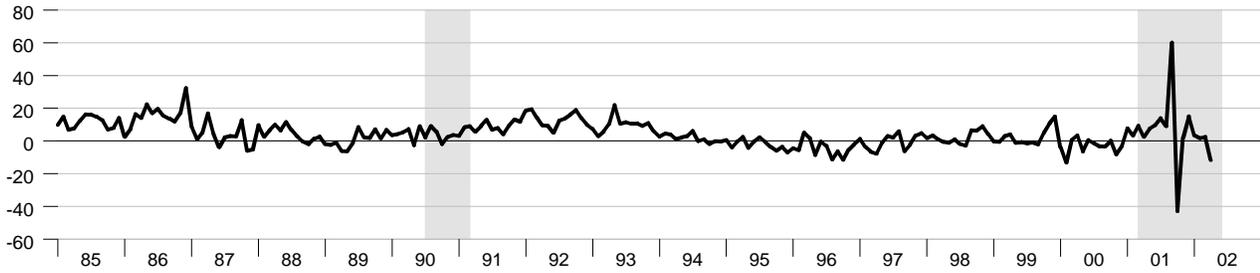
Billions of dollars

Billions of dollars



M1

Percent change at an annual rate



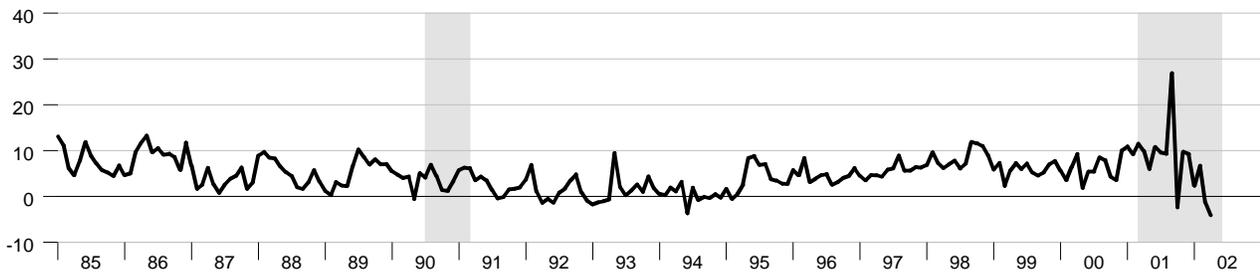
M2

Percent change at an annual rate



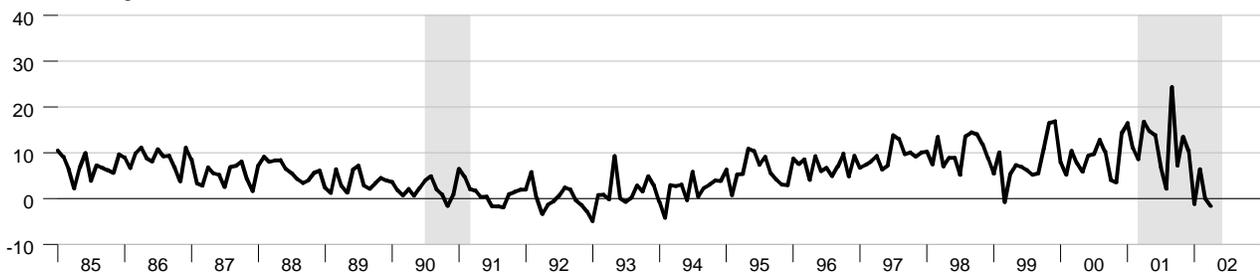
M3

Percent change at an annual rate

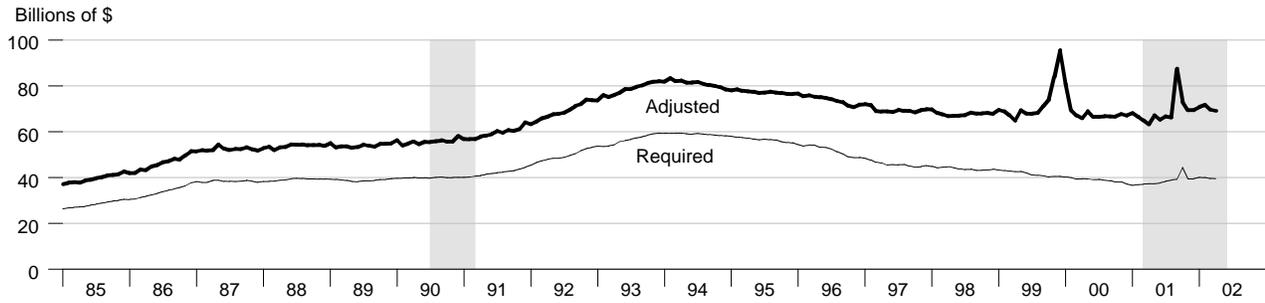


M3

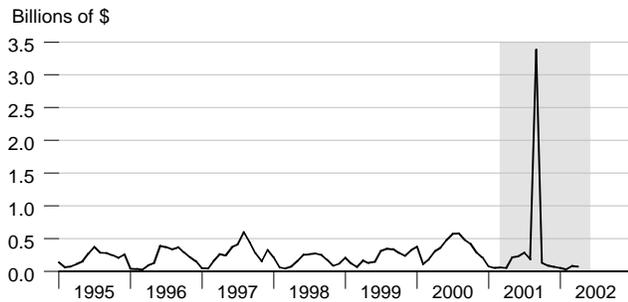
Percent change at an annual rate



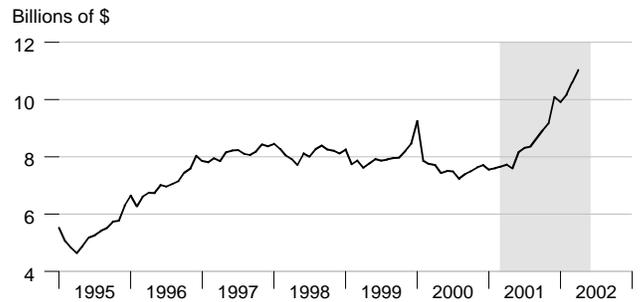
Adjusted and Required Reserves



Total Borrowings, nsa



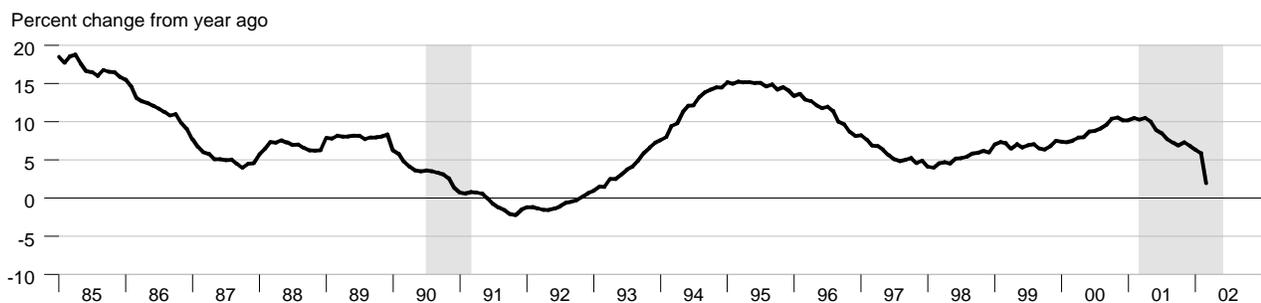
Excess Reserves plus RCB Contracts



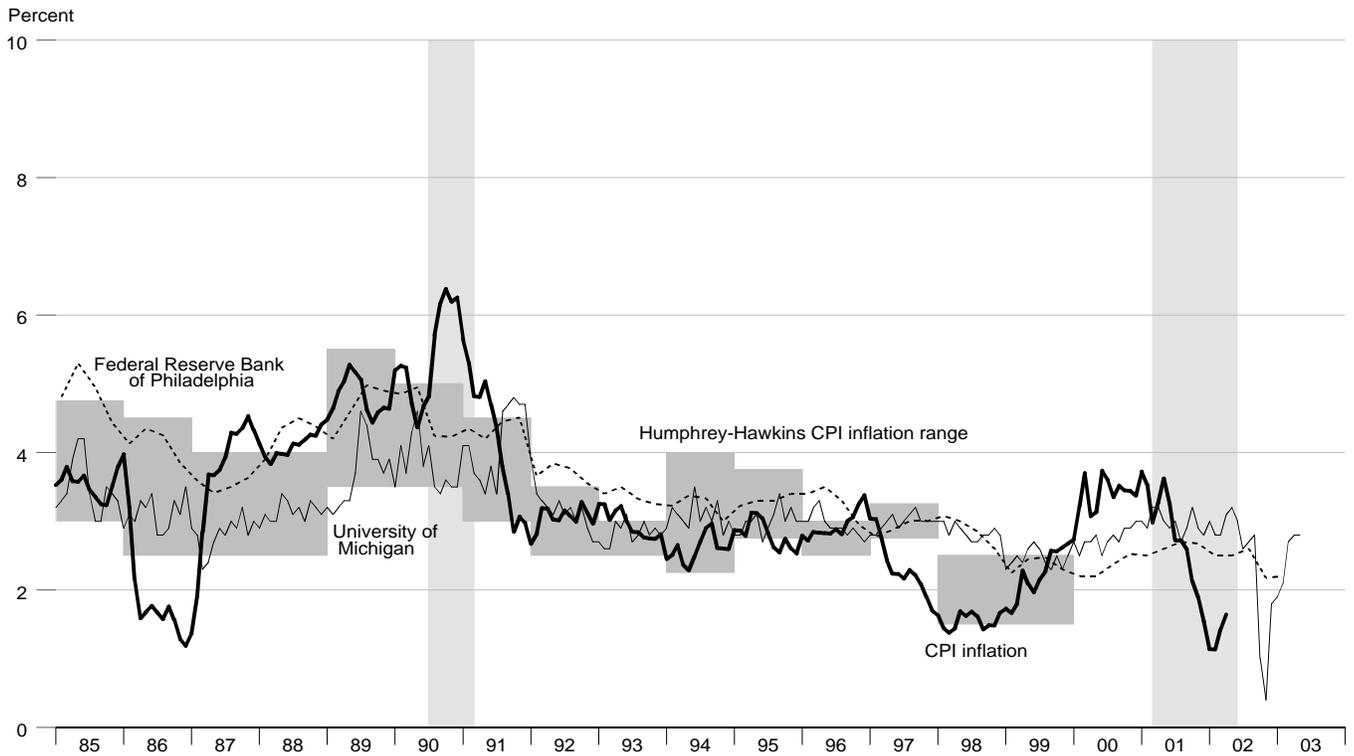
Nonfinancial Commercial Paper



Consumer Credit

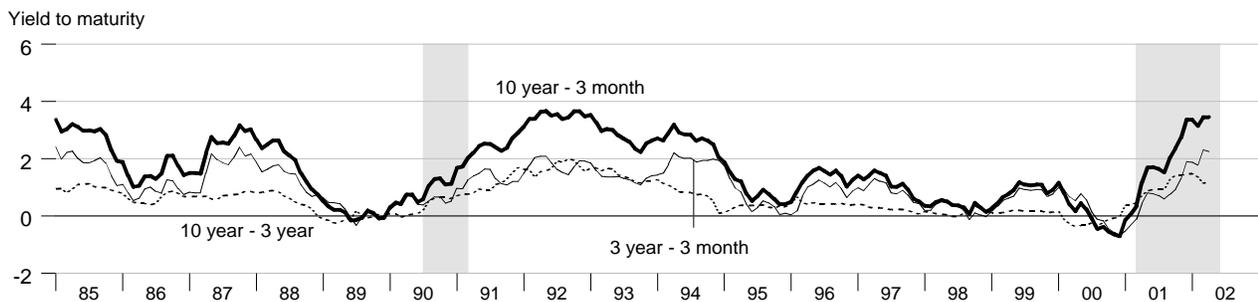


Inflation and Inflation Expectations

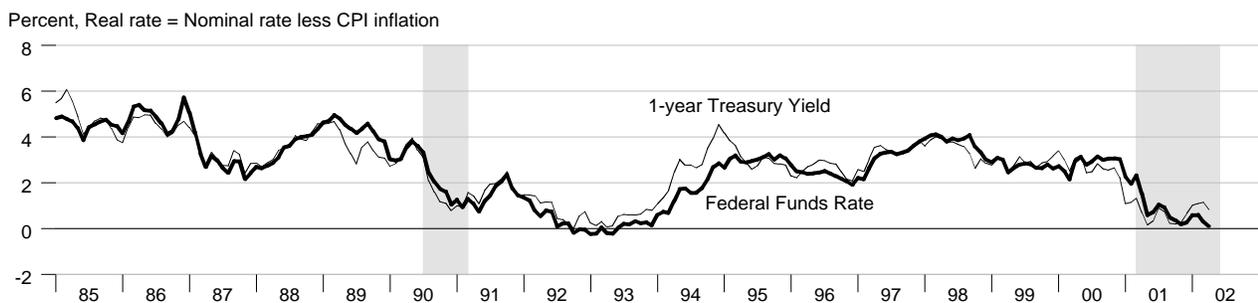


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

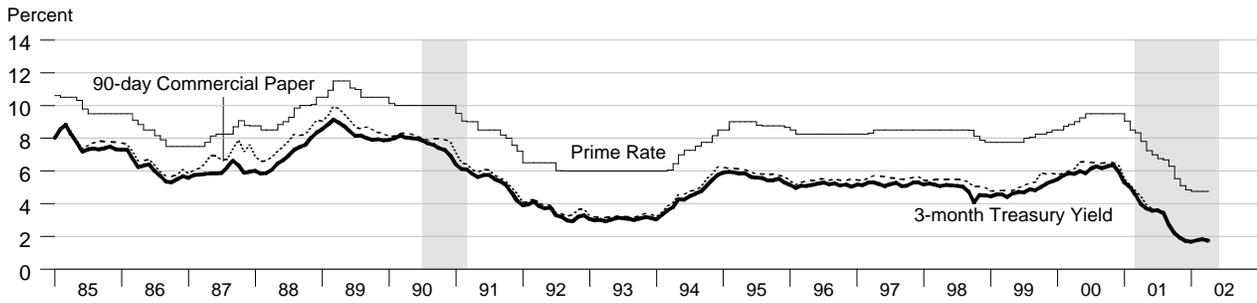
Treasury Security Yield Spreads



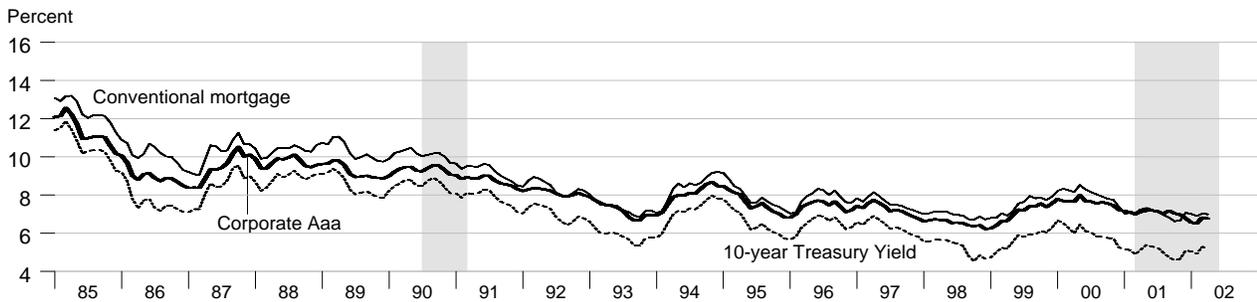
Real Interest Rates



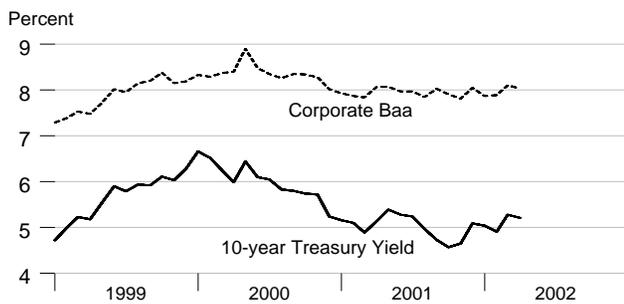
Short Term Interest Rates



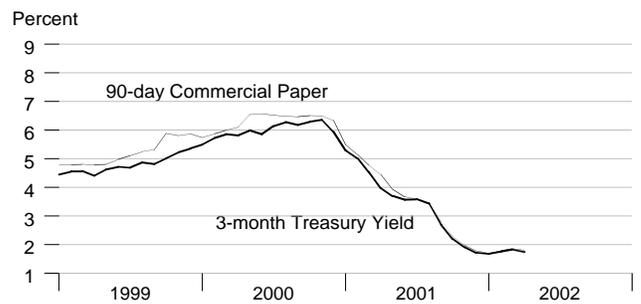
Long Term Interest Rates



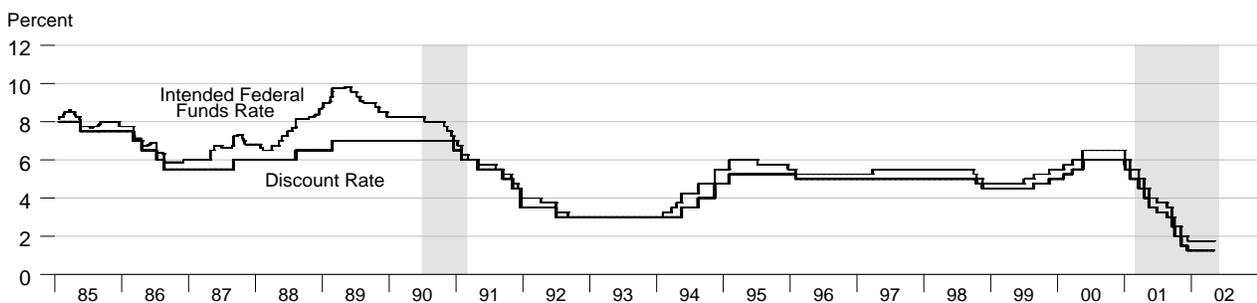
Long Term Interest Rates



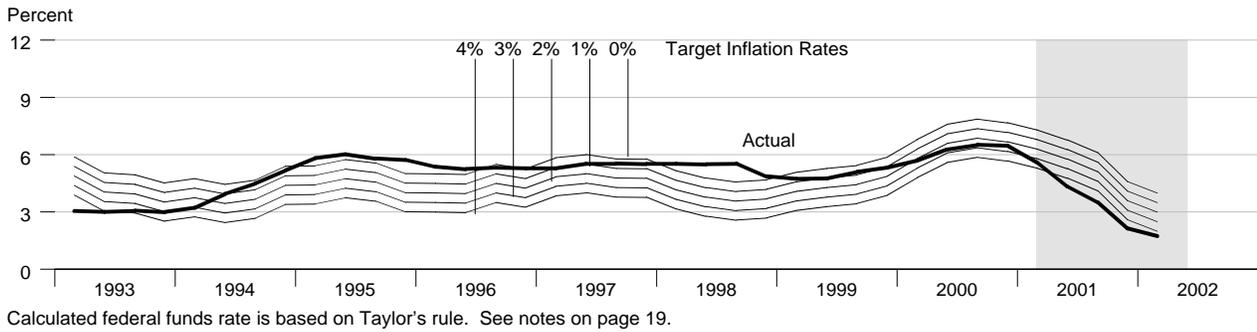
Short Term Interest Rates



FOMC Intended Federal Funds Rate and Discount Rate

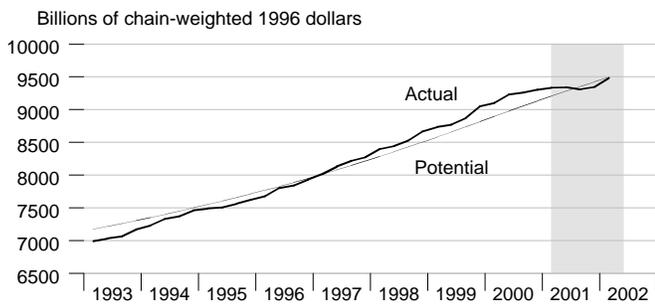


Federal Funds Rate and Inflation Targets

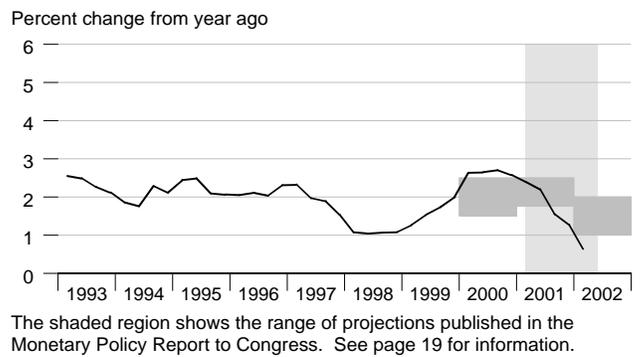


Components of Taylor's Rule

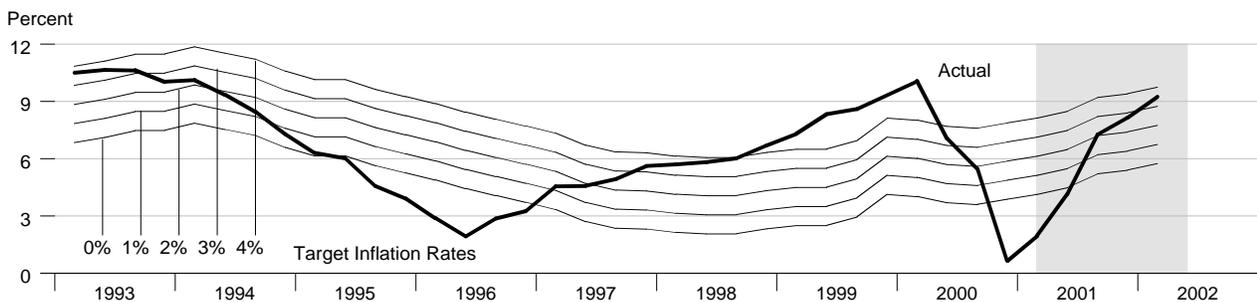
Actual and Potential Real GDP



PCE Inflation and Projections



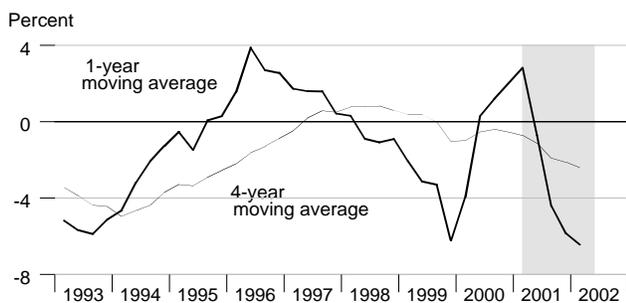
Monetary Base Growth* and Inflation Targets



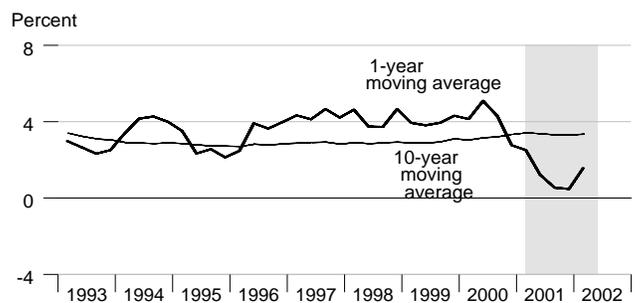
*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

Monetary Base Velocity Growth



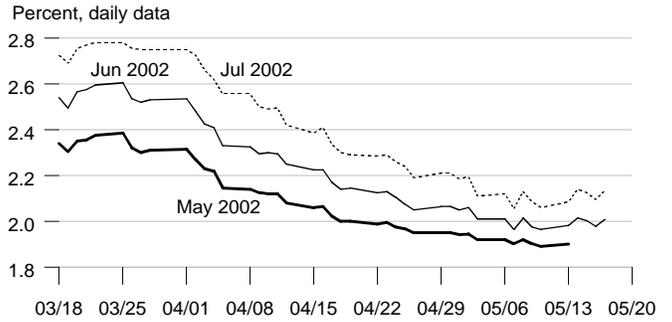
Real Output Growth



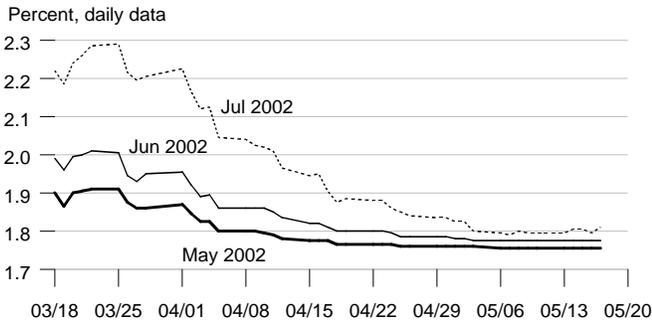
Implied One-Year Forward Rates



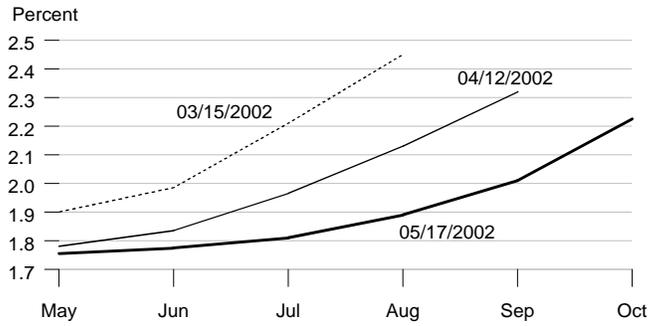
Rates on 3-Month Eurodollar Futures



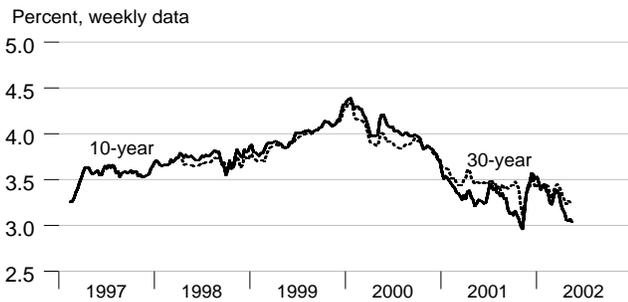
Rates on Selected Fed Funds Futures Contracts



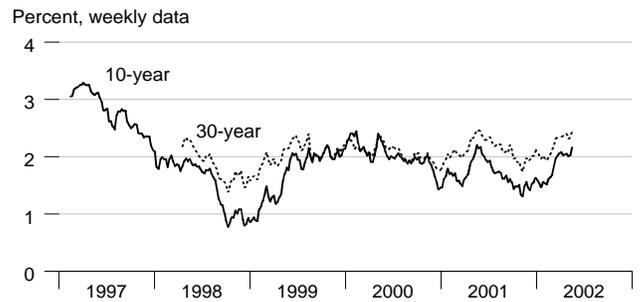
Implied Yields on Fed Funds Futures



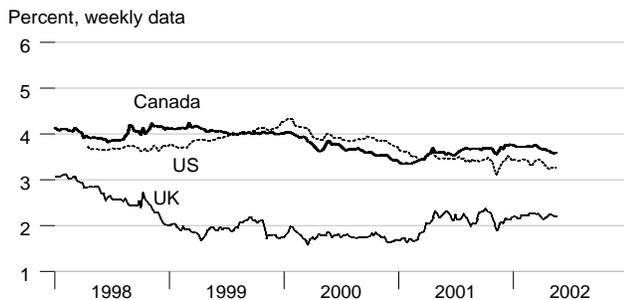
Inflation-Protected Treasury Yields



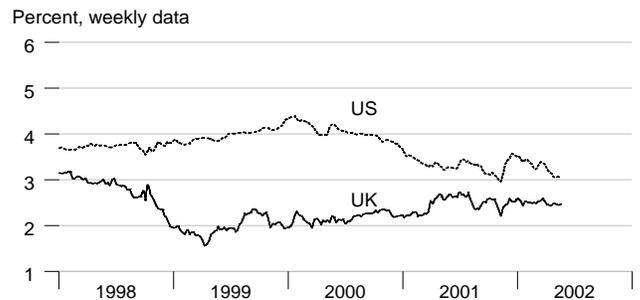
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds

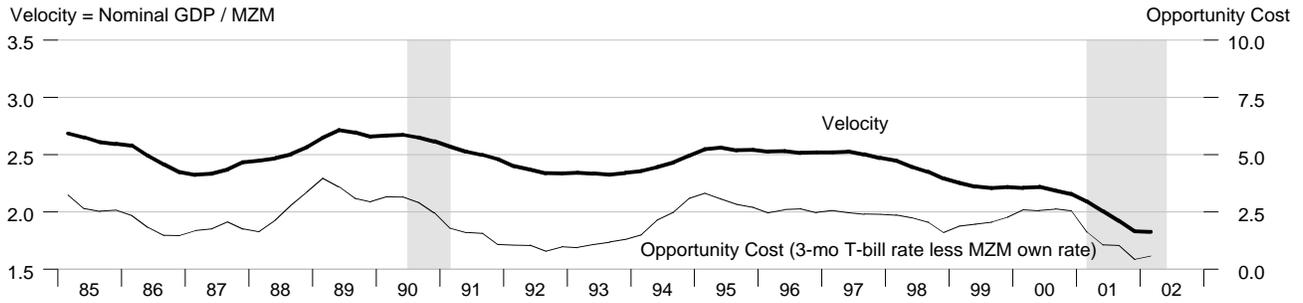


Inflation-Indexed 10-Year Bonds



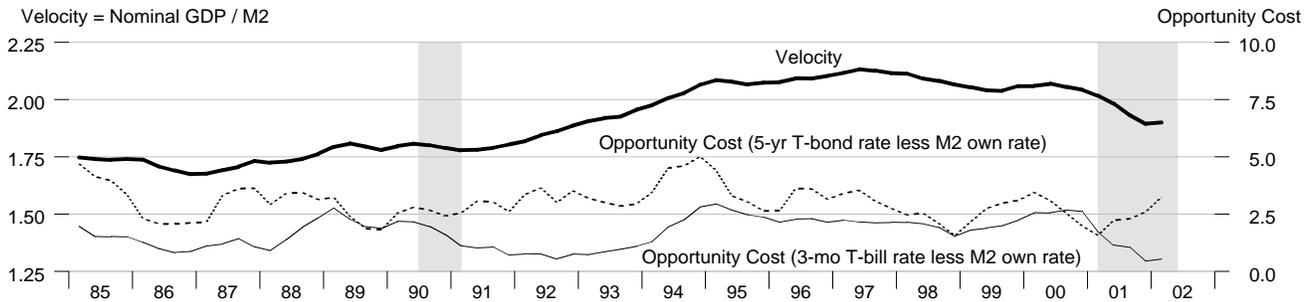
MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM



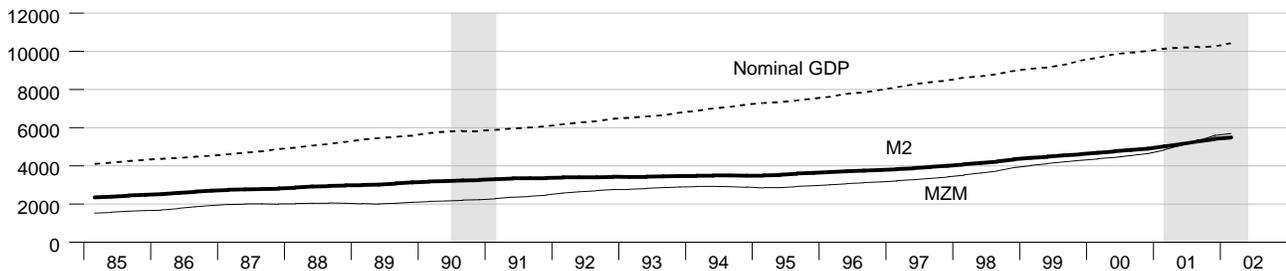
M2 Velocity and Opportunity Cost

Velocity = Nominal GDP / M2



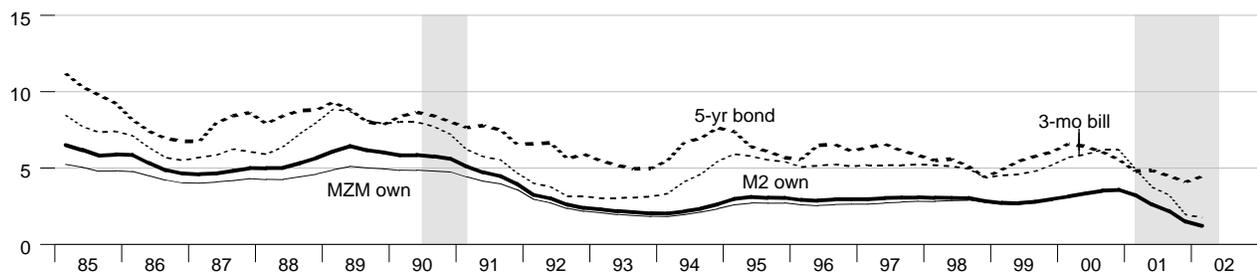
M2, MZM and Nominal GDP

Billions of \$



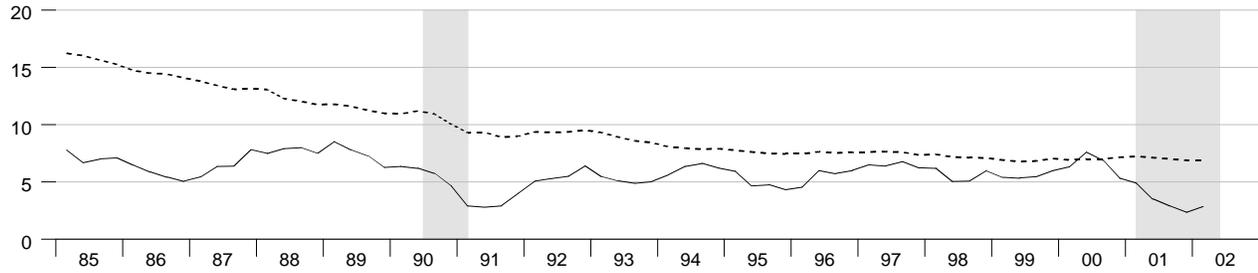
Interest Rates

Percent



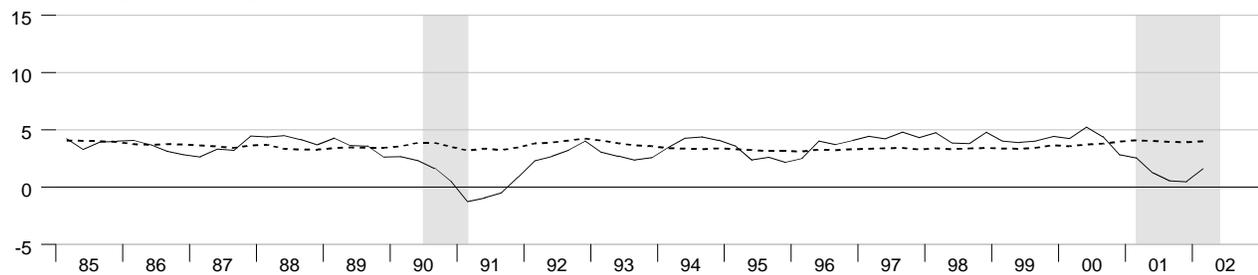
Gross Domestic Product

Percent change from year ago



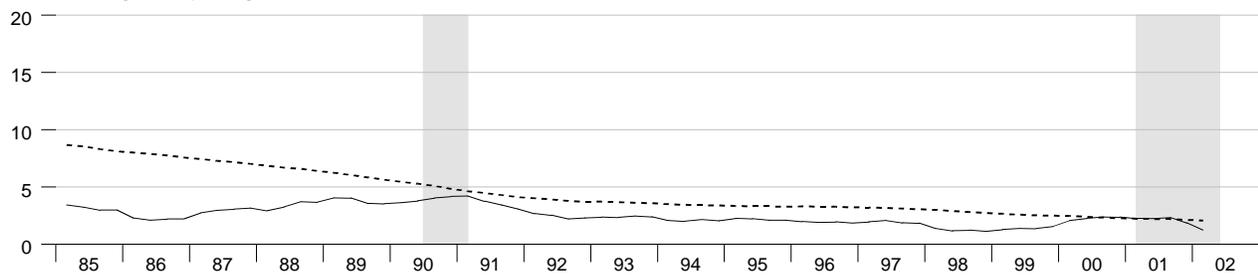
Real Gross Domestic Product

Percent change from year ago



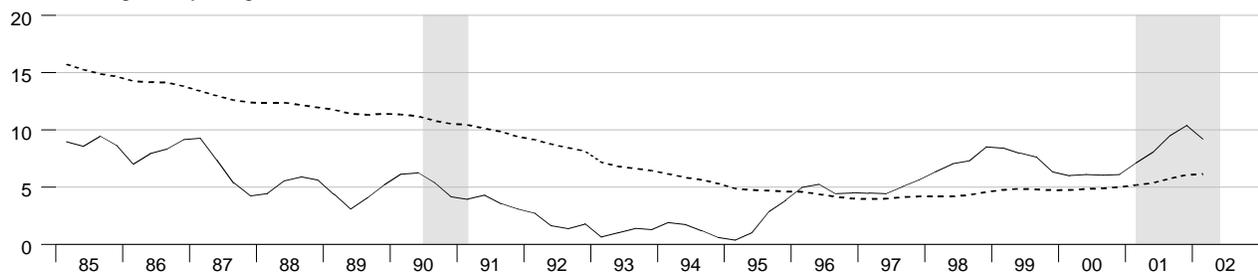
Gross Domestic Product Price Index

Percent change from year ago



M2

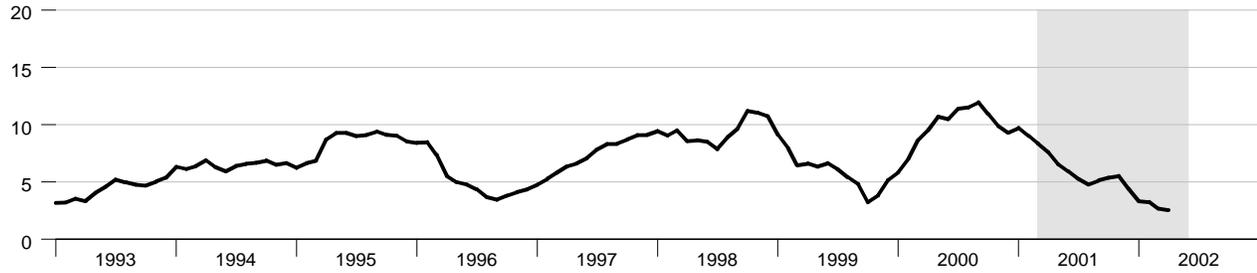
Percent change from year ago



Dashed lines indicate 10-year moving averages

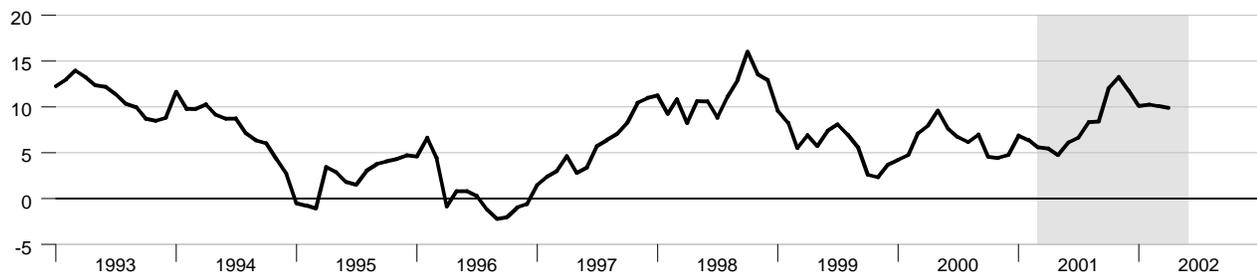
Bank Credit

Percent change from year ago



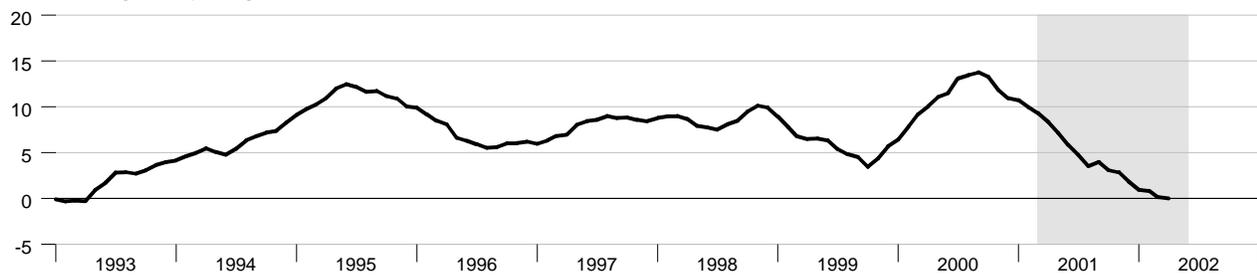
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



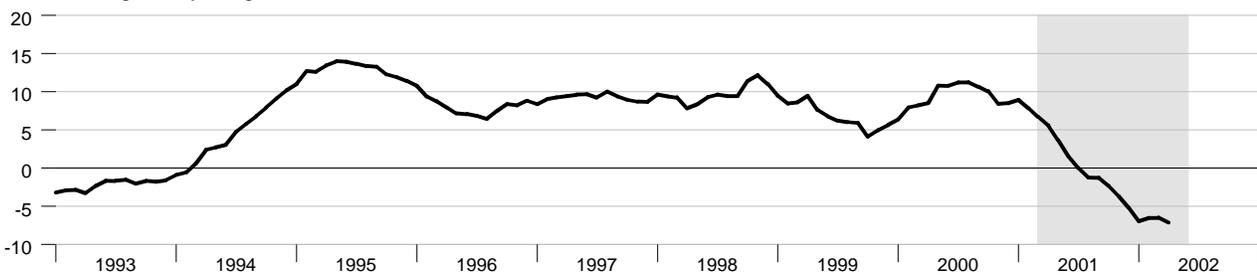
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

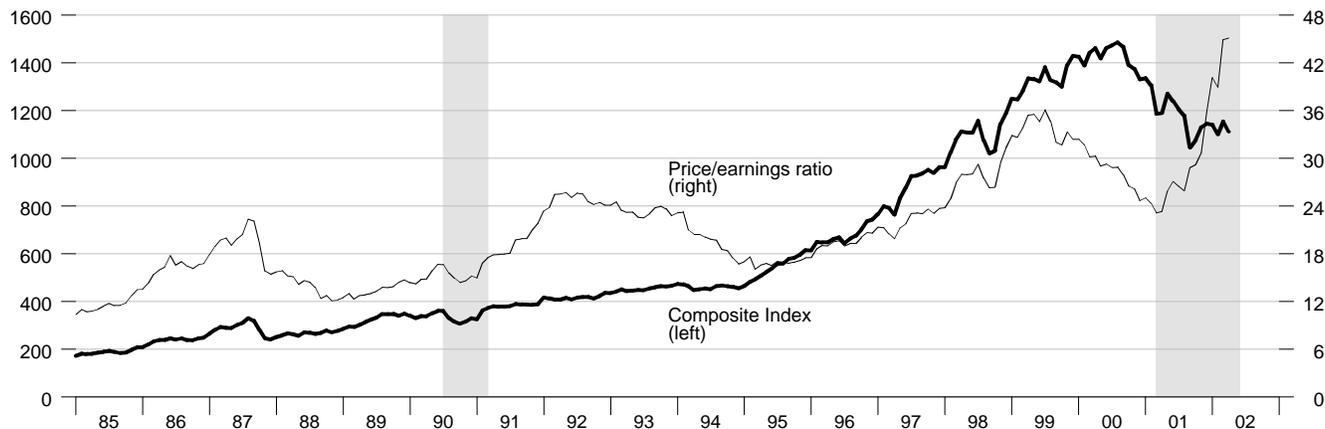


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



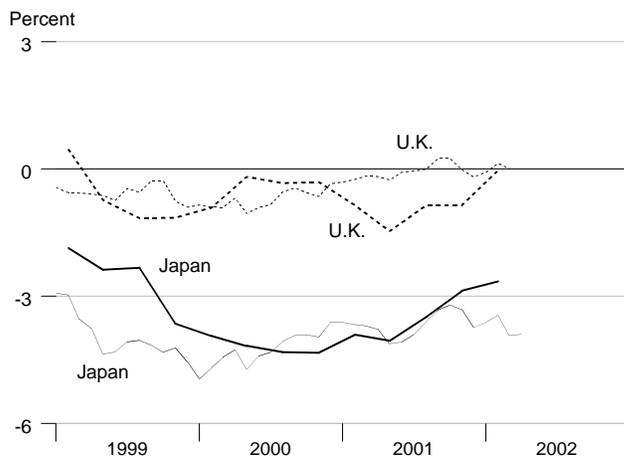
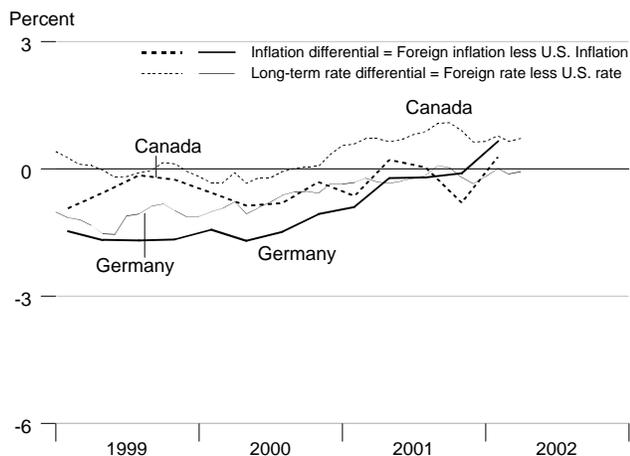
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	2001Q2	2001Q3	2001Q4	2002Q1	Jan02	Feb02	Mar02	Apr02
United States	3.38	2.66	1.89	1.25	5.04	4.91	5.28	5.21
Canada	3.60	2.69	1.10	1.53	5.69	5.69	5.93	5.93
France	2.02	1.79	1.43	2.13	5.39	5.42	5.57	.
Germany	3.16	2.46	1.79	1.90	4.86	4.92	5.16	5.15
Italy	3.05	2.80	2.40	2.50	5.14	5.20	5.41	.
Japan	-0.67	-0.84	-0.98	-1.40	1.42	1.46	1.36	1.31
United Kingdom	1.91	1.80	1.04	1.21	4.96	5.04	5.29	.

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank	Adjusted		
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
	1997	1069.292	3320.460	3920.394	5211.258	3955.521	478.708	69.523	226.529
	1998	1079.990	3708.387	4207.472	5751.770	4328.591	508.942	67.808	241.567
	1999	1101.865	4166.903	4526.244	6253.479	4584.835	557.865	72.360	257.920
	2000	1104.049	4503.205	4801.361	6837.994	5032.422	590.821	68.327	272.554
	2001	1137.313	5214.477	5223.435	7617.623	5355.252	623.789	68.950	296.358
<hr/>									
2000	1	1112.680	4373.882	4694.548	6623.095	4838.378	593.102	72.390	266.813
	2	1108.119	4443.925	4764.491	6753.141	4989.547	586.045	67.097	270.377
	3	1102.126	4546.633	4836.304	6923.027	5118.306	589.054	66.670	274.533
	4	1093.271	4648.382	4910.102	7052.715	5183.457	595.084	67.151	278.493
2001	1	1100.702	4847.948	5028.922	7274.983	5274.489	604.848	66.543	285.237
	2	1117.319	5084.765	5148.343	7523.999	5322.636	610.939	65.201	292.383
	3	1163.451	5320.823	5295.764	7717.102	5376.835	633.770	73.453	300.663
	4	1167.778	5604.373	5420.710	7954.407	5447.048	645.599	70.601	307.150
2002	1	1183.402	5711.695	5492.443	8050.750	5436.550	663.281	70.715	311.580
<hr/>									
2000	Apr	1111.965	4427.242	4752.376	6713.639	4936.679	583.053	65.913	269.700
	May	1105.976	4440.582	4759.809	6746.521	5000.552	587.863	68.889	270.060
	Jun	1106.415	4463.950	4781.289	6799.262	5031.411	587.220	66.490	271.370
	Jul	1105.149	4500.162	4802.898	6854.459	5075.226	588.032	66.555	272.740
	Aug	1102.141	4546.055	4836.988	6927.742	5115.019	588.436	66.765	274.540
	Sep	1099.088	4593.683	4869.026	6986.880	5164.673	590.694	66.689	276.320
	Oct	1099.233	4616.667	4886.657	7010.620	5152.904	593.064	66.688	277.290
	Nov	1091.724	4637.370	4901.331	7031.568	5174.343	595.549	67.686	278.050
	Dec	1088.856	4691.108	4942.318	7115.956	5223.125	596.639	67.078	280.140
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2001	Jan	1095.843	4760.199	4987.232	7213.614	5265.117	600.886	68.095	282.640
	Feb	1098.905	4854.857	5025.672	7279.561	5269.795	607.234	66.556	285.110
	Mar	1107.359	4928.789	5073.861	7331.774	5288.554	606.425	64.979	287.960
	Apr	1109.742	4999.713	5115.811	7434.274	5311.506	605.800	63.239	290.400
	May	1116.628	5080.956	5141.439	7525.379	5327.478	613.259	67.119	292.120
	Jun	1125.587	5173.627	5187.780	7612.343	5328.924	613.759	65.246	294.630
	Jul	1138.570	5235.407	5229.200	7656.007	5342.130	619.439	66.654	296.840
	Aug	1147.188	5276.202	5269.962	7669.936	5358.882	627.454	66.276	299.400
	Sep	1204.596	5450.861	5388.131	7825.362	5429.492	654.416	87.430	305.750
	Oct	1161.548	5518.640	5377.621	7872.438	5429.239	644.294	73.000	304.920
	Nov	1163.637	5606.576	5421.315	7960.846	5459.463	644.405	69.366	307.210
	Dec	1178.148	5687.902	5463.194	8029.938	5452.443	648.098	69.437	309.320
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2002	Jan	1181.479	5683.142	5473.982	8022.162	5439.381	655.825	70.815	310.210
	Feb	1183.142	5723.777	5504.566	8064.905	5440.676	667.155	71.696	312.180
	Mar	1185.585	5728.165	5498.781	8065.182	5429.593	666.864	69.633	312.350
	Apr	1174.020	5714.068	5480.142	8054.364	5446.508	667.631	69.112	311.940

*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	10 yr			
1997		5.46	5.00	8.44	5.62	5.20	6.10	6.35	7.26	5.32	7.60
1998		5.35	4.92	8.35	5.47	4.91	5.14	5.26	6.53	4.93	6.94
1999		4.97	4.62	7.99	5.33	4.78	5.49	5.64	7.04	5.28	7.43
2000		6.24	5.73	9.23	6.46	6.00	6.22	6.03	7.62	5.58	8.06
2001		3.89	3.41	6.92	3.69	3.47	4.08	5.02	7.08	4.99	6.97
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2000	1	5.68	5.19	8.69	6.03	5.70	6.56	6.48	7.71	5.82	8.26
	2	6.27	5.74	9.25	6.57	5.89	6.52	6.18	7.77	5.72	8.32
	3	6.52	6.00	9.50	6.63	6.20	6.16	5.89	7.61	5.45	8.03
	4	6.47	6.00	9.50	6.59	6.20	5.63	5.57	7.40	5.32	7.64
2001	1	5.59	5.11	8.62	5.26	4.95	4.64	5.05	7.08	5.03	7.01
	2	4.33	3.83	7.34	4.10	3.75	4.43	5.27	7.22	5.11	7.13
	3	3.50	3.06	6.57	3.34	3.24	3.93	4.98	7.11	4.87	6.97
	4	2.13	1.64	5.16	2.06	1.94	3.33	4.77	6.92	4.97	6.78
2002	1	1.73	1.25	4.75	1.82	1.76	3.75	5.08	6.62	5.02	6.97
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2000	Apr	6.02	5.50	9.00	6.28	5.82	6.36	5.99	7.64	5.60	8.15
	May	6.27	5.71	9.24	6.71	5.99	6.77	6.44	7.99	5.87	8.52
	Jun	6.53	6.00	9.50	6.73	5.86	6.43	6.10	7.67	5.69	8.29
	Jul	6.54	6.00	9.50	6.67	6.14	6.28	6.05	7.65	5.53	8.15
	Aug	6.50	6.00	9.50	6.61	6.28	6.17	5.83	7.55	5.43	8.03
	Sep	6.52	6.00	9.50	6.60	6.18	6.02	5.80	7.62	5.40	7.91
	Oct	6.51	6.00	9.50	6.67	6.29	5.85	5.74	7.55	5.46	7.80
	Nov	6.51	6.00	9.50	6.65	6.36	5.79	5.72	7.45	5.38	7.75
	Dec	6.40	6.00	9.50	6.45	5.94	5.26	5.24	7.21	5.11	7.38
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2001	Jan	5.98	5.52	9.05	5.62	5.29	4.77	5.16	7.15	4.99	7.03
	Feb	5.49	5.00	8.50	5.26	5.01	4.71	5.10	7.10	5.09	7.05
	Mar	5.31	4.81	8.32	4.89	4.54	4.43	4.89	6.98	5.00	6.95
	Apr	4.80	4.28	7.80	4.53	3.97	4.42	5.14	7.20	5.14	7.08
	May	4.21	3.73	7.24	4.02	3.70	4.51	5.39	7.29	5.15	7.15
	Jun	3.97	3.47	6.98	3.74	3.57	4.35	5.28	7.18	5.03	7.16
	Jul	3.77	3.25	6.75	3.66	3.59	4.31	5.24	7.13	4.79	7.13
	Aug	3.65	3.16	6.67	3.48	3.44	4.04	4.97	7.02	4.89	6.95
	Sep	3.07	2.77	6.28	2.87	2.69	3.45	4.73	7.17	4.93	6.82
	Oct	2.49	2.02	5.53	2.31	2.20	3.14	4.57	7.03	4.89	6.62
	Nov	2.09	1.58	5.10	2.03	1.91	3.22	4.65	6.97	4.85	6.66
	Dec	1.82	1.33	4.84	1.83	1.72	3.62	5.09	6.77	5.18	7.07
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2002	Jan	1.73	1.25	4.75	1.74	1.68	3.56	5.04	6.55	5.05	7.00
	Feb	1.74	1.25	4.75	1.82	1.76	3.55	4.91	6.51	4.93	6.89
	Mar	1.73	1.25	4.75	1.91	1.83	4.14	5.28	6.81	5.09	7.01
	Apr	1.75	1.25	4.75	1.87	1.75	4.01	5.21	6.76	5.09	6.99

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

		M1	MZM	M2	M3
Percent change from previous period					
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	1997	-3.31	7.23	4.90	8.29
	1998	1.00	11.68	7.32	10.37
	1999	2.03	12.36	7.58	8.72
	2000	0.20	8.07	6.08	9.35
	2001	3.01	15.79	8.79	11.40
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2000	1	0.07	1.82	1.48	2.65
	2	-0.41	1.60	1.49	1.96
	3	-0.54	2.31	1.51	2.52
	4	-0.80	2.24	1.53	1.87
2001	1	0.68	4.29	2.42	3.15
	2	1.51	4.88	2.37	3.42
	3	4.13	4.64	2.86	2.57
	4	0.37	5.33	2.36	3.08
2002	1	1.34	1.91	1.32	1.21
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2000	Apr	0.28	0.67	0.77	0.64
	May	-0.54	0.30	0.16	0.49
	Jun	0.04	0.53	0.45	0.78
	Jul	-0.11	0.81	0.45	0.81
	Aug	-0.27	1.02	0.71	1.07
	Sep	-0.28	1.05	0.66	0.85
	Oct	0.01	0.50	0.36	0.34
	Nov	-0.68	0.45	0.30	0.30
	Dec	-0.26	1.16	0.84	1.20
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2001	Jan	0.64	1.47	0.91	1.37
	Feb	0.28	1.99	0.77	0.91
	Mar	0.77	1.52	0.96	0.72
	Apr	0.22	1.44	0.83	1.40
	May	0.62	1.62	0.50	1.23
	Jun	0.80	1.82	0.90	1.16
	Jul	1.15	1.19	0.80	0.57
	Aug	0.76	0.78	0.78	0.18
	Sep	5.00	3.31	2.24	2.03
	Oct	-3.57	1.24	-0.20	0.60
	Nov	0.18	1.59	0.81	1.12
	Dec	1.25	1.45	0.77	0.87
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2002	Jan	0.28	-0.08	0.20	-0.10
	Feb	0.14	0.72	0.56	0.53
	Mar	0.21	0.08	-0.11	0.00
	Apr	-0.98	-0.25	-0.34	-0.13

Definitions

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

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

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

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

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

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

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

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

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

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

Notes

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

www.stls.frb.org/research/swdata.html. For analytical purposes, MZM largely replaces M1. The **Discount Rate** and **Intended 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, and 10 years to maturity. Daily data and descriptions are available at www.stls.frb.org/fred/data/wkly.html. See also *Federal Reserve Bulletin*, table 1.35. The 30-year constant maturity series was discontinued by the Treasury Department as of February 18, 2002.

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

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

Page 8: **Inflation expectations** measures include the quarterly Federal Reserve Bank of Philadelphia *Survey of Professional Forecasters*, the monthly University of Michigan Survey Research Center's *Surveys of Consumers*, and the annual Federal Open Market Committee (FOMC) 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 Intended Federal Funds Rate** is the level (or midpoint of the range, if applicable) of the federal funds rate that the staff of the FOMC expected to be consistent with the desired degree of pressure on bank reserve positions. In recent years, the FOMC has set an explicit target for the federal funds rate.

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) measured on a year-over-year basis, y_{t-1} is the log of the previous period's level of real GDP, and y_{t-1}^P is the log of an estimate of the previous period's level of potential output. **Potential Real GDP** is as estimated by the Congressional Budget Office.

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

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

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 "r" is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula $((y_t - y_{t-40})/40) \times 4 \times 100$, where y_t is the log of real GDP. The four-year moving average of base velocity growth is calculated similarly. To adjust the monetary base for the effect of retail-deposit sweep programs, we add to the monetary base an amount equal to 10 percent of the total amount swept, as estimated by the Federal

Reserve Board staff. These estimates are imprecise, at best. Sweep program data are available at www.stls.frb.org/research/swdata.html.

Page 11: Implied One-Year Forward Rates are calculated by this Bank from Treasury constant maturity yields. Yields to maturity, $R(m)$, for securities with $m = 1, \dots, 10$ years to maturity are obtained by linear interpolation between reported yields. These yields are smoothed by fitting the regression suggested by Nelson and Siegel (1987)

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

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

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

where duration is approximated as $D(m) = (1 - e^{-R(m) \times m}) / R(m)$. These rates are linear approximations to the true instantaneous forward rates; see Shiller (1990). For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Eurodollar Futures and Rates on Selected Fed Funds Futures Contracts** each trace through time the yield on three specific contracts. **Implied Yields on Fed Funds Futures** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Protected Treasury Yields** are yields on the most recently issued inflation-protected securities of 10- and 30-year original maturity. **Inflation-Protected Treasury Yield Spreads** equal, for 10- and 30-year maturities, the difference between the yields on the most recently issued inflation-protected securities and the unadjusted bond yields of similar maturity. **Inflation-Indexed 30-Year Bonds** shows the yield of an inflation-indexed bond that is scheduled to mature in approximately (but not greater than) 30 years. The current bond for Canada has a maturity date of 12/01/2031, the current U.K. bond has a maturity date of 7/22/2030, and the current U.S. bond has a maturity date of 4/15/2032. **Inflation-Indexed 10-Year Bonds** shows the yield of an inflation-indexed bond that is scheduled to mature in approximately (but not greater than) 10 years. The current U.K. bond has a maturity date of 8/23/2011 and the current U.S. bond has a maturity date of 1/15/2011.

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

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

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

Sources

Bank of Canada

Canadian inflation-linked bond yields.

Bank of England

U.K. inflation-linked bond yields.

Board of Governors of the Federal Reserve System

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

Bureau of Economic Analysis

Gross domestic product.

Bureau of Labor Statistics

Consumer price index.

Federal Reserve Bank of Philadelphia

Survey of Professional Forecasters inflation expectations.

Federal Reserve Bank of St. Louis

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

Organization for Economic Cooperation and Development

International interest and inflation rates.

University of Michigan Survey Research Center

Median expected price change.

Congressional Budget Office

Potential real GDP.

Dow Jones and Co. (Wall Street Journal)

Federal funds futures contracts, Eurodollar futures.

Standard and Poors Inc.

Stock price-earnings ratio, stock price composite index.

U.S. Department of the Treasury

U.S. inflation-protected security yields.

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