

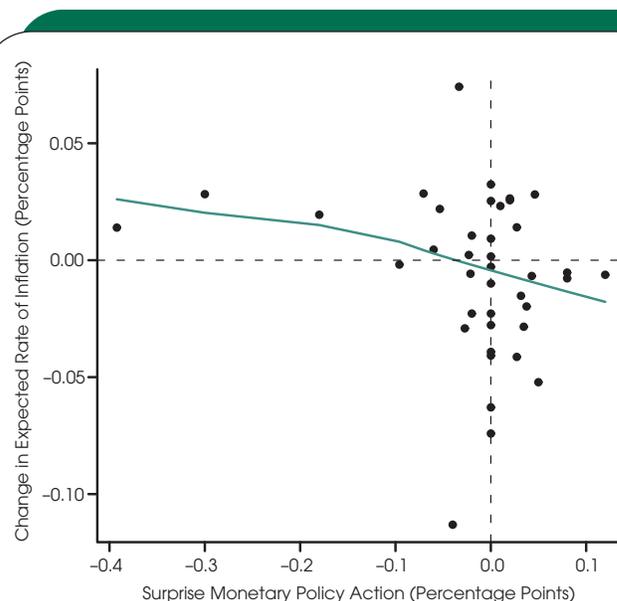
Does the TIPS Spread Overshoot?

When making monetary policy decisions, the Federal Reserve looks to financial markets for information about the state of the economy and their expectations of monetary policy actions. For instance, the difference in yields between nominal and inflation-indexed Treasury securities—the TIPS spread—tells the Federal Reserve about the average rate of CPI-U inflation the markets expect for the time to maturity of these securities. (CPI-U is the consumer price index for all urban consumers.) Similarly, the federal funds futures market offers the Federal Reserve a reading of the markets' expectations about the path of the federal funds rate over the next few months. Clearly, through communication, the Federal Reserve tries to offer the markets some guidance about its intentions. Yet, decisions on monetary policy actions are not finalized before the Federal Open Market Committee (FOMC) actually meets. It is thus almost inevitable that, on occasion, the Federal Reserve will surprise the markets.

It is interesting to know how the TIPS spread—the markets' gauge of the expected rate of inflation—responds to surprises in monetary policy actions and whether these responses are sensible in magnitude. The chart plots, for the period January 1999 through September 2003, surprises in monetary policy actions against changes in the TIPS spread. Surprises in monetary policy actions—that is, in the federal funds rate target—are measured by the price change of near-expiration federal funds futures contracts on days of scheduled FOMC meetings and on days of unscheduled, intermeeting monetary policy actions. The regression line in the chart, which was generated using a technique that is robust to outliers, is downward sloping. This suggests that monetary policy actions influence market participants as follows: tighter-(easier)-than-expected actions lead market participants to expect a lower (higher) average rate of inflation over the next 10 years, as reflected in the TIPS spread. (The author confirmed the statistical significance of this finding in a more comprehensive regression approach and for alternative measures of the TIPS spread.)

Are changes in inflation expectations after monetary policy surprises of similar size as actual changes in the rate of inflation? To answer this question we compare updates of the rate of expected inflation with updates of the actual rate of inflation. For every month during the period January 1999 through September 2003, we measure the logarithmic change in the average rate of inflation over the previous 10 years and the logarithmic change in the constant-maturity 10-year TIPS spread. Changes in the TIPS spread—and thus measured inflation expectations—are well aligned with actual changes in the rate of inflation when updates of the markets' forecast of the future average rate of inflation and updates of the past average rate of inflation are of similar size. In fact, we find that the sum of the absolute values of logarithmic changes of the expected rate of inflation is 7.4 times the sum of actual logarithmic changes in the 10-year average rate of inflation. It seems then that inflation expectations, at least as judged by the yield spread between nominal and inflation-indexed Treasury securities, tend to overshoot.

—Frank A. Schmid



NOTE: The surprise component of the FOMC decision on the federal funds target rate is measured by the price change in the respective month's federal funds futures contract, adjusted for the number of calendar days remaining for the month. If the FOMC policy action happened within the last seven days of the month, the price change of next month's federal funds futures contract was used.

Views expressed do not necessarily reflect official positions of the Federal Reserve System.

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Conventions used in this publication:

1. Unless otherwise indicated, data are monthly.
2. Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.
3. *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:

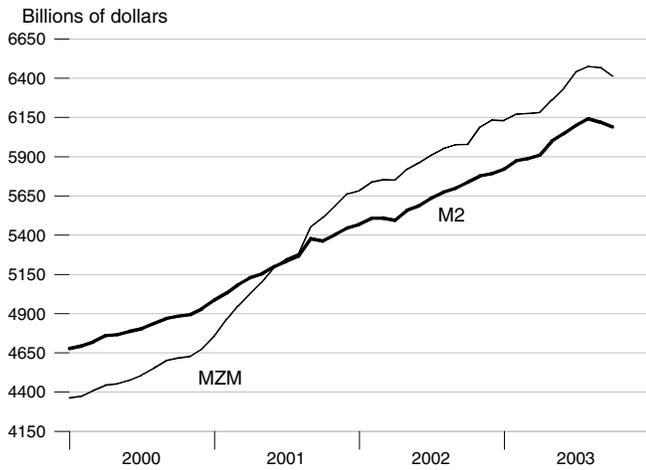
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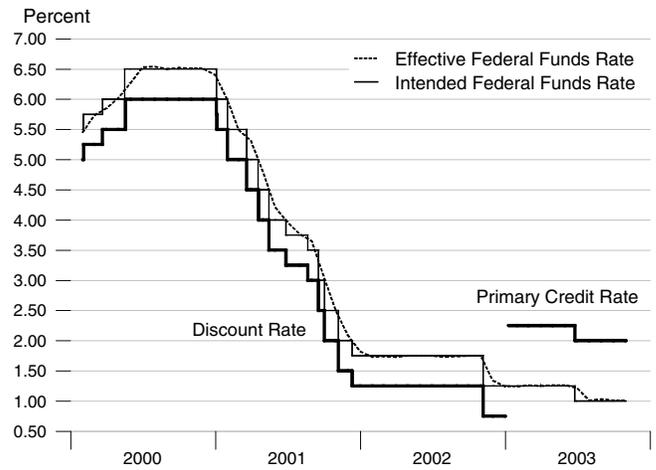
stlsFRED@stls.frb.org

Beginning this issue, 10-year and 30-year inflation-indexed government bond yields for France are included on page 11.

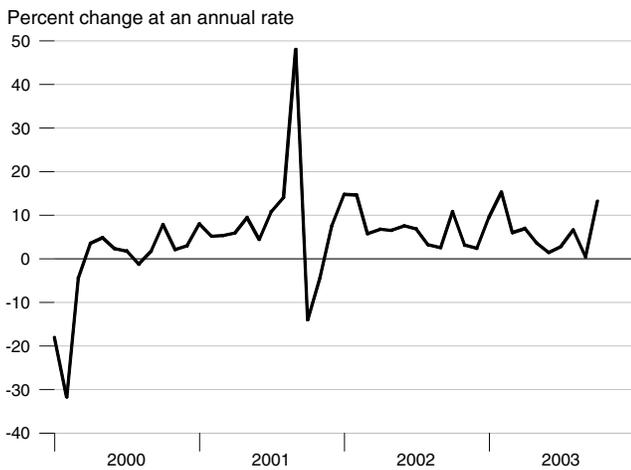
M2 and MZM



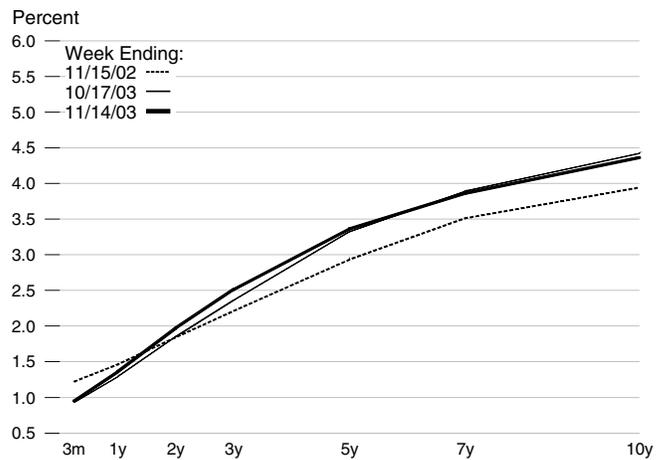
Reserve Market Rates



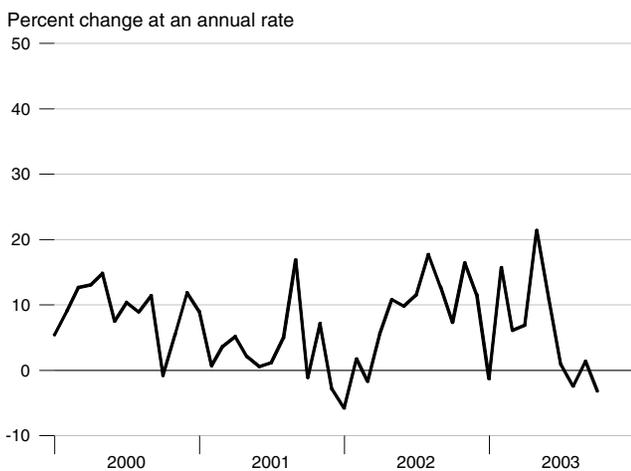
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

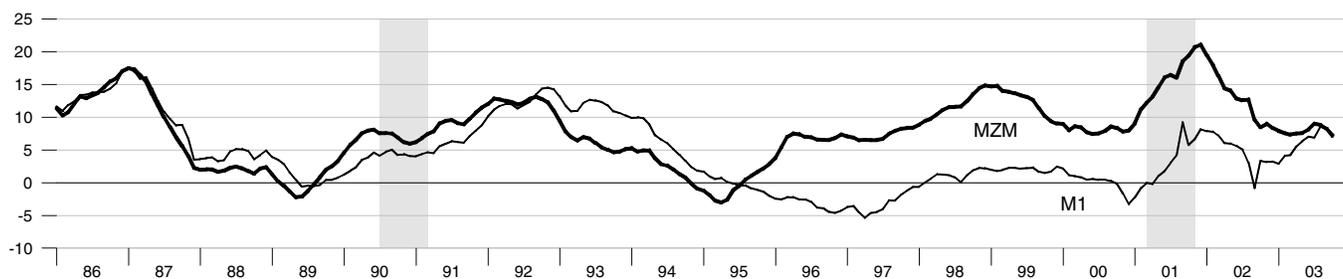


Interest Rates

	Aug 03	Sep 03	Oct 03
Federal Funds Rate	1.03	1.01	1.01
Prime Rate	4.00	4.00	4.00
Primary Credit Rate	2.00	2.00	2.00
Conventional Mortgage Rate	6.26	6.15	5.95
Treasury Yields:			
3-Month Constant Maturity	0.97	0.96	0.94
6-Month Constant Maturity	1.05	1.03	1.02
1-Year Constant Maturity	1.31	1.24	1.25
3-Year Constant Maturity	2.44	2.23	2.26
5-Year Constant Maturity	3.37	3.18	3.19
10-Year Constant Maturity	4.45	4.27	4.29

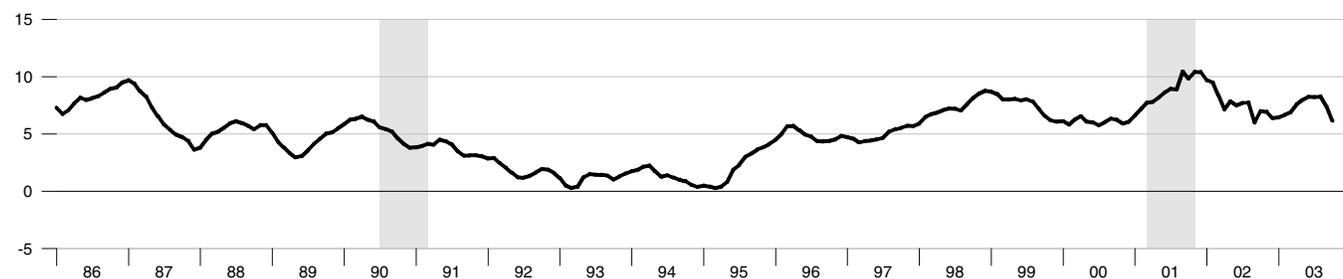
MZM and M1

Percent change from year ago



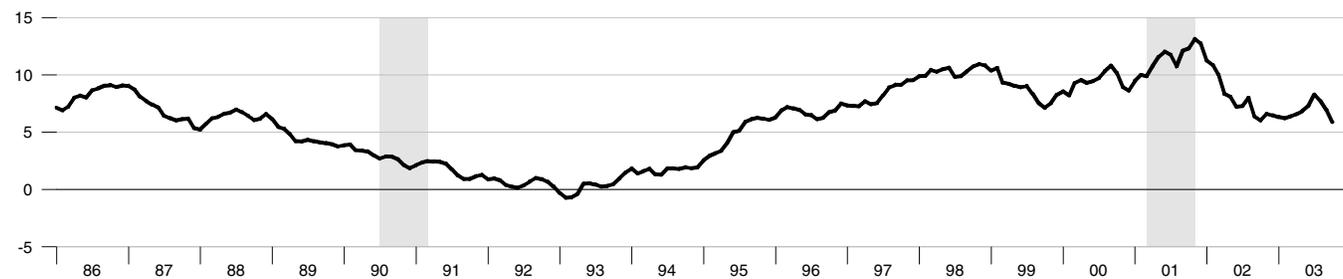
M2

Percent change from year ago



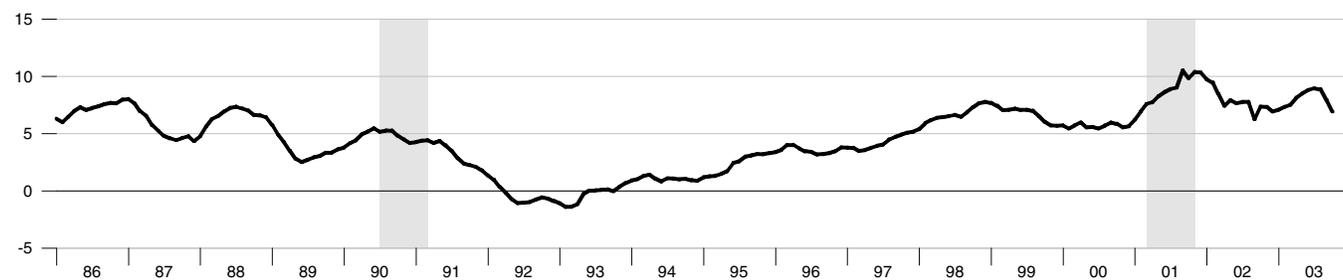
M3

Percent change from year ago



Monetary Services Index - M2

Percent change from year ago



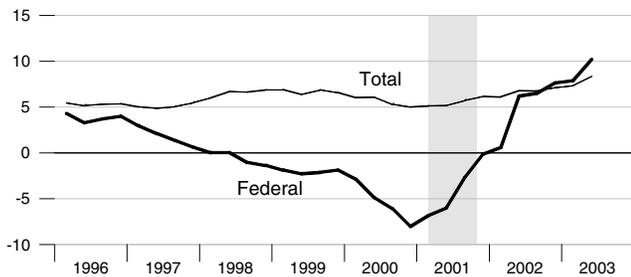
Adjusted Monetary Base

Percent change from year ago



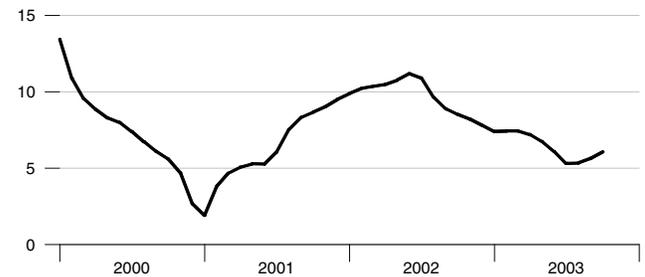
Domestic Nonfinancial Debt

Percent change from year ago



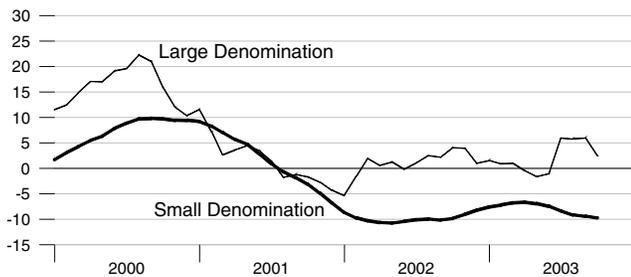
Currency Held by the Nonbank Public

Percent change from year ago



Time Deposits

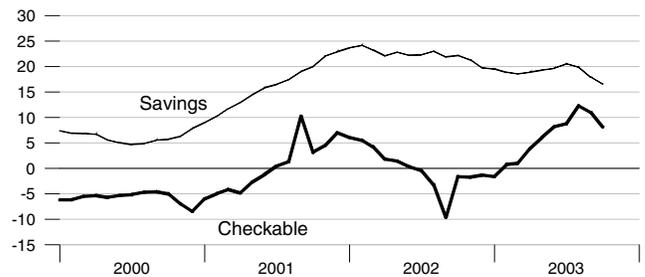
Percent change from year ago



Note: The surge in large time deposits for the month of July 2003, was due to accounting changes for commercial banks. For further information, please refer to www.federalreserve.gov/releases/h8/.

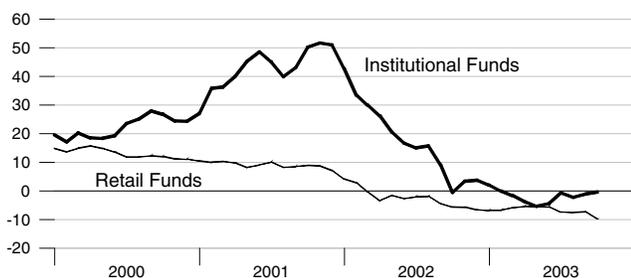
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

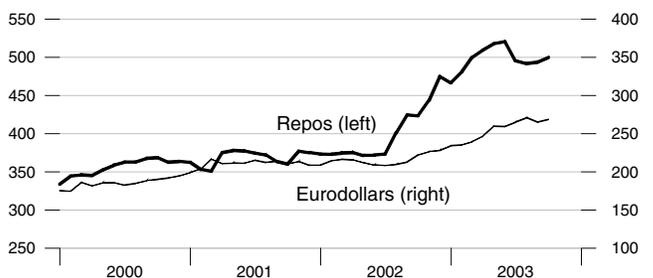
Percent change from year ago



Repurchase Agreements and Eurodollars

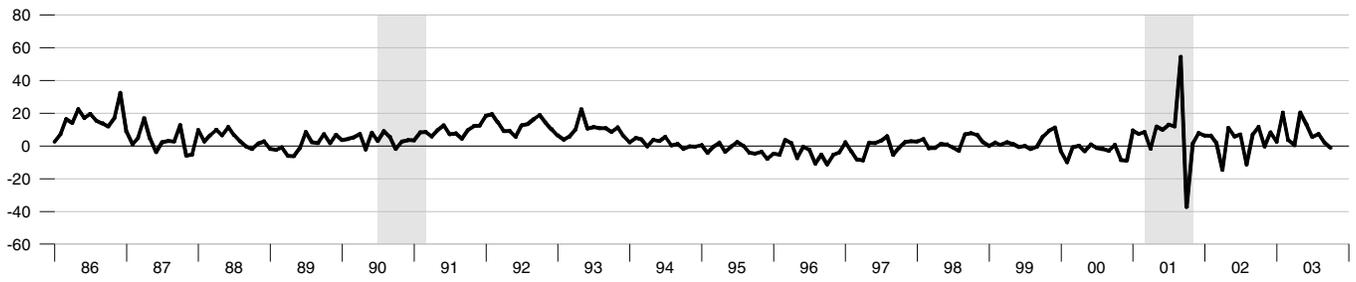
Billions of dollars

Billions of dollars



M1

Percent change at an annual rate



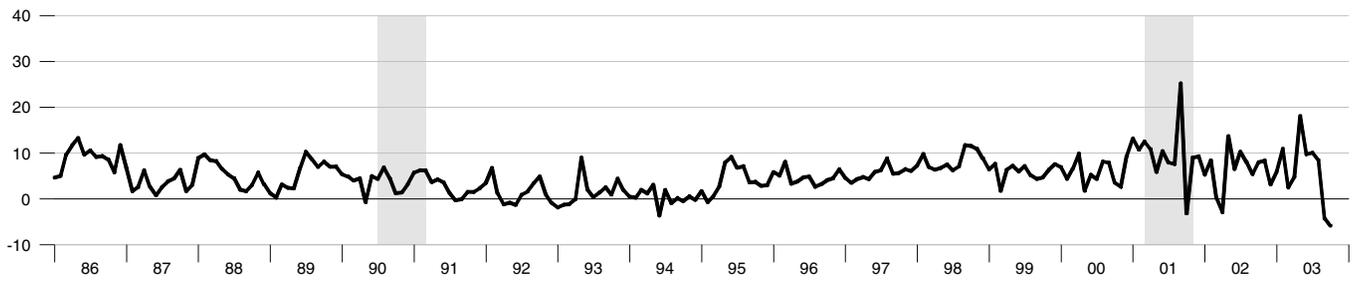
MZM

Percent change at an annual rate



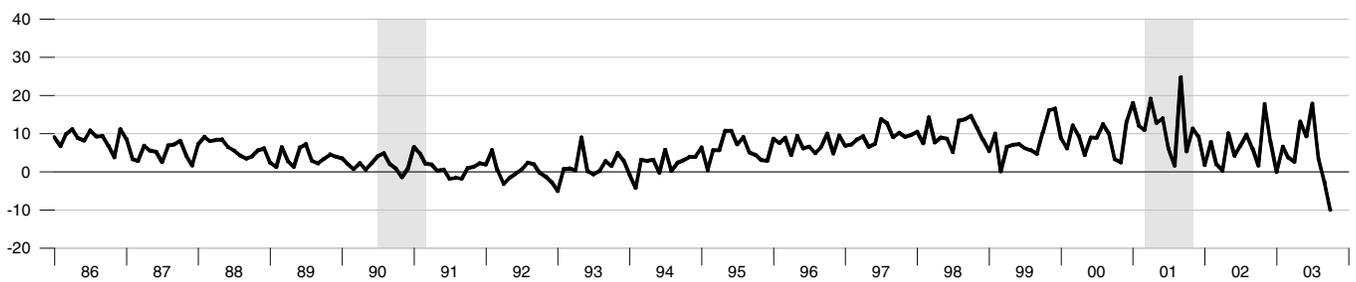
M2

Percent change at an annual rate



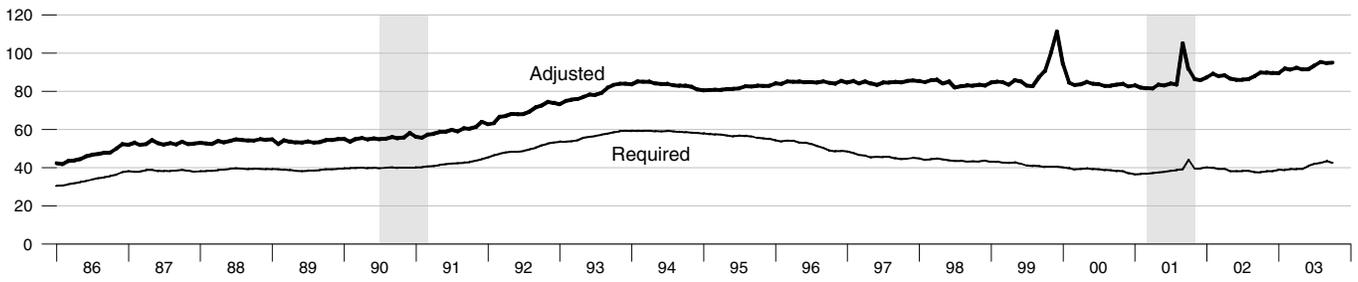
M3

Percent change at an annual rate



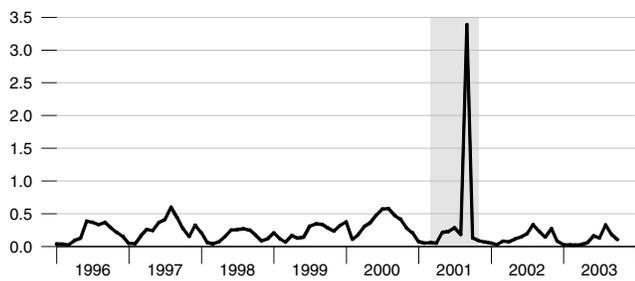
Adjusted and Required Reserves

Billions of dollars



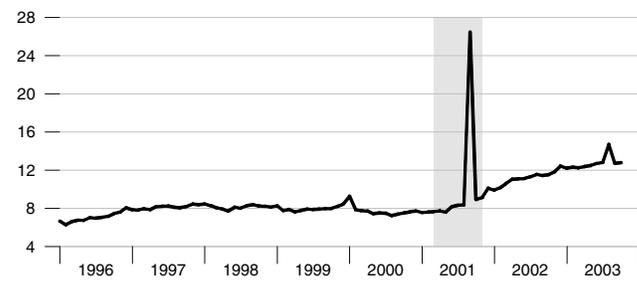
Total Borrowings, nsa

Billions of dollars



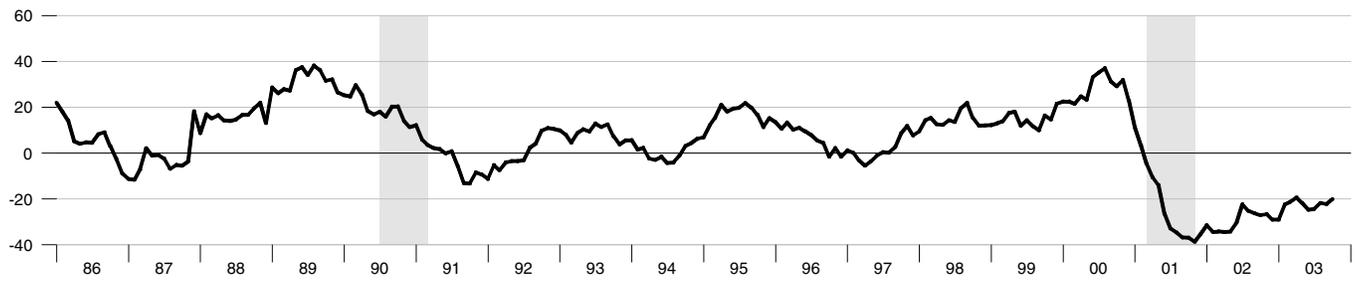
Excess Reserves plus RCB Contracts

Billions of dollars



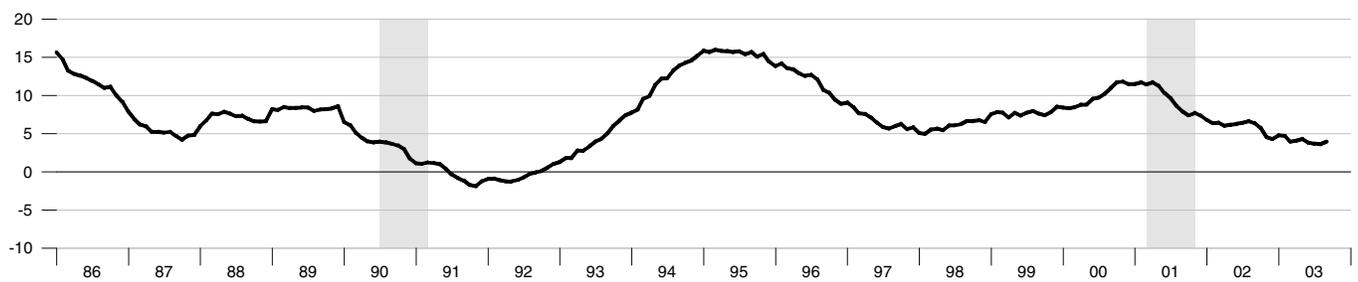
Nonfinancial Commercial Paper

Percent change from year ago

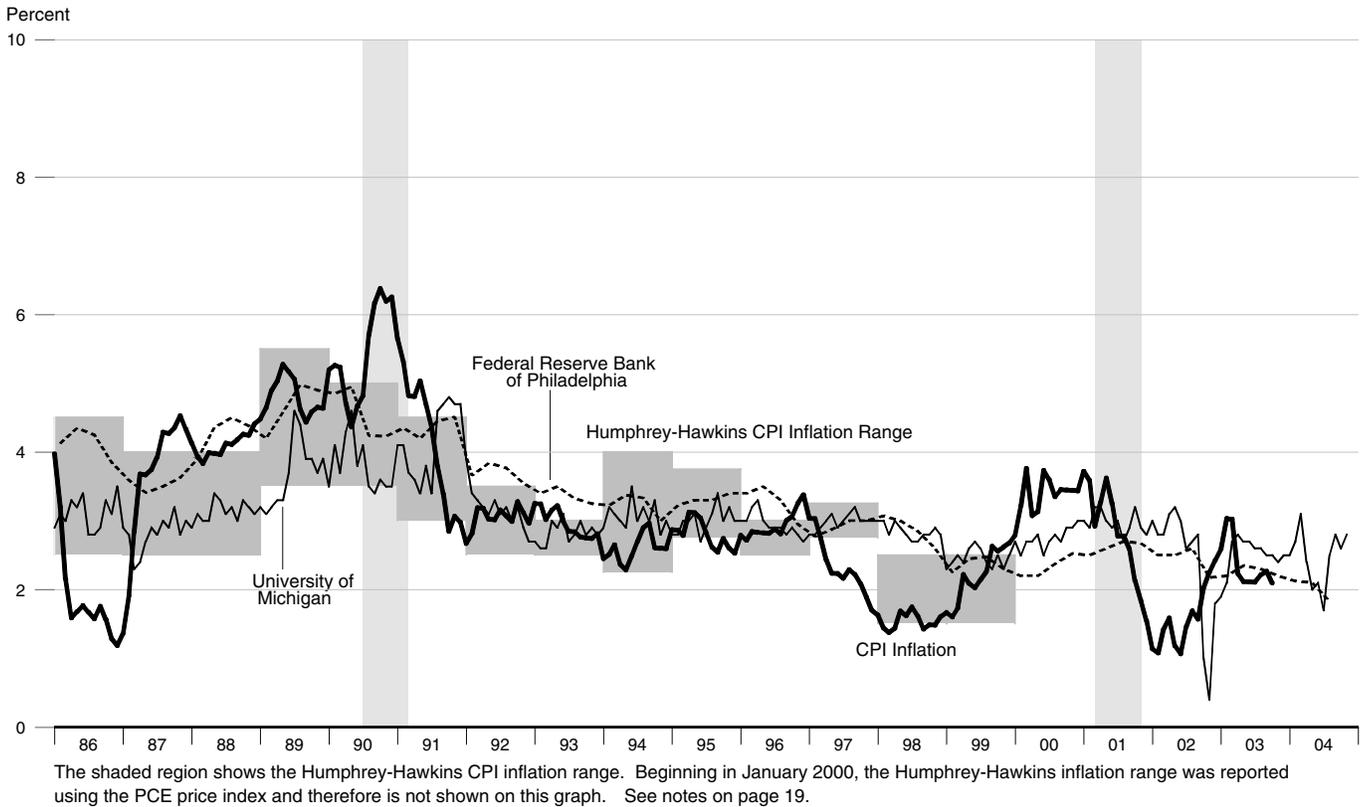


Consumer Credit

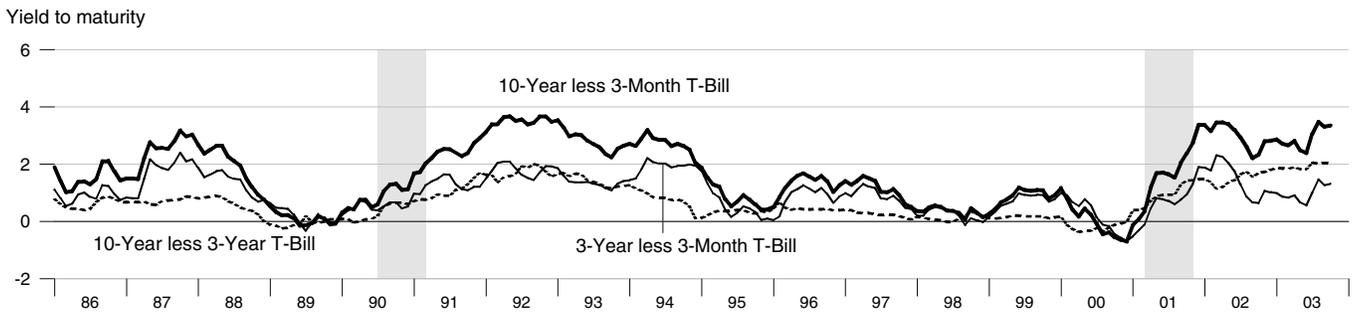
Percent change from year ago



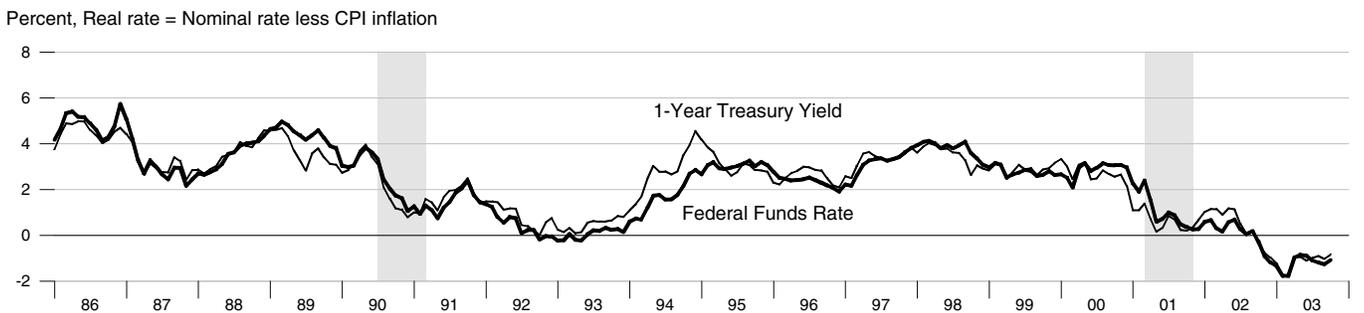
Inflation and Inflation Expectations



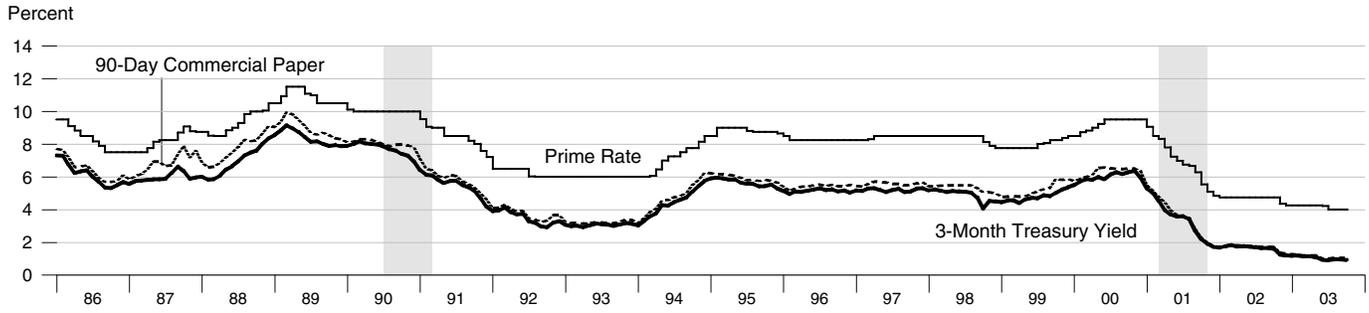
Treasury Security Yield Spreads



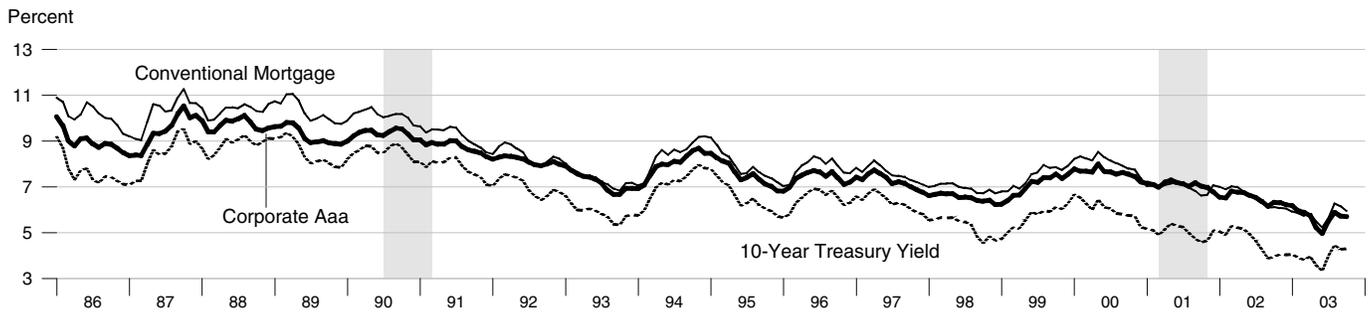
Real Interest Rates



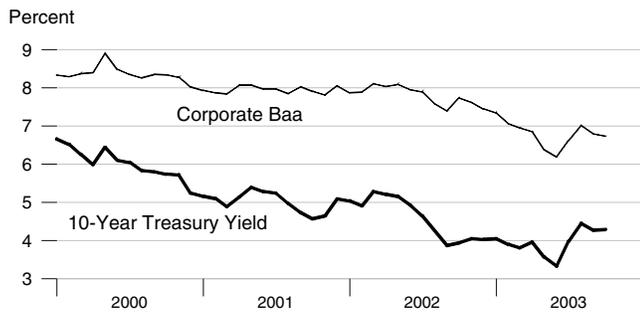
Short-Term Interest Rates



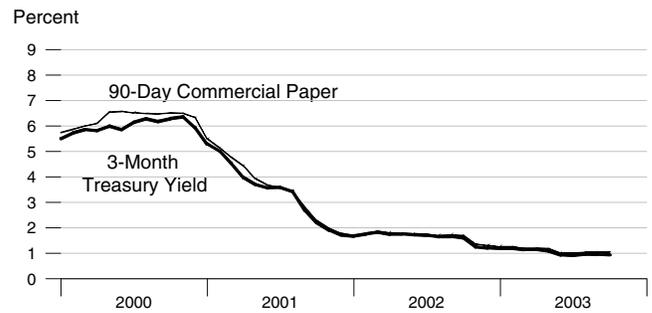
Long-Term Interest Rates



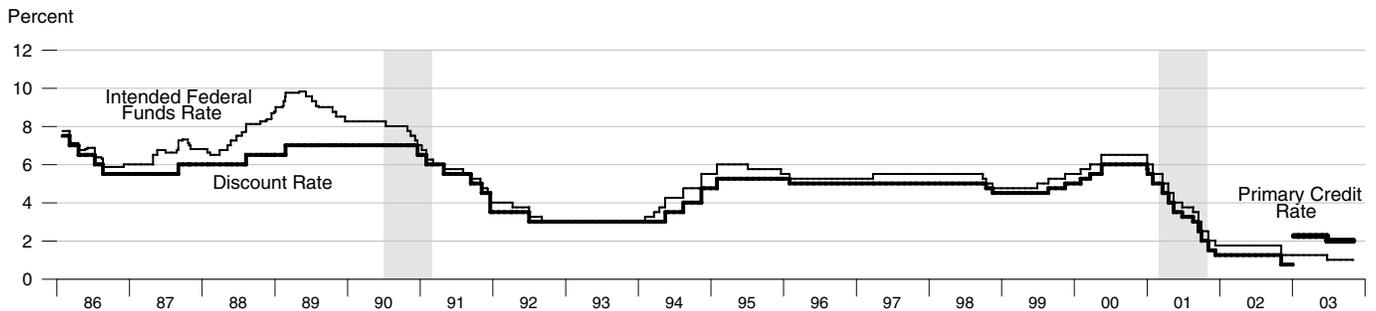
Long-Term Interest Rates



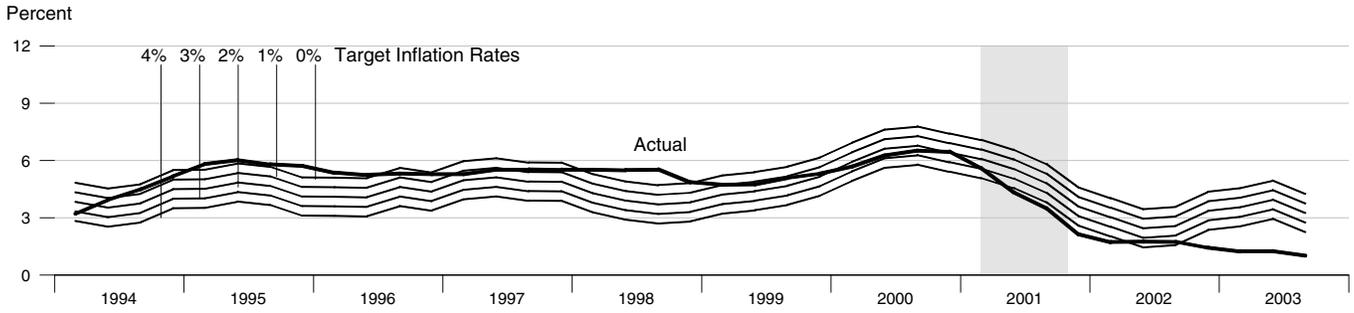
Short-Term Interest Rates



FOMC Intended Federal Funds Rate, Discount Rate, and Primary Credit Rate



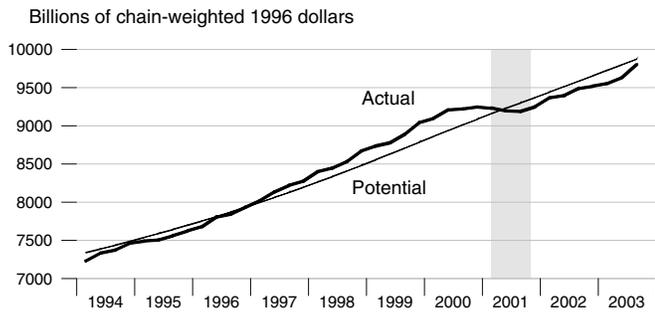
Federal Funds Rate and Inflation Targets



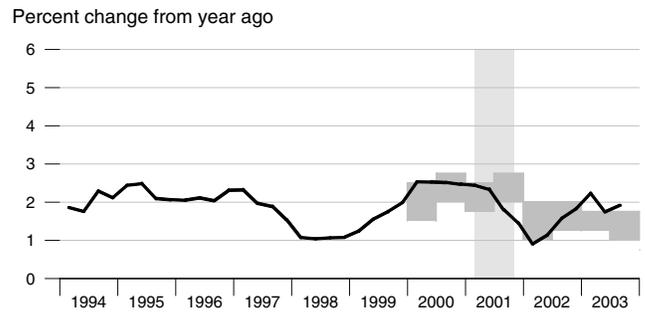
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Components of Taylor's Rule

Actual and Potential Real GDP

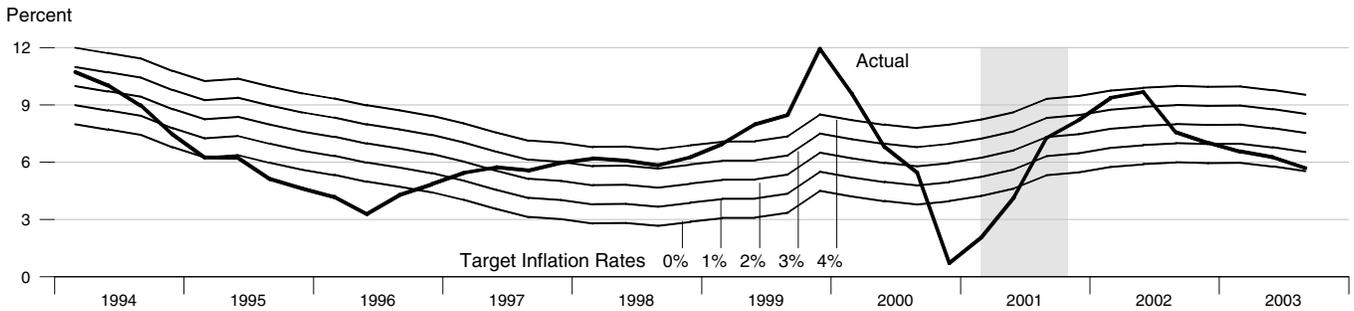


PCE Inflation and Projections



The shaded region shows the range of projections published in the Monetary Policy Report to the Congress.

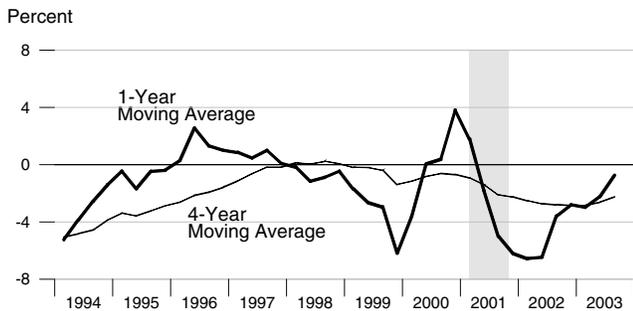
Monetary Base Growth* and Inflation Targets



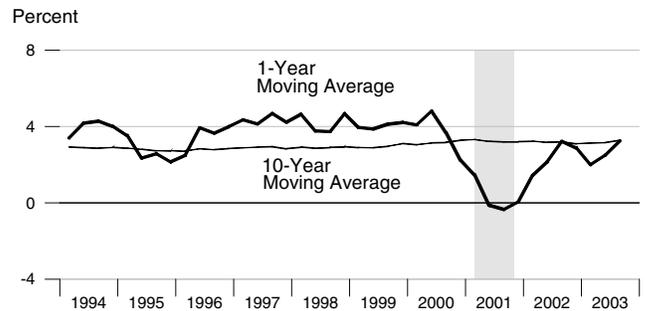
*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

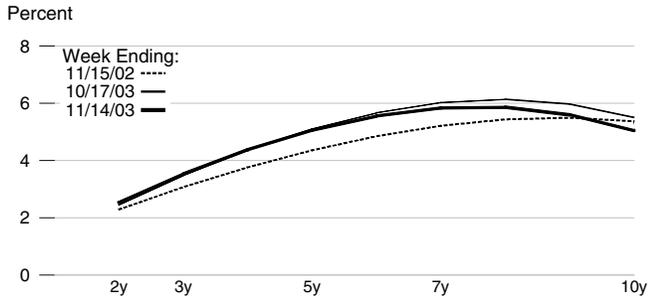
Monetary Base Velocity Growth



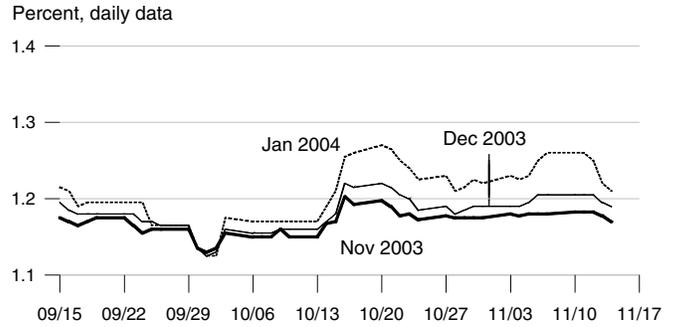
Real Output Growth



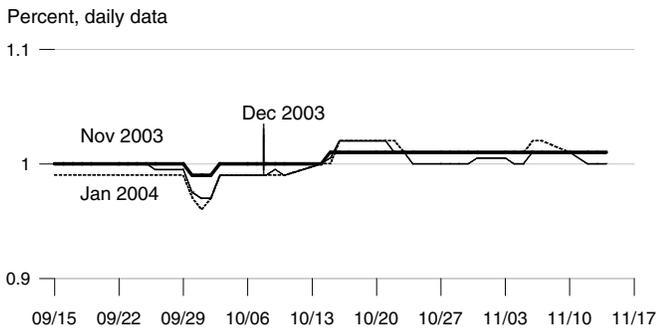
Implied One-Year Forward Rates



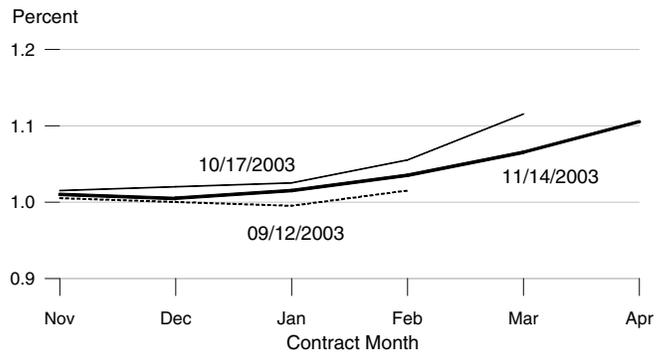
Rates on 3-Month Eurodollar Futures



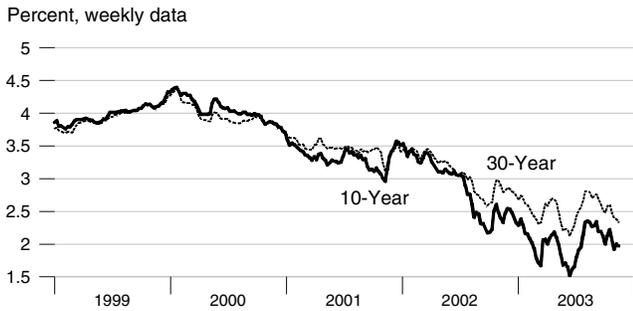
Rates on Selected Federal Funds Futures Contracts



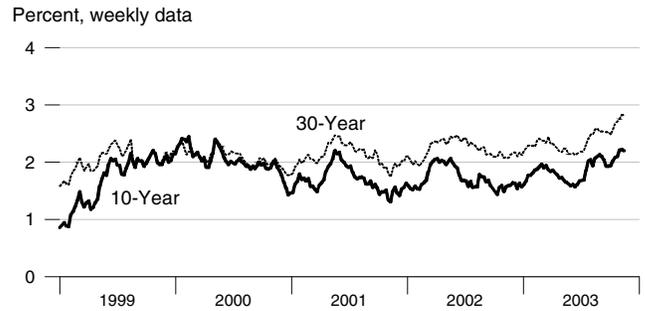
Rates on Federal Funds Futures on Selected Dates



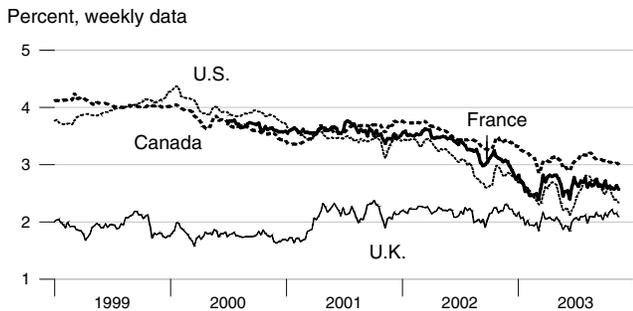
Inflation-Indexed Treasury Bonds



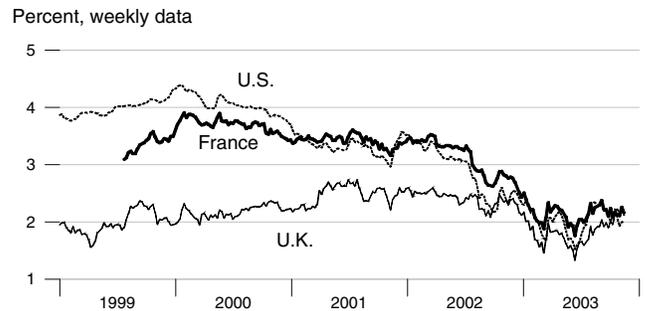
Inflation-Indexed Treasury Yield Spreads



Inflation-Indexed 30-Year Government Bonds

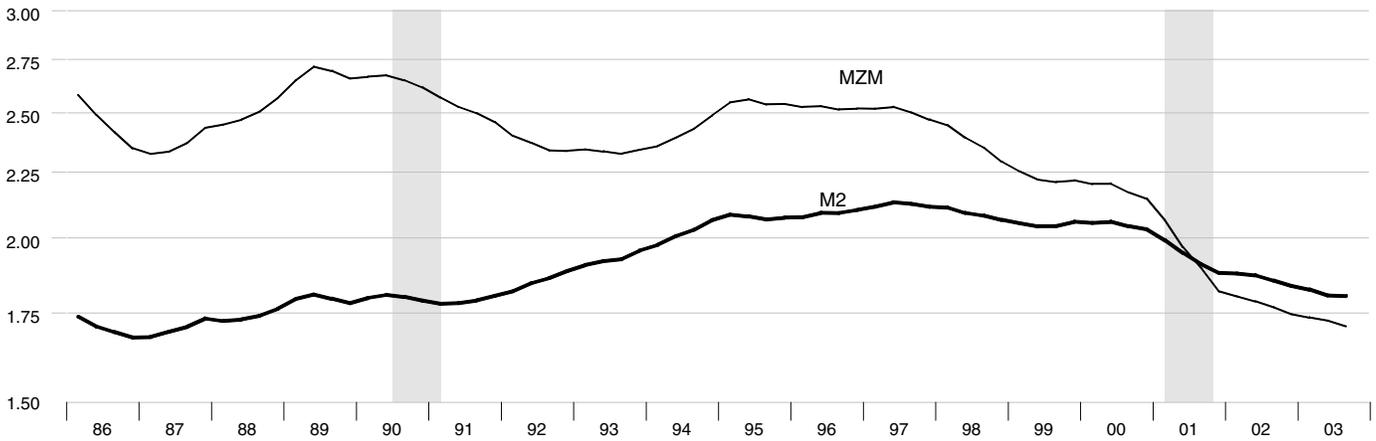


Inflation-Indexed 10-Year Government Bonds



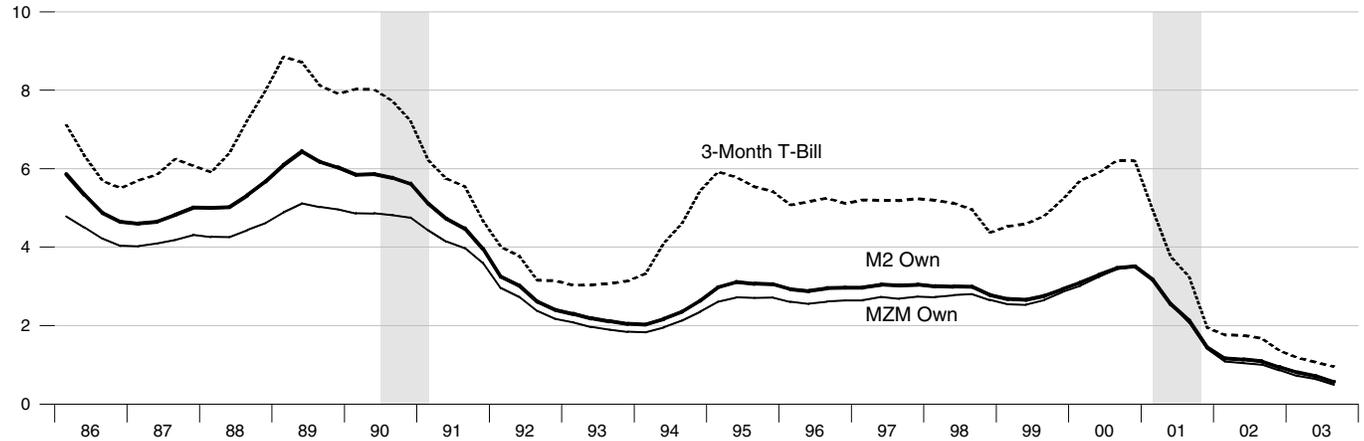
Velocity

Nominal GDP/MZM, Nominal GDP/M2 (Ratio Scale)



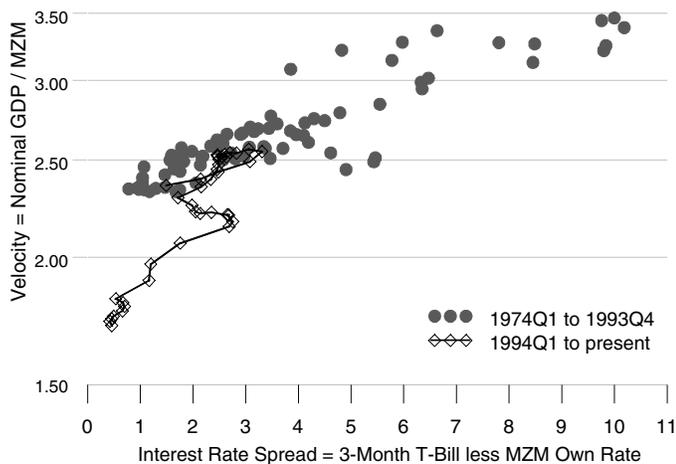
Interest Rates

Percent



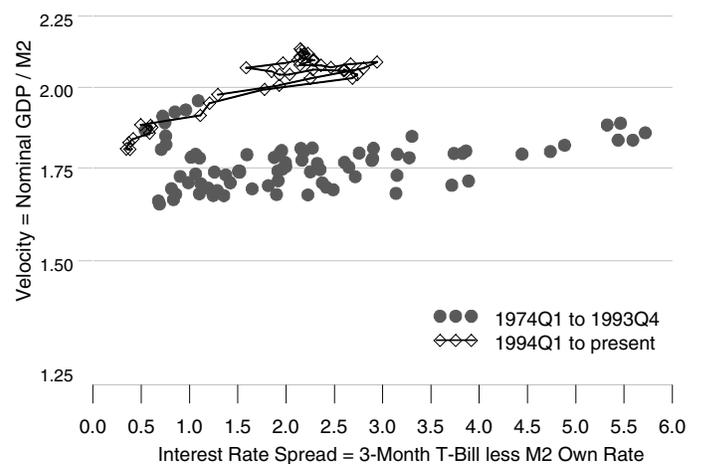
MZM Velocity and Interest Rate Spread

Ratio Scale



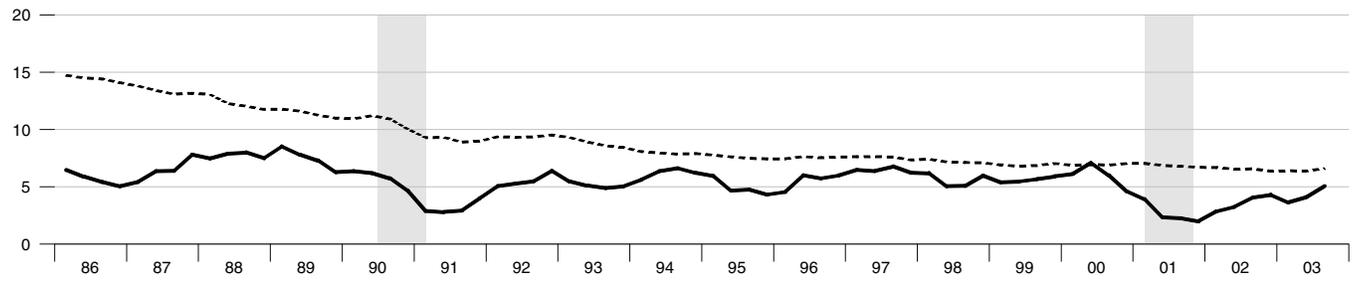
M2 Velocity and Interest Rate Spread

Ratio Scale



Gross Domestic Product

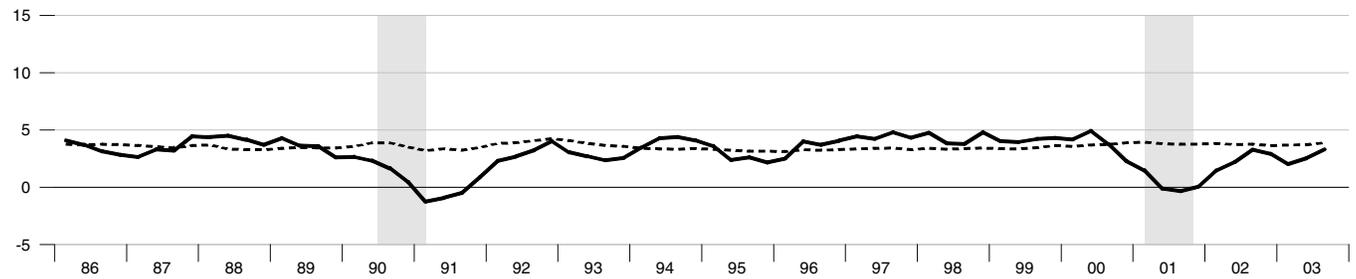
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

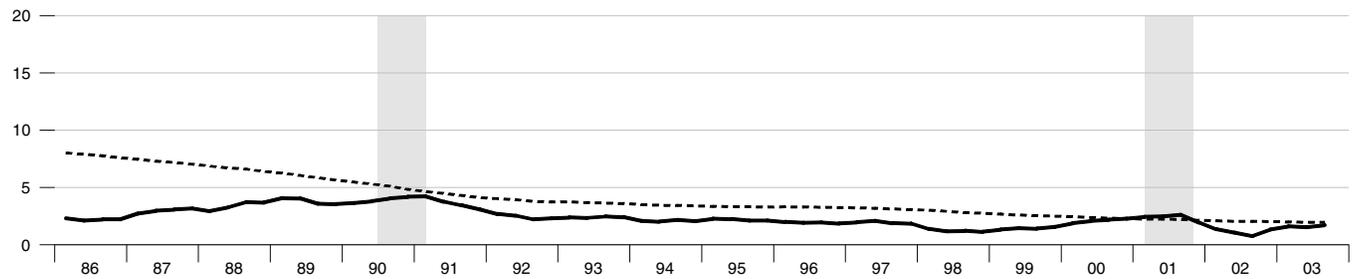
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

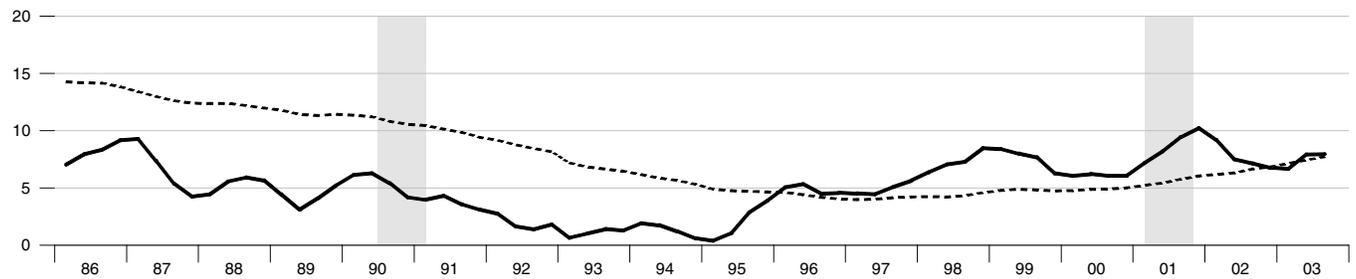
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

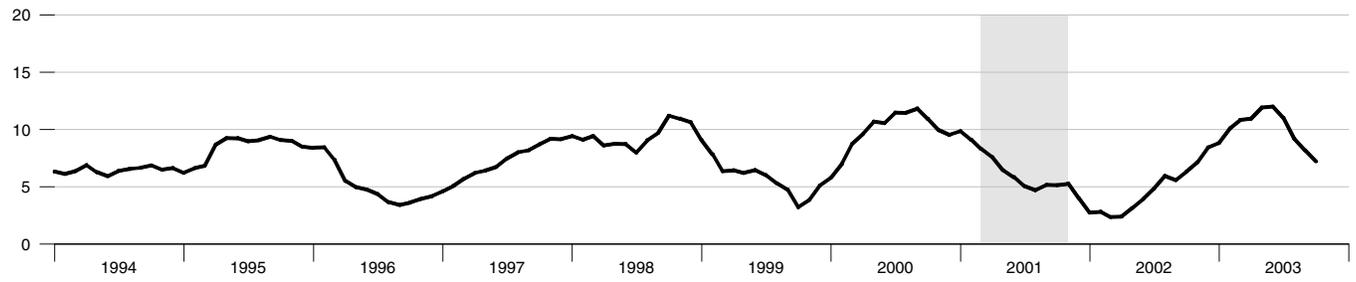
Percent change from year ago



Dashed lines indicate 10-year moving averages.

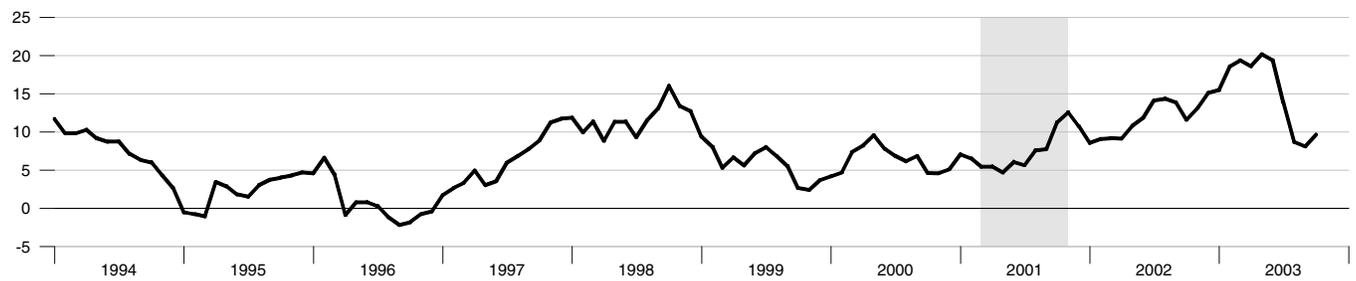
Bank Credit

Percent change from year ago



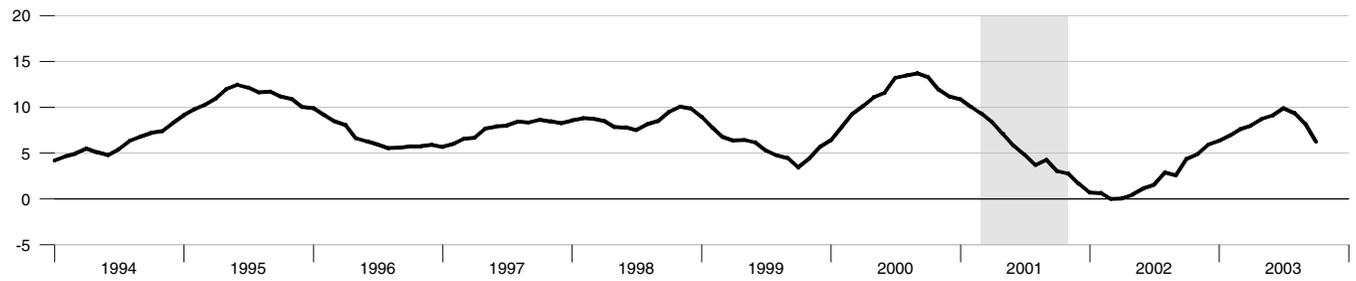
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



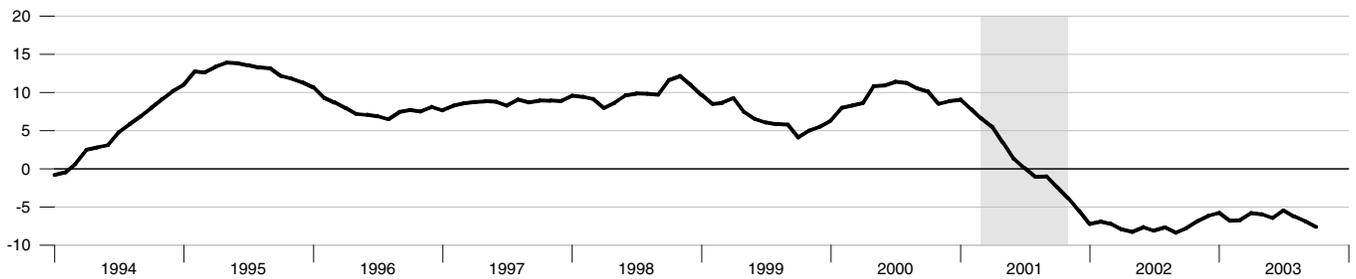
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

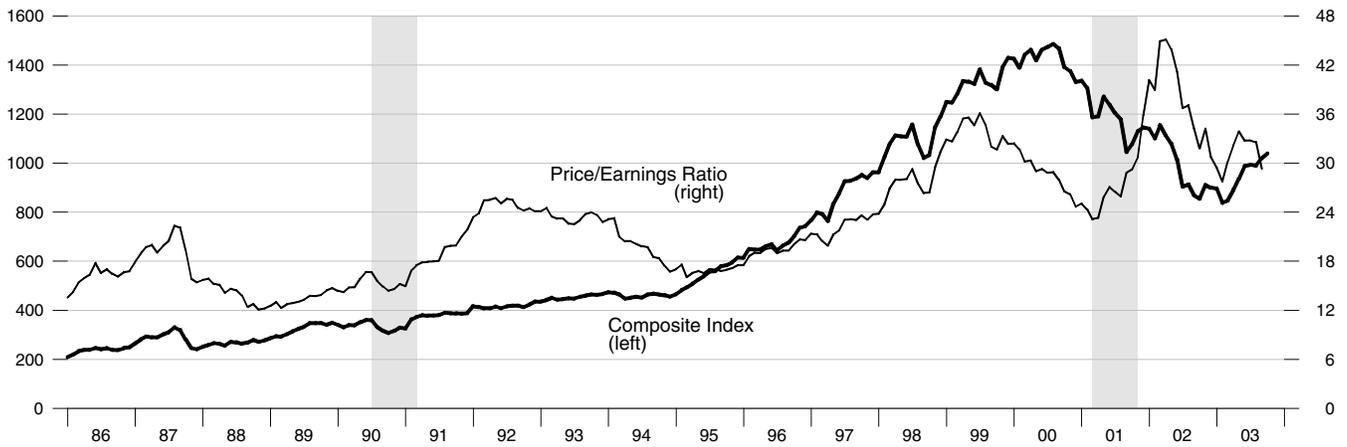


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



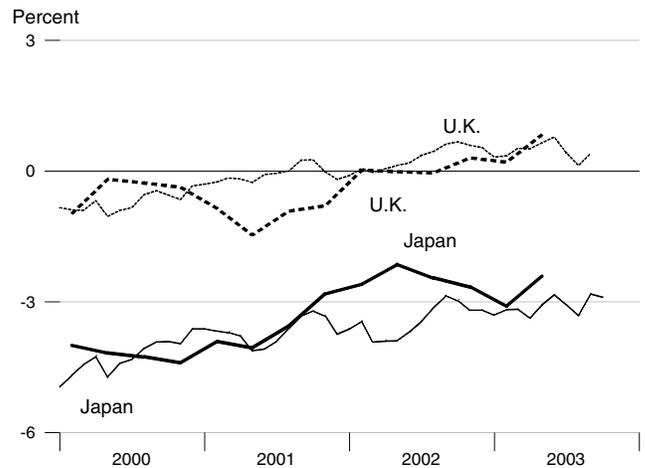
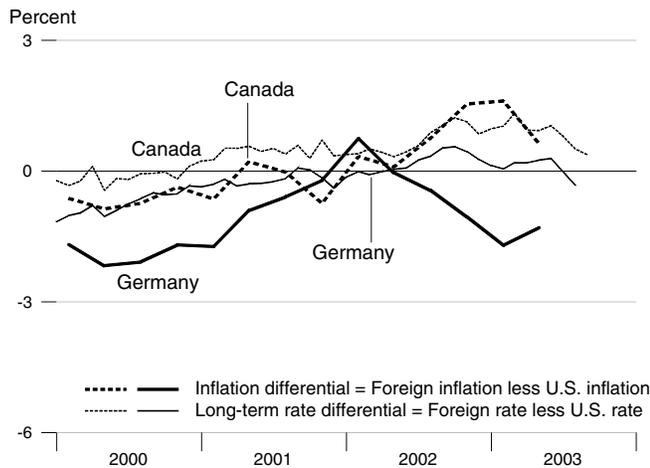
Standard & Poor's 500



Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2002Q4	2003Q1	2003Q2	2003Q3	Jul03	Aug03	Sep03	Oct03
United States	2.25	2.87	2.17	2.22	3.98	4.45	4.27	4.29
Canada	3.79	4.47	2.81	.	4.78	4.96	4.64	.
France	2.14	2.38	1.92	.	4.10	4.32	.	.
Germany	1.20	1.17	0.87	.	3.97	4.13	.	.
Italy	2.77	2.72	2.70	2.75	4.29	4.31	.	.
Japan	-0.40	-0.23	-0.24	.	0.92	1.14	1.45	1.40
United Kingdom	2.56	3.07	3.01	.	4.40	4.58	4.68	.

Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1998		1079.870	3709.650	4207.963	5749.858	4323.060	525.184	84.060	241.559
1999		1101.495	4170.202	4525.937	6252.564	4575.872	574.181	88.664	257.905
2000		1103.401	4507.769	4801.347	6841.181	5024.634	607.106	84.511	272.528
2001		1136.611	5219.013	5221.918	7621.029	5342.672	641.167	85.931	296.260
2002		1190.219	5886.055	5619.340	8229.864	5591.762	697.071	87.924	319.376
2001	1	1100.135	4855.491	5032.889	7275.980	5269.357	619.676	82.207	285.335
	2	1116.115	5107.306	5160.151	7543.074	5310.771	629.484	82.722	292.821
	3	1162.814	5327.181	5291.578	7725.858	5360.470	651.930	90.906	300.511
	4	1167.377	5586.073	5403.055	7939.203	5430.091	663.578	87.887	306.373
2002	1	1183.762	5723.809	5494.301	8054.798	5408.607	680.264	88.157	311.581
	2	1181.589	5809.724	5546.132	8137.171	5478.965	692.937	86.979	315.236
	3	1190.469	5944.730	5668.793	8282.900	5652.919	702.753	86.820	322.269
	4	1205.056	6065.955	5768.133	8444.589	5826.557	712.330	89.741	328.417
2003	1	1227.800	6158.533	5859.847	8562.316	5945.490	726.820	90.930	334.329
	2	1255.955	6259.221	5984.808	8699.226	6115.741	738.230	91.800	341.932
	3	1283.878	6460.387	6119.163	8915.350	6186.935	744.031	94.535	349.883
2001	Oct	1163.909	5511.453	5362.163	7869.673	5413.005	663.798	91.551	304.237
	Nov	1165.335	5585.259	5402.576	7943.600	5445.128	661.381	86.229	306.400
	Dec	1172.887	5661.508	5444.426	8004.336	5432.139	665.556	85.880	308.483
2002	Jan	1179.038	5682.466	5468.464	8015.988	5406.026	673.713	87.296	310.002
	Feb	1185.171	5736.941	5506.767	8067.665	5413.644	681.914	89.238	312.211
	Mar	1187.077	5752.020	5507.673	8080.741	5406.150	685.165	87.936	312.531
	Apr	1172.605	5750.150	5494.321	8082.845	5431.428	689.008	88.352	312.452
	May	1183.278	5818.160	5556.930	8150.116	5480.304	692.736	86.588	315.710
	Jun	1188.883	5860.862	5587.144	8178.551	5525.163	697.068	85.998	317.546
	Jul	1195.728	5908.530	5635.021	8224.726	5578.078	701.032	86.100	320.046
	Aug	1184.451	5950.530	5672.873	8291.246	5660.325	702.878	86.382	322.454
	Sep	1191.228	5975.129	5698.486	8332.727	5720.354	704.350	87.978	324.306
	Oct	1202.609	5977.579	5736.382	8344.143	5755.413	710.664	89.827	326.548
	Nov	1202.180	6087.291	5776.373	8467.070	5834.020	712.472	89.818	328.846
	Dec	1210.378	6132.996	5791.643	8522.553	5890.239	713.853	89.579	329.856
2003	Jan	1212.991	6130.904	5820.466	8522.414	5884.084	719.528	89.511	331.939
	Feb	1233.421	6170.179	5873.415	8568.984	5961.001	728.657	91.909	335.086
	Mar	1236.989	6174.517	5885.659	8595.550	5991.385	732.276	91.371	335.963
	Apr	1237.371	6182.109	5909.264	8614.188	6025.831	736.488	92.367	337.809
	May	1258.304	6259.687	5998.222	8708.079	6133.060	738.668	91.471	342.511
	Jun	1272.189	6335.868	6046.939	8775.410	6188.332	739.535	91.562	345.475
	Jul	1277.993	6439.198	6097.780	8905.594	6192.845	741.244	93.479	348.640
	Aug	1285.743	6474.566	6140.721	8930.762	6180.426	745.293	95.372	351.061
	Sep	1287.897	6467.397	6118.987	8909.693	6187.533	745.557	94.755	349.949
	Oct	1286.751	6413.424	6089.157	8835.401	6171.244	753.731	95.033	349.167

*All values are given in billions of dollars.

		Federal	Discount	Primary	Prime	3-mo	Treasury Yields			Corporate	S & L	Conventional
		Funds	Rate	Credit Rate	Rate		CDs	3-mo	3-yr	10-yr	Aaa Bonds	Aaa Bonds
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	5.01	6.97
2002		1.67	1.17		4.68	1.73	1.63	3.10	4.61	6.49	4.87	6.54
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	4.95	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
	2	1.75	1.25		4.75	1.83	1.75	3.77	5.10	6.71	5.01	6.81
	3	1.74	1.25		4.75	1.76	1.67	2.62	4.26	6.35	4.72	6.29
	4	1.44	0.94		4.45	1.49	1.36	2.27	4.01	6.28	4.71	6.08
2003	1	1.25		2.25	4.25	1.26	1.18	2.07	3.92	6.00	4.60	5.83
	2	1.25		2.23	4.24	1.17	1.06	1.77	3.62	5.31	4.28	5.51
	3	1.02		2.00	4.00	1.07	0.95	2.20	4.23	5.70	4.68	6.01
2001	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
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
	May	1.75	1.25		4.75	1.82	1.76	3.80	5.16	6.75	5.03	6.81
	Jun	1.75	1.25		4.75	1.81	1.73	3.49	4.93	6.63	4.92	6.65
	Jul	1.73	1.25		4.75	1.79	1.71	3.01	4.65	6.53	4.81	6.49
	Aug	1.74	1.25		4.75	1.73	1.65	2.52	4.26	6.37	4.78	6.29
	Sep	1.75	1.25		4.75	1.76	1.66	2.32	3.87	6.15	4.58	6.09
	Oct	1.75	1.25		4.75	1.73	1.61	2.25	3.94	6.32	4.66	6.11
	Nov	1.34	0.83		4.35	1.39	1.25	2.32	4.05	6.31	4.77	6.07
	Dec	1.24	0.75		4.25	1.34	1.21	2.23	4.03	6.21	4.70	6.05
2003	Jan	1.24			4.25	1.29	1.19	2.18	4.05	6.17	4.72	5.92
	Feb	1.26		2.25	4.25	1.27	1.19	2.05	3.90	5.95	4.57	5.84
	Mar	1.25		2.25	4.25	1.23	1.15	1.98	3.81	5.89	4.51	5.75
	Apr	1.26		2.25	4.25	1.24	1.15	2.06	3.96	5.74	4.60	5.81
	May	1.26		2.25	4.25	1.22	1.09	1.75	3.57	5.22	4.16	5.48
	Jun	1.22		2.20	4.22	1.04	0.94	1.51	3.33	4.97	4.07	5.23
	Jul	1.01		2.00	4.00	1.05	0.92	1.93	3.98	5.49	4.59	5.63
	Aug	1.03		2.00	4.00	1.08	0.97	2.44	4.45	5.88	4.82	6.26
	Sep	1.01		2.00	4.00	1.08	0.96	2.23	4.27	5.72	4.63	6.15
	Oct	1.01		2.00	4.00	1.10	0.94	2.26	4.29	5.70	4.64	5.95

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

		M1	MZM	M2	M3
Percent change at an annual rate					
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	1998	0.99	11.66	7.29	10.35
	1999	2.00	12.41	7.56	8.74
	2000	0.17	8.09	6.09	9.41
	2001	3.01	15.78	8.76	11.40
	2002	4.72	12.78	7.61	7.99
<hr/>					
2001	1	2.71	18.60	10.64	13.23
	2	5.81	20.74	10.11	14.68
	3	16.74	17.22	10.19	9.69
	4	1.57	19.44	8.43	11.05
2002	1	5.61	9.86	6.76	5.82
	2	-0.73	6.00	3.77	4.09
	3	3.01	9.30	8.85	7.16
	4	4.90	8.16	7.01	7.81
2003	1	7.55	6.10	6.36	5.58
	2	9.17	6.54	8.53	6.40
	3	8.89	12.86	8.98	9.94
<hr/>					
2001	Oct	-37.27	12.94	-3.15	5.36
	Nov	1.47	16.07	9.04	11.27
	Dec	7.78	16.38	9.30	9.18
<hr/>					
2002	Jan	6.29	4.44	5.30	1.75
	Feb	6.24	11.50	8.41	7.74
	Mar	1.93	3.15	0.20	1.94
	Apr	-14.63	-0.39	-2.91	0.31
	May	10.92	14.19	13.67	9.99
	Jun	5.68	8.81	6.52	4.19
	Jul	6.91	9.76	10.28	6.78
	Aug	-11.32	8.53	8.06	9.71
	Sep	6.87	4.96	5.42	6.00
	Oct	11.46	0.49	7.98	1.64
	Nov	-0.43	22.02	8.37	17.68
	Dec	8.18	9.01	3.17	7.86
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2003	Jan	2.59	-0.41	5.97	-0.02
	Feb	20.21	7.69	10.92	6.56
	Mar	3.47	0.84	2.50	3.72
	Apr	0.37	1.48	4.81	2.60
	May	20.30	15.06	18.06	13.08
	Jun	13.24	14.60	9.75	9.28
	Jul	5.47	19.57	10.09	17.80
	Aug	7.28	6.59	8.45	3.39
	Sep	2.01	-1.33	-4.25	-2.83
	Oct	-1.07	-10.01	-5.85	-10.01

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.

M2M: M2 minus small-denomination time deposits, plus institutional money market mutual funds. The label M2M 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 nonfinancial firms. End-of-period basis.

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, 1996b, 2001).

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, 2001).

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 research.stlouisfed.org/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. M2M, 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: M2M, or "Money, Zero Maturity," includes the zero maturity, or immediately available, components of M3. M2M 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 research.stlouisfed.org/aggreg/swdata.html. **Primary Credit Rate**, **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. The **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 research.stlouisfed.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: Checkable Deposits is the sum of demand and other checkable deposits. **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 consumer price index 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 gross domestic product (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 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 research.stlouisfed.org/aggreg/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 Federal Funds Futures Contracts** trace through time the yield on three specific contracts. **Rates on Federal Funds Futures on Selected Dates** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Indexed Treasury Bonds** are yields on the most recently issued inflation-indexed securities of 10- and 30-year original maturities. **Inflation-Indexed Treasury Yield Spreads** equal, for 10- and 30-year maturities, the difference between the yields on the most recently issued inflation-indexed securities and the unadjusted bond yields of similar maturity. **Inflation-Indexed 30-Year Government 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 bond for France has a maturity date of 7/25/2032, 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 Government Bonds** shows the yield of an inflation-indexed bond that is scheduled to mature in approximately (but not greater than) 10 years. The current bond for France has a maturity date of 7/25/2013, the current U.K. bond has a maturity date of 8/16/2013, and the current U.S. bond has a maturity date of 7/15/2013.

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. Prior to 1982, the 3-month T-bill rates are secondary market yields. From 1982 forward, rates are 3-month constant maturity yields.

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.

Page 17: **Treasury Yields** are Treasury constant maturities as reported in the Board of Governors of the Federal Reserve System's H.15 release.

Sources

Agence France Trésor

French inflation-indexed bond yields.

Bank of Canada

Canadian inflation-indexed bond yields.

Bank of England

U.K. inflation-indexed bond yields.

Board of Governors of the Federal Reserve System

Monetary aggregates and components: 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 website. Nonfinancial debt: Z.1 release. M2 own rate.

Bureau of Economic Analysis
GDP.

Bureau of Labor Statistics
CPI.

Chicago Board of Trade
Federal funds futures contract.

Chicago Mercantile Exchange
Eurodollar futures.

Congressional Budget Office
Potential real GDP.

Federal Reserve Bank of Philadelphia
Survey of Professional Forecasters inflation expectations.

Federal Reserve Bank of St. Louis
Adjusted monetary base and adjusted reserves, monetary services index, MZM own rate, one-year forward rates.

Organization for Economic Cooperation and Development
International interest and inflation rates.

Standard & Poor's
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University of Michigan Survey Research Center
Median expected price change.

U.S. Department of the Treasury
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- Note:** Articles from this Bank's *Review* are available on the Internet at research.stlouisfed.org/publications/review/.