

Making Monetary Policy More Transparent

Not all changes in the Federal Open Market Committee's (FOMC's) target for the federal funds rate reflect a change in the stance of monetary policy. Hence, the FOMC could provide more information about its monetary policy objective by announcing whether specific target changes reflect a change in the stance of monetary policy or are responses to changing economic conditions intended to maintain the current policy.

Such a practice has precedent: Beginning in 1963, the Fed began announcing whether specific discount rate changes reflected a change in the stance of policy or merely realigned the discount rate with market interest rates. Prior to 1963, it was difficult for market analysts to distinguish between "policy" and "technical" discount rate changes and, consequently, the market reacted to all discount rate changes. When the Fed began announcing the extent to which discount rate changes were made for technical as opposed to policy reasons, the market no longer reacted to purely technical discount rate adjustments. The Fed's announcements appear to have eliminated uncertainty about why the discount rate was changed.¹

An analogous problem exists for interpreting changes in the FOMC's funds rate target. Unlike the discount rate, the federal funds rate is determined by the market. The FOMC merely sets a target for the funds rate. In the absence of offsetting action by the Fed, the funds rate, like all market rates, responds to changing economic conditions. For example, an increase in expected inflation will tend to cause market interest rates, including the funds rate, to rise. Similarly, the onset of a recession or period of slow economic growth will cause the real rate of interest to fall and put pressure on the funds rate to decline as well. If the FOMC resists these pressures in order to maintain its target for the funds rate, it will, in effect, change the stance of monetary policy. For example, if changing inflation expectations put pressure on the funds rate to

rise, the FOMC must ease policy if it desires to maintain its existing funds rate target. On the other hand, the stance of monetary policy is unchanged if the FOMC raises its target rate to correspond to the increase in expected inflation. Monetary policy becomes tighter only if the FOMC raises its target by more than enough to accommodate the increase in expected inflation. Similarly, if the FOMC does not wish to change the stance of monetary policy when economic forces are driving nominal interest rates down, it must reduce its funds rate target by precisely the amount of the effect of the changed economic circumstances.

The endogenous behavior of the funds rate under an unchanged monetary policy is illustrated by the so-called Taylor rule, shown on page 10. The Taylor rule can be derived from a model in which policymakers set a funds rate target in an attempt to minimize a specific weighted average of the deviations of inflation from a target and output (real GDP) from potential output. The funds rate target is changed in response to changes in the rate of inflation or output growth, relative to targeted inflation and potential output; however, the stance of monetary policy is unchanged so long as the policymaker does not change the weights he assigns to the inflation and output objectives. While the FOMC has never followed the Taylor rule, it illustrates the sense in which changes in the funds rate need not correspond to changes in monetary policy.

Because interest rates are affected by many of the same economic forces that cause policymakers to adjust their target for the funds rate, it is difficult to know whether a change in the target represents a change in stance of monetary policy or is merely an effort by the FOMC to maintain the existing stance of policy. In practice, it is difficult even for the FOMC to gauge how much the funds rate would move in the absence of actions to maintain it. Nevertheless, the FOMC could enhance the transparency of monetary policy by announcing whether target changes are intended to change the stance of monetary policy, maintain it, or reflect some of each.

—Daniel L. Thornton

¹See Thornton: "Lifting the Veil of Secrecy from Monetary Policy: Evidence from the Fed's Early Discount Rate Policy." *Journal of Money, Credit, and Banking*, May 2000, 32(2), pp. 155-67.

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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:

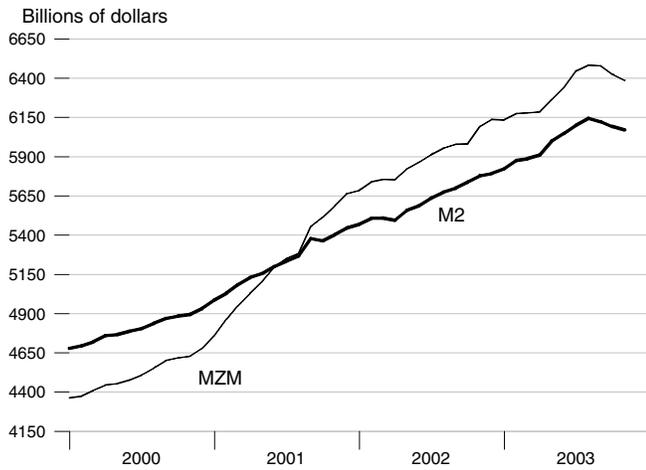
Editor, *Monetary Trends*
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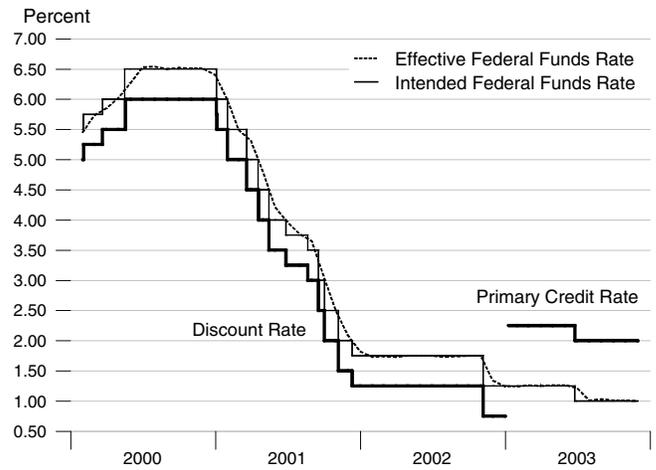
stlsFRED@stls.frb.org

The February 2004 issue of *Monetary Trends* will include benchmark revisions to the GDP series on pages 10, 12, and 13.

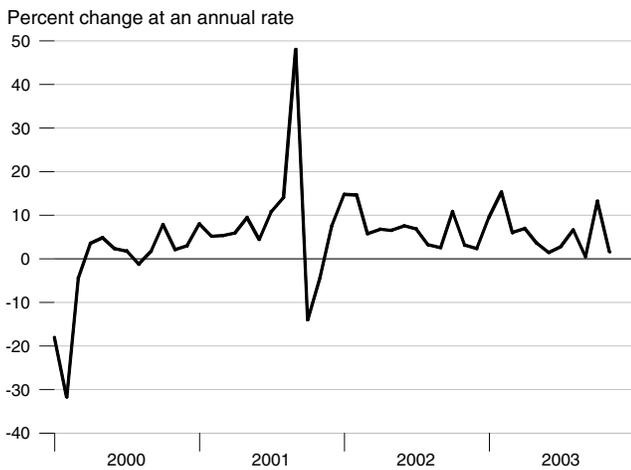
M2 and MZM



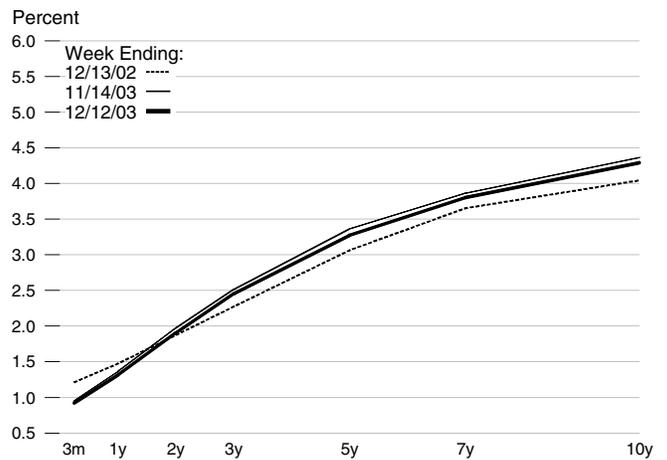
Reserve Market Rates



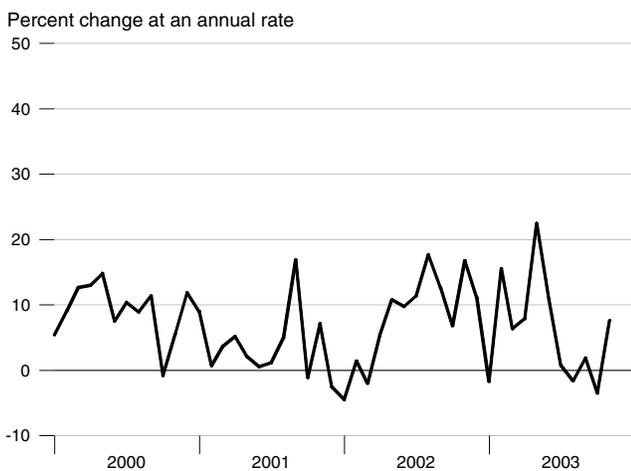
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

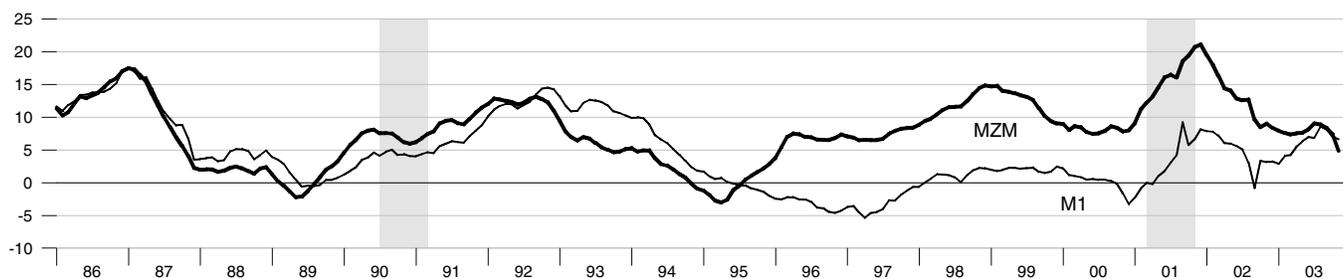


Interest Rates

	Sep 03	Oct 03	Nov 03
Federal Funds Rate	1.01	1.01	1.00
Prime Rate	4.00	4.00	4.00
Primary Credit Rate	2.00	2.00	2.00
Conventional Mortgage Rate	6.15	5.95	5.93
Treasury Yields:			
3-Month Constant Maturity	0.96	0.94	0.95
6-Month Constant Maturity	1.03	1.02	1.04
1-Year Constant Maturity	1.24	1.25	1.34
3-Year Constant Maturity	2.23	2.26	2.45
5-Year Constant Maturity	3.18	3.19	3.29
10-Year Constant Maturity	4.27	4.29	4.30

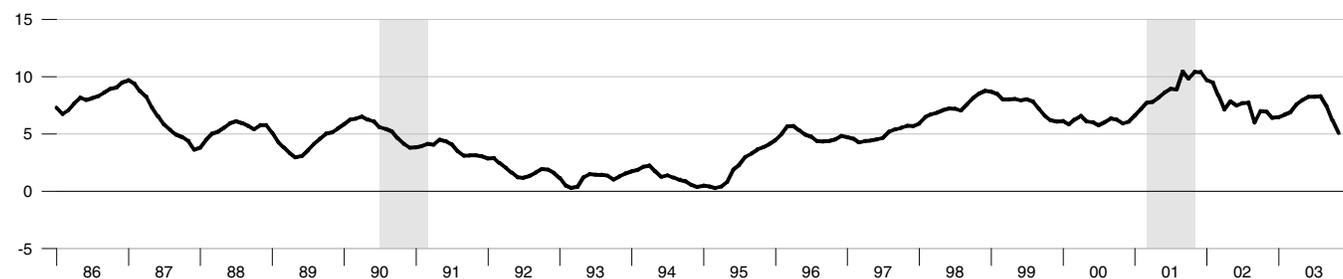
MZM and M1

Percent change from year ago



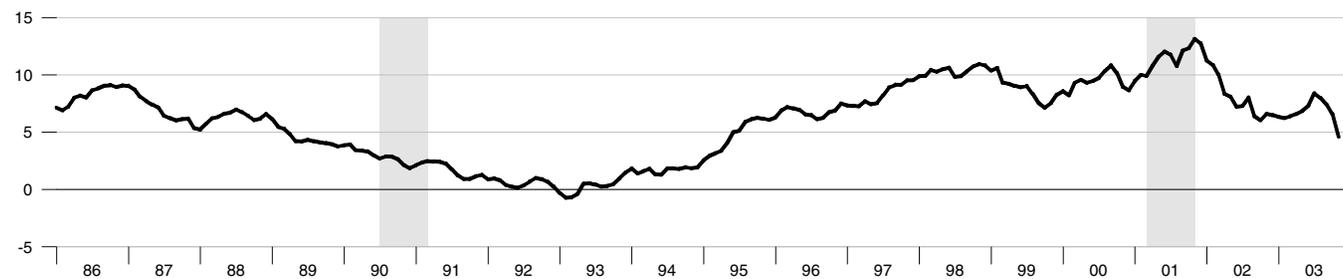
M2

Percent change from year ago



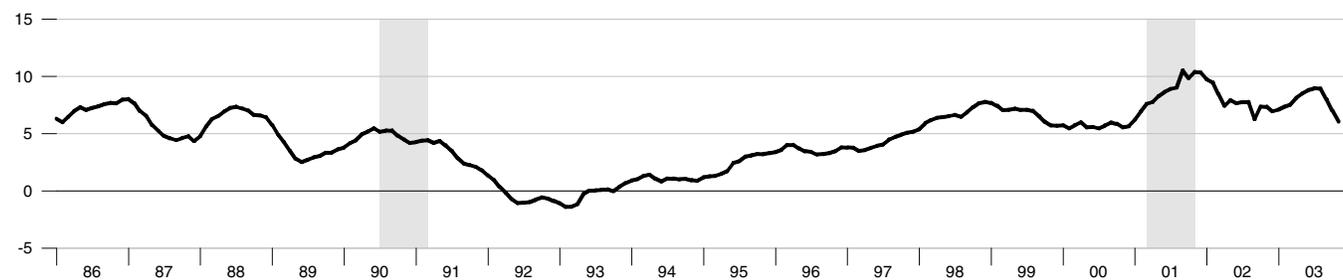
M3

Percent change from year ago



Monetary Services Index - M2

Percent change from year ago



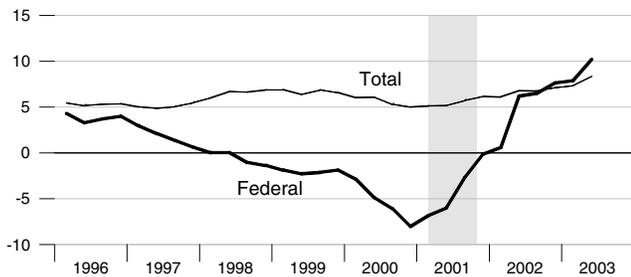
Adjusted Monetary Base

Percent change from year ago



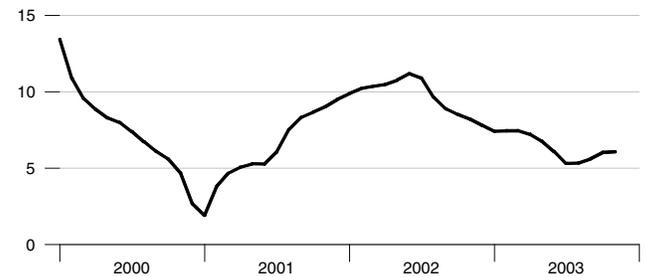
Domestic Nonfinancial Debt

Percent change from year ago



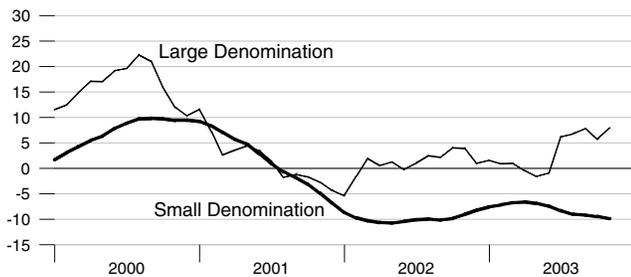
Currency Held by the Nonbank Public

Percent change from year ago



Time Deposits

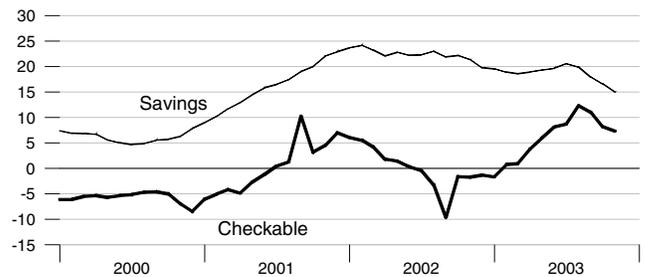
Percent change from year ago



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/.

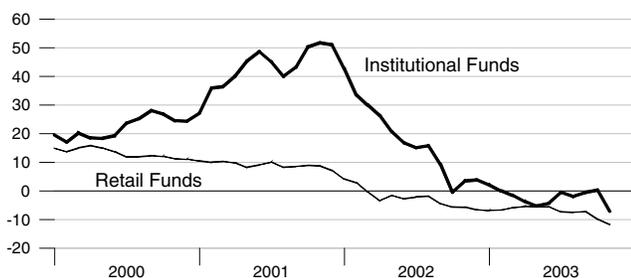
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

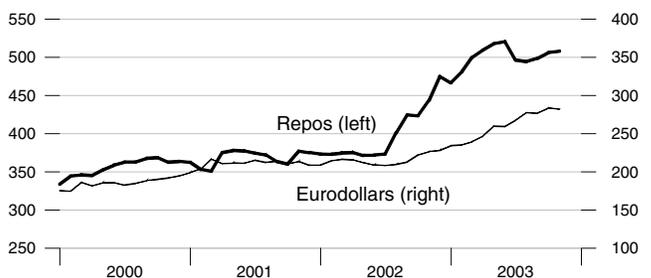
Percent change from year ago



Repurchase Agreements and Eurodollars

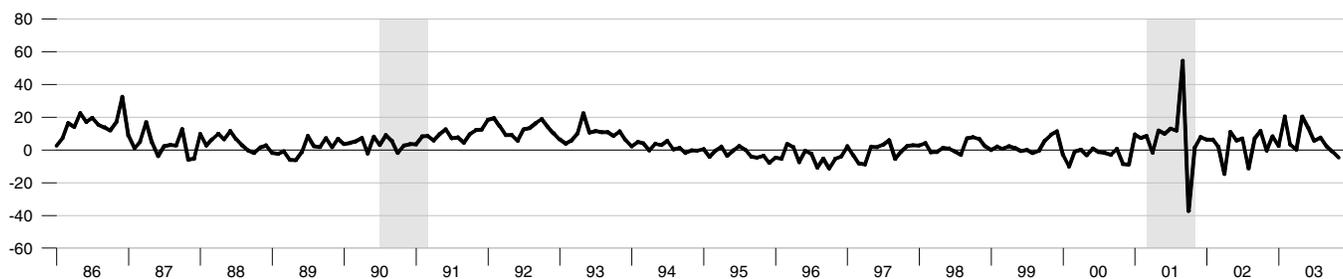
Billions of dollars

Billions of dollars



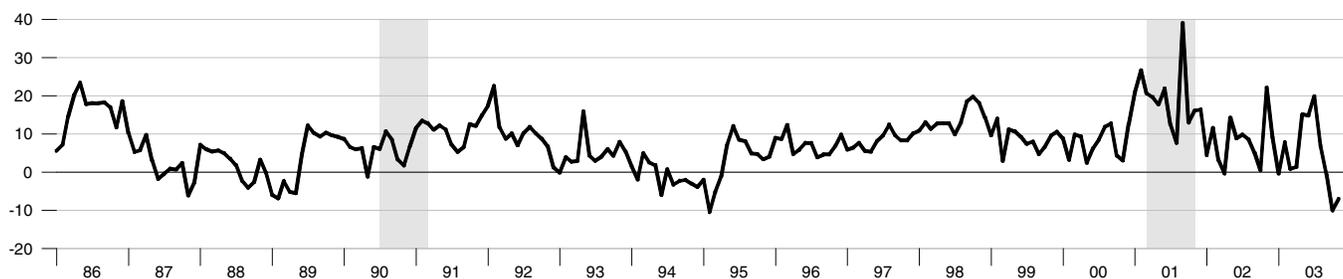
M1

Percent change at an annual rate



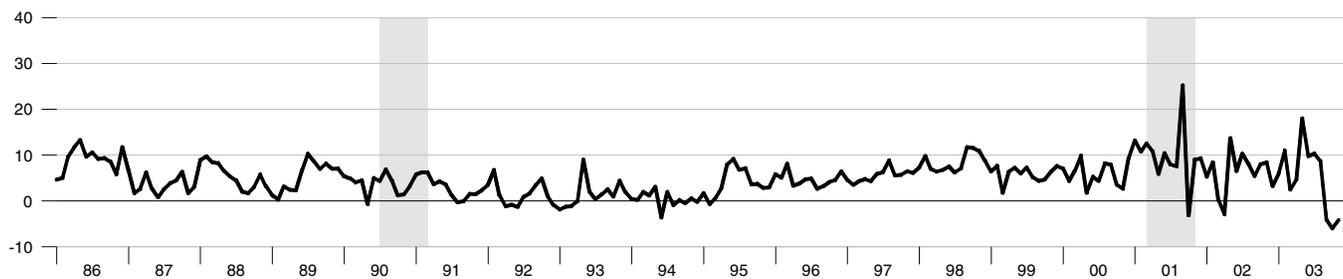
MZM

Percent change at an annual rate



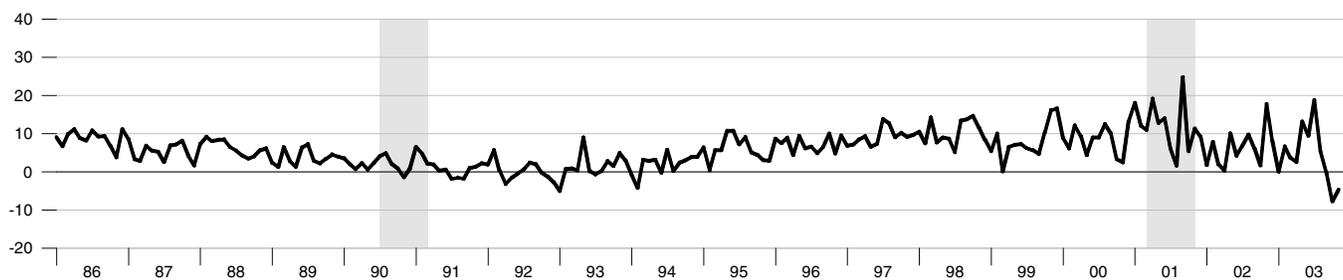
M2

Percent change at an annual rate



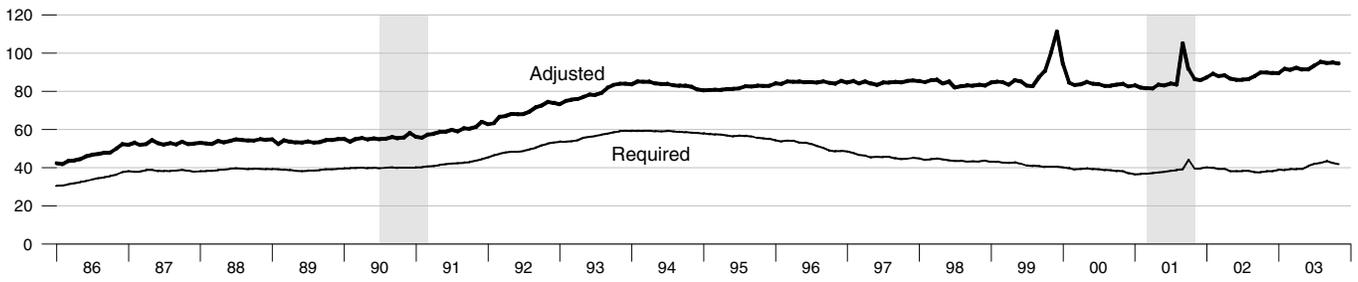
M3

Percent change at an annual rate



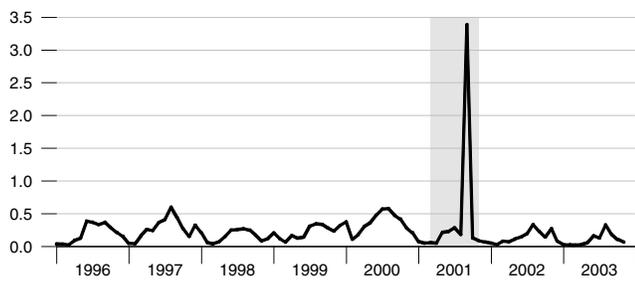
Adjusted and Required Reserves

Billions of dollars



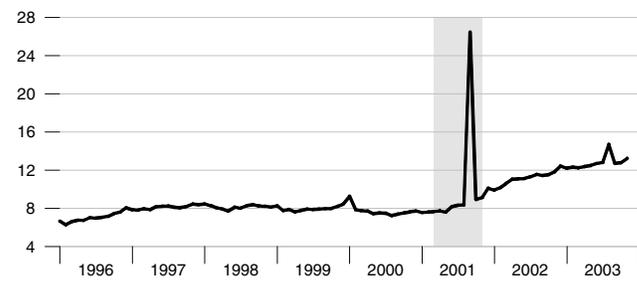
Total Borrowings, nsa

Billions of dollars



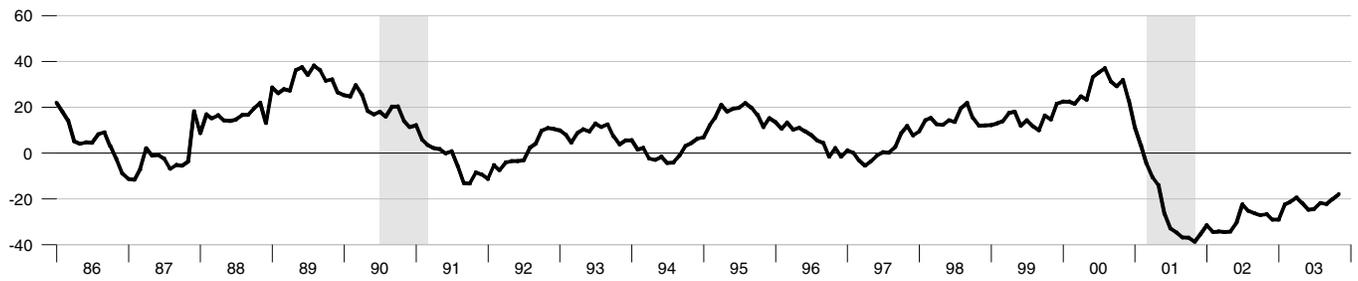
Excess Reserves plus RCB Contracts

Billions of dollars



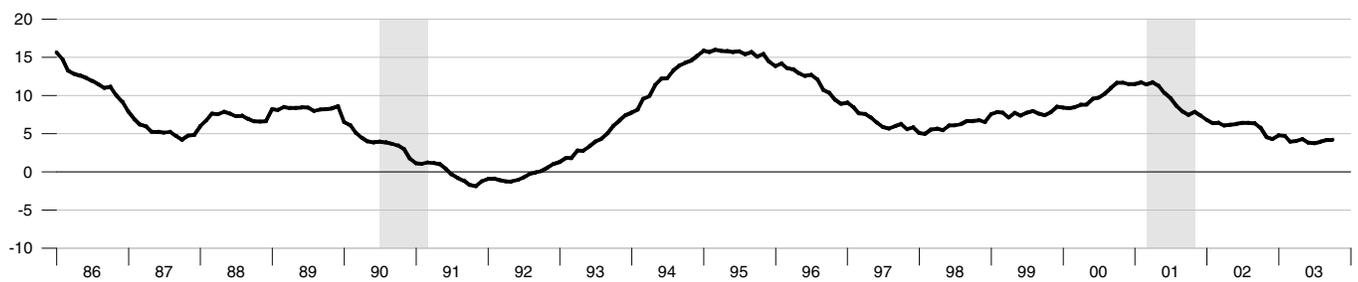
Nonfinancial Commercial Paper

Percent change from year ago

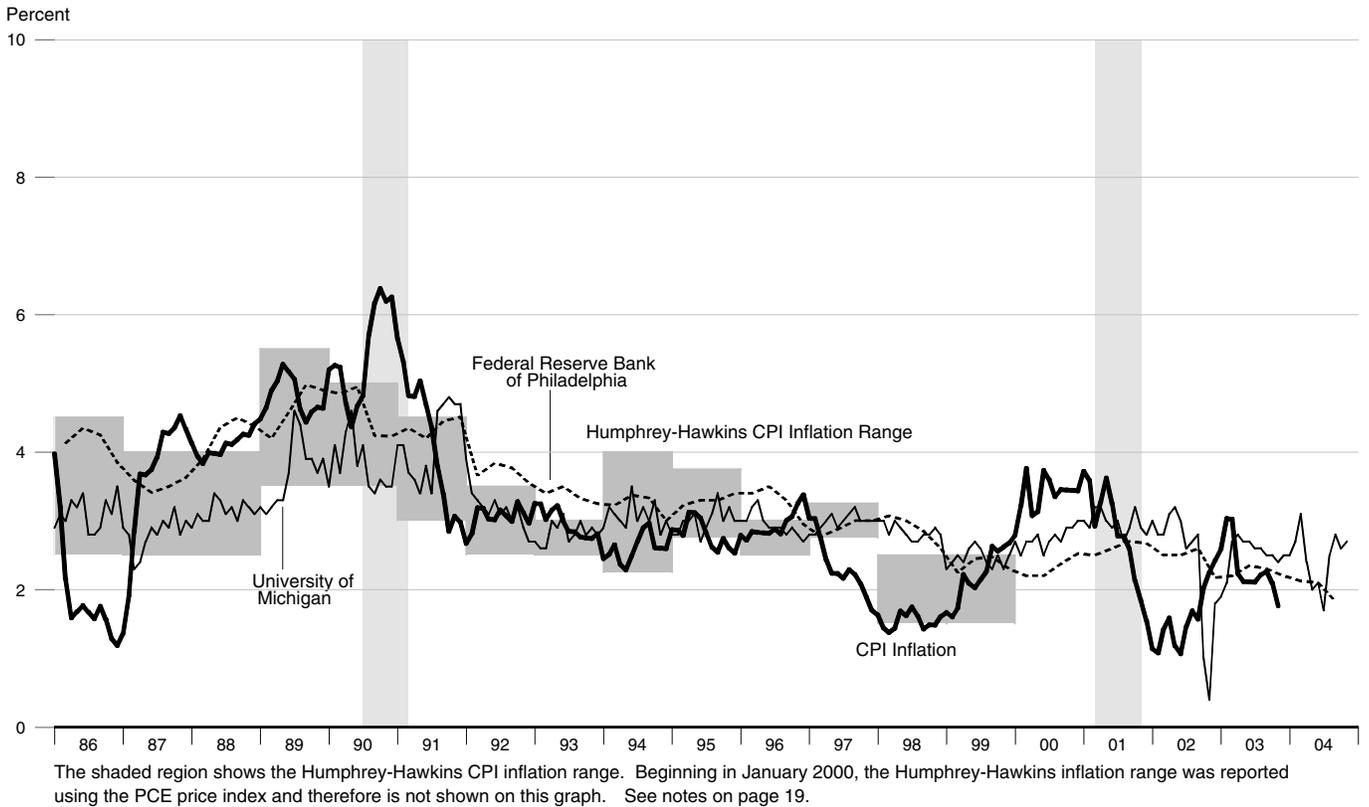


Consumer Credit

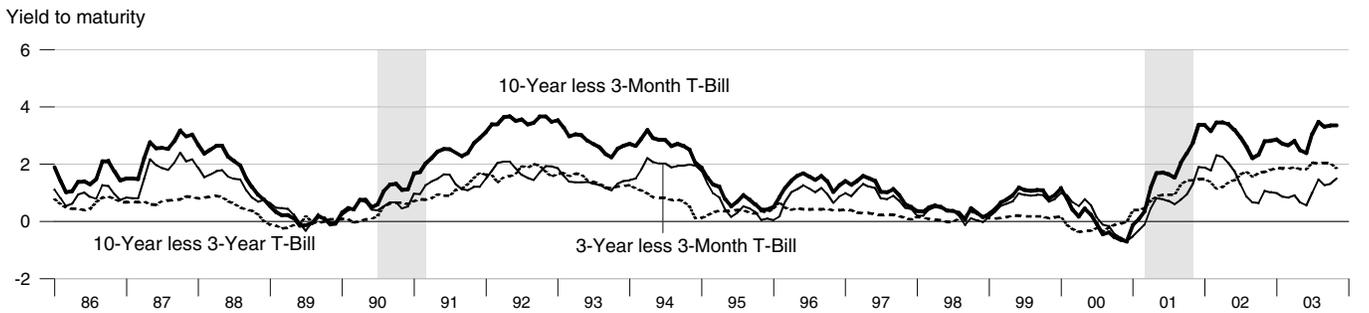
Percent change from year ago



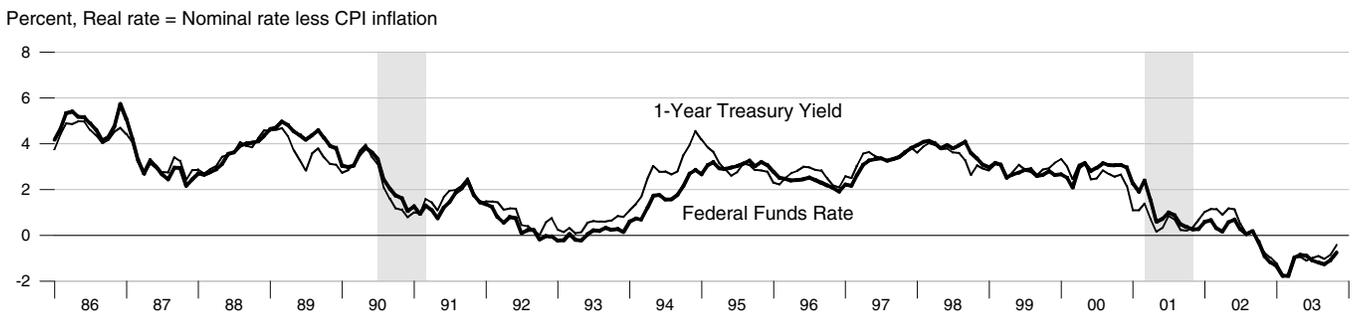
Inflation and Inflation Expectations



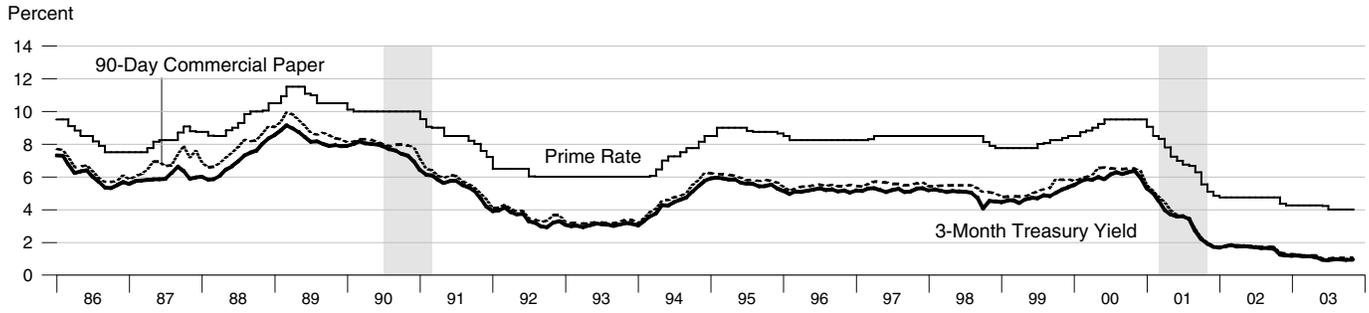
Treasury Security Yield Spreads



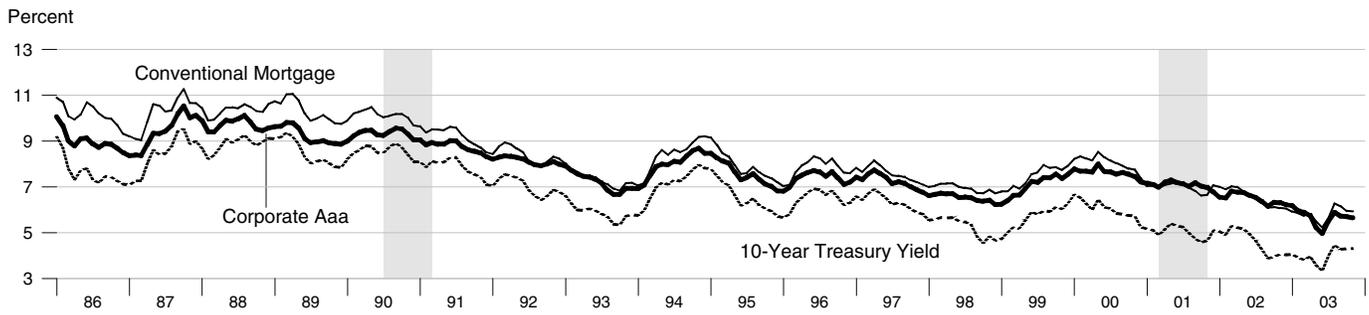
Real Interest Rates



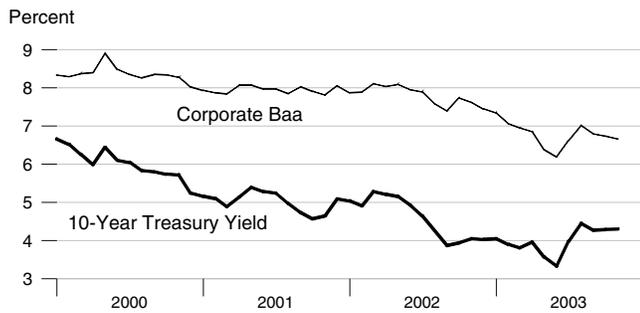
Short-Term Interest Rates



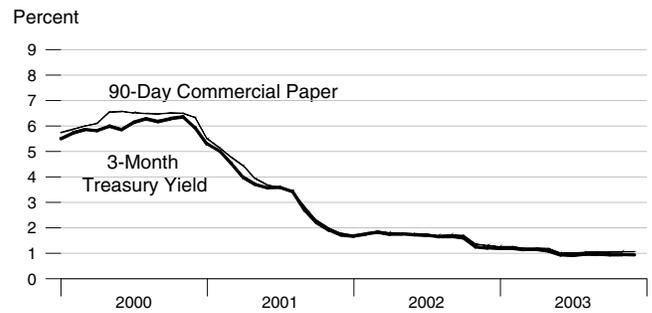
Long-Term Interest Rates



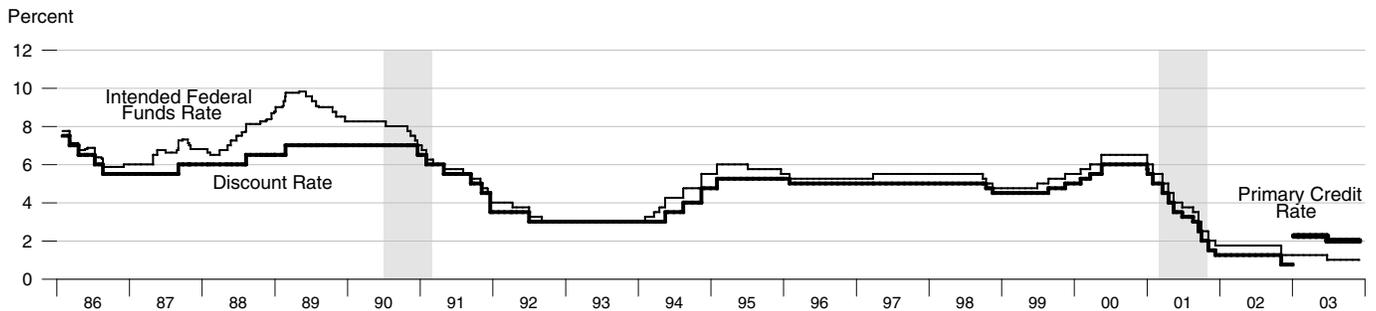
Long-Term Interest Rates



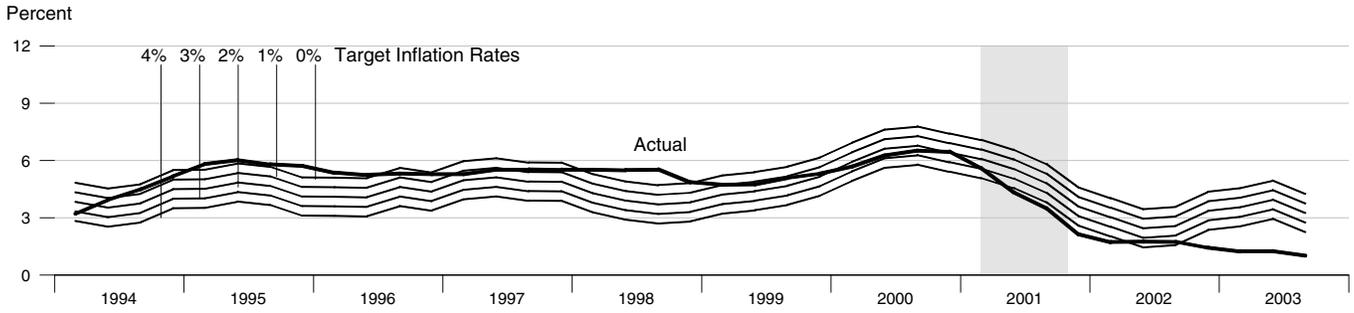
Short-Term Interest Rates



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



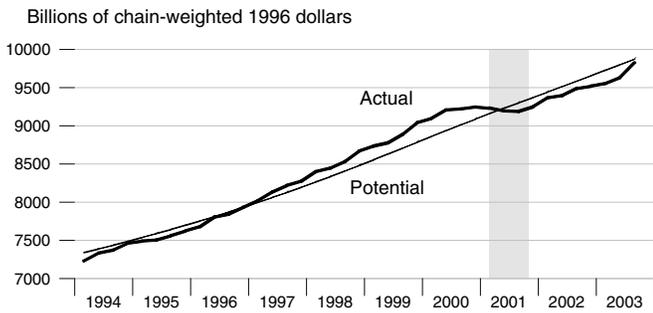
Federal Funds Rate and Inflation Targets



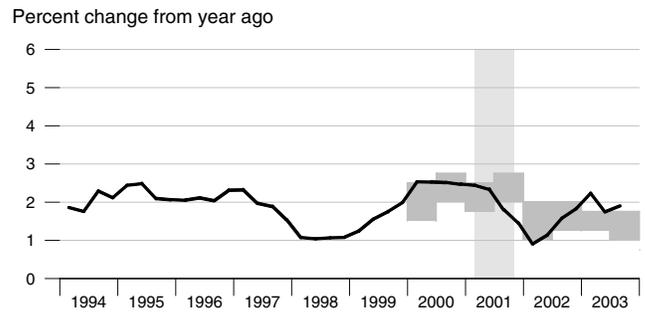
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Components of Taylor's Rule

Actual and Potential Real GDP

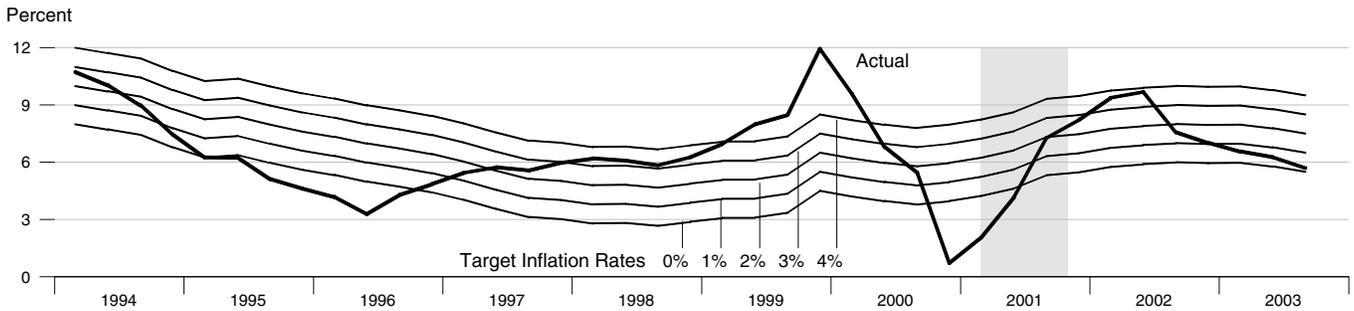


PCE Inflation and Projections



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

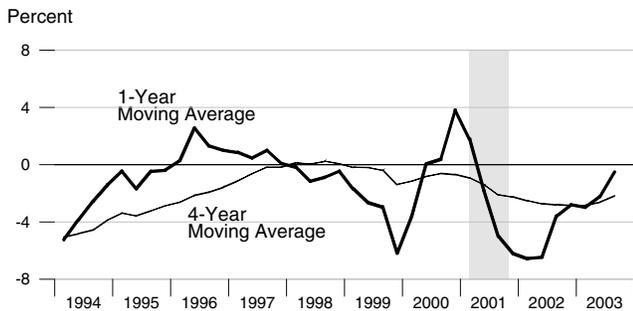
Monetary Base Growth* and Inflation Targets



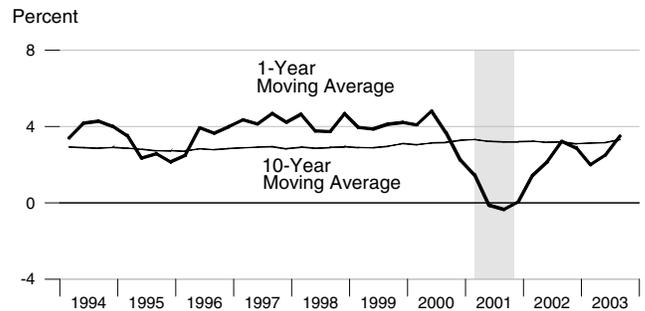
*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

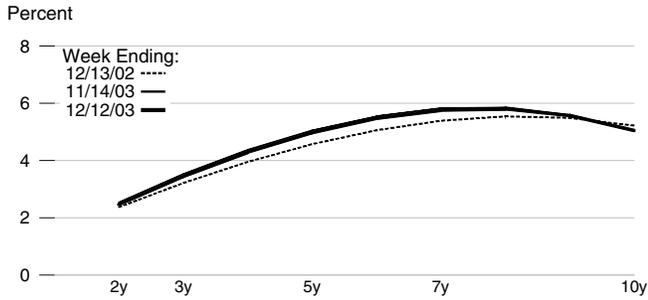
Monetary Base Velocity Growth



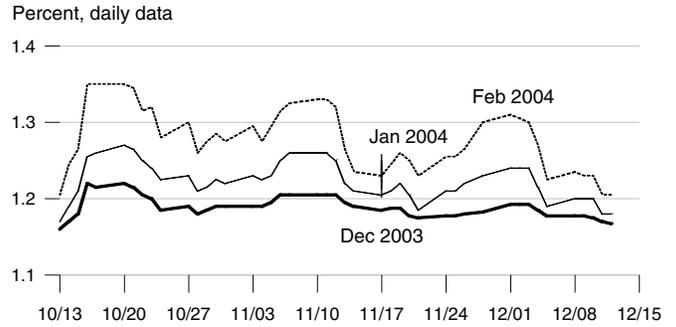
Real Output Growth



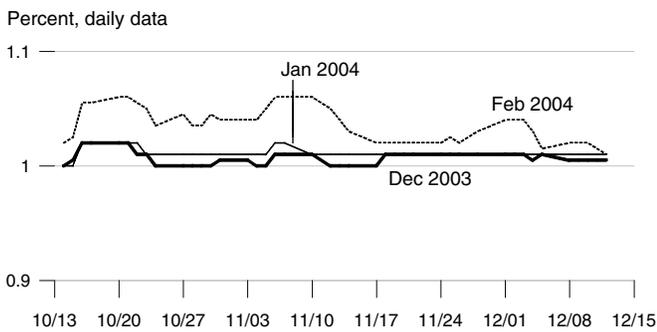
Implied One-Year Forward Rates



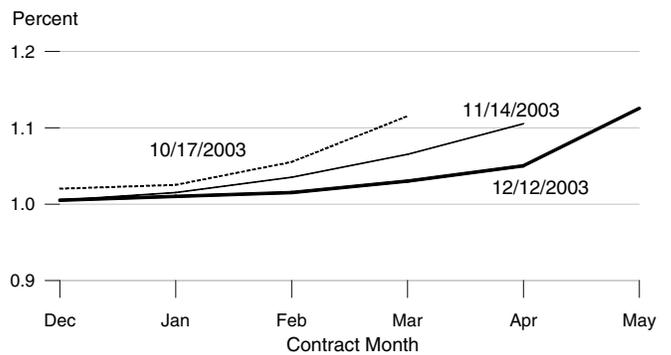
Rates on 3-Month Eurodollar Futures



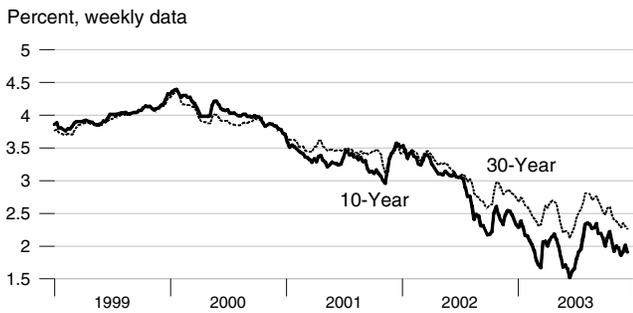
Rates on Selected Federal Funds Futures Contracts



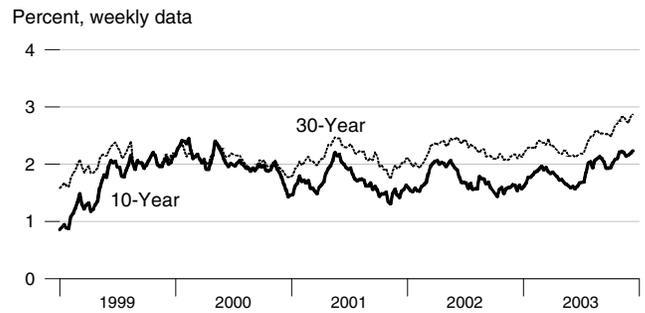
Rates on Federal Funds Futures on Selected Dates



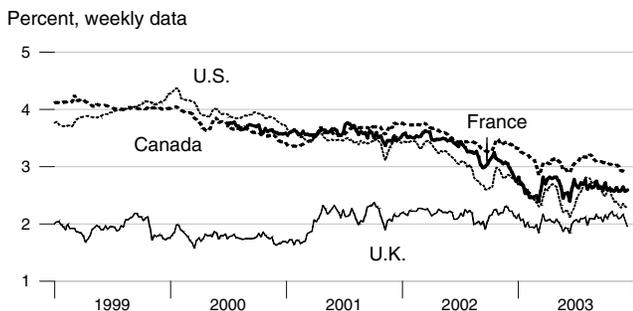
Inflation-Indexed Treasury Bonds



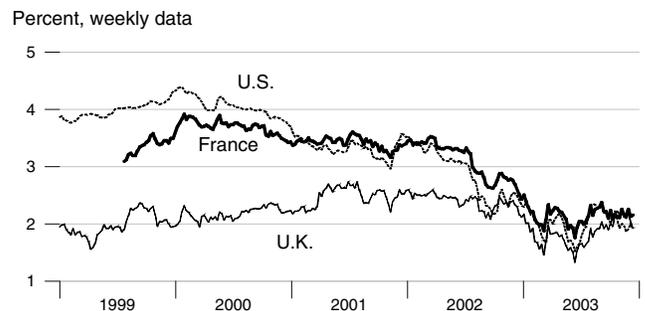
Inflation-Indexed Treasury Yield Spreads



Inflation-Indexed 30-Year Government Bonds



Inflation-Indexed 10-Year Government Bonds



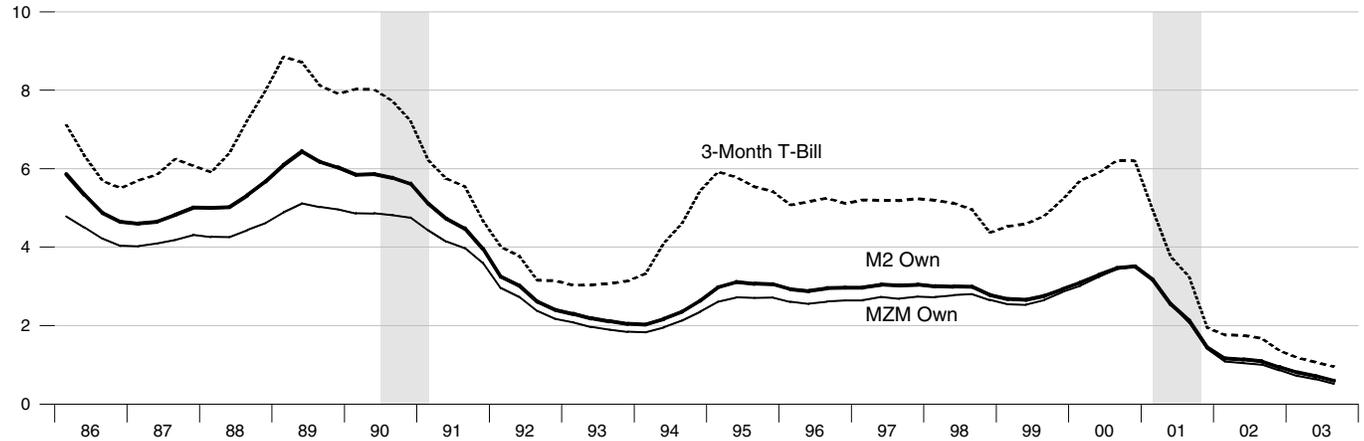
Velocity

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



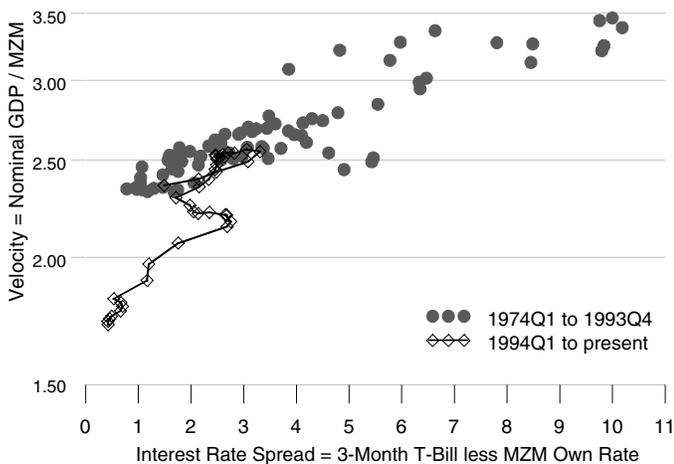
Interest Rates

Percent



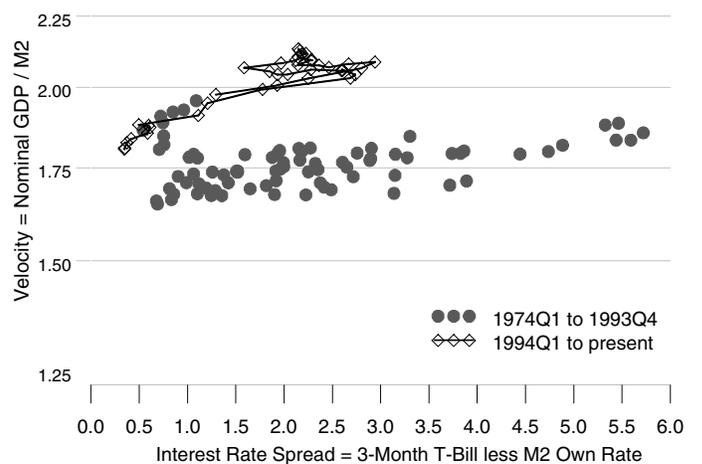
MZM Velocity and Interest Rate Spread

Ratio Scale



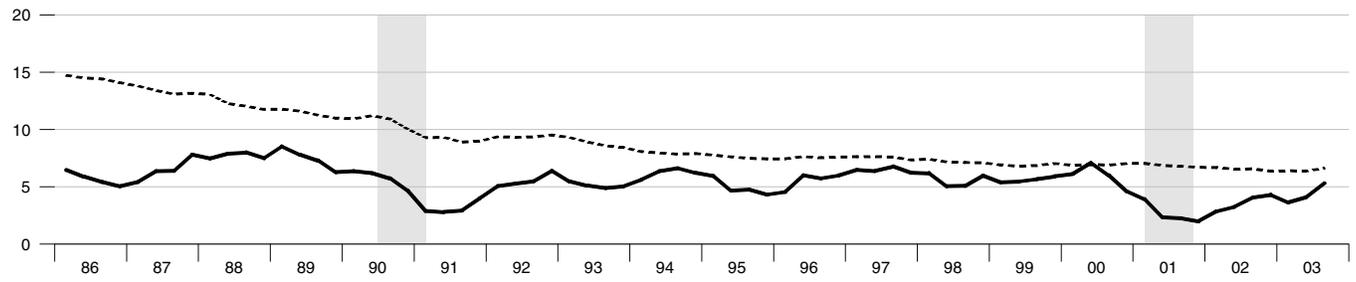
M2 Velocity and Interest Rate Spread

Ratio Scale



Gross Domestic Product

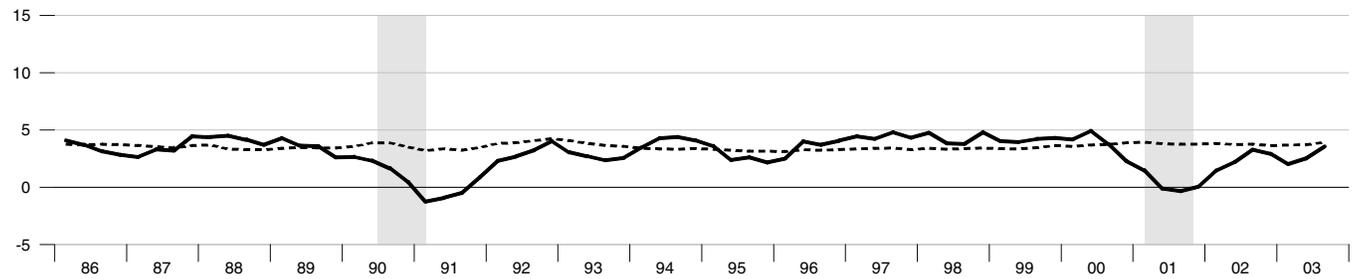
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

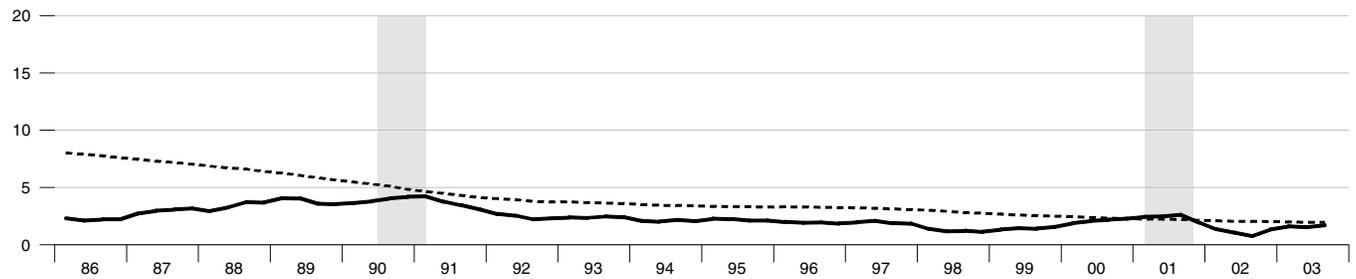
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

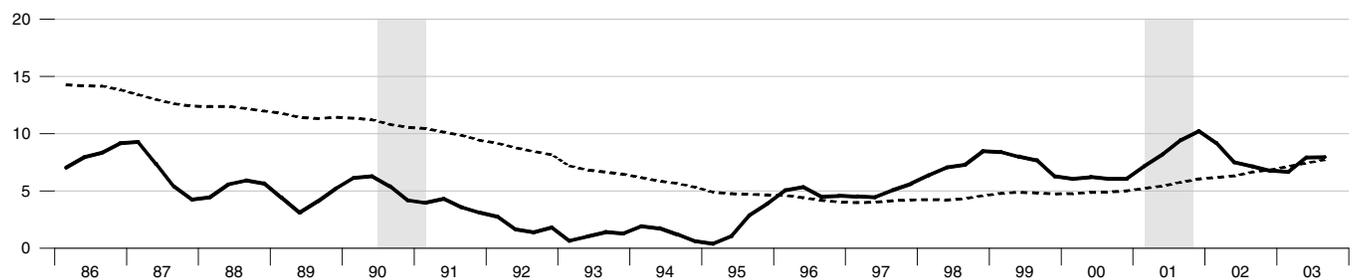
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

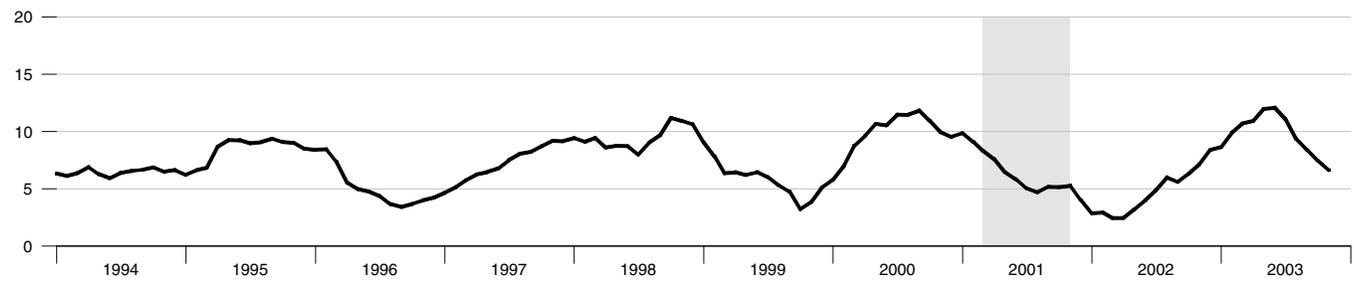
Percent change from year ago



Dashed lines indicate 10-year moving averages.

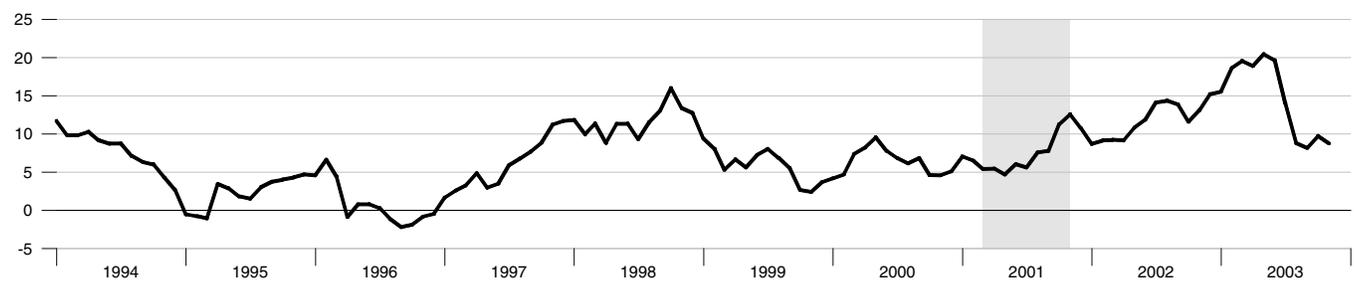
Bank Credit

Percent change from year ago



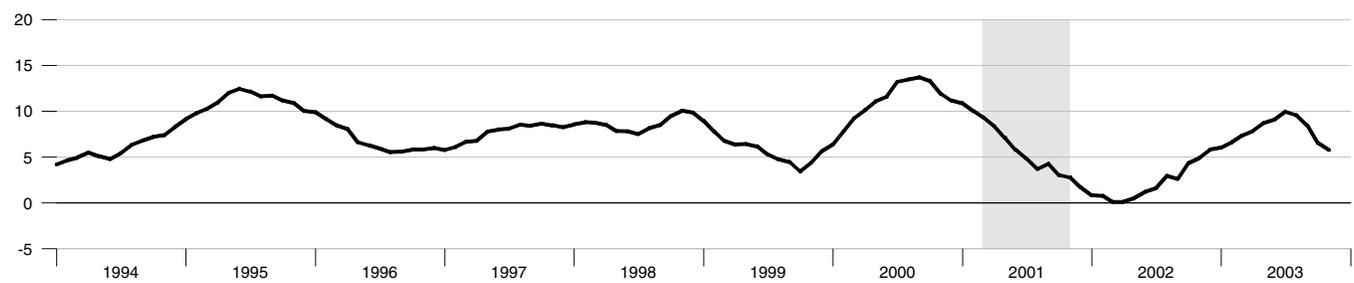
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



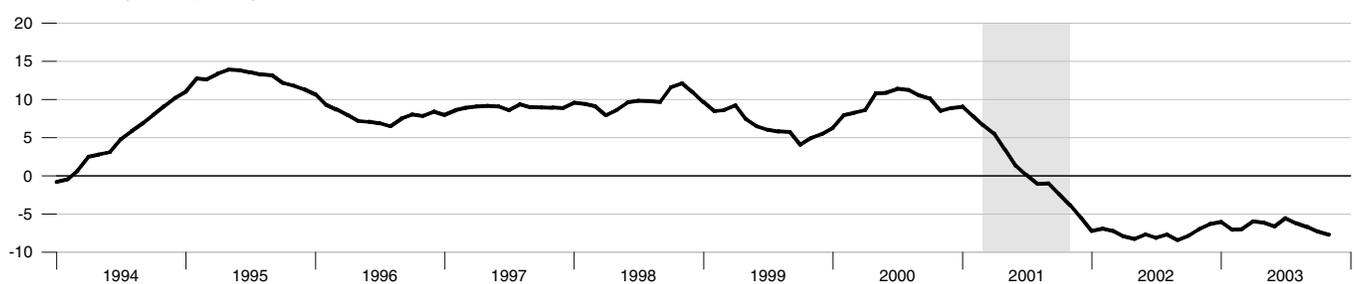
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

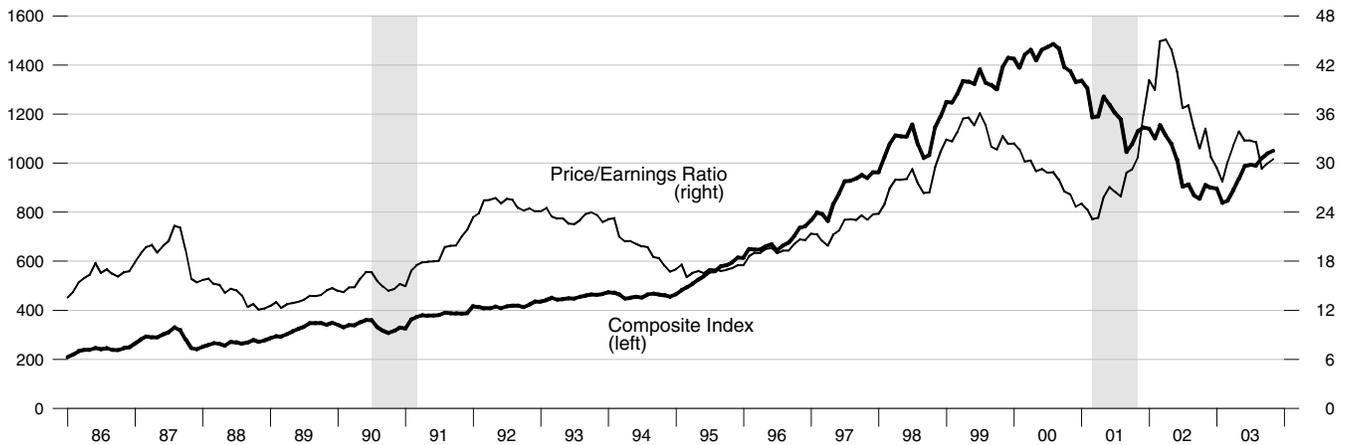


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



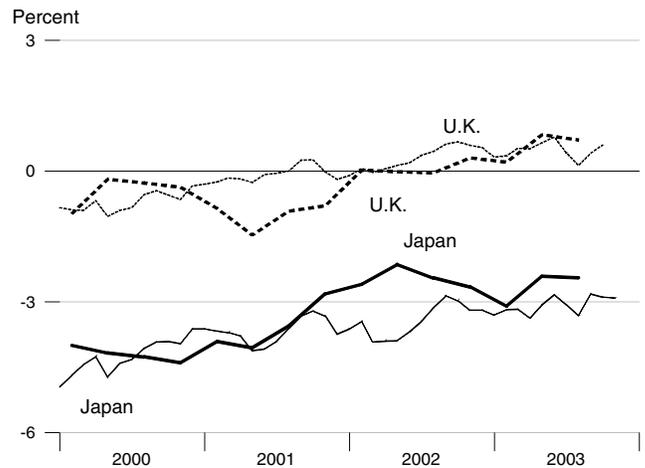
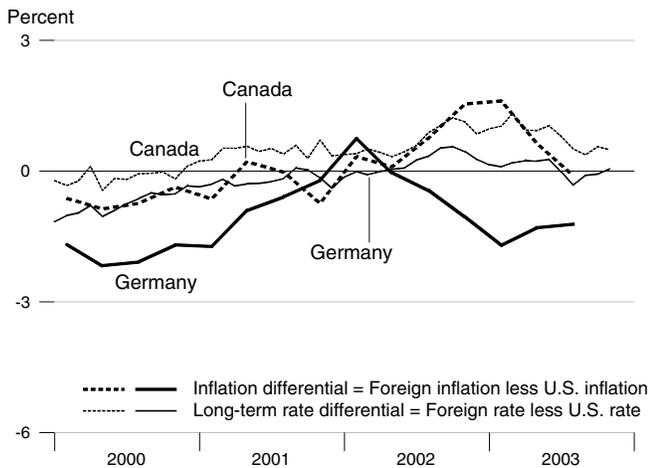
Standard & Poor's 500



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	Aug03	Sep03	Oct03	Nov03
United States	2.25	2.87	2.17	2.22	4.45	4.27	4.29	4.30
Canada	3.79	4.47	2.81	2.11	4.96	4.64	4.85	4.79
France	2.14	2.37	1.92	1.95	4.32	4.17	4.46	.
Germany	1.20	1.17	0.87	1.00	4.13	4.17	4.22	4.35
Italy	2.77	2.72	2.70	2.75	4.31	4.40	4.38	4.51
Japan	-0.40	-0.23	-0.24	-0.23	1.14	1.45	1.40	1.39
United Kingdom	2.56	3.07	3.01	2.93	4.58	4.68	4.89	.

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	4207.806	5749.858	4324.464	525.184	84.060	241.555
1999		1101.501	4170.281	4525.990	6252.637	4577.140	574.181	88.664	257.907
2000		1103.476	4508.669	4801.910	6842.016	5025.755	607.106	84.511	272.545
2001		1136.615	5220.753	5222.602	7622.646	5343.693	641.167	85.931	296.280
2002		1190.234	5888.755	5619.990	8232.295	5595.293	697.071	87.927	319.397
2001	1	1100.144	4856.861	5033.492	7277.265	5270.437	619.676	82.207	285.353
	2	1116.133	5108.948	5160.865	7544.598	5311.772	629.484	82.722	292.843
	3	1162.812	5329.059	5292.309	7727.597	5361.292	651.930	90.905	300.532
	4	1167.372	5588.141	5403.744	7941.125	5431.272	663.578	87.887	306.393
2002	1	1183.773	5726.069	5494.908	8056.785	5415.127	680.264	88.156	311.600
	2	1181.579	5812.218	5546.655	8139.404	5482.968	692.937	86.979	315.250
	3	1190.495	5947.501	5669.317	8285.396	5655.931	702.753	86.821	322.283
	4	1205.088	6069.232	5769.077	8447.594	5827.147	712.330	89.753	328.454
2003	1	1227.664	6162.302	5861.289	8566.065	5942.898	726.821	90.845	334.408
	2	1255.536	6262.783	5985.400	8703.166	6122.209	738.225	91.745	341.958
	3	1283.866	6468.293	6121.830	8942.333	6198.366	744.023	94.577	350.032
2001	Nov	1165.330	5587.325	5403.262	7945.526	5445.892	661.381	86.229	306.419
	Dec	1172.884	5663.621	5445.098	8006.248	5434.144	665.556	85.880	308.503
2002	Jan	1179.046	5684.649	5469.090	8017.885	5413.905	673.713	87.295	310.020
	Feb	1185.197	5739.210	5507.373	8069.641	5420.206	681.914	89.237	312.230
	Mar	1187.076	5754.347	5508.262	8082.829	5411.269	685.165	87.937	312.549
	Apr	1172.596	5752.540	5494.843	8084.978	5435.585	689.008	88.352	312.466
	May	1183.264	5820.652	5557.466	8152.352	5484.357	692.736	86.586	315.724
	Jun	1188.878	5863.461	5587.657	8180.881	5528.962	697.068	85.999	317.561
	Jul	1195.740	5911.203	5635.502	8227.125	5581.357	701.032	86.101	320.059
	Aug	1184.469	5953.277	5673.379	8293.720	5663.471	702.878	86.383	322.468
	Sep	1191.275	5978.022	5699.071	8335.343	5722.966	704.350	87.978	324.323
	Oct	1202.643	5980.604	5737.043	8346.900	5755.579	710.665	89.827	326.569
	Nov	1202.199	6090.541	5777.281	8470.033	5835.879	712.473	89.839	328.881
	Dec	1210.421	6136.550	5792.907	8525.849	5889.982	713.851	89.594	329.911
2003	Jan	1212.846	6134.495	5821.768	8525.995	5881.696	719.527	89.443	332.009
	Feb	1233.432	6174.092	5875.013	8572.852	5957.697	728.658	91.817	335.174
	Mar	1236.715	6178.318	5887.086	8599.348	5989.300	732.279	91.275	336.042
	Apr	1236.918	6185.216	5910.047	8617.594	6028.644	736.486	92.278	337.857
	May	1257.822	6262.954	5998.654	8711.700	6141.283	738.662	91.418	342.530
	Jun	1271.867	6340.179	6047.498	8780.203	6196.699	739.526	91.540	345.487
	Jul	1277.822	6444.853	6099.520	8916.866	6200.633	741.236	93.471	348.716
	Aug	1285.738	6481.965	6143.605	8956.490	6192.450	745.282	95.410	351.214
	Sep	1288.039	6478.061	6122.364	8953.644	6202.015	745.552	94.850	350.167
	Oct	1286.949	6423.972	6091.902	8896.071	6184.078	753.729	95.166	349.399
	Nov	1281.911	6386.221	6070.557	8861.260	6223.288	754.694	94.649	348.772

*All values are given in billions of dollars.

	Federal Funds	Discount Rate	Primary Credit Rate	Prime Rate	3-mo CDs	Treasury Yields			Corporate Aaa Bonds	S & L Aaa Bonds	Conventional Mortgage
						3-mo	3-yr	10-yr			
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		8.62	5.26	4.95	4.64	5.05	7.08	5.03	7.01
	2	4.33		7.34	4.10	3.75	4.43	5.27	7.22	5.11	7.13
	3	3.50		6.57	3.34	3.24	3.93	4.98	7.11	4.95	6.97
	4	2.13		5.16	2.06	1.94	3.33	4.77	6.92	4.97	6.78
2002	1	1.73		4.75	1.82	1.76	3.75	5.08	6.62	5.02	6.97
	2	1.75		4.75	1.83	1.75	3.77	5.10	6.71	5.01	6.81
	3	1.74		4.75	1.76	1.67	2.62	4.26	6.35	4.72	6.29
	4	1.44		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	Nov	2.09		5.10	2.03	1.91	3.22	4.65	6.97	4.85	6.66
	Dec	1.82		4.84	1.83	1.72	3.62	5.09	6.77	5.18	7.07
2002	Jan	1.73		4.75	1.74	1.68	3.56	5.04	6.55	5.05	7.00
	Feb	1.74		4.75	1.82	1.76	3.55	4.91	6.51	4.93	6.89
	Mar	1.73		4.75	1.91	1.83	4.14	5.28	6.81	5.09	7.01
	Apr	1.75		4.75	1.87	1.75	4.01	5.21	6.76	5.09	6.99
	May	1.75		4.75	1.82	1.76	3.80	5.16	6.75	5.03	6.81
	Jun	1.75		4.75	1.81	1.73	3.49	4.93	6.63	4.92	6.65
	Jul	1.73		4.75	1.79	1.71	3.01	4.65	6.53	4.81	6.49
	Aug	1.74		4.75	1.73	1.65	2.52	4.26	6.37	4.78	6.29
	Sep	1.75		4.75	1.76	1.66	2.32	3.87	6.15	4.58	6.09
	Oct	1.75		4.75	1.73	1.61	2.25	3.94	6.32	4.66	6.11
	Nov	1.34		4.35	1.39	1.25	2.32	4.05	6.31	4.77	6.07
	Dec	1.24		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
	Nov	1.00	2.00	4.00	1.11	0.95	2.45	4.30	5.65	4.50	5.93

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

		M1	MZM	M2	M3
Percent change at an annual rate					
1998		0.99	11.66	7.29	10.35
1999		2.00	12.42	7.56	8.74
2000		0.18	8.11	6.10	9.43
2001		3.00	15.79	8.76	11.41
2002		4.72	12.80	7.61	8.00
<hr/>					
2001	1	2.71	18.62	10.64	13.24
	2	5.81	20.76	10.12	14.69
	3	16.73	17.23	10.19	9.70
	4	1.57	19.45	8.42	11.05
2002	1	5.62	9.87	6.75	5.83
	2	-0.74	6.02	3.77	4.10
	3	3.02	9.31	8.85	7.17
	4	4.90	8.19	7.04	7.83
2003	1	7.49	6.13	6.39	5.61
	2	9.08	6.52	8.47	6.40
	3	9.03	13.13	9.12	10.99
<hr/>					
2001	Nov	1.47	16.07	9.04	11.27
	Dec	7.78	16.39	9.29	9.17
2002	Jan	6.30	4.46	5.29	1.74
	Feb	6.26	11.52	8.40	7.75
	Mar	1.90	3.16	0.19	1.96
	Apr	-14.64	-0.38	-2.92	0.32
	May	10.92	14.21	13.68	10.00
	Jun	5.69	8.83	6.52	4.20
	Jul	6.93	9.77	10.28	6.78
	Aug	-11.31	8.54	8.07	9.71
	Sep	6.90	4.99	5.43	6.02
	Oct	11.45	0.52	8.00	1.66
	Nov	-0.44	22.06	8.42	17.70
	Dec	8.21	9.07	3.25	7.91
2003	Jan	2.40	-0.40	5.98	0.02
	Feb	20.37	7.75	10.98	6.59
	Mar	3.19	0.82	2.47	3.71
	Apr	0.20	1.34	4.68	2.55
	May	20.28	15.08	17.99	13.10
	Jun	13.40	14.80	9.77	9.44
	Jul	5.62	19.81	10.32	18.68
	Aug	7.43	6.91	8.67	5.33
	Sep	2.15	-0.72	-4.15	-0.38
	Oct	-1.02	-10.02	-5.97	-7.72
	Nov	-4.70	-7.05	-4.20	-4.70

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 (money, zero maturity): M2 minus small-denomination time deposits, plus institutional money market mutual funds (that is, those included in M3 but excluded from M2). The label MZM was coined by William Poole (1991); the aggregate itself was proposed earlier by Motley (1988).

M2: M1 plus savings deposits (including money market deposit accounts) and small-denomination (under \$100,000) time deposits issued by financial institutions; and shares in retail money market mutual funds (funds with initial investments under \$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,b, 2001, 2003).

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 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, 2003).

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, with additional data 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. 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: 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 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/fred2/. See

also *Federal Reserve Bulletin*, table 1.35. The 30-year constant maturity series was discontinued by the Treasury 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 $((y_t - y_{t-40})/40) \times 400$, where y_t is the log of real GDP. The 4-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 found 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 Canadian bond has a maturity date of 12/01/2031, the current French bond 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 French bond 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: Stock price-earnings ratio, stock price composite index.

University of Michigan Survey Research Center: Median expected price change.

U.S. Department of the Treasury: U.S. inflation-indexed security yields.

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Note: *Available on the Internet at research.stlouisfed.org/publications/review/.