

Please go to research.stlouisfed.org/publications/mt for important information about your subscription

Can a Summer Hike Cause a Surprise Fall for Mortgage Rates?

After persistent decreases in the federal funds rate target for the past four years, the Federal Open Market Committee (FOMC) increased the target by 25 basis points at their June meeting. One might assume that raising rates dampens demand in interest-sensitive markets, such as housing, but data from the Mortgage Bankers Association show the opposite can occur. In the week following the FOMC's decision, the total number of mortgage applications (the Mortgage Composite Index) increased by nearly 20 percent on a seasonally adjusted basis as the long-term (15-year and 30-year) fixed rates fell by over 20 basis points. At the time this cover page was written, mortgage rates continue to be lower and mortgage demand higher than before the decision to raise the federal funds rate.

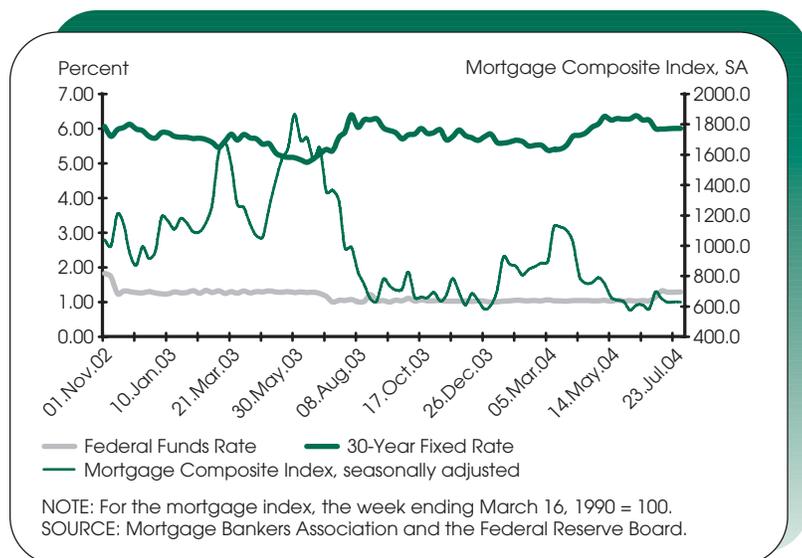
A funds rate increase can affect the market for mortgages in a number of ways, and some examples follow. Mortgages are long-term loans, meaning that the mortgage rate depends on both current short-term interest rates, e.g., the federal funds rate, and expected future short rates, which partly depend on inflation expectations. Therefore, one effect is that, other things equal, an increase in the funds rate causes long rates to rise. Another effect is that markets might expect future inflation to fall when the funds rate increases because this eases upward pressure on inflation. Thus, when the funds rate rises, long-term mortgage rates might remain unchanged or even fall. Additionally, raising the funds rate has an *intertemporal substitution effect*, whereby an increase now might signal that further increases are impending. As a result, borrowers may decide to apply for mortgages now before rates become higher. This, in turn, raises short-run mortgage demand. Assuming expected inflation does in fact fall, the latter two effects on mortgage demand counterbalance the first.

As the chart shows, the funds rate has remained between 1.00 and 1.75 percent since November

2002, with two long periods of almost no change; however, within those two periods, the 30-year fixed rate moved continually, due partially to fluctuating inflation expectations. Mortgage demand also fluctuated greatly during this time. For the two funds rate decreases that are shown, the long rate increased, suggesting that the increase in expected inflation swamped the effect of the decline in current short rates. Concurrently, mortgage demand fell in these episodes, perhaps because of the combination of the indirect effect of higher inflation expectations and the lack of a sense of urgency to apply for mortgages. Since June of this year, when the funds rate increased, the 30-year mortgage rate has fallen, and mortgage demand has risen slightly, possibly reflecting both lower rates and homeowners' urgency to secure loans before an anticipated series of funds rate target increases by the FOMC.

Despite the recent increase in the federal funds rate target, there was not an immediate increase in long-term rates and lower mortgage demand. Thus, it is incorrect to assume that monetary policy tightenings will always curtail housing in the short run. Nevertheless, coming weeks may yet see a decline in mortgage applications, as many borrowers may have moved their purchase and refinancing decisions forward.

—Kristie M. Engemann and Michael T. Owyang



Contents

Page

3	Monetary and Financial Indicators at a Glance
4	Monetary Aggregates and Their Components
6	Monetary Aggregates: Monthly Growth
7	Reserves Markets and Short-Term Credit Flows
8	Measures of Expected Inflation
9	Interest Rates
10	Policy-Based Inflation Indicators
11	Implied Forward Rates, Futures Contracts, and Inflation-Indexed Securities
12	Velocity, Gross Domestic Product, and M2
14	Bank Credit
15	Stock Market Index and Foreign Inflation and Interest Rates
16	Reference Tables
18	Definitions, Notes, and Sources

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

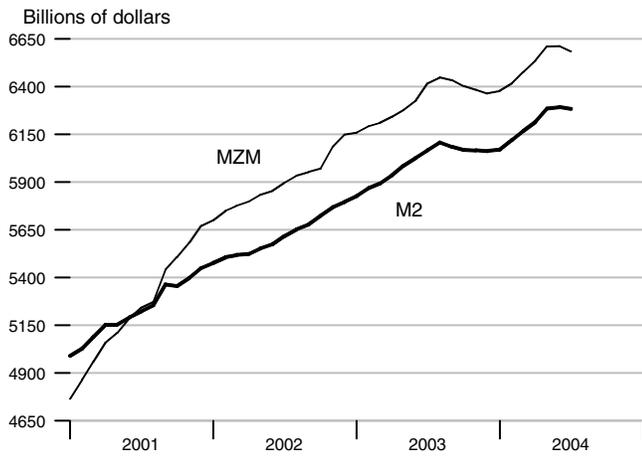
We welcome your comments addressed to:

Editor, *Monetary Trends*
Research Division
Federal Reserve Bank of St. Louis
P.O. Box 442
St. Louis, MO 63166-0442

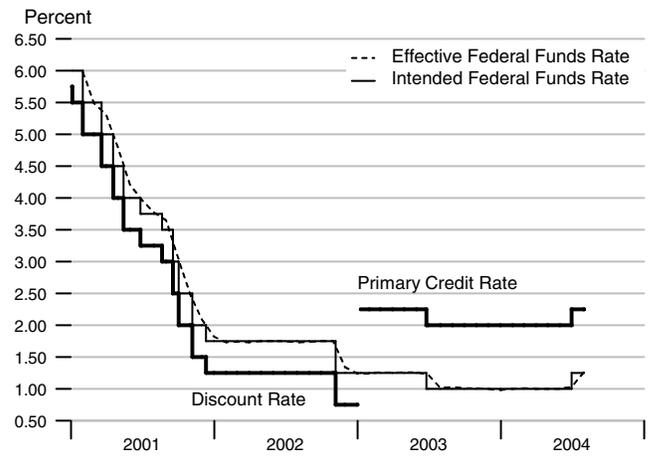
or to:

stlsFRED@stls.frb.org

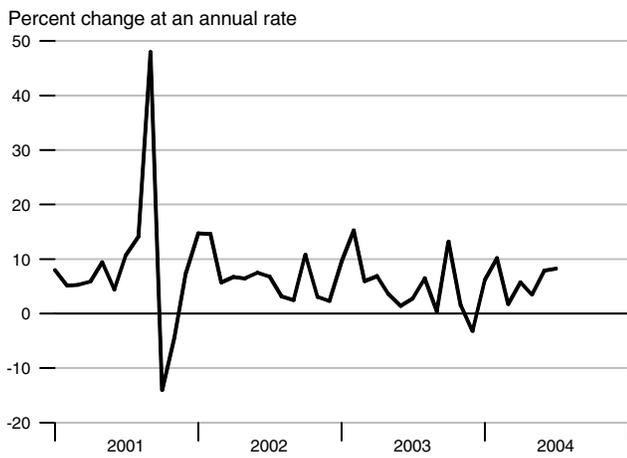
M2 and MZM



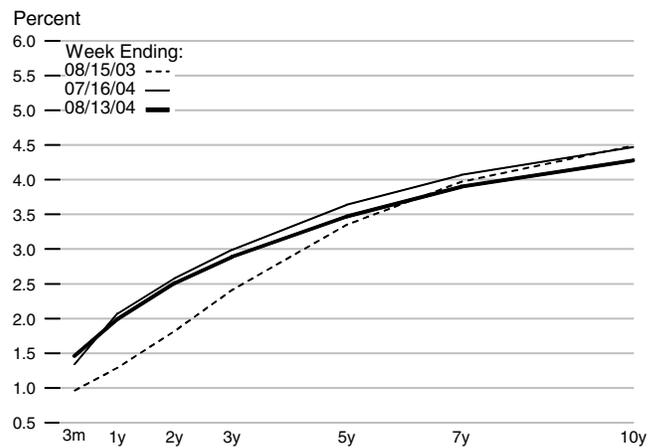
Reserve Market Rates



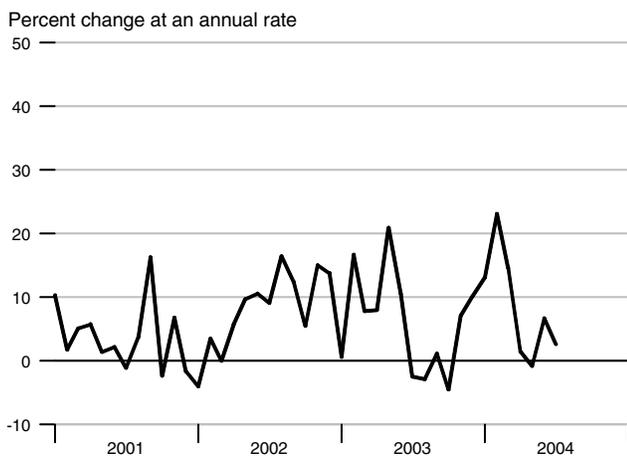
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit



Interest Rates

	May 04	Jun 04	Jul 04
Federal Funds Rate	1.00	1.03	1.26
Prime Rate	4.00	4.00	4.25
Primary Credit Rate	2.00	2.01	2.25
Conventional Mortgage Rate	6.27	6.29	6.06
Treasury Yields:			
3-Month Constant Maturity	1.04	1.29	1.36
6-Month Constant Maturity	1.33	1.64	1.70
1-Year Constant Maturity	1.78	2.12	2.10
3-Year Constant Maturity	3.10	3.26	3.05
5-Year Constant Maturity	3.85	3.93	3.69
10-Year Constant Maturity	4.72	4.73	4.50

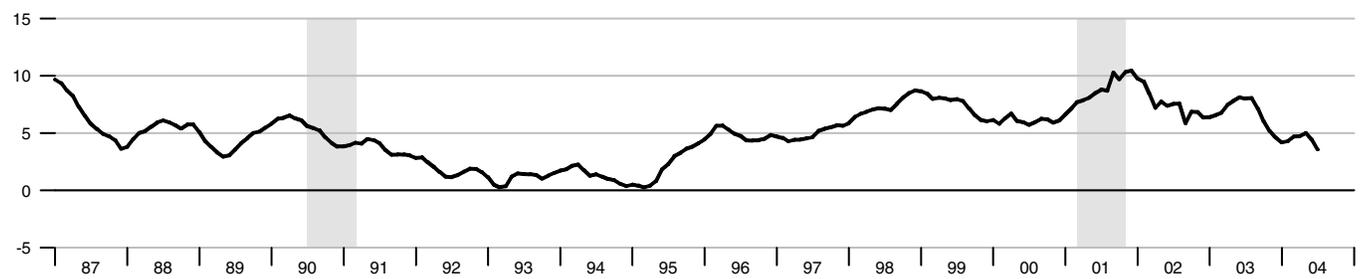
MZM and M1

Percent change from year ago



M2

Percent change from year ago



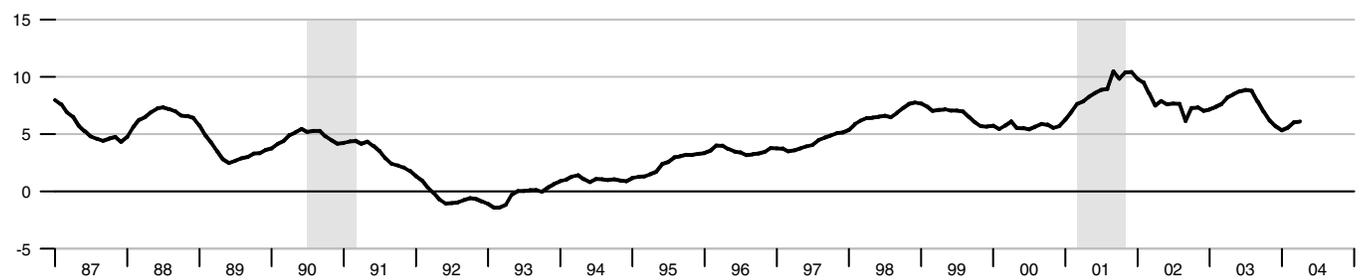
M3

Percent change from year ago



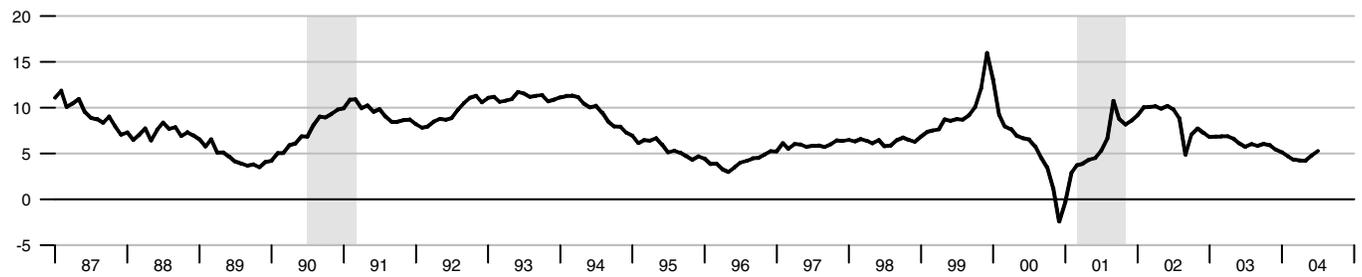
Monetary Services Index - M2

Percent change from year ago



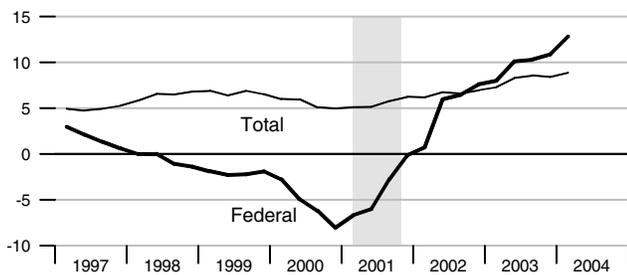
Adjusted Monetary Base

Percent change from year ago



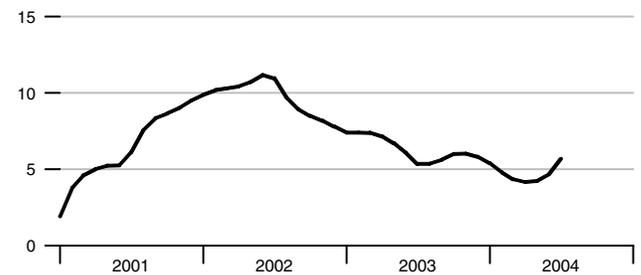
Domestic Nonfinancial Debt

Percent change from year ago



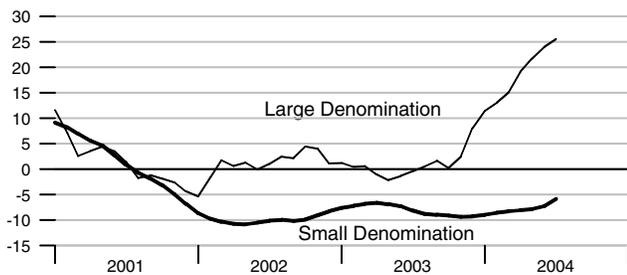
Currency Held by the Nonbank Public

Percent change from year ago



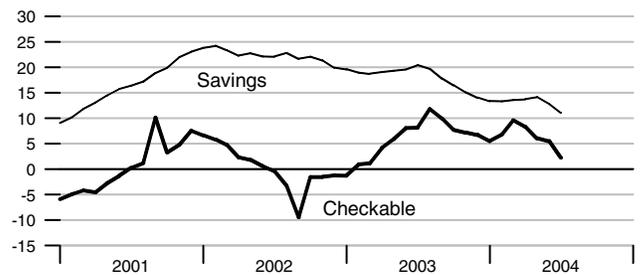
Time Deposits

Percent change from year ago



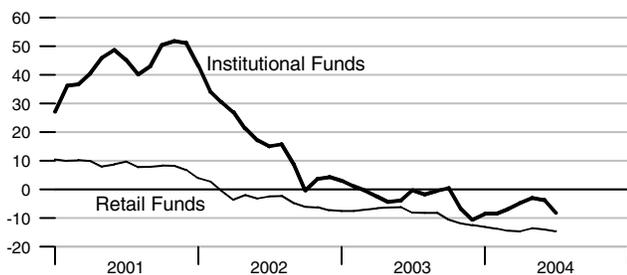
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

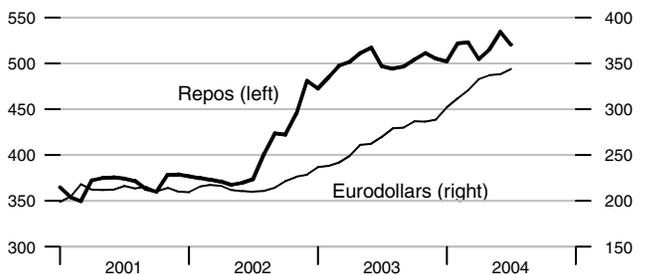
Percent change from year ago



Repurchase Agreements and Eurodollars

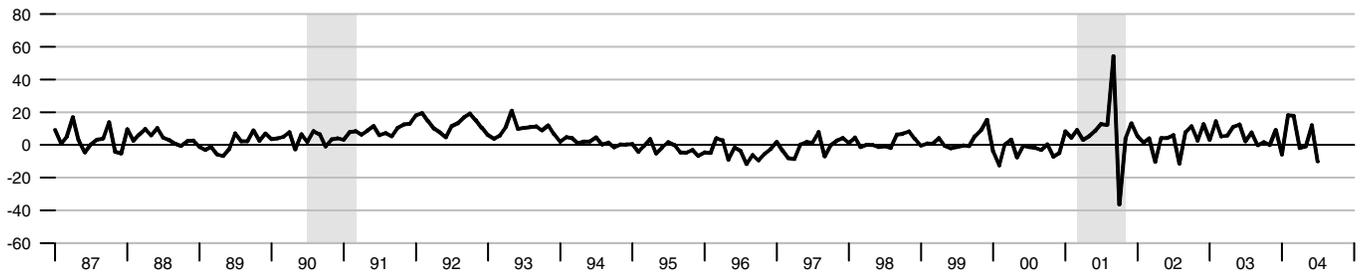
Billions of dollars

Billions of dollars



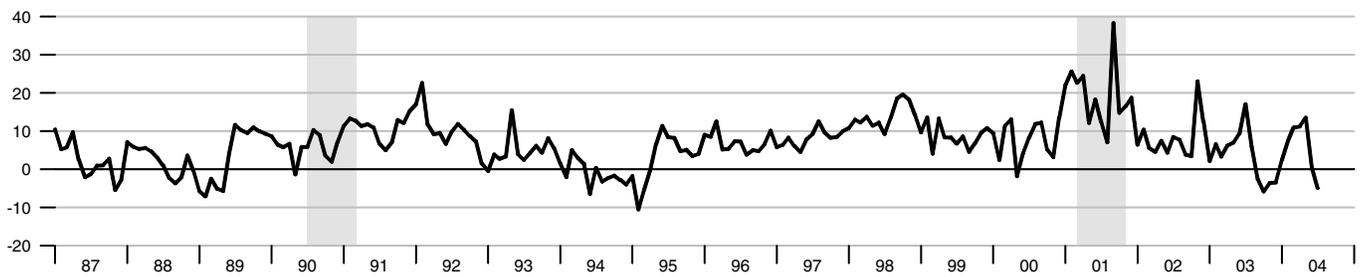
M1

Percent change at an annual rate



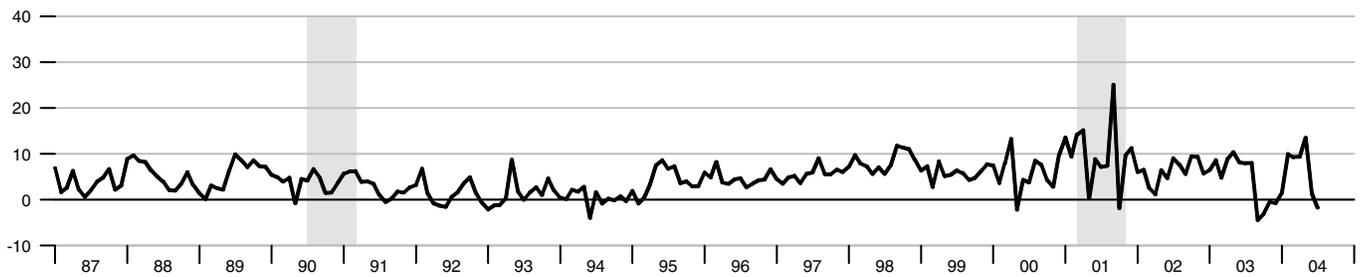
M2M

Percent change at an annual rate



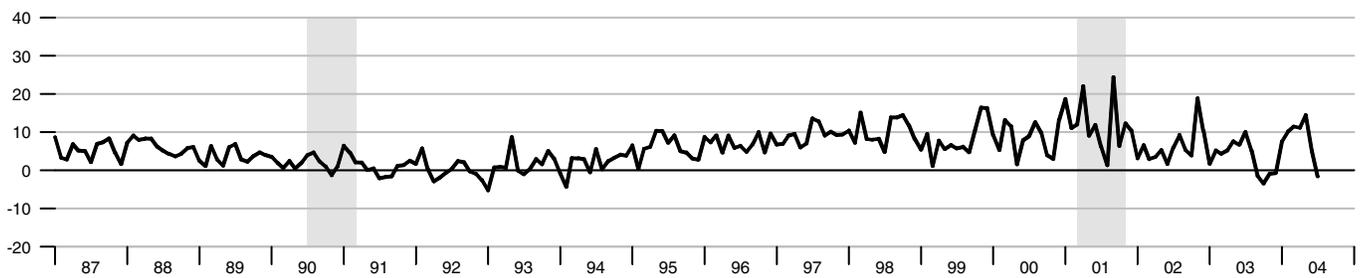
M2

Percent change at an annual rate



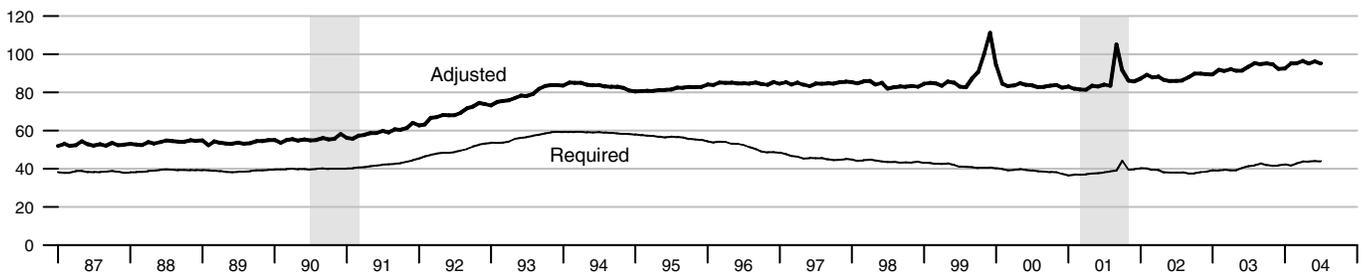
M3

Percent change at an annual rate



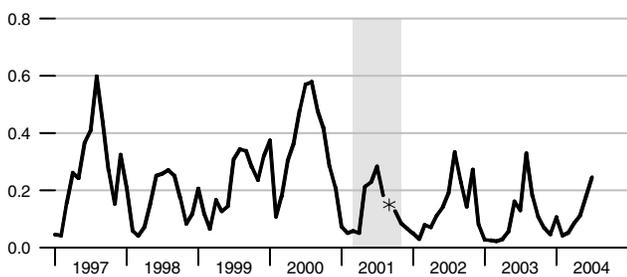
Adjusted and Required Reserves

Billions of dollars



Total Borrowings, nsa

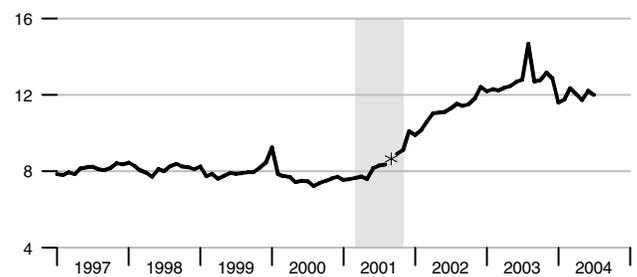
Billions of dollars



*Actual value for September 2001 is \$3.4 billion.

Excess Reserves plus RCB Contracts

Billions of dollars



*Actual value for September 2001 is \$26.43 billion.

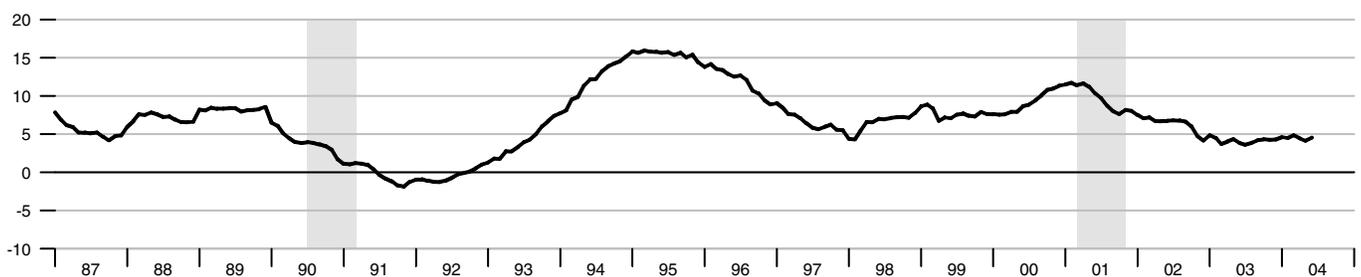
Nonfinancial Commercial Paper

Percent change from year ago

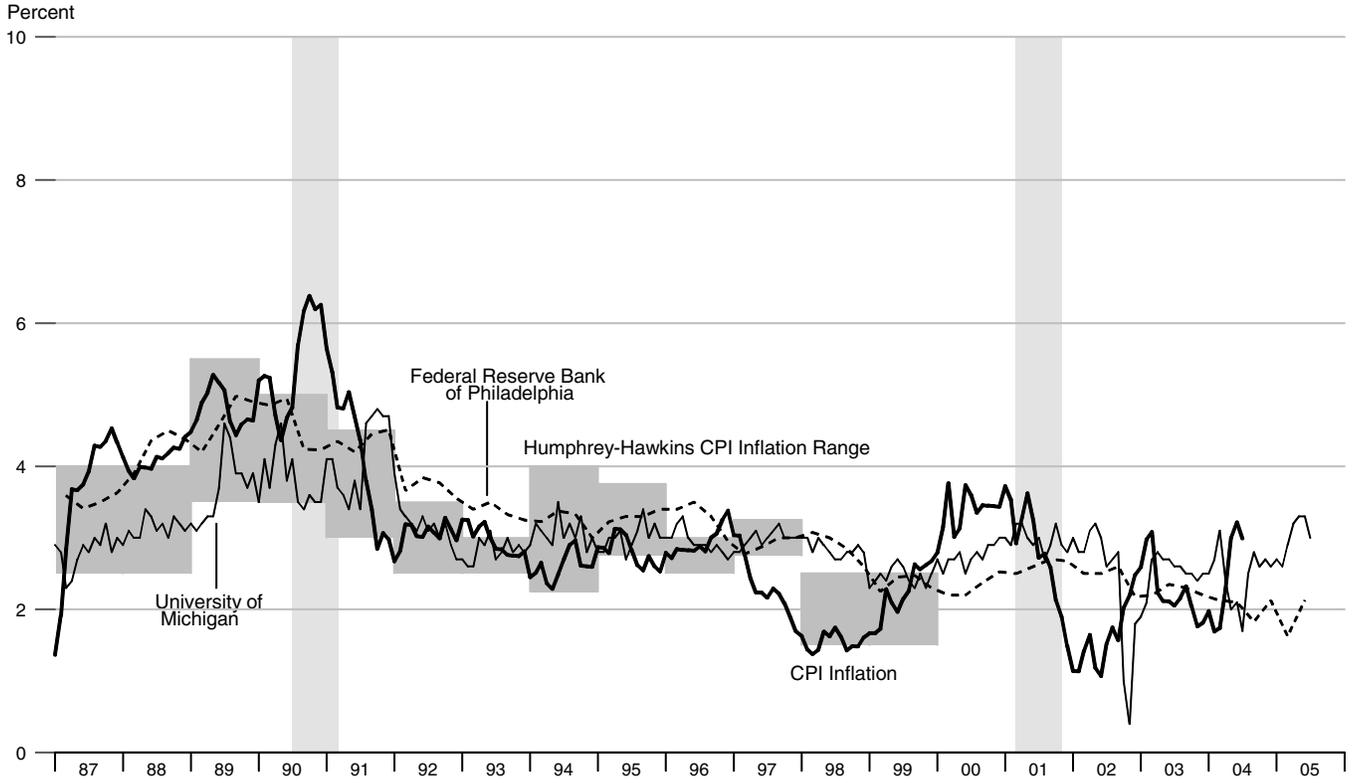


Consumer Credit

Percent change from year ago

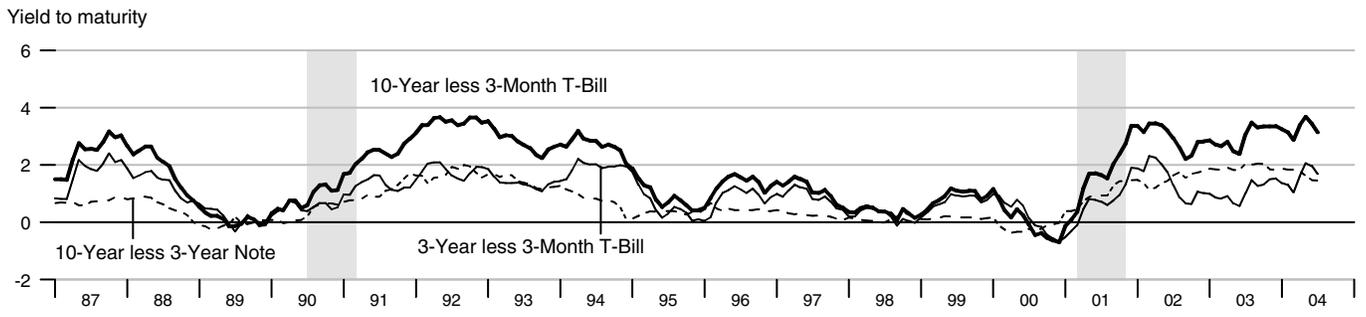


Inflation and Inflation Expectations

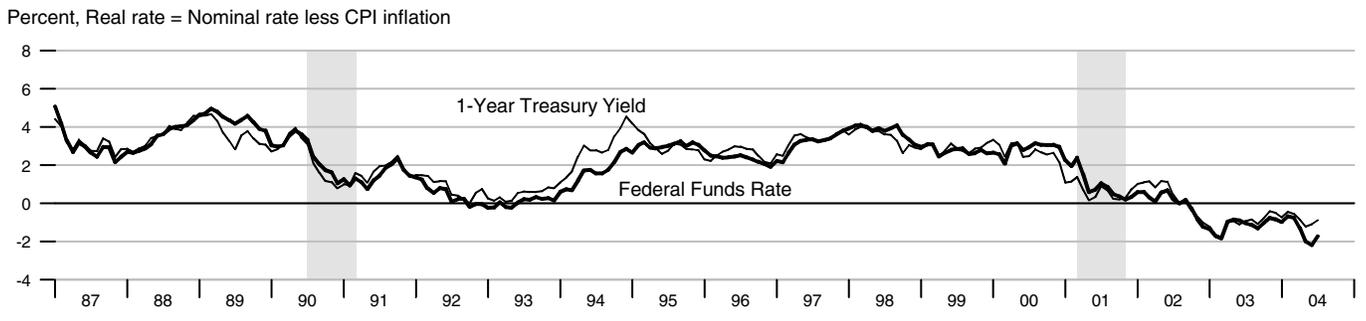


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See notes on page 19.

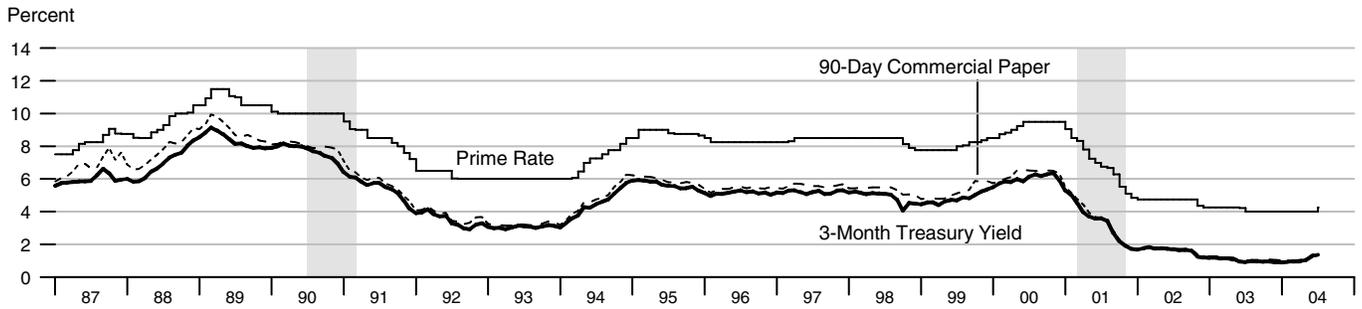
Treasury Security Yield Spreads



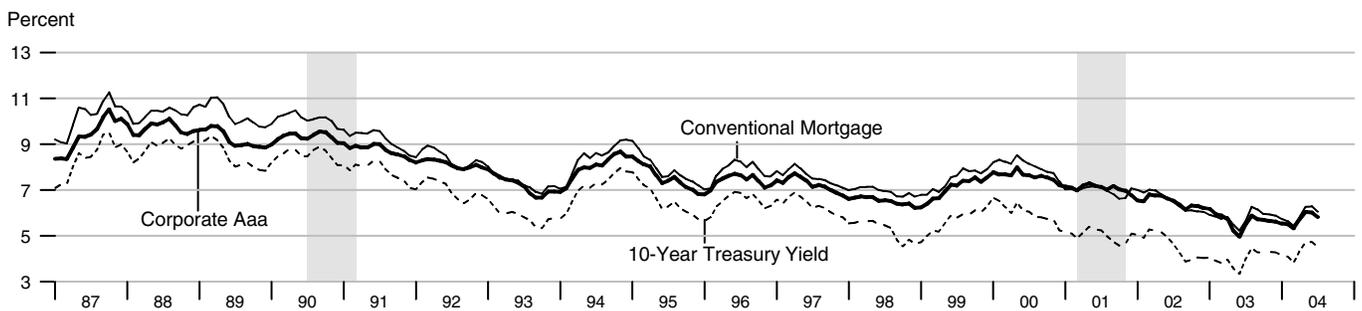
Real Interest Rates



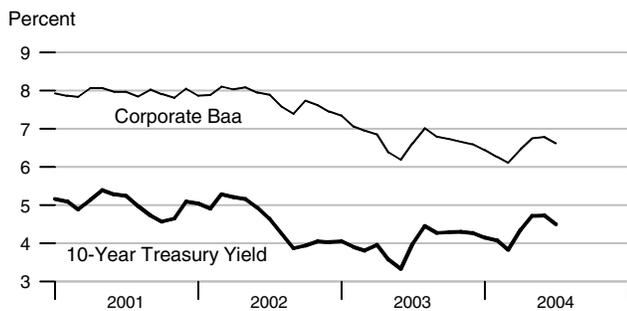
Short-Term Interest Rates



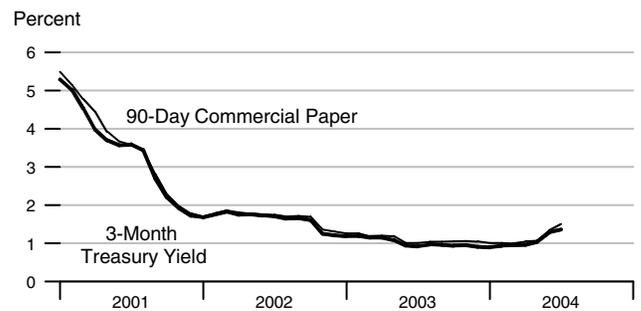
Long-Term Interest Rates



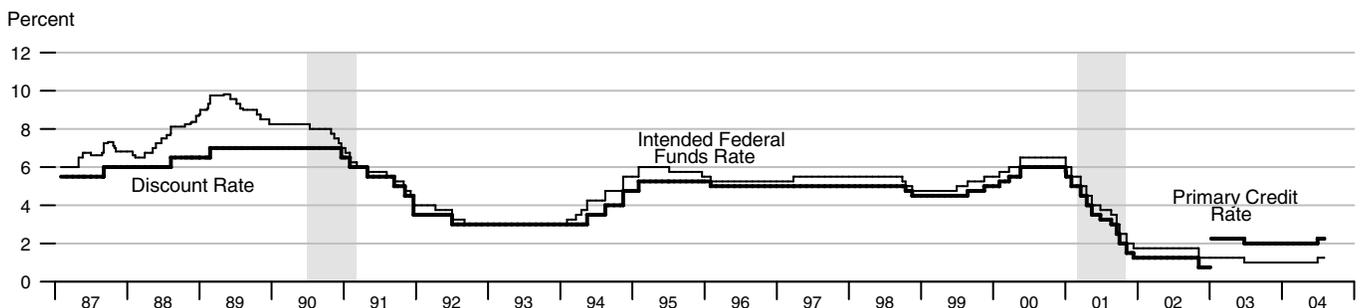
Long-Term Interest Rates



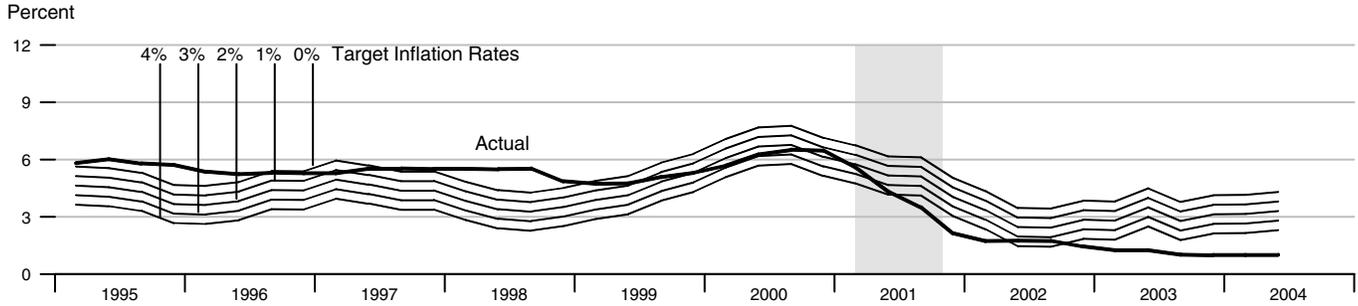
Short-Term Interest Rates



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



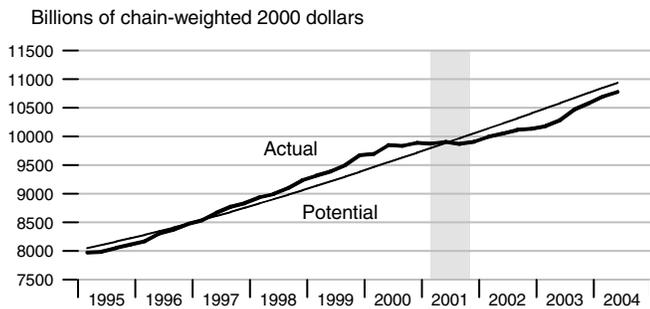
Federal Funds Rate and Inflation Targets



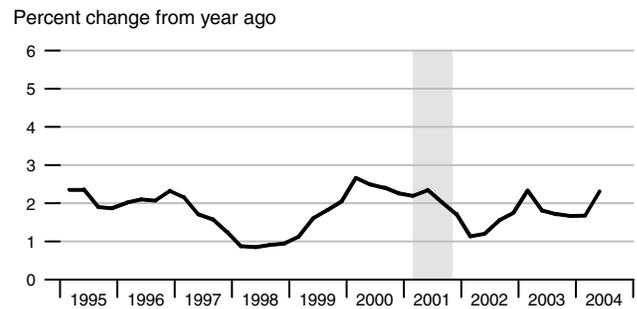
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Components of Taylor's Rule

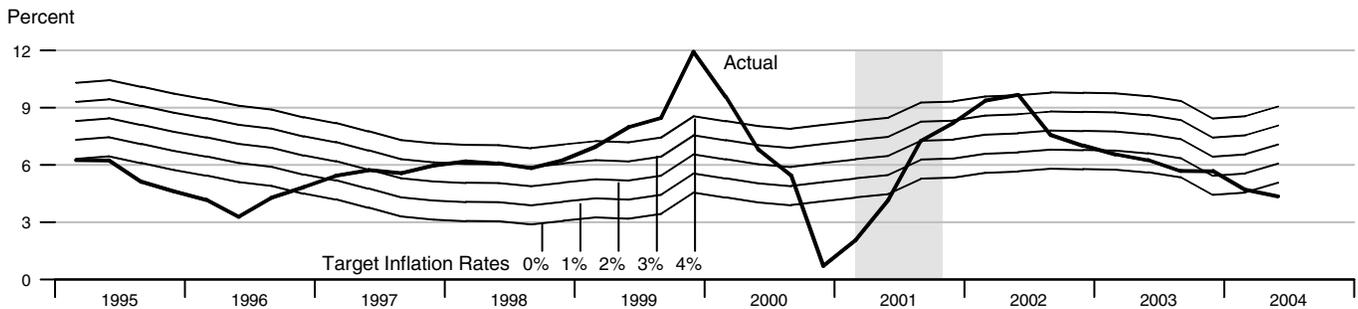
Actual and Potential Real GDP



PCE Inflation



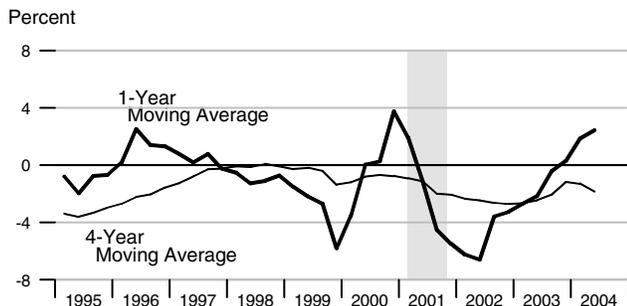
Monetary Base Growth* and Inflation Targets



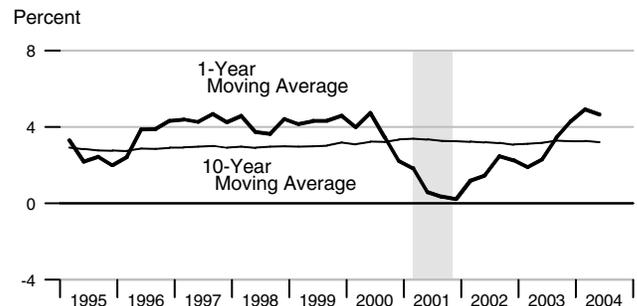
*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

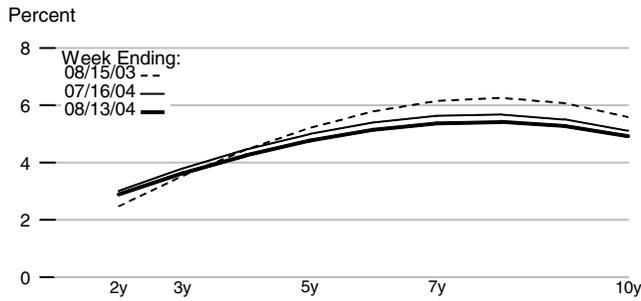
Monetary Base Velocity Growth



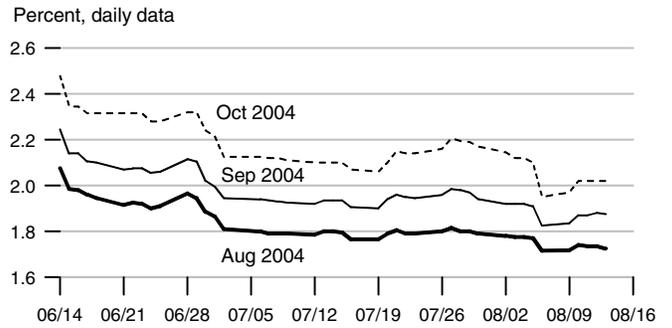
Real Output Growth



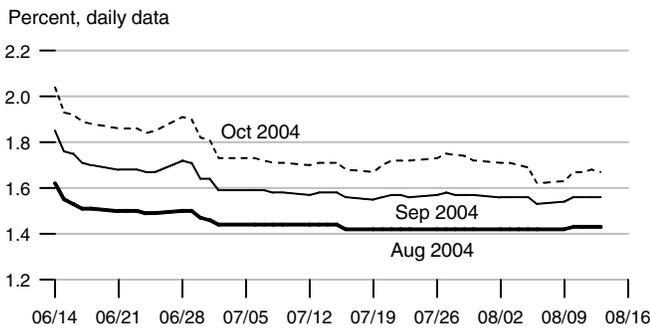
Implied One-Year Forward Rates



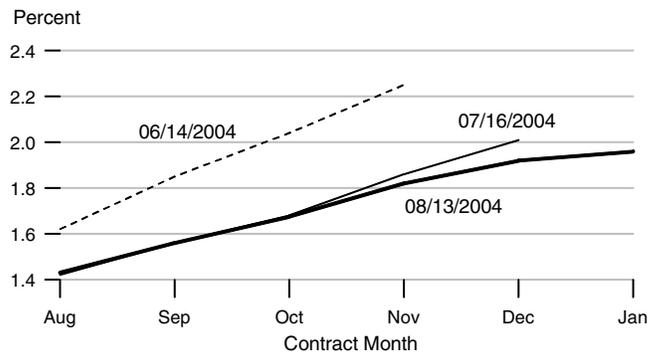
Rates on 3-Month Eurodollar Futures



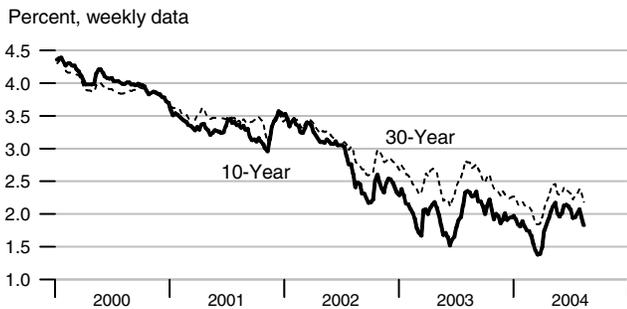
Rates on Selected Federal Funds Futures Contracts



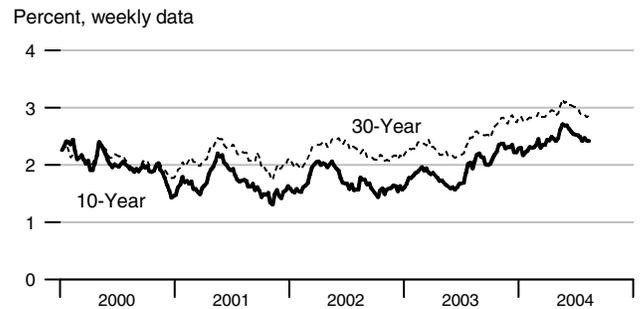
Rates on Federal Funds Futures on Selected Dates



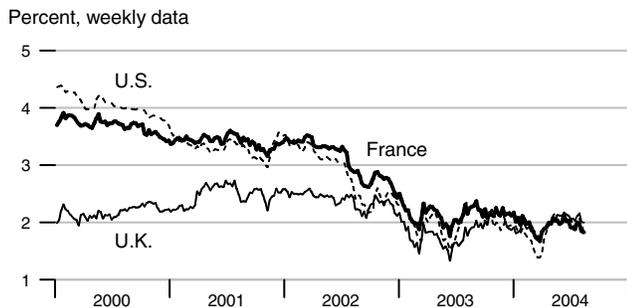
Inflation-Indexed Treasury Securities



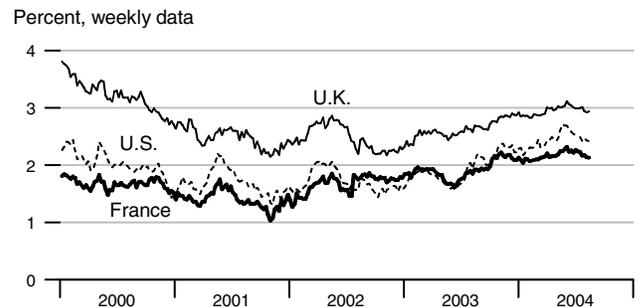
Inflation-Indexed Treasury Yield Spreads



Inflation-Indexed 10-Year Government Notes

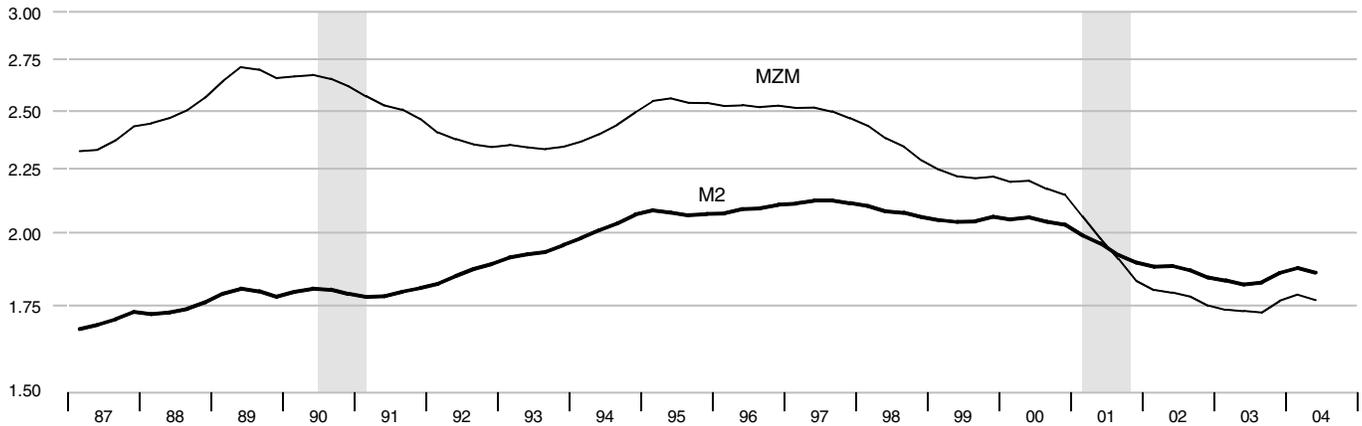


Inflation-Indexed 10-Year Government Yield Spreads



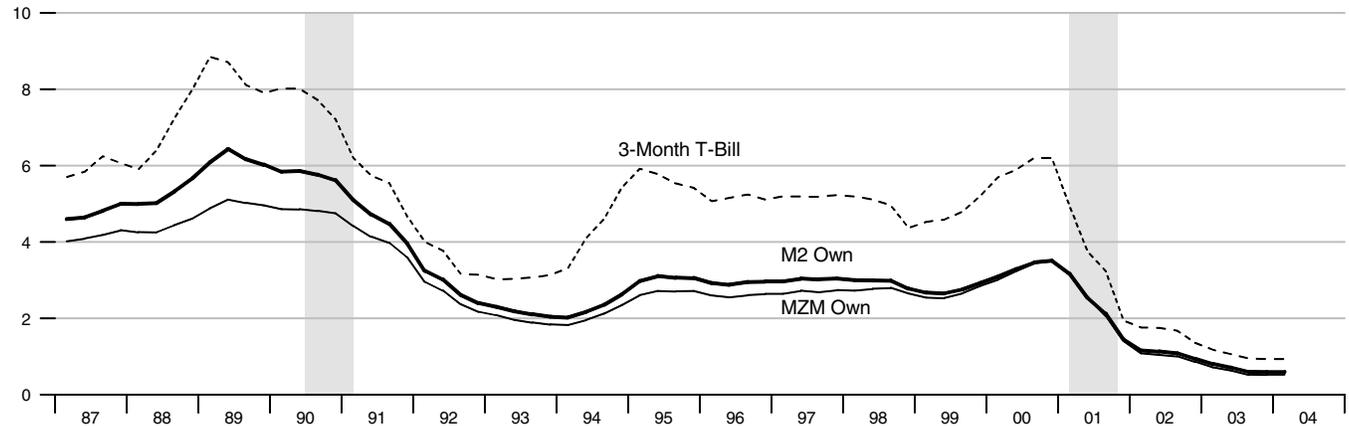
Velocity

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



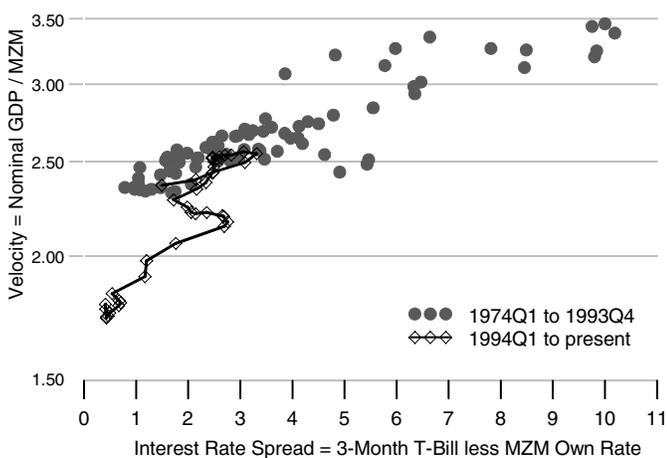
Interest Rates

Percent



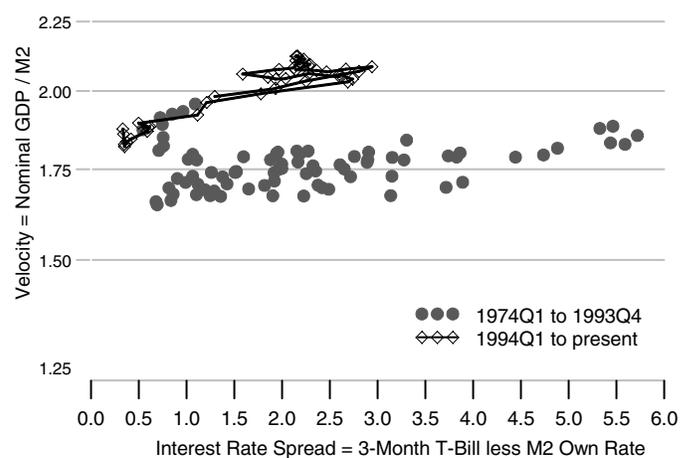
MZM Velocity and Interest Rate Spread

Ratio Scale



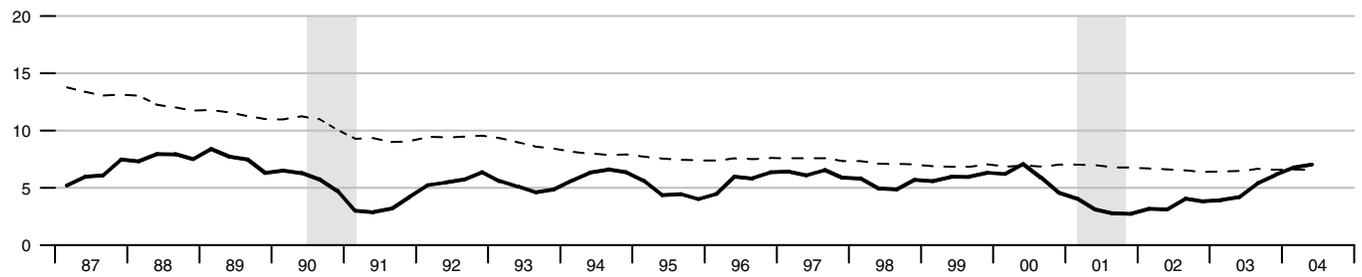
M2 Velocity and Interest Rate Spread

Ratio Scale



Gross Domestic Product

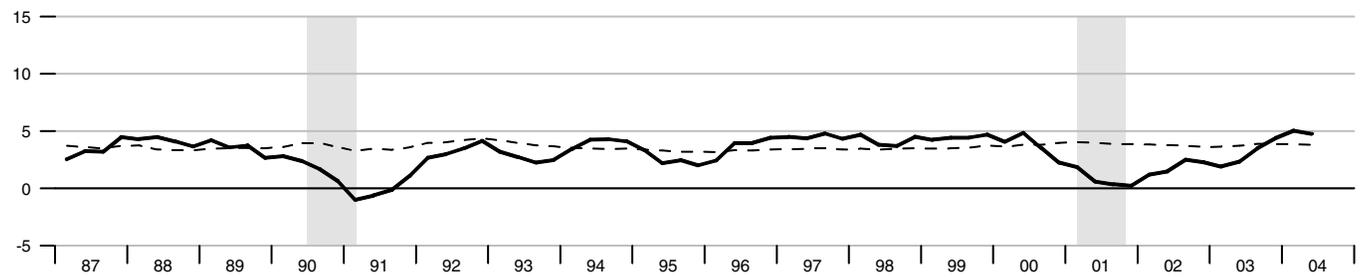
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

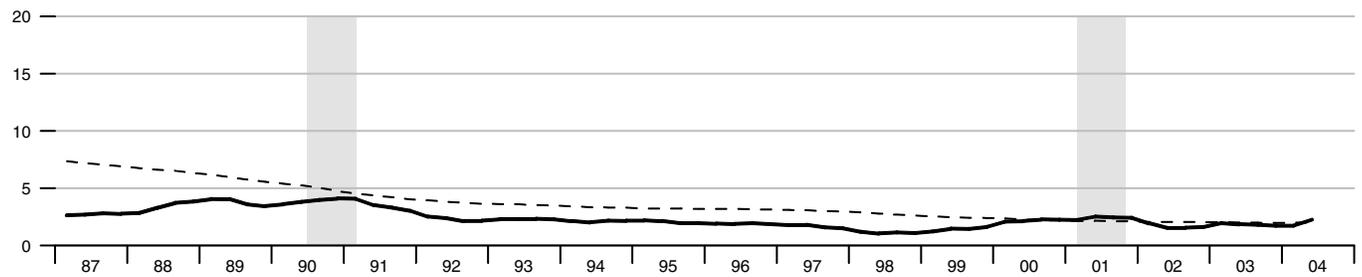
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

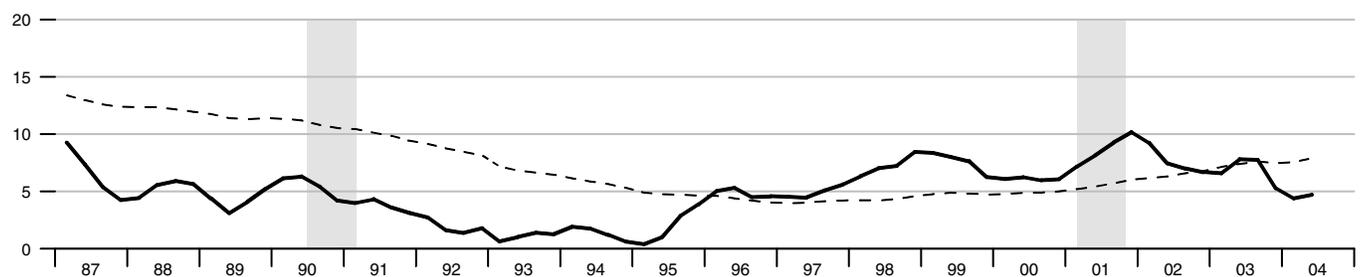
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

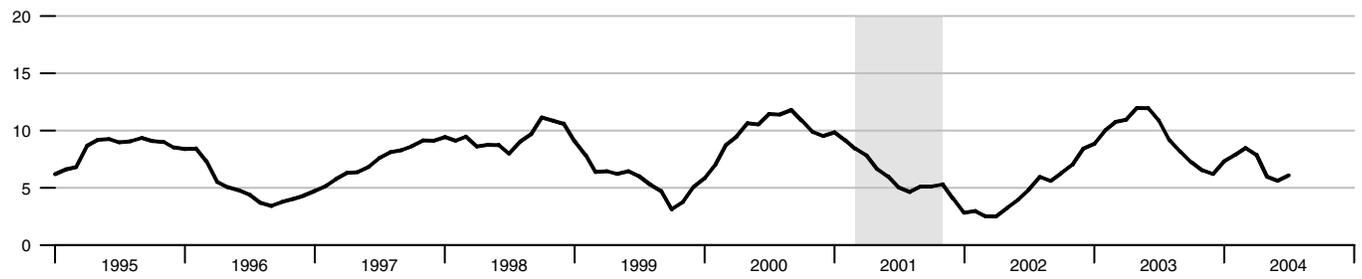
Percent change from year ago



Dashed lines indicate 10-year moving averages.

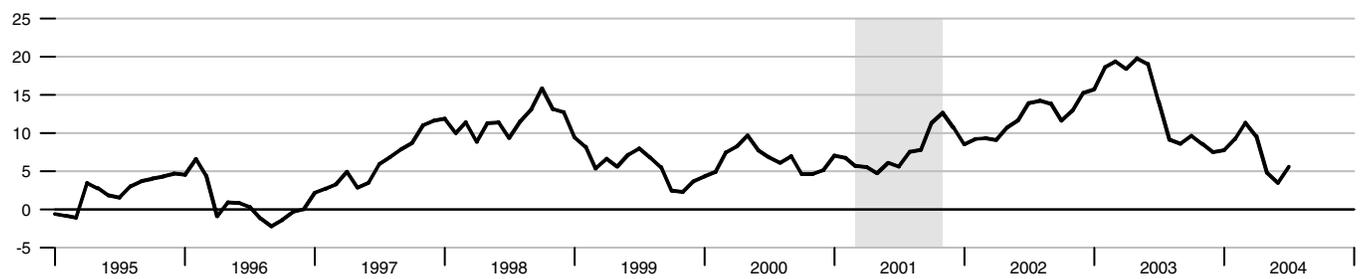
Bank Credit

Percent change from year ago



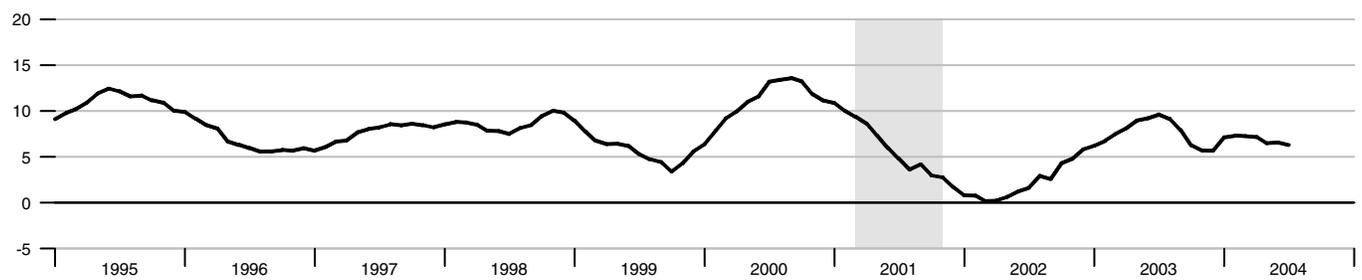
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



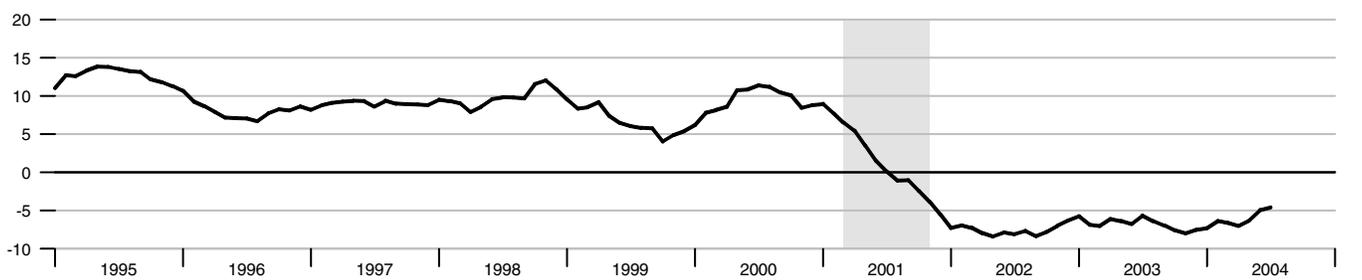
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

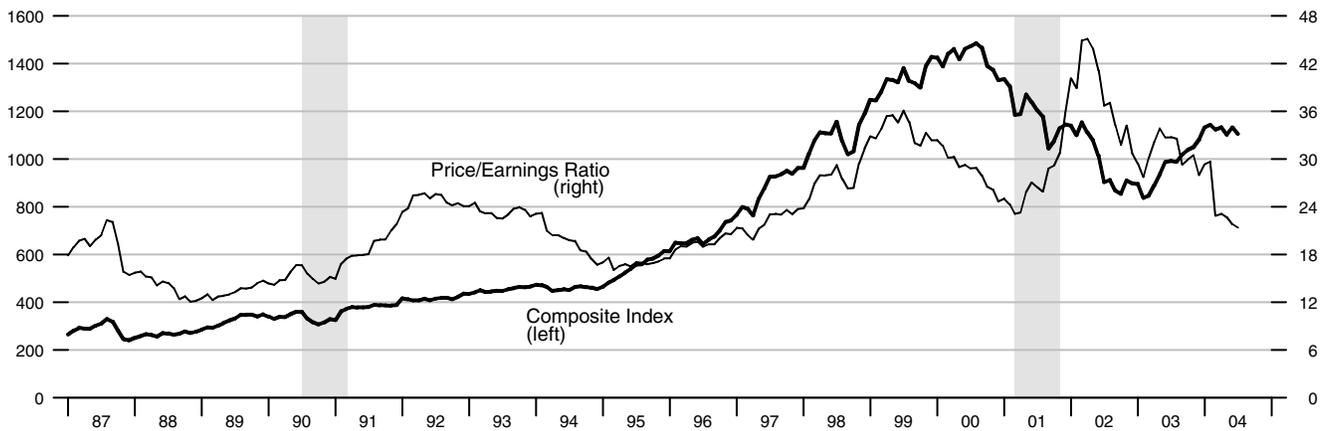


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



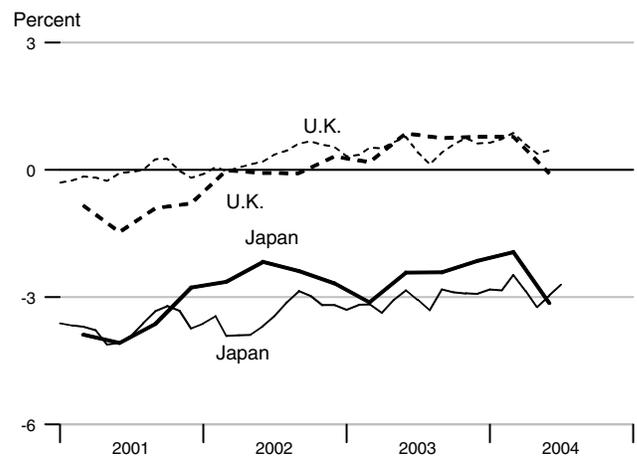
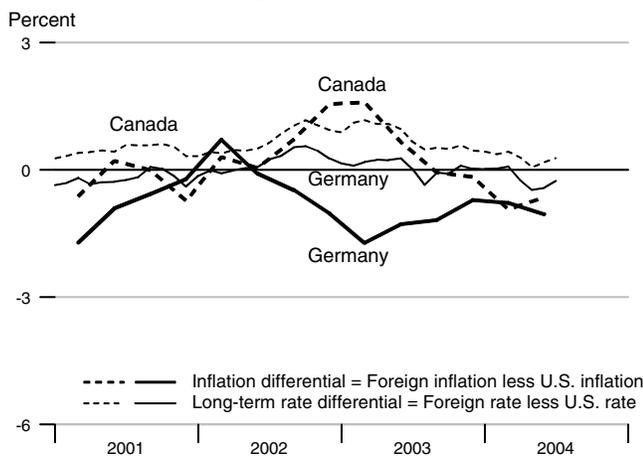
Standard & Poor's 500



Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2003Q3	2003Q4	2004Q1	2004Q2	Apr04	May04	Jun04	Jul04
United States	2.18	1.87	1.80	2.84	4.35	4.72	4.73	4.50
Canada	2.11	1.71	0.87	2.18	4.64	4.78	4.91	4.78
France	1.95	2.19	1.80	2.38	4.19	4.34	4.39	.
Germany	1.00	1.16	1.02	1.79	4.10	4.25	4.31	4.24
Italy	2.74	2.53	2.29	2.33	4.35	4.49	4.54	4.44
Japan	-0.24	-0.27	-0.14	-0.31	1.50	1.49	1.77	1.79
United Kingdom	2.93	2.65	2.58	2.75	4.95	5.10	5.19	.

Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank Credit	Adjusted		MSI M2
		M1	MZM	M2	M3		Monetary Base	Reserves	
1999		1101.461	4170.473	4526.388	6261.627	4578.890	574.181	88.664	257.940
2000		1103.438	4509.032	4802.150	6852.095	5026.852	607.106	84.511	272.588
2001		1136.966	5221.161	5220.205	7633.058	5347.556	641.167	85.923	296.386
2002		1192.055	5891.395	5615.315	8244.884	5599.022	697.072	87.913	319.537
2003		1263.926	6321.960	5999.412	8758.812	6122.398	740.673	92.829	343.977
2002	1	1186.983	5741.758	5500.209	8082.164	5421.939	680.264	88.148	312.109
	2	1184.135	5828.732	5550.039	8161.300	5498.310	692.937	86.969	315.680
	3	1189.253	5927.616	5648.888	8275.966	5657.551	702.753	86.804	321.630
	4	1207.849	6067.474	5762.125	8460.106	5818.289	712.332	89.733	328.727
2003	1	1231.995	6187.228	5862.191	8599.888	5957.224	726.829	90.856	335.184
	2	1258.532	6282.483	5982.902	8723.623	6138.462	738.234	91.760	342.444
	3	1278.788	6433.561	6086.464	8869.119	6188.380	743.993	94.583	348.950
	4	1286.387	6384.566	6066.092	8842.617	6205.525	753.635	94.118	349.331
2004	1	1305.919	6424.690	6119.466	8971.188	6427.569	761.089	94.353	354.123
	2	1326.901	6587.076	6264.894	9223.806	6536.923	770.812	95.978	
2002	Jul	1194.262	5895.982	5616.246	8221.650	5587.157	701.032	86.085	319.473
	Aug	1182.926	5933.979	5652.025	8284.891	5663.518	702.878	86.366	321.742
	Sep	1190.570	5952.888	5678.393	8321.358	5721.979	704.350	87.962	323.676
	Oct	1201.852	5969.908	5723.222	8348.358	5748.127	710.667	89.804	326.419
	Nov	1204.503	6084.576	5767.888	8479.474	5819.944	712.476	89.819	329.035
	Dec	1217.191	6147.938	5795.264	8552.485	5886.797	713.854	89.576	330.728
2003	Jan	1220.411	6159.136	5826.487	8564.763	5889.794	719.532	89.450	332.918
	Feb	1235.090	6192.703	5868.295	8601.860	5971.513	728.669	91.828	335.492
	Mar	1240.483	6209.846	5891.791	8633.041	6010.365	732.287	91.291	337.141
	Apr	1246.495	6241.924	5935.192	8670.749	6050.303	736.488	92.280	339.764
	May	1258.015	6278.184	5986.425	8725.529	6155.568	738.672	91.435	342.635
	Jun	1271.085	6327.340	6027.088	8774.591	6209.516	739.543	91.566	344.933
	Jul	1273.463	6417.206	6067.065	8847.732	6196.480	741.242	93.486	347.770
	Aug	1281.526	6448.823	6107.525	8885.372	6181.484	745.242	95.383	350.029
	Sep	1281.376	6434.653	6084.803	8874.254	6187.177	745.496	94.879	349.052
	Oct	1283.190	6403.401	6069.100	8848.721	6163.801	753.679	95.238	349.139
	Nov	1283.145	6384.358	6066.444	8842.103	6200.211	754.613	94.757	349.356
	Dec	1292.827	6365.940	6062.732	8837.026	6252.563	752.614	92.358	349.499
2004	Jan	1286.544	6378.746	6070.216	8892.384	6320.526	756.454	92.544	350.682
	Feb	1305.944	6418.446	6120.422	8967.776	6442.055	762.851	95.218	354.232
	Mar	1325.270	6476.877	6167.759	9053.403	6520.127	763.962	95.296	357.455
	Apr	1323.126	6537.447	6215.945	9137.567	6527.833	767.621	96.474	360.519
	May	1322.189	6610.851	6285.847	9247.460	6523.383	769.878	95.144	
	Jun	1335.389	6612.929	6292.889	9286.392	6559.554	774.936	96.317	
	Jul	1324.242	6585.837	6283.724	9274.169	6573.776	780.259	95.230	

*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			
	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
	2003	1.13		2.11	4.12	1.15	1.03	2.11	4.02	5.67	4.52	5.82
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
	4	1.00		2.00	4.00	1.10	0.93	2.38	4.29	5.66	4.52	5.92
2004	1	1.00		2.00	4.00	1.05	0.93	2.17	4.02	5.45	4.26	5.61
	2	1.01		2.00	4.00	1.25	1.10	2.98	4.60	5.93	4.82	6.13
2002	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
	Nov	1.00		2.00	4.00	1.11	0.95	2.45	4.30	5.65	4.50	5.93
	Dec	0.98		2.00	4.00	1.10	0.91	2.44	4.27	5.62	4.41	5.88
2004	Jan	1.00		2.00	4.00	1.06	0.90	2.27	4.15	5.54	4.42	5.74
	Feb	1.01		2.00	4.00	1.05	0.94	2.25	4.08	5.50	4.26	5.64
	Mar	1.00		2.00	4.00	1.05	0.95	2.00	3.83	5.33	4.11	5.45
	Apr	1.00		2.00	4.00	1.08	0.96	2.57	4.35	5.73	4.69	5.83
	May	1.00		2.00	4.00	1.20	1.04	3.10	4.72	6.04	4.93	6.27
	Jun	1.03		2.01	4.00	1.46	1.29	3.26	4.73	6.01	4.85	6.29
	Jul	1.26		2.25	4.25	1.57	1.36	3.05	4.50	5.82	4.71	6.06

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

		M1	MZM	M2	M3
Percent change at an annual rate					
1999		2.00	12.41	7.54	8.75
2000		0.18	8.12	6.09	9.43
2001		3.04	15.79	8.71	11.40
2002		4.85	12.84	7.57	8.02
2003		6.03	7.31	6.84	6.23
<hr/>					
2002	1	5.94	11.13	7.34	6.54
	2	-0.96	6.06	3.62	3.92
	3	1.73	6.79	7.12	5.62
	4	6.25	9.44	8.02	8.90
2003	1	8.00	7.89	6.95	6.61
	2	8.62	6.16	8.24	5.76
	3	6.44	9.62	6.92	6.67
	4	2.38	-3.05	-1.34	-1.20
2004	1	6.07	2.51	3.52	5.82
	2	6.43	10.11	9.51	11.26
<hr/>					
2002	Jul	5.99	8.45	9.01	5.98
	Aug	-11.39	7.73	7.64	9.23
	Sep	7.75	3.82	5.60	5.28
	Oct	11.37	3.43	9.47	3.89
	Nov	2.65	23.05	9.37	18.85
	Dec	12.64	12.50	5.70	10.33
2003	Jan	3.17	2.19	6.47	1.72
	Feb	14.43	6.54	8.61	5.20
	Mar	5.24	3.32	4.80	4.35
	Apr	5.82	6.20	8.84	5.24
	May	11.09	6.97	10.36	7.58
	Jun	12.47	9.40	8.15	6.75
	Jul	2.25	17.04	7.96	10.00
	Aug	7.60	5.91	8.00	5.11
	Sep	-0.14	-2.64	-4.46	-1.50
	Oct	1.70	-5.83	-3.10	-3.45
	Nov	-0.04	-3.57	-0.53	-0.90
	Dec	9.05	-3.46	-0.73	-0.69
2004	Jan	-5.83	2.41	1.48	7.52
	Feb	18.09	7.47	9.93	10.17
	Mar	17.76	10.92	9.28	11.46
	Apr	-1.94	11.22	9.38	11.16
	May	-0.85	13.47	13.49	14.43
	Jun	11.98	0.38	1.34	5.05
	Jul	-10.02	-4.92	-1.75	-1.58

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 *Statistical Supplement to the 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 *Statistical Supplement to the 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 *Statistical Supplement to the 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 testimony that accompanies the Monetary Policy Report to the Congress. Beginning February 2000, the FOMC began using the personal consumption expenditures (PCE) price index to report its inflation range; the FOMC then switched to the PCE chain-type price index excluding food and energy prices ("core") beginning July 2004. Accordingly, neither are 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 Securities** are yields on the most recently issued inflation-indexed securities of 10- and 30-year original maturities. **Inflation-Indexed 10-Year Government Notes** shows the yield of an inflation-indexed note that is scheduled to mature in approximately (but not greater than) 10 years. The current French note has a maturity date of 7/25/2013, the current U.K. note has a maturity date of 8/16/2013, and the current U.S. note has a maturity date of 7/15/2014. **Inflation-Indexed Treasury Yield Spreads** and **Inflation-Indexed 10-Year Government Yield Spreads** equal the difference between the yields on the most recently issued inflation-indexed securities and the unadjusted security yields of similar maturity.

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 2000 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 2000 dollars.

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

Page 15: Inflation Rate Differentials are the differences between the foreign consumer price inflation rates and year-over-year changes in the U.S. all-items Consumer Price Index.

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 note yields.

Bank of Canada: Canadian note yields.

Bank of England: U.K. note 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. security yields.

References

Anderson, Richard G. and Robert H. Rasche (1996a). "A Revised Measure of the St. Louis Adjusted Monetary Base," *Federal Reserve Bank of St. Louis Review*, March/April, 78(2), pp. 3-13.*

____ and ____ (1996b). "Measuring the Adjusted Monetary Base in an Era of Financial Change," *Federal Reserve Bank of St. Louis Review*, November/December, 78(6), pp. 3-37.*

____ and ____ (2001). "Retail Sweep Programs and Bank Reserves, 1994-1999," *Federal Reserve Bank of St. Louis Review*, January/February, 83(1), pp. 51-72.*

____ and ____ , with Jeffrey Loesel (2003). "A Reconstruction of the Federal Reserve Bank of St. Louis Adjusted Monetary Base and Reserves," *Federal Reserve Bank of St. Louis Review*, September/October, 85(5), pp. 39-70.*

____ , Barry E. Jones and Travis D. Nesmith (1997). "Special Report: The Monetary Services Indexes Project of the Federal Reserve Bank of St. Louis," *Federal Reserve Bank of St. Louis Review*, January/February, 79(1), pp. 31-82.*

McCallum, Bennett T. (1988). "Robustness Properties of a Monetary Policy Rule," *Carnegie-Rochester Conference Series on Public Policy*, vol. 29, pp. 173-204.

____ (1993). "Specification and Analysis of a Monetary Policy Rule for Japan," *Bank of Japan Monetary and Economic Studies*, November, pp. 1-45.

Motley, Brian (1988). "Should M2 Be Redefined?" *Federal Reserve Bank of San Francisco Economic Review*, Winter, pp. 33-51.

Nelson, Charles R. and Andrew F. Siegel (1987). "Parsimonious Modeling of Yield Curves," *Journal of Business*, October, pp. 473-89.

Poole, William (1991). Statement before the Subcommittee on Domestic Monetary Policy of the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, November 6, 1991. Government Printing Office, Serial No. 102-82.

Sharpe, William F. (1997). *Macro-Investment Analysis*, on-line textbook available at www.stanford.edu/~wfs Sharpe/mia/mia.htm.

Shiller, Robert (1990). "The Term Structure of Interest Rates," *Handbook of Monetary Economics*, vol. 1, B. Friedman and F. Hahn, eds., pp. 627-722.

Taylor, John B. (1993). "Discretion versus Policy Rules in Practice," *Carnegie-Rochester Conference Series on Public Policy*, vol. 39, pp. 195-214.

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