



Closing the Gap

A popular measure of inflation is based on the consumer price index (CPI). The total CPI measures the price of a market-based basket of goods and services, relative to the base year. Core CPI inflation is the year-over-year rate of change of the CPI, excluding food and energy commodities and energy services.¹

The core CPI inflation rate is an aggregate measure and therefore hides important differences between goods and services with regard to the behavior of inflation. Between January 1968 and April 2005, the price of services (excluding energy services) grew at an average annual rate of 5.55 percent. Over the same period, the price of goods (excluding food and energy commodities) grew at an average annual rate of 3.27 percent. In other words, the price of services, relative to goods, grew at an average annual rate of 2.27 percent over the past 37 years.²

In the 1990s and early 2000s (between the two vertical lines in the chart), goods and services core inflation rates were extremely different. Core goods inflation declined sharply from around 4 percent to -2 percent. Core services inflation hovered around 4 percent. The difference between the two core inflation rates widened from 0 to 6 percent. This widening gap has provoked opposing views. Some have argued that a high sustained rate of inflation for services could drag the overall inflation rate upward. Others fear that declining prices of goods could trigger a general deflation.

Peach, Rich, and Antoniadis observe that, while the gap between services and goods inflation rates moves around in the short run, it has a tendency to return to a constant equilibrium value in the long run.³ The recent behavior of core goods and services inflation confirms their finding. In the past two years the gap has returned to its long-run value, with a decline in services inflation and a sharp rise in goods inflation.

The long-run behavior of the gap between services and goods inflation is not surprising. The monetary policy stance determines the

overall inflation rate. One of the objectives of monetary policy is to keep prices stable. A successful monetary policy enforces a low and stable value of overall inflation, which is a weighted average of goods inflation and services inflation. This rules out the possibility that both goods and services inflation rates increase or decrease indefinitely. Core CPI inflation could be stable with goods inflation and services inflation moving in opposite directions indefinitely. However, this would imply that either goods or services prices would eventually become negative.

In summary, even if goods and services inflation rates behave differently in the short run, they cannot diverge indefinitely because monetary policy puts a constraint on their weighted average and prices cannot be negative.

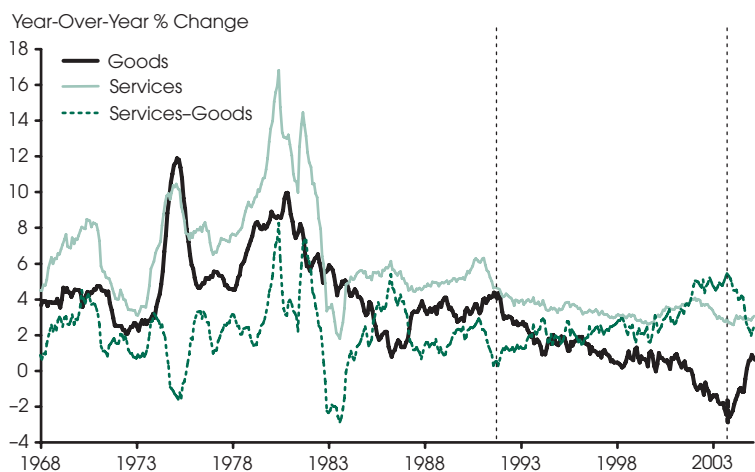
—Riccardo DiCecio

¹ For details on different measures of core inflation, see Kristie M. Engemann and Michael T. Owyang's "Hard 'Core' Inflation," Federal Reserve Bank of St. Louis *Monetary Trends*, February 2005.

² This increase in the relative price of services is a well-documented fact and is believed to be caused by differences in total factor productivity across sectors.

³ Peach, Richard W.; Rich, Robert and Antoniadis, Alexis. "The Historical and Recent Behavior of Goods and Services Inflation." Federal Reserve Bank of New York *Economic Policy Review*, December 2004, 10(3), pp. 19-31.

CPI Core Inflation Rates (seasonally adjusted)



SOURCE: Bureau of Labor Statistics.

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

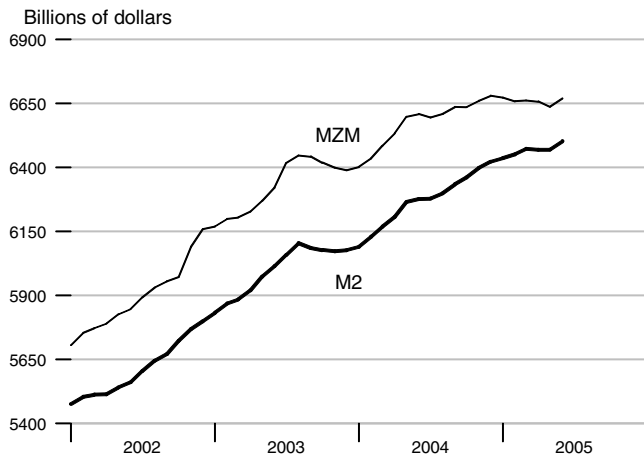
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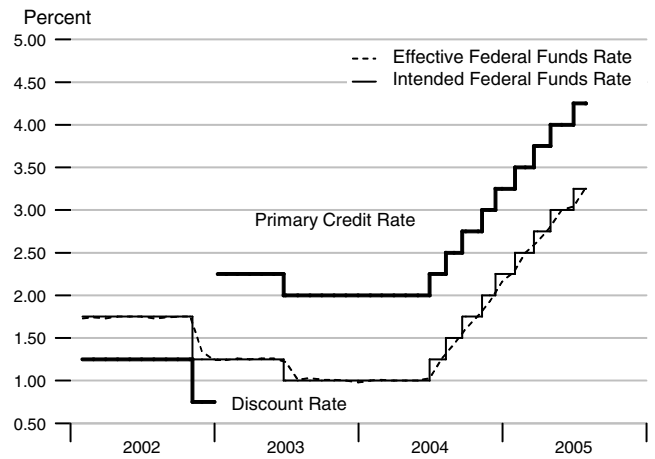
or to:

stlsFRED@stls.frb.org

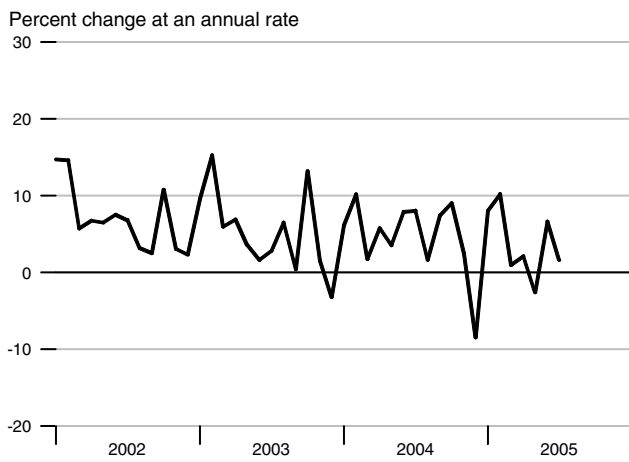
M2 and MZM



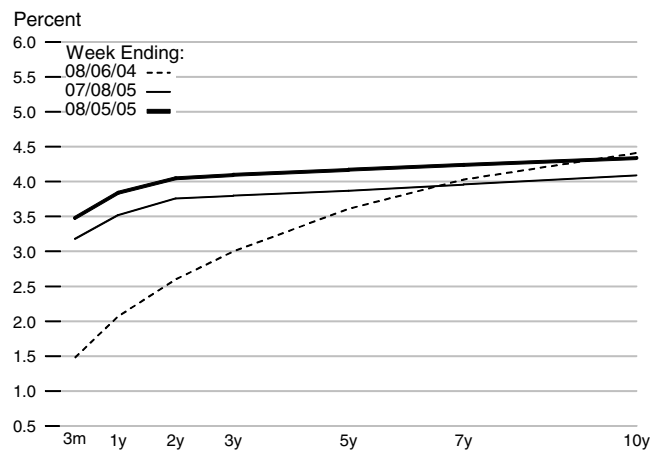
Reserve Market Rates



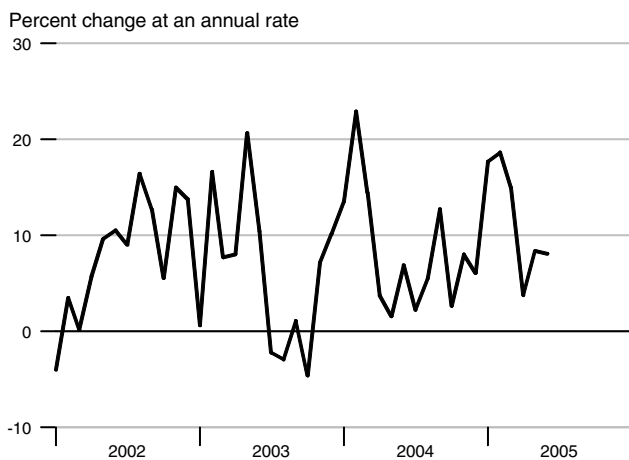
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

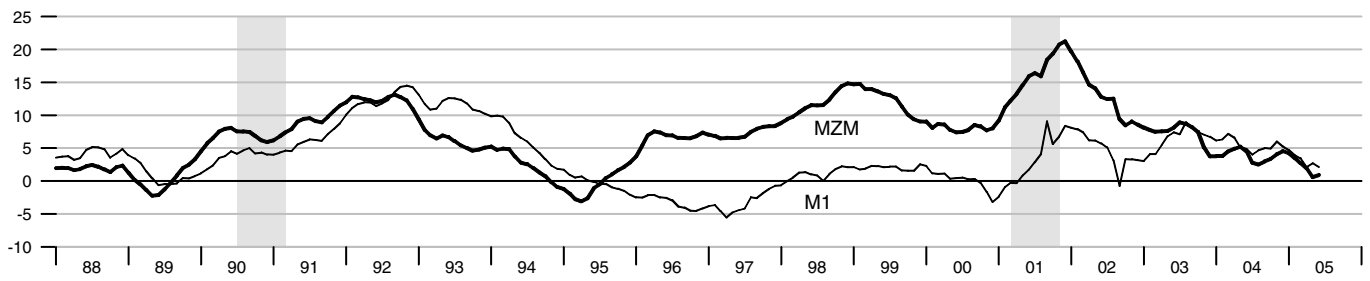


Interest Rates

	May 05	Jun 05	Jul 05
Federal Funds Rate	3.00	3.04	3.26
Prime Rate	5.98	6.01	6.25
Primary Credit Rate	3.98	4.01	4.25
Conventional Mortgage Rate	5.72	5.58	5.70
Treasury Yields:			
3-Month Constant Maturity	2.90	3.04	3.29
6-Month Constant Maturity	3.17	3.22	3.53
1-Year Constant Maturity	3.33	3.36	3.64
3-Year Constant Maturity	3.72	3.69	3.91
5-Year Constant Maturity	3.85	3.77	3.98
10-Year Constant Maturity	4.14	4.00	4.18

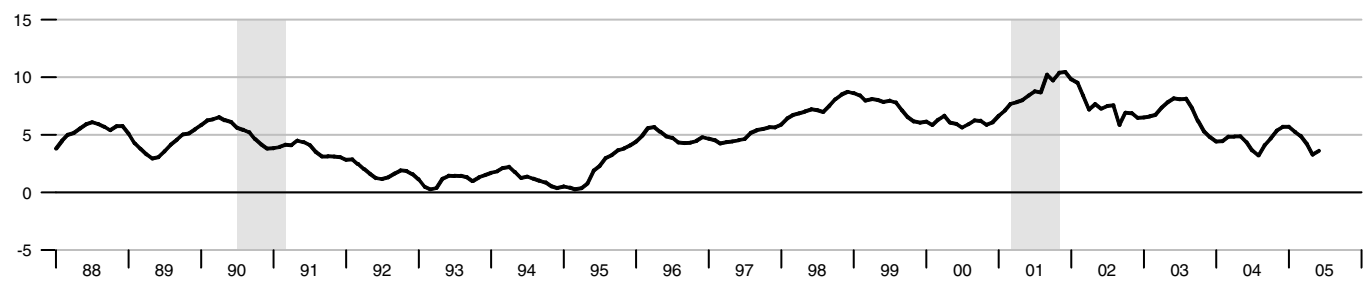
MZM and M1

Percent change from year ago



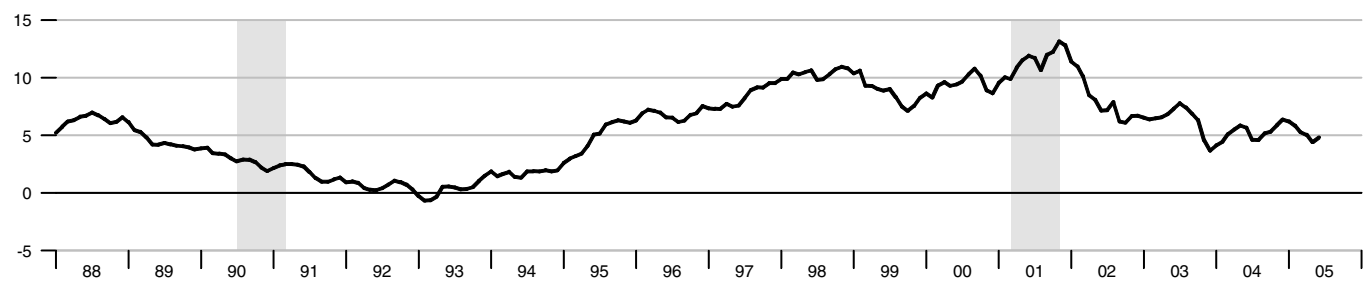
M2

Percent change from year ago



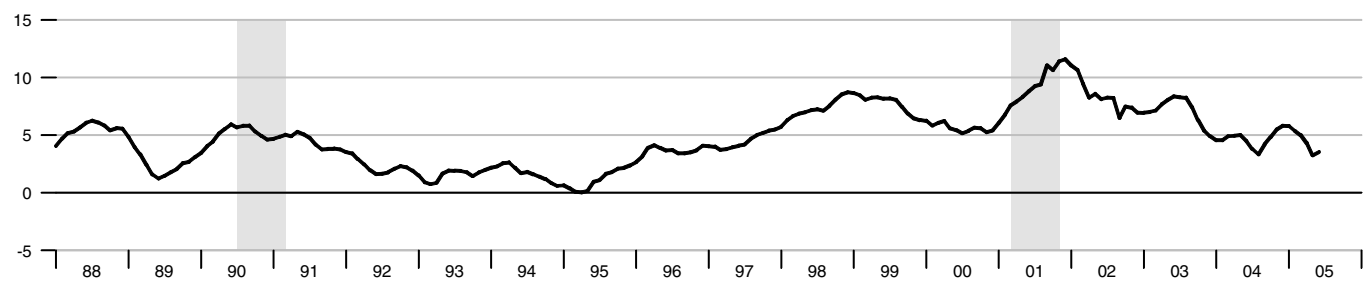
M3

Percent change from year ago



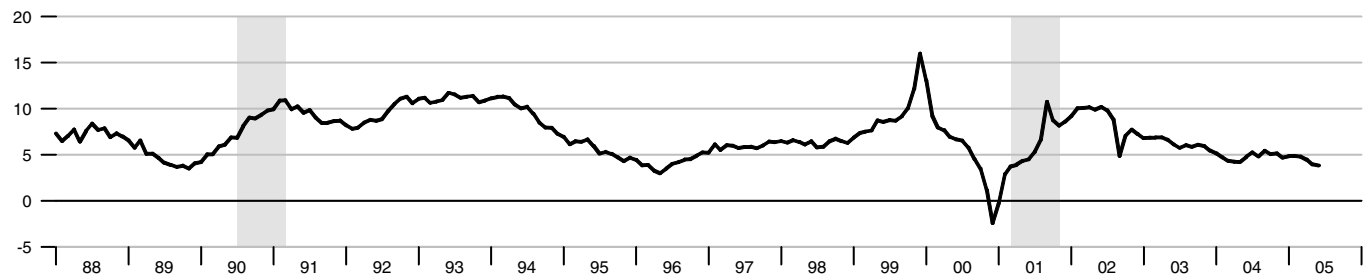
Monetary Services Index - M2

Percent change from year ago



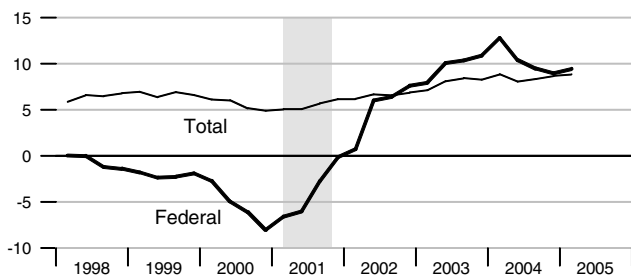
Adjusted Monetary Base

Percent change from year ago



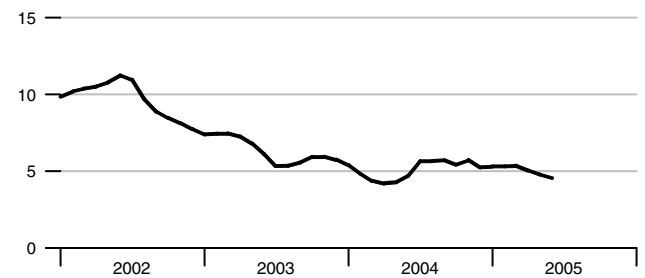
Domestic Nonfinancial Debt

Percent change from year ago



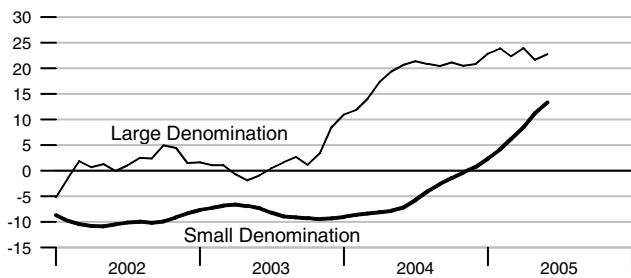
Currency Held by the Nonbank Public

Percent change from year ago



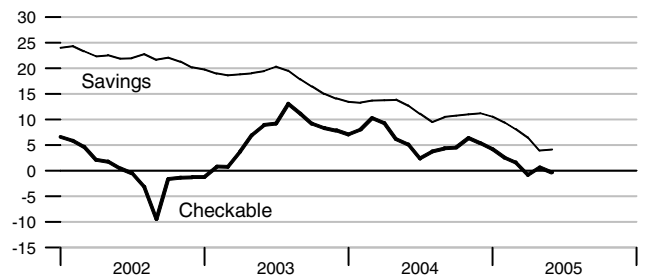
Time Deposits

Percent change from year ago



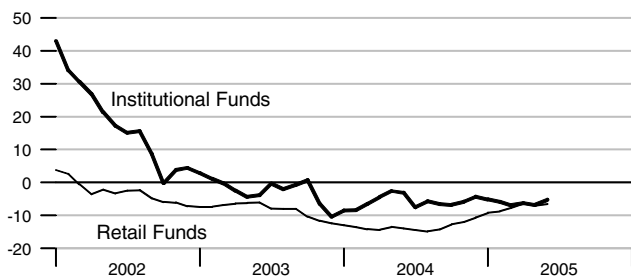
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

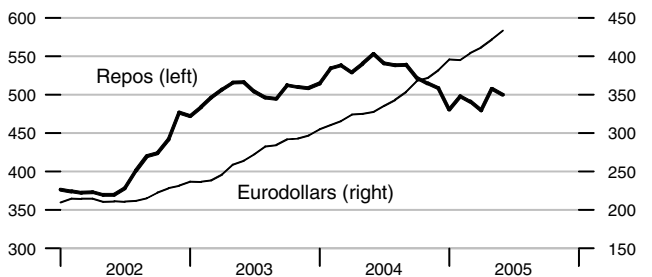
Percent change from year ago



Repurchase Agreements and Eurodollars

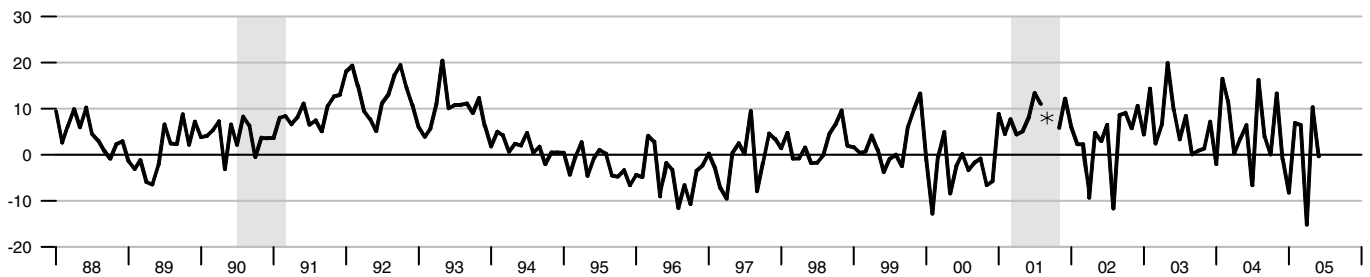
Billions of dollars

Billions of dollars



M1

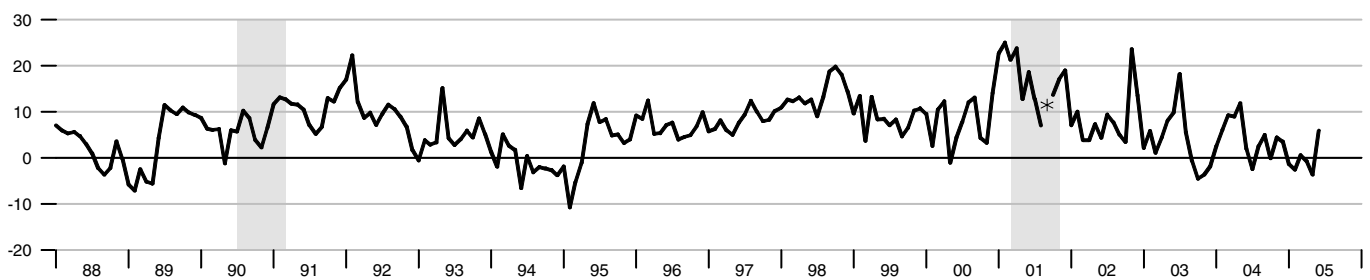
Percent change at an annual rate



*Actual values for September and October 2001 are 55.87 and -38.35 percent rate, respectively.

M2M

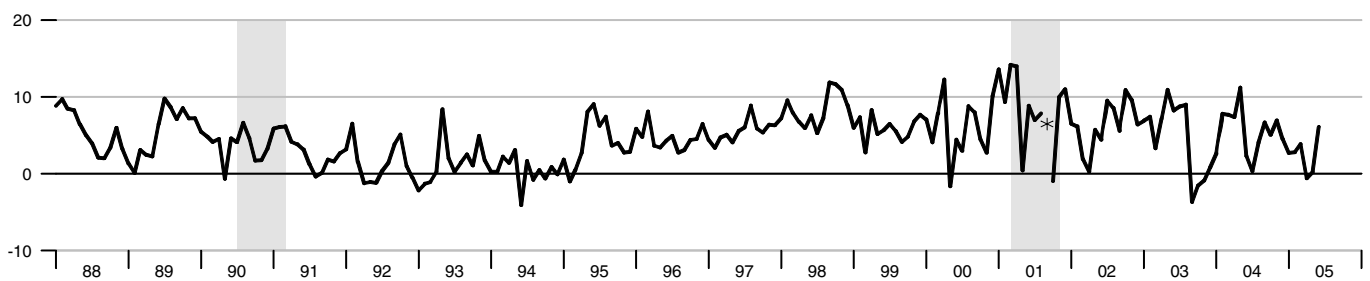
Percent change at an annual rate



*Actual value for September 2001 is 39.41 percent rate.

M2

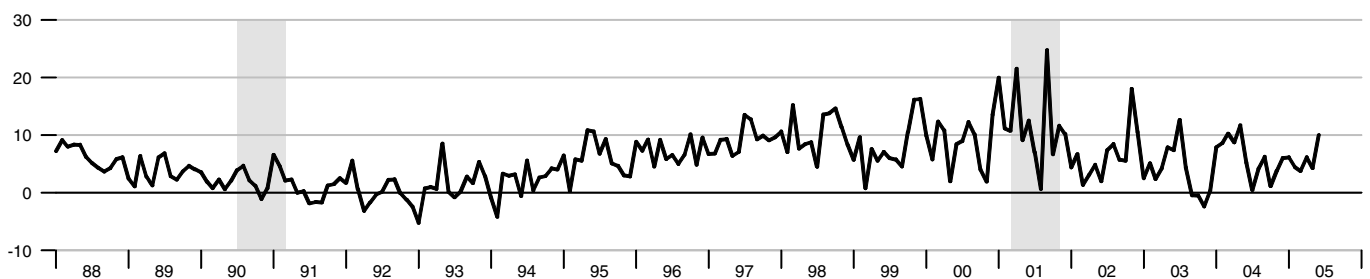
Percent change at an annual rate



*Actual value for September 2001 is 24.90 percent rate.

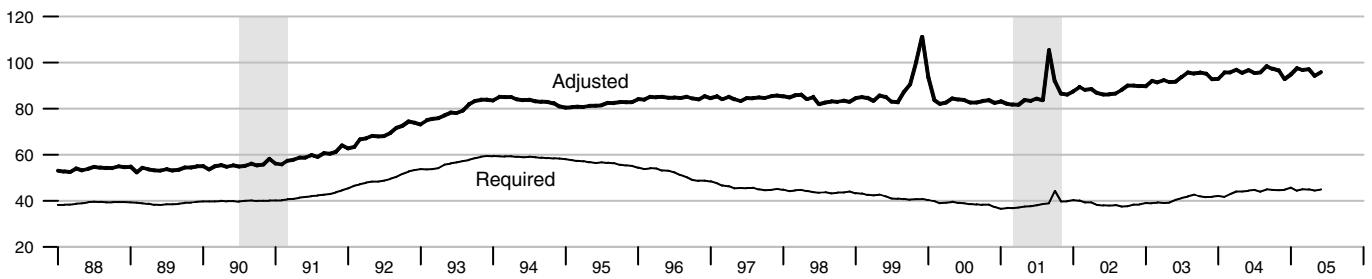
M3

Percent change at an annual rate



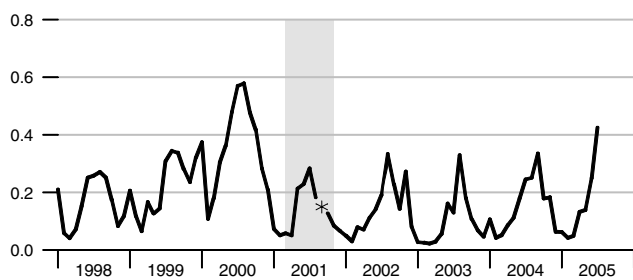
Adjusted and Required Reserves

Billions of dollars



Total Borrowings, nsa

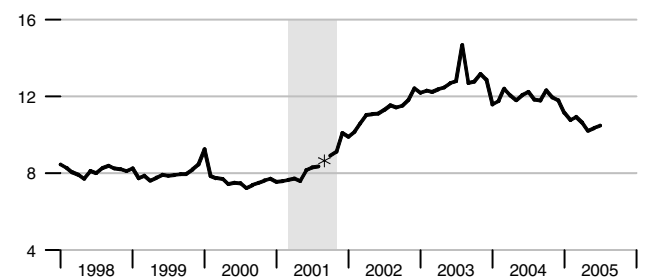
Billions of dollars



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

Excess Reserves plus RCB Contracts

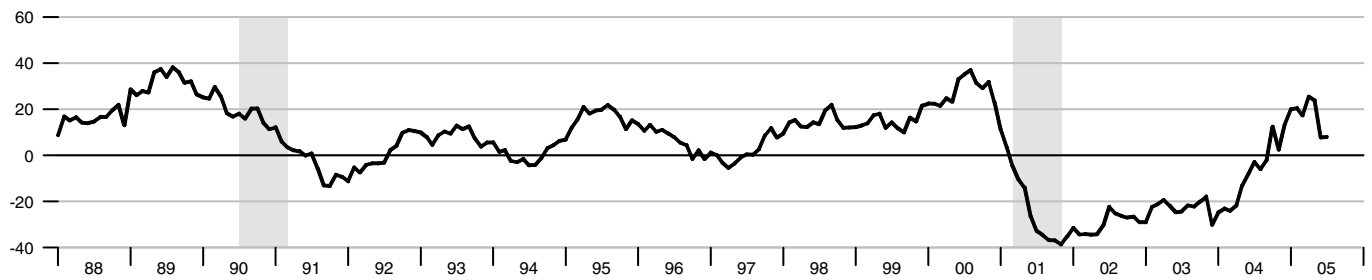
Billions of dollars



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

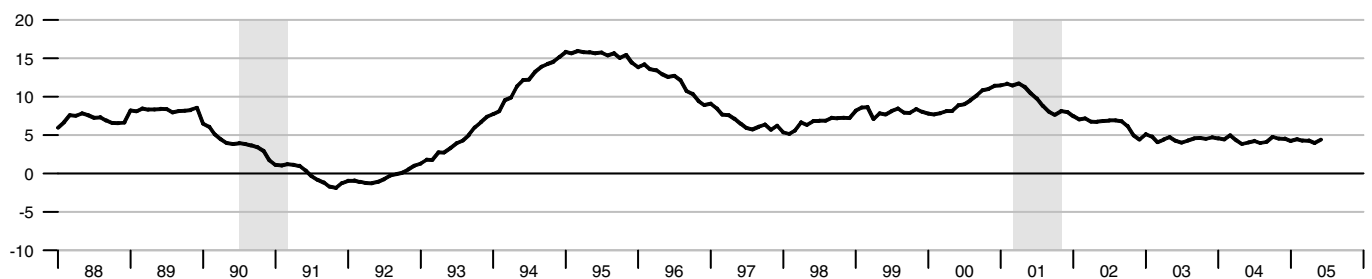
Nonfinancial Commercial Paper

Percent change from year ago

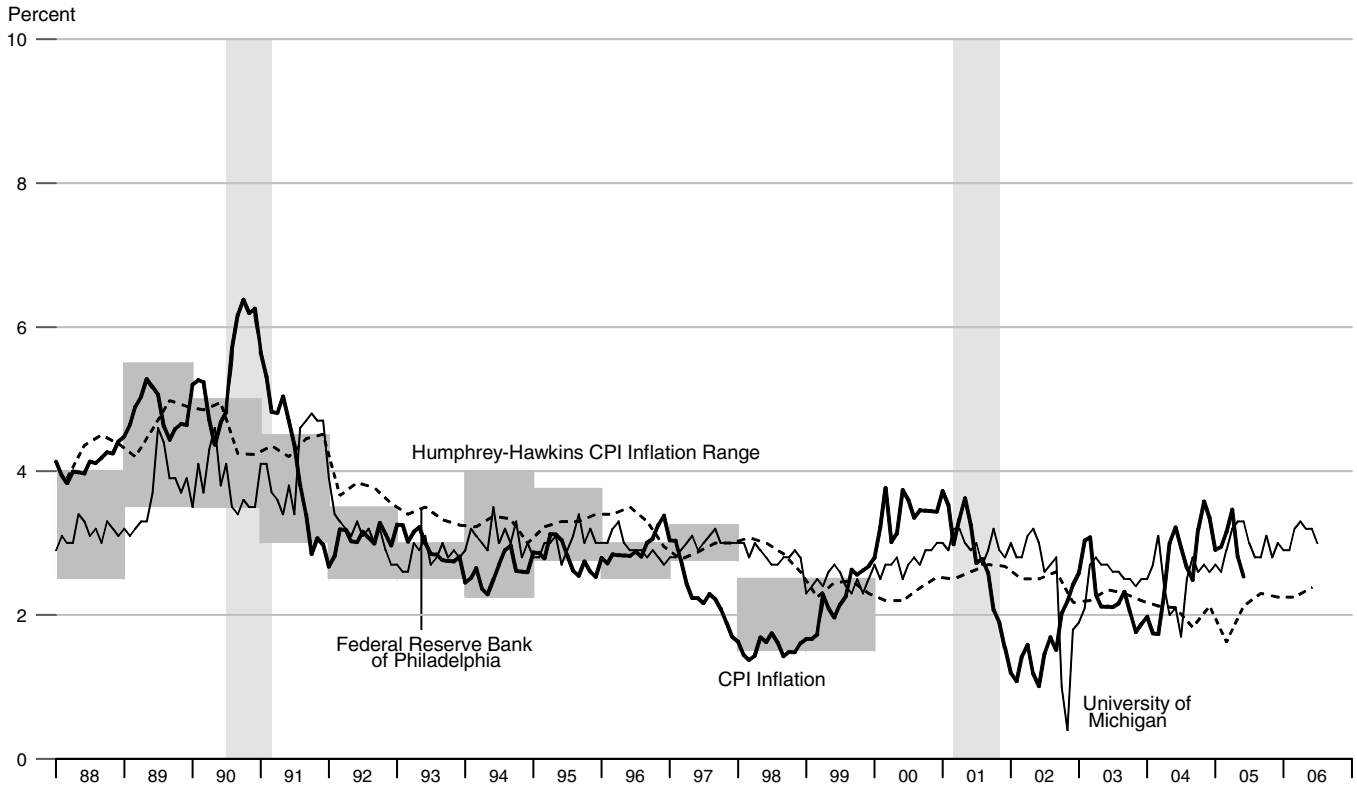


Consumer Credit

Percent change from year ago

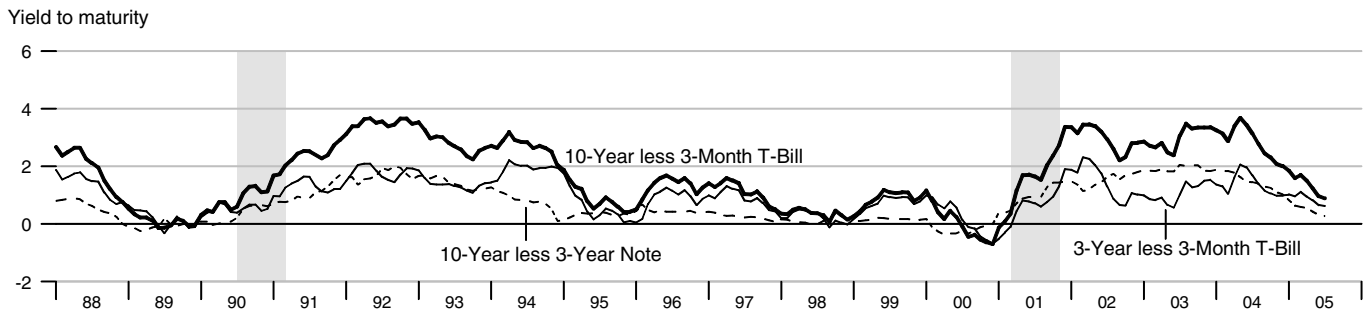


Inflation and Inflation Expectations

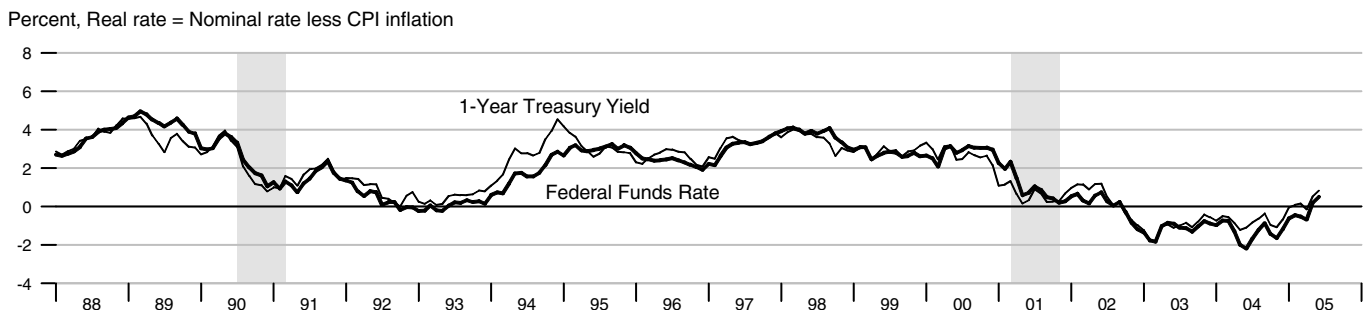


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See notes on page 19.

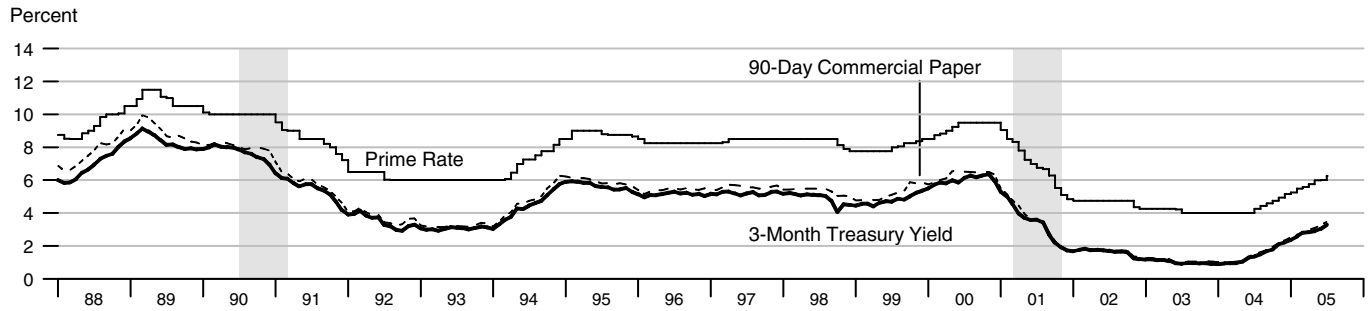
Treasury Security Yield Spreads



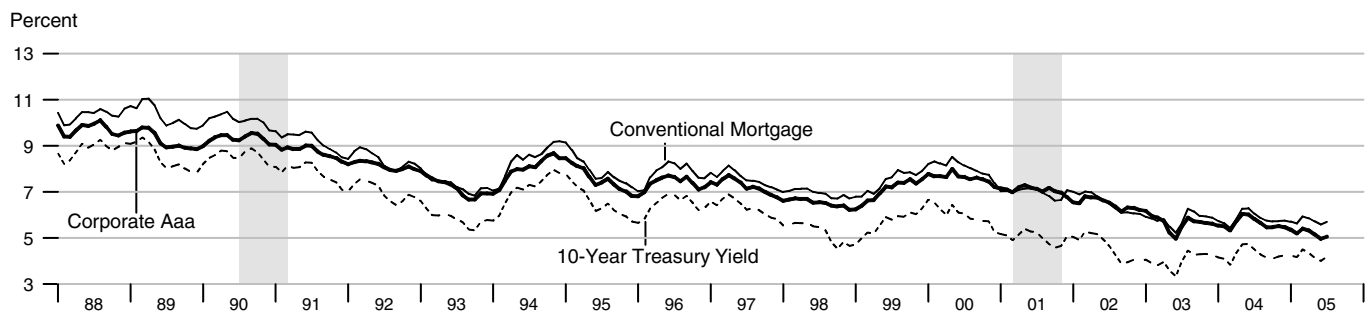
Real Interest Rates



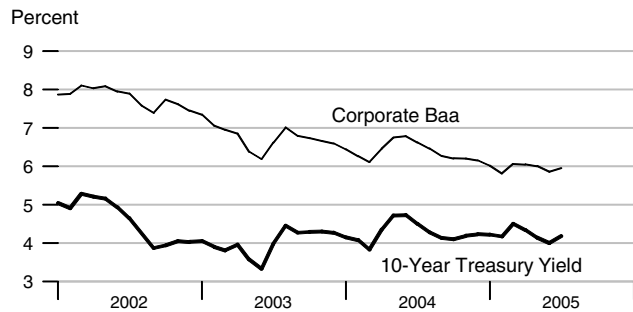
Short-Term Interest Rates



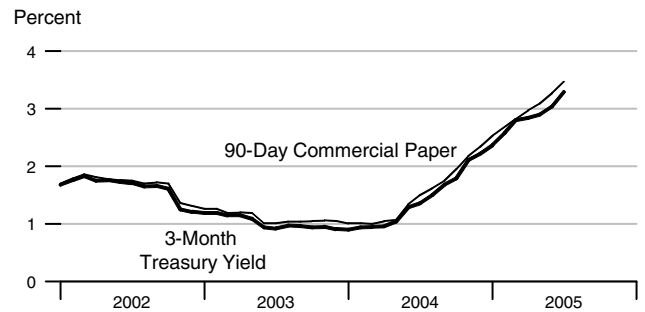
Long-Term Interest Rates



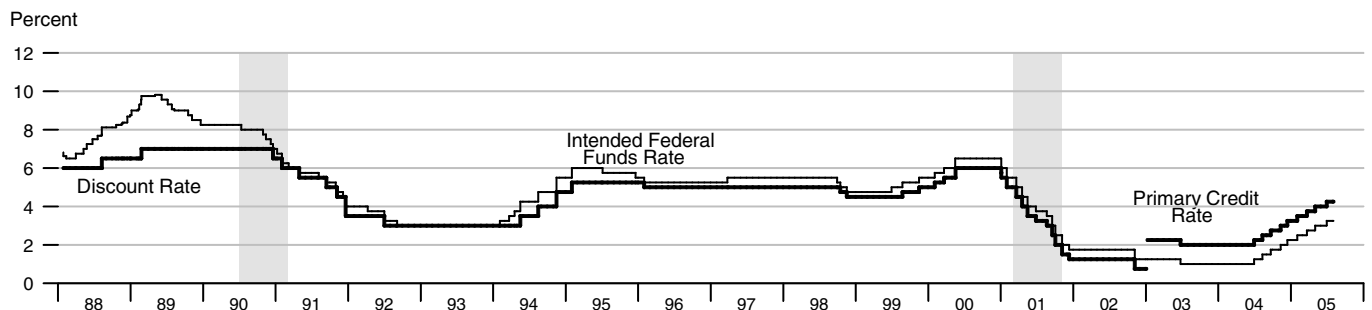
Long-Term Interest Rates



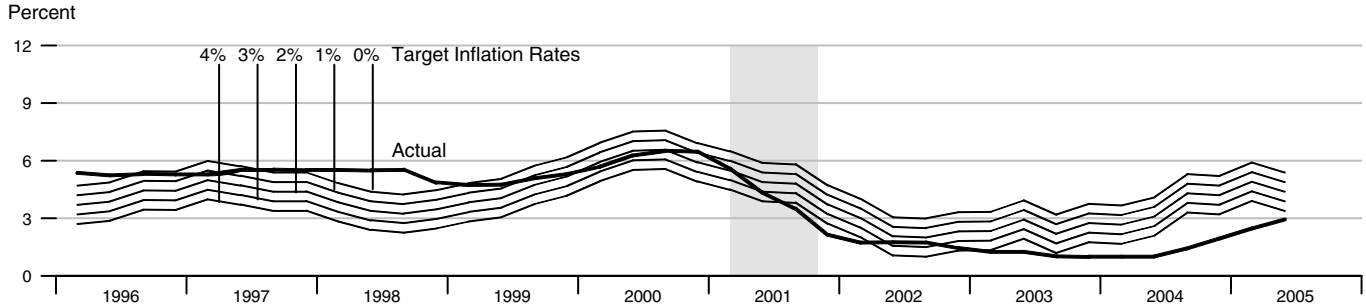
Short-Term Interest Rates



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



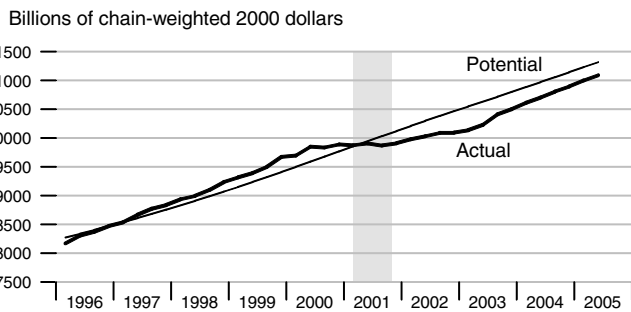
Federal Funds Rate and Inflation Targets



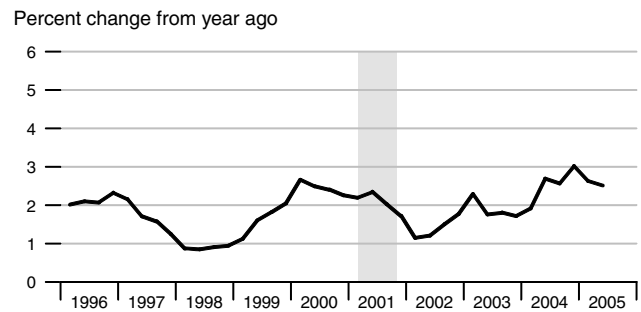
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Components of Taylor's Rule

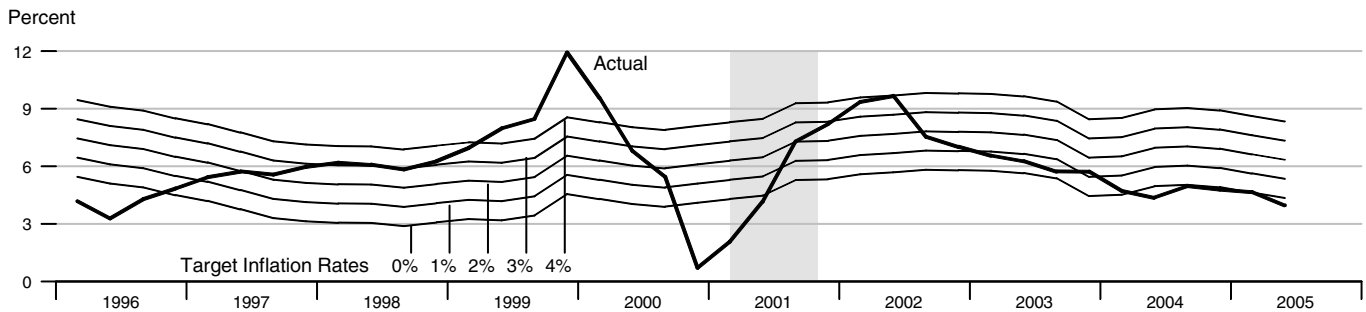
Actual and Potential Real GDP



PCE Inflation



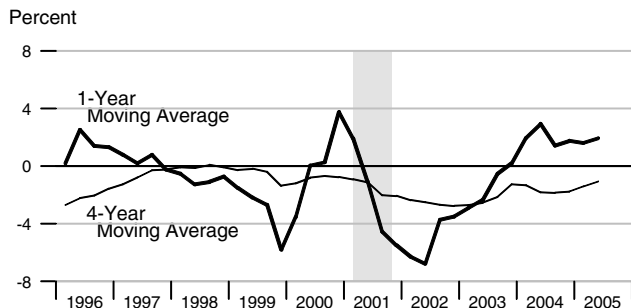
Monetary Base Growth* and Inflation Targets



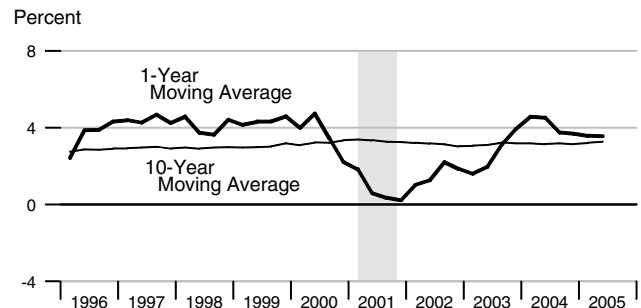
*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

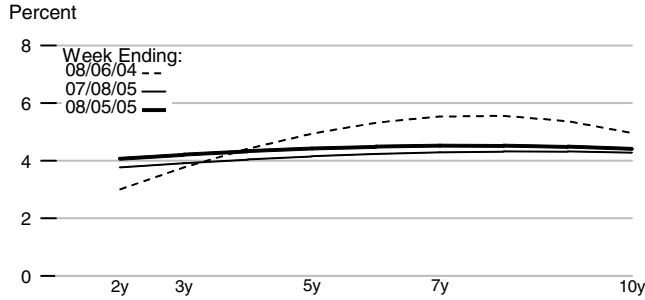
Monetary Base Velocity Growth



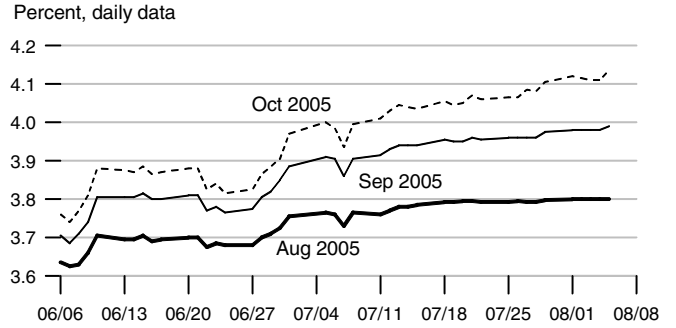
Real Output Growth



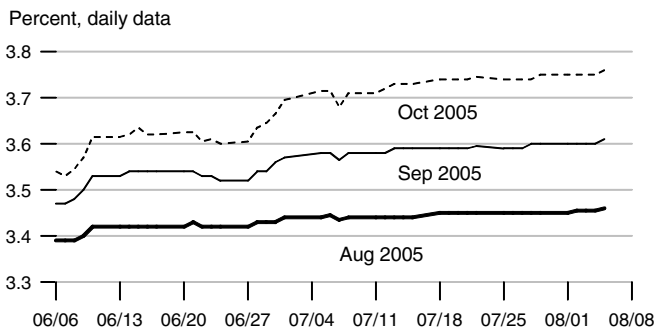
Implied One-Year Forward Rates



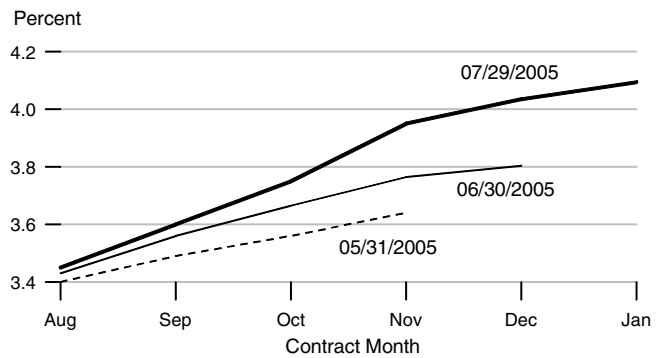
Rates on 3-Month Eurodollar Futures



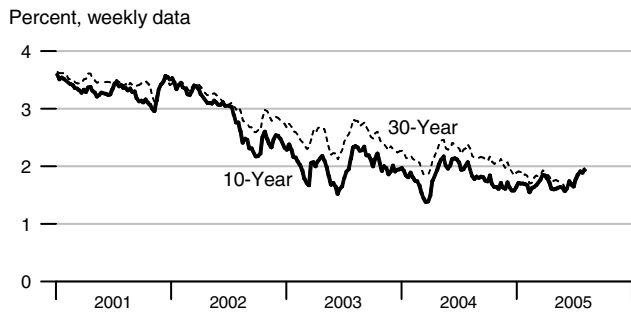
Rates on Selected Federal Funds Futures Contracts



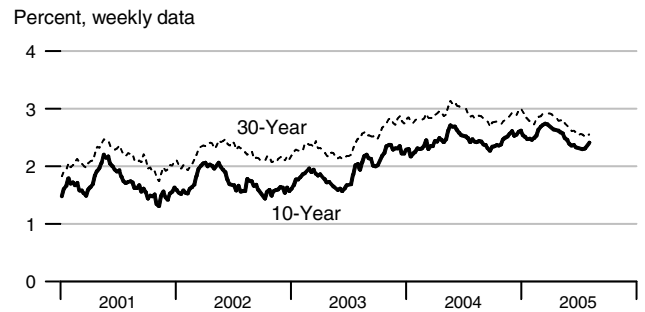
Rates on Federal Funds Futures on Selected Dates



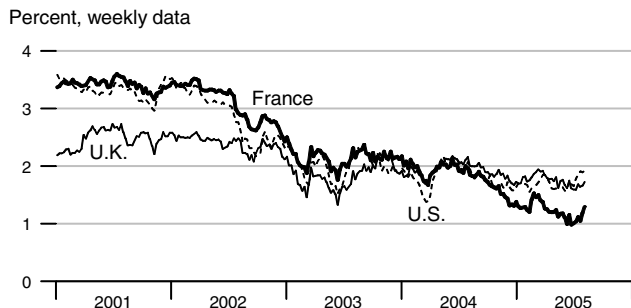
Inflation-Indexed Treasury Securities



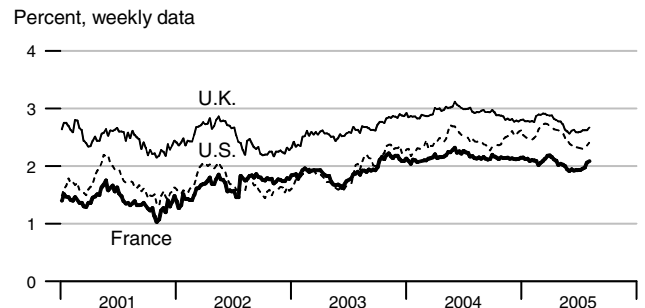
Inflation-Indexed Treasury Yield Spreads



Inflation-Indexed 10-Year Government Notes

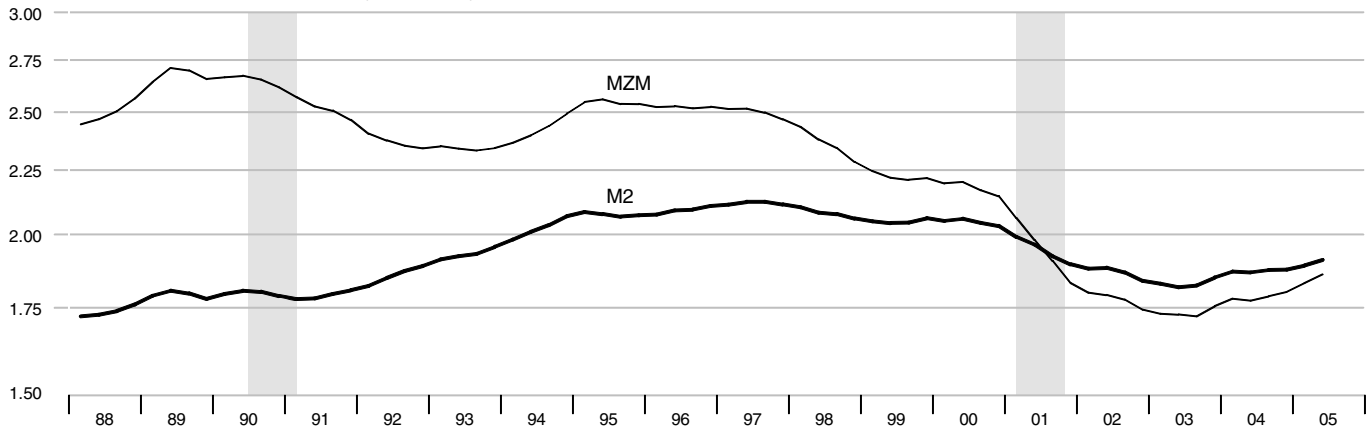


Inflation-Indexed 10-Year Government Yield Spreads



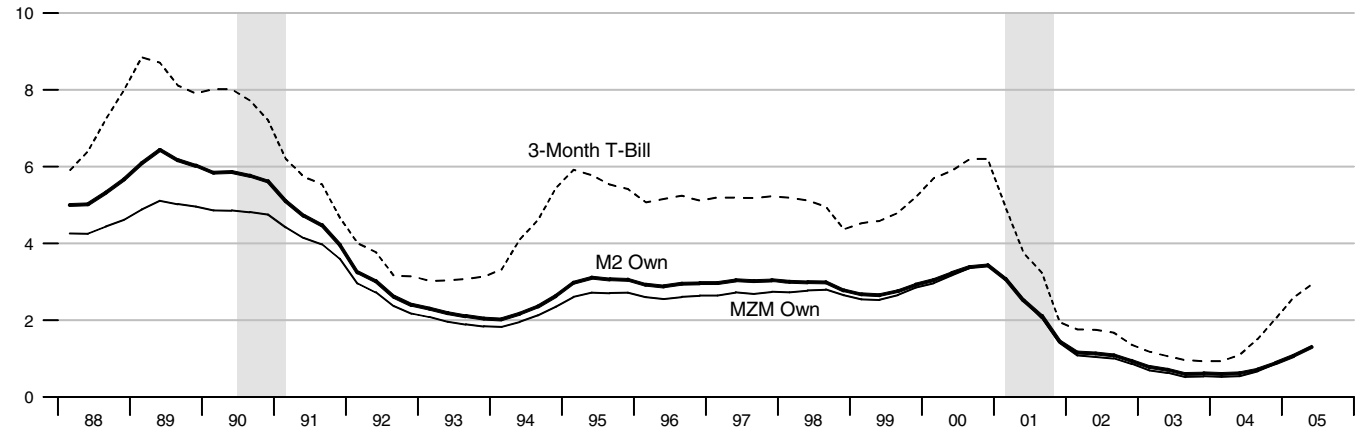
Velocity

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



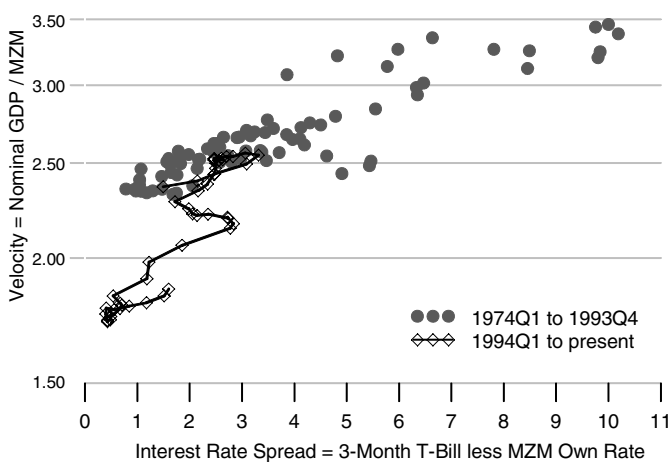
Interest Rates

Percent



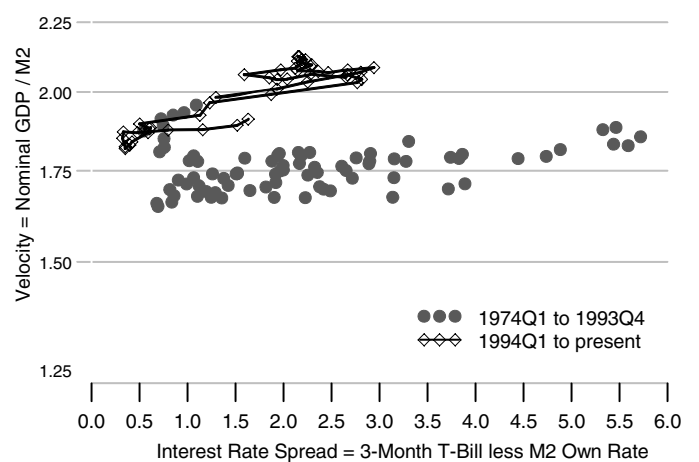
MZM Velocity and Interest Rate Spread

Ratio Scale



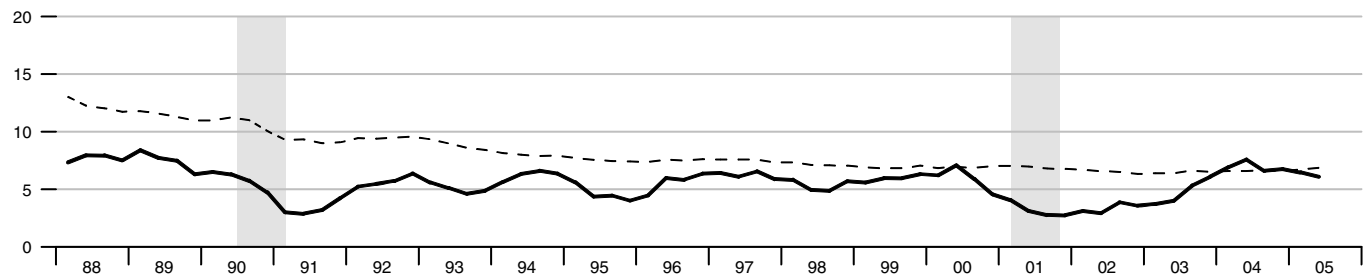
M2 Velocity and Interest Rate Spread

Ratio Scale



Gross Domestic Product

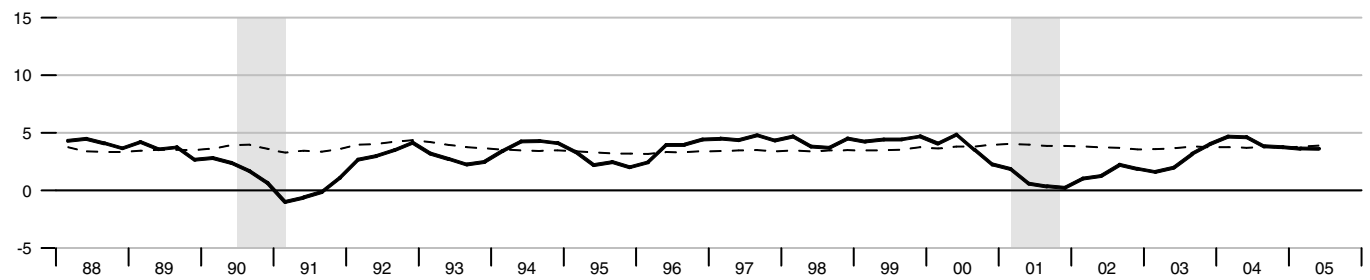
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

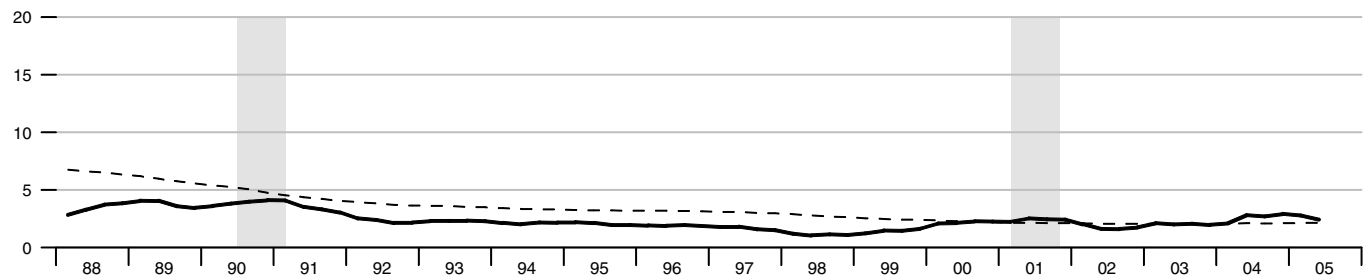
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

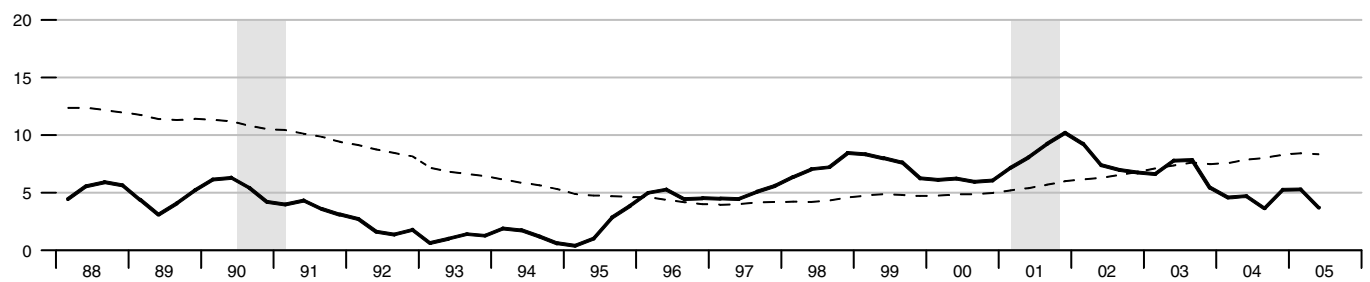
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

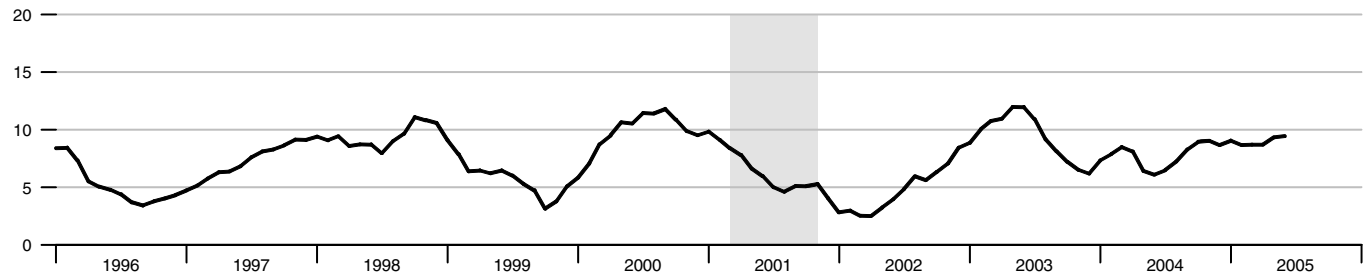
Percent change from year ago



Dashed lines indicate 10-year moving averages.

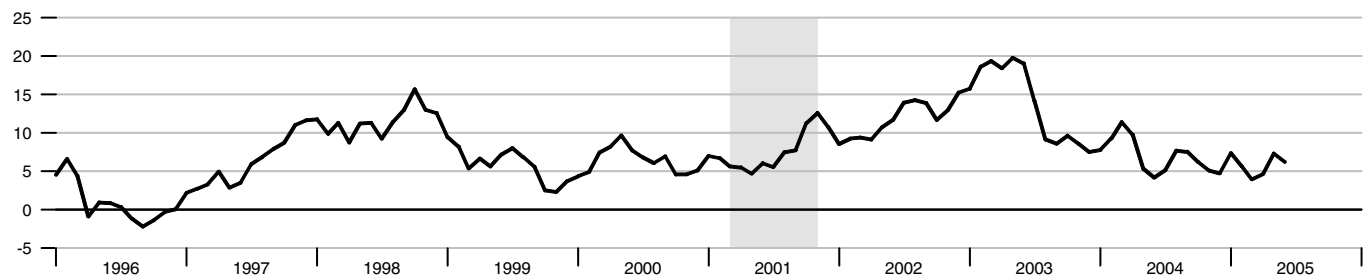
Bank Credit

Percent change from year ago



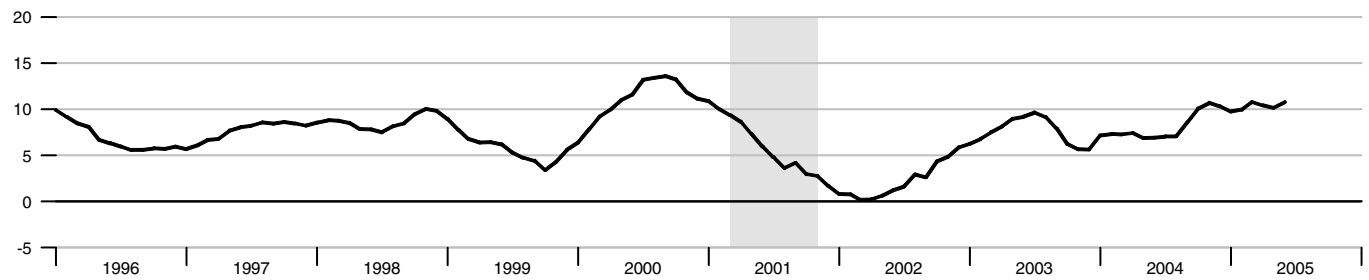
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



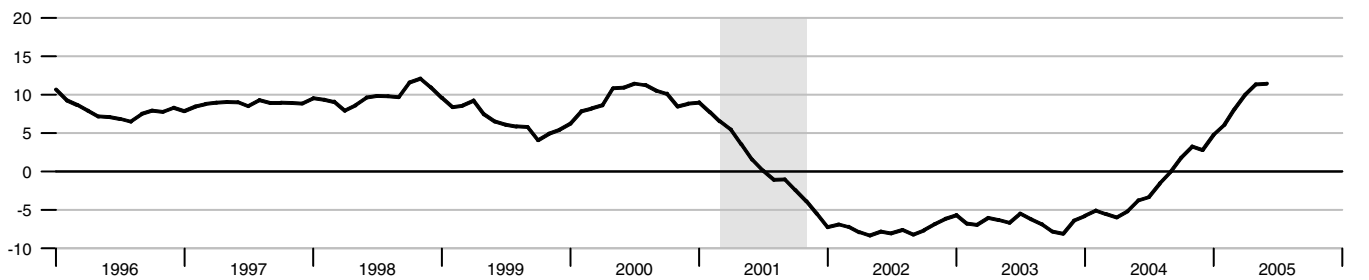
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

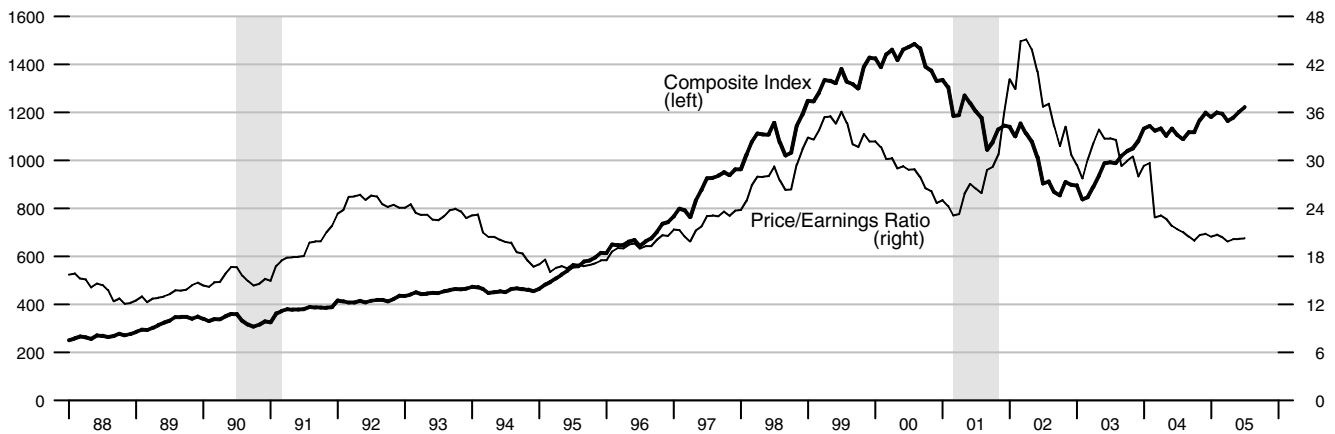


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



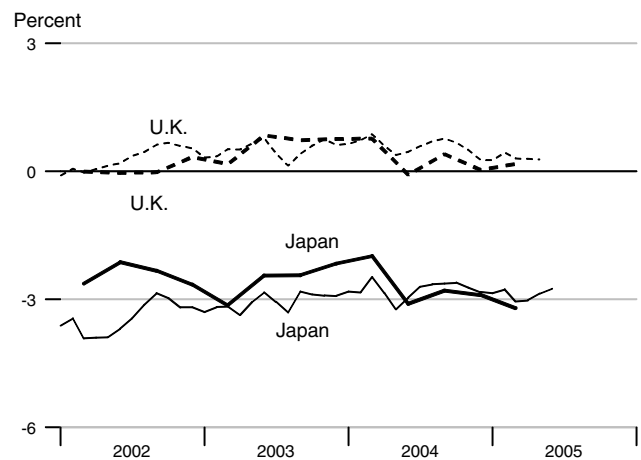
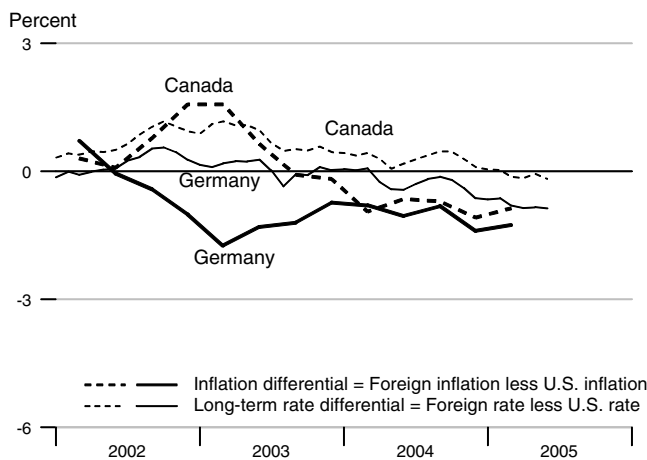
Standard & Poor's 500



Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2004Q3	2004Q4	2005Q1	2005Q2	Mar05	Apr05	May05	Jun05
United States	2.69	3.37	3.00	2.93	4.50	4.34	4.14	4.00
Canada	1.99	2.29	2.13	.	4.37	4.18	4.08	3.82
France	2.28	2.08	1.70	.	3.75	3.54	3.38	.
Germany	1.88	1.98	1.74	.	3.70	3.48	3.30	3.13
Italy	2.23	1.98	1.92	1.84	3.84	3.65	3.55	3.41
Japan	-0.10	0.48	-0.20	.	1.45	1.32	1.27	1.24
United Kingdom	3.09	3.41	3.17	.	4.80	4.63	4.42	.

Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
2000		1103.678	4508.490	4798.172	6860.767	5025.393	607.106	84.115	248.592
2001		1136.048	5220.145	5214.927	7642.562	5345.104	641.167	86.177	271.192
2002		1190.960	5890.892	5609.469	8256.046	5597.006	697.072	88.136	293.905
2003		1266.713	6325.605	5997.077	8783.042	6120.084	740.762	93.143	314.863
2004		1336.556	6573.340	6269.108	9241.555	6594.353	776.518	95.867	329.521
2003	1	1230.394	6191.256	5861.564	8618.652	5955.574	726.828	91.083	307.669
	2	1260.790	6273.095	5969.138	8728.386	6135.753	738.281	91.944	313.329
	3	1284.077	6435.714	6082.247	8895.660	6186.169	744.144	94.974	319.343
	4	1291.592	6402.354	6075.361	8889.470	6202.839	753.796	94.570	319.110
2004	1	1311.109	6441.073	6129.380	9011.952	6426.548	761.243	94.840	322.050
	2	1330.781	6579.909	6249.258	9223.690	6556.953	770.962	96.406	328.380
	3	1342.897	6613.563	6304.062	9321.557	6640.070	782.591	96.596	331.396
	4	1361.438	6658.816	6393.734	9409.021	6753.840	791.277	95.624	336.258
2005	1	1363.925	6664.312	6453.507	9532.070	6992.307	798.060	96.438	339.386
	2	1361.681	6655.070	6480.802	9662.352	7157.317	802.450	95.735	340.524
2003	Jun	1274.499	6321.563	6014.380	8783.113	6206.056	739.676	91.828	315.707
	Jul	1278.056	6417.316	6058.250	8875.476	6194.455	741.389	93.811	318.073
	Aug	1287.035	6446.848	6103.614	8907.438	6179.299	745.394	95.778	320.432
	Sep	1287.140	6442.979	6084.876	8904.065	6184.753	745.648	95.332	319.525
	Oct	1288.045	6418.660	6076.974	8900.509	6161.011	753.833	95.699	319.138
	Nov	1289.524	6399.197	6072.484	8882.831	6197.539	754.786	95.220	318.966
	Dec	1297.207	6389.206	6076.626	8885.069	6249.966	752.769	92.790	319.227
2004	Jan	1295.024	6402.845	6089.918	8943.387	6320.267	756.606	93.026	320.065
	Feb	1312.792	6435.469	6129.479	9007.759	6440.850	763.012	95.738	322.045
	Mar	1325.512	6484.905	6168.743	9084.709	6518.528	764.112	95.755	324.039
	Apr	1325.842	6533.357	6206.673	9150.944	6538.761	767.768	96.901	326.106
	May	1329.698	6597.850	6264.588	9240.044	6547.305	770.029	95.588	329.200
	Jun	1336.804	6608.521	6276.512	9280.081	6584.793	775.088	96.729	329.835
	Jul	1329.473	6595.183	6278.298	9283.808	6596.519	780.276	95.493	330.135
	Aug	1347.436	6609.074	6299.453	9316.269	6626.745	781.339	95.823	331.099
	Sep	1351.782	6636.432	6334.435	9364.593	6696.945	786.158	98.473	332.954
	Oct	1351.858	6635.947	6361.180	9373.459	6711.862	792.055	97.355	334.510
	Nov	1366.815	6660.394	6397.942	9403.217	6757.737	793.690	96.637	336.486
	Dec	1365.641	6680.107	6422.079	9450.386	6791.922	788.085	92.881	337.779
2005	Jan	1356.290	6672.741	6436.537	9498.744	6891.914	793.357	94.890	338.606
	Feb	1364.064	6658.549	6451.662	9533.719	6998.900	800.094	97.596	339.269
	Mar	1371.421	6661.645	6472.323	9563.748	7086.108	800.730	96.828	340.283
	Apr	1354.067	6657.642	6469.083	9612.706	7108.145	802.130	97.133	340.184
	May	1365.691	6637.519	6470.266	9646.979	7157.666	800.401	94.251	339.890
	Jun	1365.286	6670.049	6503.056	9727.372	7206.140	804.818	95.820	341.497

*All values are given in billions of dollars.

		Federal Funds	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				
2000		6.24		9.23	6.46	6.00	6.22	6.03	7.62	5.58	8.06	
2001		3.89		6.92	3.69	3.47	4.08	5.02	7.08	5.01	6.97	
2002		1.67		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	
2004		1.35	2.34	4.34	1.56	1.40	2.78	4.27	5.63	4.50	5.84	
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	
	3	1.43	2.42	4.42	1.70	1.51	2.92	4.30	5.64	4.54	5.89	
	4	1.95	2.94	4.94	2.25	2.04	3.05	4.17	5.48	4.39	5.73	
2005	1	2.47	3.44	5.44	2.78	2.58	3.61	4.30	5.32	4.23	5.76	
	2	2.94	3.91	5.91	3.23	2.93	3.73	4.16	5.15	4.15	5.72	
2003	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	4.01	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	
Aug		1.43	2.43	4.43	1.68	1.50	2.88	4.28	5.65	4.52	5.87	
Sep		1.61	2.58	4.58	1.86	1.68	2.83	4.13	5.46	4.40	5.75	
Oct		1.76	2.75	4.75	2.04	1.79	2.85	4.10	5.47	4.38	5.72	
Nov		1.93	2.93	4.93	2.26	2.11	3.09	4.19	5.52	4.45	5.73	
Dec		2.16	3.15	5.15	2.45	2.22	3.21	4.23	5.47	4.35	5.75	
2005	Jan	2.28	3.25	5.25	2.61	2.37	3.39	4.22	5.36	4.24	5.71	
	Feb	2.50	3.49	5.49	2.77	2.58	3.54	4.17	5.20	4.16	5.63	
	Mar	2.63	3.58	5.58	2.97	2.80	3.91	4.50	5.40	4.29	5.93	
	Apr	2.79	3.75	5.75	3.09	2.84	3.79	4.34	5.33	4.18	5.86	
	May	3.00	3.98	5.98	3.22	2.90	3.72	4.14	5.15	4.20	5.72	
	Jun	3.04	4.01	6.01	3.38	3.04	3.69	4.00	4.96	4.08	5.58	
	Jul	3.26	4.25	6.25	3.57	3.29	3.91	4.18	5.06		5.70	

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

		M1	MZM	M2	M3	
Percent change at an annual rate						
2000		0.20	8.11	6.08	9.43	
2001		2.93	15.78	8.69	11.40	
2002		4.83	12.85	7.57	8.03	
2003		6.36	7.38	6.91	6.38	
2004		5.51	3.92	4.54	5.22	
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2003	1	7.97	7.77	6.84	6.59	
	2	9.88	5.29	7.34	5.09	
	3	7.39	10.37	7.58	7.67	
	4	2.34	-2.07	-0.45	-0.28	
2004	1	6.04	2.42	3.56	5.51	
	2	6.00	8.62	7.82	9.40	
	3	3.64	2.05	3.51	4.24	
	4	5.52	2.74	5.69	3.75	
2005	1	0.73	0.33	3.74	5.23	
	2	-0.66	-0.55	1.69	5.47	
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2003	Jun	9.73	9.89	8.23	7.38	
	Jul	3.35	18.18	8.75	12.62	
	Aug	8.43	5.52	8.99	4.32	
	Sep	0.10	-0.72	-3.68	-0.45	
	Oct	0.84	-4.53	-1.56	-0.48	
	Nov	1.38	-3.64	-0.89	-2.38	
	Dec	7.15	-1.87	0.82	0.30	
	<hr/>					
	2004	Jan	-2.02	2.56	2.62	7.88
		Feb	16.46	6.11	7.80	8.64
		Mar	11.63	9.22	7.69	10.25
		Apr	0.30	8.97	7.38	8.75
May		3.49	11.85	11.20	11.68	
Jun		6.41	1.94	2.28	5.20	
Jul		-6.58	-2.42	0.34	0.48	
Aug		16.21	2.53	4.04	4.20	
Sep		3.87	4.97	6.66	6.22	
Oct		0.07	-0.09	5.07	1.14	
Nov		13.28	4.42	6.93	3.81	
Dec		-1.03	3.55	4.53	6.02	
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2005	Jan	-8.22	-1.32	2.70	6.14	
	Feb	6.88	-2.55	2.82	4.42	
	Mar	6.47	0.56	3.84	3.78	
	Apr	-15.18	-0.72	-0.60	6.14	
	May	10.30	-3.63	0.22	4.28	
	Jun	-0.36	5.88	6.08	10.00	

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 7/25/2015, the current U.K. note has a maturity date of 8/16/2013, and the current U.S. note has a maturity date of 1/15/2015. **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/.