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 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.

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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/.

Monetary Trends

March 2005

Wicksell's Natural Rate

Most central banks now implement monetary policy by setting a near-term target for an overnight interbank interest rate. In turn, policymakers face the difficult issue of how to choose, and adjust, the target rate. One widely discussed policy guide is the "natural," or equilibrium, real rate of interest. To use this guide, one compares the level of a medium-term financial-market real interest rate—such as the yield on a 10-year Treasury inflation-indexed bond—to an estimate of the long-term "natural," or equilibrium, rate of return on the economy's capital stock. The idea that inflation will be approximately constant when these two rates of return are equal is an extension of an idea advanced in 1898 by the Swedish economist Knut Wicksell.[1]

Wicksell, throughout his career, was an unwavering advocate of the quantity theory of money. He argued that increases in the economy's average level of prices were due to excessive increases in the monetary base, that is, increases beyond the increase in the economy's overall output. Precisely *how* this occurred, he felt, was muddled in writings of the time. With the natural rate concept, he sought to illuminate the transmission mechanism behind the quantity theory and to begin connecting the monetary base, banks' extension of credit, aggregate demand, and inflation.

Wicksell based his theory on a comparison of the marginal product of capital with the cost of borrowing money. If the money rate of interest was below the natural rate of return on capital, entrepreneurs would borrow at the money rate to purchase capital (equipment and buildings), thereby increasing demand for all types of resources and their prices; the converse would be true if the money rate was greater than the natural rate of return on capital. (Wicksell did not distinguish real from nominal interest rates because, under the gold standard of the time, sustained inflation was unlikely. Here, all interest rates and rates of return should be interpreted as real rates.) So long as the money rate of interest persisted below the natural rate of return on capital, upward price pressures would continue. In Wicksell's theory, price pressure could arise even if new credit were extended only against increases in production, that is, against "real bills." Price stability would result only when the money rate of interest and the natural rate of return on capital—the marginal product of capital—were equal.

Wicksell did not complete his theory of money, output, and inflation. He did not propose a market mechanism that determined the money rate of interest. Nor did he advocate an activist policy based on the natural rate for Sweden's central bank, the Riksbank. His work did, however, inspire later writers. John Maynard Keynes took up Wicksell's unfinished quest for a theory connecting the price level to money and credit in his 1930 *A Treatise on Money*.

Implementing monetary policy by means of a natural rate framework has many uncertainties. The most relevant financial market rates for household and firm behavior likely are not the overnight rates set by central banks, but rather are intermediate-run rates of 5 to 10 years to maturity. Shocks to the economy, such as an energy or financial crisis, may cause near-term real rates of return on capital to deviate significantly from the longer-term rate of return on capital. Further, the natural rate is not observable. It varies with the economy's underlying ability to produce, and must be estimated from empirical models often subject to substantial disagreement. Beyond differences in structure, models depend on assumed long-run projections for variables such as productivity growth, the share of national income received by capital, the aggregate savings rate from GDP, the growth of the labor force, the rate of depreciation of capital, and the variances and covariance of shocks to the economy. Agreement among economists on these issues does not seem imminent.

Ironically, Wicksell's work laid the foundations that have led economists during the twentieth century to shift away from analysis of the quantity theory and, in some cases, to omit money entirely from their models. But, models based on the natural rate concept likely have some distance to go before they become useful guides to monetary policy.

—Richard G. Anderson

Further reading: Angelo Mascaro, "Using the Natural Rate Concept to Assess the Consistency of Projections Ten Years Ahead for Real Interest Rates and Inflation," Congressional Budget Office Technical Paper Series, number 2004-5, March 2004; Thomas M. Humphrey, "Knut Wicksell and Gustav Cassel on the Cumulative Process and the Price-Stabilizing Policy Rule," Federal Reserve Bank of Richmond *Economic Quarterly*, *88*(3), Summer 2002; Roger W. Ferguson, Jr., "Equilibrium Real Interest Rate: Theory and Application," speech at the University of Connecticut School of Business, October 29, 2004, available at <www.federalreserve.gov/boarddocs/speeches/20041029/default.htm>.

[1]Wicksell introduced the natural rate in the 1898 paper, "The Influence of the Rate of Interest on Commodity Prices," reprinted in Erik Lindahl, ed., *Selected Papers on Economic Theory by Knut Wicksell* (1958, pp. 67-92); it remains one of the clearest expositions. He expanded the idea in *Geldzins und Guterpreise* (1898), translated by R.F. Kahn as *Interest and Prices* (1936). The definitive biography is Torsten Gårdlund, *The Life of Knut Wicksell* (1958).

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

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

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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

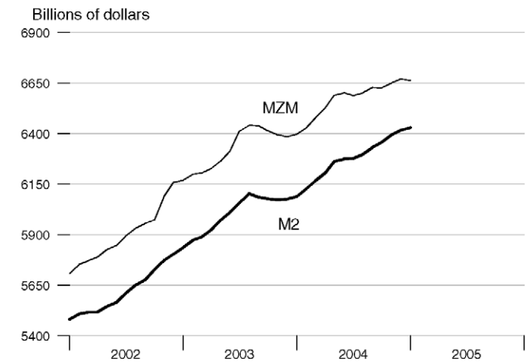
$$\Delta MB_t^* = \pi^* + (\text{10-year moving average growth of real GDP}) - (\text{4-year moving average of base velocity growth})$$

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.

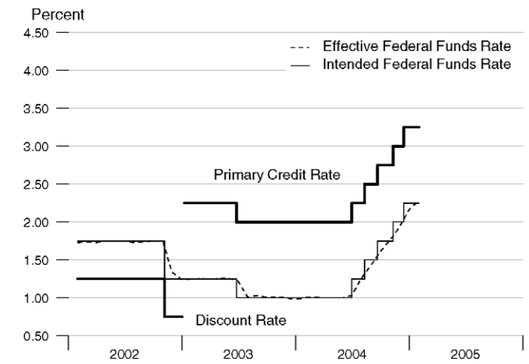
Page 11: **Implied One-Year Forward Rates** are calculated by this Bank from Treasury constant maturity yields. Yields to maturity, $R(m)$, for securities with $m = 1,\ldots, 10$ years to maturity are obtained by linear interpolation between

		M1	MZM	M2	M3
Percent change at an annual rate					
2000		0.18	8.12	6.09	9.43
2001		3.03	15.80	8.71	11.40
2002		4.85	12.84	7.57	8.03
2003		6.04	7.31	6.83	6.32
2004		5.39	3.86	4.48	5.17
2002	1	5.96	11.10	7.24	6.64
	2	-0.91	5.42	2.99	3.41
	3	1.86	7.31	7.44	6.04
	4	6.13	9.90	8.67	9.27
2003	1	7.95	7.70	6.77	6.55
	2	8.45	5.00	7.04	4.88
	3	6.86	10.33	7.58	7.58
	4	2.44	-2.04	-0.45	-0.34
2004	1	5.91	2.31	3.45	5.55
	2	6.13	8.57	7.78	9.43
	3	3.83	2.07	3.56	4.24
	4	5.55	2.59	5.51	3.29
2003	Jan	4.46	2.10	6.84	2.49
	Feb	14.35	5.80	7.40	5.09
	Mar	2.42	1.07	3.28	2.38
	Apr	6.44	4.40	7.18	4.18
	May	13.61	6.88	9.62	6.97
	Jun	9.85	9.95	8.28	7.40
	Jul	3.47	18.38	8.99	12.69
	Aug	8.76	5.60	9.13	4.29
	Sep	0.32	-0.68	-3.56	-0.52
	Oct	0.86	-4.50	-1.58	-0.57
	Nov	1.38	-3.63	-0.98	-2.45
	Dec	7.15	-1.85	0.75	0.27
2004	Jan	-2.64	2.39	2.51	8.01
	Feb	16.52	5.93	7.65	8.66
	Mar	12.15	9.08	7.58	10.29
	Apr	0.33	8.89	7.30	8.78
	May	3.16	11.88	11.27	11.71
	Jun	7.05	2.14	2.32	5.28
	Jul	-6.38	-2.43	0.52	0.40
	Aug	16.20	2.47	3.93	4.22
	Sep	4.05	4.88	6.66	6.20
	Oct	-0.14	-0.31	4.71	0.63
	Nov	13.37	4.26	6.86	2.96
	Dec	-0.70	3.44	4.29	5.17
2005	Jan	-7.47	-1.10	2.48	5.25

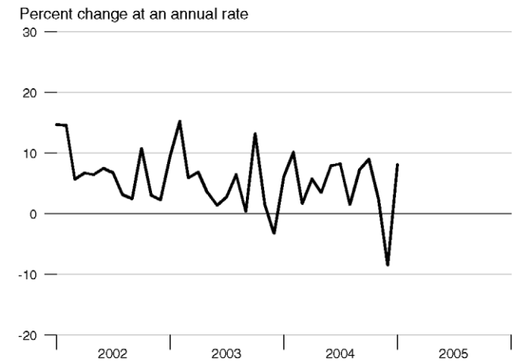
M2 and MZM



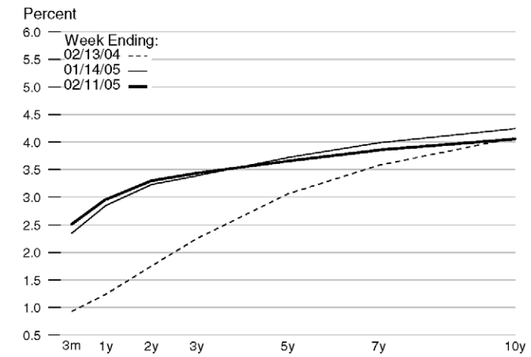
Reserve Market Rates



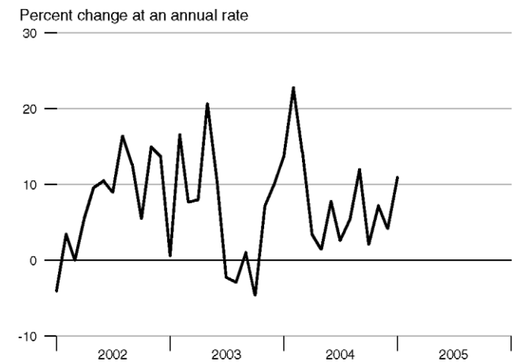
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

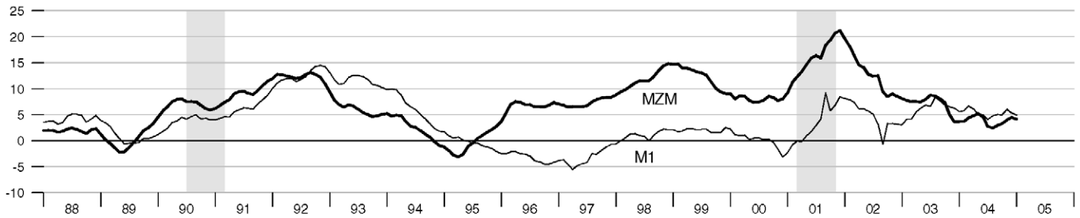


Interest Rates

	Nov 04	Dec 04	Jan 05
Federal Funds Rate	1.93	2.16	2.28
Prime Rate	4.93	5.15	5.25
Primary Credit Rate	2.93	3.15	3.25
Conventional Mortgage Rate	5.73	5.75	5.71
Treasury Yields:			
3-Month Constant Maturity	2.11	2.22	2.37
6-Month Constant Maturity	2.32	2.50	2.68
1-Year Constant Maturity	2.50	2.67	2.86
3-Year Constant Maturity	3.09	3.21	3.39
5-Year Constant Maturity	3.53	3.60	3.71
10-Year Constant Maturity	4.19	4.23	4.22

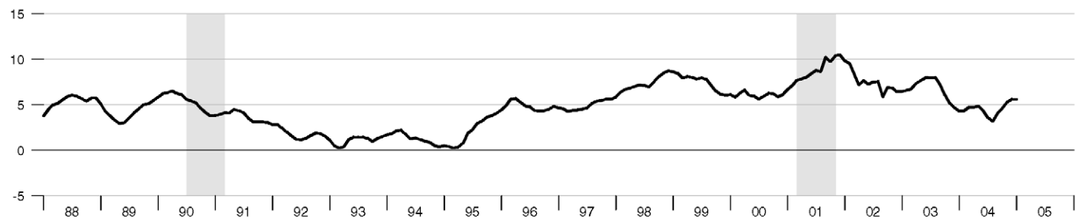
MZM and M1

Percent change from year ago



M2

Percent change from year ago

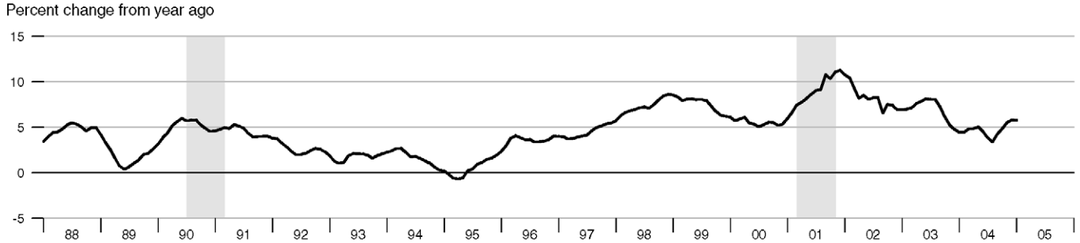


M3

Percent change from year ago

Monetary Services Index - M2

Percent change from year ago



		Federal Funds	Primary Credit Rate	Prime Rate	3-mo CDs	Treasury Yields 3-mo	3-yr	10-yr	Corporate Aaa Bonds	S & L Aaa Bonds	Conventional Mortgage
	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
2002	1	1.73		4.75	1.82	1.76	3.75	5.08	6.62	5.02	6.97
	2	1.75		4.75	1.83	1.75	3.77	5.10	6.71	5.01	6.81
	3	1.74		4.75	1.76	1.67	2.62	4.26	6.35	4.72	6.29
	4	1.44		4.45	1.49	1.36	2.27	4.01	6.28	4.71	6.08
2003	1	1.25	2.25	4.25	1.26	1.18	2.07	3.92	6.00	4.60	5.83
	2	1.25	2.23	4.24	1.17	1.06	1.77	3.62	5.31	4.28	5.51
	3	1.02	2.00	4.00	1.07	0.95	2.20	4.23	5.70	4.68	6.01
	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
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	4.01	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

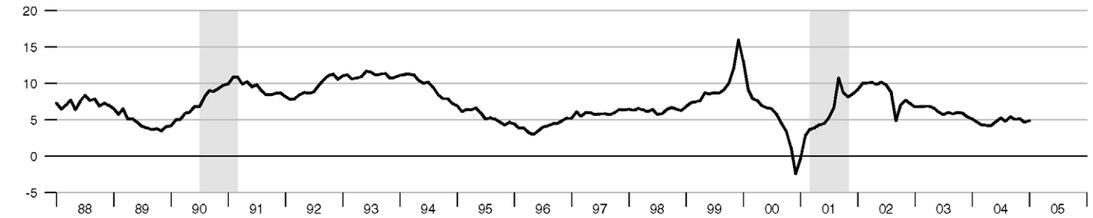
*All values are given as a percent at an annual rate.

		Money Stock				Bank	Adjusted		
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
2000		1103.482	4508.931	4801.405	6861.391	5025.616	607.106	84.511	242.158
2001		1136.938	5221.308	5219.493	7643.641	5345.608	641.167	85.923	263.728
2002		1192.032	5891.818	5614.811	8257.342	5597.371	697.072	87.914	285.718
2003		1264.043	6322.368	5998.417	8778.864	6120.338	740.674	92.828	305.754
2004		1332.206	6566.221	6266.947	9232.705	6592.605	776.404	95.445	320.027
2002	1	1186.742	5743.563	5501.839	8095.861	5420.280	680.264	88.149	279.335
	2	1184.043	5821.418	5542.972	8164.934	5496.363	692.937	86.970	281.994
	3	1189.554	5927.767	5646.008	8288.250	5655.519	702.753	86.805	287.587
	4	1207.787	6074.523	5768.425	8480.324	5817.320	712.332	89.733	293.957
2003	1	1231.793	6191.493	5866.100	8619.232	5955.829	726.828	90.855	298.983
	2	1257.815	6268.964	5969.410	8724.380	6135.943	738.230	91.756	304.217
	3	1279.387	6430.927	6082.462	8889.717	6186.516	743.993	94.581	309.981
	4	1287.175	6398.090	6075.694	8882.127	6203.062	753.644	94.120	309.833
2004	1	1306.187	6435.077	6128.069	9005.386	6426.395	761.085	94.365	312.703
	2	1326.213	6573.025	6247.233	9217.792	6556.092	770.823	96.014	318.898
	3	1338.921	6607.019	6302.814	9315.463	6643.523	782.544	96.267	321.931
	4	1357.502	6649.765	6389.672	9392.178	6744.411	791.162	95.131	326.577
2003	Jan	1221.229	6169.771	5836.751	8589.249	5888.762	719.531	89.448	297.491
	Feb	1235.831	6199.598	5872.755	8625.665	5970.192	728.668	91.827	299.307
	Mar	1238.319	6205.110	5888.794	8642.783	6008.533	732.286	91.291	300.152
	Apr	1244.962	6227.854	5924.008	8672.877	6048.780	736.490	92.281	301.939
	May	1259.077	6263.556	5971.507	8723.251	6152.828	738.664	91.427	304.310
	Jun	1269.407	6315.482	6012.716	8777.011	6206.222	739.536	91.559	306.403
	Jul	1273.077	6412.210	6057.766	8869.850	6194.614	741.241	93.485	308.719
	Aug	1282.370	6442.120	6103.860	8901.566	6179.834	745.242	95.383	311.030
	Sep	1282.713	6438.451	6085.761	8897.736	6185.100	745.496	94.876	310.195
	Oct	1283.635	6414.302	6077.735	8893.546	6161.556	753.680	95.233	309.855
	Nov	1285.115	6394.915	6072.769	8875.421	6198.066	754.634	94.768	309.689
	Dec	1292.776	6385.052	6076.579	8877.415	6249.564	752.618	92.360	309.955
2004	Jan	1289.936	6397.790	6089.282	8936.660	6320.786	756.453	92.552	310.781
	Feb	1307.691	6429.406	6128.113	9001.139	6440.745	762.852	95.247	312.698
	Mar	1320.933	6478.036	6166.813	9078.359	6517.653	763.951	95.297	314.630
	Apr	1321.296	6526.037	6204.342	9144.747	6536.501	767.620	96.489	316.639
	May	1324.778	6590.647	6262.616	9234.005	6544.590	769.879	95.190	319.704
	Jun	1332.565	6602.390	6274.742	9274.625	6587.186	774.970	96.364	320.351
	Jul	1325.481	6589.003	6277.472	9277.705	6601.644	780.300	95.252	320.711
	Aug	1343.371	6602.592	6298.020	9310.302	6631.301	781.299	95.502	321.632
	Sep	1347.910	6629.461	6332.950	9358.383	6697.624	786.033	98.047	323.451
	Oct	1347.754	6627.746	6357.826	9363.307	6709.579	791.929	96.893	324.898
	Nov	1362.774	6651.249	6394.153	9386.401	6749.942	793.566	96.144	326.816
	Dec	1361.977	6670.300	6417.037	9426.827	6773.712	787.992	92.357	328.018
2005	Jan	1353.503	6664.204	6430.278	9468.080	6835.395	793.322	94.302	328.746

*All values are given in billions of dollars.

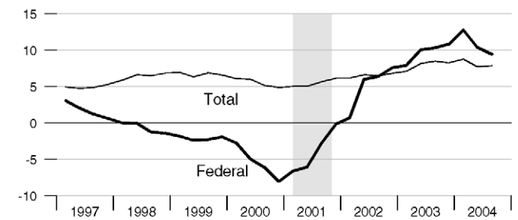
Adjusted Monetary Base

Percent change from year ago



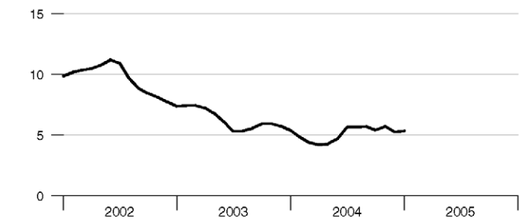
Domestic Nonfinancial Debt

Percent change from year ago



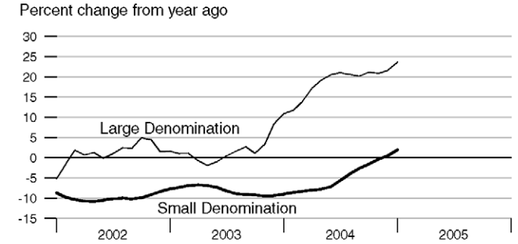
Currency Held by the Nonbank Public

Percent change from year ago



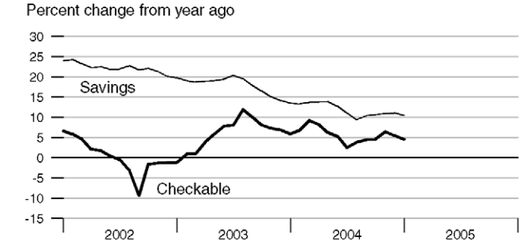
Time Deposits

Percent change from year ago



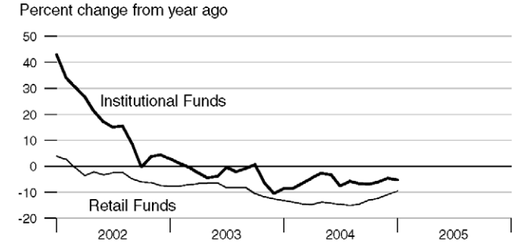
Checkable and Savings Deposits

Percent change from year ago



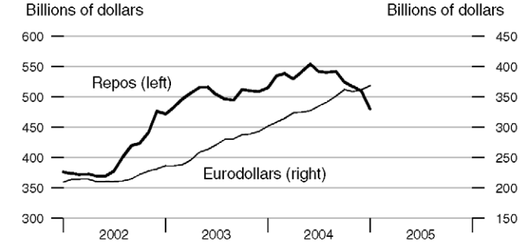
Money Market Mutual Fund Shares

Percent change from year ago



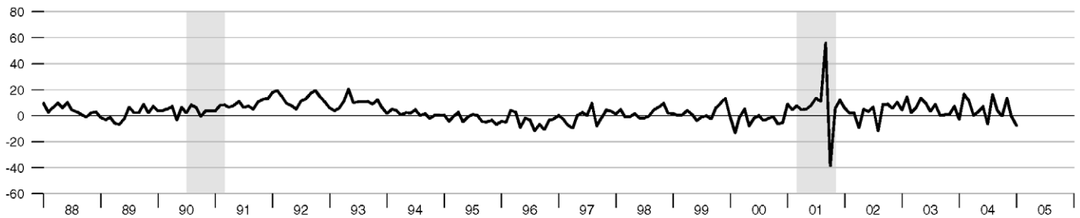
Repurchase Agreements and Eurodollars

Billions of dollars | Billions of dollars



M1

Percent change at an annual rate

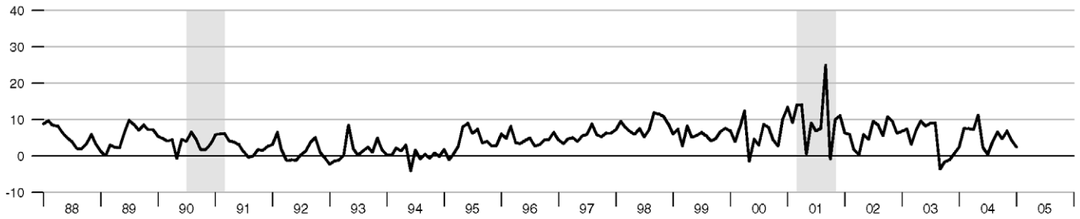


MZM

Percent change at an annual rate

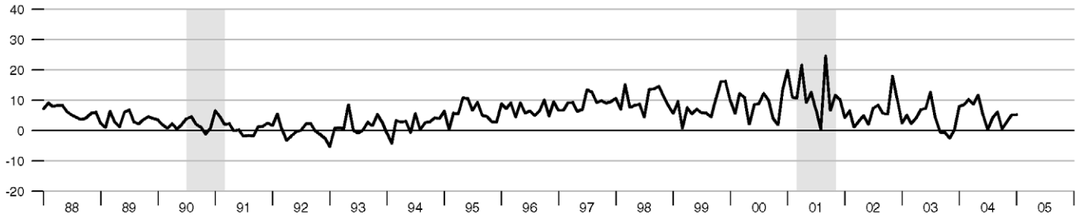
M2

Percent change at an annual rate

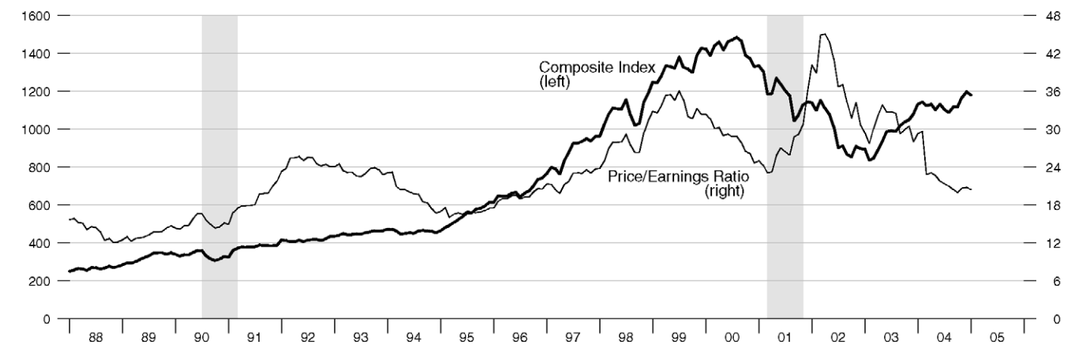


M3

Percent change at an annual rate



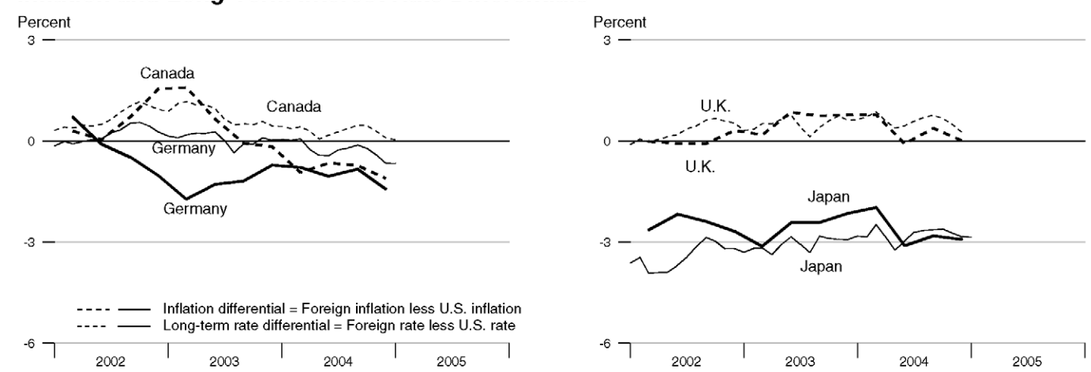
Standard & Poor's 500



Recent Inflation and Long-Term Interest Rates

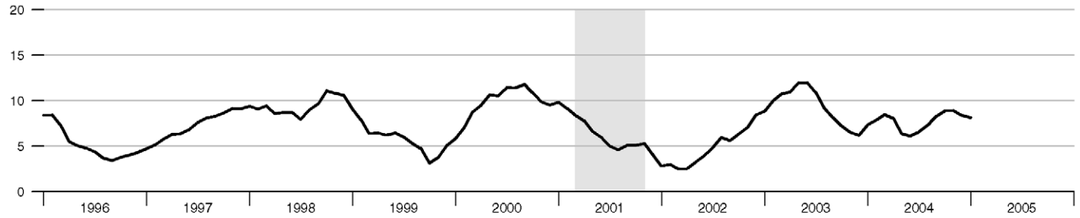
	Consumer Price Inflation Rates (Percent change from year ago)				Long-Term Government Bond Rates (Percent)			
	2004Q1	2004Q2	2004Q3	2004Q4	Oct04	Nov04	Dec04	Jan05
United States	1.80	2.84	2.71	3.39	4.10	4.19	4.23	4.22
Canada	0.87	2.18	1.99	2.29	4.56	4.48	4.33	4.26
France	1.80	2.38	2.28	2.08	3.98	3.86	3.64	.
Germany	1.02	1.79	1.88	1.98	3.89	3.78	3.58	3.56
Italy	2.29	2.33	2.23	1.98	4.13	4.00	3.79	3.71
Japan	-0.17	-0.27	-0.10	0.48	1.49	1.46	1.40	1.36
United Kingdom	2.58	2.75	3.09	3.41	4.77	4.69	4.50	.

Inflation and Long-Term Interest Rate Differentials



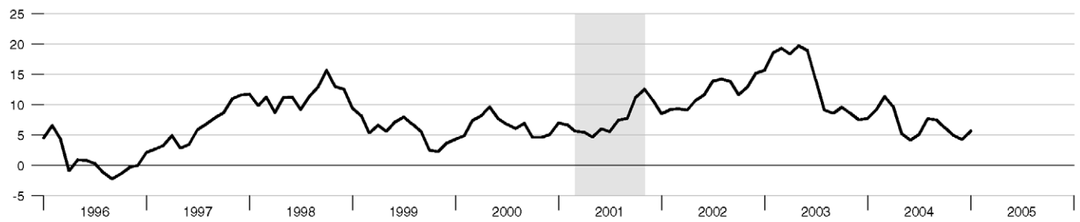
Bank Credit

Percent change from year ago



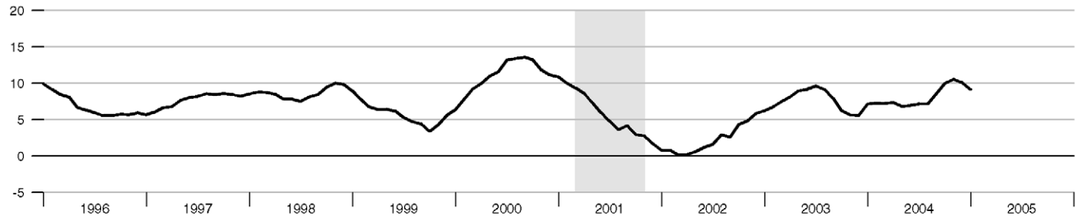
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

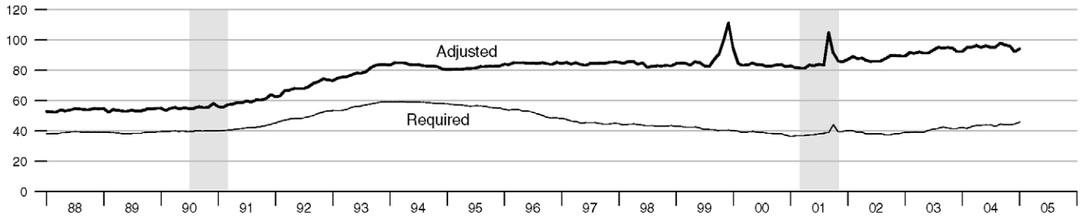


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago

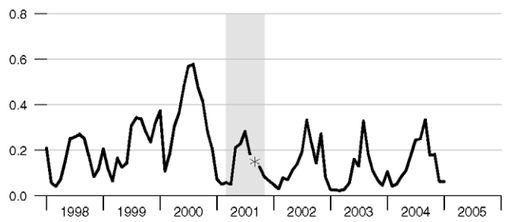
Adjusted and Required Reserves

Billions of dollars



Total Borrowings, nsa

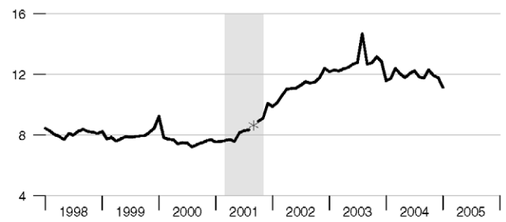
Billions of dollars



*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.

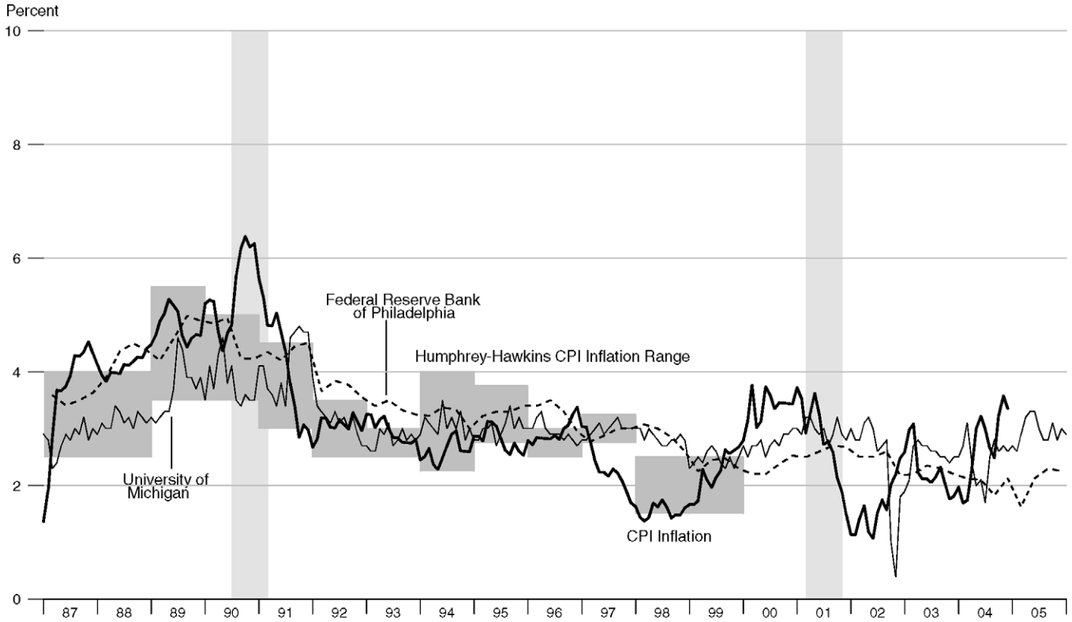
Nonfinancial Commercial Paper

Percent change from year ago

Consumer Credit

Percent change from year ago

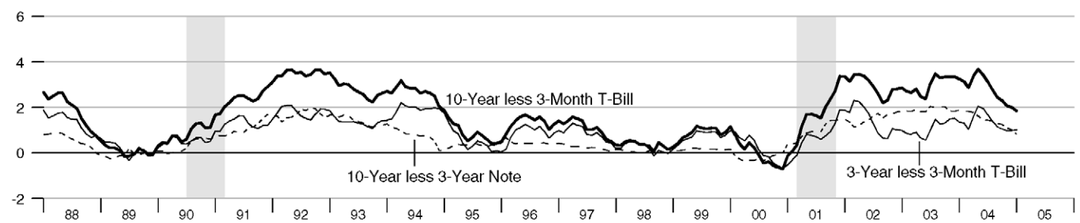
Inflation and Inflation Expectations



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.

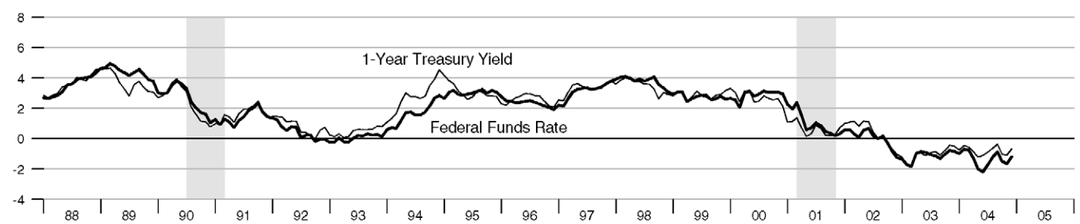
Treasury Security Yield Spreads

Yield to maturity



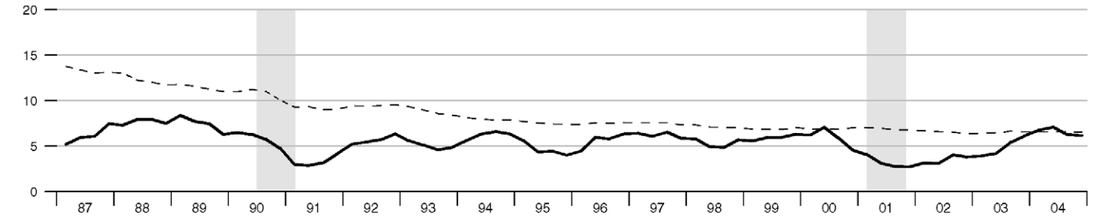
Real Interest Rates

Percent, Real rate = Nominal rate less CPI inflation



Gross Domestic Product

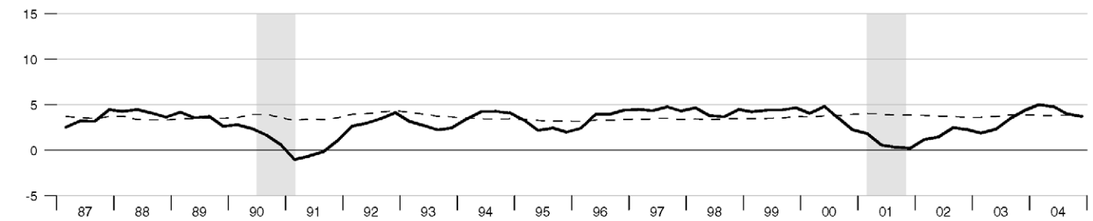
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

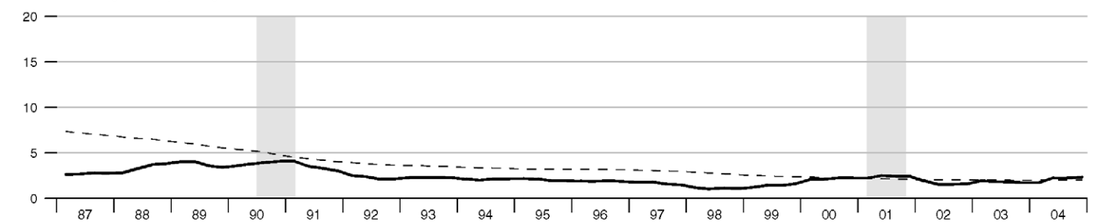
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

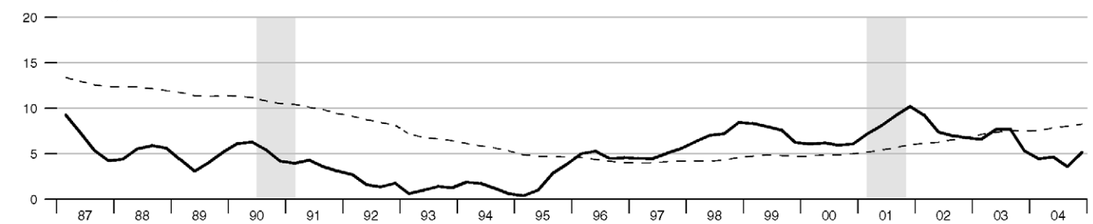
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

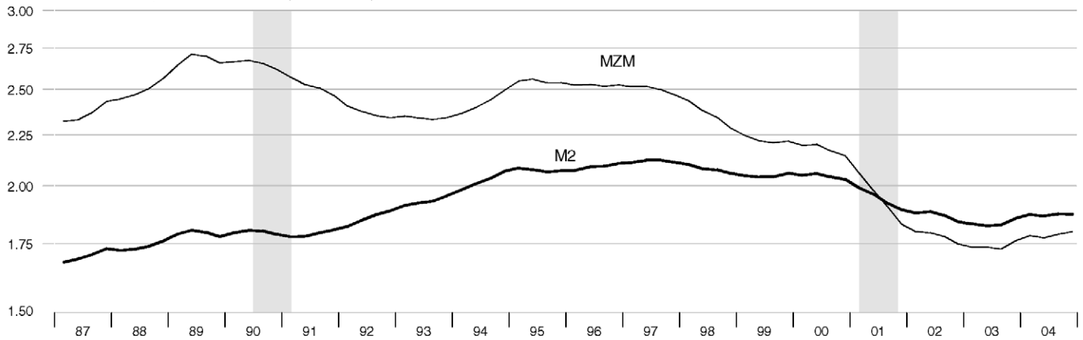
Percent change from year ago



Dashed lines indicate 10-year moving averages.

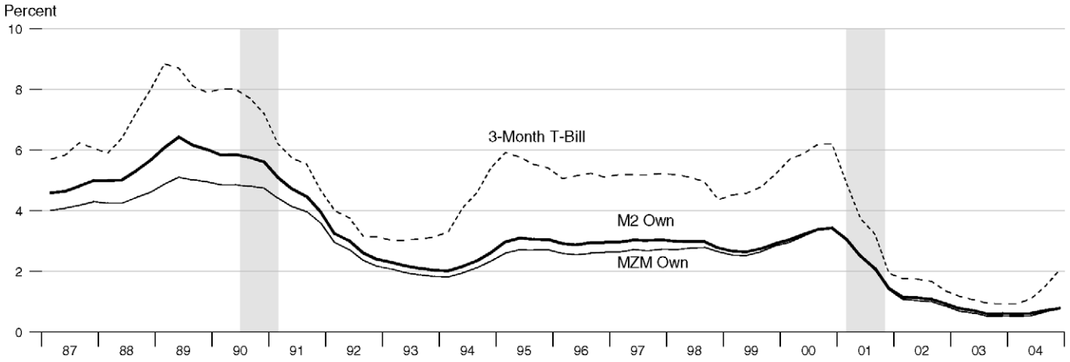
Velocity

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



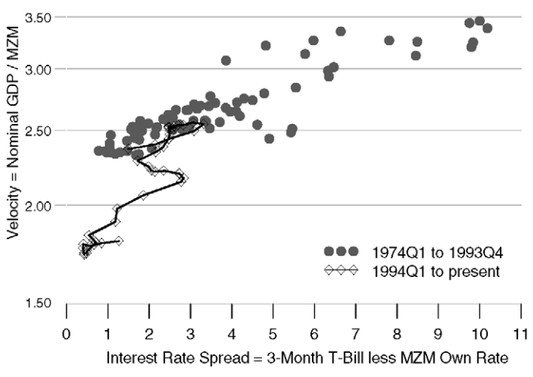
Interest Rates

Percent



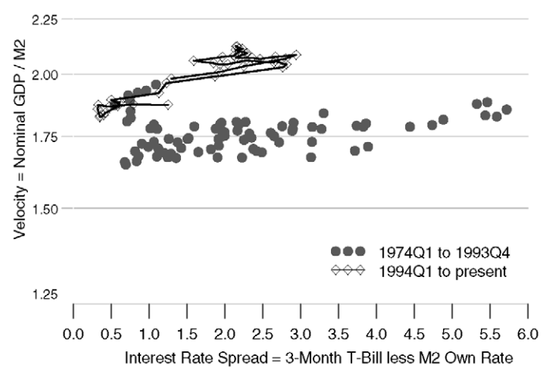
MZM Velocity and Interest Rate Spread

Ratio Scale



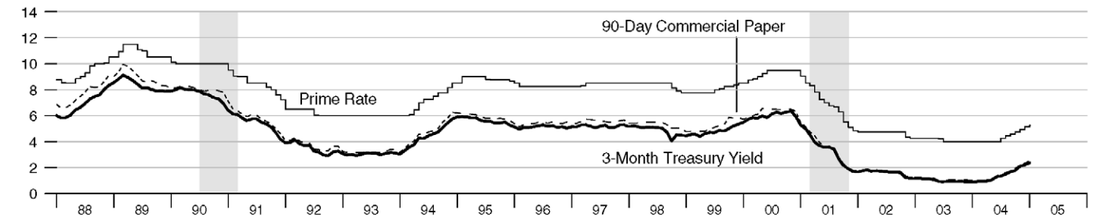
M2 Velocity and Interest Rate Spread

Ratio Scale



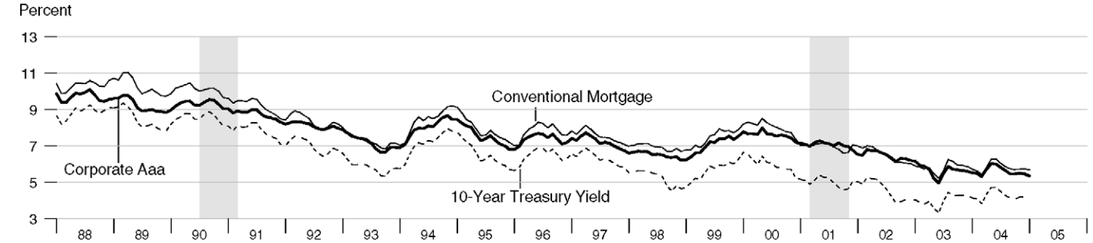
Short-Term Interest Rates

Percent



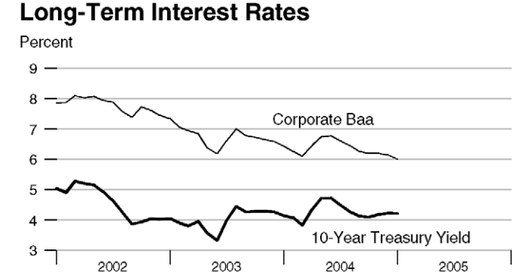
Long-Term Interest Rates

Percent



Long-Term Interest Rates

Percent

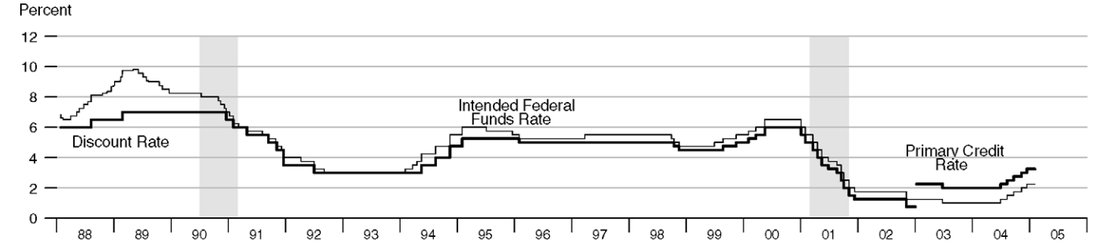


Short-Term Interest Rates

Percent

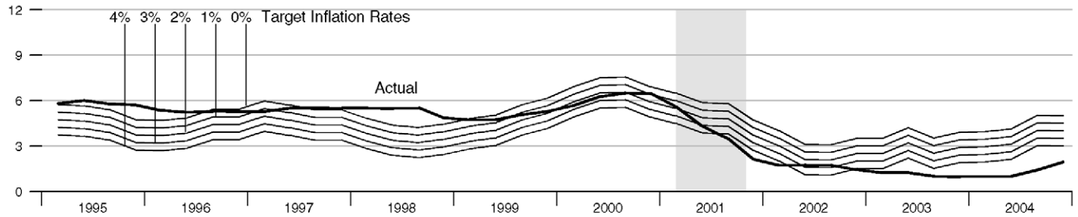
FOMC Intended Federal Funds Rate, Discount Rate, and Primary Credit Rate

Percent



Federal Funds Rate and Inflation Targets

Percent

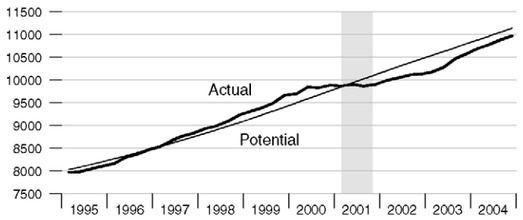


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

Components of Taylor's Rule

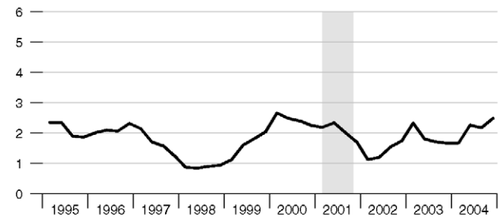
Actual and Potential Real GDP

Billions of chain-weighted 2000 dollars



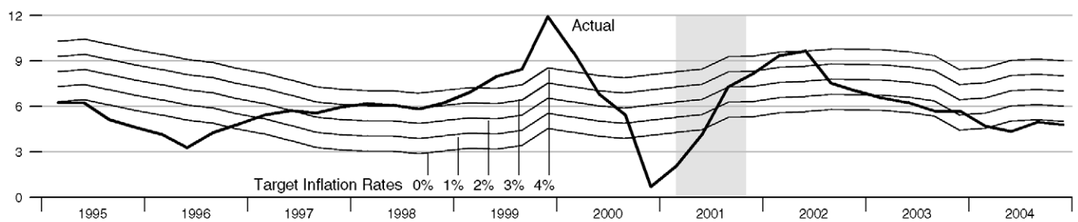
PCE Inflation

Percent change from year ago



Monetary Base Growth* and Inflation Targets

Percent

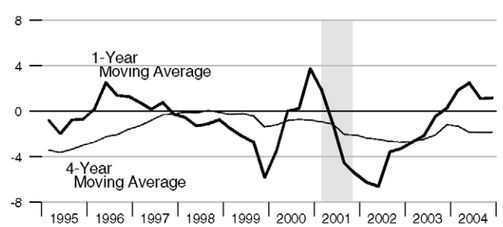


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

Components of McCallum's Rule

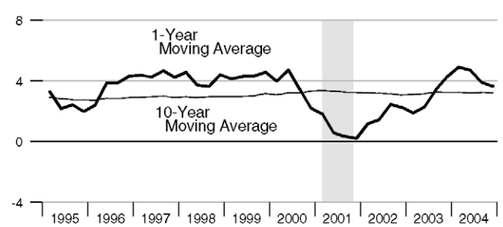
Monetary Base Velocity Growth

Percent



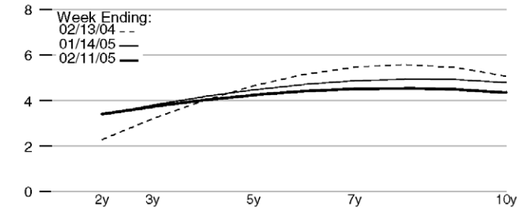
Real Output Growth

Percent



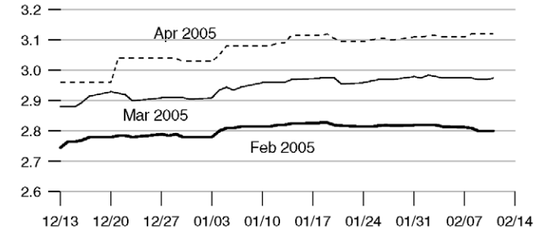
Implied One-Year Forward Rates

Percent



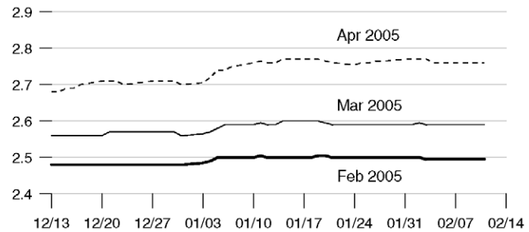
Rates on 3-Month Eurodollar Futures

Percent, daily data



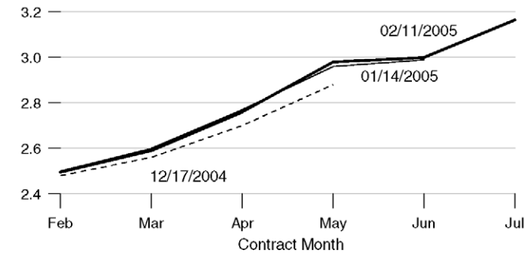
Rates on Selected Federal Funds Futures Contracts

Percent, daily data



Rates on Federal Funds Futures on Selected Dates

Percent

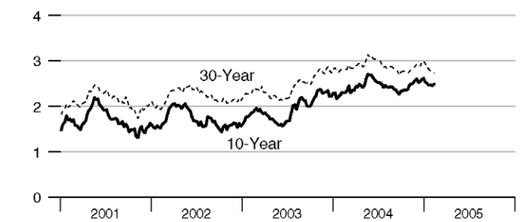


Inflation-Indexed Treasury Securities

Percent, weekly data

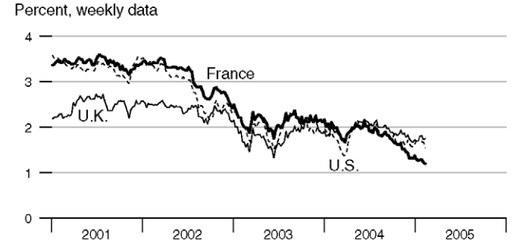
Inflation-Indexed Treasury Yield Spreads

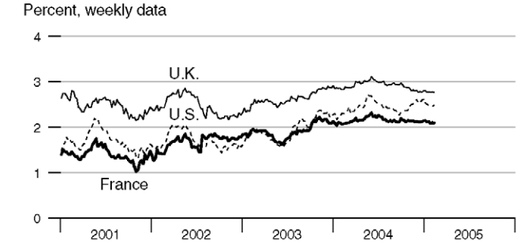
Percent, weekly data



Inflation-Indexed 10-Year Government Notes

Percent, weekly data



Inflation-Indexed 10-Year Government Yield Spreads

Percent, weekly data