



## U.S. Currency at Home and Abroad

Despite the increasing use of electronic payments and credit cards, currency remains the most familiar medium for face-to-face transactions in the U.S. economy. In addition, U.S. currency, more than any other of the world's currencies, is widely held as a store of value and used as a medium of exchange outside its home country. The chart shows the currency component of M1 and the Federal Reserve Board staff's estimates of U.S. currency held by the rest of the world. In 2005, approximately 50 percent of all U.S. currency in circulation, or about \$350 billion, was held outside the United States.

U.S. currency is an attractive asset to residents of nations with political or economic uncertainty. Much of the recent growth in demand for U.S. currency has been in countries of the former Soviet Union and Latin America. Indeed, anecdotal press reports tell of Moscow taxi drivers insisting to be paid in U.S. dollars rather than rubles. Other stories tell of merchants in the most remote areas of China accepting—and giving change in—U.S. banknotes. The extensive, widespread use of U.S. currency benefits American taxpayers because, unlike Treasury bonds, the currency is a liability of the Treasury on which no interest is paid.<sup>1</sup> The use of the banknotes also is a social and economic benefit to the residents of foreign countries who might otherwise lack a currency that is stable in value and widely accepted in transactions. This same popularity also is a curse, encouraging counterfeiting of U.S. banknotes. Despite the temptation and potential profit from counterfeiting, the Treasury and Federal Reserve estimate that the frequency of counterfeiting is low, approximately 1 note in 10,000 both in the United States and abroad. At Federal Reserve cash offices, during 2005, \$100 denominations had the highest frequency of counterfeit notes, at 44.1 notes per million processed, followed by \$10 denominations, at 7.8 notes per million. Overall, 6.4 counterfeit notes were detected per million notes processed.<sup>2</sup>

Technological innovations in color copying, scanning, and printing have intensified the race between increasingly sophisticated banknote counterfeiters and government banknote designers. Perhaps the most difficult-to-duplicate counterfeit deterrence feature of U.S. banknotes is its unique yellow-green paper. Combined with intaglio-printed images and numerals, U.S. currency has a unique “feel,” which surveys have reported is the most common method of counterfeit detection by the public and bank employees. Other features include magnetic ink, large detailed presidential portraits, color-shifting ink in the

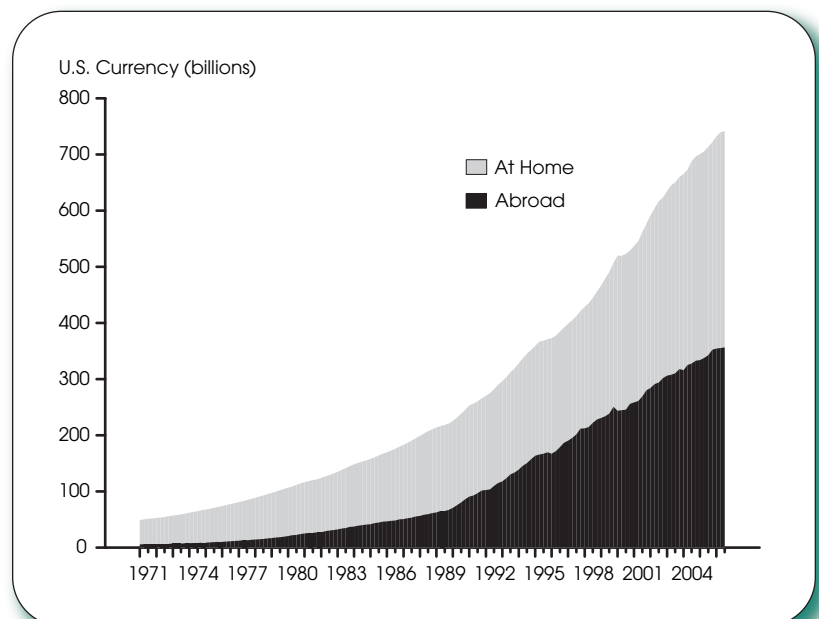
front lower-right corner of notes (the color of which differs by denomination), watermarks, security threads that glow different colors under ultraviolet light, microprinting, subtle shades of color overprinted on the front and reverse, and embedded machine-readable features.

As the design of U.S. currency has been revised through time to deter counterfeiting, an underlying principle of the Bureau of Engraving and Printing has been to retain the distinctive “American look” of U.S. banknotes: All denominations are physically the same size and use the same primary ink color. For at least 30 years, however, advocates for the visually impaired have asked for changes to make U.S. currency more accessible, including note size that varies by denomination. Any such redesign of U.S. currency would need to be studied carefully, to avoid reducing the international recognition and acceptance of U.S. currency, and be accompanied by an effective public education program to ensure its continued acceptance at home and abroad.

—Richard G. Anderson and Marcela M. Williams

<sup>1</sup> Technically, currency is a liability of the Federal Reserve Banks. But, because the Banks hold Treasury securities as specific collateral against currency and return to the Treasury nearly all the interest they receive on these bonds, for practical purposes currency may be regarded as a liability of the Treasury.

<sup>2</sup> United States Treasury Department, *The Use and Counterfeiting of United States Currency Abroad*, Part 3, September 2006.



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

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## Conventions used in this publication:

1. Unless otherwise indicated, data are monthly.
2. Shaded areas indicate recessions, as determined by the National Bureau of Economic Research.
3. *Percent change at an annual rate* is the simple, not compounded, monthly percent change multiplied by 12. For example, using consecutive months, the percent change at an annual rate in  $x$  between month  $t-1$  and the current month  $t$  is:  $[(x_t/x_{t-1})-1] \times 1200$ . Note that this differs from *National Economic Trends*. In that publication, monthly percent changes are compounded and expressed as annual growth rates.
4. The *percent change from year ago* refers to the percent change from the same period in the previous year. For example, the percent change from year ago in  $x$  between month  $t-12$  and the current month  $t$  is:  $[(x_t/x_{t-12})-1] \times 100$ .

We welcome your comments addressed to:

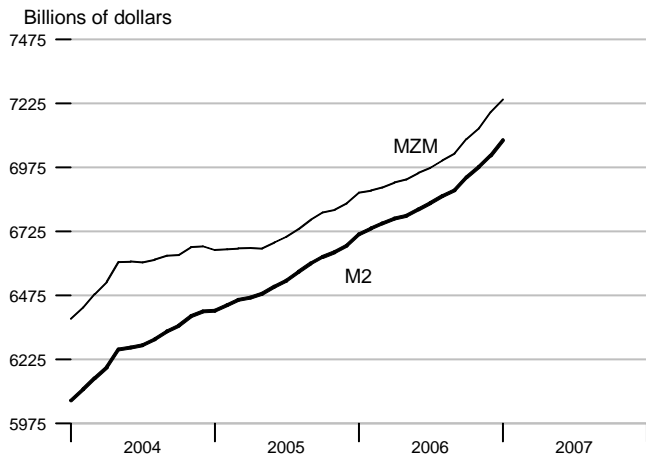
Editor, *Monetary Trends*  
Research Division  
Federal Reserve Bank of St. Louis  
P.O. Box 442  
St. Louis, MO 63166-0442

On March 23, 2006, the Board of Governors of the Federal Reserve System ceased the publication of the M3 monetary aggregate. It also ceased publishing the following components: large-denomination time deposits, RPs, and eurodollars.

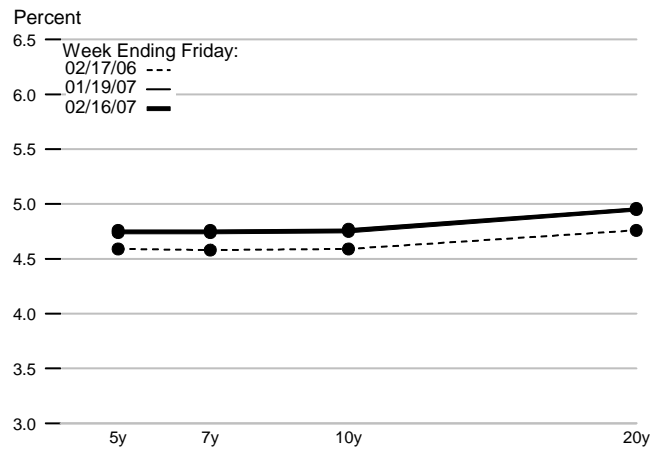
or to:

stlsFRED@stls.frb.org

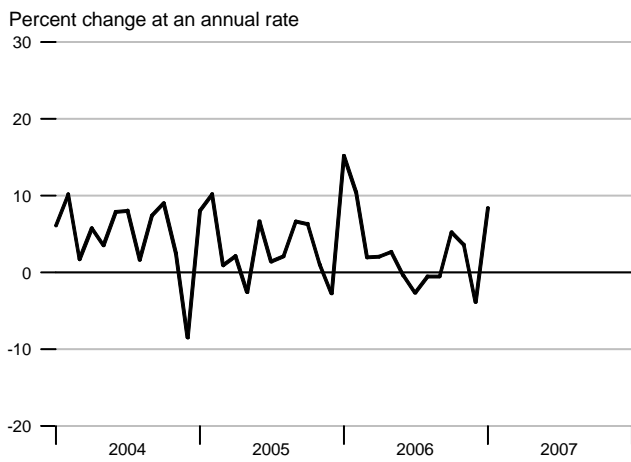
### M2 and MZM



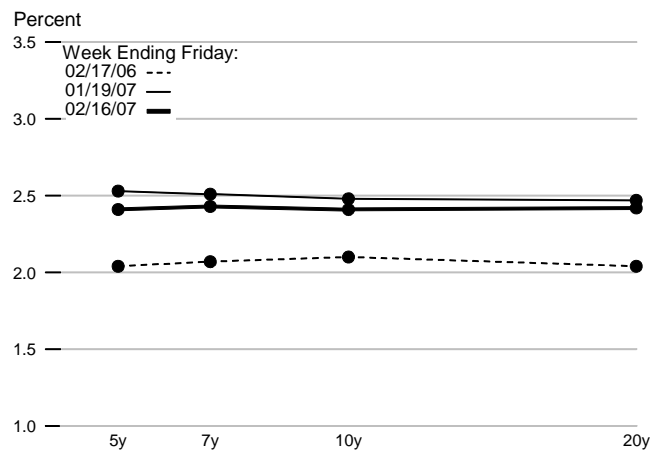
### Treasury Yield Curve



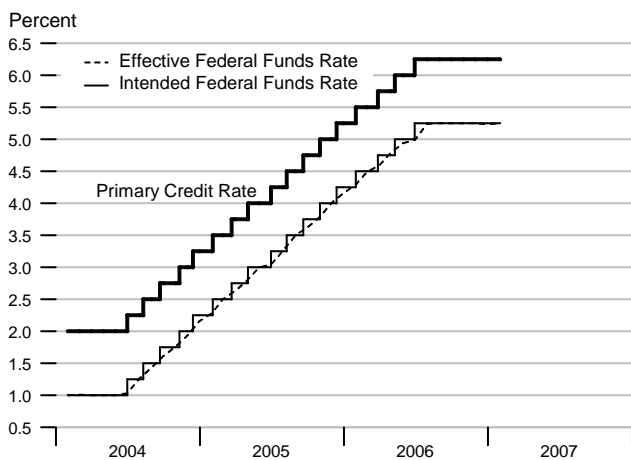
### Adjusted Monetary Base



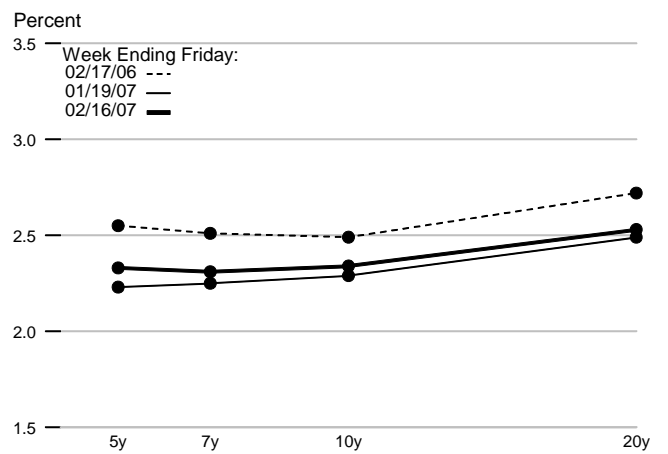
### Real Treasury Yield Curve



### Reserve Market Rates

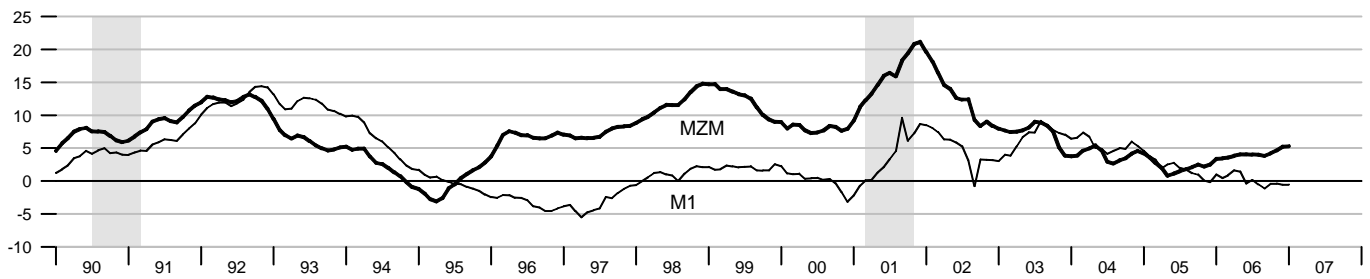


### Inflation-Indexed Treasury Yield Spreads



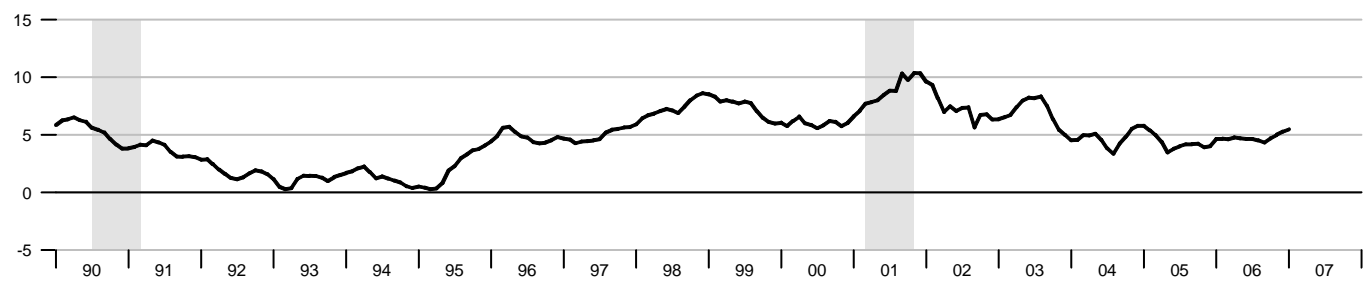
**MZM and M1**

Percent change from year ago



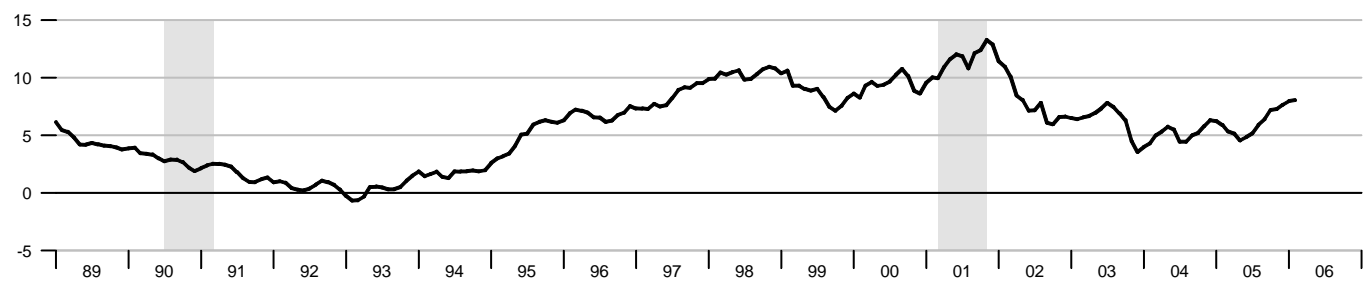
**M2**

Percent change from year ago



**M3\***

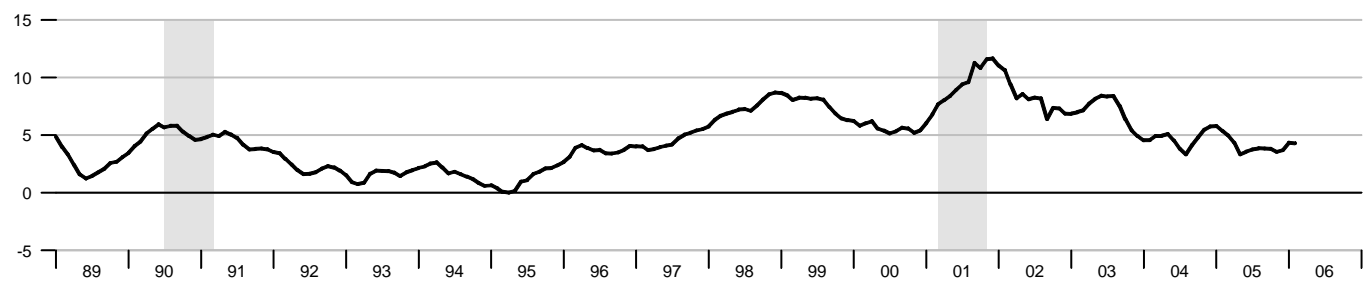
Percent change from year ago



\*See table of contents for changes to the series.

**Monetary Services Index - M2\*\***

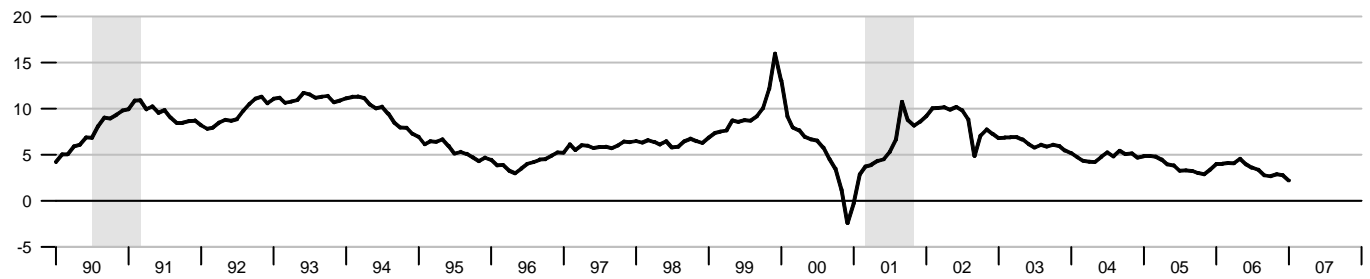
Percent change from year ago



\*\*We will not update the MSI series until we revise the code to accommodate the discontinuation of M3.

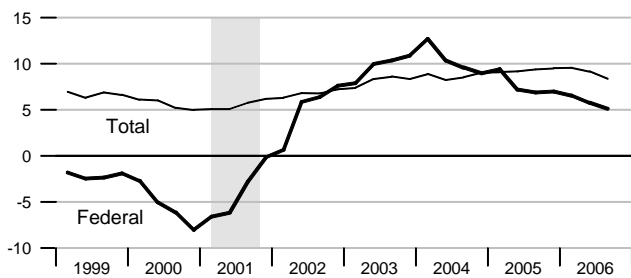
### Adjusted Monetary Base

Percent change from year ago



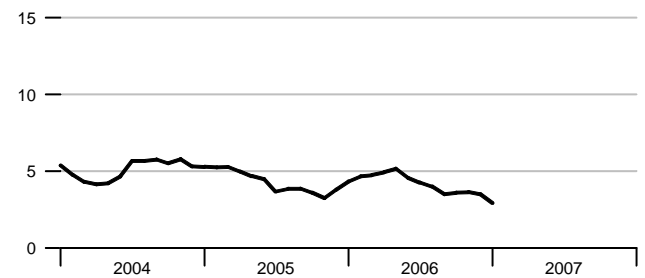
### Domestic Nonfinancial Debt

Percent change from year ago



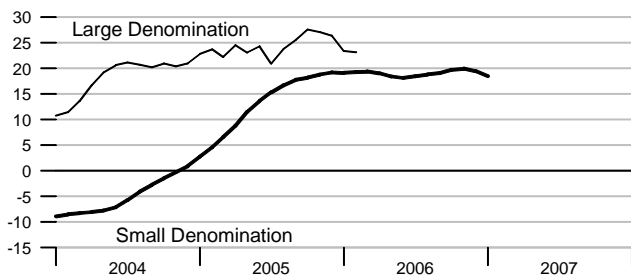
### Currency Held by the Nonbank Public

Percent change from year ago



### Time Deposits\*

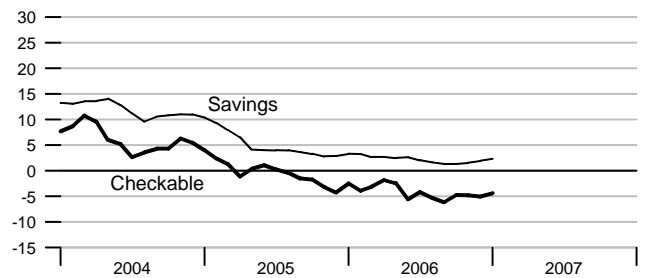
Percent change from year ago



\*See table of contents for changes to the series.

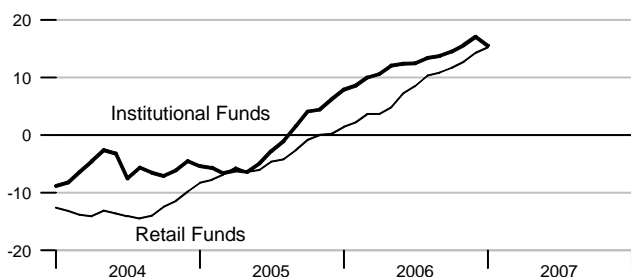
### Checkable and Savings Deposits

Percent change from year ago



### Money Market Mutual Fund Shares

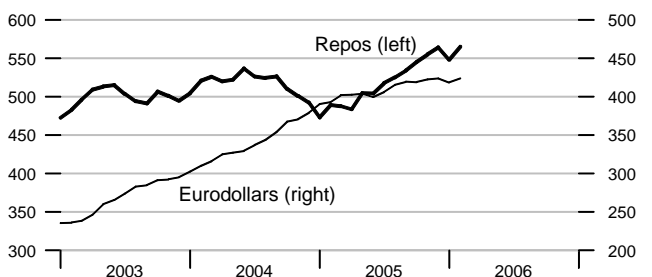
Percent change from year ago



### Repurchase Agreements and Eurodollars\*

Billions of dollars

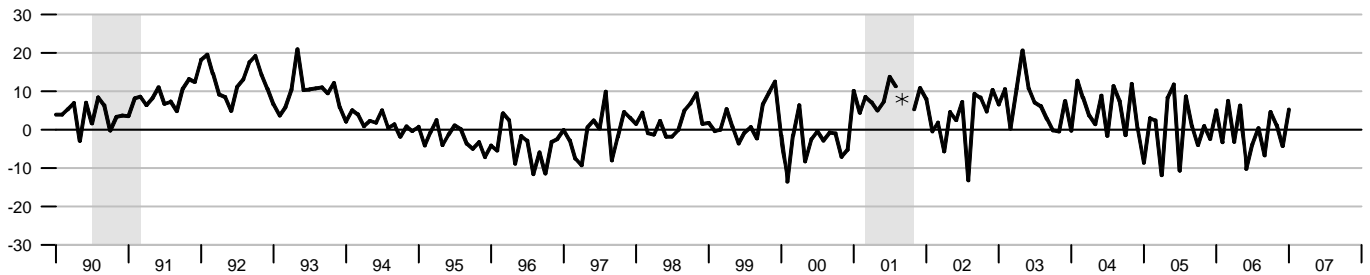
Billions of dollars



\*See table of contents for changes to these series.

**M1**

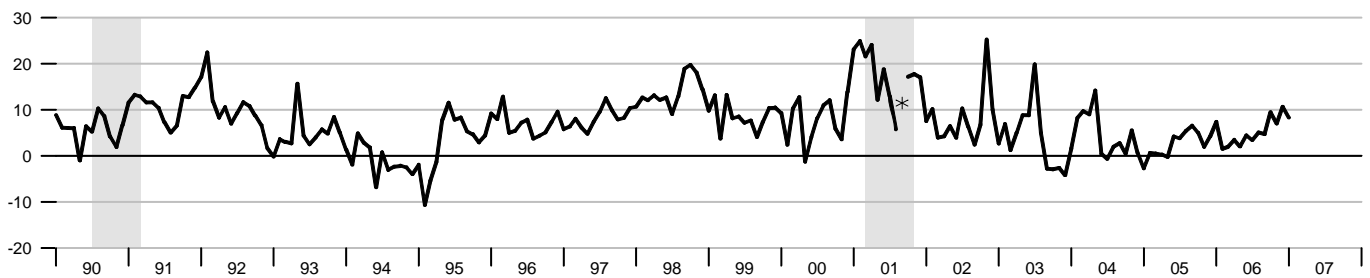
Percent change at an annual rate



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

**MZM**

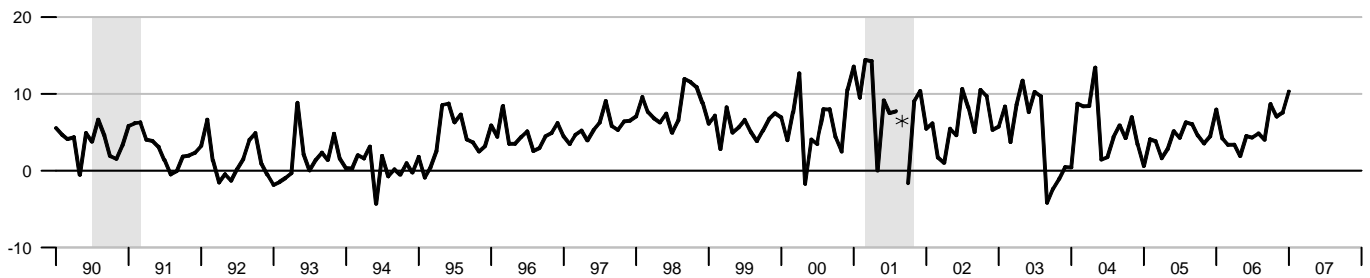
Percent change at an annual rate



\*Actual value for September 2001 is 39.41 percent rate.

**M2**

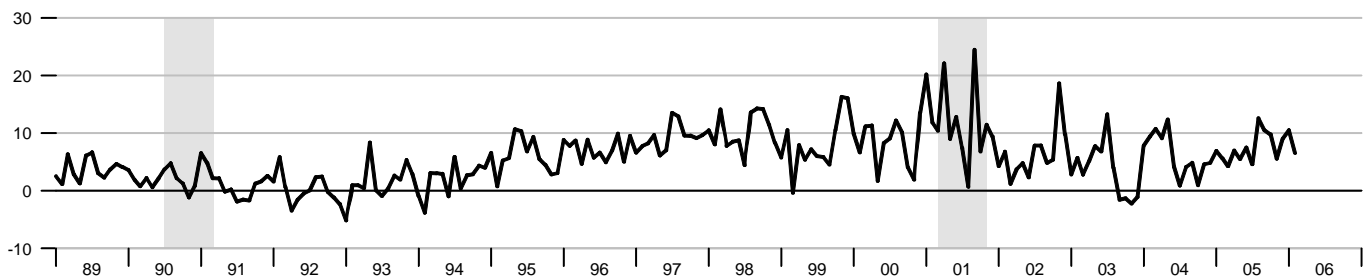
Percent change at an annual rate



\*Actual value for September 2001 is 24.90 percent rate.

**M3\***

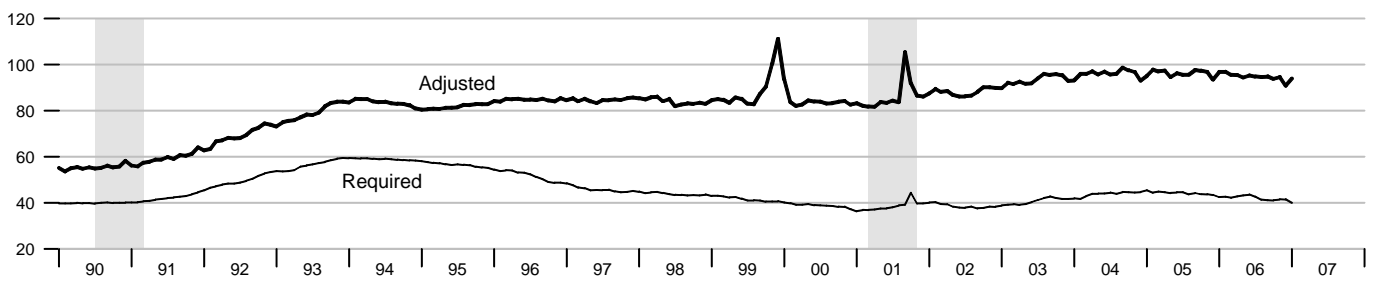
Percent change at an annual rate



\*See table of contents for changes to the series.

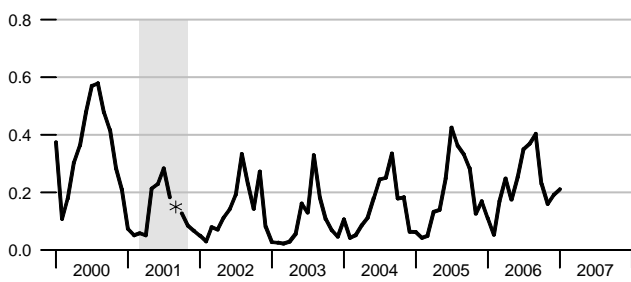
### Adjusted and Required Reserves

Billions of dollars



### Total Borrowings, nsa

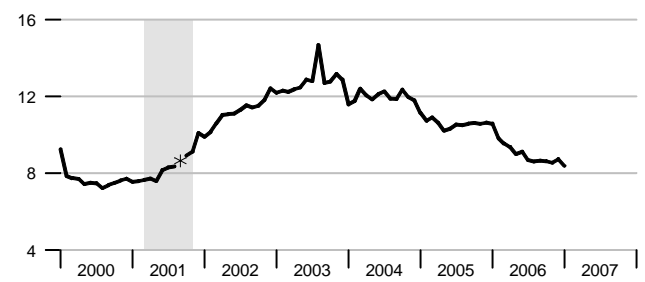
Billions of dollars



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

### Excess Reserves plus RCB Contracts

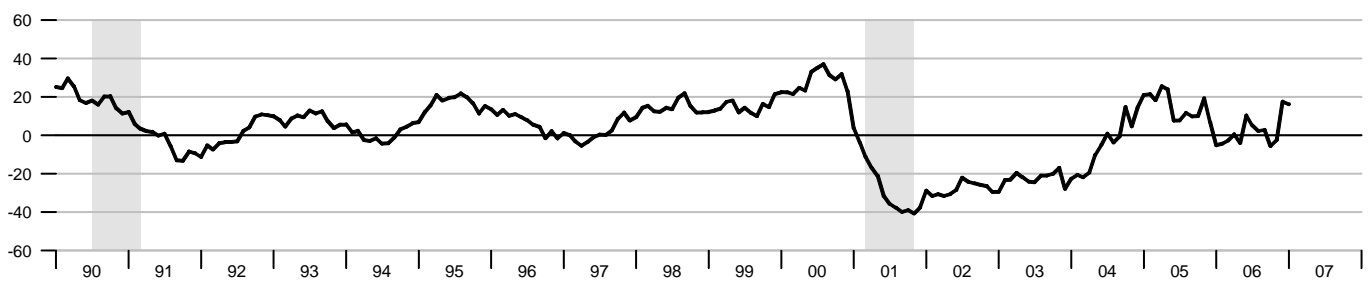
Billions of dollars



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

### Nonfinancial Commercial Paper

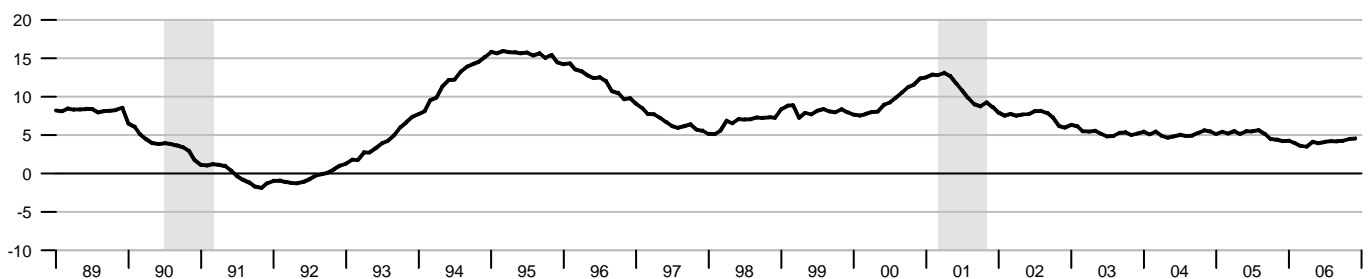
Percent change from year ago



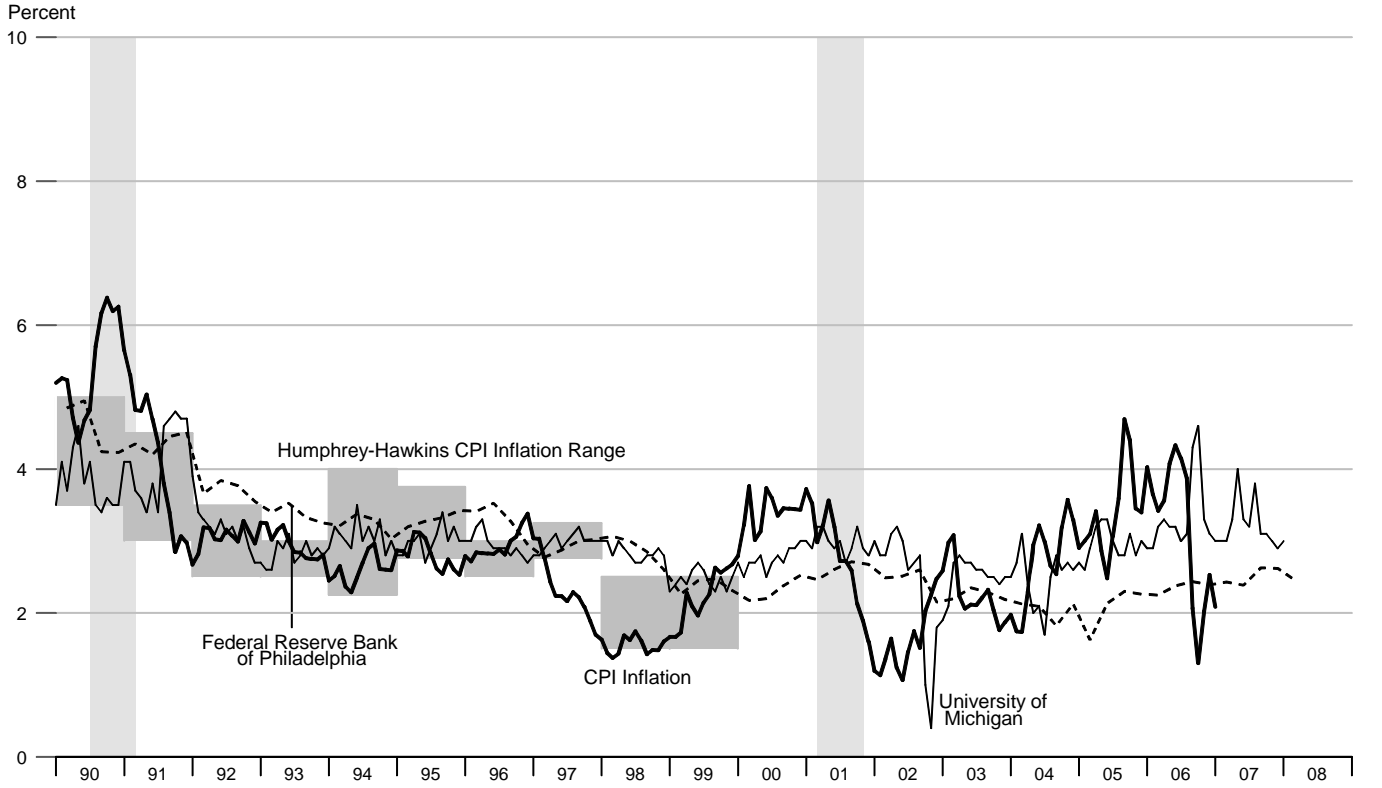
As of April 10, 2006, the Federal Reserve Board made major changes to its commercial paper calculations. For more information, please refer to <http://www.federalreserve.gov/releases/cp/about.htm>.

### Consumer Credit

Percent change from year ago

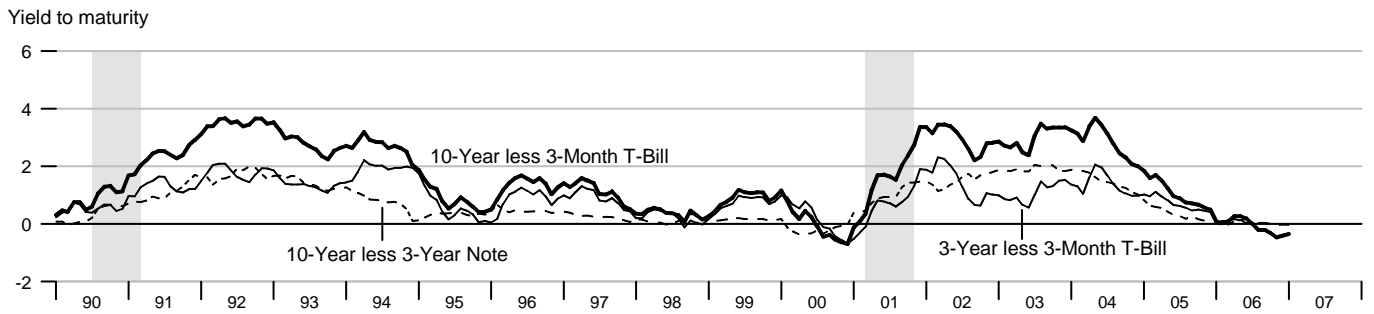


**Inflation and 1-Year-Ahead Inflation Expectations**

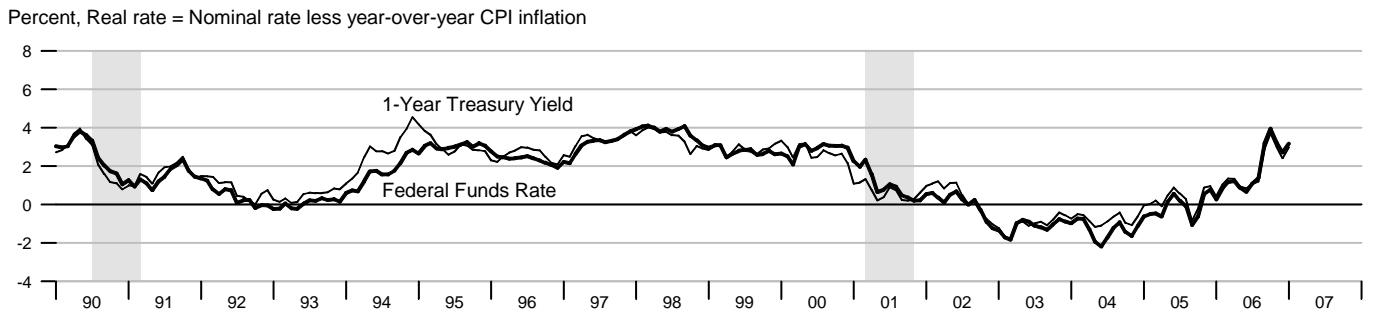


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See notes on page 19.

**Treasury Security Yield Spreads**

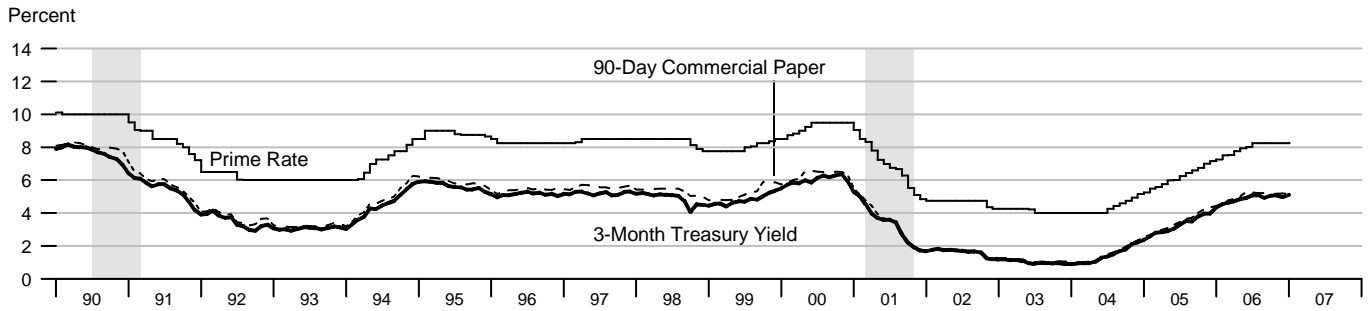


**Real Interest Rates**

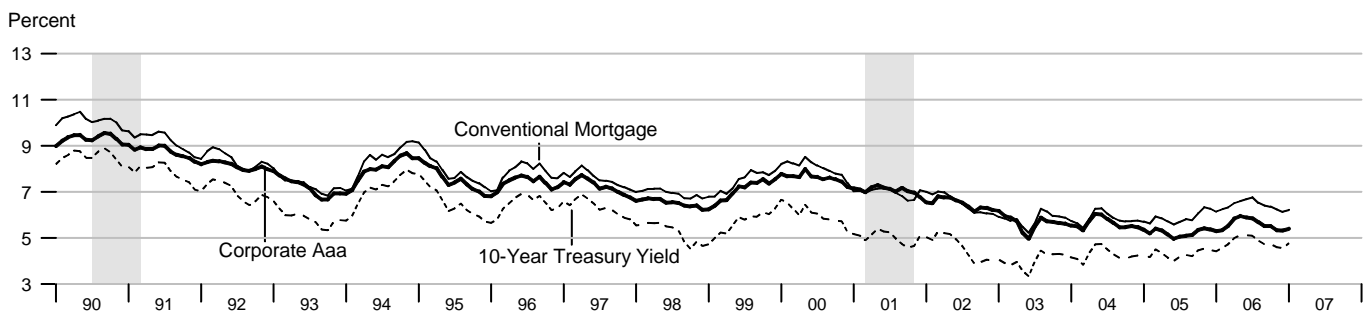




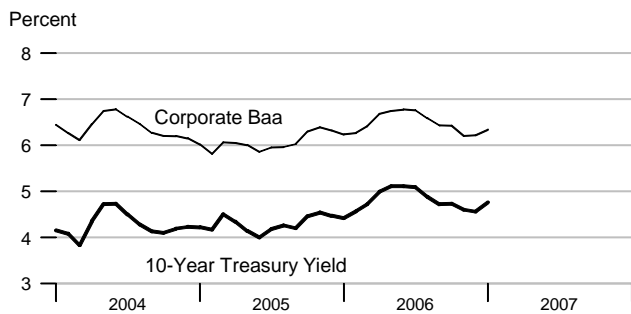
### Short-Term Interest Rates



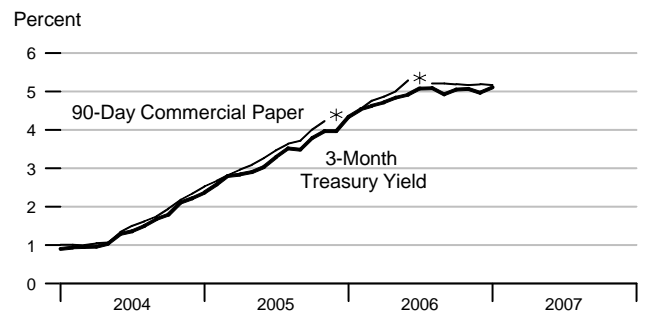
### Long-Term Interest Rates



### Long-Term Interest Rates

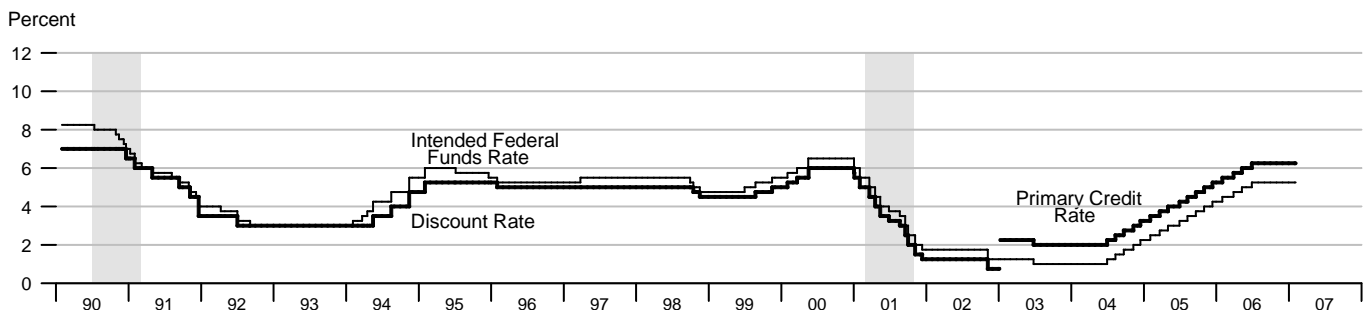


### Short-Term Interest Rates

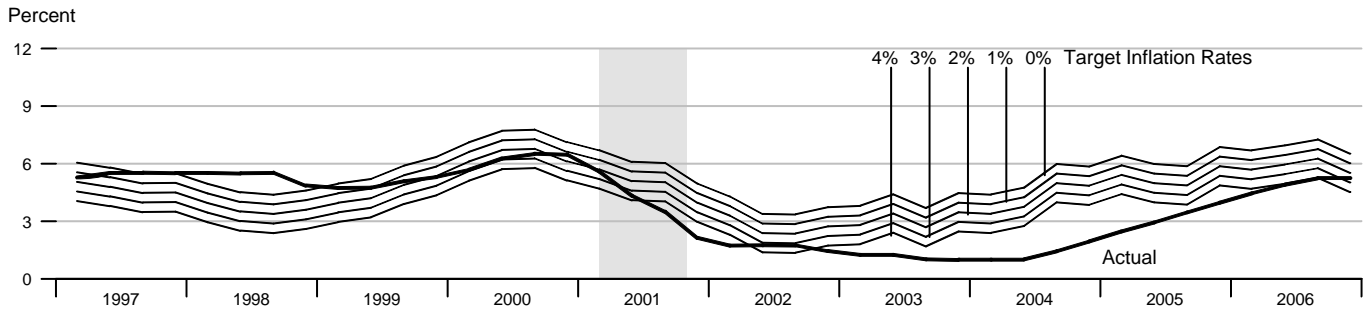


\*90-Day Commercial Paper data are not available for December 2005, January 2006, and July 2006.

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



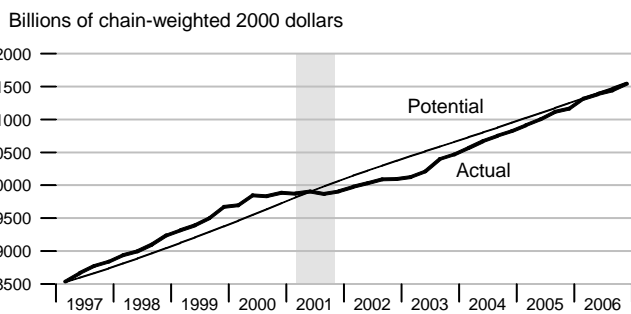
### Federal Funds Rate and Inflation Targets



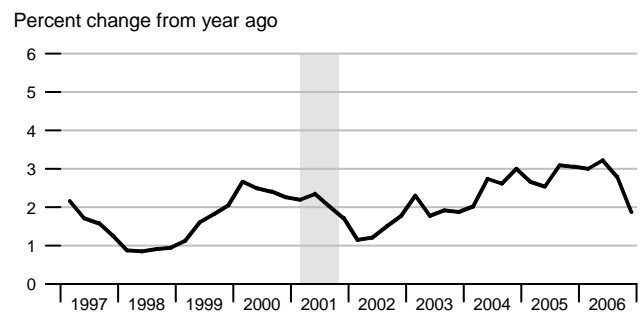
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

### Components of Taylor's Rule

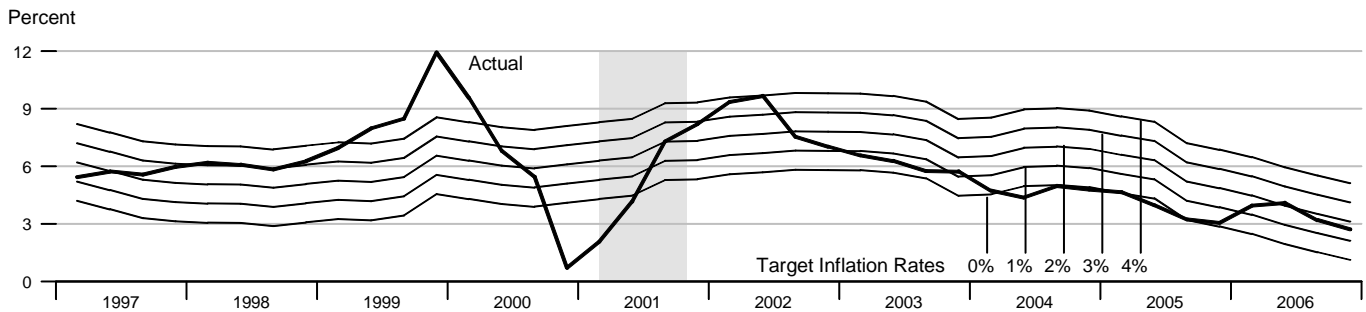
#### Actual and Potential Real GDP



#### PCE Inflation



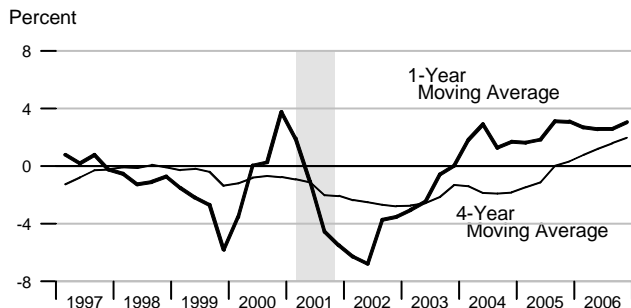
### Monetary Base Growth\* and Inflation Targets



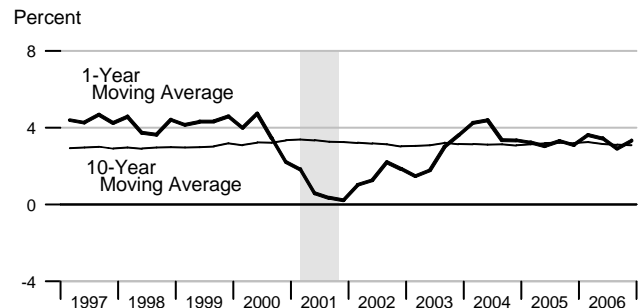
\*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

### Components of McCallum's Rule

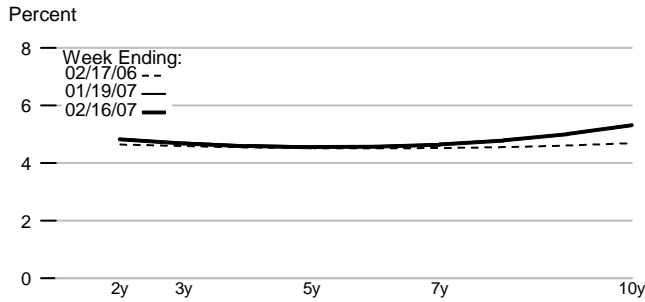
#### Monetary Base Velocity Growth



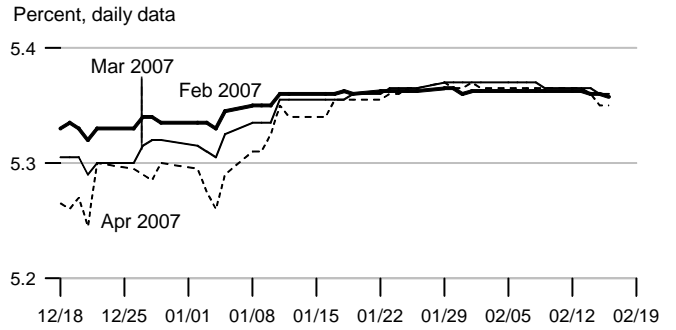
#### Real Output Growth



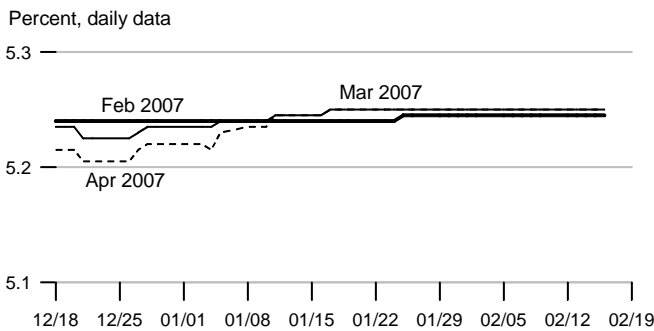
### Implied One-Year Forward Rates



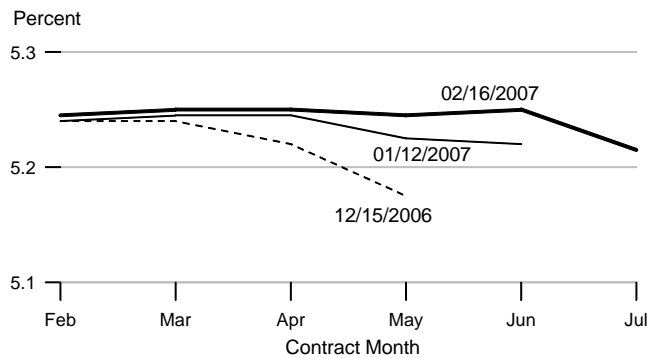
### Rates on 3-Month Eurodollar Futures



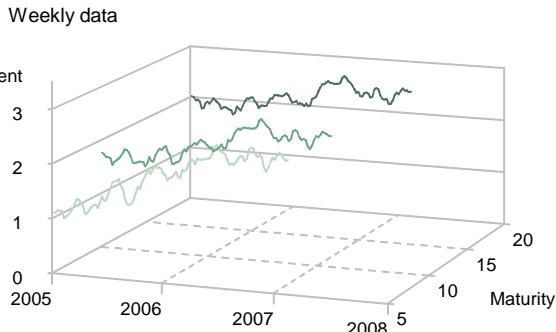
### Rates on Selected Federal Funds Futures Contracts



### Rates on Federal Funds Futures on Selected Dates

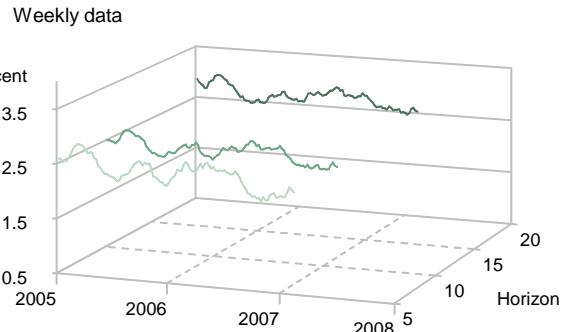


### Inflation-Indexed Treasury Securities



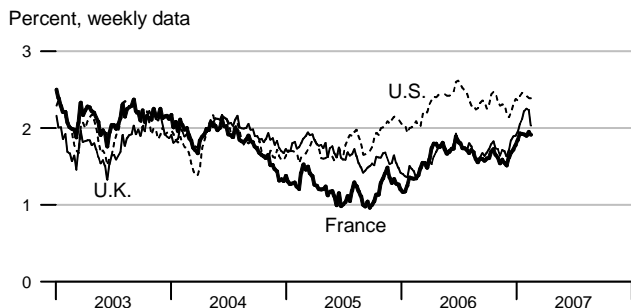
Note: Yields are inflation-indexed constant maturity U.S. Treasury securities

### Inflation-Indexed Treasury Yield Spreads

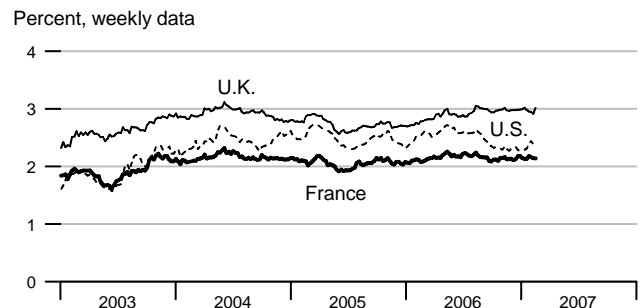


Note: Yield spread is between nominal and inflation-indexed constant maturity U.S. Treasury securities.

### Inflation-Indexed 10-Year Government Notes

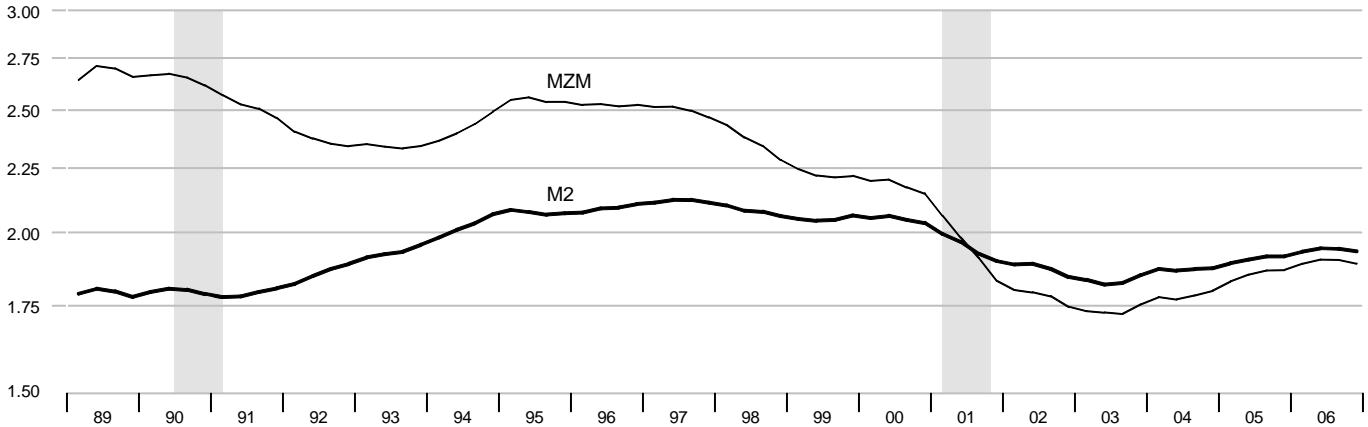


### Inflation-Indexed 10-Year Government Yield Spreads



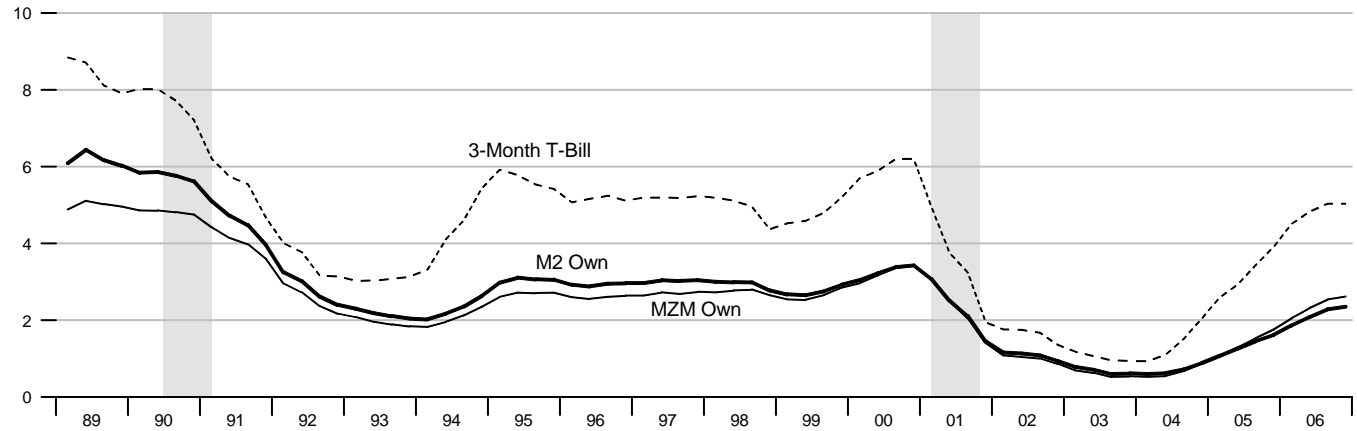
**Velocity**

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



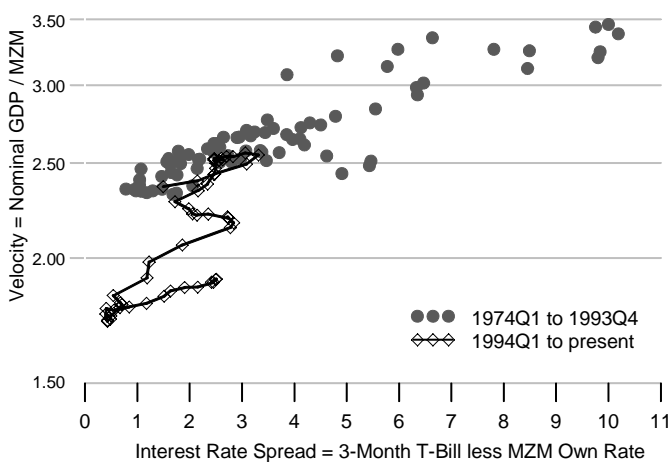
**Interest Rates**

Percent



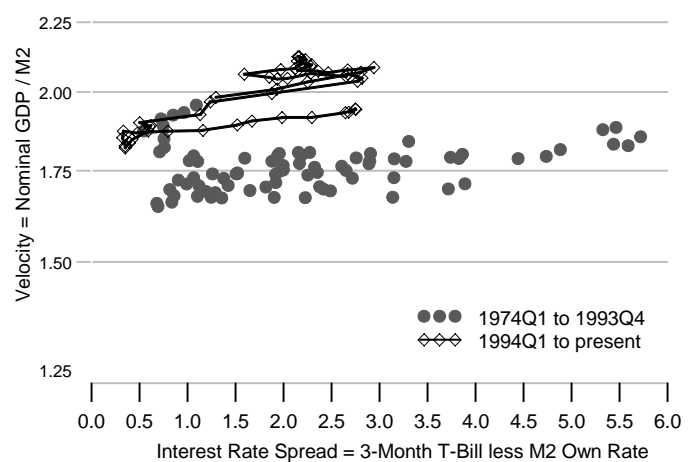
**MZM Velocity and Interest Rate Spread**

Ratio Scale



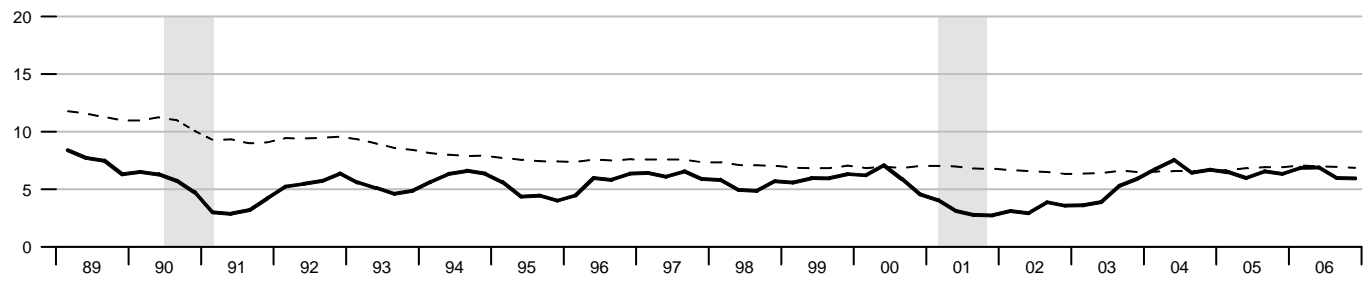
**M2 Velocity and Interest Rate Spread**

Ratio Scale



### Gross Domestic Product

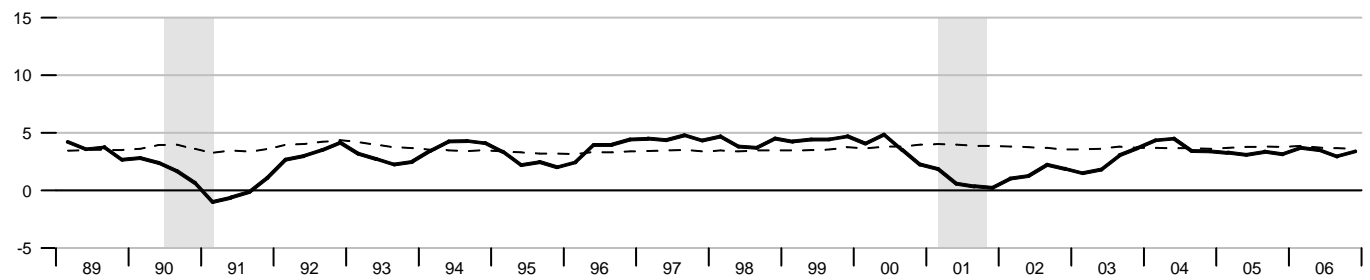
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Real Gross Domestic Product

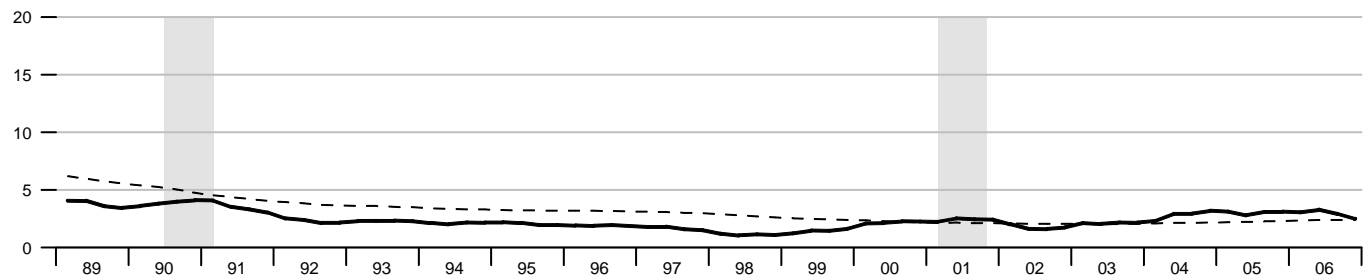
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Gross Domestic Product Price Index

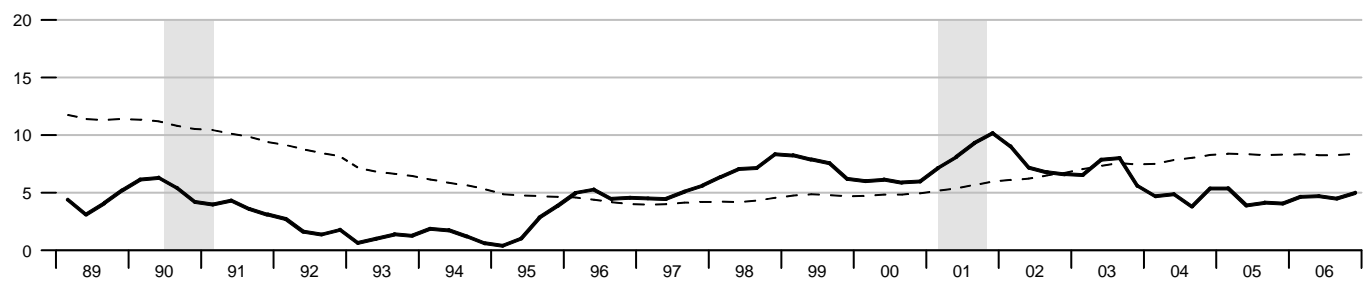
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### M2

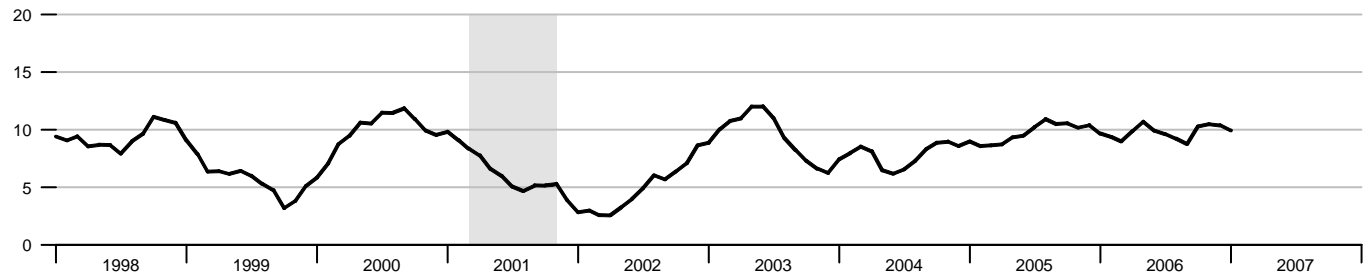
Percent change from year ago



Dashed lines indicate 10-year moving averages.

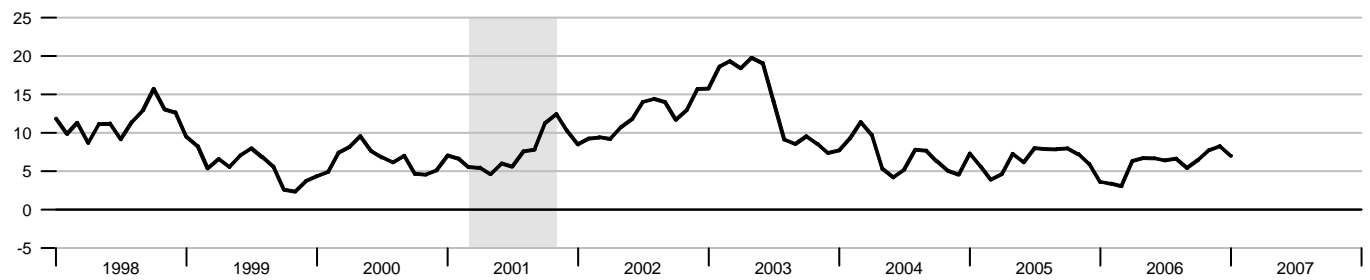
**Bank Credit**

Percent change from year ago



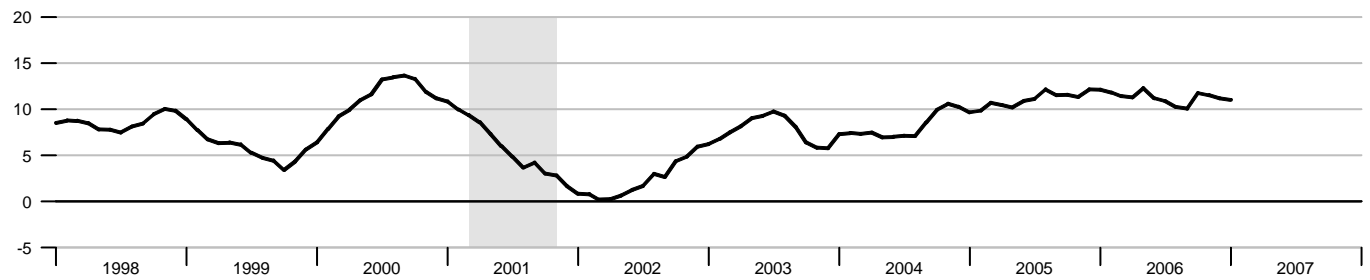
**Investment Securities in Bank Credit at Commercial Banks**

Percent change from year ago



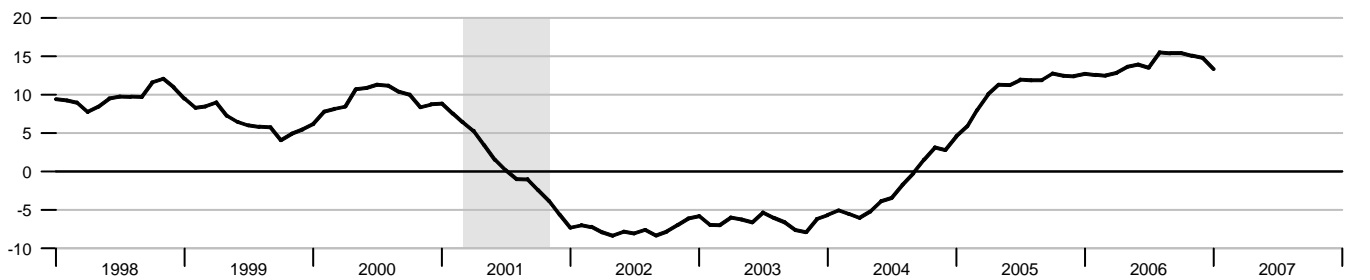
**Total Loans and Leases in Bank Credit at Commercial Banks**

Percent change from year ago

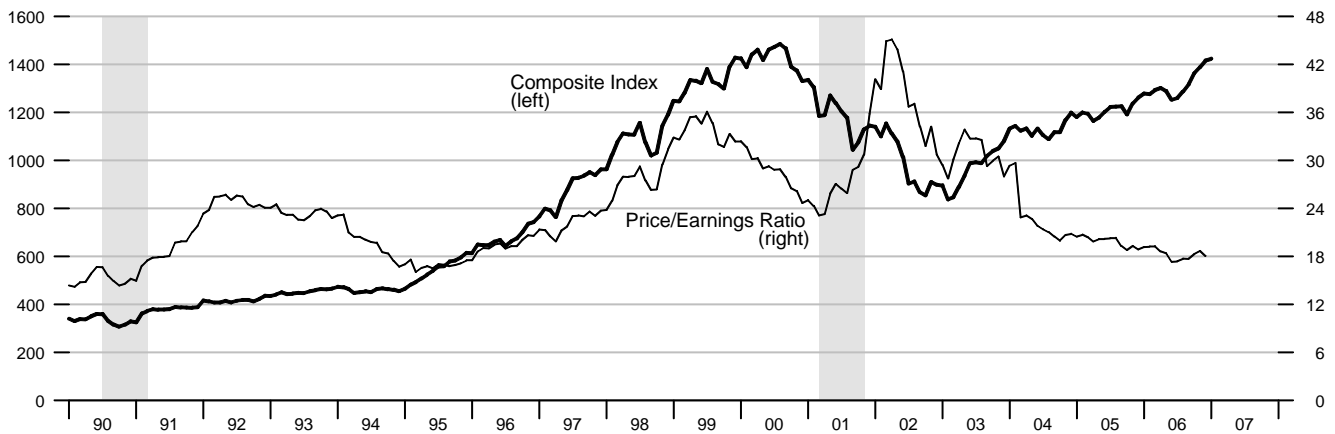


**Commercial and Industrial Loans at Commercial Banks**

Percent change from year ago



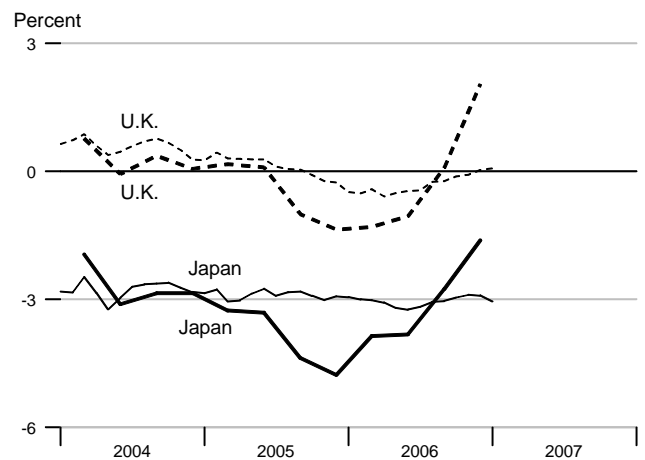
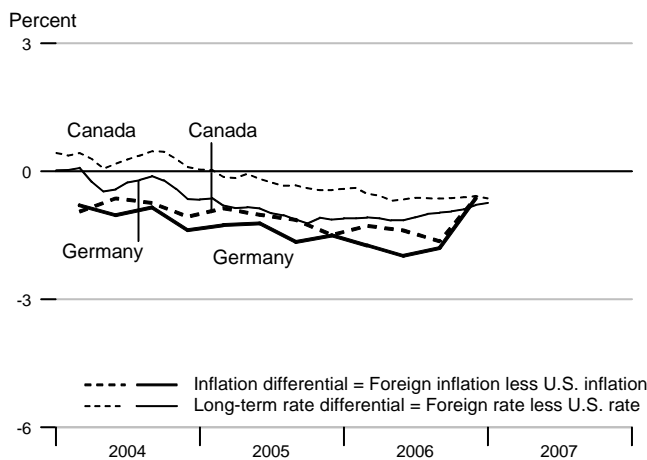
### Standard & Poor's 500



### Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2006Q1	2006Q2	2006Q3	2006Q4	Oct06	Nov06	Dec06	Jan07
United States	3.70	3.99	3.36	1.95	4.73	4.60	4.56	4.76
Canada	2.41	2.60	1.72	1.32	4.10	3.99	3.98	4.12
France	1.79	1.92	1.68	1.34	3.81	3.74	3.81	.
Germany	1.96	2.01	1.56	1.31	3.79	3.71	3.77	4.02
Italy	2.14	2.23	2.17	1.82	4.07	3.97	4.04	4.26
Japan	-0.17	0.17	0.60	0.33	1.77	1.71	1.65	1.71
United Kingdom	2.39	2.93	3.44	3.99	4.61	4.52	4.59	4.83

### Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		MSI M2**
		M1	MZM	M2	M3*	Credit	Monetary Base	Reserves	
2002		1196.221	5880.427	5590.420	8259.055	5596.859	697.092	88.158	294.080
2003		1273.495	6316.470	5981.398	8787.321	6122.609	740.929	93.313	315.192
2004		1344.523	6570.332	6261.068	9234.718	6598.753	776.711	96.069	329.873
2005		1371.916	6718.081	6533.679	9786.477	7240.309	806.316	96.246	343.539
2006		1374.384	6988.708	6841.494	10270.74	7947.978	835.026	94.858	
2004	1	1317.541	6430.325	6107.868	9003.705	6428.146	761.428	95.033	322.050
	2	1336.667	6580.376	6243.144	9223.054	6557.319	771.146	96.604	328.960
	3	1353.260	6616.365	6305.982	9316.285	6650.288	782.790	96.809	332.111
	4	1370.624	6654.261	6387.279	9395.830	6759.261	791.478	95.833	336.371
2005	1	1368.653	6655.182	6436.460	9528.052	6989.075	798.249	96.658	339.356
	2	1368.816	6666.821	6485.554	9670.405	7160.281	802.653	96.087	341.280
	3	1375.540	6735.907	6566.334	9859.294	7351.400	808.407	96.306	344.766
	4	1374.654	6814.412	6646.370	10088.16	7460.481	815.954	95.932	348.753
2006	1	1379.282	6885.658	6735.457		7641.403	830.498	96.450	
	2	1381.001	6932.477	6790.561		7887.588	836.375	95.067	
	3	1368.853	7002.194	6861.873		8027.661	834.591	94.793	
	4	1368.402	7134.503	6978.085		8235.261	838.639	93.122	
2005	Jan	1365.487	6651.878	6415.062	9487.218	6892.977	793.554	95.113	338.366
	Feb	1368.872	6655.379	6436.869	9531.592	6993.412	800.286	97.816	339.355
	Mar	1371.600	6658.290	6457.449	9565.346	7080.836	800.907	97.045	340.347
	Apr	1358.047	6659.929	6466.210	9620.909	7106.255	802.318	97.428	340.663
	May	1367.503	6658.588	6481.326	9665.013	7158.975	800.604	94.599	340.941
	Jun	1380.899	6681.947	6509.125	9725.292	7215.612	805.036	96.233	342.235
	Jul	1368.639	6703.395	6532.400	9762.435	7281.550	805.982	95.547	343.275
	Aug	1378.512	6733.756	6566.686	9864.629	7362.023	807.394	95.653	344.739
	Sep	1379.468	6770.569	6599.917	9950.818	7410.626	811.844	97.717	346.285
	Oct	1374.862	6798.996	6625.042	10031.96	7429.660	816.118	97.365	347.590
	Nov	1375.926	6810.169	6644.661	10078.49	7450.046	816.800	96.884	348.603
	Dec	1373.174	6834.070	6669.406	10154.03	7501.737	814.944	93.546	350.067
2006	Jan	1378.910	6876.044	6713.576	10242.79	7558.822	825.252	96.870	353.032
	Feb	1375.180	6884.778	6736.964	10298.68	7647.898	832.441	96.900	353.943
	Mar	1383.756	6896.153	6755.831		7717.490	833.802	95.581	
	Apr	1380.106	6916.075	6774.880		7808.002	835.232	95.498	
	May	1387.342	6927.894	6785.656		7923.814	837.094	94.404	
	Jun	1375.554	6953.462	6811.148		7930.947	836.799	95.298	
	Jul	1371.107	6973.428	6835.747		7981.895	834.952	94.851	
	Aug	1371.547	7002.825	6863.383		8040.927	834.582	94.642	
	Sep	1363.904	7030.328	6886.488		8060.160	834.239	94.885	
	Oct	1369.138	7085.705	6936.237		8192.834	837.860	93.865	
	Nov	1370.463	7127.241	6977.026		8231.036	840.377	94.620	
	Dec	1365.605	7190.562	7020.992		8281.914	837.679	90.880	
2007	Jan	1371.566	7240.402	7081.318		8309.621	843.529	93.978	

Note: All values are given in billions of dollars. \*See table of contents for changes to the series.

\*\*We will not update the MSI series until we revise the code to accommodate the discontinuation of M3.



		Federal Funds	Primary Credit Rate	Prime Rate	3-mo CDs	Treasury Yields			Corporate Aaa Bonds	Municipal Aaa Bonds	Conventional Mortgage
						3-mo	3-yr	10-yr			
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
2005		3.21	4.19	6.19	3.51	3.21	3.93	4.29	5.23	4.28	5.86
2006		4.96	5.96	7.96	5.15	4.85	4.77	4.79	5.59	4.15	6.41
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
	3	3.46	4.43	6.43	3.74	3.43	3.98	4.21	5.09	4.28	5.76
	4	3.98	4.97	6.97	4.30	3.91	4.37	4.49	5.38	4.45	6.22
2006	1	4.46	5.43	7.43	4.72	4.50	4.58	4.57	5.39	4.29	6.24
	2	4.91	5.90	7.90	5.18	4.83	4.98	5.07	5.89	4.36	6.60
	3	5.25	6.25	8.25	5.39	5.03	4.87	4.90	5.68	4.13	6.56
	4	5.25	6.25	8.25	5.32	5.03	4.65	4.63	5.39	3.82	6.24
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	4.18	5.70
	Aug	3.50	4.44	6.44	3.77	3.52	4.08	4.26	5.09	4.33	5.82
	Sep	3.62	4.59	6.59	3.87	3.49	3.96	4.20	5.13	4.34	5.77
	Oct	3.78	4.75	6.75	4.13	3.79	4.29	4.46	5.35	4.49	6.07
	Nov	4.00	5.00	7.00	4.31	3.97	4.43	4.54	5.42	4.42	6.33
	Dec	4.16	5.15	7.15	4.45	3.97	4.39	4.47	5.37	4.46	6.27
2006	Jan	4.29	5.26	7.26	4.56	4.34	4.35	4.42	5.29	4.27	6.15
	Feb	4.49	5.50	7.50	4.72	4.54	4.64	4.57	5.35	4.33	6.25
	Mar	4.59	5.53	7.53	4.88	4.63	4.74	4.72	5.53	4.29	6.32
	Apr	4.79	5.75	7.75	5.03	4.72	4.89	4.99	5.84	4.36	6.51
	May	4.94	5.93	7.93	5.15	4.84	4.97	5.11	5.95	4.38	6.60
	Jun	4.99	6.02	8.02	5.35	4.92	5.09	5.11	5.89	4.35	6.68
	Jul	5.24	6.25	8.25	5.46	5.08	5.07	5.09	5.85	4.41	6.76
	Aug	5.25	6.25	8.25	5.38	5.09	4.85	4.88	5.68	4.10	6.52
	Sep	5.25	6.25	8.25	5.34	4.93	4.69	4.72	5.51	3.87	6.40
	Oct	5.25	6.25	8.25	5.33	5.05	4.72	4.73	5.51	3.91	6.36
	Nov	5.25	6.25	8.25	5.32	5.07	4.64	4.60	5.33	3.81	6.24
	Dec	5.24	6.25	8.25	5.32	4.97	4.58	4.56	5.32	3.76	6.14
2007	Jan	5.25	6.25	8.25	5.32	5.11	4.79	4.76	5.40	3.89	6.22

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

		M1	MZM	M2	M3*
<b>Percent change at an annual rate</b>					
2002		4.91	12.76	7.38	7.98
2003		6.46	7.42	6.99	6.40
2004		5.58	4.02	4.68	5.09
2005		2.04	2.25	4.35	5.97
2006		0.18	4.03	4.71	4.95
<hr/>					
2004	1	5.31	2.22	3.01	5.43
	2	5.81	9.33	8.86	9.74
	3	4.97	2.19	4.03	4.04
	4	5.13	2.29	5.16	3.42
2005	1	-0.58	0.06	3.08	5.63
	2	0.05	0.70	3.05	5.98
	3	1.96	4.15	4.98	7.81
	4	-0.26	4.66	4.88	9.29
2006	1	1.35	4.18	5.36	
	2	0.50	2.72	3.27	
	3	-3.52	4.02	4.20	
	4	-0.13	7.56	6.77	
<hr/>					
2005	Jan	-8.60	-2.69	0.62	6.90
	Feb	2.97	0.63	4.08	5.61
	Mar	2.39	0.52	3.84	4.25
	Apr	-11.86	0.30	1.63	6.97
	May	8.36	-0.24	2.81	5.50
	Jun	11.76	4.21	5.15	7.48
	Jul	-10.65	3.85	4.29	4.58
	Aug	8.66	5.44	6.30	12.56
	Sep	0.83	6.56	6.07	10.48
	Oct	-4.01	5.04	4.57	9.79
	Nov	0.93	1.97	3.55	5.57
	Dec	-2.40	4.21	4.47	8.99
<hr/>					
2006	Jan	5.01	7.37	7.95	10.49
	Feb	-3.25	1.52	4.18	6.55
	Mar	7.48	1.98	3.36	
	Apr	-3.17	3.47	3.38	
	May	6.29	2.05	1.91	
	Jun	-10.20	4.43	4.51	
	Jul	-3.88	3.45	4.33	
	Aug	0.39	5.06	4.85	
	Sep	-6.69	4.71	4.04	
	Oct	4.61	9.45	8.67	
	Nov	1.16	7.03	7.06	
	Dec	-4.25	10.66	7.56	
<hr/>					
2007	Jan	5.24	8.32	10.31	

\*See table of contents for changes to the series.

## 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](http://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](http://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** and **Real Treasury Yield Curve** show constant maturity yields calculated by the U.S. Treasury for securities 5, 7, 10, and 20 years to maturity. **Inflation-Indexed Treasury Yield Spreads** are a

measure of inflation compensation at those horizons, and it is simply the nominal constant maturity yield less the real constant maturity yield. Daily data and descriptions are available at [research.stlouisfed.org/fred2/](http://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 year-over-year 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,  $\pi_{t-1}$  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  $\Delta MB_t^*$  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](http://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 and Yield Spreads** are those plotted on page 3. **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 7/15/2016. **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](http://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/](http://research.stlouisfed.org/publications/review/).