

## Another Window: The Term Auction Facility

**O**n December 12, 2007, the Federal Reserve and four other central banks announced they were taking measures to alleviate pressures in short-term financial markets. One measure the Federal Reserve instituted was the establishment of a temporary Term Auction Facility (TAF), designed to lend funds directly to depository institutions for a fixed term (thus far, for 28 or 35 days). Two auctions of term loans were held in December, two were held in January 2008, and two more were held in February 2008. Although the TAF is a temporary program, the Fed announced that it is considering a permanent facility for auctioning term credit.<sup>1</sup>

The TAF was created in part because the volume of discount window borrowing has remained low despite persistent stress in interbank lending markets, possibly because of a perceived stigma associated with such borrowing. Moreover, most discount window loans have been overnight loans, even though restrictions on discount window loans were relaxed on August 17, 2007, to permit loans of up to 30 days. The TAF offers an anonymous source of term funds without the stigma attached to discount window borrowing.

TAF loans are made against any collateral that is normally accepted for discount window loans. However, the operations of the TAF and the discount window program differ in several respects. Traditional discount window loans are made at interest rates set by the Federal Reserve, with no limits on the aggregate volume of loans that can be extended on any given date. By contrast, under the TAF, the Federal Reserve determines in advance the dollar amount of funds it will lend at each auction and the interest rate charged on those loans is determined from the auction itself.<sup>2</sup> For example, at its auction on December 17, 2007, the Federal Reserve offered \$20 billion with a 28-day term and received bids totaling \$61.553 billion. Bids offering the highest interest rates were accepted until the full \$20 billion had been allocated, though all successful bids were funded at the lowest accepted bid rate (4.65 percent).

Has the TAF helped ease financial market pressures? Short-term financial markets began to show signs of substantial strain in August 2007, as rising U.S. mortgage defaults caused market participants to question the values of asset-backed securities and the net worth of institutions that

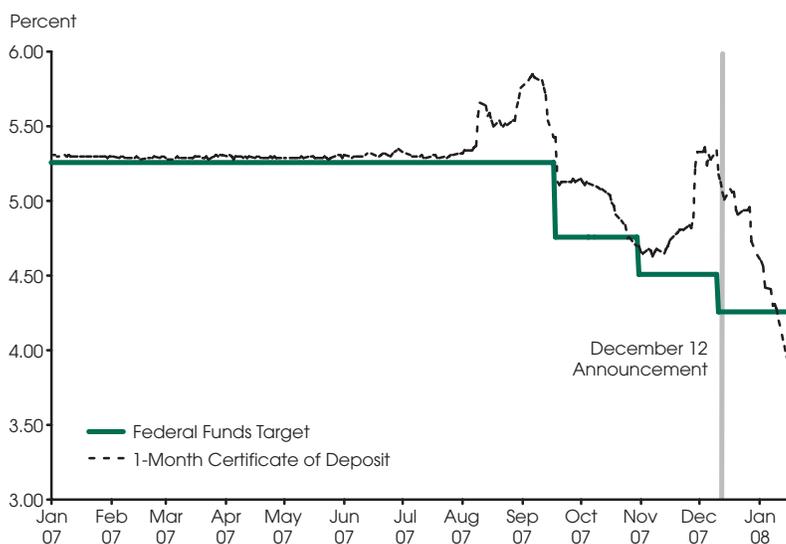
hold those securities. One indication of the scramble for liquidity, shown in the chart, was a sharp increase in the interest rates offered by banks on one-month bank certificates of deposit relative to the Federal Reserve's federal funds rate target. Although money market pressures eased in September and October, strains in the markets reappeared in November and early December. Once again, term deposit rates rose sharply even though market forecasters expected the Fed to lower its federal funds rate target. Market interest rates generally fell after the December 12 announcement, suggesting that market participants viewed the coordinated central bank action as likely to ease money market pressures, especially during the year-end period when the demand for liquidity typically is high. The impact of the auctions themselves is difficult to determine, however, as seasonal patterns, expectations of future monetary policy actions, and other factors all influence interest rates and other indicators of financial market conditions.

—David C. Wheelock

<sup>1</sup> Board of Governors of the Federal Reserve System press release, December 12, 2007: [www.federalreserve.gov/newsevents/press/monetary/20071212a.htm](http://www.federalreserve.gov/newsevents/press/monetary/20071212a.htm).

<sup>2</sup> See [www.federalreserve.gov/monetarypolicy/taf.htm](http://www.federalreserve.gov/monetarypolicy/taf.htm).

**Federal Funds Target and 1-Month Certificate of Deposit Rates**



NOTE: Daily Data, January 02, 2007 thru January 18, 2008.

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

# Contents

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## Page

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

## Conventions used in this publication:

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

We welcome your comments addressed to:

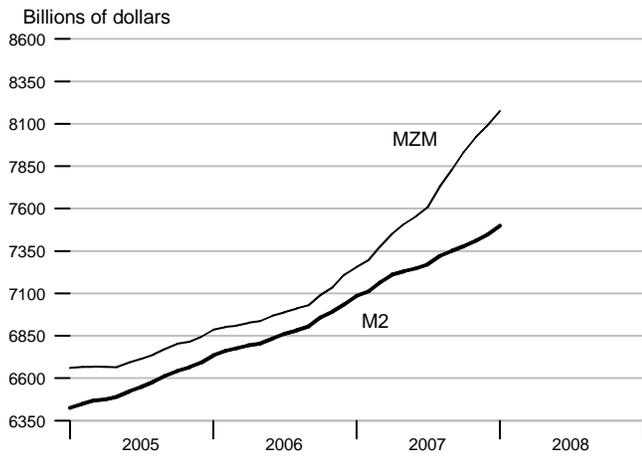
Editor, *Monetary Trends*  
Research Division  
Federal Reserve Bank of St. Louis  
P.O. Box 442  
St. Louis, MO 63166-0442

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.

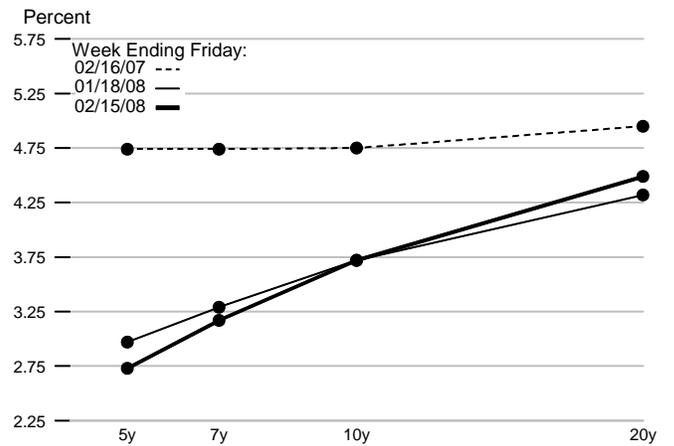
or to:

stlsFRED@stls.frb.org

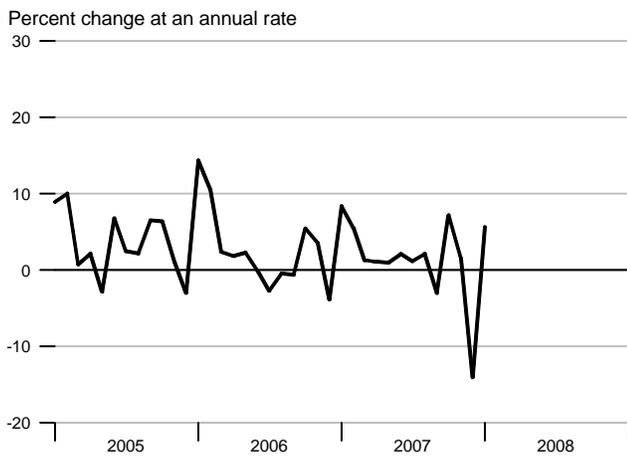
### M2 and MZM



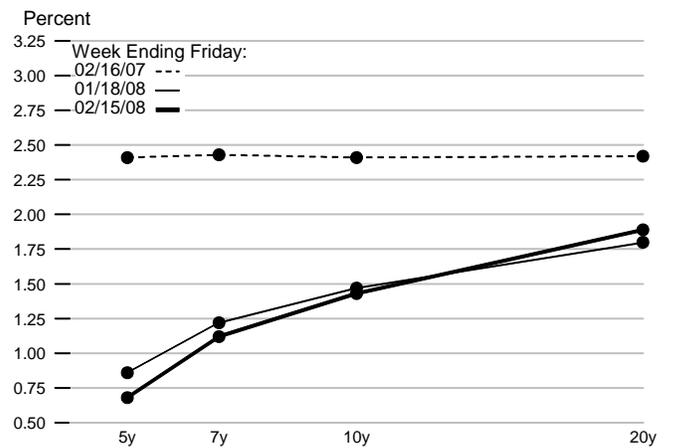
### Treasury Yield Curve



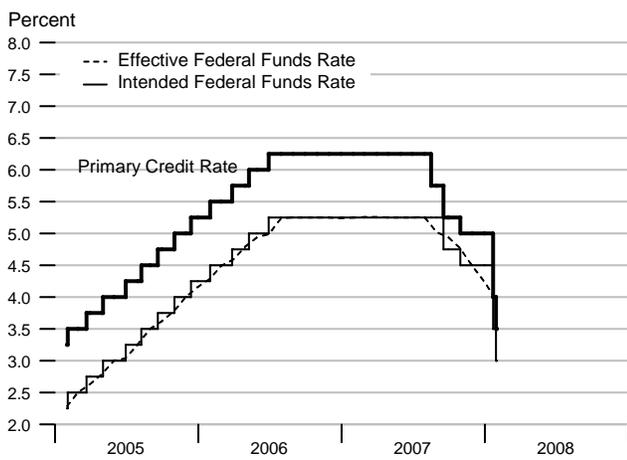
### Adjusted Monetary Base



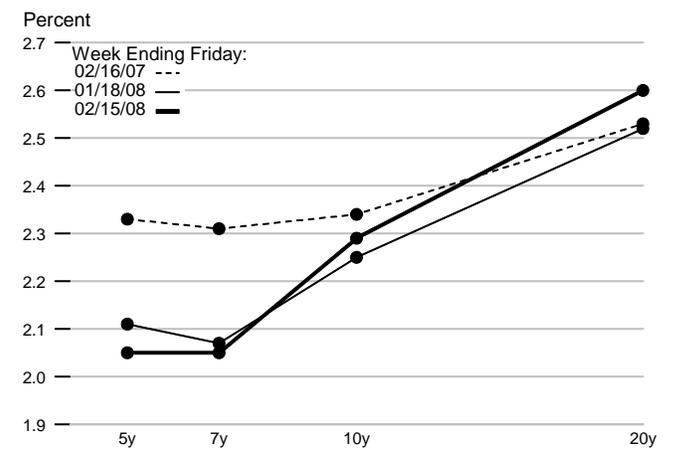
### Real Treasury Yield Curve



### Reserve Market Rates



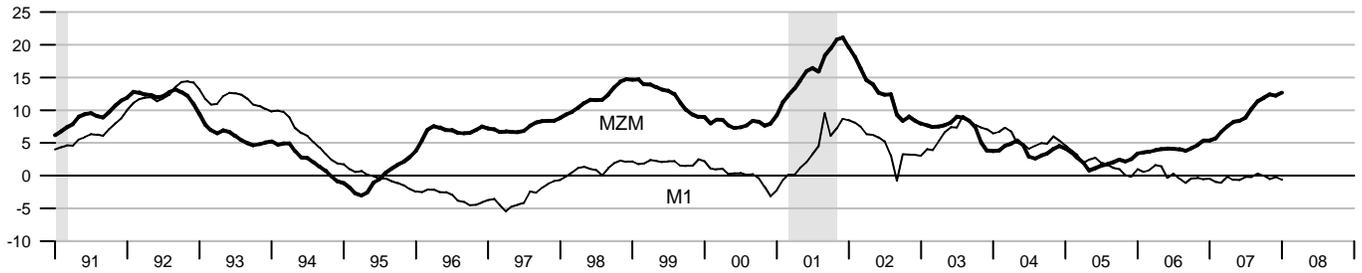
### Inflation-Indexed Treasury Yield Spreads



Data available as of January 2008.

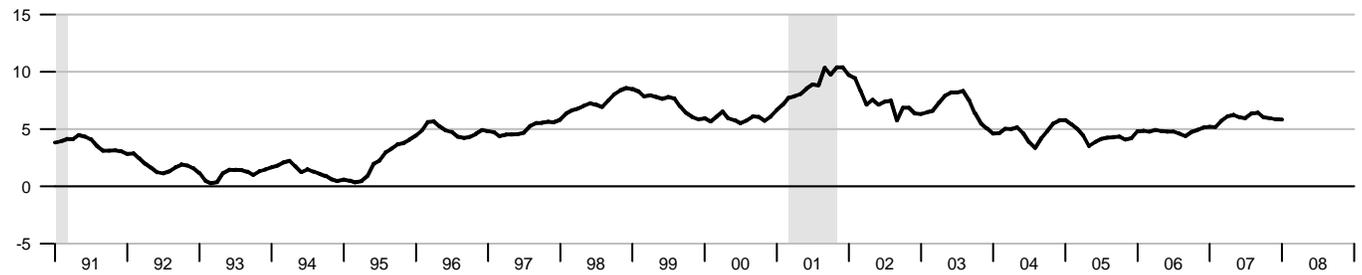
**MZM and M1**

Percent change from year ago



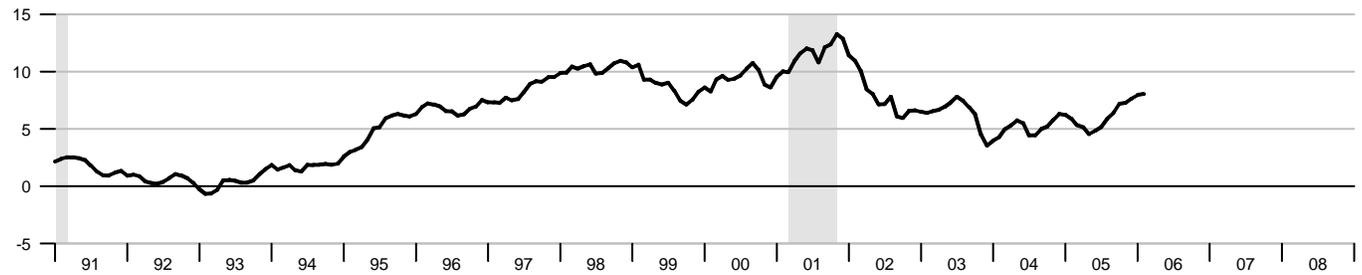
**M2**

Percent change from year ago



**M3\***

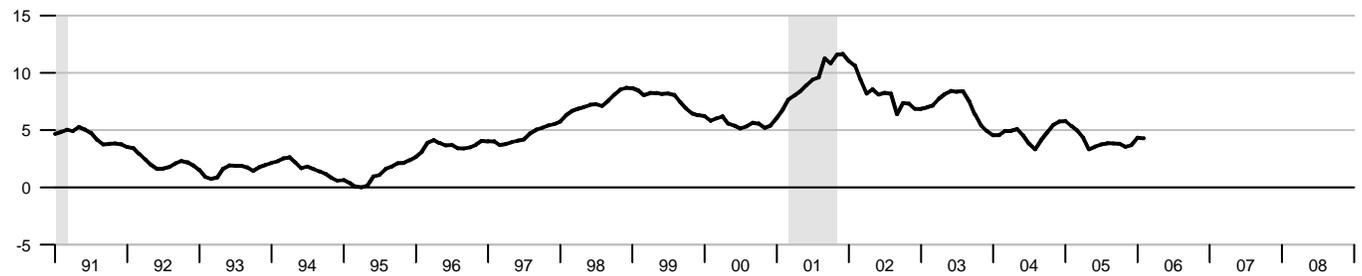
Percent change from year ago



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

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

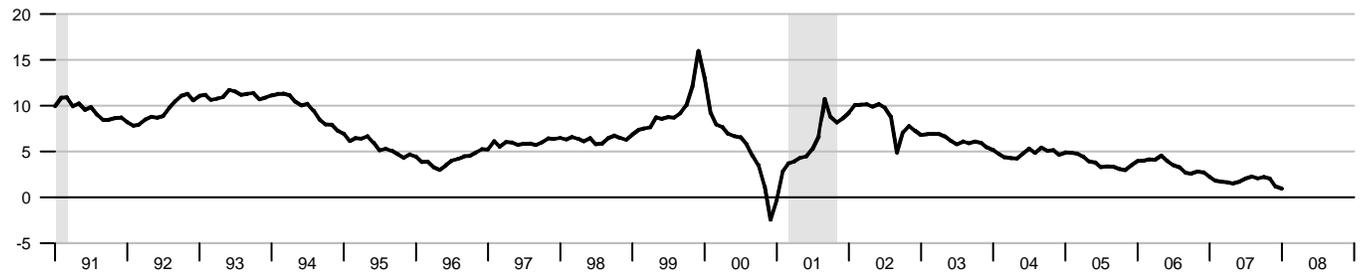
Percent change from year ago



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

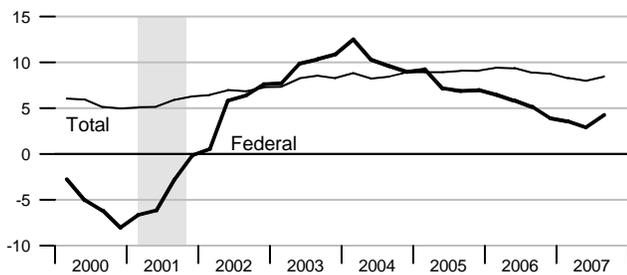
### Adjusted Monetary Base

Percent change from year ago



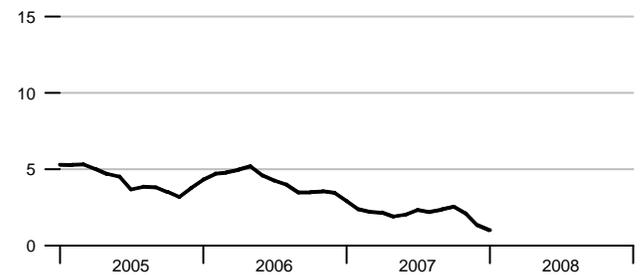
### Domestic Nonfinancial Debt

Percent change from year ago



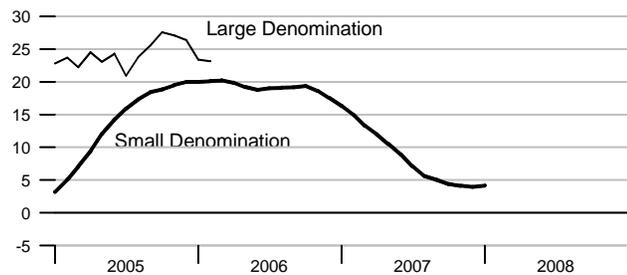
### Currency Held by the Nonbank Public

Percent change from year ago



### Time Deposits\*

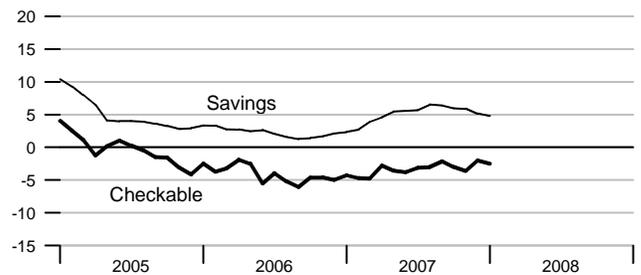
Percent change from year ago



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

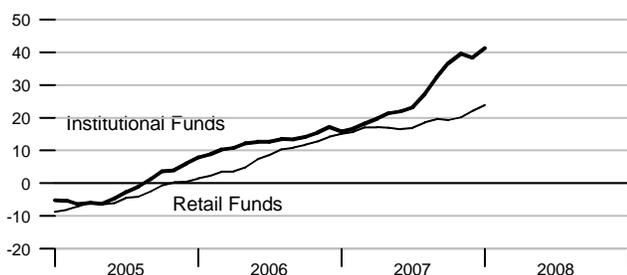
### Checkable and Savings Deposits

Percent change from year ago



### Money Market Mutual Fund Shares

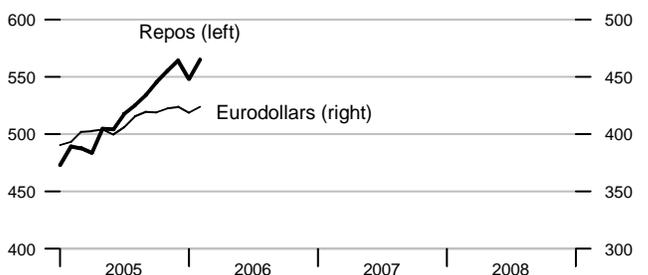
Percent change from year ago



### Repurchase Agreements and Eurodollars\*

Billions of dollars

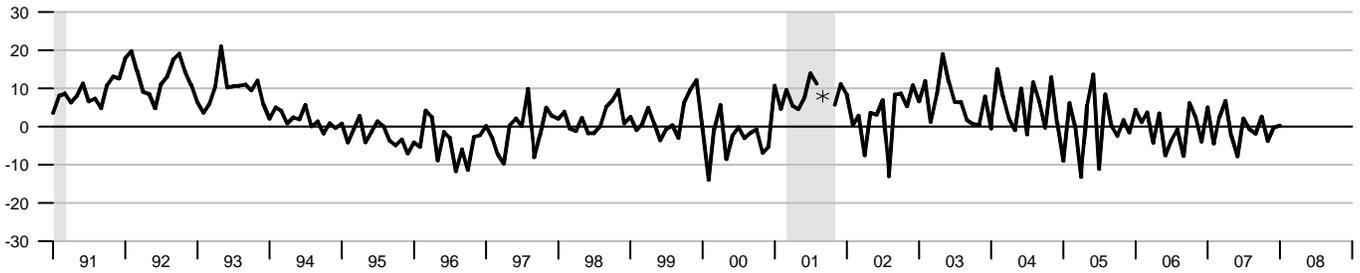
Billions of dollars



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

**M1**

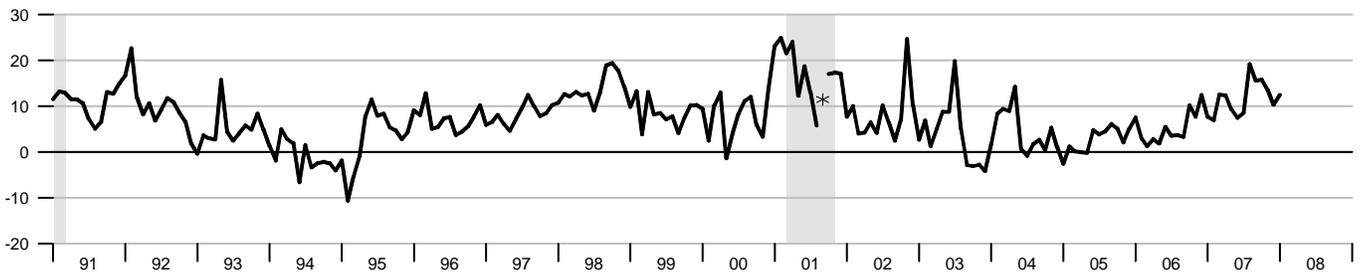
Percent change at an annual rate



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

**MZM**

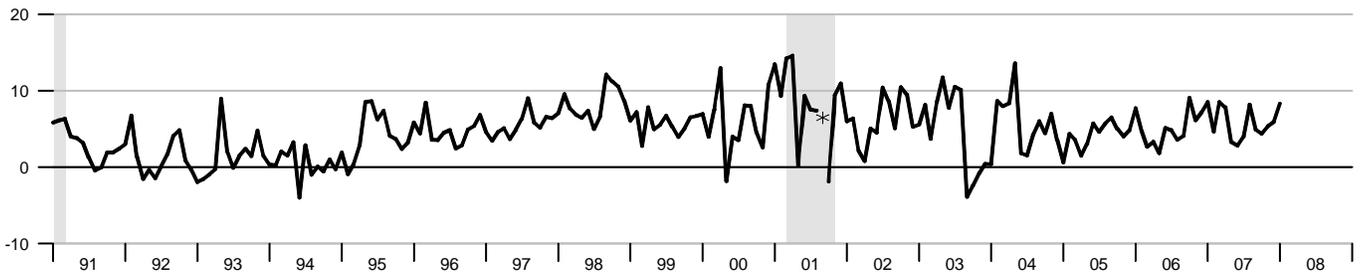
Percent change at an annual rate



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

**M2**

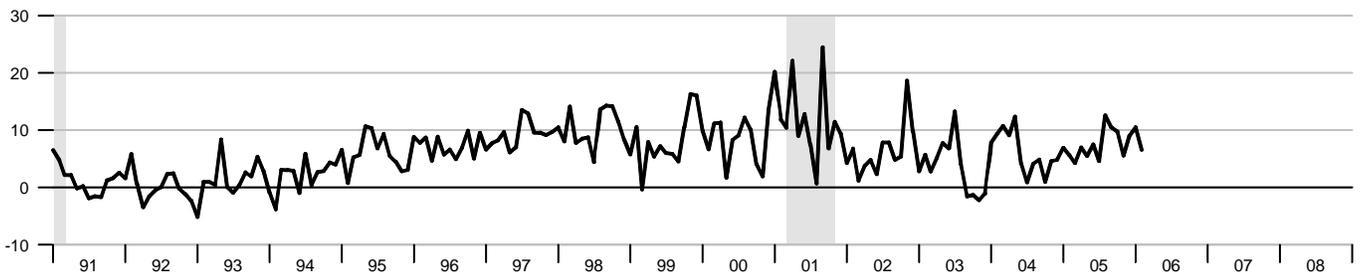
Percent change at an annual rate



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

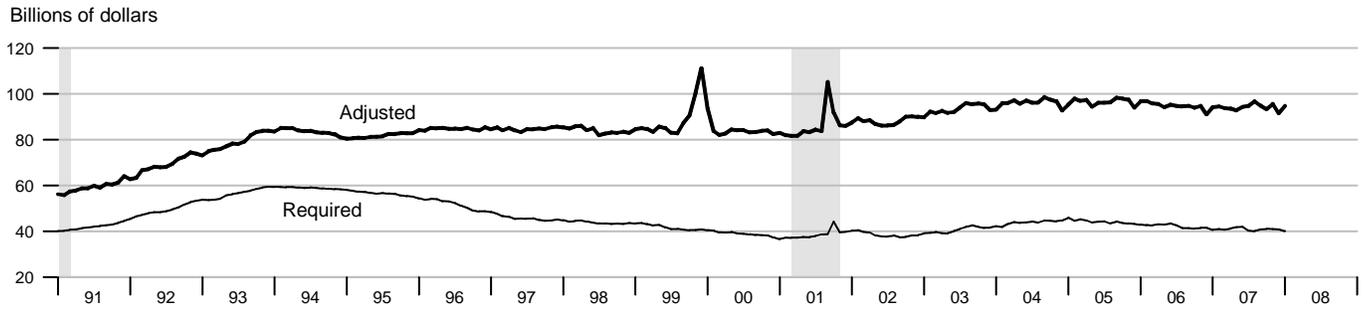
**M3\***

Percent change at an annual rate

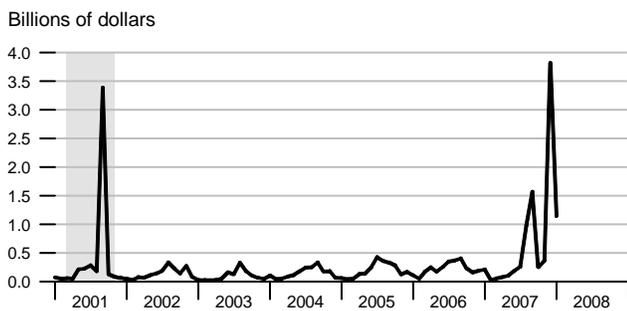


\*See table of contents for changes to the series.

### Adjusted and Required Reserves



### Total Borrowings, nsa



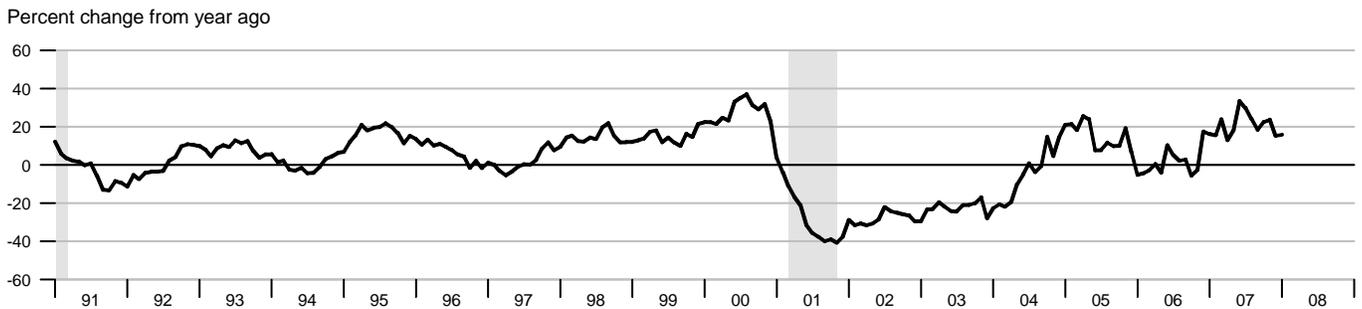
\* Total borrowings include loans to depository institutions for primary, secondary, and seasonal credit, but exclude term auction credit.

### Excess Reserves plus RCB Contracts



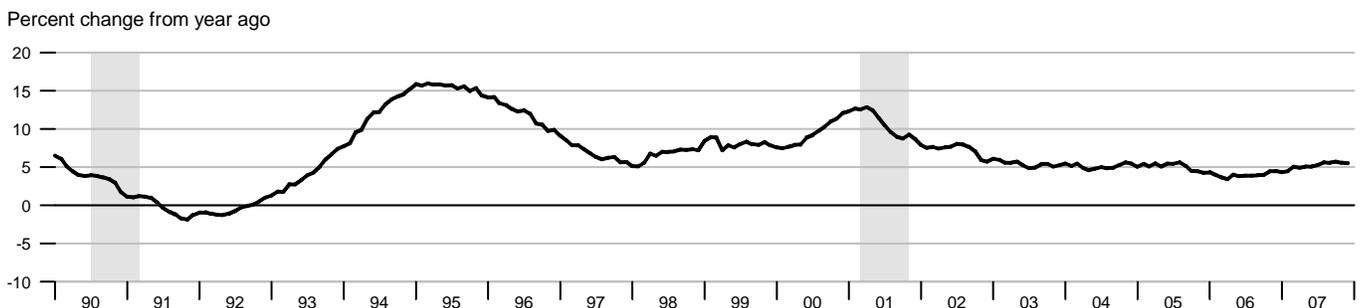
\*Actual value for September 2001 is \$26.43 billion.

### Nonfinancial Commercial Paper

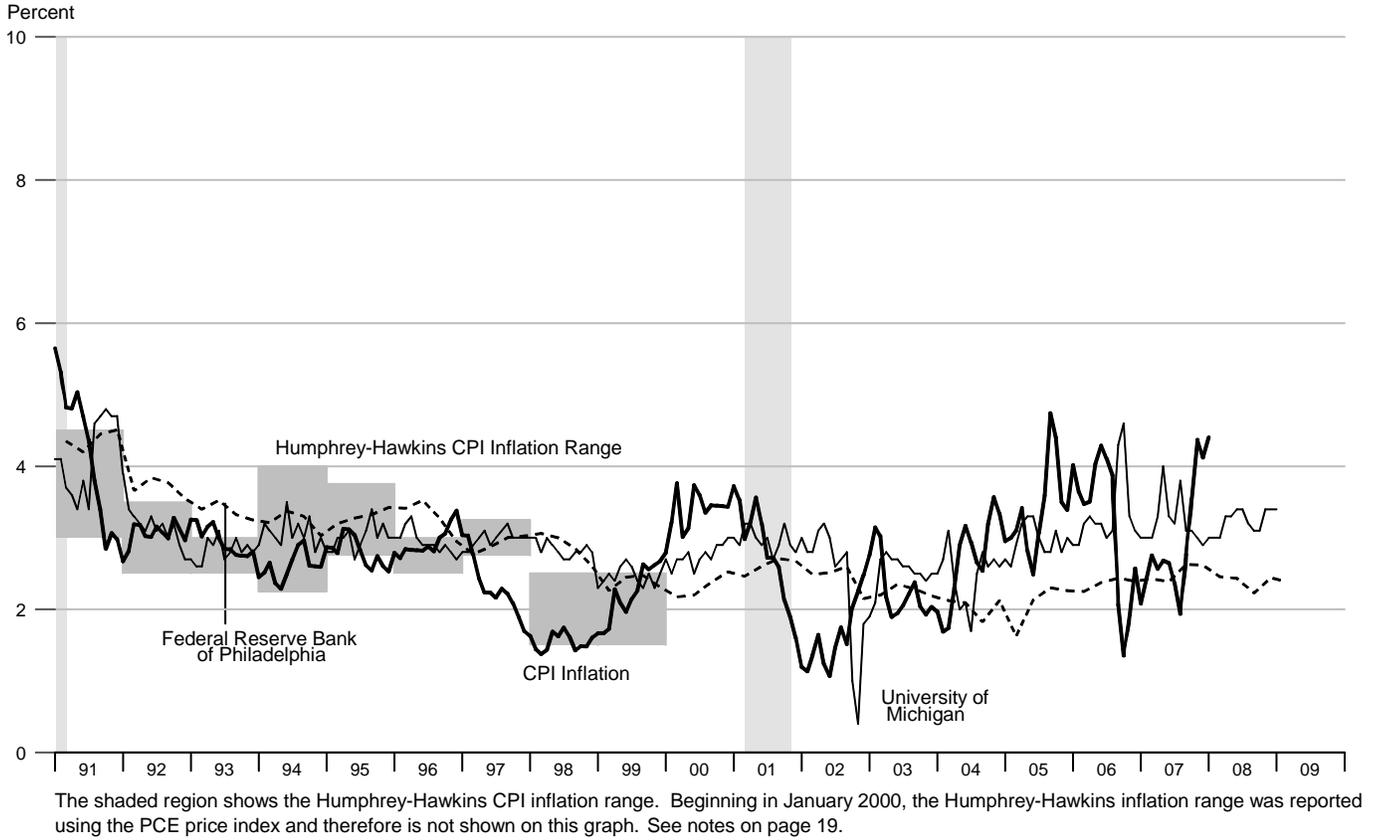


As of April 10, 2006, the Federal Reserve Board made major changes to its commercial paper calculations. For more information, please refer to <http://www.federalreserve.gov/releases/cp/about.htm>.

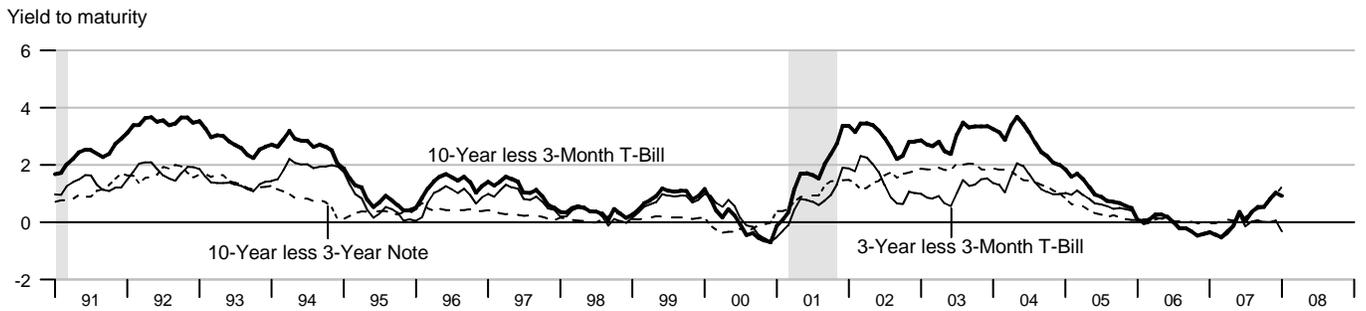
### Consumer Credit



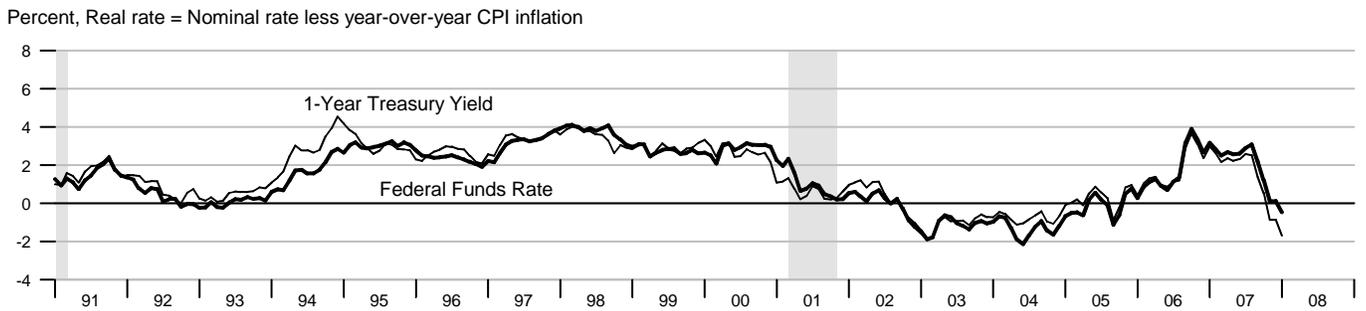
### Inflation and 1-Year-Ahead Inflation Expectations



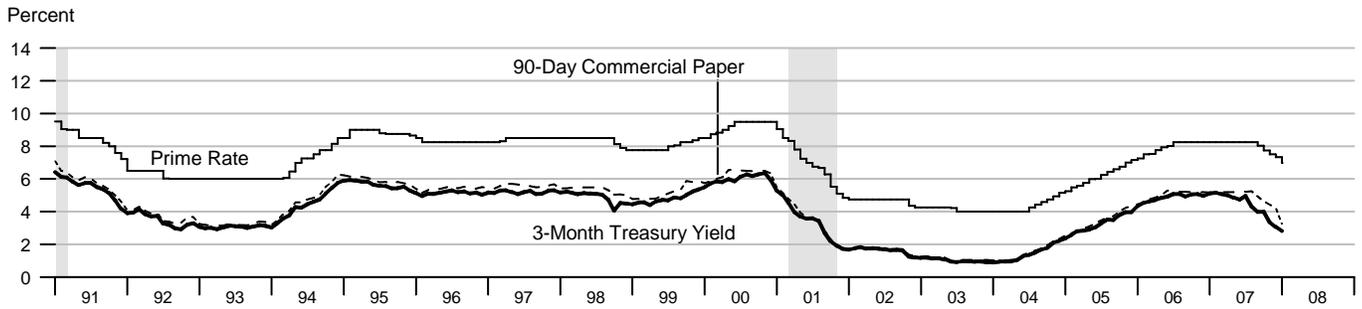
### Treasury Security Yield Spreads



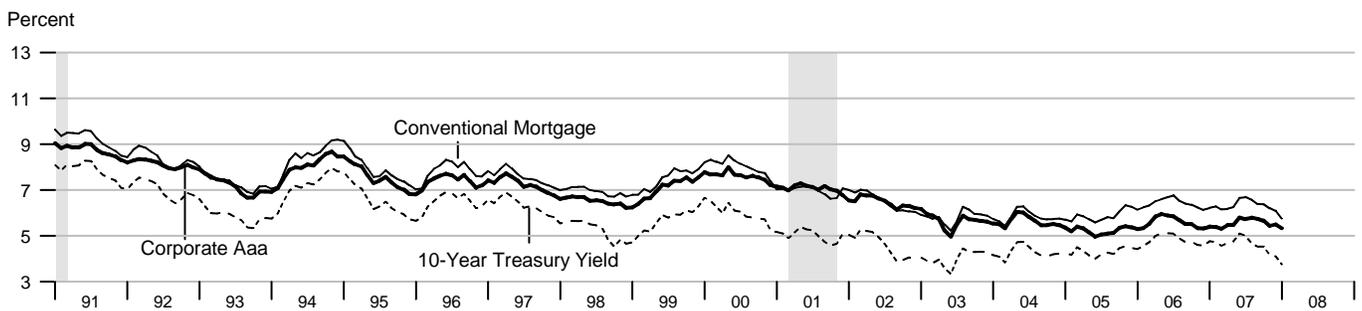
### Real Interest Rates



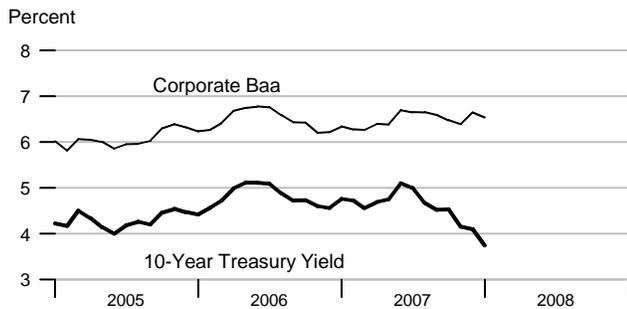
### Short-Term Interest Rates



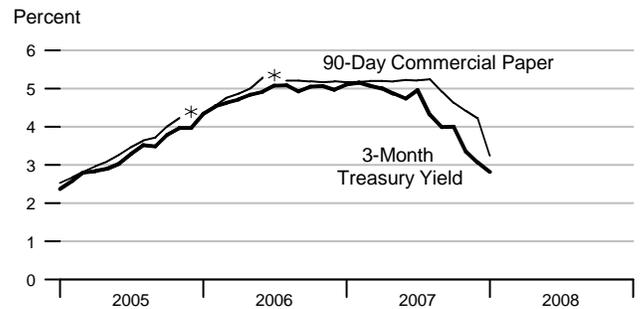
### Long-Term Interest Rates



### Long-Term Interest Rates

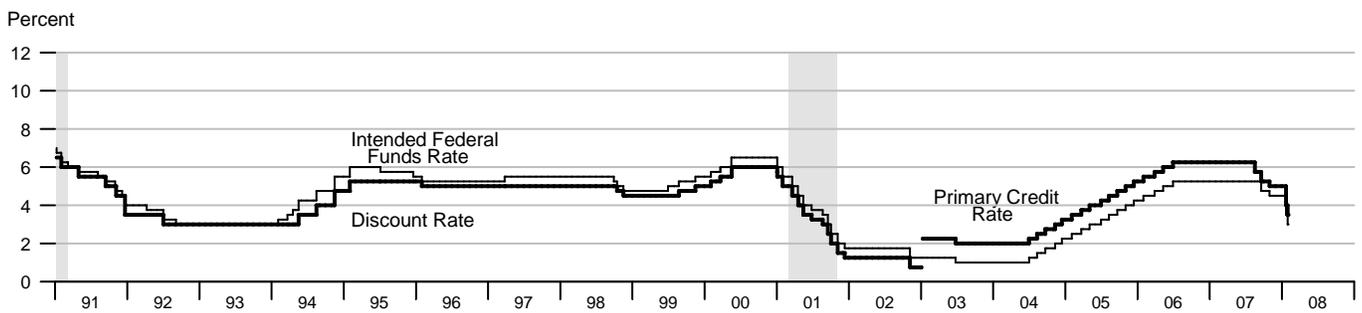


### Short-Term Interest Rates



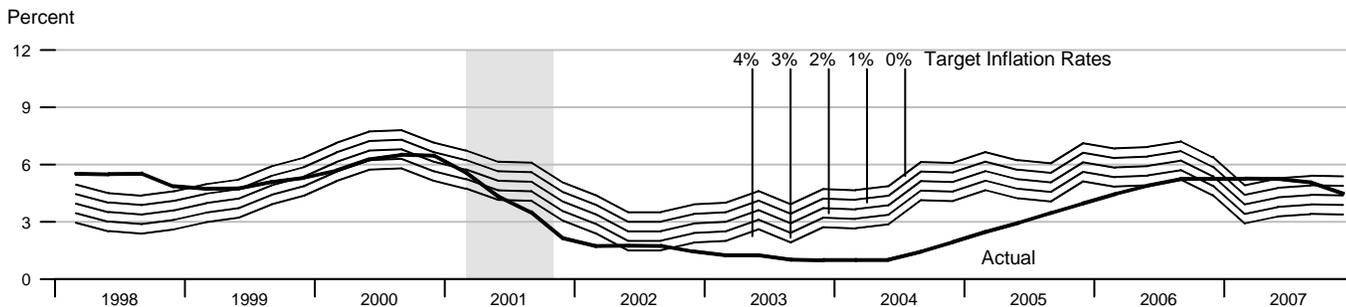
\*90-Day Commercial Paper data are not available for December 2005, January 2006, and July 2006.

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



Data available as of January 2008.

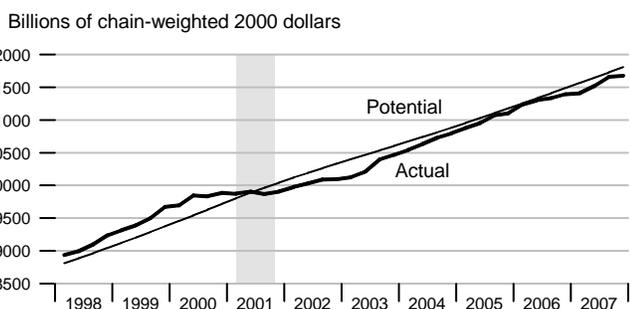
### Federal Funds Rate and Inflation Targets



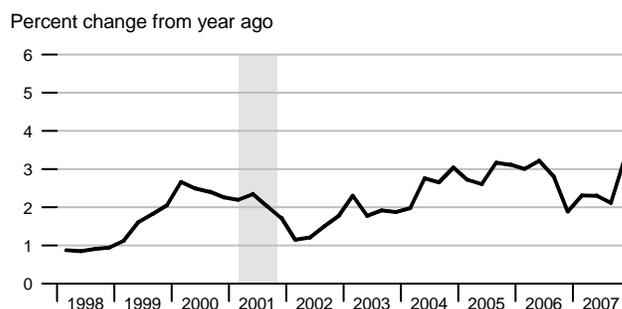
Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

### Components of Taylor's Rule

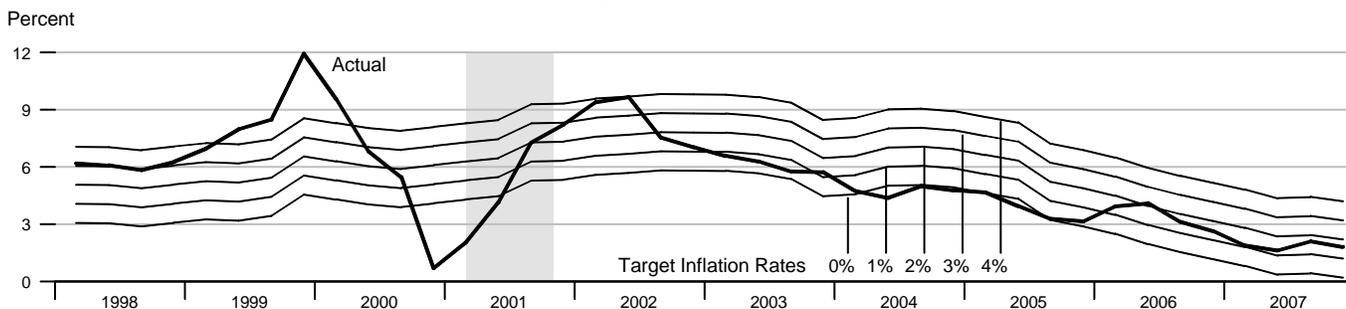
#### Actual and Potential Real GDP



#### PCE Inflation



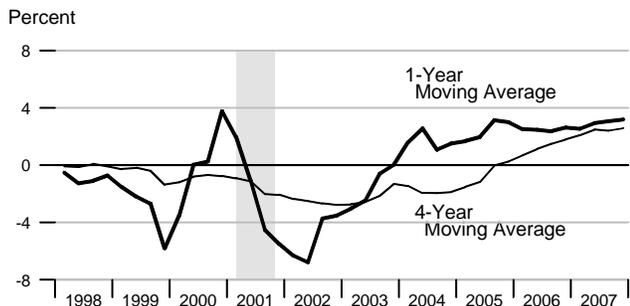
### Monetary Base Growth\* and Inflation Targets



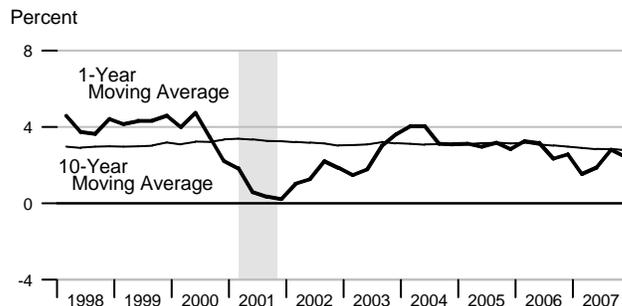
\*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

### Components of McCallum's Rule

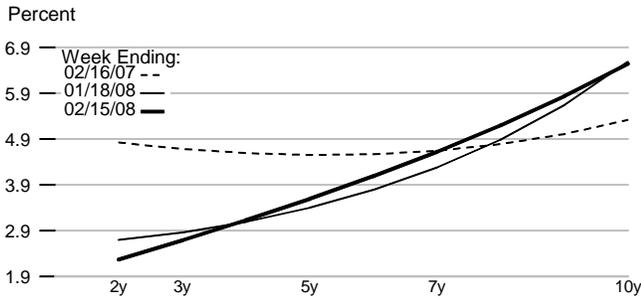
#### Monetary Base Velocity Growth



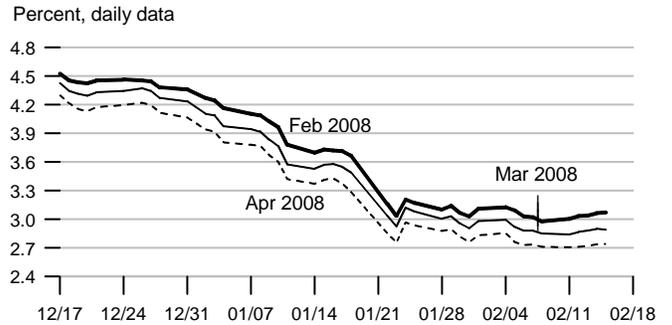
#### Real Output Growth



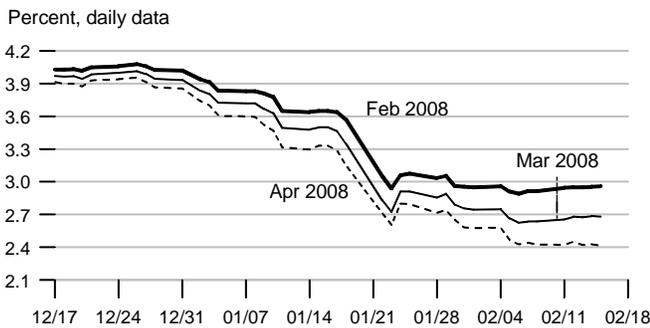
### Implied One-Year Forward Rates



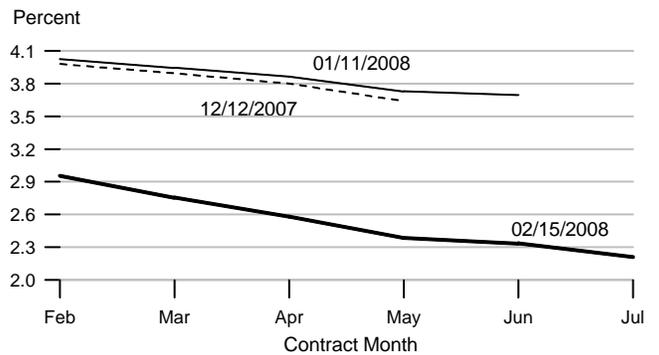
### Rates on 3-Month Eurodollar Futures



### Rates on Selected Federal Funds Futures Contracts

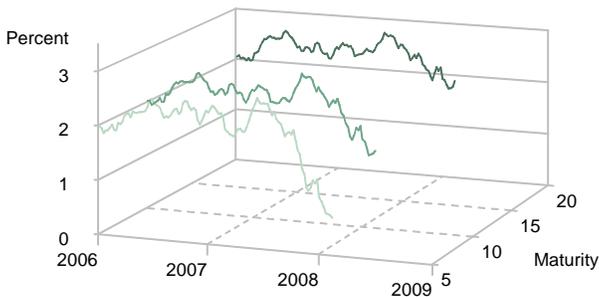


### Rates on Federal Funds Futures on Selected Dates



### Inflation-Indexed Treasury Securities

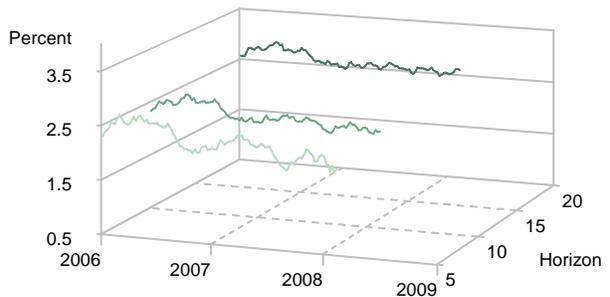
Weekly data



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

### Inflation-Indexed Treasury Yield Spreads

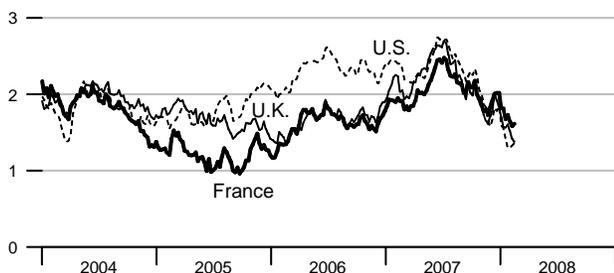
Weekly data



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

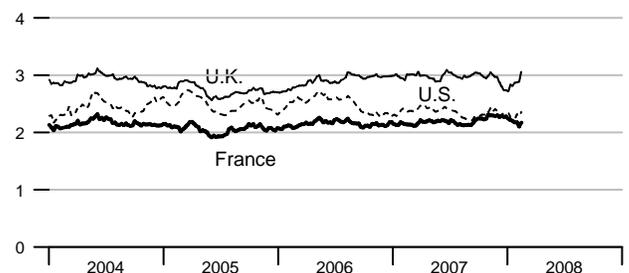
### Inflation-Indexed 10-Year Government Notes

Percent, weekly data



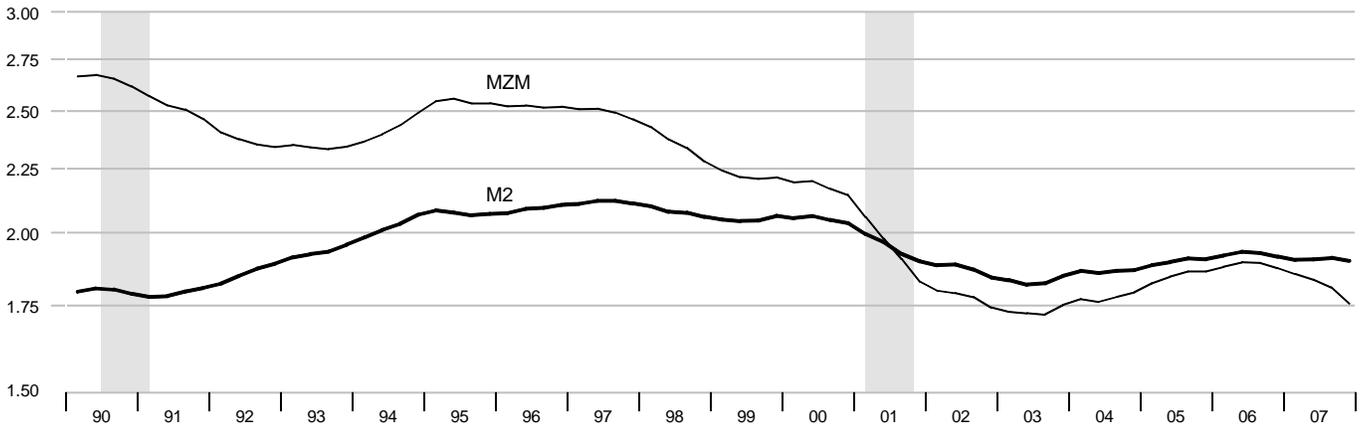
### Inflation-Indexed 10-Year Government Yield Spreads

Percent, weekly data



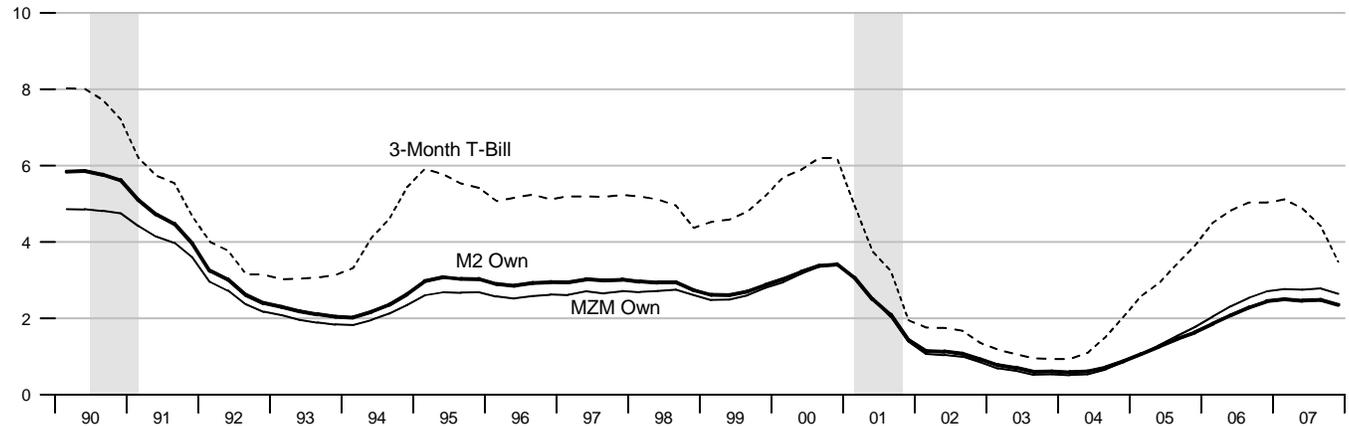
**Velocity**

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



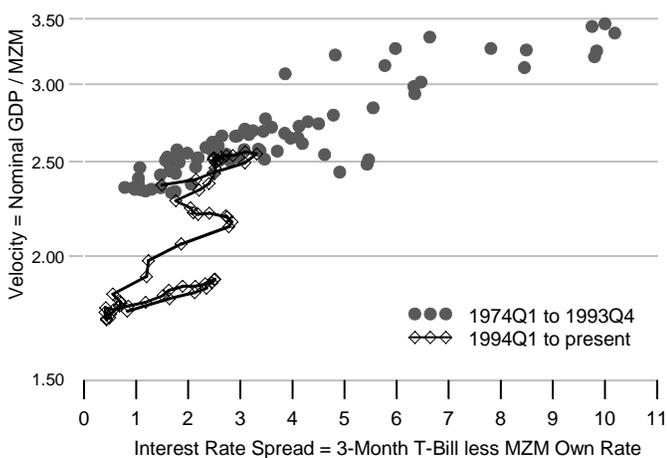
**Interest Rates**

Percent



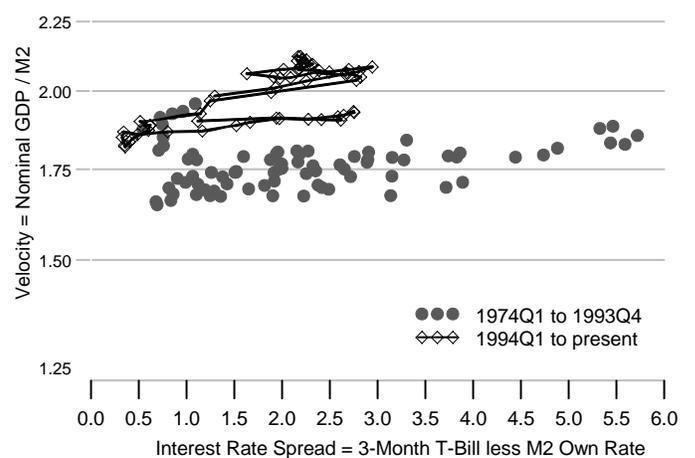
**MZM Velocity and Interest Rate Spread**

Ratio Scale



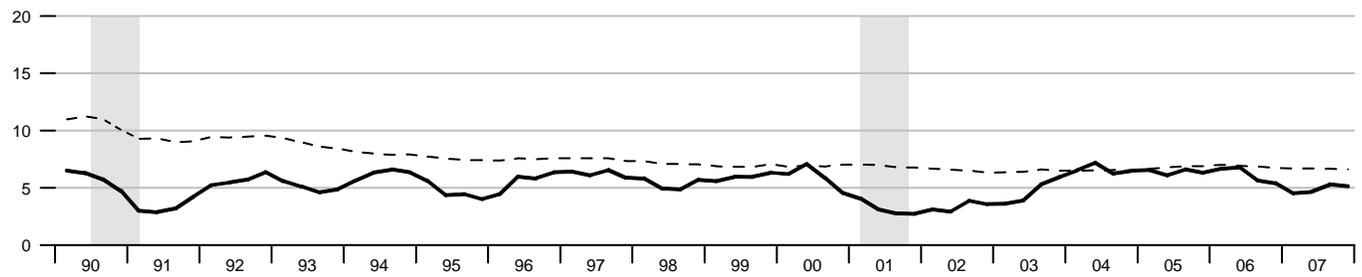
**M2 Velocity and Interest Rate Spread**

Ratio Scale



### Gross Domestic Product

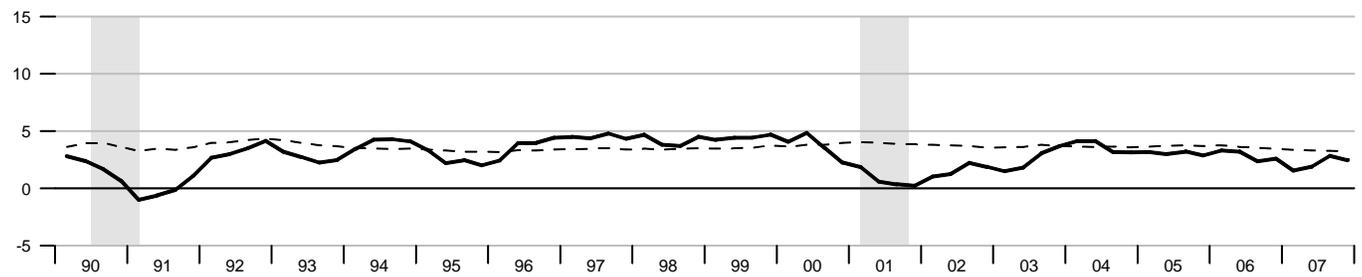
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Real Gross Domestic Product

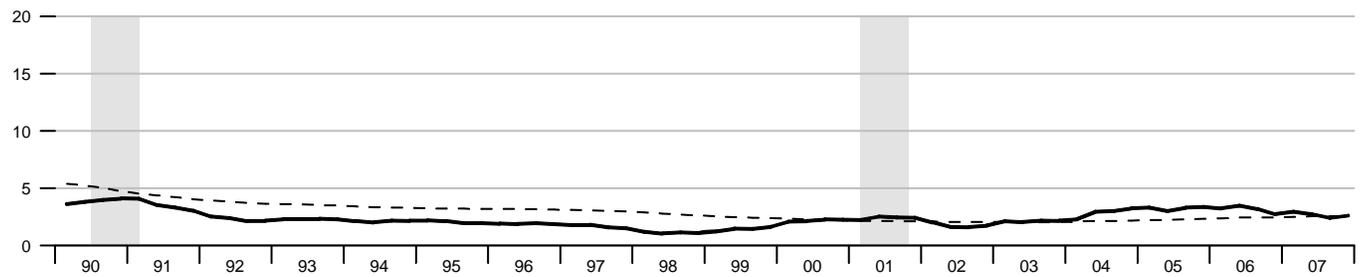
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Gross Domestic Product Price Index

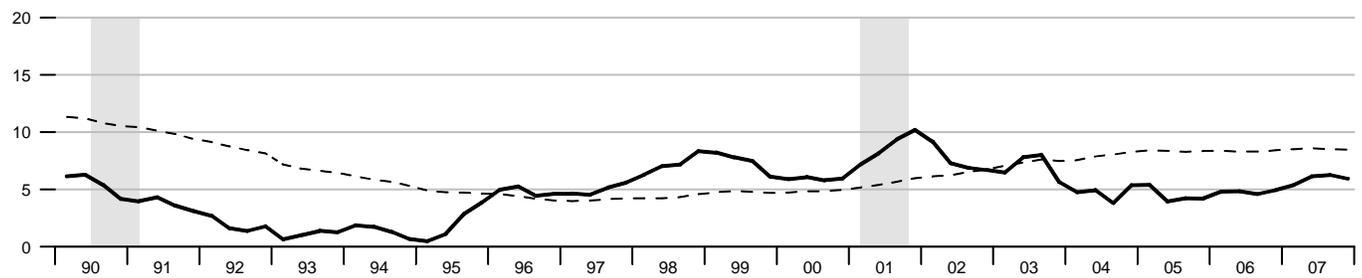
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### M2

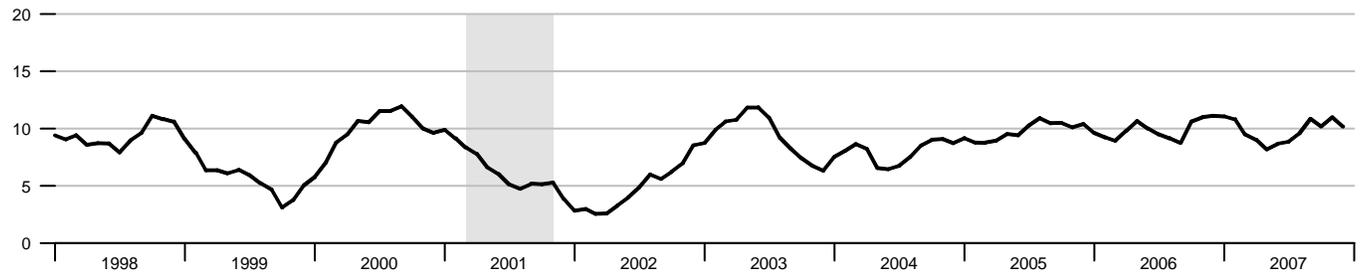
Percent change from year ago



Dashed lines indicate 10-year moving averages.

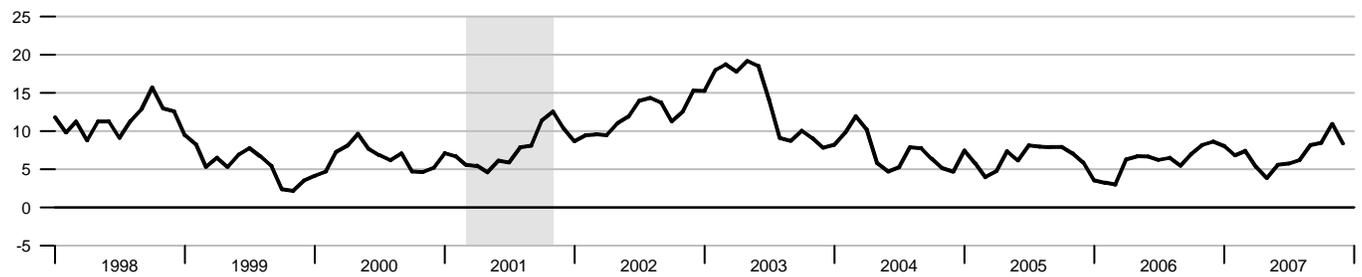
**Bank Credit**

Percent change from year ago



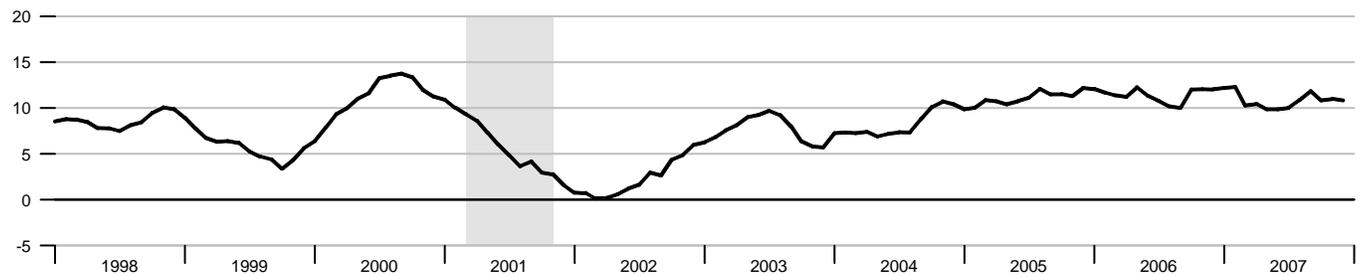
**Investment Securities in Bank Credit at Commercial Banks**

Percent change from year ago



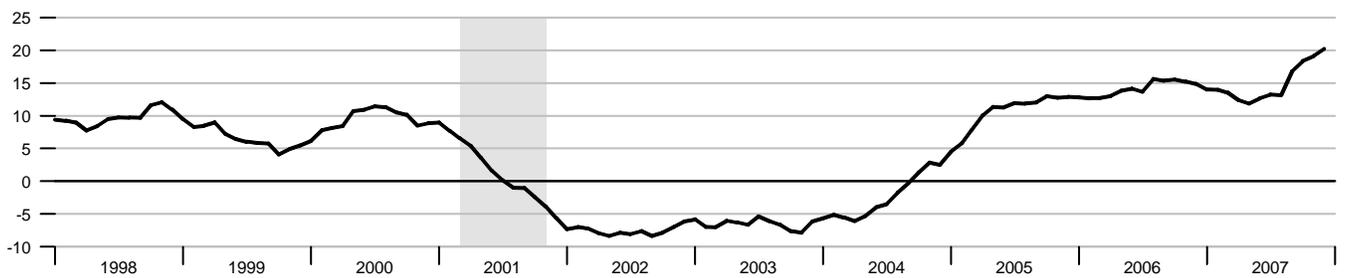
**Total Loans and Leases in Bank Credit at Commercial Banks**

Percent change from year ago

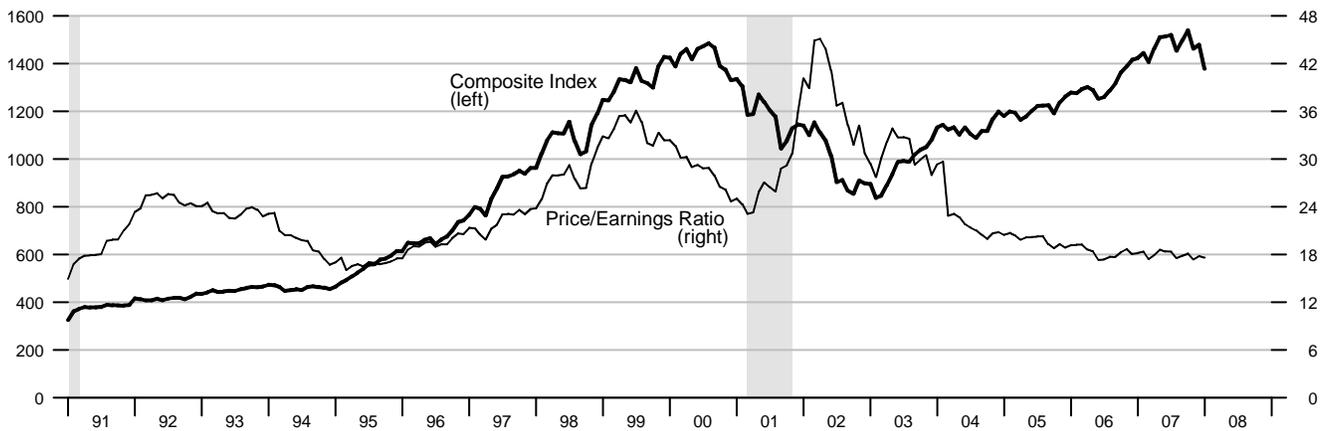


**Commercial and Industrial Loans at Commercial Banks**

Percent change from year ago



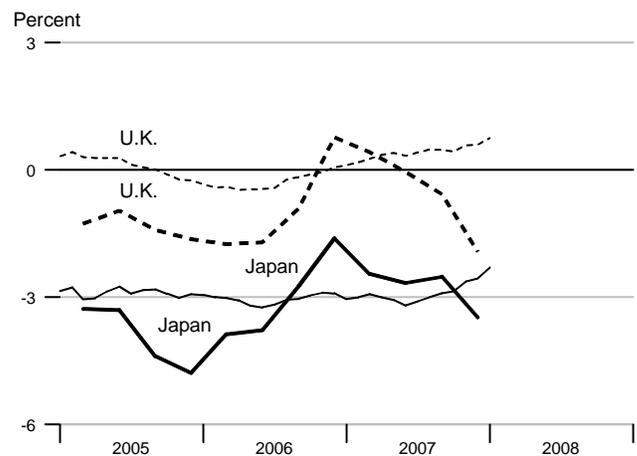
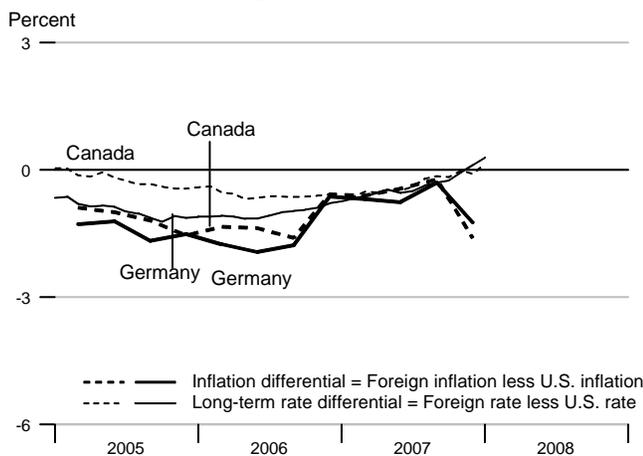
### Standard & Poor's 500



### Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2007Q1	2007Q2	2007Q3	2007Q4	Oct07	Nov07	Dec07	Jan08
United States	2.42	2.63	2.36	4.01	4.53	4.15	4.10	3.74
Canada	1.81	2.19	2.13	2.41	4.36	4.13	4.01	3.87
France	1.16	1.18	1.27	2.34	4.40	4.23	4.35	.
Germany	1.74	1.88	2.05	2.77	4.28	4.09	4.21	4.03
Italy	1.73	1.59	1.64	2.36	4.59	4.45	4.54	.
Japan	-0.03	-0.03	-0.16	0.53	1.67	1.52	1.54	1.44
United Kingdom	2.84	2.58	1.78	2.09	4.96	4.73	4.69	4.49

### Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		MSI M2**
		M1	MZM	M2	M3*	Credit	Monetary Base	Reserves	
2003		1273.483	6327.288	5987.020	8787.321	6117.884	740.938	93.325	315.192
2004		1344.422	6578.703	6269.297	9234.718	6603.256	776.768	96.129	329.873
2005		1371.780	6725.613	6547.741	9786.477	7249.102	806.627	96.558	343.539
2006		1374.716	6999.837	6861.928	10270.74	7964.529	835.013	94.887	
2007		1369.224	7637.496	7268.956		8748.219	850.600	94.185	
2005	1	1370.779	6664.907	6446.907	9528.052	7000.215	798.379	96.773	339.356
	2	1367.567	6675.210	6496.824	9670.405	7166.294	802.566	95.998	341.280
	3	1373.736	6742.246	6580.808	9859.294	7362.396	809.023	96.938	344.766
	4	1375.036	6820.089	6666.423	10088.16	7467.503	816.538	96.525	348.753
2006	1	1381.849	6899.781	6757.209		7647.843	830.533	96.494	
	2	1379.996	6944.253	6811.376		7893.807	836.330	95.026	
	3	1367.890	7010.342	6883.345		8035.112	834.533	94.752	
	4	1369.130	7144.973	6995.781		8281.353	838.655	93.276	
2007	1	1370.321	7308.915	7120.677		8446.290	846.370	94.184	
	2	1373.255	7503.676	7229.143		8574.104	849.946	93.585	
	3	1367.493	7722.119	7314.253		8821.349	852.275	95.424	
	4	1365.826	8015.275	7411.748		9151.131	853.811	93.546	
2006	Jan	1379.526	6886.124	6734.634	10242.79	7568.370	825.163	96.789	353.032
	Feb	1380.879	6902.895	6760.952	10298.68	7651.351	832.401	96.867	353.943
	Mar	1385.142	6910.325	6776.042		7723.808	834.035	95.826	
	Apr	1380.275	6926.457	6794.768		7814.828	835.307	95.578	
	May	1384.202	6937.359	6805.164		7928.049	836.887	94.200	
	Jun	1375.511	6968.942	6834.196		7938.544	836.797	95.299	
	Jul	1371.330	6989.543	6861.807		7986.255	834.900	94.811	
	Aug	1370.539	7011.053	6882.340		8048.410	834.570	94.648	
	Sep	1361.802	7030.431	6905.889		8070.671	834.130	94.797	
	Oct	1368.774	7089.979	6958.083		8223.678	837.900	93.971	
	Nov	1371.550	7135.539	6993.716		8272.813	840.382	94.765	
	Dec	1367.066	7209.401	7035.544		8347.568	837.684	91.091	
2007	Jan	1372.772	7255.492	7085.468		8405.238	843.515	94.206	
	Feb	1367.716	7297.609	7113.031		8477.612	847.350	94.518	
	Mar	1370.475	7373.645	7163.533		8456.020	848.244	93.829	
	Apr	1378.143	7449.674	7210.318		8518.271	848.994	93.636	
	May	1375.274	7507.337	7230.039		8576.943	849.681	92.838	
	Jun	1366.348	7554.018	7247.073		8627.098	851.164	94.280	
	Jul	1368.733	7607.648	7271.167		8694.491	851.985	94.726	
	Aug	1367.909	7729.157	7320.784		8821.518	853.486	96.687	
	Sep	1365.838	7829.552	7350.809		8948.038	851.353	94.860	
	Oct	1368.763	7932.643	7377.644		9066.741	856.425	93.419	
	Nov	1364.495	8022.063	7410.544		9186.038	857.523	95.623	
	Dec	1364.220	8091.119	7447.057		9200.615	847.485	91.595	
2008	Jan	1364.553	8175.134	7498.585		9286.719	851.453	94.779	

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			
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
2007		5.02	5.86	8.05	5.27	4.47	4.34	4.63	5.56	4.13	6.34
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
2007	1	5.26	6.25	8.25	5.31	5.12	4.68	4.68	5.36	3.91	6.22
	2	5.25	6.25	8.25	5.32	4.87	4.76	4.85	5.58	4.13	6.37
	3	5.07	5.93	8.18	5.42	4.42	4.41	4.73	5.75	4.27	6.55
	4	4.50	5.02	7.52	5.02	3.47	3.50	4.26	5.53	4.24	6.23
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
	Feb	5.26	6.25	8.25	5.31	5.16	4.75	4.72	5.39	3.95	6.29
	Mar	5.26	6.25	8.25	5.30	5.08	4.51	4.56	5.30	3.88	6.16
	Apr	5.25	6.25	8.25	5.31	5.01	4.60	4.69	5.47	3.99	6.18
	May	5.25	6.25	8.25	5.31	4.87	4.69	4.75	5.47	4.04	6.26
	Jun	5.25	6.25	8.25	5.33	4.74	5.00	5.10	5.79	4.36	6.66
	Jul	5.26	6.25	8.25	5.32	4.96	4.82	5.00	5.73	4.24	6.70
	Aug	5.02	6.01	8.25	5.49	4.32	4.34	4.67	5.79	4.30	6.57
	Sep	4.94	5.53	8.03	5.46	3.99	4.06	4.52	5.74	4.26	6.38
	Oct	4.76	5.24	7.74	5.08	4.00	4.01	4.53	5.66	4.20	6.38
	Nov	4.49	5.00	7.50	4.97	3.35	3.35	4.15	5.44	4.26	6.21
	Dec	4.24	4.83	7.33	5.02	3.07	3.13	4.10	5.49	4.25	6.10
2008	Jan	3.94	4.48	6.98	3.84	2.82	2.51	3.74	5.33	4.13	5.76

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

		M1	MZM	M2	M3*
<b>Percent change at an annual rate</b>					
	2003	6.46	7.41	6.98	6.40
	2004	5.57	3.97	4.71	5.09
	2005	2.03	2.23	4.44	5.97
	2006	0.21	4.08	4.80	4.95
	2007	-0.40	9.11	5.93	
2005	1	0.02	0.23	3.14	5.63
	2	-0.94	0.62	3.10	5.98
	3	1.80	4.02	5.17	7.81
	4	0.38	4.62	5.20	9.29
2006	1	1.98	4.67	5.45	
	2	-0.54	2.58	3.21	
	3	-3.51	3.81	4.23	
	4	0.36	7.68	6.53	
2007	1	0.35	9.18	7.14	
	2	0.86	10.66	6.09	
	3	-1.68	11.64	4.71	
	4	-0.49	15.19	5.33	
2006	Jan	4.38	7.50	7.70	10.49
	Feb	1.18	2.92	4.69	6.55
	Mar	3.70	1.29	2.68	
	Apr	-4.22	2.80	3.32	
	May	3.41	1.89	1.84	
	Jun	-7.53	5.46	5.12	
	Jul	-3.65	3.55	4.85	
	Aug	-0.69	3.69	3.59	
	Sep	-7.65	3.32	4.11	
	Oct	6.14	10.16	9.07	
	Nov	2.43	7.71	6.15	
	Dec	-3.92	12.42	7.18	
2007	Jan	5.01	7.67	8.52	
	Feb	-4.42	6.97	4.67	
	Mar	2.42	12.50	8.52	
	Apr	6.71	12.37	7.84	
	May	-2.50	9.29	3.28	
	Jun	-7.79	7.46	2.83	
	Jul	2.09	8.52	3.99	
	Aug	-0.72	19.17	8.19	
	Sep	-1.82	15.59	4.92	
	Oct	2.57	15.80	4.38	
	Nov	-3.74	13.53	5.35	
	Dec	-0.24	10.33	5.91	
2008	Jan	0.29	12.46	8.30	

\*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 7/15/2017. **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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**Note:** \*Available on the Internet at [research.stlouisfed.org/publications/review/](http://research.stlouisfed.org/publications/review/).