

# Monetary *Trends*

April 2013

This publication contains charts and tables  
compiled by the Data Desk staff  
of the Federal Reserve Bank of St. Louis.

The data are related to U.S. monetary and financial conditions,  
with an emphasis on various measures of the monetary policy stance.



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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:

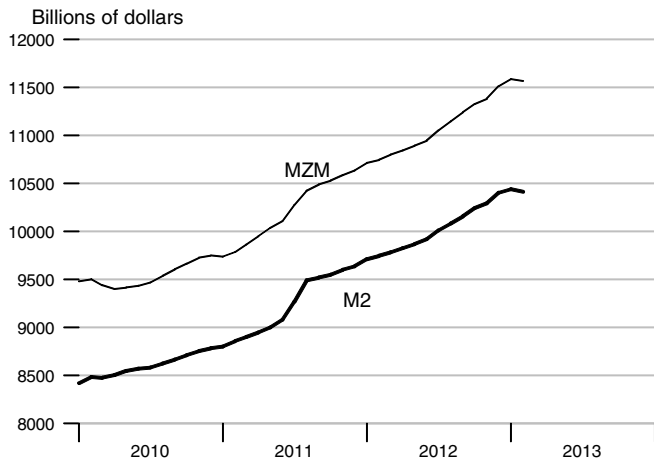
Editor, *Monetary Trends*  
Research Division  
Federal Reserve Bank of St. Louis  
P.O. Box 442  
St. Louis, MO 63166-0442

or to:

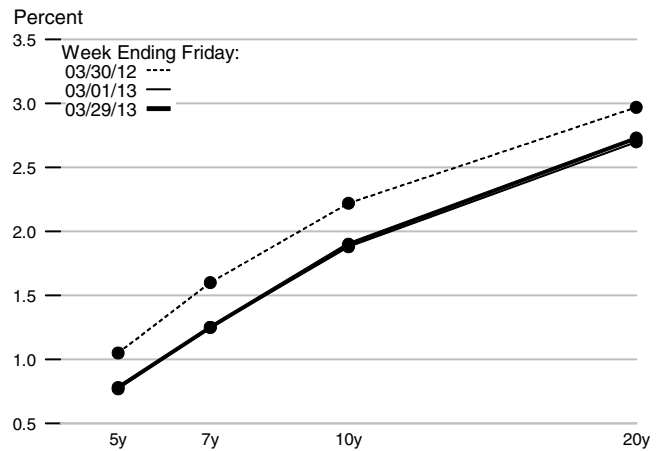
stlsFRED@stls.frb.org

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.

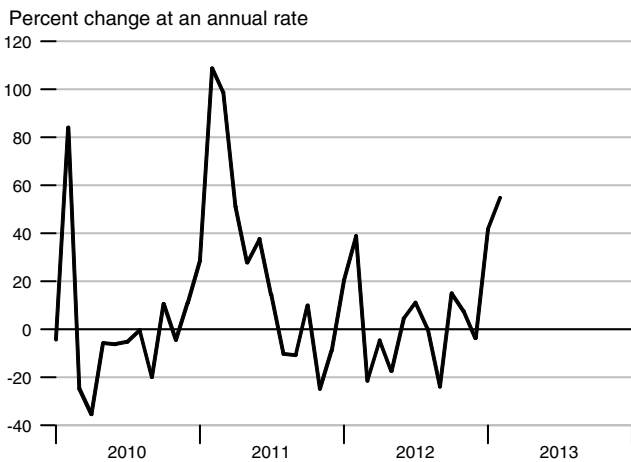
### M2 and MZM



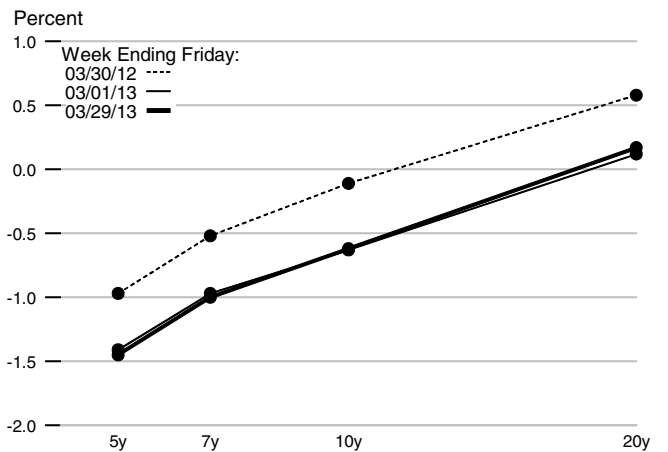
### Treasury Yield Curve



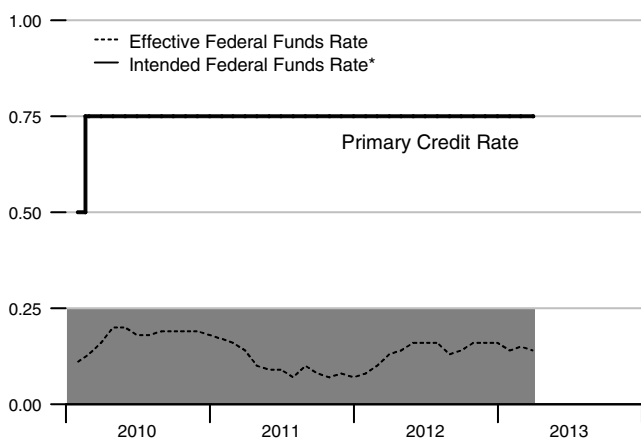
### Adjusted Monetary Base



### Real Treasury Yield Curve

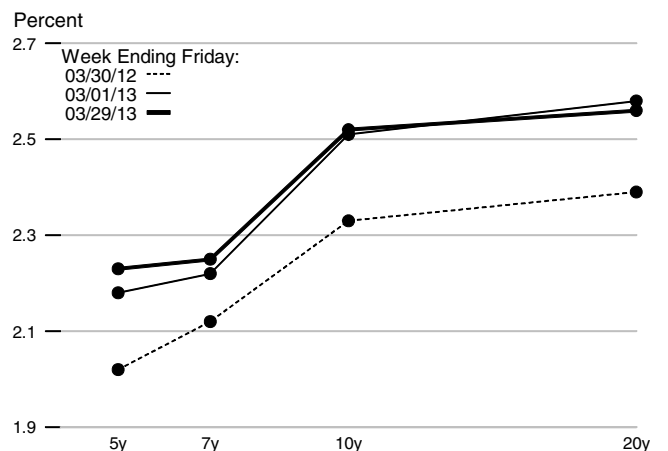


### Reserve Market Rates



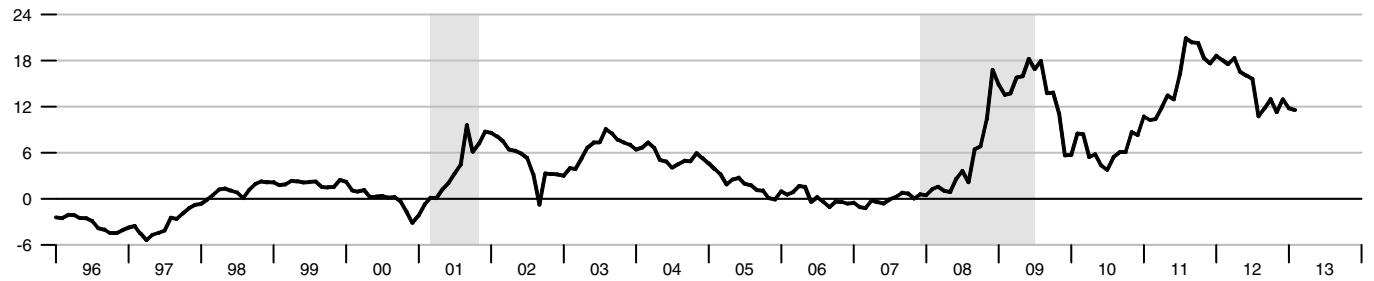
\*Note: Effective December 16, 2008, FOMC reports the Intended Federal Funds Rate as a range. Currently, Intended Federal Funds Rate is not plotted on this chart due to the note above.

### Inflation-Indexed Treasury Yield Spreads



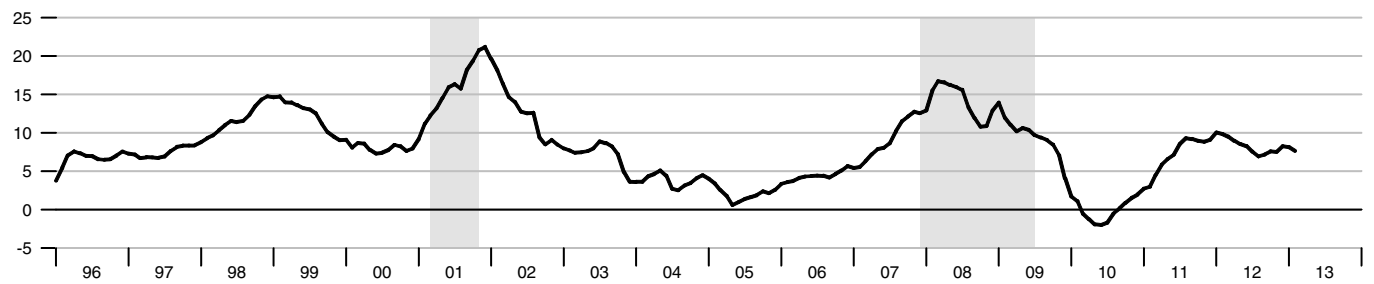
**M1**

Percent change from year ago



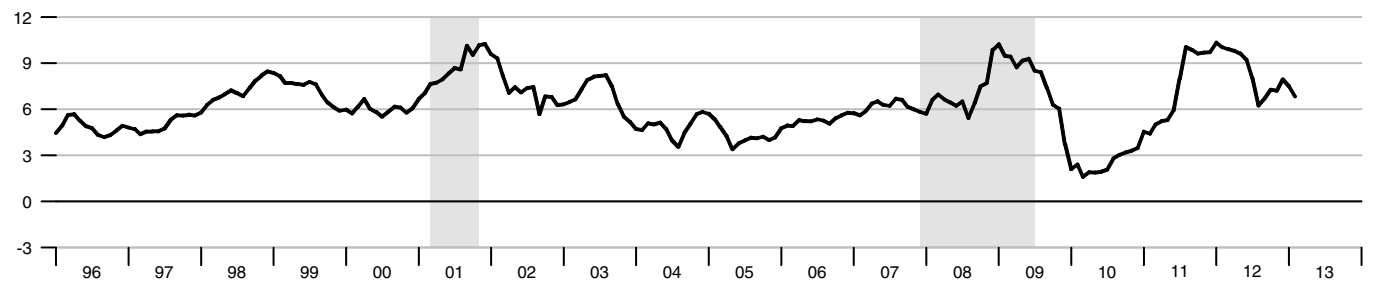
**M2M**

Percent change from year ago



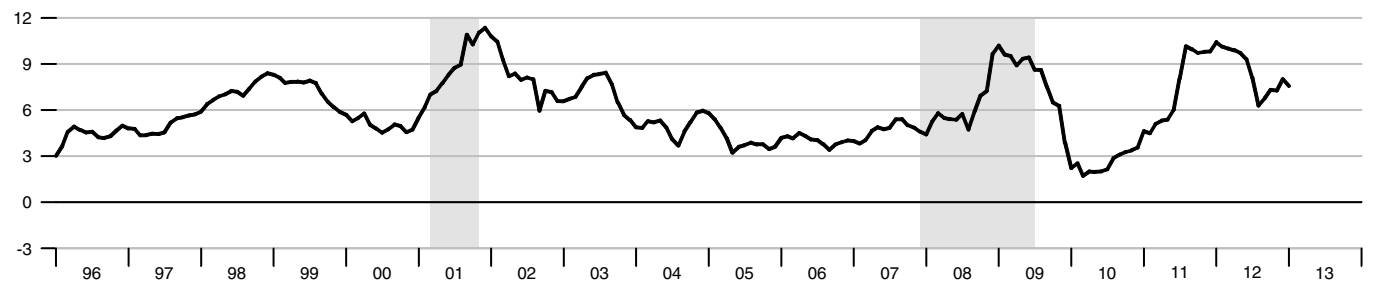
**M2**

Percent change from year ago



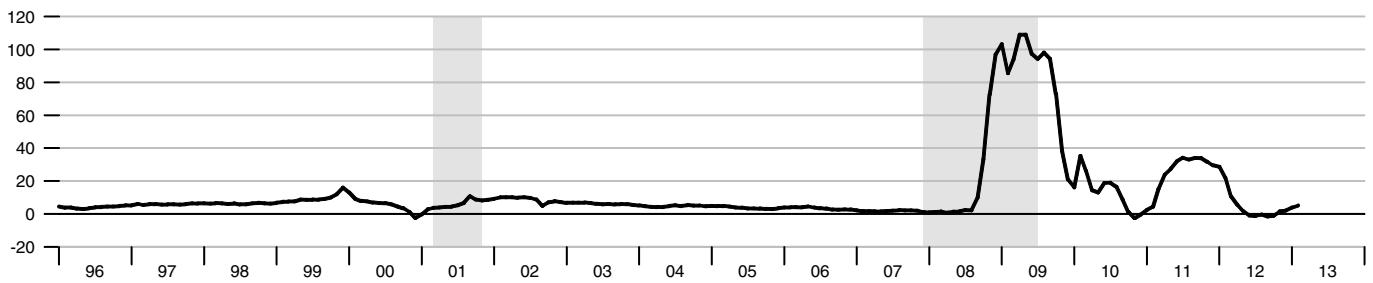
**Monetary Services Index - M2**

Percent change from year ago



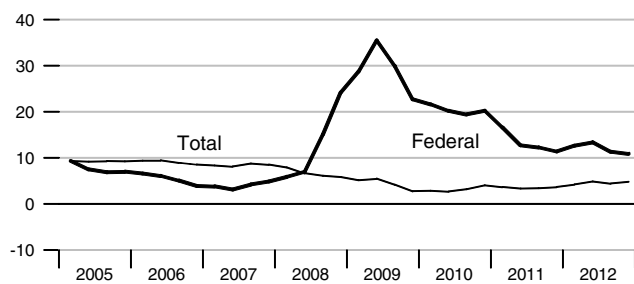
### Adjusted Monetary Base

Percent change from year ago



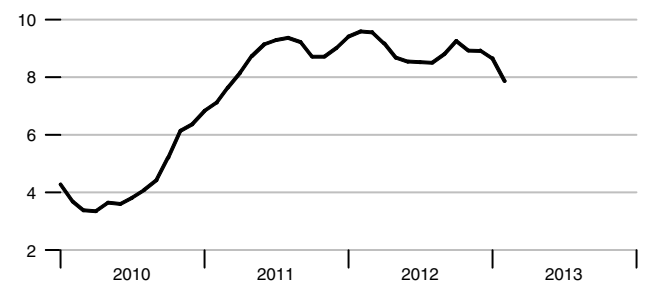
### Domestic Nonfinancial Debt

Percent change from year ago



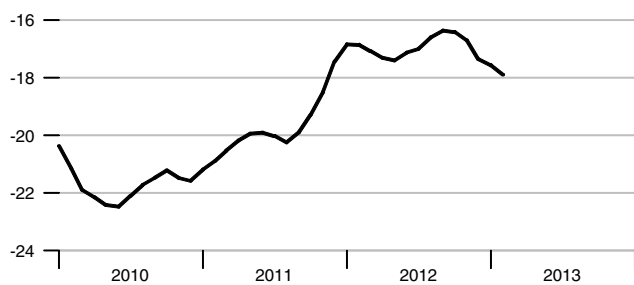
### Currency Held by the Nonbank Public

Percent change from year ago



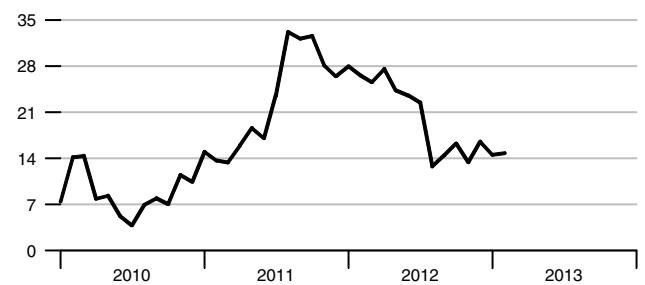
### Small Denomination Time Deposits

Percent change from year ago



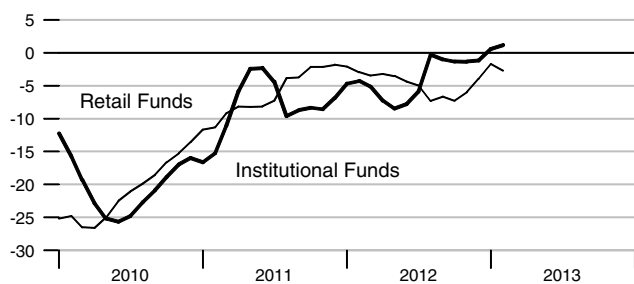
### Checkable Deposits

Percent change from year ago



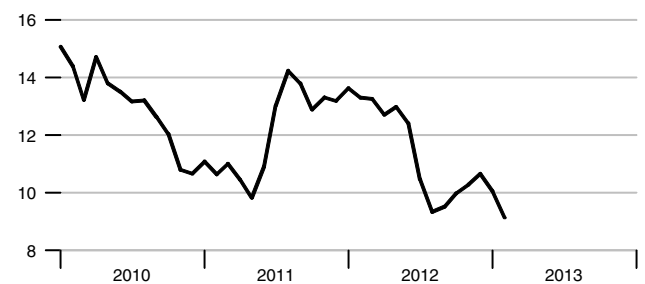
### Money Market Mutual Fund Shares

Percent change from year ago



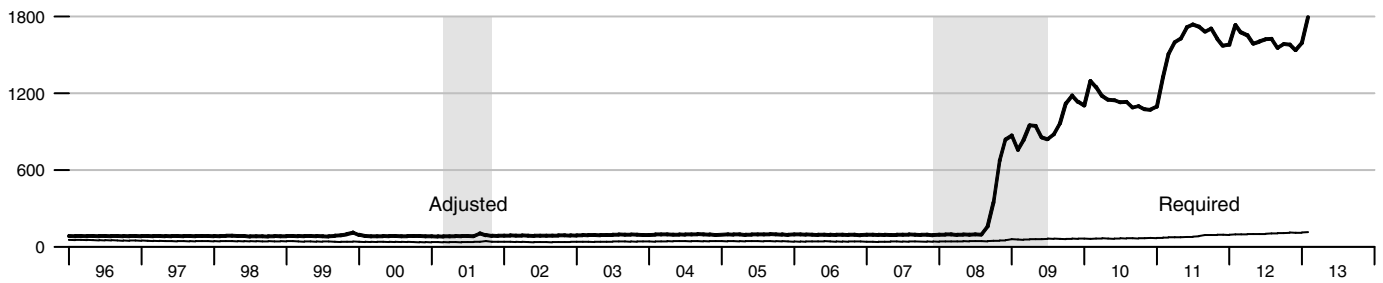
### Savings Deposits

Percent change from year ago



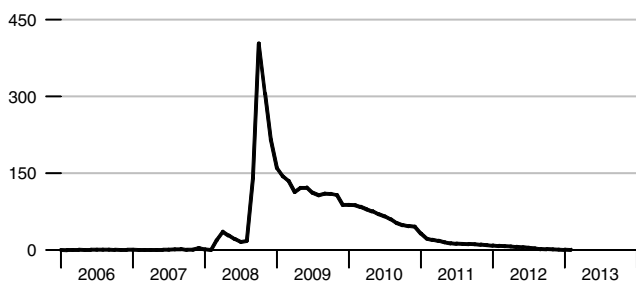
### Adjusted and Required Reserves

Billions of dollars



### Total Borrowings, nsa

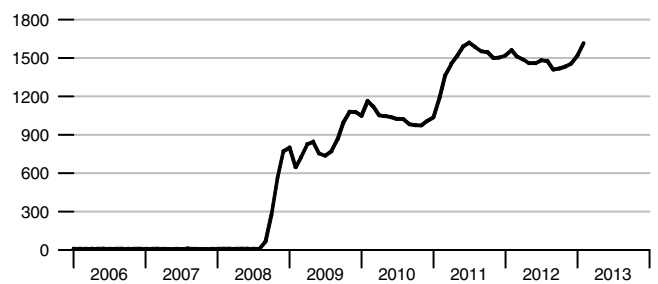
Billions of dollars



\* Data exclude term auction credit

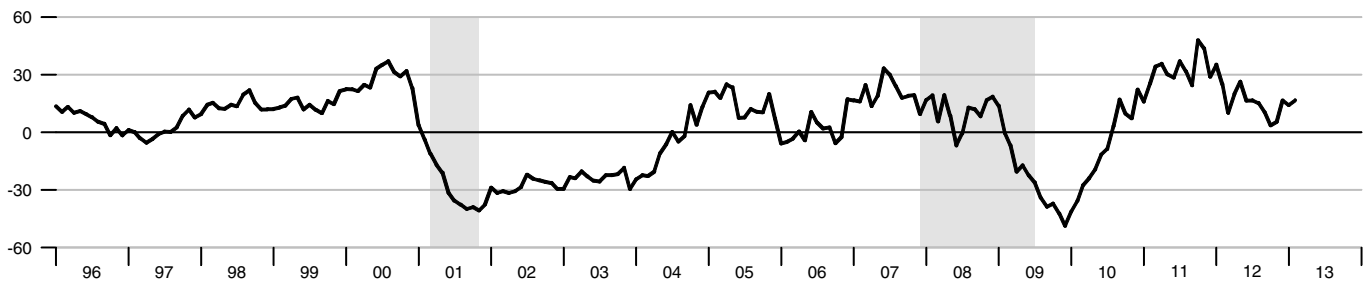
### Excess Reserves plus RCB Contracts

Billions of dollars



### Nonfinancial Commercial Paper

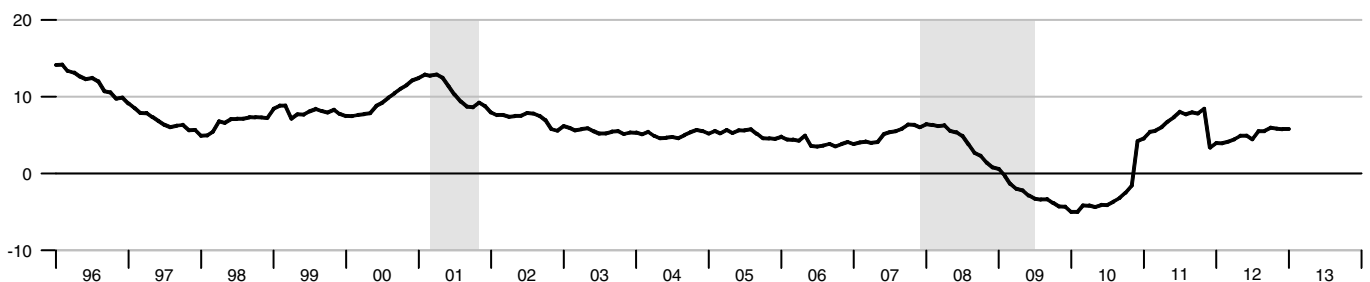
Percent change from year ago



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>.

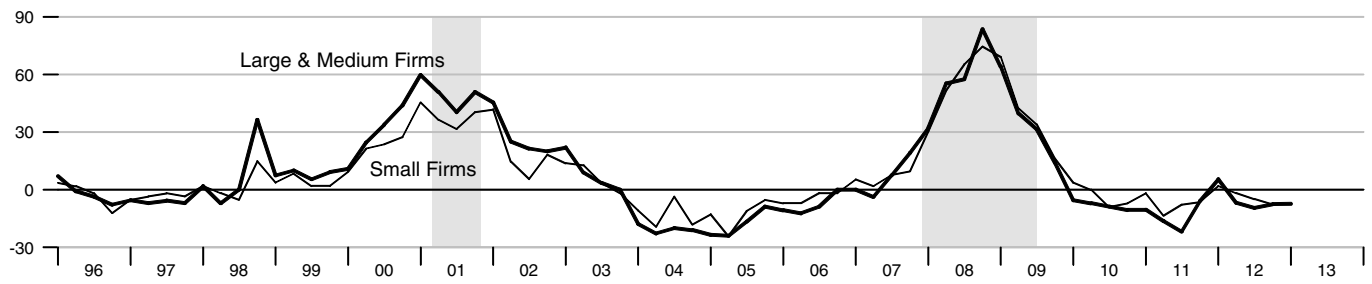
### Consumer Credit

Percent change from year ago



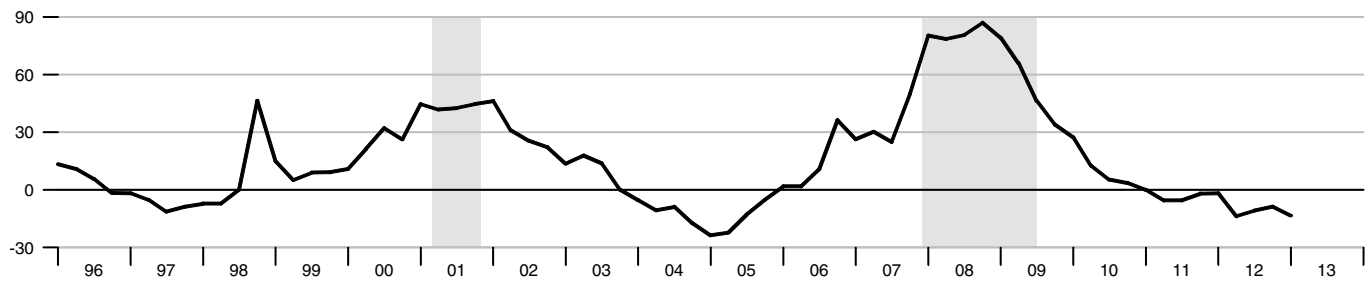
**Net Percentage of Domestic Banks Tightening Standards for Commercial and Industrial Loans**

Percentage



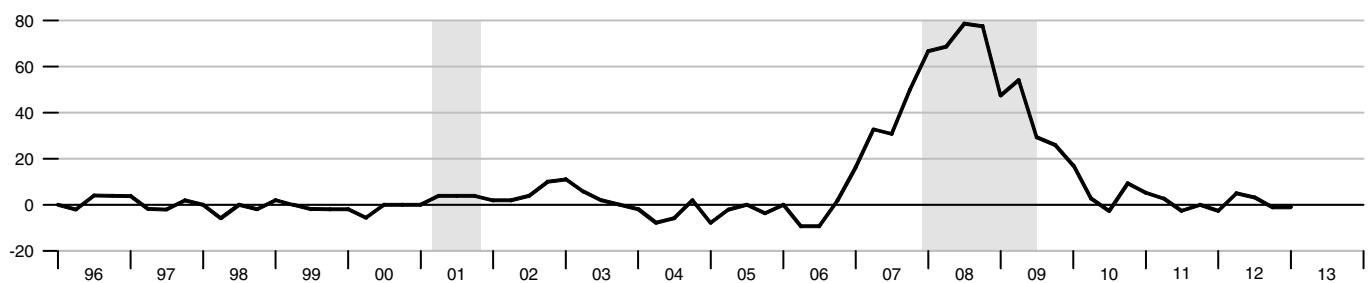
**Net Percentage of Domestic Banks Tightening Standards for Commercial Real Estate Loans**

Percentage



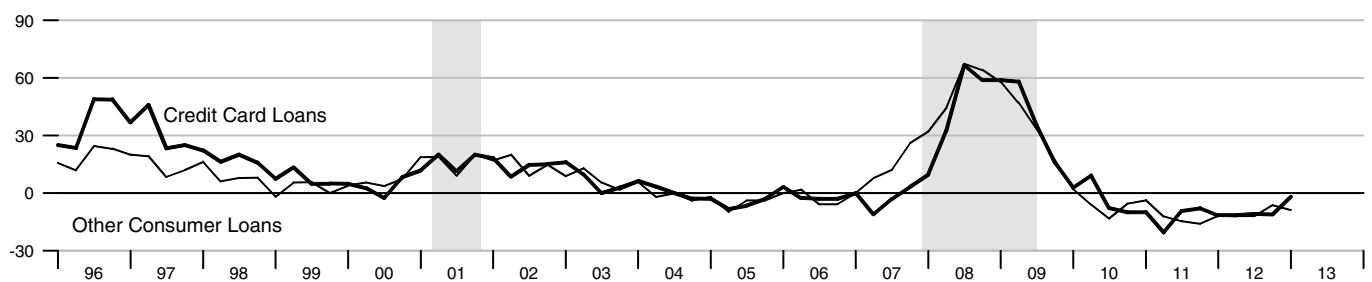
**Net Percentage of Domestic Banks Tightening Standards for Residential Mortgage Loans**

Percentage

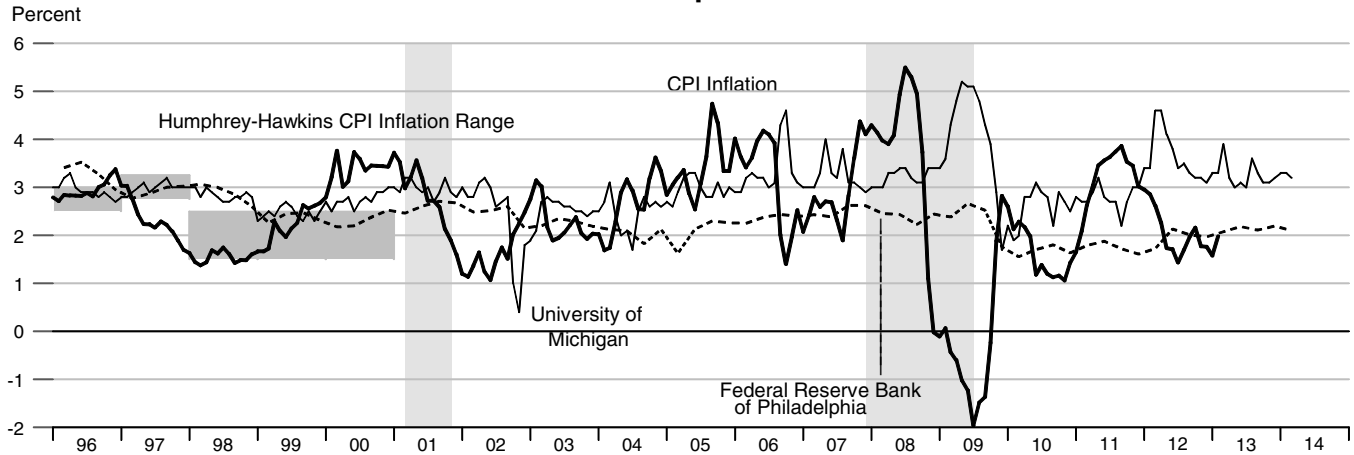


**Net Percentage of Domestic Banks Tightening Standards for Consumer Loans**

Percentage

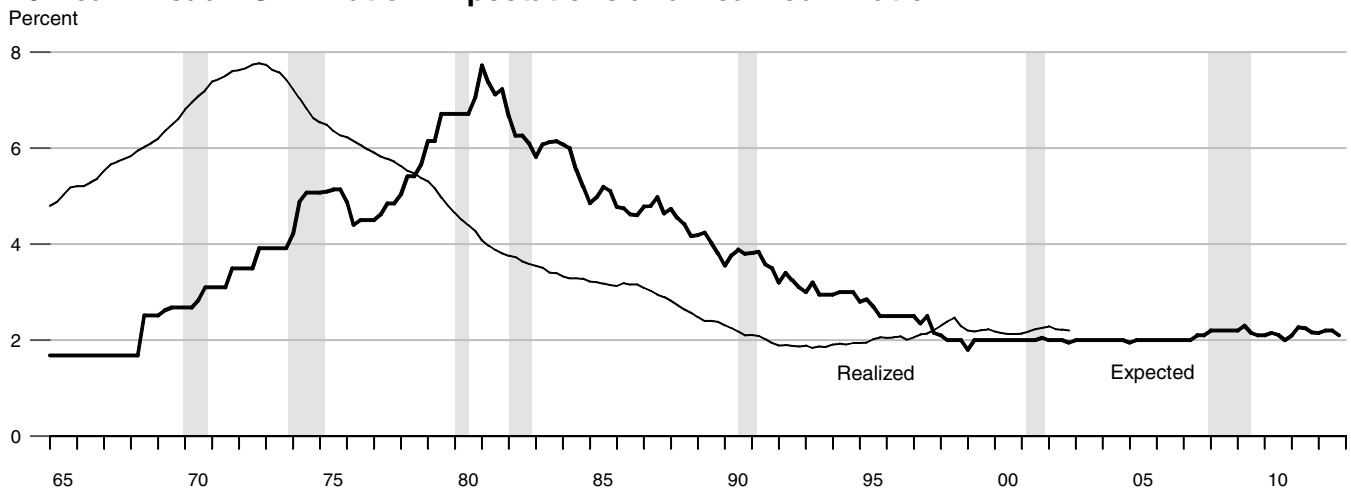


### CPI Inflation and 1-Year-Ahead CPI Inflation Expectations



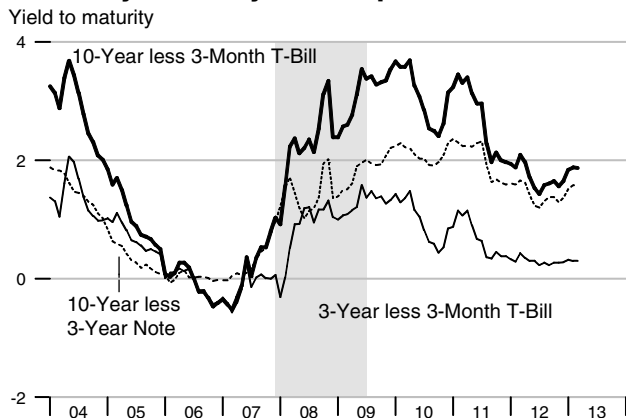
The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph.

### 10-Year Ahead PCE Inflation Expectations and Realized Inflation

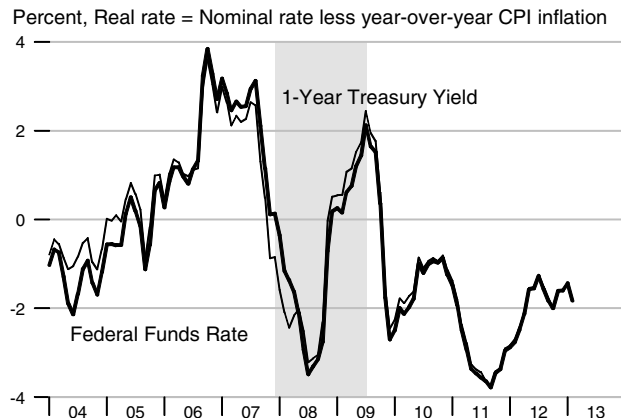


See the notes section for an explanation of the chart.

### Treasury Security Yield Spreads

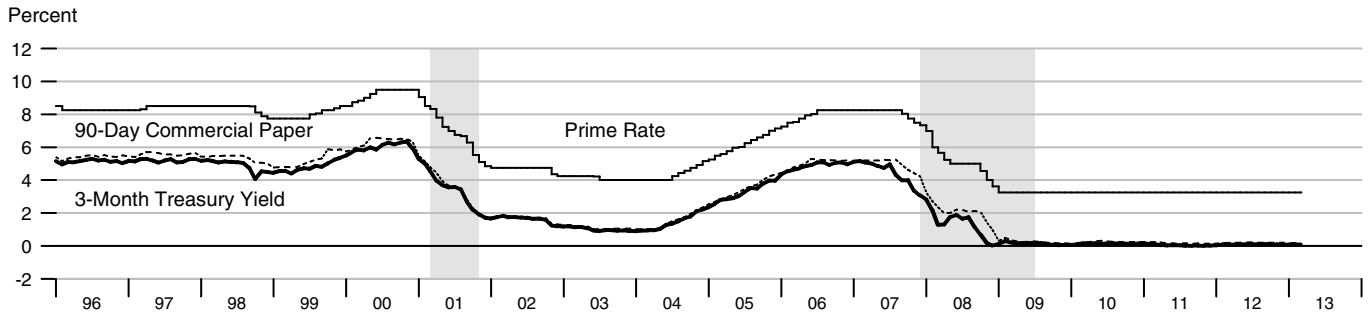


### Real Interest Rates

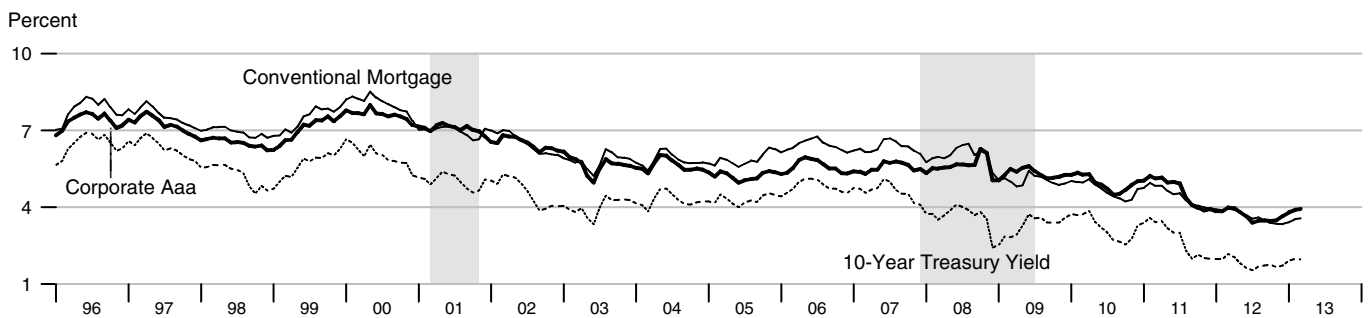




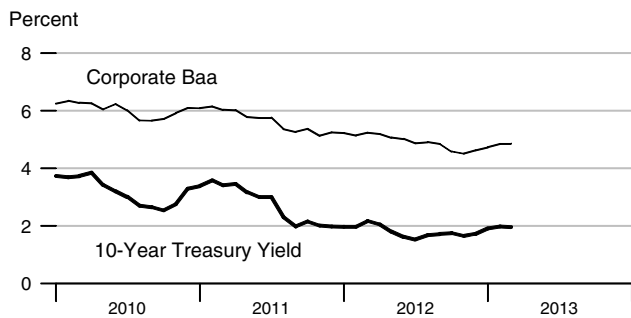
### Short-Term Interest Rates



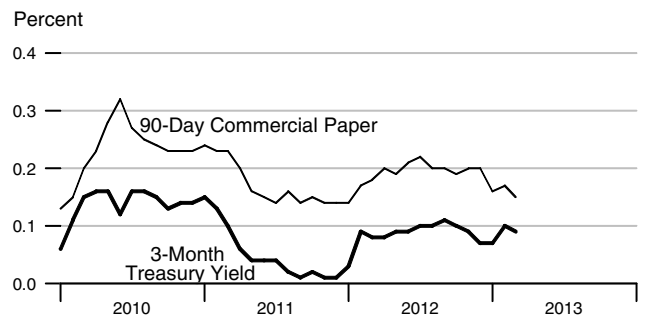
### Long-Term Interest Rates



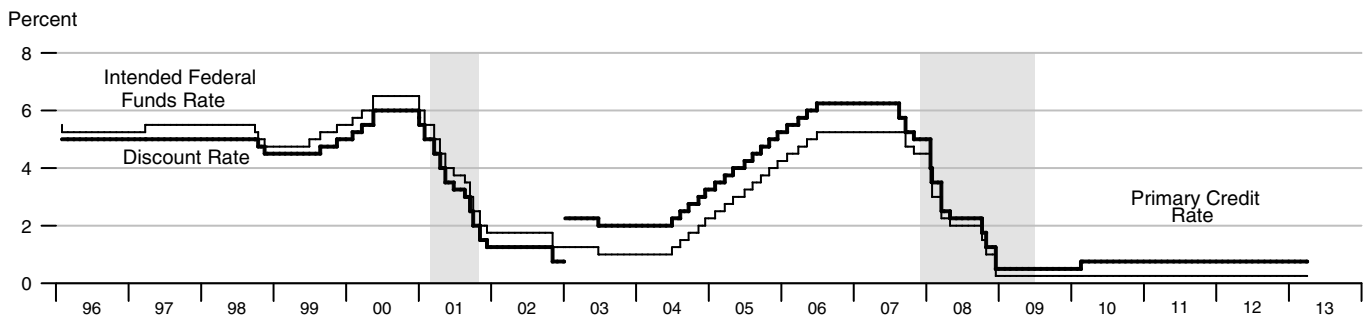
### Long-Term Interest Rates



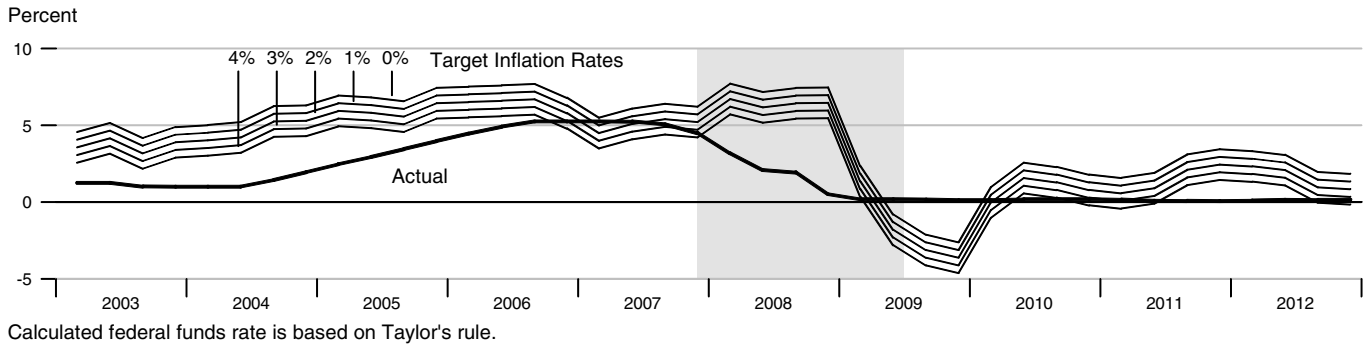
### Short-Term Interest Rates



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

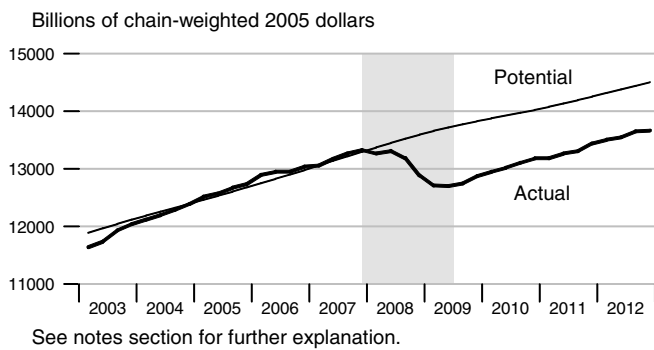


### Federal Funds Rate and Inflation Targets

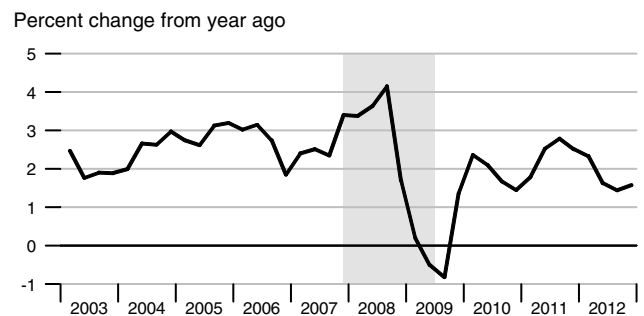


### Components of Taylor's Rule

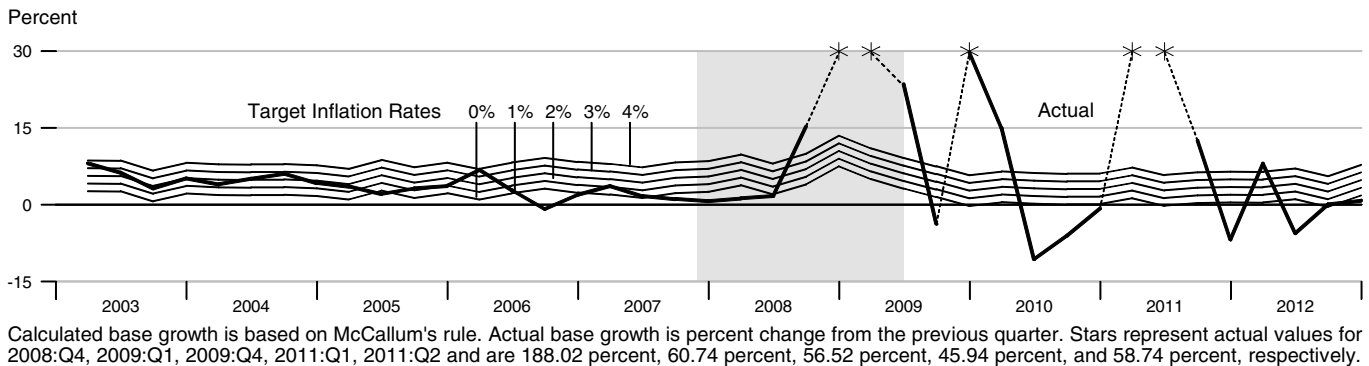
#### Actual and Potential Real GDP



#### PCE Inflation

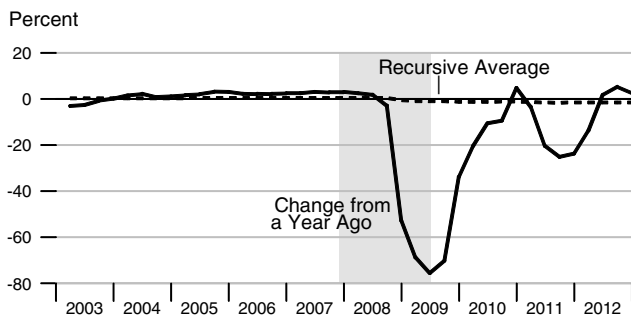


### Monetary Base Growth and Inflation Targets

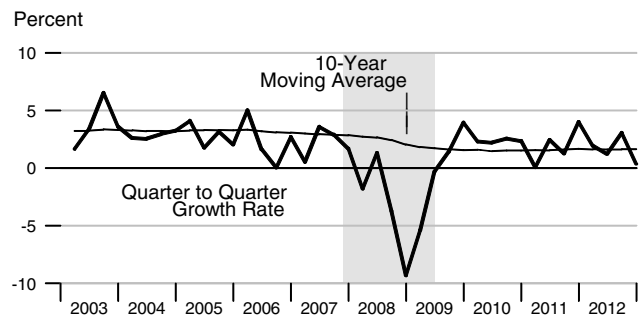


### Components of McCallum's Rule

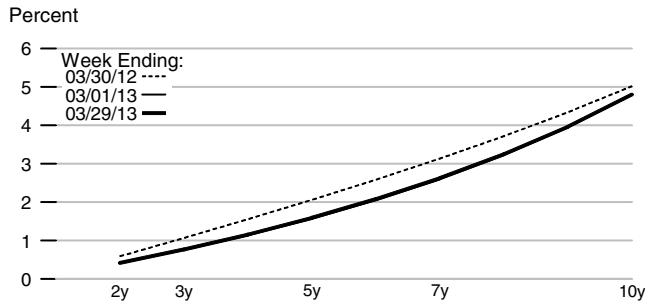
#### Monetary Base Velocity Growth



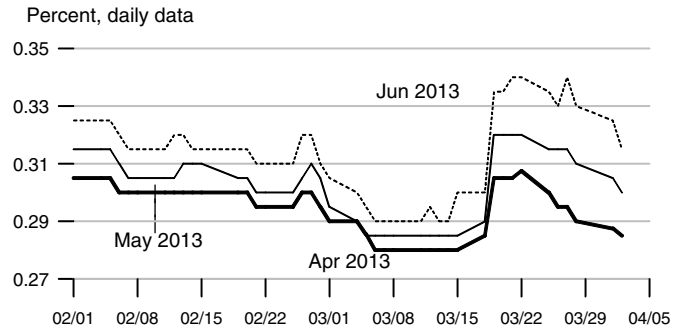
#### Real Output Growth



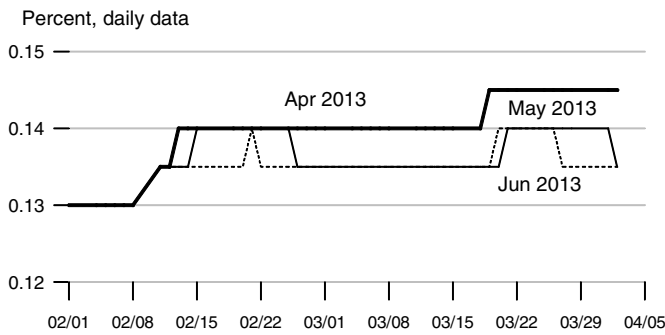
### Implied One-Year Forward Rates



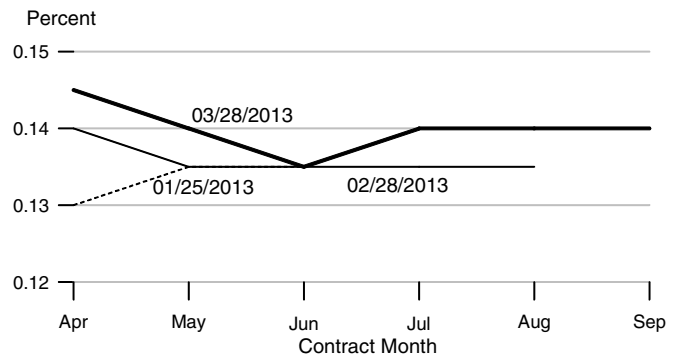
### Rates on 3-Month Eurodollar Futures



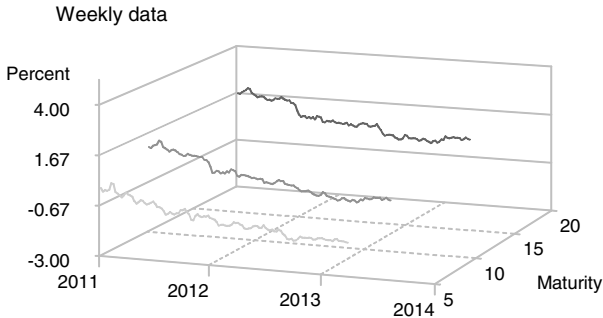
### Rates on Selected Federal Funds Futures Contracts



### Rates on Federal Funds Futures on Selected Dates

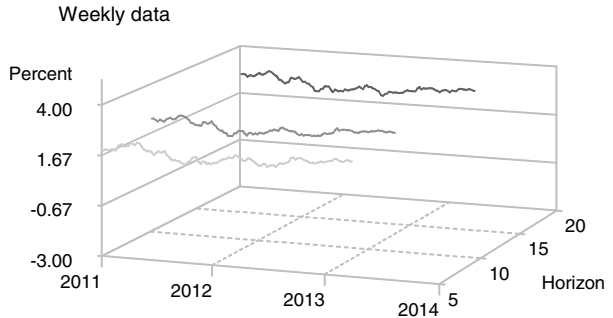


### Inflation-Indexed Treasury Securities



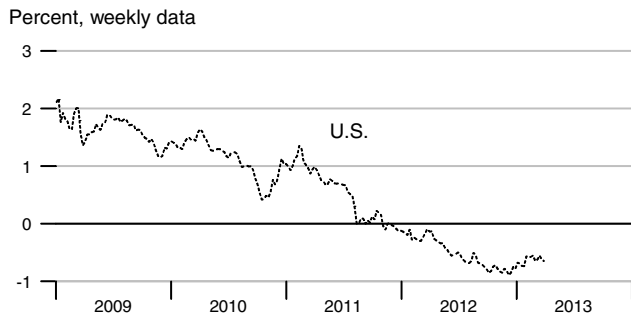
Note: Yields are inflation-indexed constant maturity U.S. Treasury securities

### Inflation-Indexed Treasury Yield Spreads



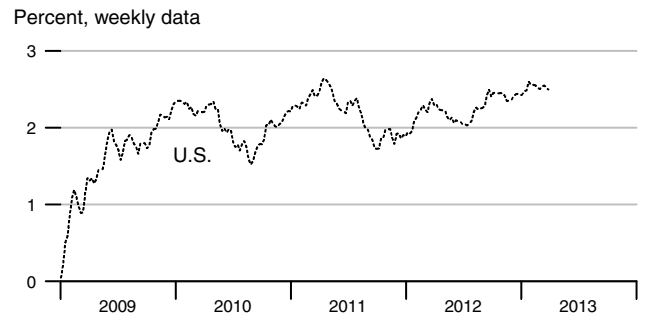
Note: Yield spread is between nominal and inflation-indexed constant maturity U.S. Treasury securities.

### Inflation-Indexed 10-Year Government Notes



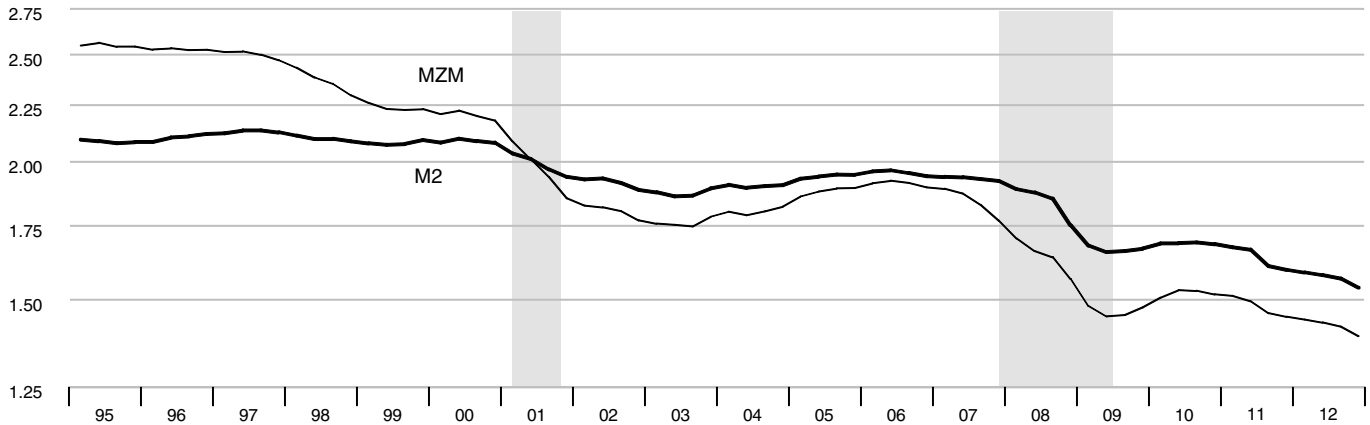
Note: Data is temporarily unavailable for the French and U.K. 10-Year Notes and Government Yield Spreads.

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



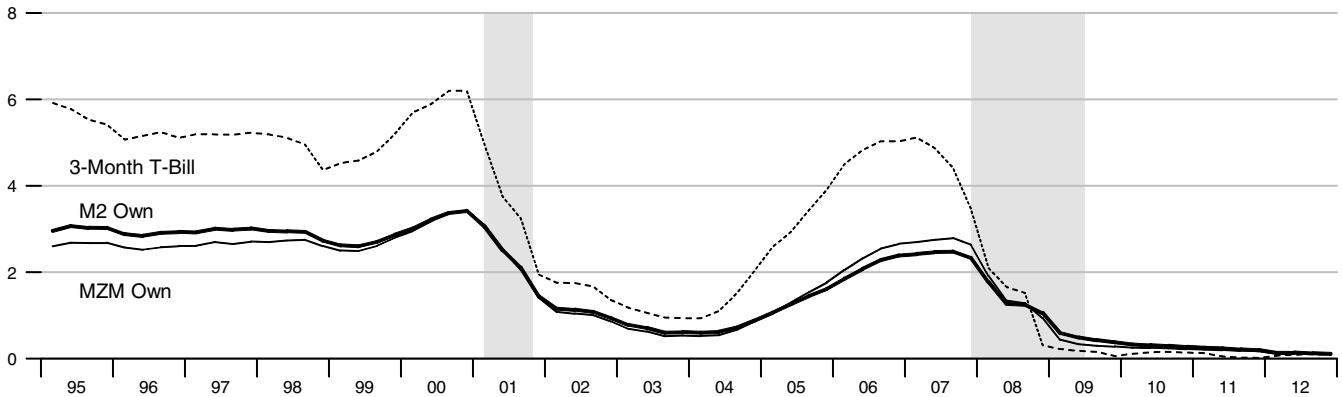
Velocity

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



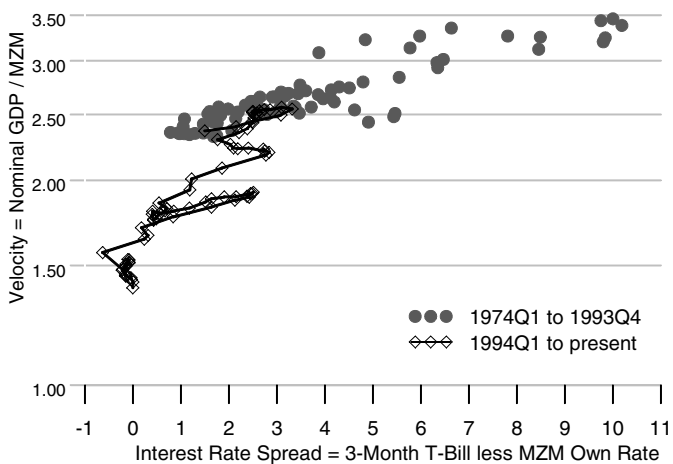
Interest Rates

Percent



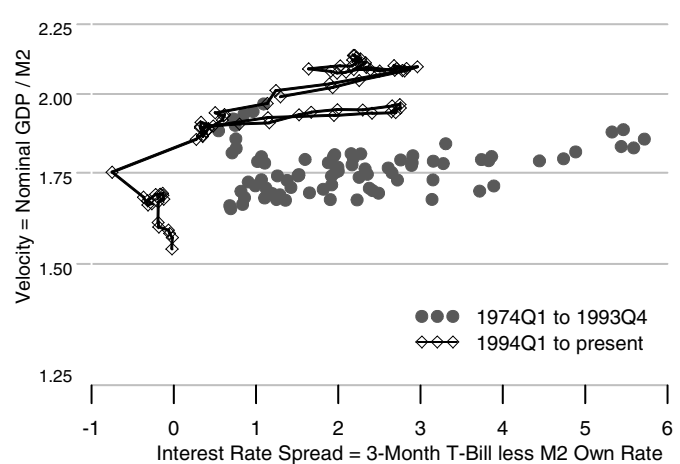
MZM Velocity and Interest Rate Spread

Ratio Scale



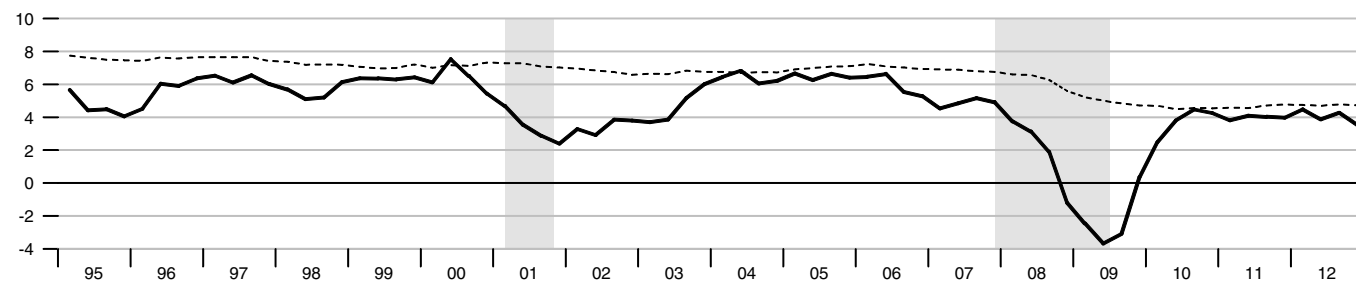
M2 Velocity and Interest Rate Spread

Ratio Scale



### Gross Domestic Product

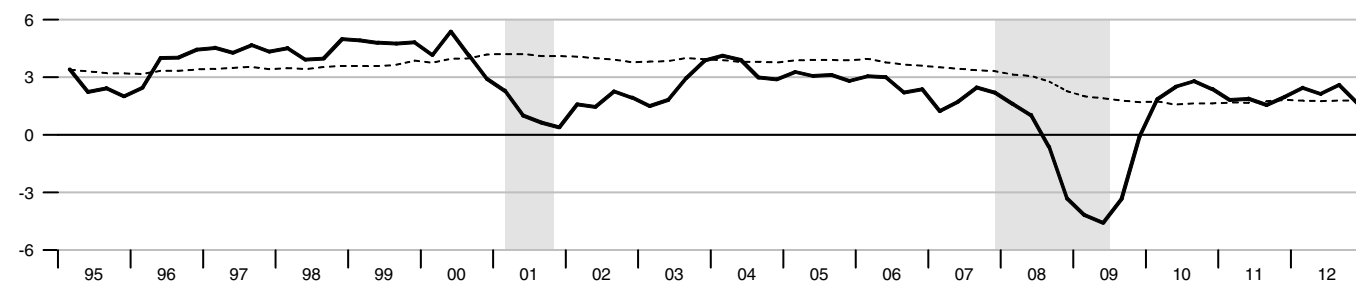
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Real Gross Domestic Product

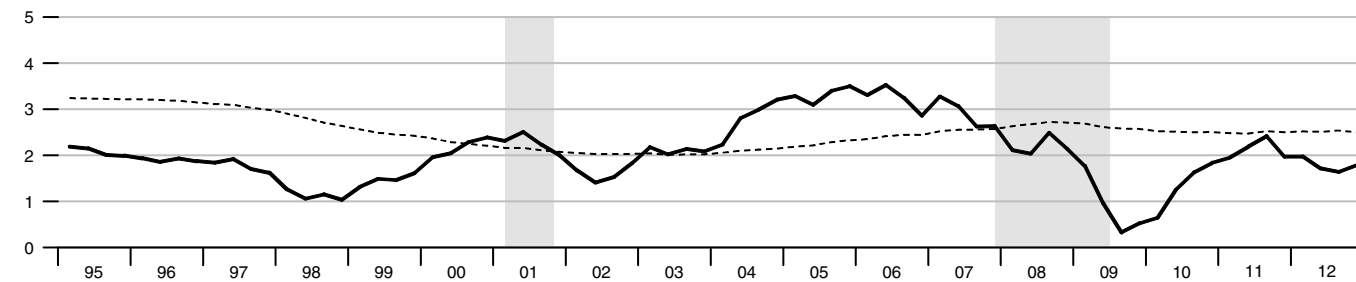
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### Gross Domestic Product Price Index

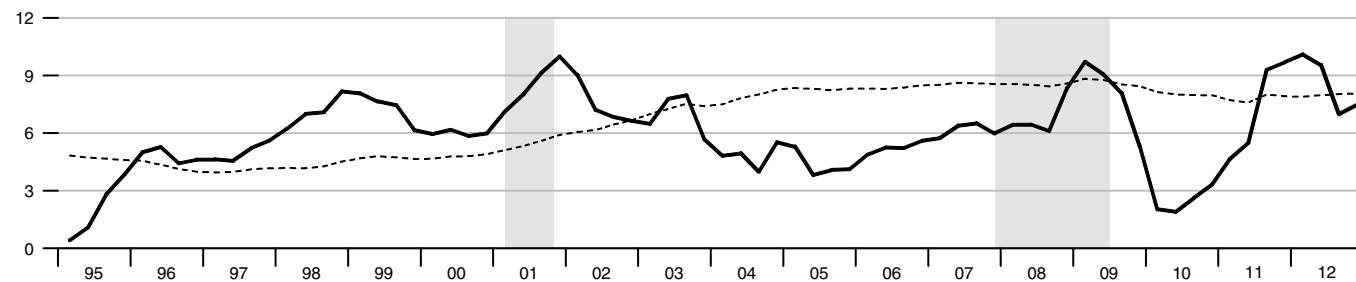
Percent change from year ago



Dashed lines indicate 10-year moving averages.

### M2

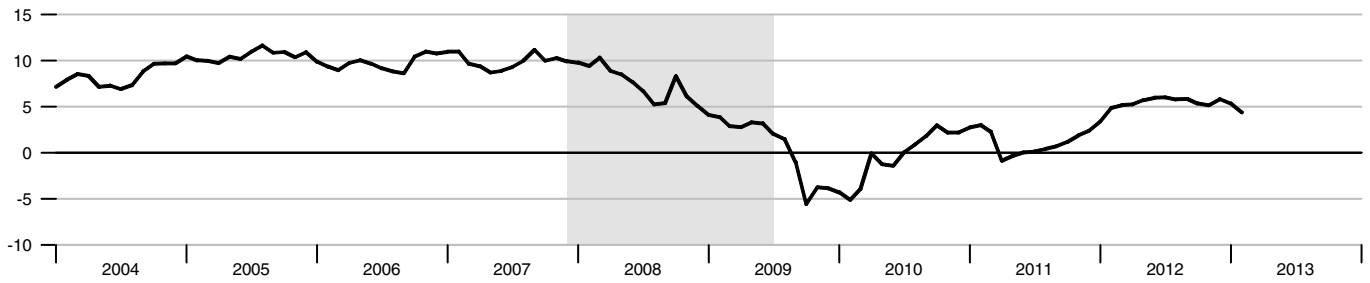
Percent change from year ago



Dashed lines indicate 10-year moving averages.

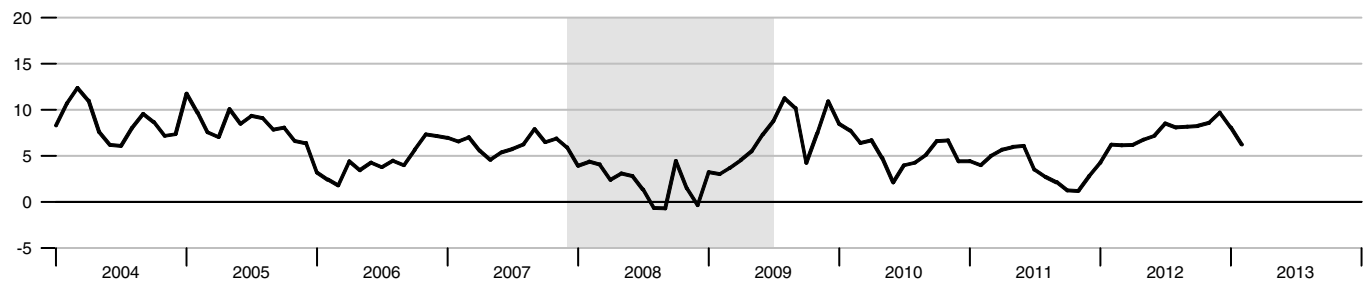
**Bank Credit**

Percent change from year ago



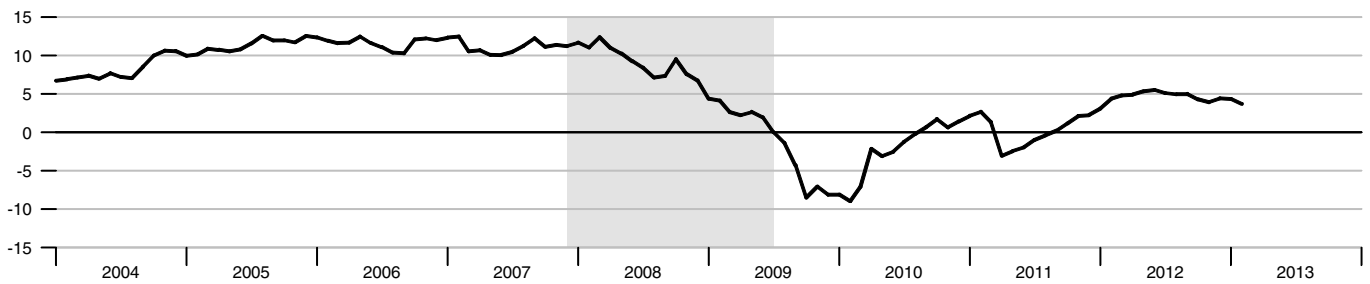
**Investment Securities in Bank Credit at Commercial Banks**

Percent change from year ago



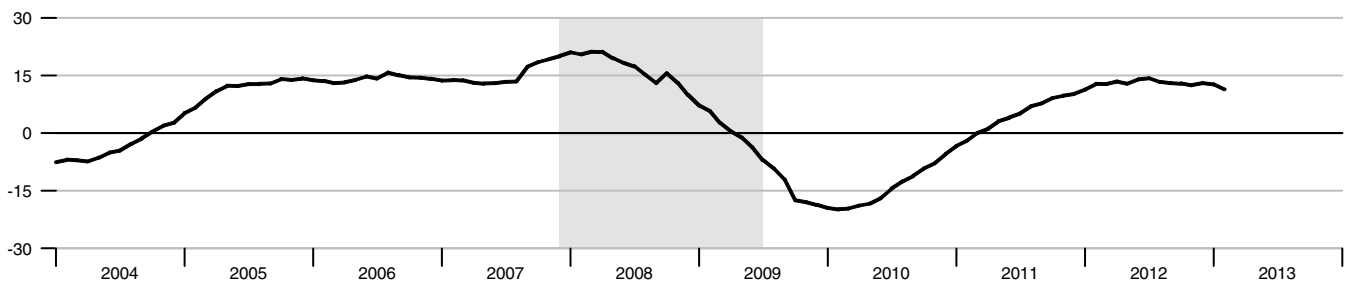
**Total Loans and Leases in Bank Credit at Commercial Banks**

Percent change from year ago

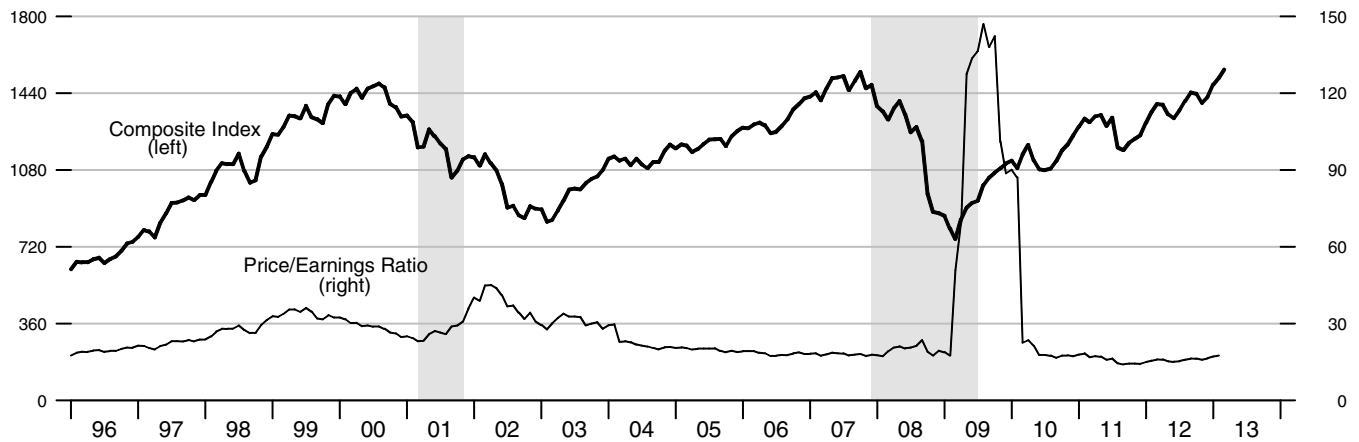


**Commercial and Industrial Loans at Commercial Banks**

Percent change from year ago



### Standard & Poor's 500

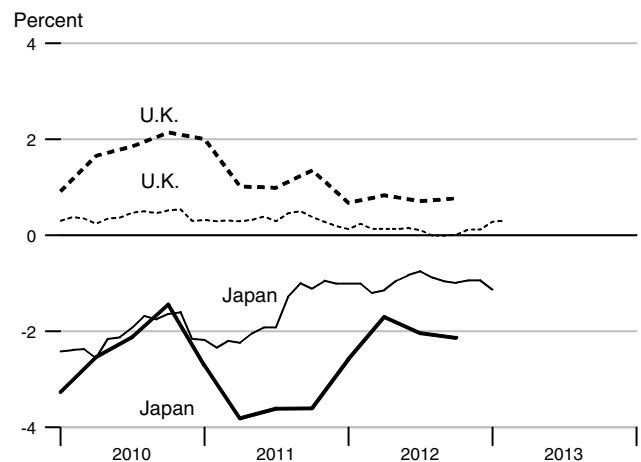
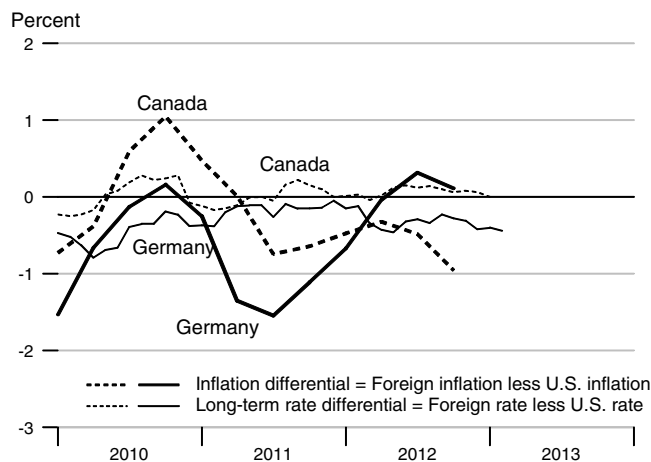


### Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2012Q1	2012Q2	2012Q3	2012Q4	Dec12	Jan13	Feb13	Mar13
United States	2.81	1.90	1.70	1.90	1.72	1.91	1.98	1.96
Canada	2.34	1.58	1.22	0.94	1.78	1.91	.	.
France	2.31	2.00	1.98	1.54	2.01	2.17	2.24	.
Germany	2.14	1.87	2.02	2.01	1.30	1.51	1.54	.
Italy	3.24	3.28	3.17	2.47	4.54	4.21	4.49	.
Japan	0.23	0.20	-0.34	-0.24	0.78	0.78	.	.
United Kingdom	3.49	2.74	2.41	2.67	1.84	2.19	2.29	.

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### Inflation and Long-Term Interest Rate Differentials



		Money Stock			Bank	Adjusted			
		M1	MZM	M2	M3*	Credit	Monetary Base	Reserves	MSI M2**
2008		1434.313	8706.098	7762.694		9103.849	1010.160	232.562	7621.433
2009		1637.332	9541.151	8384.806		9170.387	1796.556	944.783	8243.058
2010		1741.650	9534.947	8592.436		9121.312	2031.689	1144.122	8454.425
2011		2009.135	10201.71	9220.576		9224.069	2538.959	1576.923	9079.883
2012		2308.396	11050.97	10003.35		9718.737	2661.948	1612.187	9857.200
2010	1	1696.119	9473.462	8458.751		8894.437	2089.170	1217.026	8320.367
	2	1712.693	9416.798	8539.674		9191.509	2034.258	1158.432	8401.433
	3	1743.806	9536.701	8623.232		9197.425	2003.669	1117.966	8485.367
	4	1813.980	9712.827	8748.087		9201.877	1999.659	1083.064	8610.533
2011	1	1873.438	9794.834	8852.270		9132.974	2242.975	1310.572	8714.333
	2	1931.385	10032.18	9009.145		9155.979	2597.817	1647.666	8870.033
	3	2077.839	10396.31	9425.099		9237.142	2680.091	1713.909	9282.700
	4	2153.876	10583.50	9595.790		9370.182	2634.953	1635.547	9452.467
2012	1	2212.341	10753.96	9746.194		9541.622	2688.250	1662.916	9602.233
	2	2258.987	10894.58	9870.537		9672.769	2651.079	1616.276	9725.533
	3	2341.225	11146.92	10083.78		9780.050	2651.566	1601.426	9936.467
	4	2421.031	11408.42	10312.88		9880.507	2656.895	1568.129	10164.57
2011	Feb	1875.959	9784.896	8856.796		9119.899	2243.572	1327.461	8718.800
	Mar	1889.994	9861.651	8899.378		9119.459	2428.216	1508.380	8760.900
	Apr	1902.057	9950.909	8947.597		9153.739	2531.668	1599.128	8808.900
	May	1940.173	10036.38	8999.728		9154.551	2590.336	1627.328	8860.700
	Jun	1951.926	10109.24	9080.109		9159.647	2671.446	1716.542	8940.500
	Jul	1998.326	10275.73	9266.296		9202.095	2703.445	1737.866	9124.800
	Aug	2112.032	10423.56	9489.638		9245.080	2680.325	1721.223	9346.800
	Sep	2123.158	10489.63	9519.362		9264.252	2656.502	1682.638	9376.500
	Oct	2141.760	10529.23	9549.009		9323.104	2678.391	1706.876	9406.200
	Nov	2159.484	10586.54	9601.243		9386.425	2622.981	1627.609	9457.900
	Dec	2160.384	10634.75	9637.117		9401.016	2603.487	1572.155	9493.300
	2012	Jan	2200.060	10714.48	9710.592		9471.216	2647.502	1579.763
Feb		2215.044	10747.15	9745.931		9563.359	2733.060	1733.268	9602.300
Mar		2221.918	10800.26	9782.059		9590.292	2684.187	1675.716	9637.900
Apr		2250.808	10843.73	9825.540		9634.603	2673.652	1654.844	9681.200
May		2260.734	10893.34	9867.504		9677.333	2634.871	1588.364	9722.500
Jun		2265.418	10946.68	9918.568		9706.372	2644.714	1605.621	9772.900
Jul		2310.853	11052.18	10009.99		9755.034	2669.125	1621.945	9863.400
Aug		2339.051	11146.42	10082.47		9780.004	2669.356	1626.537	9935.100
Sep		2373.771	11242.16	10158.87		9805.114	2616.218	1555.796	10010.90
Oct		2419.496	11328.37	10242.77		9821.746	2648.743	1584.771	10094.20
Nov		2403.507	11384.50	10293.55		9871.330	2665.084	1581.272	10146.00
Dec		2440.089	11512.38	10402.33		9948.446	2656.859	1538.345	10253.50
2013	Jan	2459.555	11586.55	10439.45		9977.771	2748.923	1593.872	10290.80
	Feb	2471.238	11568.14	10412.62		9982.673	2874.346	1794.718	

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



		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				
2008		1.93	2.39	5.09	2.97	1.39	2.24	3.67	5.63	4.58	6.04	
2009		0.16	0.50	3.25	0.56	0.15	1.43	3.26	5.31	4.27	5.04	
2010		0.17	0.72	3.25	0.31	0.14	1.11	3.21	4.94	3.90	4.69	
2011		0.10	0.75	3.25	0.30	0.05	0.75	2.79	4.64	4.26	4.46	
2012		0.14	0.75	3.25	0.28	0.09	0.38	1.80	3.67	3.12	3.66	
2011	1	0.16	0.75	3.25	0.28	0.13	1.16	3.46	5.13	4.71	4.85	
	2	0.09	0.75	3.25	0.22	0.05	0.95	3.21	5.04	4.50	4.66	
	3	0.08	0.75	3.25	0.29	0.02	0.47	2.43	4.46	4.02	4.31	
	4	0.07	0.75	3.25	0.42	0.01	0.42	2.05	3.93	3.82	4.01	
2012	1	0.10	0.75	3.25	0.33	0.07	0.42	2.04	3.89	3.31	3.92	
	2	0.15	0.75	3.25	0.30	0.09	0.40	1.82	3.80	3.32	3.79	
	3	0.14	0.75	3.25	0.27	0.10	0.35	1.64	3.45	3.05	3.55	
	4	0.16	0.75	3.25	0.23	0.09	0.36	1.71	3.54	2.81	3.36	
2013	1	0.14	0.75	3.25	0.22	0.09	0.39	1.95	3.88		3.50	
2011	Mar	0.14	0.75	3.25	0.28	0.10	1.17	3.41	5.13	4.47	4.84	
	Apr	0.10	0.75	3.25	0.23	0.06	1.21	3.46	5.16	4.93	4.84	
	May	0.09	0.75	3.25	0.21	0.04	0.94	3.17	4.96	4.33	4.64	
	Jun	0.09	0.75	3.25	0.22	0.04	0.71	3.00	4.99	4.23	4.51	
	Jul	0.07	0.75	3.25	0.24	0.04	0.68	3.00	4.93	4.31	4.55	
	Aug	0.10	0.75	3.25	0.29	0.02	0.38	2.30	4.37	3.90	4.27	
	Sep	0.08	0.75	3.25	0.33	0.01	0.35	1.98	4.09	3.84	4.11	
	Oct	0.07	0.75	3.25	0.37	0.02	0.47	2.15	3.98	3.93	4.07	
	Nov	0.08	0.75	3.25	0.41	0.01	0.39	2.01	3.87	3.79	3.99	
	Dec	0.07	0.75	3.25	0.49	0.01	0.39	1.98	3.93	3.75	3.96	
	2012	Jan	0.08	0.75	3.25	0.40	0.03	0.36	1.97	3.85	3.48	3.92
		Feb	0.10	0.75	3.25	0.30	0.09	0.38	1.97	3.85	3.09	3.89
Mar		0.13	0.75	3.25	0.29	0.08	0.51	2.17	3.99	3.37	3.95	
Apr		0.14	0.75	3.25	0.29	0.08	0.43	2.05	3.96	3.43	3.91	
May		0.16	0.75	3.25	0.29	0.09	0.39	1.80	3.80	3.20	3.80	
Jun		0.16	0.75	3.25	0.32	0.09	0.39	1.62	3.64	3.32	3.68	
Jul		0.16	0.75	3.25	0.30	0.10	0.33	1.53	3.40	3.18	3.55	
Aug		0.13	0.75	3.25	0.26	0.10	0.37	1.68	3.48	3.01	3.60	
Sep		0.14	0.75	3.25	0.24	0.11	0.34	1.72	3.49	2.96	3.50	
Oct		0.16	0.75	3.25	0.23	0.10	0.37	1.75	3.47	2.86	3.38	
Nov		0.16	0.75	3.25	0.23	0.09	0.36	1.65	3.50	2.76	3.35	
Dec		0.16	0.75	3.25	0.24	0.07	0.35	1.72	3.65	2.81	3.35	
2013	Jan	0.14	0.75	3.25	0.23	0.07	0.39	1.91	3.80	2.83	3.41	
	Feb	0.15	0.75	3.25	0.22	0.10	0.40	1.98	3.90	3.08	3.53	
	Mar	0.14	0.75	3.25	0.21	0.09	0.39	1.96	3.93		3.57	

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

		M1	MZM	M2	M3*
<b>Percent change at an annual rate</b>					
	2008	4.50	14.06	6.84	
	2009	14.15	9.59	8.01	
	2010	6.37	-0.07	2.48	
	2011	15.36	6.99	7.31	
	2012	14.90	8.32	8.49	
<hr/>					
2010	1	2.76	-4.16	-0.37	
	2	3.91	-2.39	3.83	
	3	7.27	5.09	3.91	
	4	16.10	7.39	5.79	
2011	1	13.11	3.38	4.76	
	2	12.37	9.69	7.09	
	3	30.33	14.52	18.47	
	4	14.64	7.20	7.24	
2012	1	10.86	6.44	6.27	
	2	8.43	5.23	5.10	
	3	14.56	9.26	8.64	
	4	13.63	9.38	9.09	
<hr/>					
2011	Feb	13.98	5.78	7.66	
	Mar	8.98	9.41	5.77	
	Apr	7.66	10.86	6.50	
	May	24.05	10.31	6.99	
	Jun	7.27	8.71	10.72	
	Jul	28.53	19.76	24.61	
	Aug	68.28	17.26	28.92	
	Sep	6.32	7.61	3.76	
	Oct	10.51	4.53	3.74	
	Nov	9.93	6.53	6.56	
	Dec	0.50	5.46	4.48	
<hr/>					
2012	Jan	22.04	9.00	9.15	
	Feb	8.17	3.66	4.37	
	Mar	3.72	5.93	4.45	
	Apr	15.60	4.83	5.33	
	May	5.29	5.49	5.13	
	Jun	2.49	5.88	6.21	
	Jul	24.07	11.56	11.06	
	Aug	14.64	10.23	8.69	
	Sep	17.81	10.31	9.09	
	Oct	23.12	9.20	9.91	
	Nov	-7.93	5.95	5.95	
	Dec	18.26	13.48	12.68	
<hr/>					
2013	Jan	9.57	7.73	4.28	
	Feb	5.70	-1.91	-3.08	

\*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. **Retail Money Market Mutual Funds** are included in M2. **Institutional** money market funds are not included in M2.

**Page 6:** **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 7:** Data are reported in the Senior Loan Officer Opinion Survey on Bank Lending Practices.

**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.

From 1991 to the present the source of the long-term PCE inflation expectations data is the Federal Reserve Bank of Philadelphia's *Survey of Professional Forecasters*. Prior to 1991, the data were obtained from the Board of Governors of the Federal Reserve System. Realized (actual) inflation is the annualized rate of change for the 40-quarter period that corresponds to the forecast horizon (the expectations measure). For example, in 1965:Q1, annualized PCE inflation over the next 40 quarters was expected to average 1.7 percent. In actuality, the average annualized rate of change measured 4.8 percent from 1965:Q1 to 1975:Q1. Thus, the vertical distance between the two lines in the chart at any point is the forecast error.

**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 estimated by the Congressional Budget Office (CBO).

**Monetary Base Growth and Inflation Targets** shows the quarterly growth of the adjusted monetary base implied by applying McCallum's (2000, p. 52) equation

$$\Delta b_t = \Delta x_t^* - \Delta v_t^a + \lambda (\Delta x_t^* - \Delta x_{t-1}),$$

$$\Delta x_t^* = \pi^* + \Delta y_t^*$$

to five alternative target inflation rates,  $\pi^* = 0, 1, 2, 3, 4$  percent, where  $\Delta b_t$  is the implied growth rate of the adjusted monetary base,  $\Delta y_t^*$  is the 10-year

moving average growth in real GDP,  $\Delta v_t^a$  is the average base velocity growth (calculated recursively),  $\Delta x_{t-1}$  is the lag growth rate of nominal GDP, and  $\lambda = 0.5$ .

**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 4/16/2020, and the current U.S. note has a maturity date of 11/15/2020. **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 2005 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. Senior Loan Officer Opinion Survey on Bank Lending Practices.

*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/).