

Fiscal Policy and Expected Inflation

Unless something is done, the United States faces the prospect of unprecedented deficits and exploding debt-to-GDP (gross domestic product) ratios. Budget analysts forecast the publicly held U.S. debt-to-GDP ratio will rise from 60 percent at 2010 fiscal year-end to 185 percent by 2035. Although a few developed countries (e.g., Japan and Italy) have managed to avoid default with very high debt-to-GDP ratios, rising prices of credit default swaps (CDSs) on U.S. debt indicate that financial markets now consider a U.S. default possible, if still highly unlikely. CDSs function much like insurance for bonds: The buyer of a CDS pays an annual premium in exchange for insurance against the possibility of default by the bond issuer. Just as the likelihood of an auto accident affects the price of auto insurance, CDS premia reflect changes in market expectations about the likelihood that a bond issuer—such as a corporation or government—will default. CDS rates on U.S. debt have risen from less than 5 basis points per annum in 2007 to more than 40 basis points recently. The possibility of a technical default—in which wrangling over the debt ceiling delays bond payments by a few days—might produce some of the increase in CDS rates, but fears of a substantive default are also likely to have risen. Investors are much more wary of an explicit U.S. default.

A country in an untenable fiscal situation can evade its debt obligations in at least two ways. The first is to default by canceling or restructuring debt. The second (and indirect) way to default is by raising the domestic price level with surprise inflation—reducing the real value of nominal bonds denominated in the domestic currency. Although Federal Reserve Chairman Ben Bernanke has been steadfast in stating that the Fed will not allow inflation to rise above 2 percent—which the Fed has traditionally equated with price stability—some analysts predict the Fed will use inflation to greatly reduce the real value of U.S. debt.¹

Despite U.S. fiscal problems, the Fed appears to still retain excellent inflation credibility with financial markets. The chart shows that expected inflation from both Treasury Inflation-Protected Security (TIPS) spreads measures and professional economists' forecasts seems to be well anchored near 2 percent. Markets and forecasters appear to discount the possibility of using inflation to reduce the value of U.S. debt.

Although confidence in the Fed might explain the quiescence of inflation expectations, the structure of U.S. government debt may be more important. Each year, almost 40 percent of privately held U.S. government debt matures and must be refi-

nanced. A surprise burst of inflation would reduce the real value of this debt but also greatly increase the cost of rolling it over and perhaps make it impossible to roll over. Furthermore, 7 percent of the U.S. debt consists of TIPS whose payments would rise commensurately with increases in the consumer price index.²

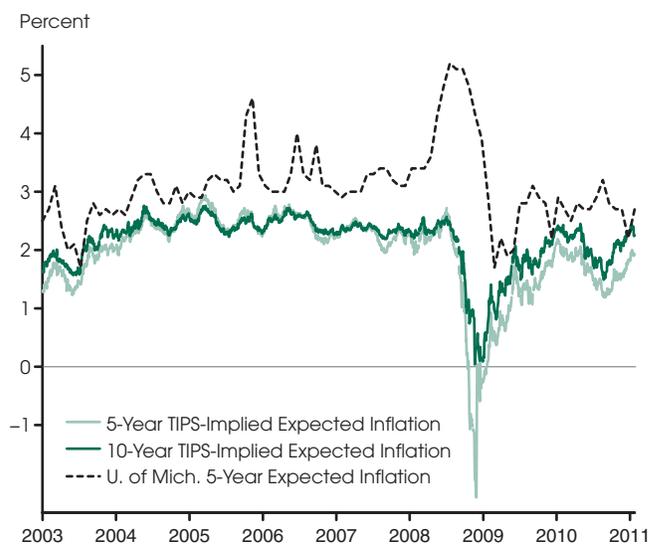
In other words, inflating away the U.S. debt simply would not work because a high proportion of the debt is in short-term or inflation-protected securities. Some combination of reduced spending and/or higher taxes would reduce the default risk and create a sustainable fiscal path.

—Christopher J. Neely

¹ Chairman Bernanke has said recently that “We’ve been very, very clear that we will not allow inflation to rise above two percent or less” (www.clipsandcomment.com/2010/12/06/transcript-ben-bernanke-on-60-minutes-december-5-2010/) and “Well, first, let me say that we’re not going to be monetizing the debt” (see p. 35 of http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_house_hearings&docid=f:56766.pdf).

² The short-maturity debt also includes some near-to-maturity TIPS.

Expected Inflation



NOTE: The chart shows three measures of expected consumer price index inflation. The TIPS measures show expected inflation that is implied by real and nominal Treasury bond yields. The Thomson Reuters/University of Michigan survey measures consumer inflation expectations.

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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:

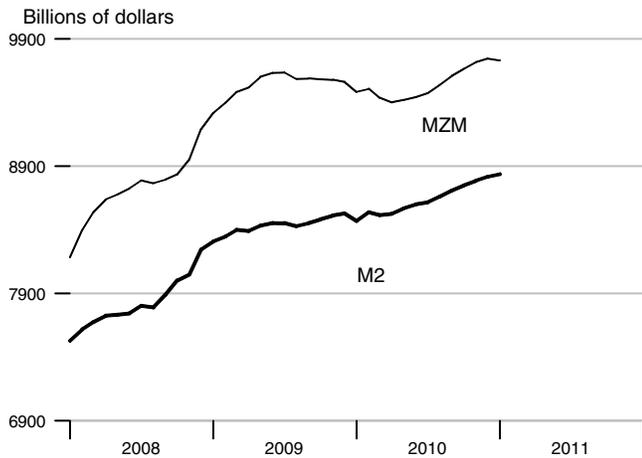
Editor, *Monetary Trends*
Research Division
Federal Reserve Bank of St. Louis
P.O. Box 442
St. Louis, MO 63166-0442

or to:

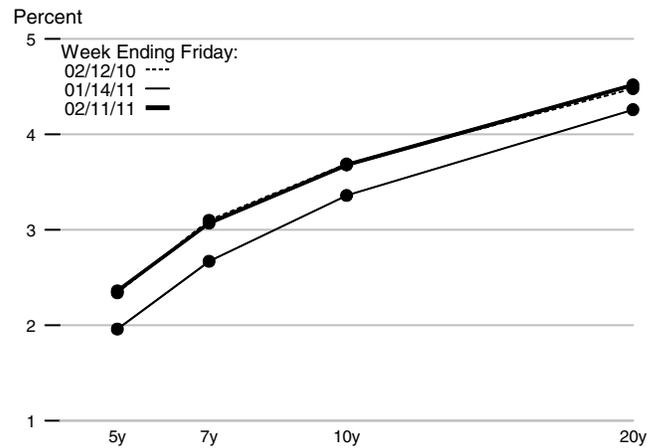
stlsFRED@stls.frb.org

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.

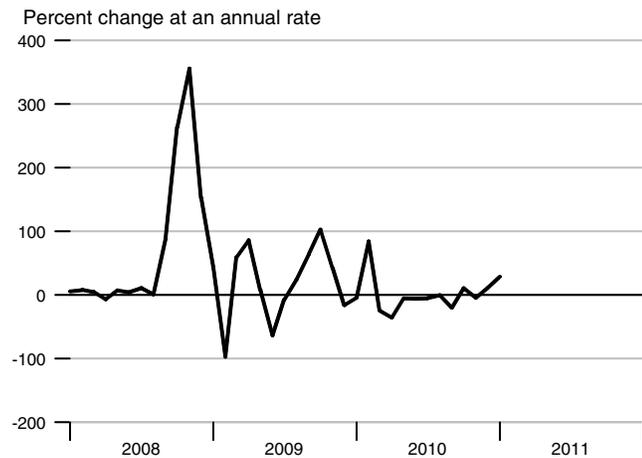
M2 and MZM



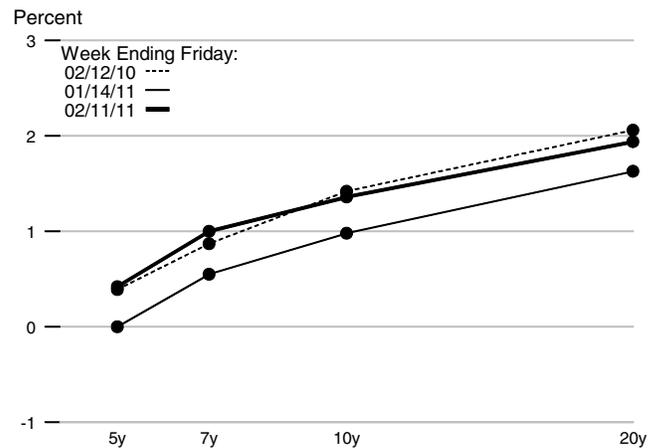
Treasury Yield Curve



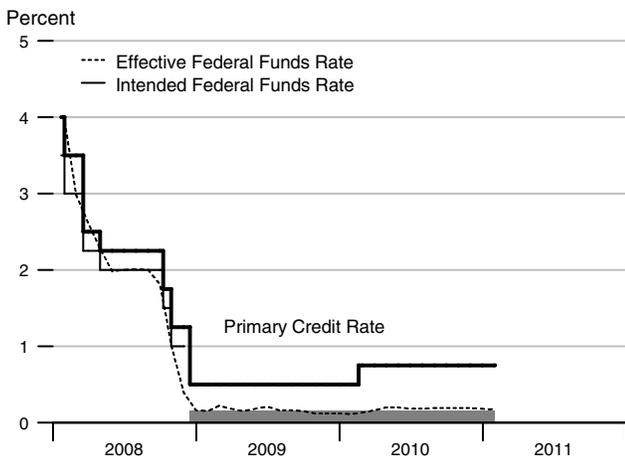
Adjusted Monetary Base



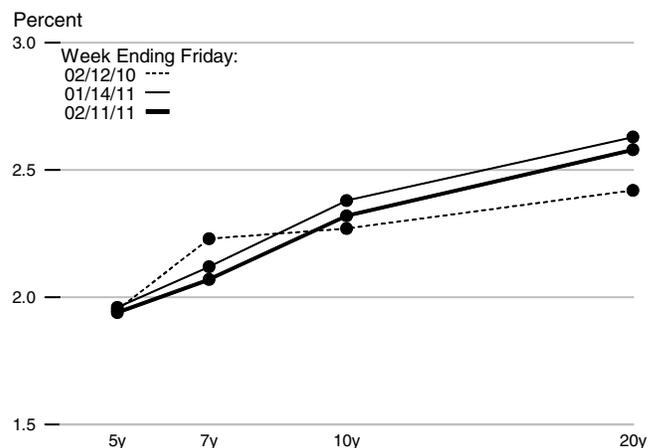
Real Treasury Yield Curve



Reserve Market Rates



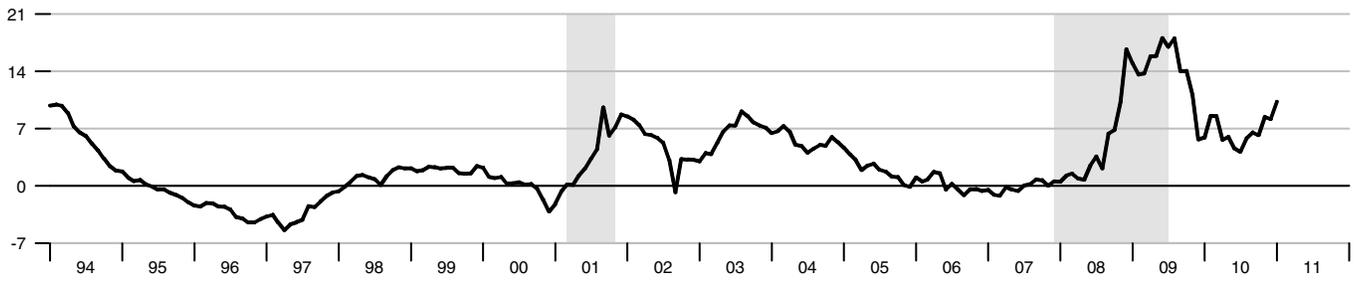
Inflation-Indexed Treasury Yield Spreads



Note: Effective December 16, 2008, FOMC reports the intended Federal Funds Rate as a range.

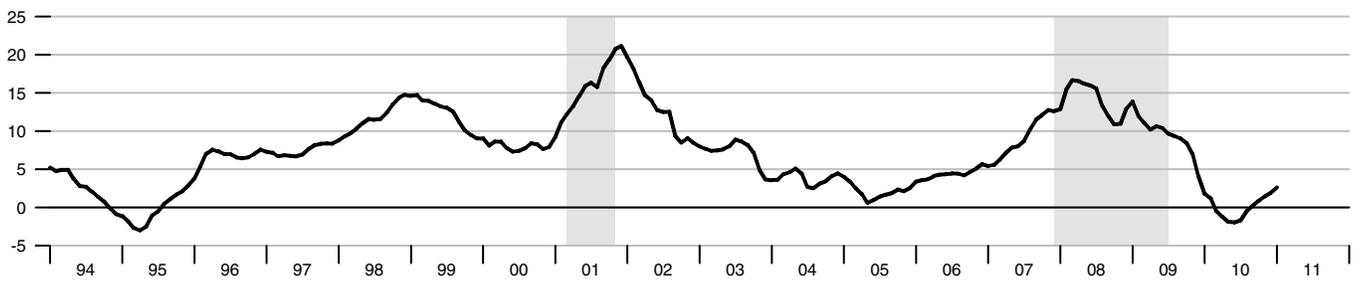
M1

Percent change from year ago



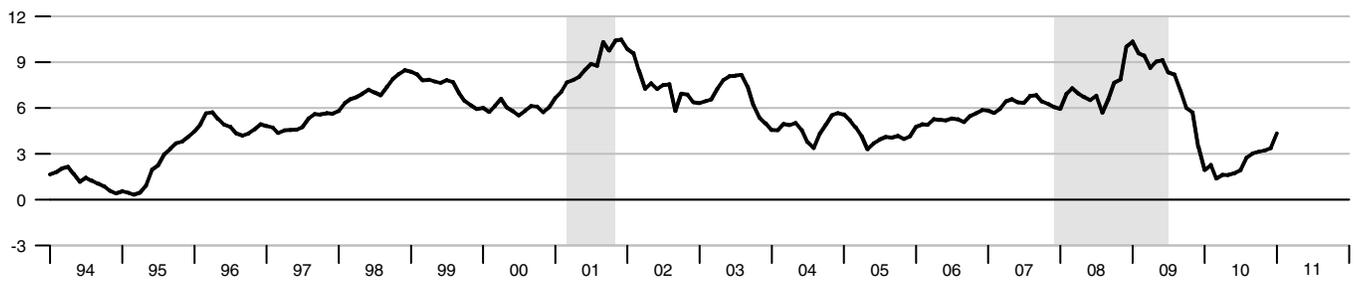
MZM

Percent change from year ago



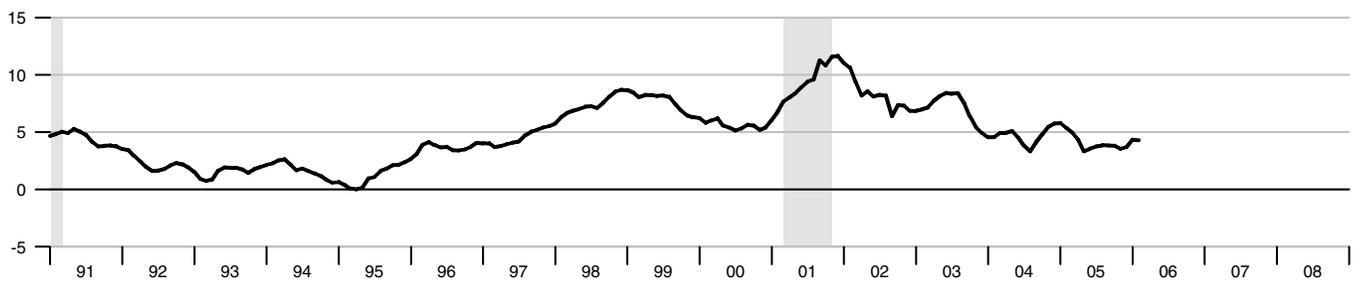
M2

Percent change from year ago



Monetary Services Index - M2**

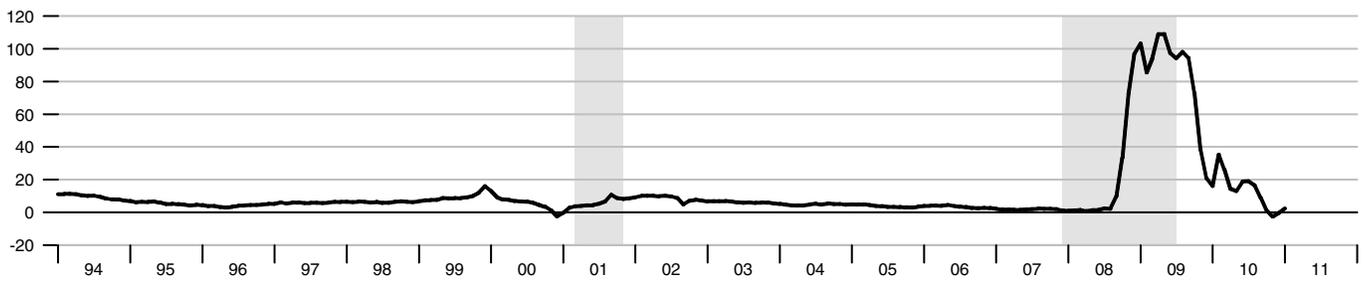
Percent change from year ago



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

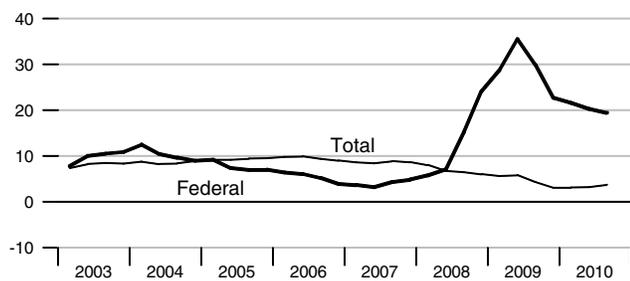
Adjusted Monetary Base

Percent change from year ago



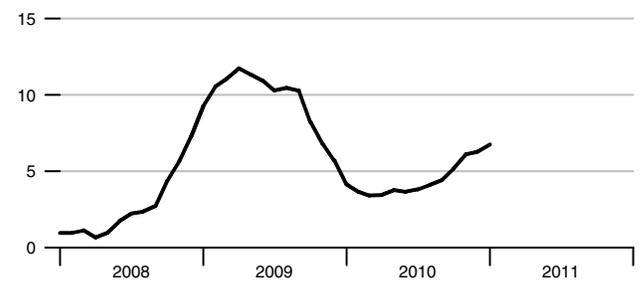
Domestic Nonfinancial Debt

Percent change from year ago



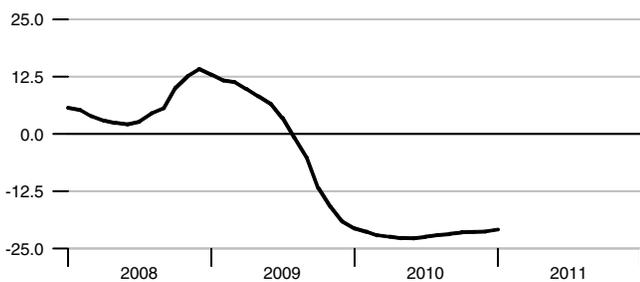
Currency Held by the Nonbank Public

Percent change from year ago



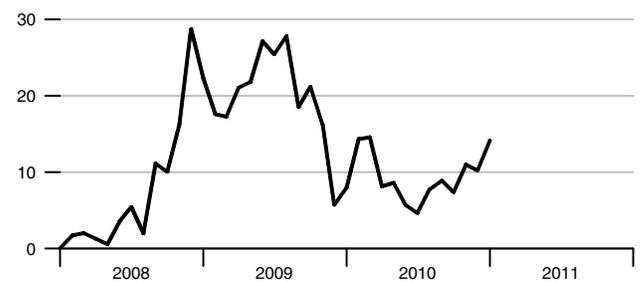
Small Denomination Time Deposits*

Percent change from year ago



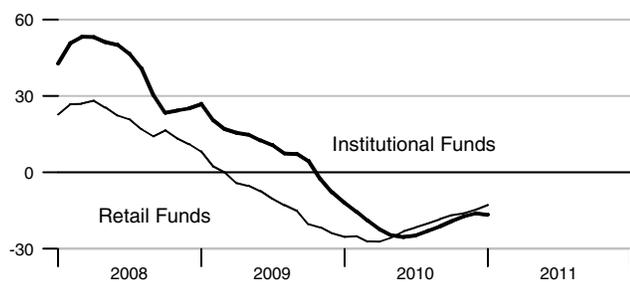
Checkable Deposits

Percent change from year ago



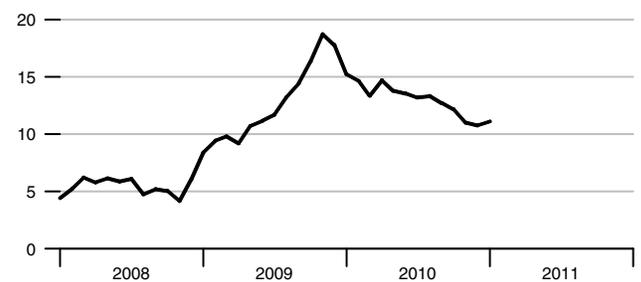
Money Market Mutual Fund Shares

Percent change from year ago



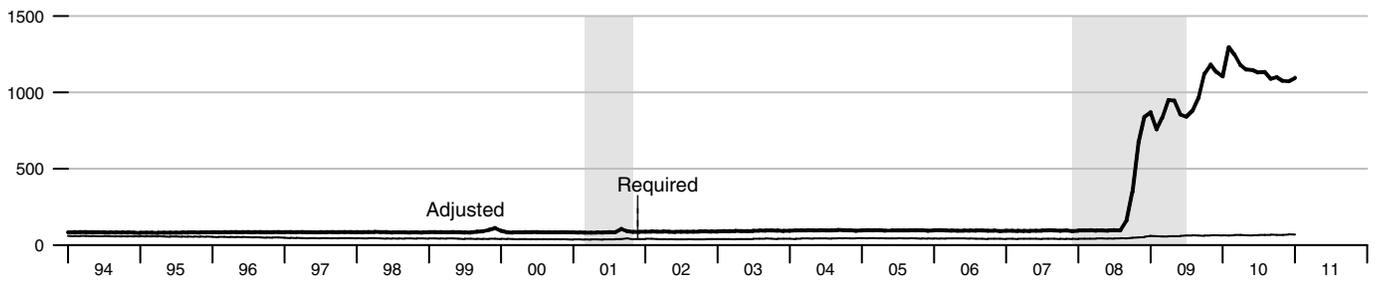
Savings Deposits

Percent change from year ago



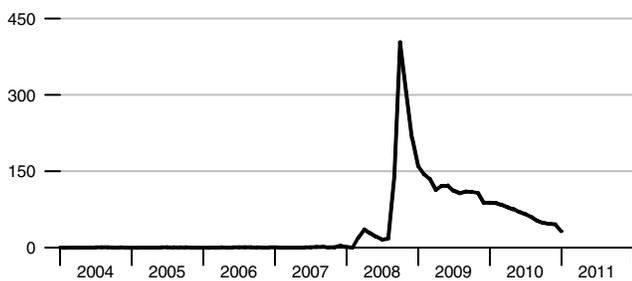
Adjusted and Required Reserves

Billions of dollars



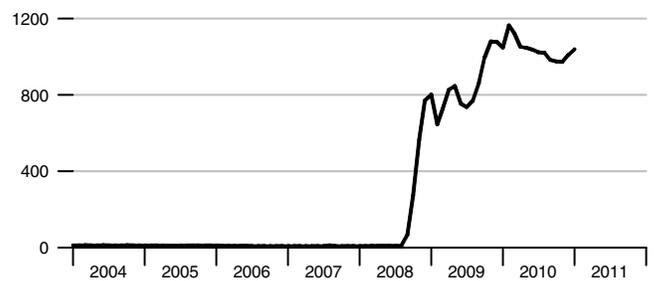
Total Borrowings, nsa

Billions of dollars



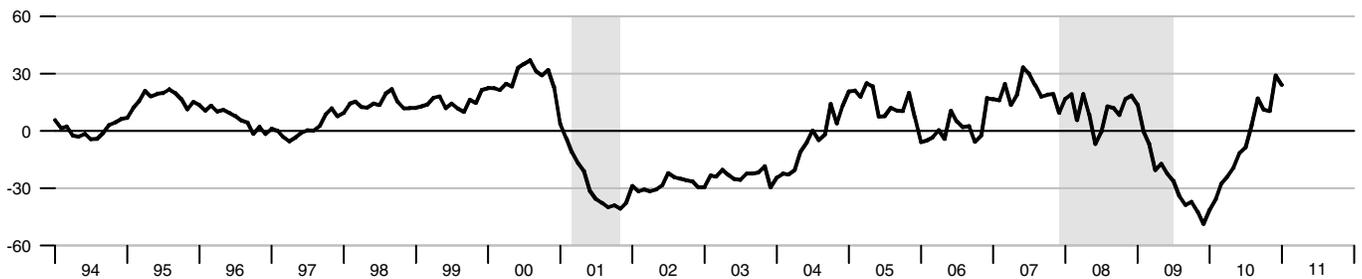
Excess Reserves plus RCB Contracts

Billions of dollars



Nonfinancial Commercial Paper

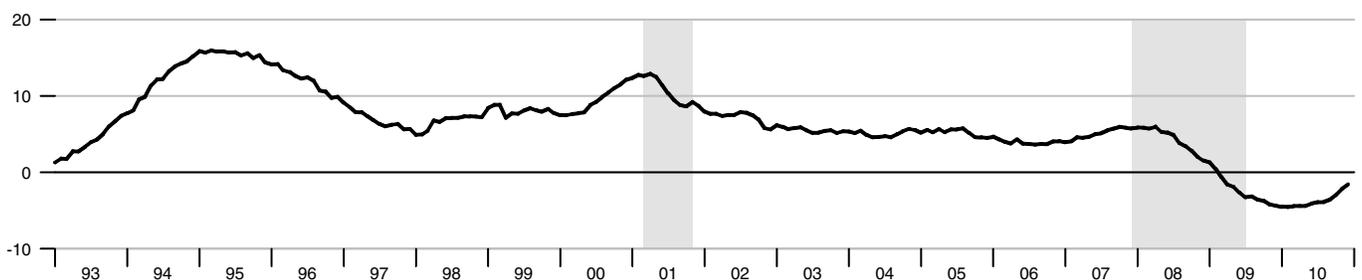
Percent change from year ago



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>.

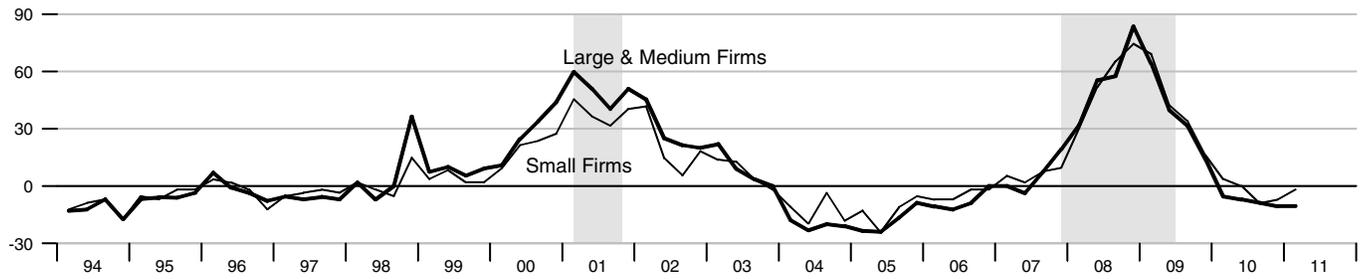
Consumer Credit

Percent change from year ago



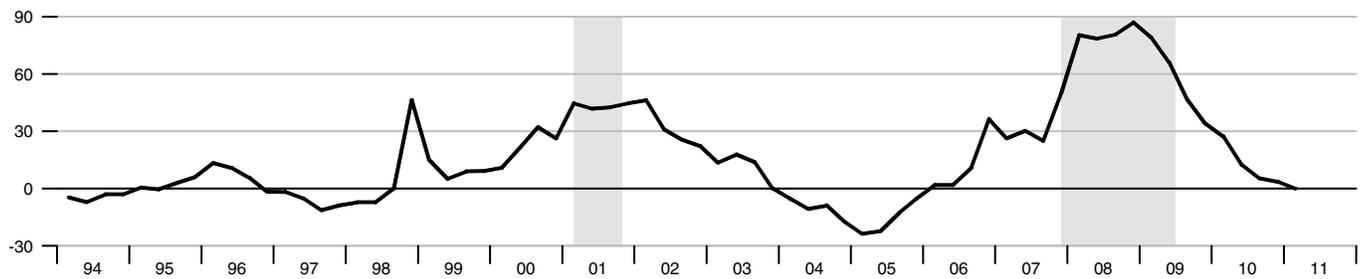
Net Percentage of Domestic Banks Tightening Standards for Commercial and Industrial Loans

Percentage



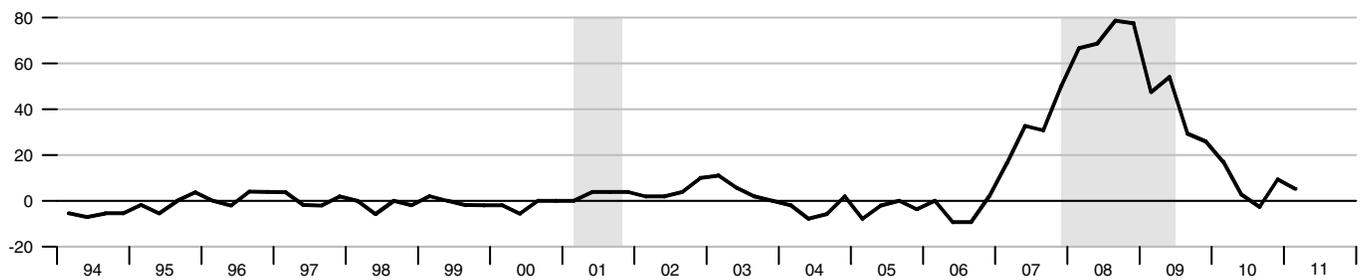
Net Percentage of Domestic Banks Tightening Standards for Commercial Real Estate Loans

Percentage



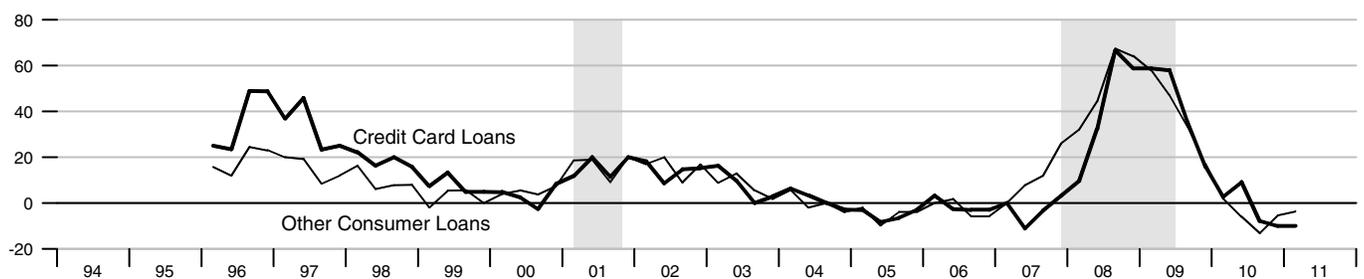
Net Percentage of Domestic Banks Tightening Standards for Residential Mortgage Loans

Percentage

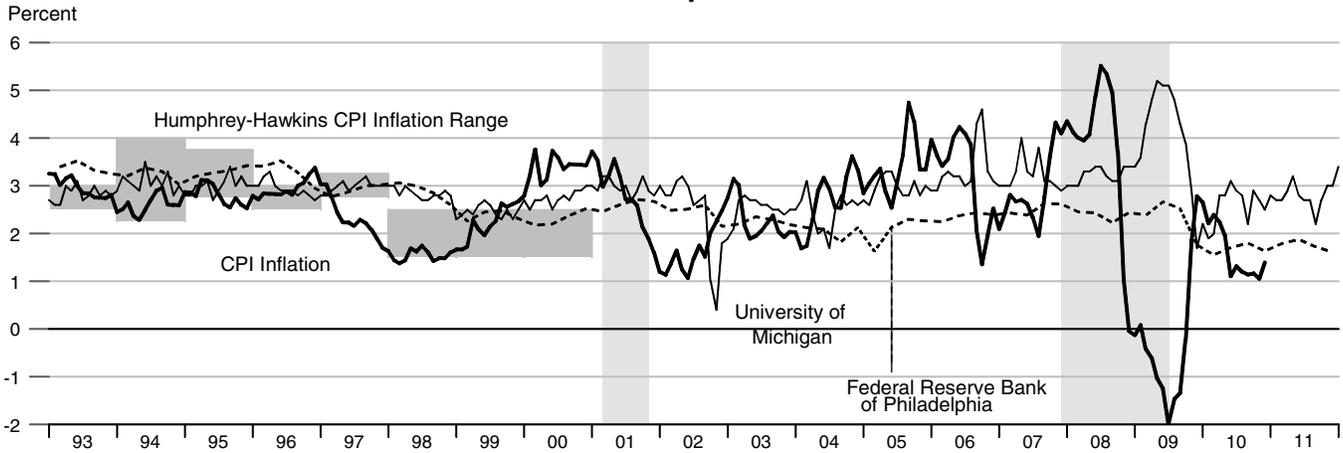


Net Percentage of Domestic Banks Tightening Standards for Consumer Loans

Percentage

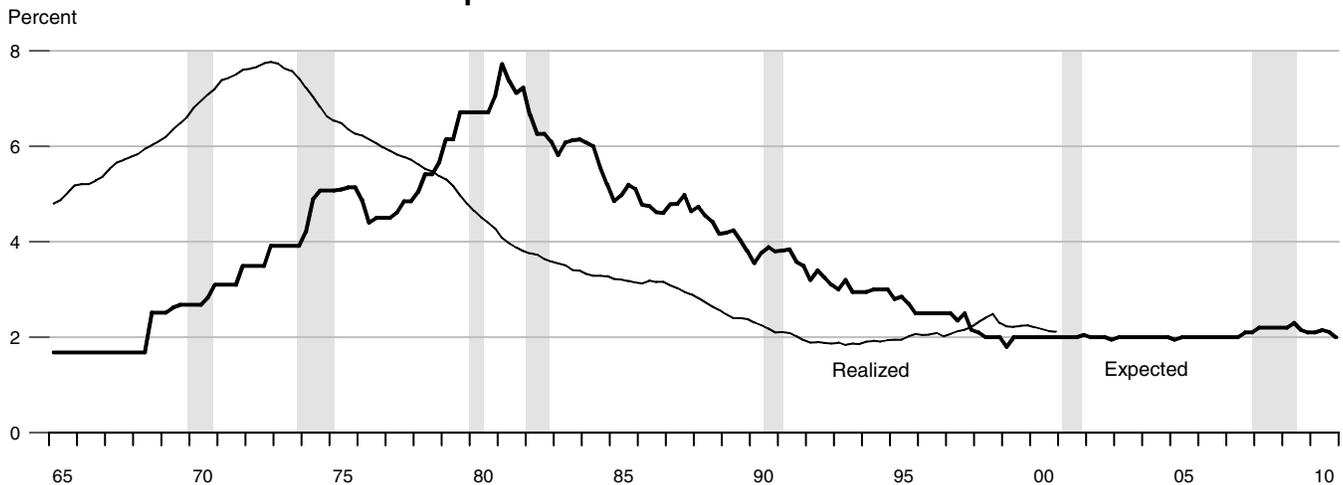


CPI Inflation and 1-Year-Ahead CPI Inflation Expectations



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

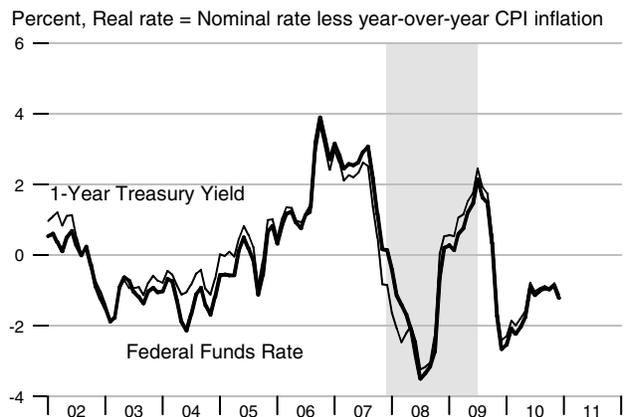


See the notes section for an explanation of the chart.

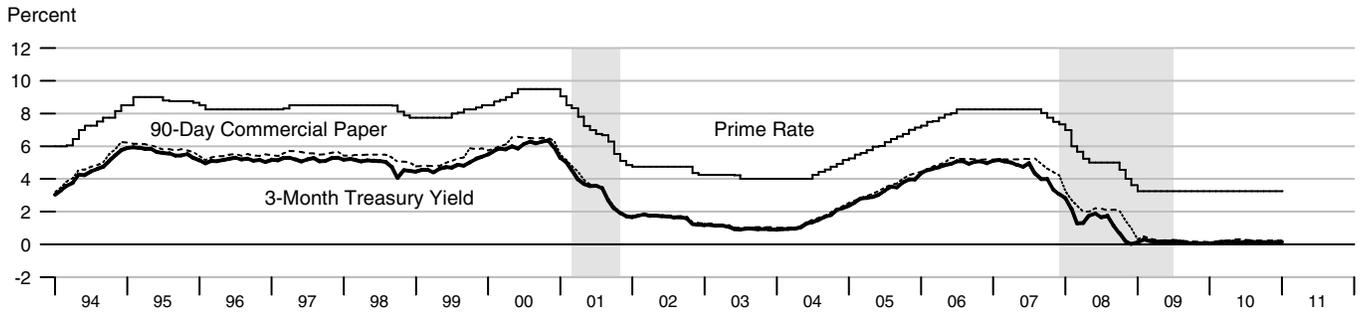
Treasury Security Yield Spreads



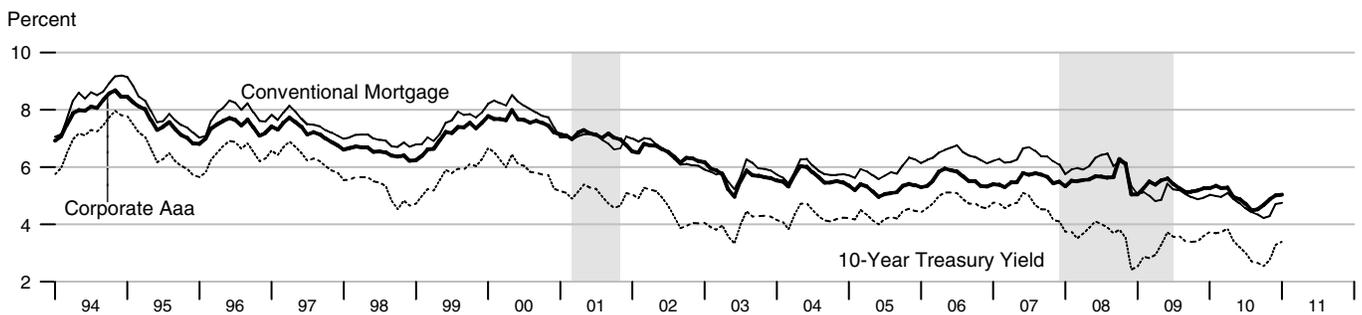
Real Interest Rates



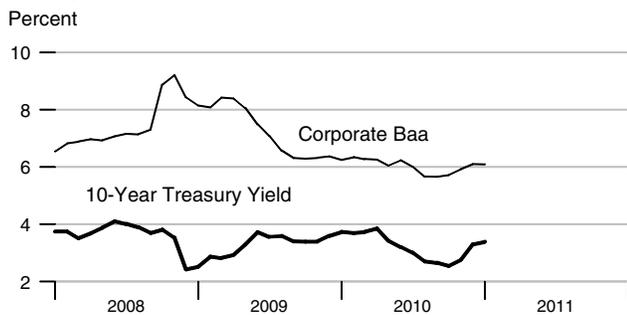
Short-Term Interest Rates



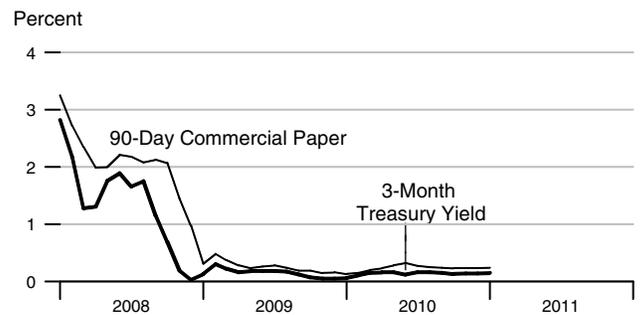
Long-Term Interest Rates



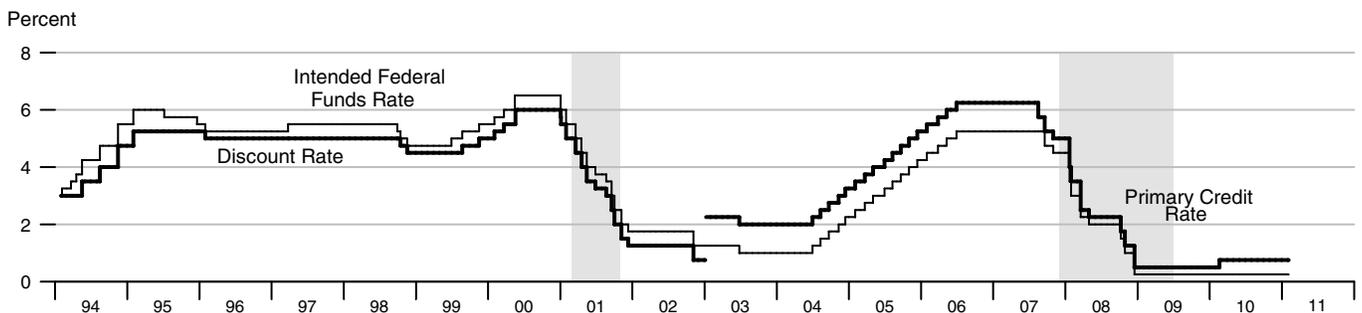
Long-Term Interest Rates



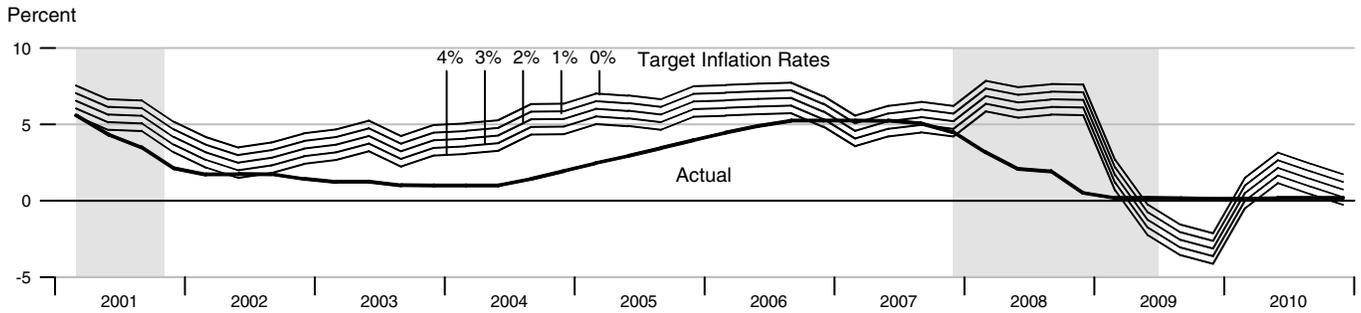
Short-Term Interest Rates



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



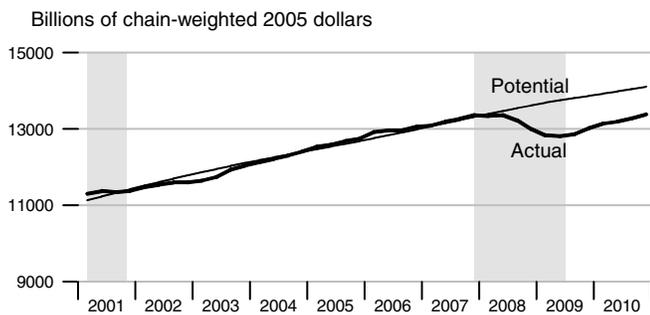
Federal Funds Rate and Inflation Targets



Calculated federal funds rate is based on Taylor's rule.

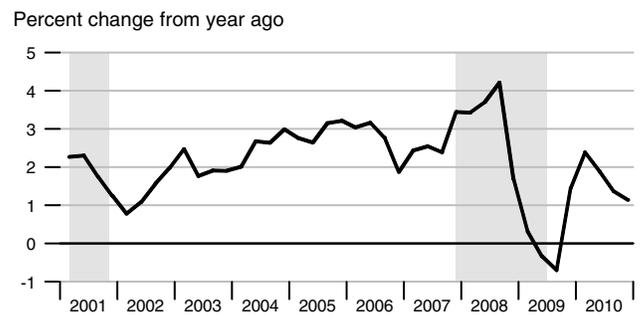
Components of Taylor's Rule

Actual and Potential Real GDP

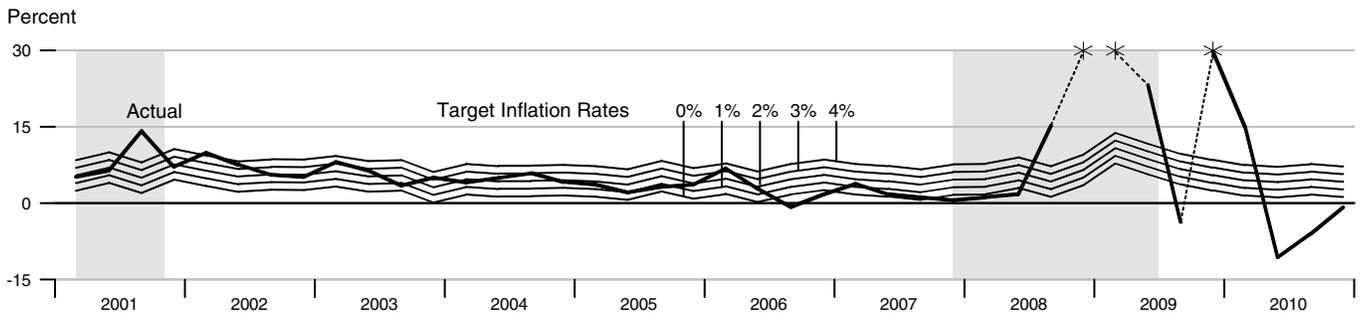


See notes section for further explanation.

PCE Inflation



Monetary Base Growth and Inflation Targets

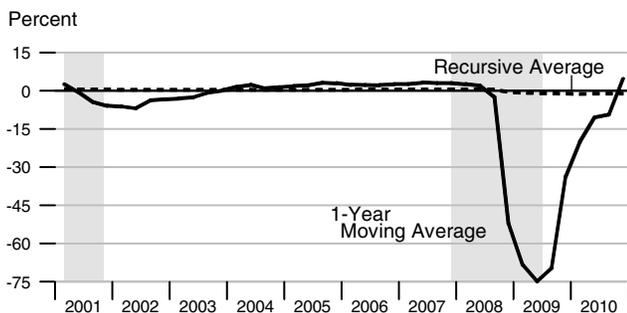


Calculated base growth is based on McCallum's rule. Actual base growth is percent change from the previous quarter.

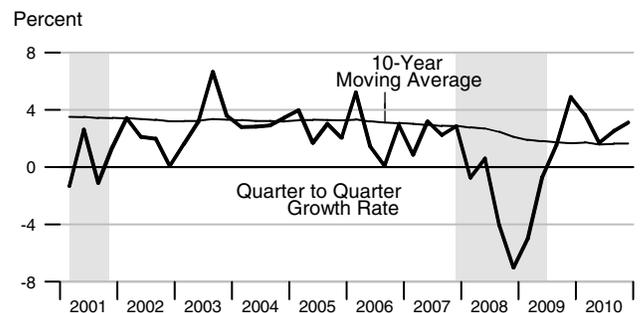
*Actual values for 2008:Q4, 2009:Q1, and 2009:Q4 are 188.38 percent, 60.77 percent, and 56.51, respectively.

Components of McCallum's Rule

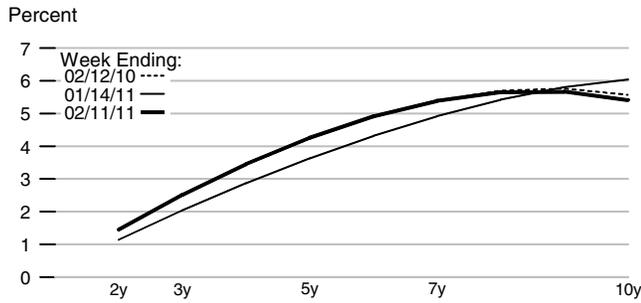
Monetary Base Velocity Growth



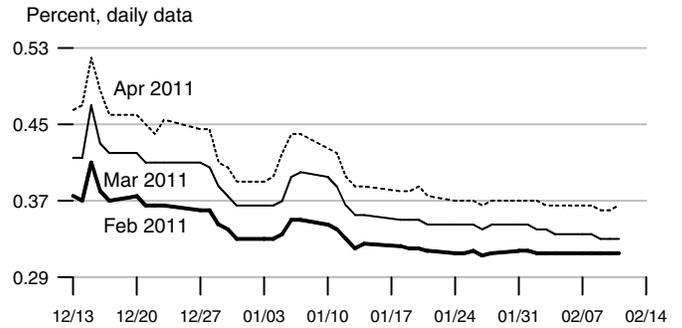
Real Output Growth



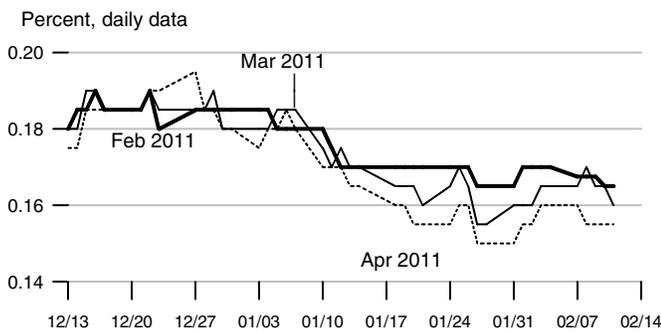
Implied One-Year Forward Rates



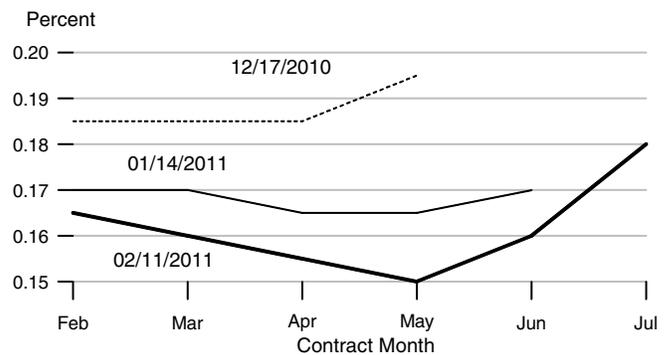
Rates on 3-Month Eurodollar Futures



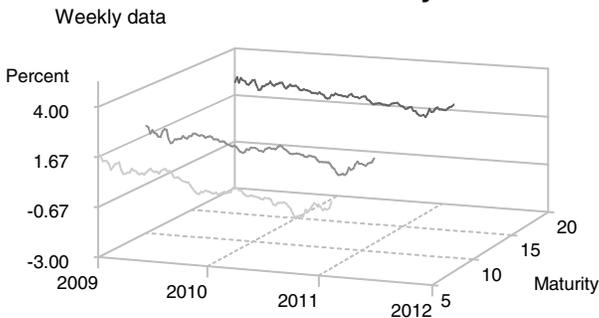
Rates on Selected Federal Funds Futures Contracts



Rates on Federal Funds Futures on Selected Dates



Inflation-Indexed Treasury Securities



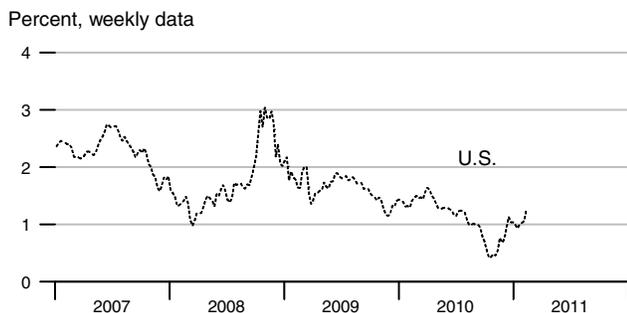
Note: Yields are inflation-indexed constant maturity U.S. Treasury securities

Inflation-Indexed Treasury Yield Spreads

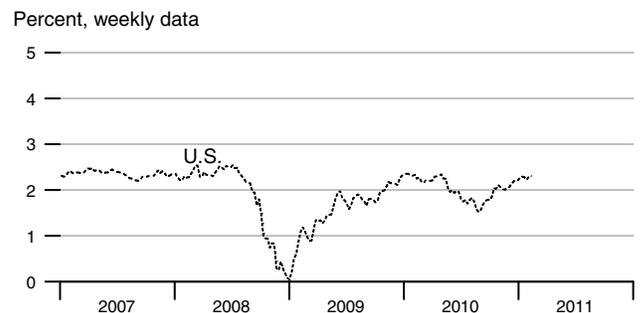


Note: Yield spread is between nominal and inflation-indexed constant maturity U.S. Treasury securities.

Inflation-Indexed 10-Year Government Notes



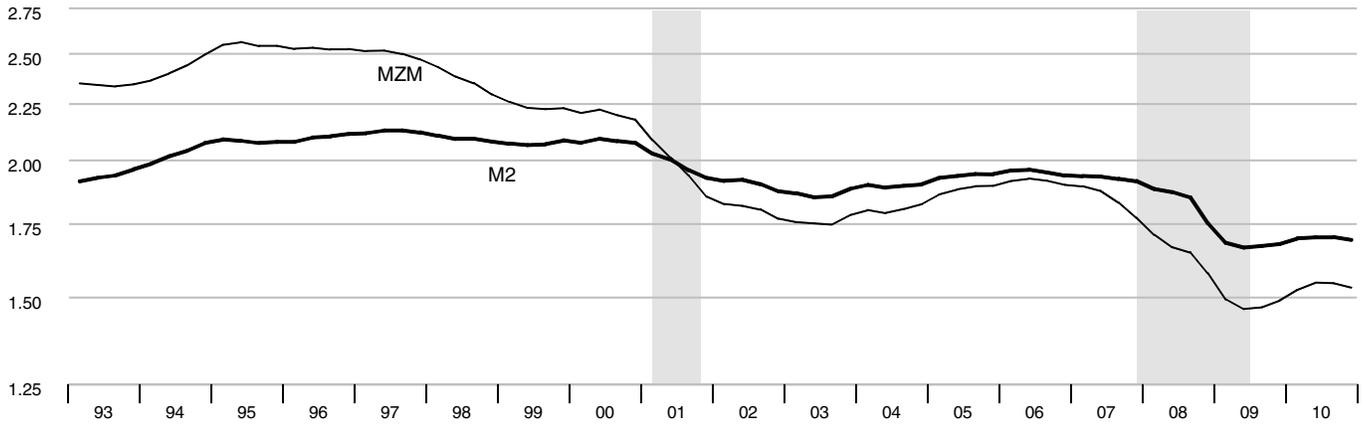
Inflation-Indexed 10-Year Government Yield Spreads



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

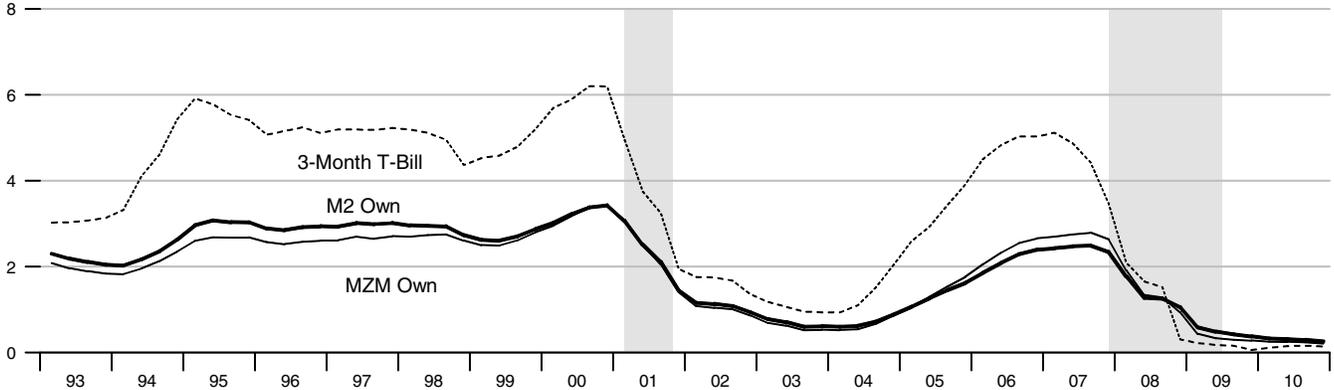
Velocity

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



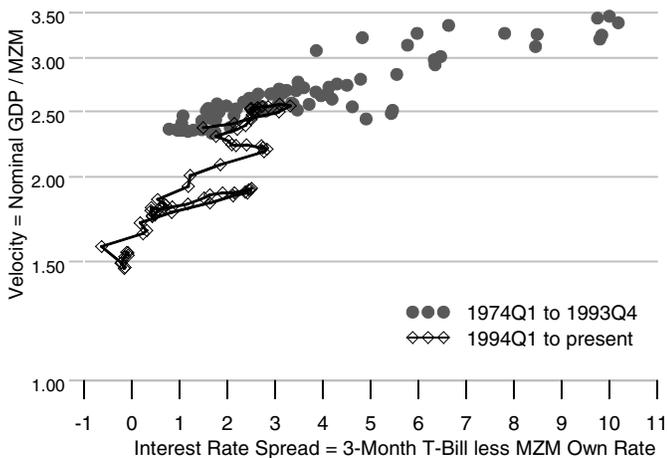
Interest Rates

Percent



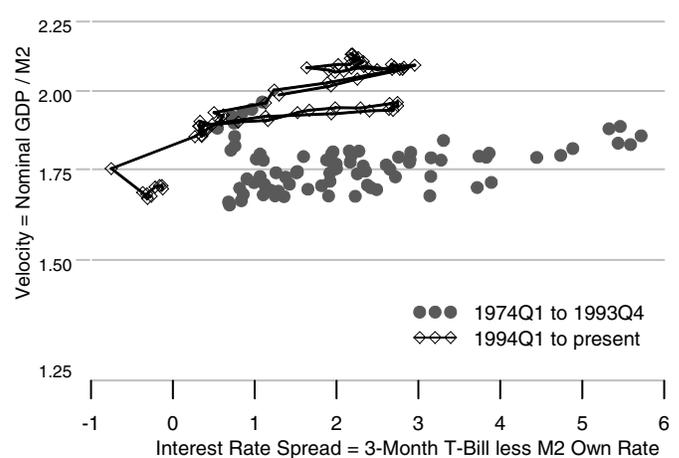
MZM Velocity and Interest Rate Spread

Ratio Scale



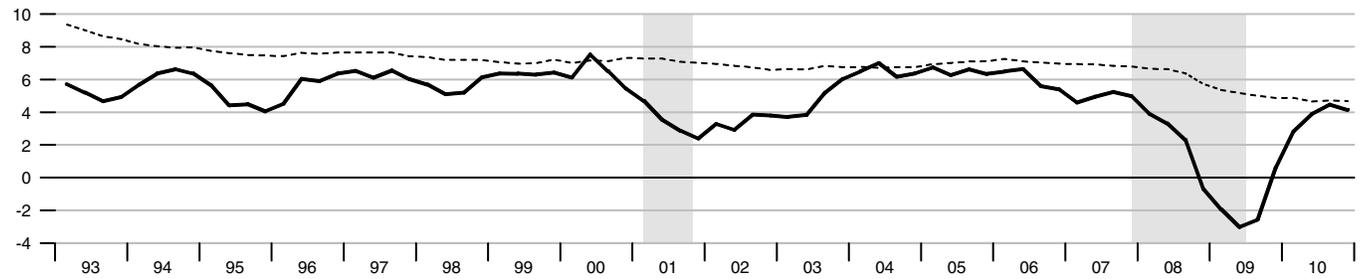
M2 Velocity and Interest Rate Spread

Ratio Scale



Gross Domestic Product

Percent change from year ago



Dashed lines indicate 10-year moving averages.

Real Gross Domestic Product

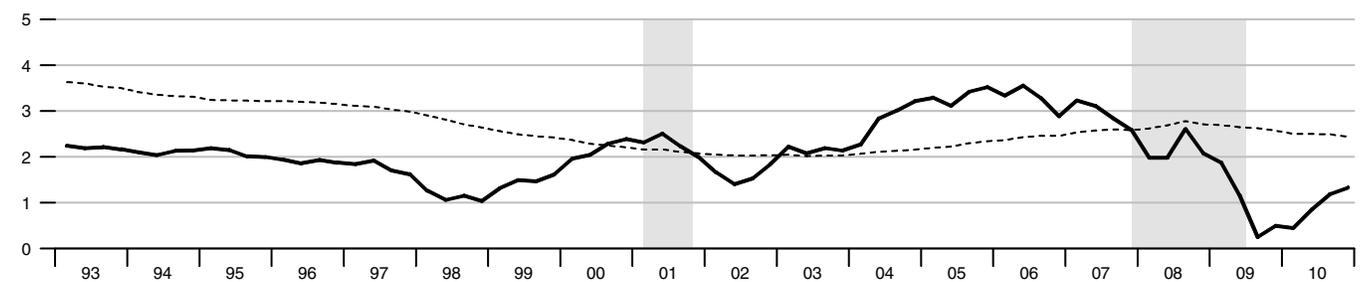
Percent change from year ago



Dashed lines indicate 10-year moving averages.

Gross Domestic Product Price Index

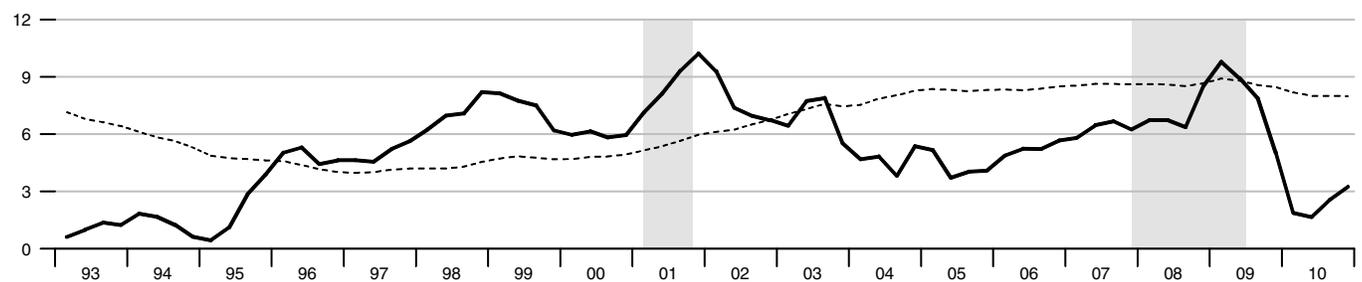
Percent change from year ago



Dashed lines indicate 10-year moving averages.

M2

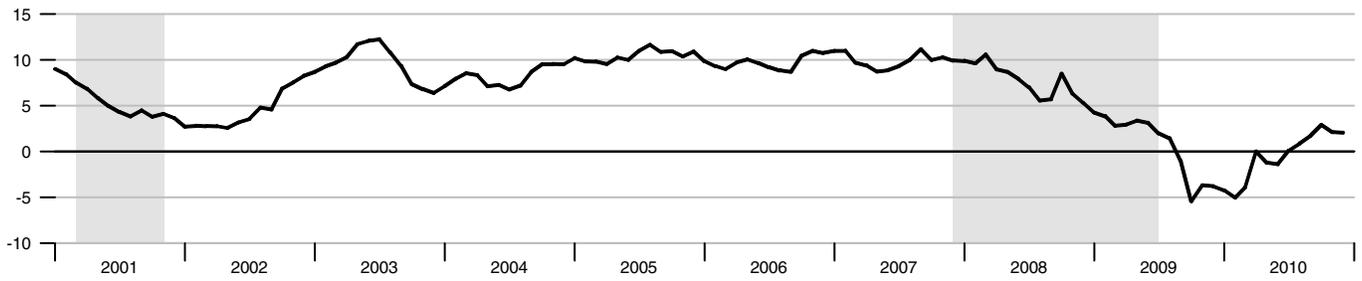
Percent change from year ago



Dashed lines indicate 10-year moving averages.

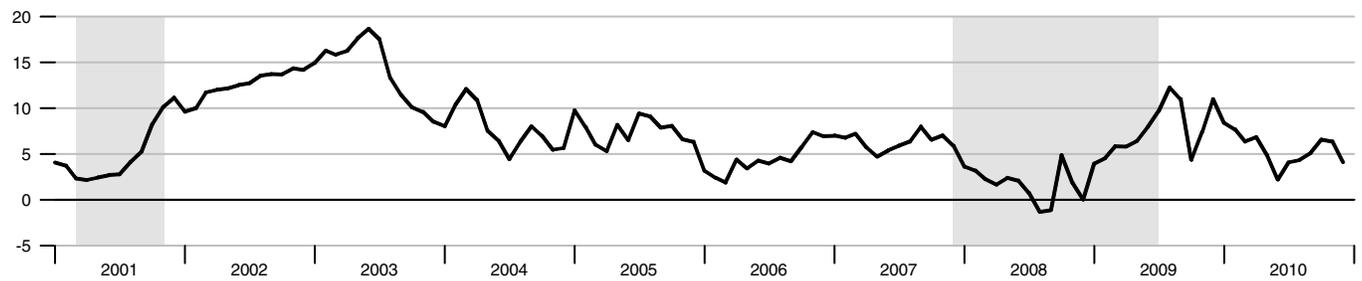
Bank Credit

Percent change from year ago



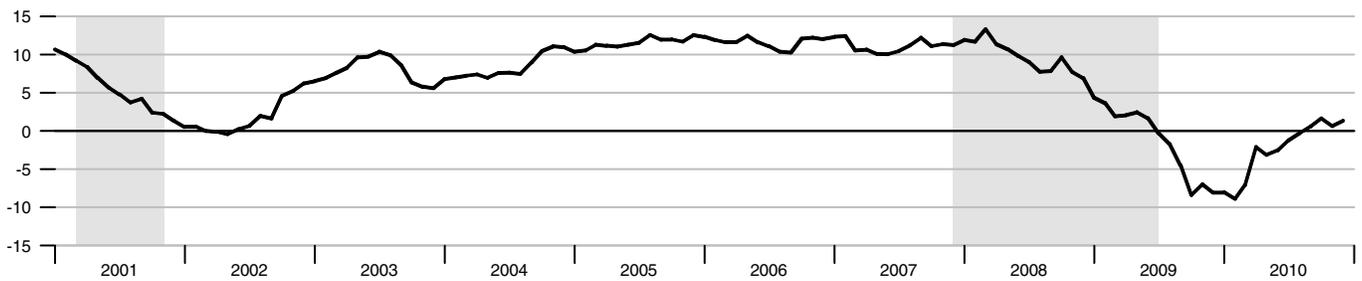
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



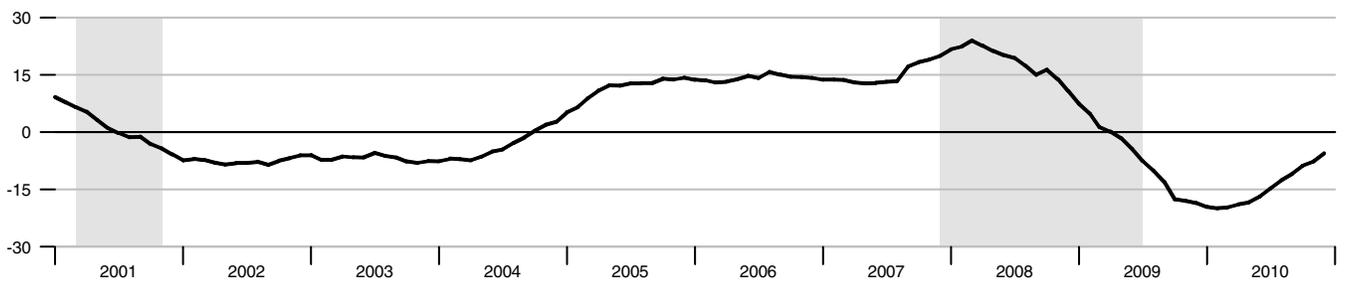
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

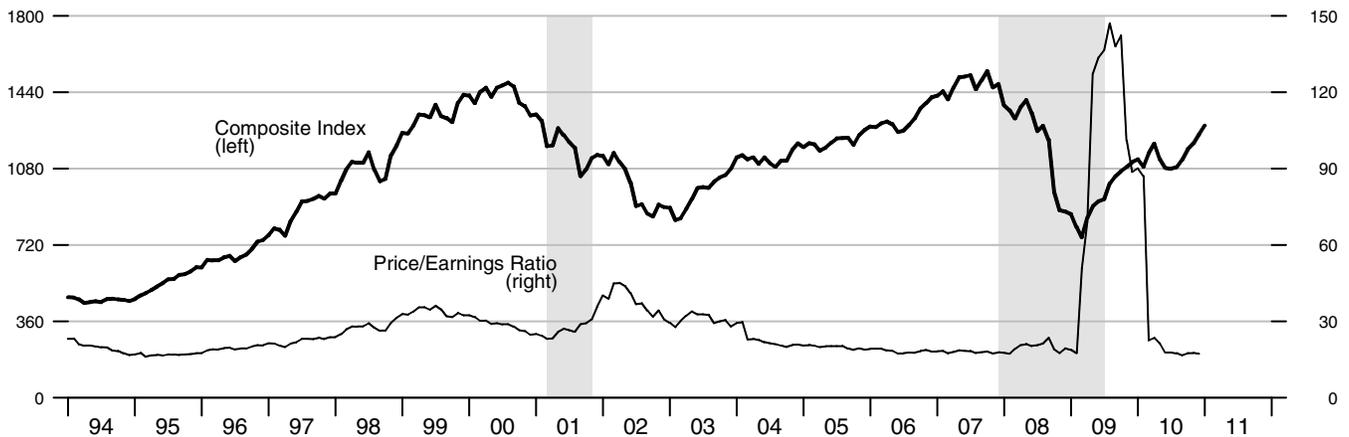


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



Standard & Poor's 500

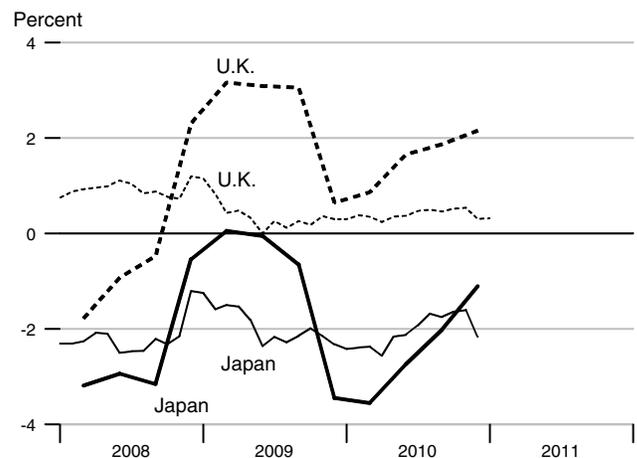
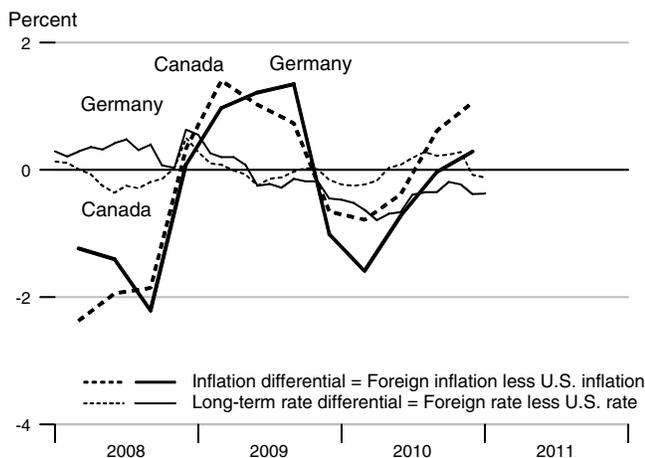


Recent Inflation and Long-Term Interest Rates

	Consumer Price Inflation Rates				Long-Term Government Bond Rates			
	Percent change from year ago				Percent			
	2010Q1	2010Q2	2010Q3	2010Q4	Oct10	Nov10	Dec10	Jan11
United States	2.40	1.78	1.22	1.20	2.54	2.76	3.29	3.39
Canada	1.61	1.40	1.83	2.27	2.78	3.04	3.21	3.27
France	1.32	1.61	1.53	1.65	2.72	3.00	3.34	.
Germany	0.81	1.06	1.18	1.49	2.35	2.53	2.91	3.02
Italy	1.29	1.41	1.62	1.79	3.80	4.18	4.60	4.73
Japan	-1.15	-0.96	-0.80	0.10	0.90	1.16	1.13	.
United Kingdom	3.26	3.44	3.09	3.36	3.06	3.30	3.59	3.71

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Inflation and Long-Term Interest Rate Differentials



		Money Stock				Bank	Adjusted		MSI M2**
		M1	MZM	M2	M3*	Credit	Monetary Base	Reserves	
	2006	1374.189	7000.711	6865.809	10270.74	7697.237	835.035	94.908	
	2007	1372.137	7634.968	7298.505		8462.949	850.529	94.145	
	2008	1433.111	8708.028	7816.754		9122.893	1010.131	232.536	
	2009	1636.777	9541.218	8432.114		9192.006	1796.541	944.769	
	2010	1743.806	9537.291	8629.316		9142.823	2031.695	1144.100	
2008	1	1382.619	8373.905	7606.477		8999.100	856.341	96.195	
	2	1392.860	8680.873	7733.560		9006.425	860.035	95.083	
	3	1427.790	8783.200	7827.611		9071.147	893.440	118.519	
	4	1529.174	8994.132	8099.369		9414.900	1430.710	620.347	
2009	1	1577.790	9400.631	8351.336		9326.304	1662.910	820.583	
	2	1624.005	9585.008	8425.019		9289.747	1763.619	917.024	
	3	1660.868	9604.231	8444.607		9143.163	1747.180	895.438	
	4	1684.447	9575.000	8507.494		9008.809	2012.456	1146.033	
2010	1	1698.705	9477.049	8507.285		8915.970	2089.184	1217.037	
	2	1711.573	9421.606	8564.864		9208.987	2034.289	1158.456	
	3	1752.369	9540.968	8661.574		9224.452	2003.654	1117.918	
	4	1812.576	9709.540	8783.542		9221.883	1999.654	1082.990	
2009	Jan	1587.132	9318.917	8307.807		9330.935	1730.136	869.917	
	Feb	1568.852	9399.596	8347.217		9344.982	1590.134	758.561	
	Mar	1577.386	9483.380	8398.985		9302.995	1668.461	833.270	
	Apr	1609.798	9520.070	8390.464		9259.088	1787.681	949.273	
	May	1610.536	9601.986	8431.788		9317.929	1799.197	946.072	
	Jun	1651.681	9632.969	8452.805		9292.225	1703.979	855.726	
	Jul	1661.494	9636.921	8452.751		9209.080	1693.704	841.468	
	Aug	1655.331	9586.329	8428.713		9153.751	1728.107	879.583	
	Sep	1665.778	9589.442	8452.357		9066.658	1819.730	965.263	
	Oct	1679.831	9582.238	8482.316		8979.190	1975.374	1122.197	
	Nov	1679.913	9579.475	8511.456		9044.200	2044.685	1182.376	
	Dec	1693.596	9563.287	8528.709		9003.038	2017.309	1133.526	
2010	Jan	1680.951	9484.310	8469.482		8934.668	2010.106	1105.458	
	Feb	1703.188	9508.957	8537.132		8874.262	2150.916	1296.192	
	Mar	1711.975	9437.879	8515.242		8938.980	2106.530	1249.461	
	Apr	1700.234	9402.087	8527.198		9258.669	2044.306	1179.141	
	May	1707.057	9419.757	8568.322		9204.383	2034.554	1149.868	
	Jun	1727.428	9442.974	8599.071		9163.910	2024.007	1146.360	
	Jul	1731.029	9473.173	8615.334		9216.012	2015.190	1131.087	
	Aug	1751.544	9538.686	8660.806		9233.425	2014.632	1133.712	
	Sep	1774.534	9611.046	8708.582		9223.919	1981.141	1088.956	
	Oct	1784.124	9664.758	8748.415		9239.465	1998.498	1099.654	
	Nov	1821.458	9717.940	8785.820		9235.010	1991.149	1076.373	
	Dec	1832.146	9745.921	8816.392		9191.173	2009.315	1072.943	
2011	Jan	1853.713	9732.017	8836.980		9153.940	2057.112	1095.858	

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			
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
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
2008	1	3.18	3.67	6.21	3.23	2.09	2.17	3.66	5.46	4.39	5.88
	2	2.09	2.33	5.08	2.76	1.65	2.67	3.89	5.60	4.43	6.09
	3	1.94	2.25	5.00	3.06	1.52	2.63	3.86	5.65	4.50	6.31
	4	0.51	1.31	4.06	2.82	0.30	1.48	3.25	5.82	5.02	5.87
2009	1	0.18	0.50	3.25	1.08	0.22	1.27	2.74	5.27	4.64	5.06
	2	0.18	0.50	3.25	0.62	0.17	1.49	3.31	5.51	4.43	5.03
	3	0.16	0.50	3.25	0.30	0.16	1.56	3.52	5.27	4.11	5.16
	4	0.12	0.50	3.25	0.22	0.06	1.39	3.46	5.20	3.91	4.92
2010	1	0.13	0.61	3.25	0.21	0.11	1.47	3.72	5.29	3.93	5.00
	2	0.19	0.75	3.25	0.42	0.15	1.38	3.49	5.04	3.83	4.91
	3	0.19	0.75	3.25	0.34	0.16	0.83	2.79	4.58	3.58	4.45
	4	0.19	0.75	3.25	0.28	0.14	0.74	2.86	4.86	4.24	4.41
2009	Jan	0.15	0.50	3.25	1.02	0.13	1.13	2.52	5.05	4.64	5.06
	Feb	0.22	0.50	3.25	1.16	0.30	1.37	2.87	5.27	4.56	5.13
	Mar	0.18	0.50	3.25	1.07	0.22	1.31	2.82	5.50	4.74	5.00
	Apr	0.15	0.50	3.25	0.89	0.16	1.32	2.93	5.39	4.48	4.81
	May	0.18	0.50	3.25	0.57	0.18	1.39	3.29	5.54	4.26	4.86
	Jun	0.21	0.50	3.25	0.39	0.18	1.76	3.72	5.61	4.56	5.42
	Jul	0.16	0.50	3.25	0.35	0.18	1.55	3.56	5.41	4.36	5.22
	Aug	0.16	0.50	3.25	0.30	0.17	1.65	3.59	5.26	4.17	5.19
	Sep	0.15	0.50	3.25	0.25	0.12	1.48	3.40	5.13	3.81	5.06
	Oct	0.12	0.50	3.25	0.24	0.07	1.46	3.39	5.15	3.85	4.95
	Nov	0.12	0.50	3.25	0.21	0.05	1.32	3.40	5.19	3.99	4.88
	Dec	0.12	0.50	3.25	0.22	0.05	1.38	3.59	5.26	3.89	4.93
2010	Jan	0.11	0.50	3.25	0.20	0.06	1.49	3.73	5.26	3.96	5.03
	Feb	0.13	0.59	3.25	0.19	0.11	1.40	3.69	5.35	3.91	4.99
	Mar	0.16	0.75	3.25	0.23	0.15	1.51	3.73	5.27	3.91	4.97
	Apr	0.20	0.75	3.25	0.30	0.16	1.64	3.85	5.29	3.95	5.10
	May	0.20	0.75	3.25	0.45	0.16	1.32	3.42	4.96	3.75	4.89
	Jun	0.18	0.75	3.25	0.52	0.12	1.17	3.20	4.88	3.81	4.74
	Jul	0.18	0.75	3.25	0.41	0.16	0.98	3.01	4.72	3.69	4.56
	Aug	0.19	0.75	3.25	0.32	0.16	0.78	2.70	4.49	3.44	4.43
	Sep	0.19	0.75	3.25	0.28	0.15	0.74	2.65	4.53	3.63	4.35
	Oct	0.19	0.75	3.25	0.27	0.13	0.57	2.54	4.68	3.62	4.23
	Nov	0.19	0.75	3.25	0.27	0.14	0.67	2.76	4.87	4.44	4.30
	Dec	0.18	0.75	3.25	0.30	0.14	0.99	3.29	5.02	4.67	4.71
2011	Jan	0.17	0.75	3.25	0.29	0.15	1.03	3.39	5.04		4.76

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

		M1	M2	M3*
Percent change at an annual rate				
2006		0.19	4.34	4.95
2007		-0.15	9.06	6.30
2008		4.44	14.05	7.10
2009		14.21	9.57	7.87
2010		6.54	-0.04	2.34
<hr/>				
2008	1	2.36	15.61	7.69
	2	2.96	14.66	6.68
	3	10.03	4.72	4.86
	4	28.40	9.61	13.89
2009	1	12.72	18.08	12.44
	2	11.72	7.85	3.53
	3	9.08	0.80	0.93
	4	5.68	-1.22	2.98
2010	1	3.39	-4.09	-0.01
	2	3.03	-2.34	2.71
	3	9.53	5.07	4.52
	4	13.74	7.07	5.63
<hr/>				
2009	Jan	-11.62	16.69	9.13
	Feb	-13.82	10.39	5.69
	Mar	6.53	10.70	7.44
	Apr	24.66	4.64	-1.22
	May	0.55	10.33	5.91
	Jun	30.66	3.87	2.99
	Jul	7.13	0.49	-0.01
	Aug	-4.45	-6.30	-3.41
	Sep	7.57	0.39	3.37
	Oct	10.12	-0.90	4.25
	Nov	0.06	-0.35	4.12
	Dec	9.77	-2.03	2.43
<hr/>				
2010	Jan	-8.96	-9.91	-8.33
	Feb	15.87	3.12	9.59
	Mar	6.19	-8.97	-3.08
	Apr	-8.23	-4.55	1.68
	May	4.82	2.26	5.79
	Jun	14.32	2.96	4.31
	Jul	2.50	3.84	2.27
	Aug	14.22	8.30	6.33
	Sep	15.75	9.10	6.62
	Oct	6.49	6.71	5.49
	Nov	25.11	6.60	5.13
	Dec	7.04	3.46	4.18
<hr/>				
2011	Jan	14.13	-1.71	2.80

*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.

Note: M1, M2, M3, Bank Credit, and Domestic Nonfinancial Debt are constructed and published by the Board of Governors of the Federal Reserve System. For details, see *Statistical Supplement to the Federal Reserve Bulletin*, tables 1.21 and 1.26. MZM, Adjusted Monetary Base, Adjusted Reserves, and Monetary Services Index are constructed and published by the Research Division of the Federal Reserve Bank of St. Louis.

Notes

Page 3: Readers are cautioned that, since early 1994, the level and growth of M1 have been depressed by retail sweep programs that reclassify transactions deposits (demand deposits and other checkable deposits) as savings deposits overnight, thereby reducing banks' required reserves; see Anderson and Rasche (2001) and research.stlouisfed.org/aggreg/swdata.html. **Primary Credit Rate**, **Discount Rate**, and **Intended Federal Funds Rate** shown in the chart **Reserve Market Rates** are plotted as of the date of the change, while the **Effective Federal Funds Rate** is plotted as of the end of the month. Interest rates in the table are monthly averages from the Board of Governors H.15 Statistical Release. The **Treasury Yield Curve** 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/. 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, π_{t-1} is the previous period's inflation rate (PCE) measured on a year-over-year basis, y_{t-1} is the log of the previous period's level of real gross domestic product (GDP), and y_{t-1}^P is the log of an estimate of the previous period's level of potential output. **Potential Real GDP** is 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 Δb_t is the implied growth rate of the adjusted monetary base, Δy_t^* is the 10-year

moving average growth in real GDP, Δv_t^α is the average base velocity growth (calculated recursively), Δx_{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 5/15/2020. **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.

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. (2000). "Alternative Monetary Policy Rules: A Comparison with Historical Settings for the United States, the United Kingdom, and Japan," *Federal Reserve Bank of Richmond Economic Quarterly*, vol. 86/1, Winter.

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/~wfsarpe/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/.