Monetary*Trends*

30-Year Bond Faces Uncertain Future

Market yields on intermediate- and long-term U.S. Government securities, especially the 30-year bond, declined sharply between mid-January and late February 2000. Yields on securities of 10-30 years maturity also fell below those on intermediate-term securities. The decline in yields might signal a decline in expected inflation, as lower inflation makes fixed-income securities more attractive to investors. The decline in yields on long-term securities below those on shorter-term securities also could reflect market expectations that the pace of economic activity will slow, as many forecasters now predict.

Alternatively, the decline in yields might be related to an announcement by the Department of the Treasury of a plan to reduce the average maturity of outstanding U.S. Government debt, which would reduce the expected supply of such securities. Pension funds, and other investors with long-term commitments, buy intermediate- and long-term U.S. Government and other securities to hedge future liabilities. Thus, the recent decline in yields might reflect market purchases in anticipation of a reduction in future supply of such securities.

Yield spreads between conventional and inflation-protected Treasury securities (TIPS) offer one clue of the public's inflation expectations, and might help untangle the reasons for the decline in market yields. Other things being equal, a decline in the market yield on a conventional security, relative to the yield on an inflation-protected security of similar maturity, would indicate that expected inflation had fallen. The chart shows that during the last two weeks of January and during February, the spread between 30-year conventional securities and TIPS fell substantially, possibly indicating a decline in expected inflation. Yield spreads for 5- and 10-year securities, however, did not decline–in fact, the spread for 5-year securities increased.
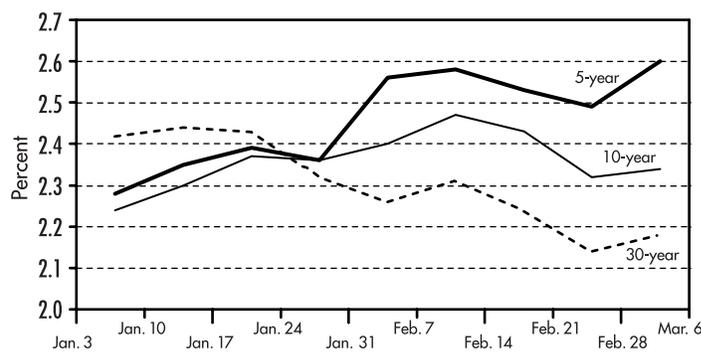
Moreover, throughout February, the yield spread for 30-year securities was smaller than those for 5-and 10-year securities–a phenomenon that had not previously occurred since 30-year TIPS were first issued in April 1998 (see chart on page 11).

The divergence of TIPS and conventional security yields across securities of different maturity suggests that the recent behavior of government security prices, especially the price of the 30-year bond, has not been dominated by changes in inflation expectations. It seems doubtful that market expectations of inflation over a 30-year horizon would have declined while expected inflation during the next 10 years stayed the same or even increased. The coincidence of large declines in market yields on conventional Treasury securities, especially the 30-year bond, with the Treasury Department's announcement on February 2 of a planned reduction in the issuance of intermediate and long-term securities, and the repurchase of parts of some outstanding issues, suggests further that yield changes have been driven more by changes in expected supply than by demand. Thus, while bond yields in general reflect market expectations about inflation and economic activity, they also can–at least in the short run–reflect purely idiosyncratic changes in market demand or supply.

—David C. Wheelock

Inflation-Protected Treasury Yield Spreads
Weekly averages of daily data, January-February 2000

Table*of*Contents

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Conventions used in this publication:

1. Unless otherwise indicated, data are monthly.

2. Shaded areas indicate recessions, as dated by the National Bureau of Economic Research.

3. The *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:
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Revisions to *Monetary Trends*

Page 8, **Inflation and Inflation Expectations**: Through 1999, shaded areas in this chart show expected annual (Q4/Q4) ranges for CPI inflation as delivered to Congress by the Federal Reserve in the February Humphrey-Hawkins Act testimony each year. No range is shown for 2000 because, in Chairman Greenspan's February 17, 2000 testimony, expected inflation was stated in terms of the personal consumption expenditure (PCE) price index rather than the CPI. For a chart of the PCE deflator, see page 10. For further discussion, see <www.federalreserve.gov/boarddocs/hh/2000/February/FullReport.htm>.

Page 10, **Federal Funds Rate and Inflation Targets, Actual and Potential GDP, and Actual PCE Inflation**: These charts have been revised to use the PCE price index (rather than the CPI) and recently released revisions to GDP. In its most-recent Humphrey-Hawkins Act testimony, the Federal Reserve stated its expectation for inflation during 2000 in terms of the PCE price index. The GDP data reflect benchmark revisions published during October 1999 by the Bureau of Economic Analysis <www.bea.doc.gov/bea/newsrel/gdp399a.htm>, and recent revisions by the Congressional Budget Office to its estimates of potential real output <www.cbo.gov>.

The chart at the top of page 10 in *Monetary Trends* contains six lines. One line is the actual quarterly average level of the federal funds rate. The others show, for the alternative target annual (same quarter a year earlier) inflation rates $\pi^* = 0, 1, 2, 3, 4\%$, suggested settings for the policy-target federal funds rate, f^*, calculated according to the equation:

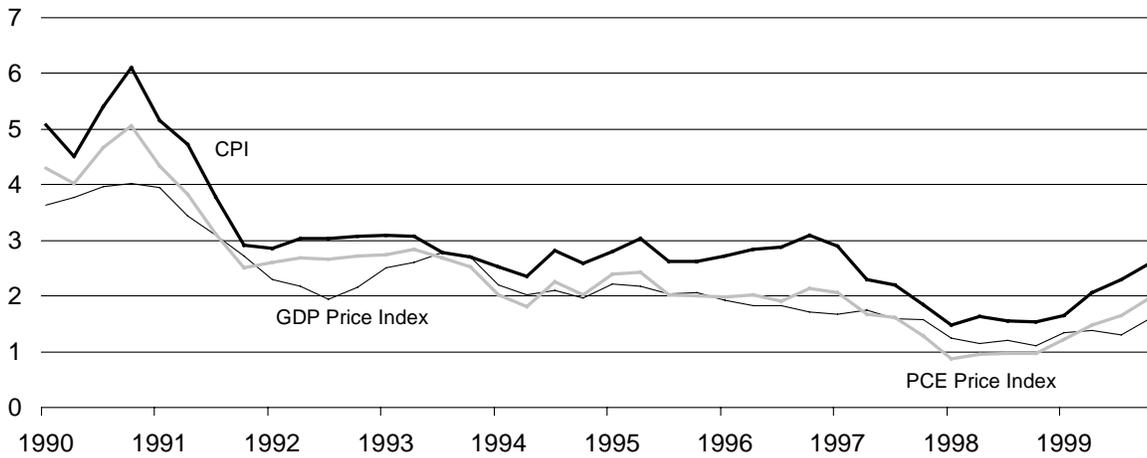$$ f^* = r^* + \pi_{t-1} + 0.5\left(\pi_{t-1} - \pi^*\right) + 0.5 Y_{t-1} \, , $$

where r^* is the level of a short-term real interest rate assumed to be consistent with inflation equal to its target and real output equal to potential; π_{t-1} is the previous period's inflation rate; and Y_{t-1} is the GDP gap, expressed as a percentage of potential GDP, that is, as $100 \times (\log(\text{real GDP}) - \log(\text{potential real GDP}))$. Potential real output is as estimated by the Congressional Budget Office. The coefficients are those suggested by Taylor (1993).

Prior to this issue of *Monetary Trends*, the equation was plotted for $r^* = 2\%$. Because the PCE price index has increased approximately one-half percentage point less rapidly than the CPI during the last several years, we have changed r^* to 2.5%.

Figures comparing alternative price indexes and GDP data are shown on the next page. A table containing the data used to construct these charts is shown on the third page of this special insert.
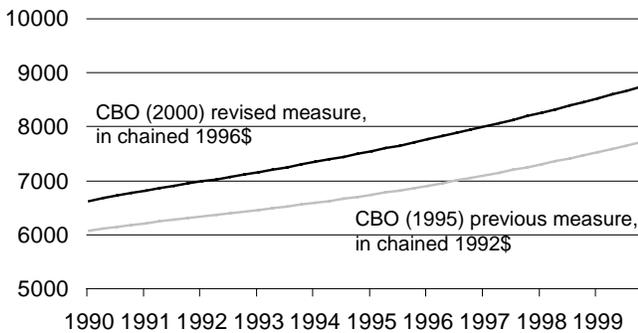
Price Indexes

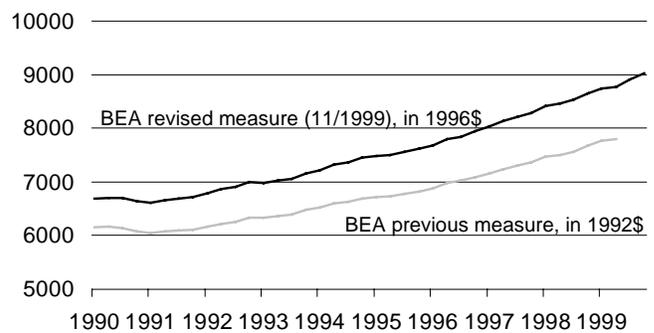Percent change from a year ago

GDP and Potential Output

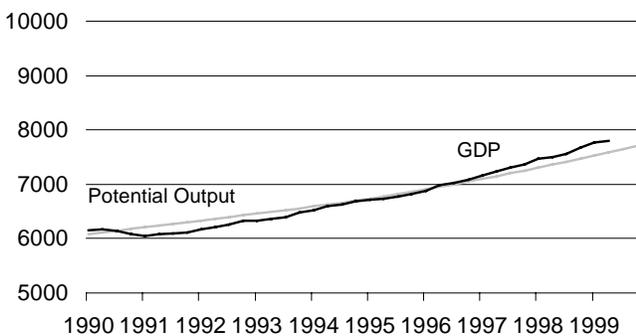### Real Potential Output

Billions

CBO (2000) revised measure, in chained 1996$

CBO (1995) previous measure, in chained 1992$

Gross Domestic Product

Billions

BEA revised measure (11/1999), in 1996$
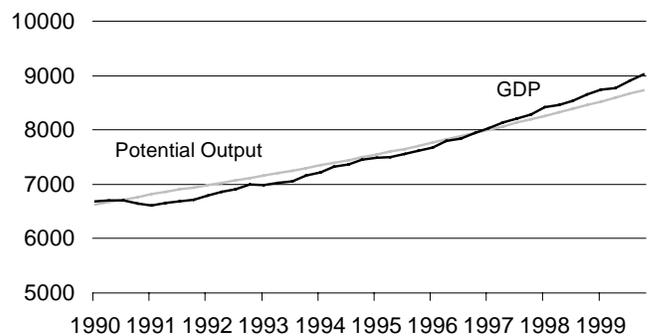
BEA previous measure, in 1992$

GDP and Potential Output

Previously published series, billions of chained 1992$

GDP

Potential Output
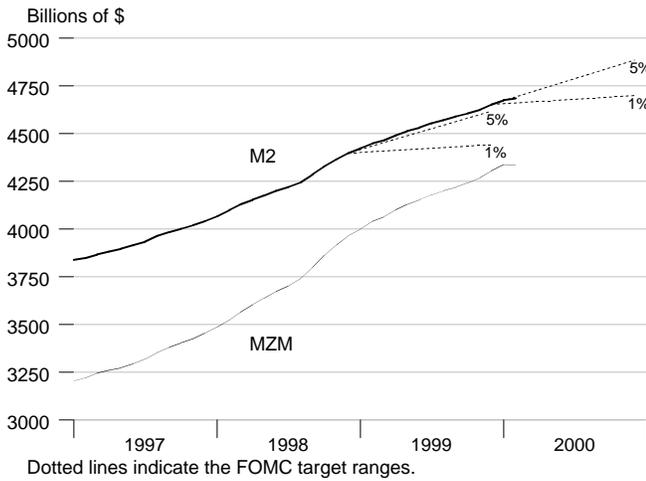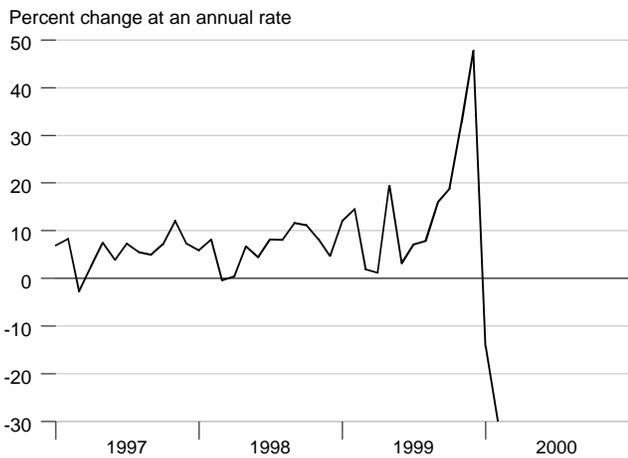
GDP and Potential Output

Revised series, billions of chained 1996$

GDP

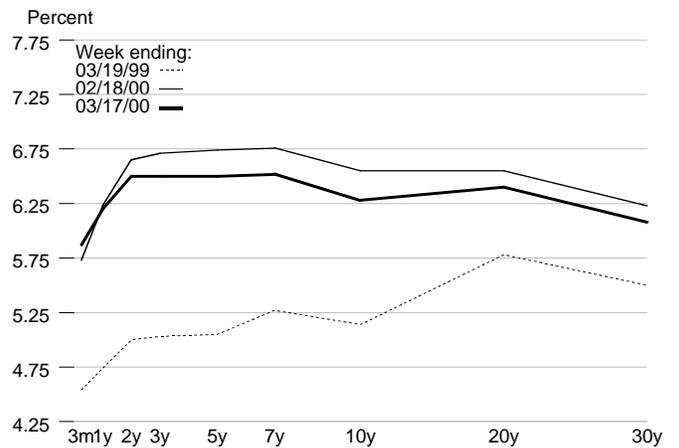Potential Output

M2 and MZM

Billions of $

Dotted lines indicate the FOMC target ranges.

Reserve Market Rates

Percent

---- Effective Federal Funds Rate
—— Expected Federal Funds Rate

Adjusted Monetary Base

Percent change at an annual rate

Treasury Yield Curve

Percent

Week ending:
03/19/99 ------
02/18/00 ——
03/17/00 ━━

Total Bank Credit

Percent change at an annual rate
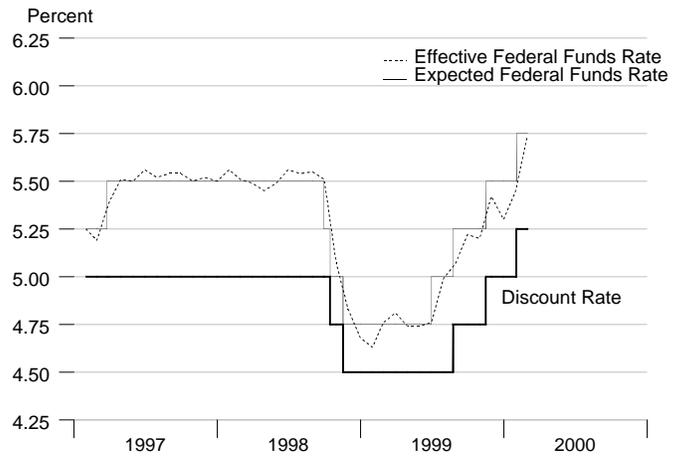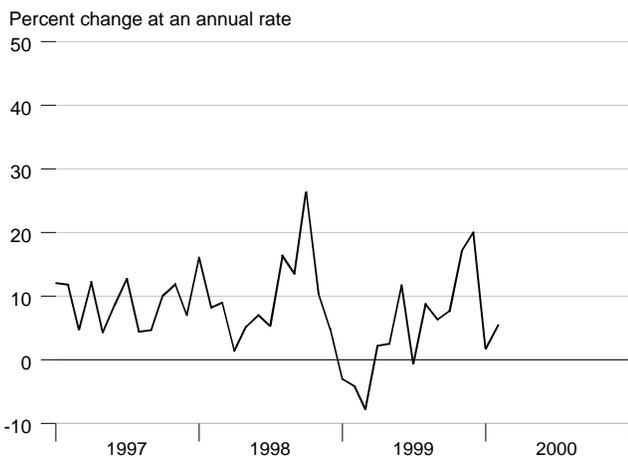
Interest Rates

	Dec 99	Jan 00	Feb 00
Federal Funds Rate	5.30	5.45	5.73
Discount Rate	5.00	5.00	5.24
Prime Rate	8.50	8.50	8.73
Conventional Mortgage Rate	7.91	8.21	8.33
Treasury Yields:			
3-month constant maturity	5.36	5.50	5.73
6-month constant maturity	5.68	5.76	6.00
1-year constant maturity	5.84	6.12	6.22
3-year constant maturity	6.14	6.49	6.65
5-year constant maturity	6.19	6.58	6.68
10-year constant maturity	6.28	6.66	6.52
30-year constant maturity	6.35	6.63	6.23

MZM and M1

Percent change from year ago

M2
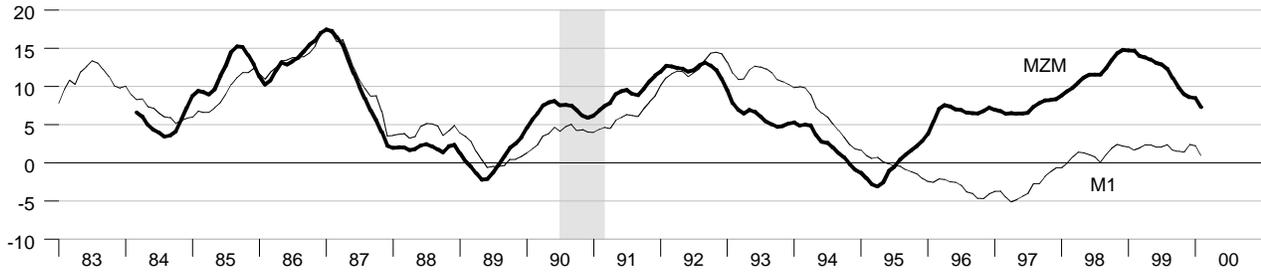
Percent change from year ago

Dotted lines indicate the FOMC target ranges.

M3

Percent change from year ago
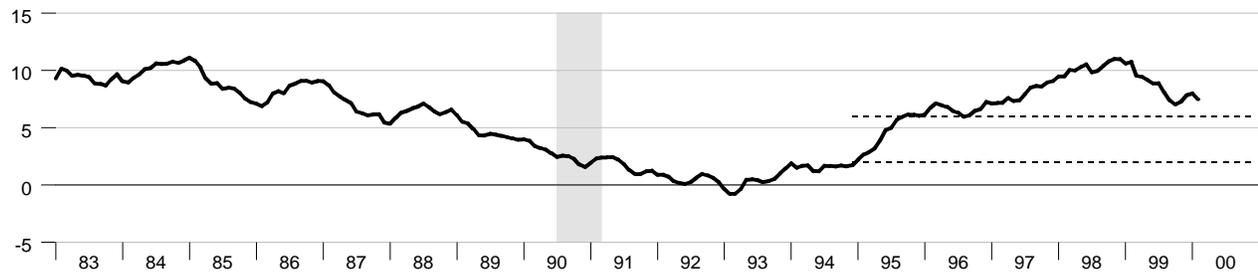
Dotted lines indicate the FOMC target ranges.

Monetary Services Index - M2

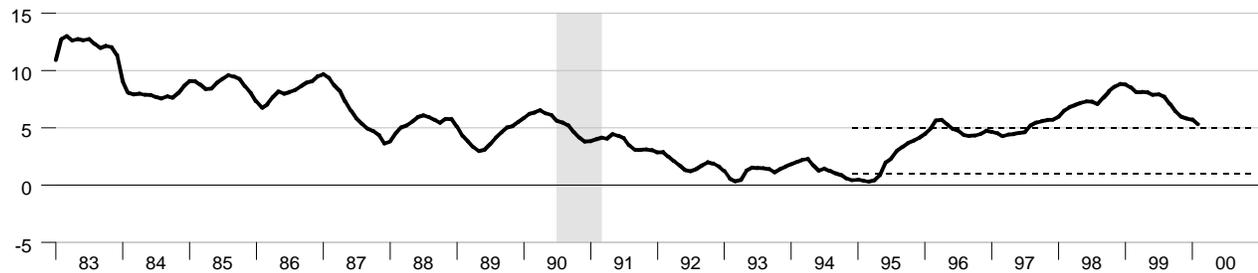Percent change from year ago

Federal Reserve Bank of St. Louis
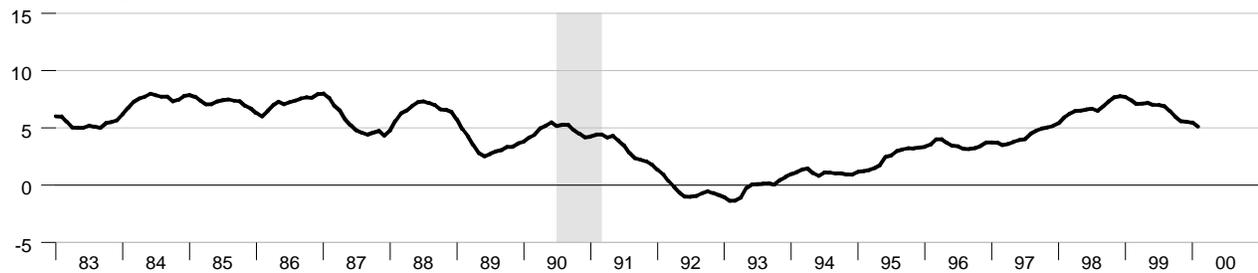
Adjusted Monetary Base

Percent change from year ago
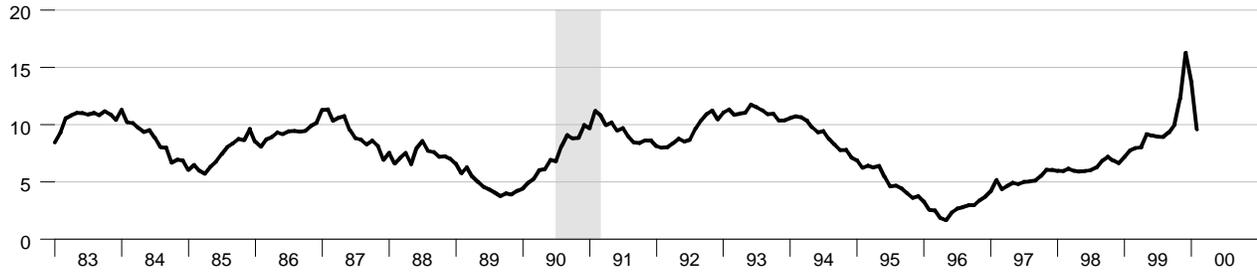
Domestic Nonfinancial Debt

Percent change from year ago

Federal

Total
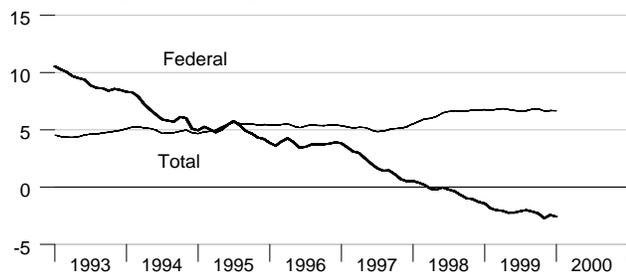
Currency Held by the Nonbank Public

Percent change from year ago

Time Deposits

Percent change from year ago

Large Denomination

Small Denomination
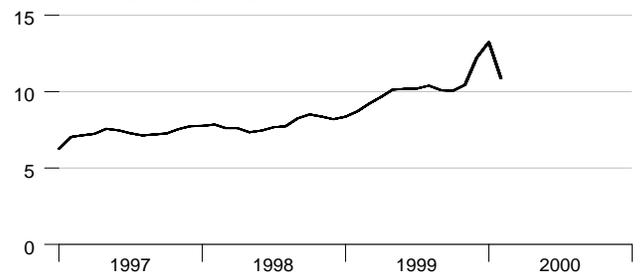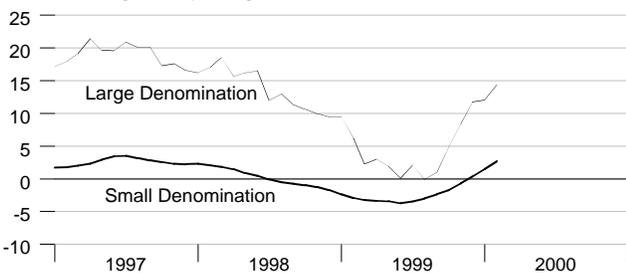
Checkable and Savings Deposits

Percent change from year ago

Savings

Checkable
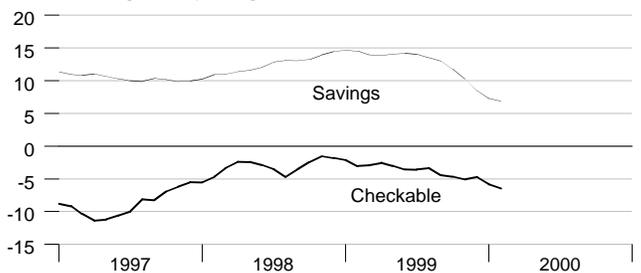
Money Market Mutual Fund Shares

Percent change from year ago

Institutional funds

Retail funds
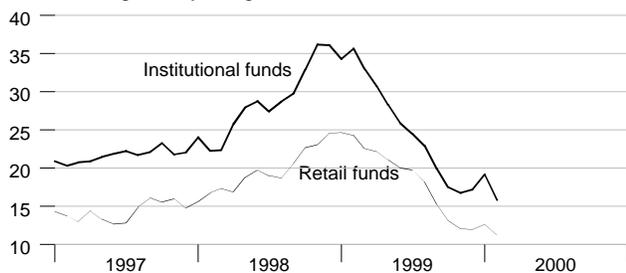
Repurchase Agreements and Eurodollars

Billions of dollars   Billions of dollars

Repos (left)

Eurodollars (right)
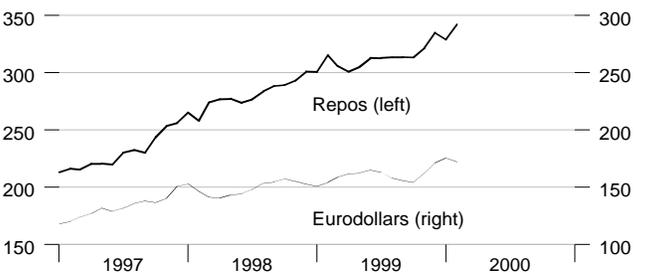
M1

Percent change at an annual rate

MZM

Percent change at an annual rate
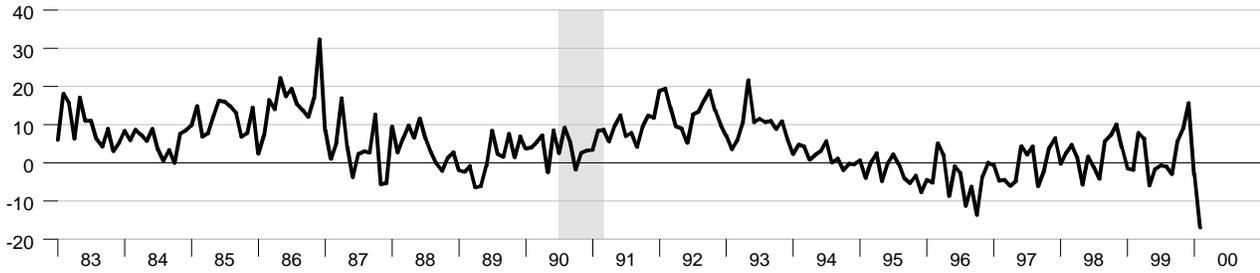
M2

Percent change at an annual rate

M3

Percent change at an annual rate

Federal Reserve Bank of St. Louis
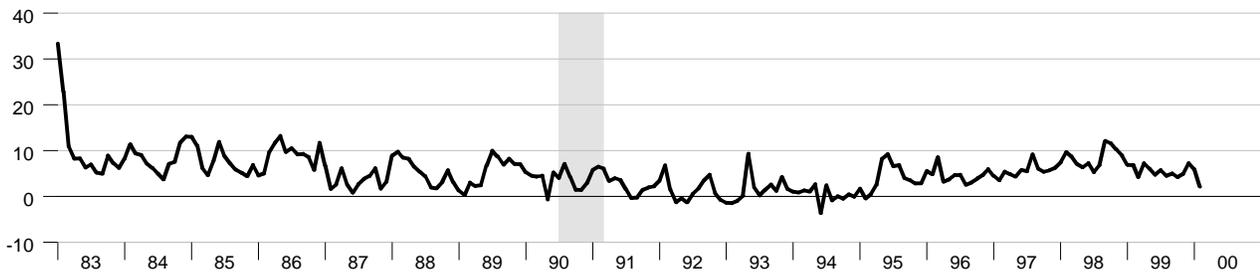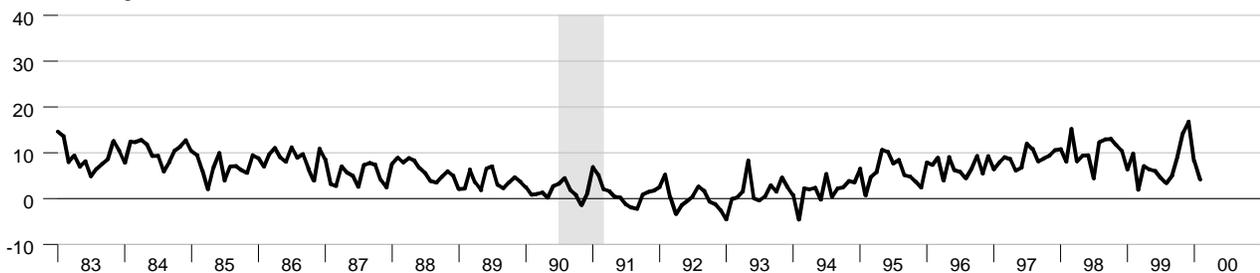
Adjusted and Required Reserves

Billions of $

Adjusted

Required
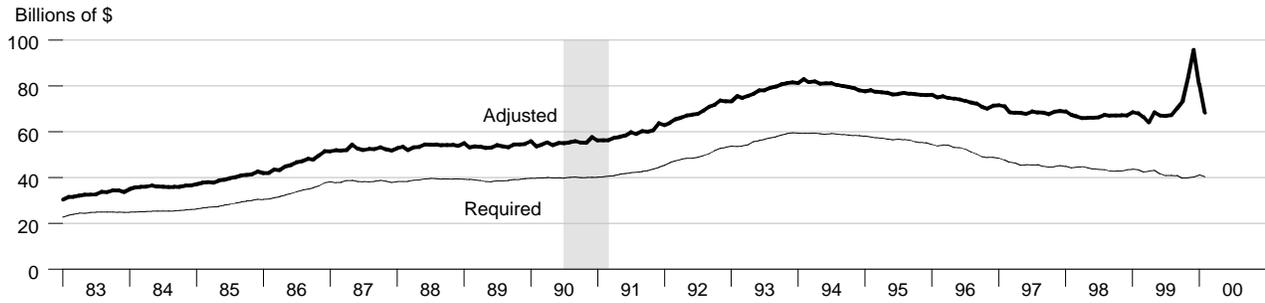
Total Borrowings, nsa

Billions of $
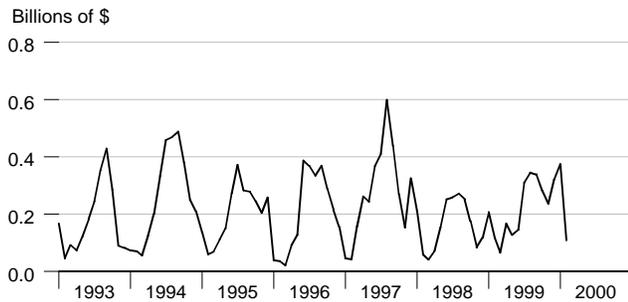
Excess Reserves plus RCB Contracts
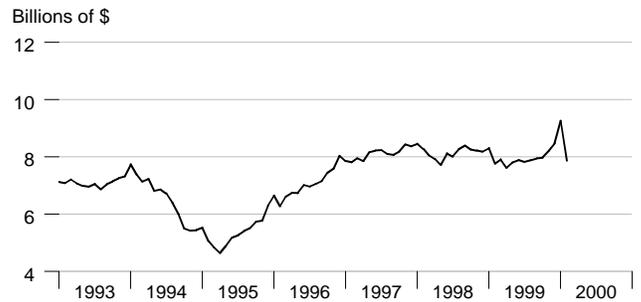
Billions of $

Nonfinancial Commercial Paper

Percent change from year ago

Consumer Credit

Percent change from year ago

Inflation and Inflation Expectations

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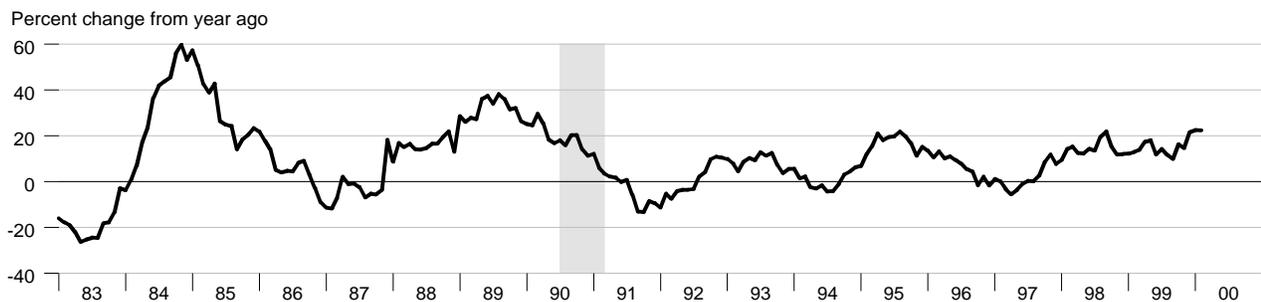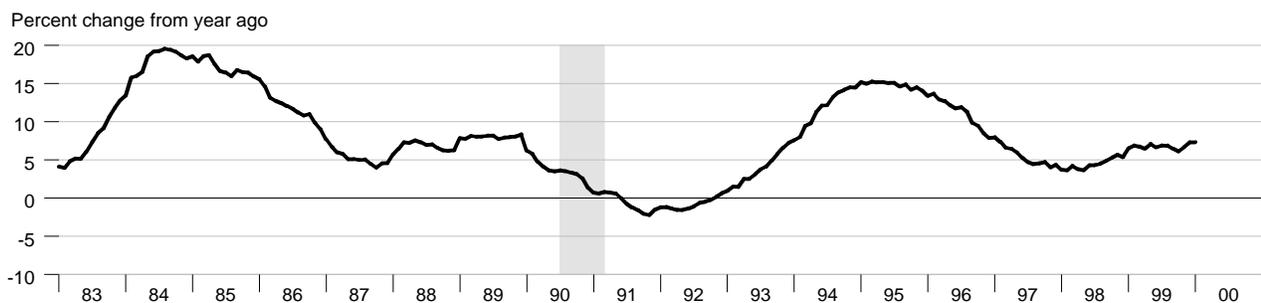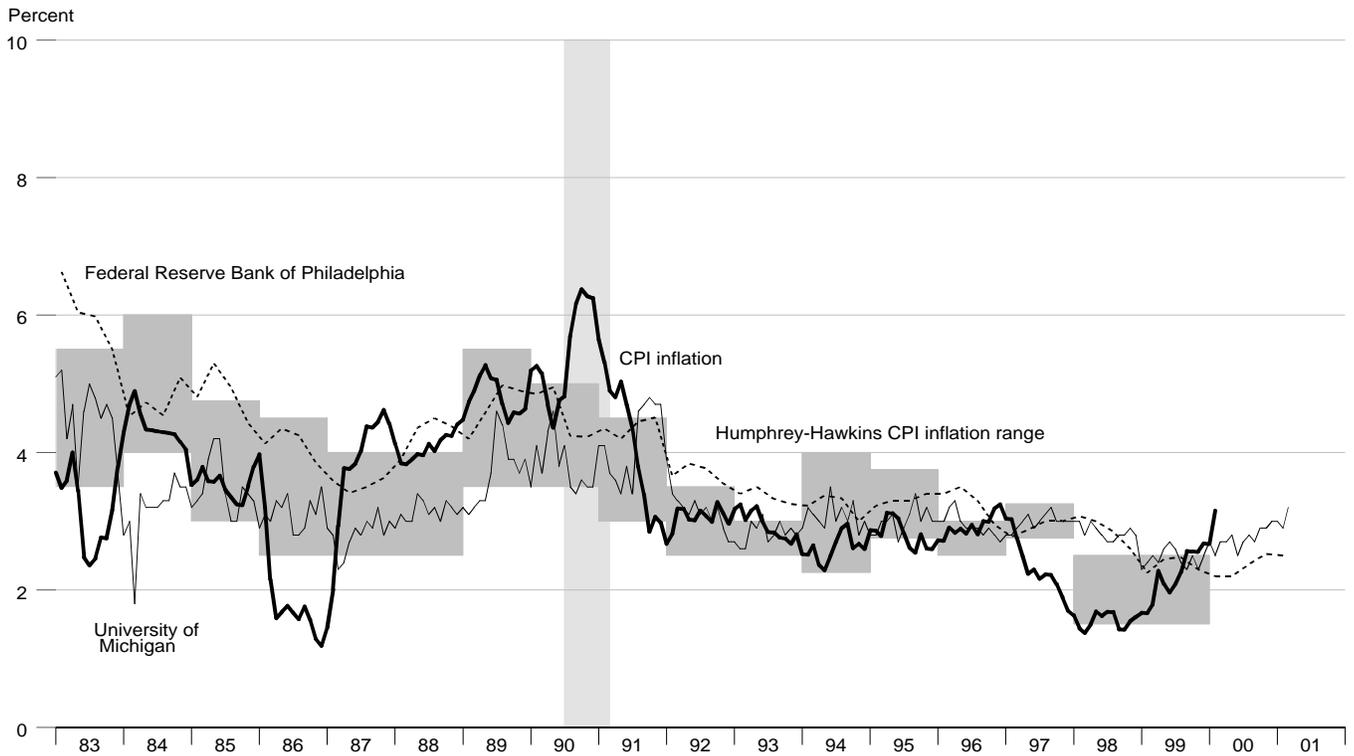
The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range
was reported using the PCE price index and therefore is not shown on this graph . See page 19 for information.

Treasury Security Yield Spreads
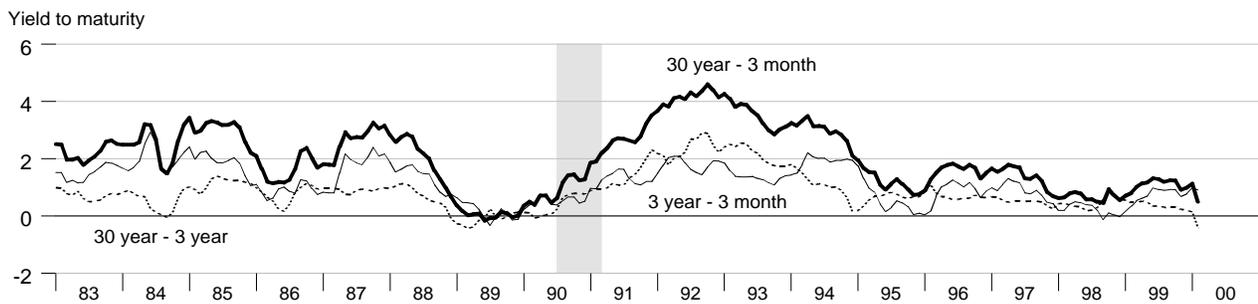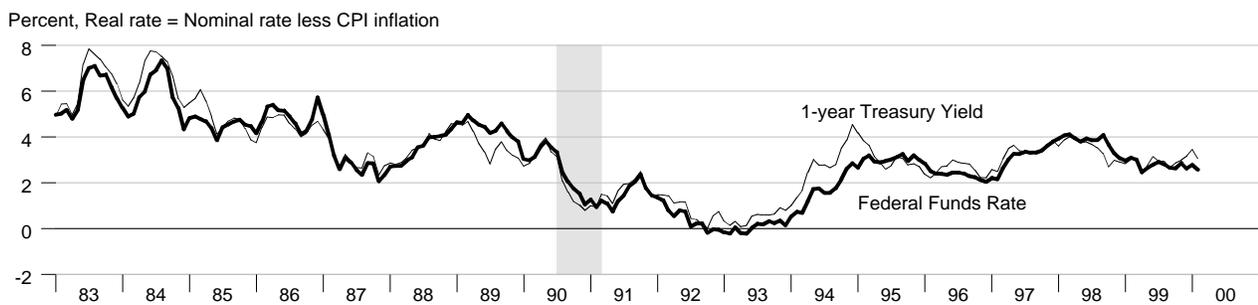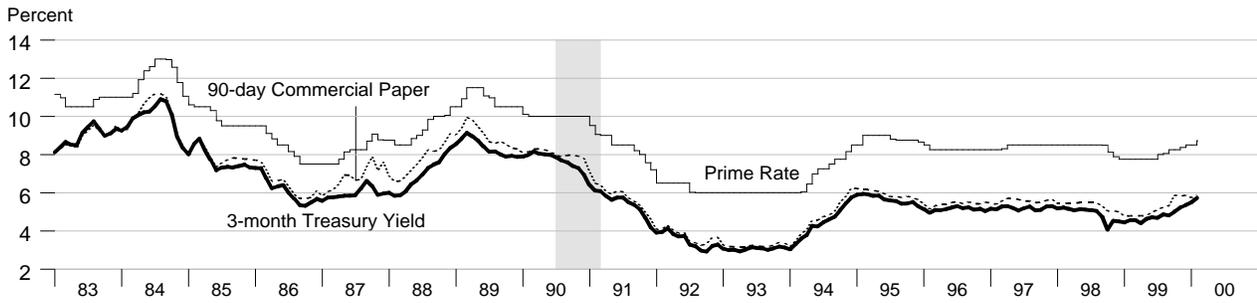
Yield to maturity

Real Interest Rates

Percent, Real rate = Nominal rate less CPI inflation

Federal Reserve Bank of St. Louis

Short Term Interest Rates

Percent

90-day Commercial Paper

Prime Rate

3-month Treasury Yield

Long Term Interest Rates

Percent

Conventional mortgage

Corporate Aaa

30-year Treasury Yield

Long Term Interest Rates

Percent

Corporate Baa

30-year Treasury Yield

10-year Treasury Yield

Short Term Interest Rates

Percent

90-day Commercial Paper

3-month Treasury Yield
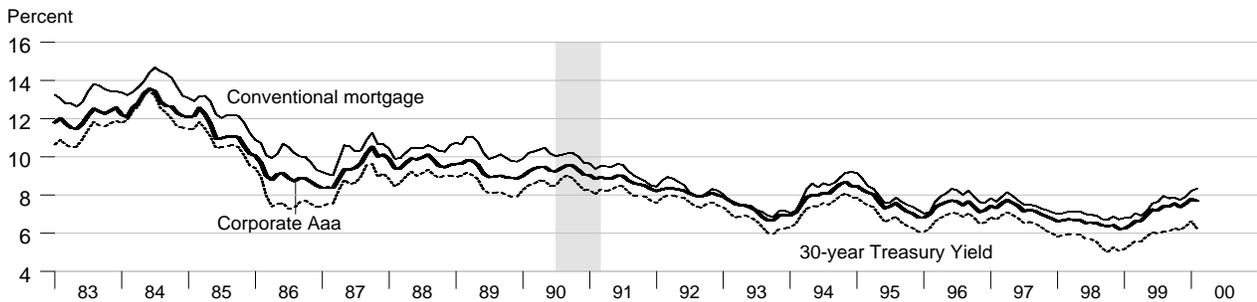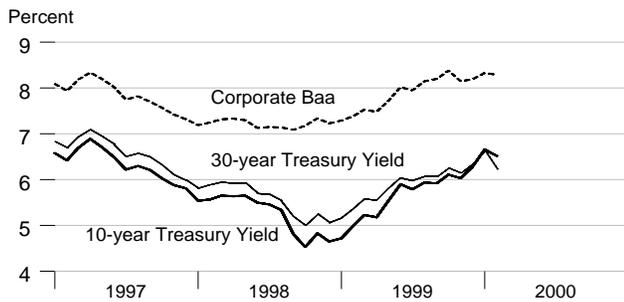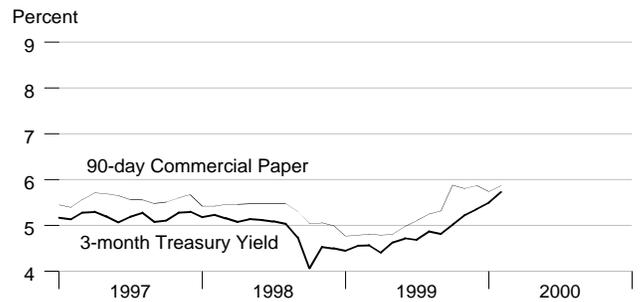
FOMC Expected Federal Funds Rate and Discount Rate

Percent

Federal Funds Rate

Discount Rate

Federal Funds Rate and Inflation Targets

Percent

4% 3% 2% 1% 0% Target Inflation Rates

Actual

Calculated federal funds rate is based on Taylor's rule. See notes on page 19.
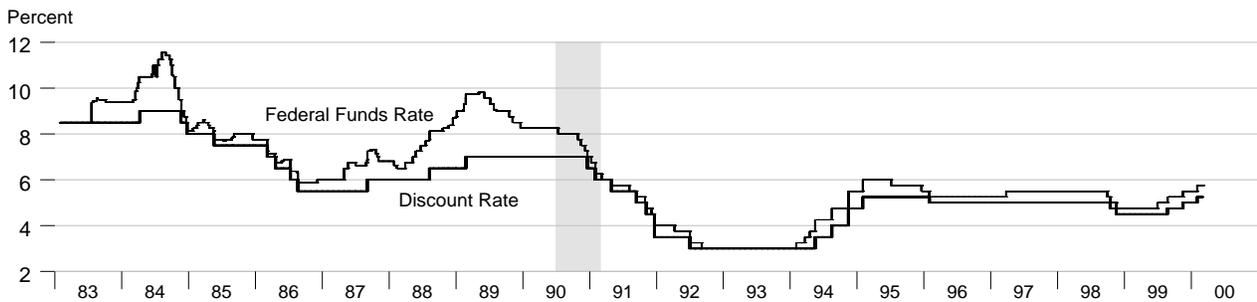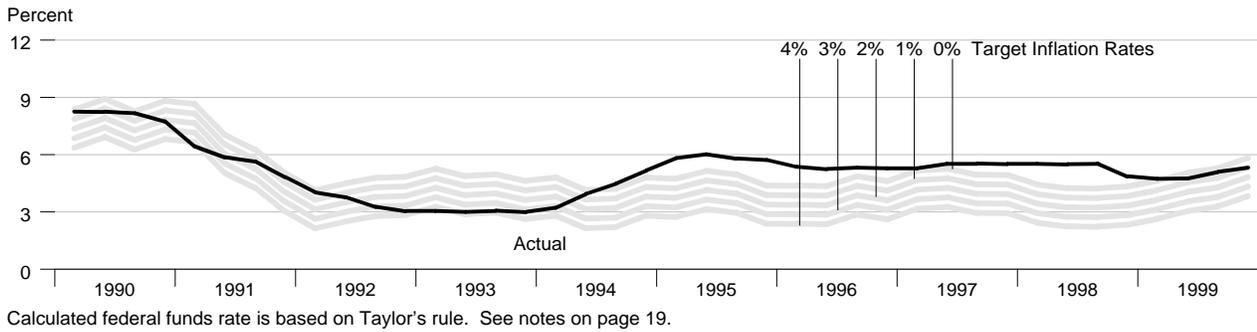
Actual and Potential Real GDP

Billions of chain-weighted 1996 dollars

Potential

Actual

PCE Inflation

Percent change from year ago

Monetary Base Growth* and Inflation Targets

Percent

Actual (2-year moving average)
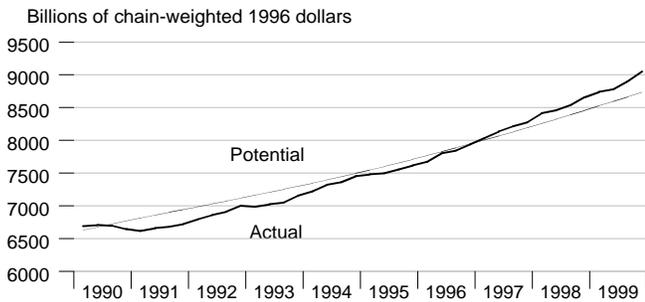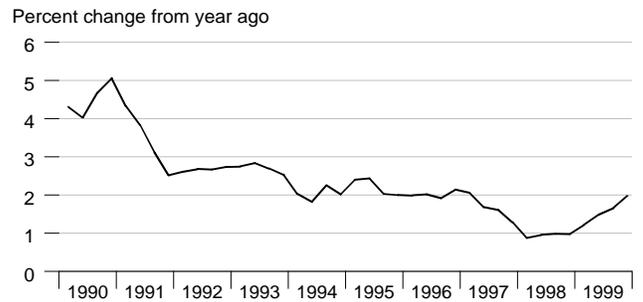
0% 1% 2% 3% 4% Target Inflation Rates
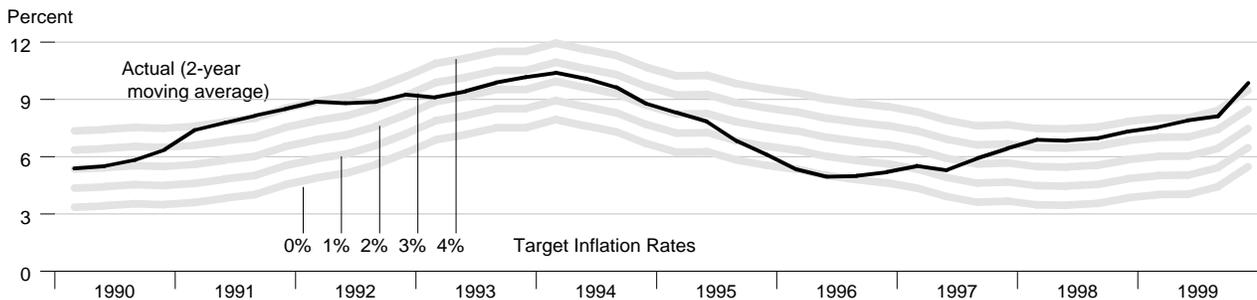
*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. See notes on page 19.

Monetary Base Velocity Growth
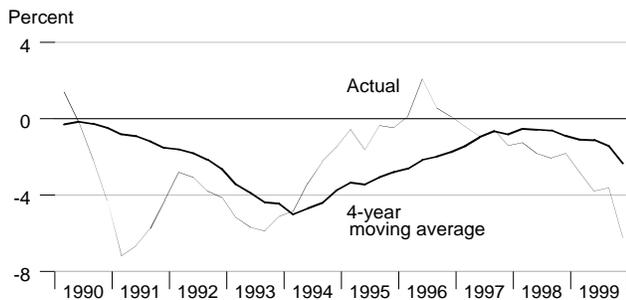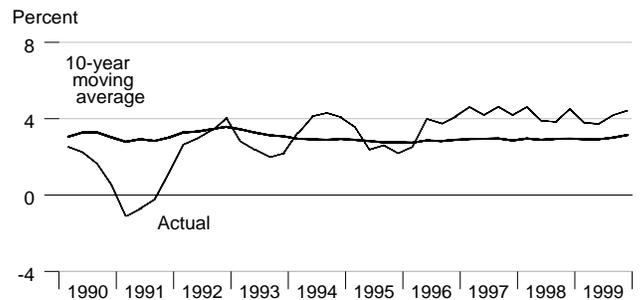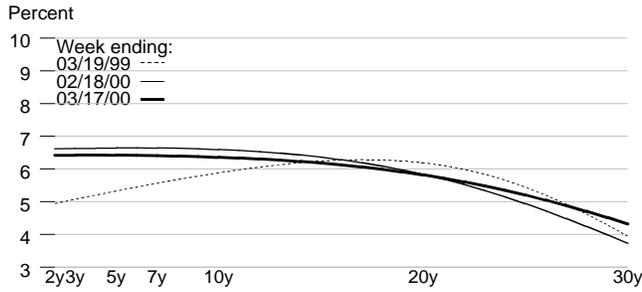
Percent

Actual

4-year moving average

Real Output Growth

Percent

10-year moving average

Actual

Implied One-Year Forward Rates

Percent

Week ending:
03/19/99 ------
02/18/00 ——
03/17/00 ━━

2y 3y 5y 7y 10y   20y   30y

Rates on 3-Month Eurodollar Futures

Percent, daily data

May 2000

Apr 2000

Mar 2000

01/17 01/24 01/31 02/07 02/14 02/21 02/28 03/06 03/13 03/20

Rates on Selected Fed Funds Futures Contracts

Percent, daily data

May 2000

Apr 2000

Mar 2000

01/17 01/24 01/31 02/07 02/14 02/21 02/28 03/06 03/13 03/20

Implied Yields on Fed Funds Futures

Percent

3/17/2000

2/11/2000

1/14/2000

Mar   Apr   May   Jun   Jul   Aug

Inflation-Protected Treasury Yields

Percent, weekly data

5-year

30-year

10-year

1997   1998   1999   2000

Inflation-Protected Treasury Yield Spreads

Percent, weekly data

10-year

30-year

5-year

1997   1998   1999   2000
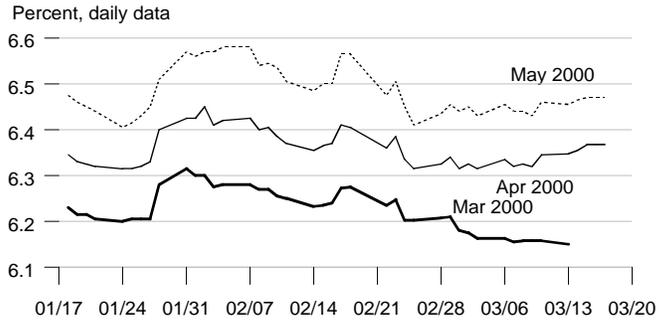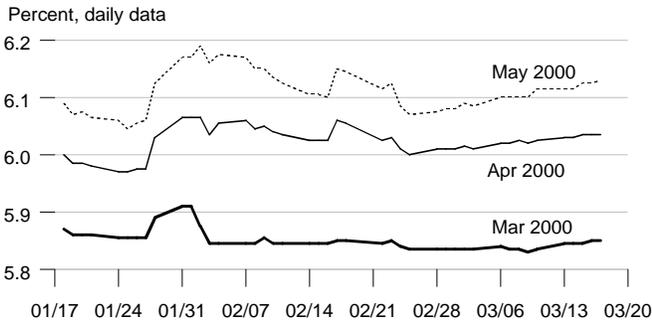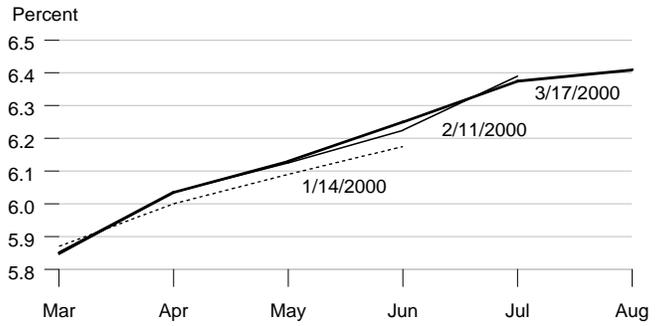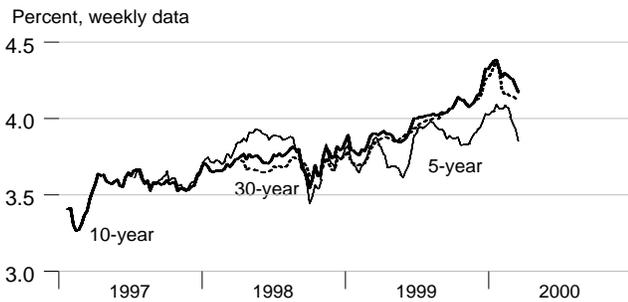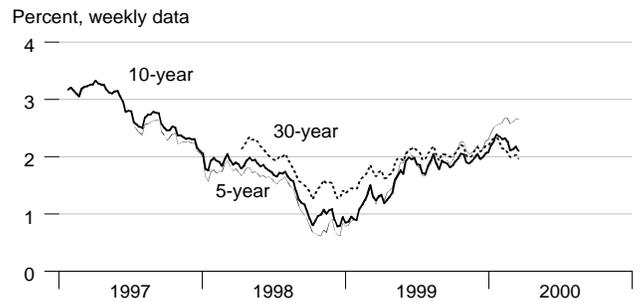
Inflation-Indexed 30-Year Bonds

Percent, weekly data

Canada

UK   US

1996   1997   1998   1999   2000
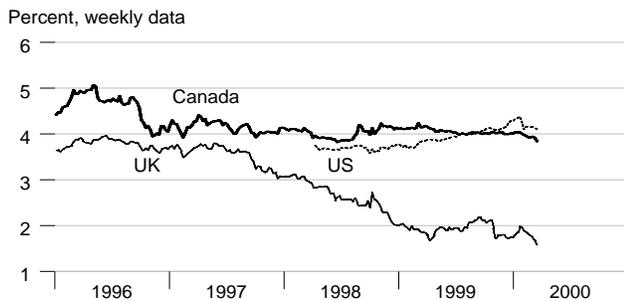
Inflation-Indexed 10-Year Bonds

Percent, weekly data

US

UK

1996   1997   1998   1999   2000
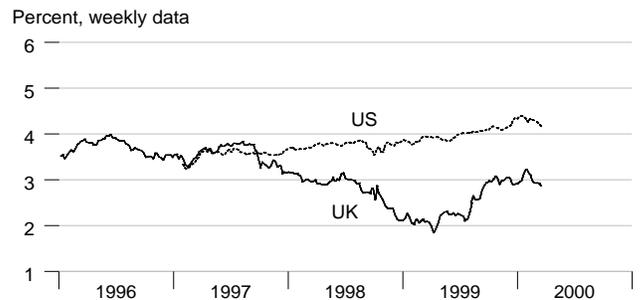
MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM   Opportunity Cost = 3 month T-bill rate less MZM own rate

Velocity
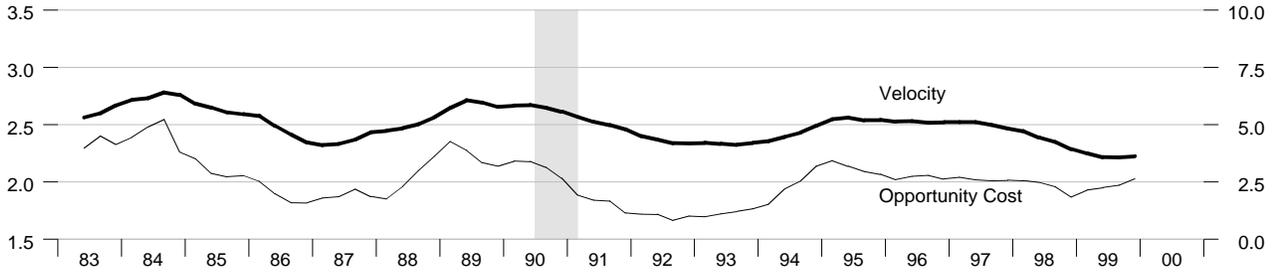
Opportunity Cost

M2 Velocity and Opportunity Cost

Velocity = Nominal GDP / M2   Opportunity Cost = Treasury rate less M2 own rate

Velocity

Opportunity Cost (5-yr T-bond)

Opportunity Cost (3-mo T-bill)
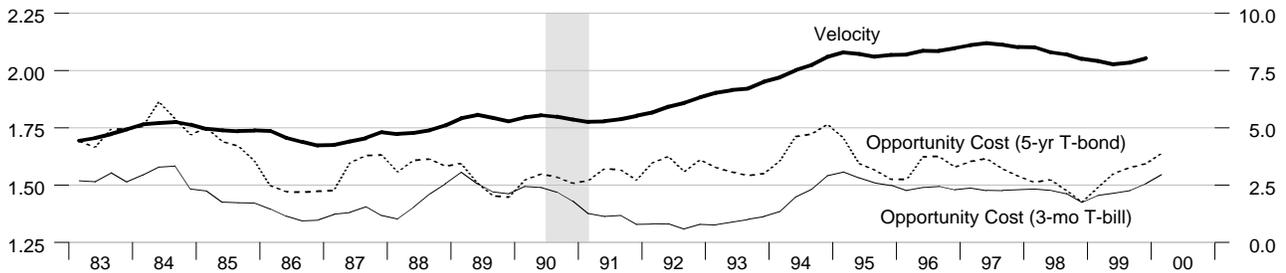
M2, MZM and Nominal GDP

Billions of $

Nominal GDP

M2

MZM

Interest Rates

Percent

M2 own

MZM own

5-yr bond

3-mo bill

Federal Reserve Bank of St. Louis
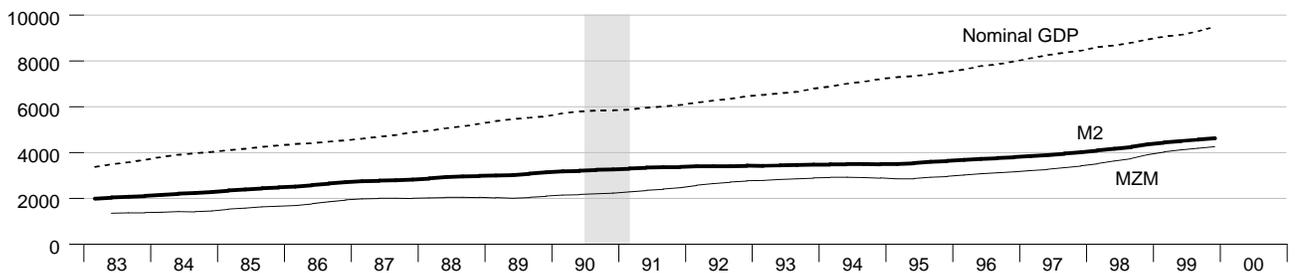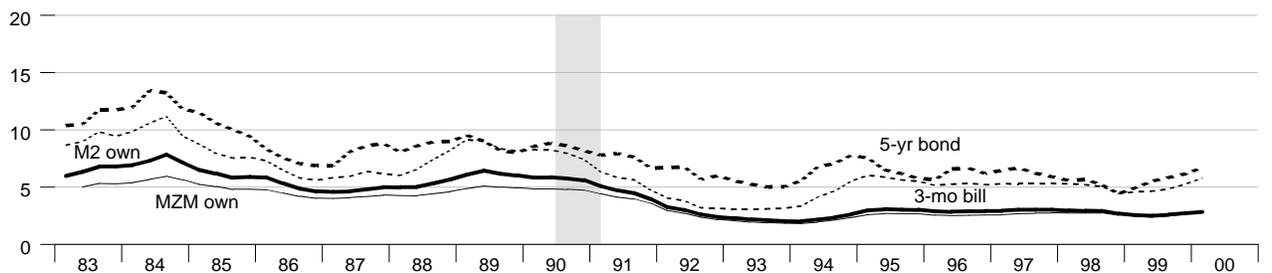
Gross Domestic Product

Percent change from year ago
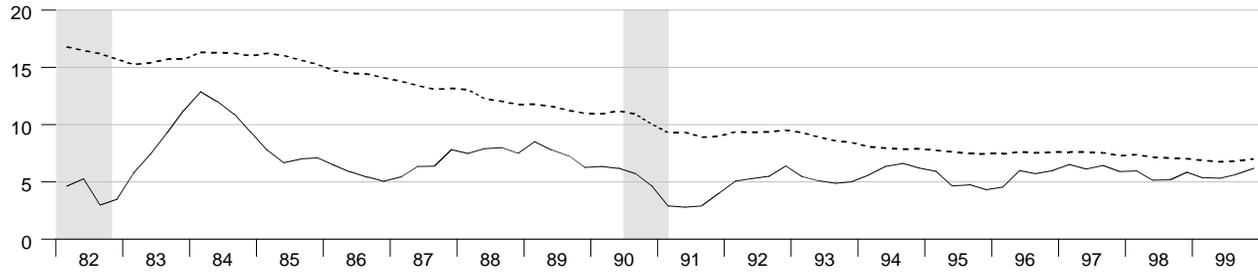
Real Gross Domestic Product

Percent change from year ago
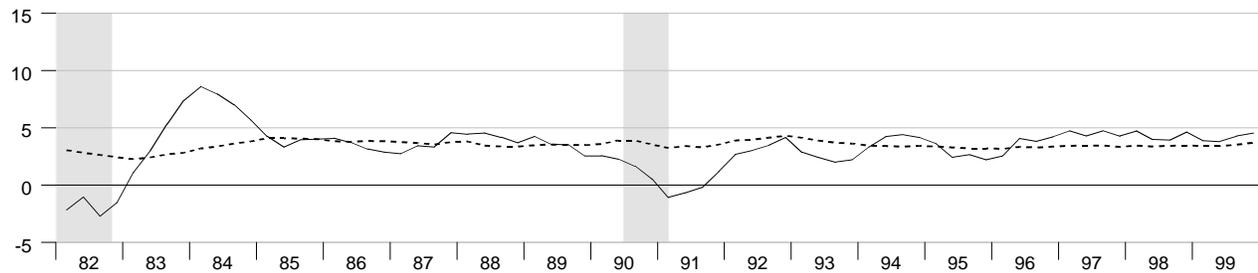
Gross Domestic Product Price Index

Percent change from year ago

M2
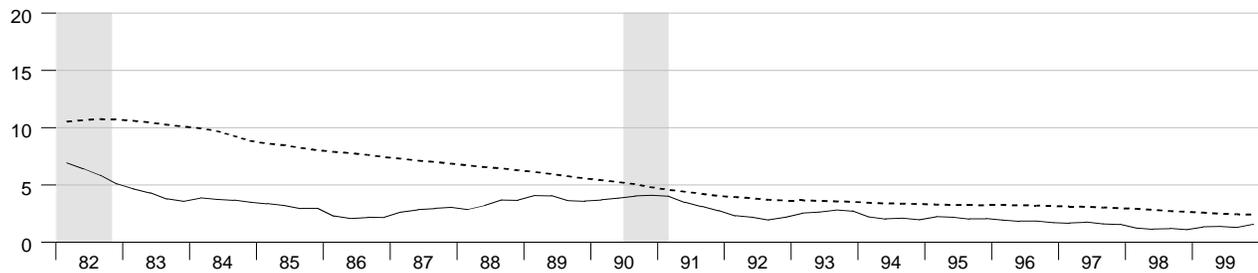
Percent change from year ago
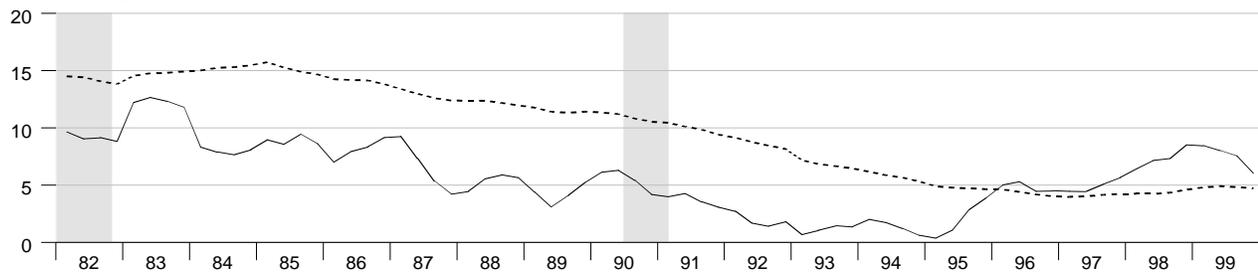
Dashed lines indicate 10-year moving averages

Federal Reserve Bank of St. Louis

Bank Credit

Percent change from year ago
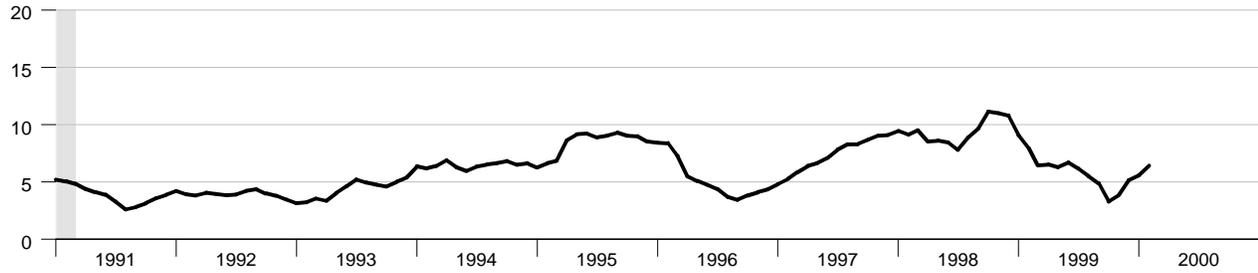
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago
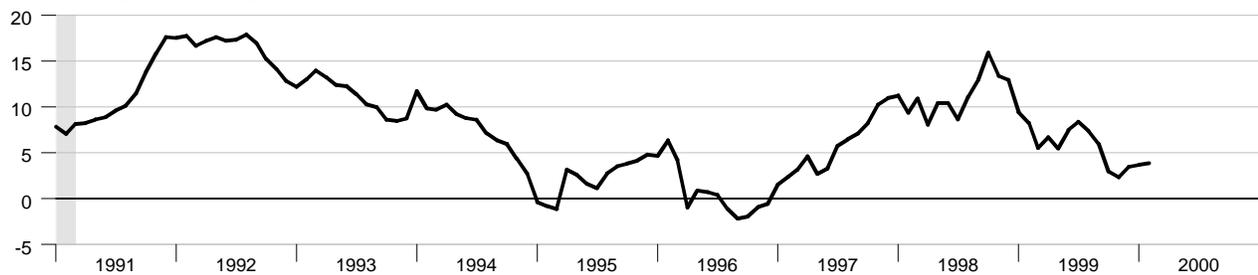
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago
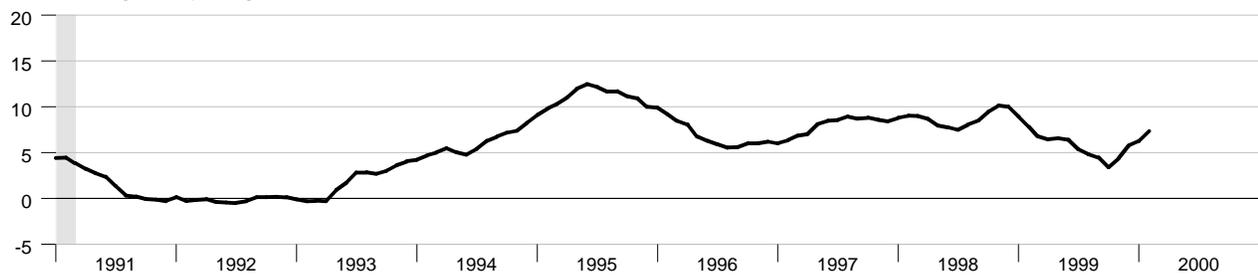
Commercial and Industrial Loans at Commercial Banks

Percent change from year ago

Federal Reserve Bank of St. Louis
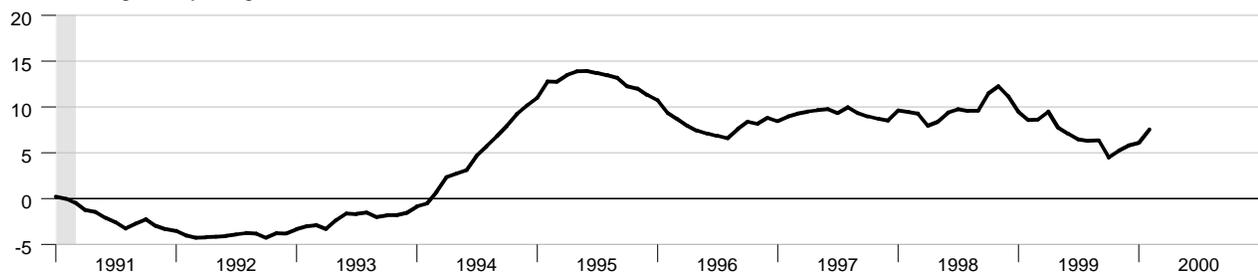
Standard and Poor's 500
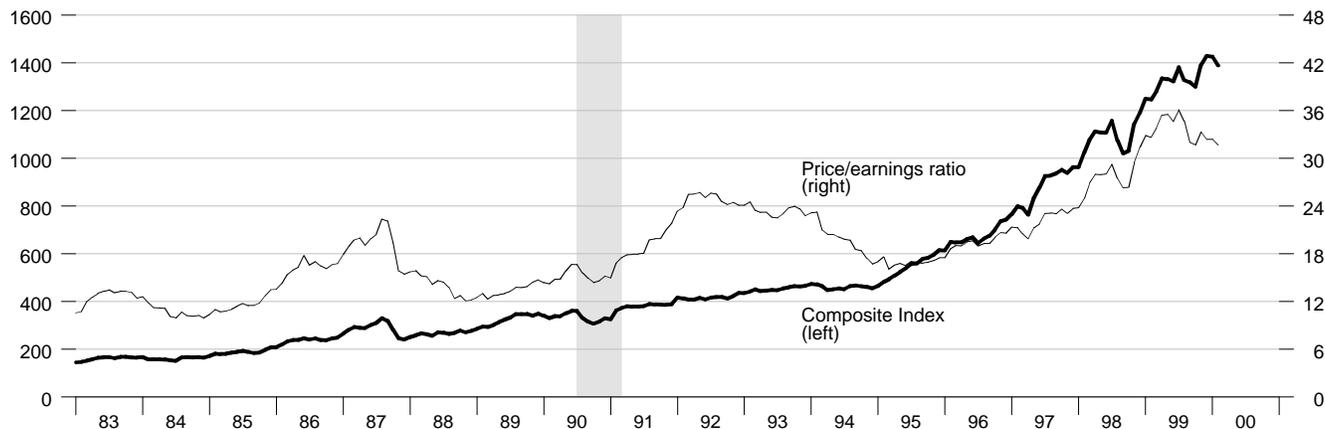
Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1999Q1	1999Q2	1999Q3	1999Q4	Nov99	Dec99	Jan00	Feb00
United States	1.73	2.09	2.26	2.56	6.42	6.63	6.81	6.49
Canada	0.80	1.59	2.18	2.36	6.15	6.22	6.48	6.19
France	0.26	0.36	0.53	1.00	5.66	5.81	6.11	5.96
Germany	0.26	0.48	0.64	0.96	5.04	5.15	5.54	5.51
Italy	1.39	1.44	1.72	2.06	5.29	5.40	5.79	5.77
Japan	-0.10	-0.22	0.07	-1.04	1.81	1.74	1.71	1.84
United Kingdom	2.20	1.42	1.17	1.47	5.28	5.38	5.82	5.62

Inflation and Long-Term Interest Rates Differentials
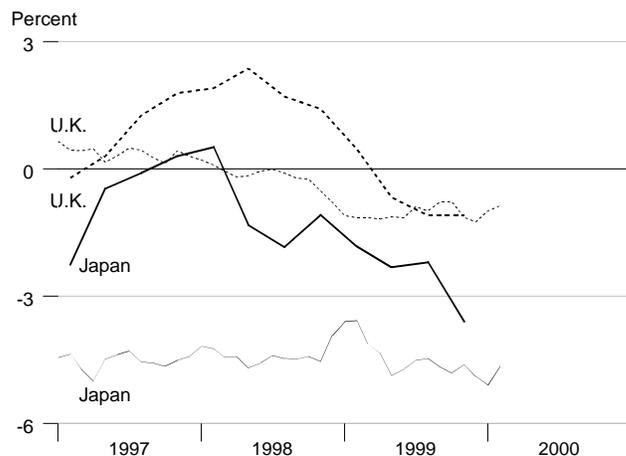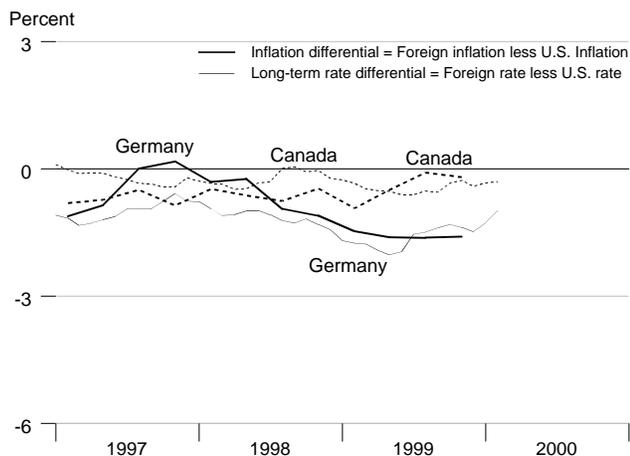
		Money Stock			Bank			
		M1	**MZM**	**M2**	**M3**	**Credit**	**Monetary Base**	**Reserves**	**MSI M2**
1995		1143.037	2906.093	3575.434	4500.288	3500.434	443.499	76.838	210.451
1996		1106.428	3096.347	3747.395	4796.863	3683.251	455.572	73.401	217.848
1997		1069.928	3318.613	3931.933	5179.573	3951.492	478.708	68.873	227.070
1998		1080.851	3705.090	4221.490	5710.897	4323.846	508.942	66.925	242.228
1999		1102.446	4157.563	4538.437	6208.620	4580.674	557.863	71.648	258.535
1997	1	1076.355	3222.658	3850.581	5013.301	3829.781	470.011	70.393	222.860
	2	1065.335	3275.272	3897.351	5112.773	3910.574	473.856	68.137	225.233
	3	1069.092	3349.688	3959.375	5235.401	3990.927	480.885	68.504	228.457
	4	1068.930	3426.834	4020.424	5356.815	4074.686	490.081	68.456	231.730
1998	1	1076.718	3523.710	4097.751	5498.386	4188.340	498.320	67.645	235.917
	2	1078.686	3637.300	4176.066	5638.533	4244.136	502.020	66.044	239.943
	3	1076.071	3746.116	4249.253	5763.384	4341.108	511.546	66.905	243.733
	4	1091.927	3913.233	4362.888	5943.284	4521.801	523.881	67.105	249.320
1999	1	1097.220	4033.485	4444.488	6064.827	4515.471	536.335	67.691	253.370
	2	1103.061	4127.357	4511.460	6155.764	4519.880	545.912	66.526	257.007
	3	1098.074	4198.569	4570.573	6231.278	4580.340	557.969	68.112	260.270
	4	1111.430	4270.841	4627.226	6382.612	4707.006	591.238	84.263	263.493
1998	Feb	1076.110	3522.418	4098.736	5487.458	4187.377	499.490	67.349	235.960
	Mar	1080.319	3563.019	4128.581	5556.968	4218.715	499.342	66.736	237.550
	Apr	1081.657	3601.717	4152.912	5594.709	4223.704	499.537	65.937	238.890
	May	1076.489	3637.081	4174.983	5638.310	4241.946	502.322	66.071	239.820
	Jun	1077.912	3673.103	4200.304	5682.580	4266.759	504.200	66.125	241.120
	Jul	1076.877	3700.662	4218.927	5703.551	4285.776	507.618	66.307	242.270
	Aug	1073.126	3739.452	4242.999	5762.211	4344.278	511.031	67.371	243.440
	Sep	1078.211	3798.233	4285.832	5824.390	4393.269	515.990	67.036	245.490
	Oct	1084.671	3860.123	4327.305	5887.775	4489.640	520.806	67.058	247.530
	Nov	1093.735	3915.841	4364.342	5945.154	4528.596	524.379	67.182	249.420
	Dec	1097.375	3963.734	4397.018	5996.923	4547.167	526.458	67.074	251.010
1999	Jan	1095.980	3998.710	4422.360	6028.749	4535.709	531.761	68.517	252.260
	Feb	1094.290	4039.737	4447.669	6077.971	4519.976	538.190	68.067	253.460
	Mar	1101.391	4062.008	4463.435	6087.761	4490.727	539.053	66.488	254.390
	Apr	1107.226	4099.557	4490.355	6123.735	4498.972	539.609	64.109	255.900
	May	1101.751	4129.187	4513.053	6156.255	4508.375	548.331	68.424	257.080
	Jun	1100.206	4153.327	4530.973	6187.303	4552.294	549.797	67.046	258.040
	Jul	1099.569	4177.179	4552.715	6210.837	4550.105	553.061	66.882	259.230
	Aug	1098.668	4200.217	4569.938	6228.405	4583.356	556.713	67.249	260.230
	Sep	1095.985	4218.310	4589.066	6254.592	4607.559	564.133	70.206	261.350
	Oct	1101.146	4240.711	4605.250	6302.528	4636.927	572.986	73.315	262.260
	Nov	1109.359	4267.261	4624.240	6378.045	4702.869	588.662	83.810	263.330
	Dec	1123.784	4304.550	4652.188	6467.263	4781.223	612.065	95.665	264.890
2000	Jan	1120.873	4337.569	4675.248	6511.005	4788.221	604.798	80.633	266.060
	Feb	1105.036	4334.615	4683.702	6533.592	4809.964	589.772	68.323	266.430

*All values are given in billions of dollars

Federal Reserve Bank of St. Louis

		Federal Funds	Discount Rate	Prime Rate	3-mo CDs	Treasury Yields			Corporate Aaa Bonds	S & L Aaa Bonds	Conventional Mortgage
						3 mo	3 yr	30 yr			
	1995	5.84	5.21	8.83	5.92	5.66	6.26	6.88	7.59	5.80	7.95
	1996	5.30	5.02	8.27	5.39	5.15	5.99	6.70	7.37	5.52	7.80
	1997	5.46	5.00	8.44	5.62	5.20	6.10	6.61	7.26	5.32	7.60
	1998	5.35	4.92	8.35	5.47	4.91	5.14	5.58	6.53	4.93	6.94
	1999	4.97	4.62	7.99	5.33	4.78	5.49	5.87	7.04	5.28	7.43
1997	1	5.28	5.00	8.27	5.44	5.20	6.19	6.82	7.43	5.44	7.79
	2	5.52	5.00	8.50	5.69	5.19	6.42	6.93	7.57	5.49	7.93
	3	5.53	5.00	8.50	5.60	5.18	6.01	6.53	7.17	5.23	7.47
	4	5.51	5.00	8.50	5.73	5.23	5.78	6.14	6.88	5.14	7.20
1998	1	5.52	5.00	8.50	5.55	5.19	5.46	5.88	6.67	4.94	7.05
	2	5.50	5.00	8.50	5.59	5.11	5.57	5.85	6.64	5.00	7.09
	3	5.53	5.00	8.50	5.53	4.96	5.11	5.47	6.49	4.95	6.87
	4	4.86	4.66	7.92	5.20	4.37	4.41	5.11	6.33	4.82	6.76
1999	1	4.73	4.50	7.75	4.90	4.53	4.87	5.37	6.42	4.87	6.88
	2	4.75	4.50	7.75	4.98	4.59	5.35	5.80	6.93	5.05	7.20
	3	5.09	4.60	8.10	5.38	4.79	5.71	6.04	7.33	5.42	7.80
	4	5.31	4.87	8.37	6.06	5.20	6.00	6.25	7.49	5.79	7.83
1998	Feb	5.51	5.00	8.50	5.54	5.23	5.43	5.89	6.67	4.92	7.04
	Mar	5.49	5.00	8.50	5.58	5.16	5.57	5.95	6.72	5.03	7.13
	Apr	5.45	5.00	8.50	5.58	5.08	5.58	5.92	6.69	5.00	7.14
	May	5.49	5.00	8.50	5.59	5.14	5.61	5.93	6.69	5.04	7.14
	Jun	5.56	5.00	8.50	5.60	5.12	5.52	5.70	6.53	4.97	7.00
	Jul	5.54	5.00	8.50	5.59	5.09	5.47	5.68	6.55	5.01	6.95
	Aug	5.55	5.00	8.50	5.58	5.04	5.24	5.54	6.52	5.01	6.92
	Sep	5.51	5.00	8.49	5.41	4.74	4.62	5.20	6.40	4.84	6.72
	Oct	5.07	4.86	8.12	5.21	4.07	4.18	5.01	6.37	4.76	6.71
	Nov	4.83	4.63	7.89	5.24	4.53	4.57	5.25	6.41	4.87	6.87
	Dec	4.68	4.50	7.75	5.14	4.50	4.48	5.06	6.22	4.83	6.72
1999	Jan	4.63	4.50	7.75	4.89	4.45	4.61	5.16	6.24	4.85	6.79
	Feb	4.76	4.50	7.75	4.90	4.56	4.90	5.37	6.40	4.80	6.81
	Mar	4.81	4.50	7.75	4.91	4.57	5.11	5.58	6.62	4.96	7.04
	Apr	4.74	4.50	7.75	4.88	4.41	5.03	5.55	6.64	4.89	6.92
	May	4.74	4.50	7.75	4.92	4.63	5.33	5.81	6.93	5.05	7.15
	Jun	4.76	4.50	7.75	5.13	4.72	5.70	6.04	7.23	5.22	7.55
	Jul	4.99	4.50	8.00	5.24	4.69	5.62	5.98	7.19	5.24	7.63
	Aug	5.07	4.56	8.06	5.41	4.87	5.77	6.07	7.40	5.47	7.94
	Sep	5.22	4.75	8.25	5.50	4.82	5.75	6.07	7.39	5.56	7.82
	Oct	5.20	4.75	8.25	6.13	5.02	5.94	6.26	7.55	5.78	7.85
	Nov	5.42	4.86	8.37	6.00	5.23	5.92	6.15	7.36	5.77	7.74
	Dec	5.30	5.00	8.50	6.05	5.36	6.14	6.35	7.55	5.82	7.91
2000	Jan	5.45	5.00	8.50	5.95	5.50	6.49	6.63	7.78	5.91	8.21
	Feb	5.73	5.24	8.73	6.01	5.73	6.65	6.23	7.68	5.88	8.33

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

Federal Reserve Bank of St. Louis

		M1	MZM	M2	M3
Percent change from previous period					
	1995	-0.21	-0.46	2.06	4.56
	1996	-3.20	6.55	4.81	6.59
	1997	-3.30	7.18	4.92	7.98
	1998	1.02	11.65	7.36	10.26
	1999	2.00	12.21	7.51	8.72
1997	1	-0.53	1.79	1.19	1.90
	2	-1.02	1.63	1.21	1.98
	3	0.35	2.27	1.59	2.40
	4	-0.02	2.30	1.54	2.32
1998	1	0.73	2.83	1.92	2.64
	2	0.18	3.22	1.91	2.55
	3	-0.24	2.99	1.75	2.21
	4	1.47	4.46	2.67	3.12
1999	1	0.48	3.07	1.87	2.05
	2	0.53	2.33	1.51	1.50
	3	-0.45	1.73	1.31	1.23
	4	1.22	1.72	1.24	2.43
1998	Feb	0.22	1.05	0.81	0.67
	Mar	0.39	1.15	0.73	1.27
	Apr	0.12	1.09	0.59	0.68
	May	-0.48	0.98	0.53	0.78
	Jun	0.13	0.99	0.61	0.79
	Jul	-0.10	0.75	0.44	0.37
	Aug	-0.35	1.05	0.57	1.03
	Sep	0.47	1.57	1.01	1.08
	Oct	0.60	1.63	0.97	1.09
	Nov	0.84	1.44	0.86	0.97
	Dec	0.33	1.22	0.75	0.87
1999	Jan	-0.13	0.88	0.58	0.53
	Feb	-0.15	1.03	0.57	0.82
	Mar	0.65	0.55	0.35	0.16
	Apr	0.53	0.92	0.60	0.59
	May	-0.49	0.72	0.51	0.53
	Jun	-0.14	0.58	0.40	0.50
	Jul	-0.06	0.57	0.48	0.38
	Aug	-0.08	0.55	0.38	0.28
	Sep	-0.24	0.43	0.42	0.42
	Oct	0.47	0.53	0.35	0.77
	Nov	0.75	0.63	0.41	1.20
	Dec	1.30	0.87	0.60	1.40
2000	Jan	-0.26	0.77	0.50	0.68
	Feb	-1.41	-0.07	0.18	0.35

		Price Indexes			Potential Output		Gross Domestic Product	
		CPI[1]	GDP[2]	PCE[2]	CBO (1995)[3]	CBO (2000)[4]	(Previous)[5]	(Revised)[6]
1990	1	128.1	85.5	84.5	6074.3	6626.8	6152.6	6689.2
	2	129.4	86.5	85.4	6110.1	6674.3	6171.6	6705.4
	3	131.6	87.3	86.5	6145.0	6720.9	6142.1	6695.4
	4	133.9	88.0	87.7	6179.1	6767.0	6079.0	6643.9
1991	1	134.9	89.0	88.2	6212.3	6812.3	6047.5	6616.2
	2	135.7	89.5	88.7	6244.7	6857.0	6074.7	6658.4
	3	136.7	90.1	89.2	6276.4	6901.1	6090.1	6680.2
	4	137.8	90.5	89.9	6307.2	6944.6	6105.3	6721.7
1992	1	138.8	91.0	90.6	6337.6	6987.8	6175.7	6792.9
	2	139.8	91.5	91.1	6367.7	7030.9	6214.2	6859.3
	3	140.9	91.8	91.7	6397.9	7074.1	6260.7	6912.1
	4	142.1	92.4	92.4	6428.4	7117.6	6327.1	7000.0
1993	1	143.1	93.4	93.1	6459.5	7161.8	6327.9	6986.9
	2	144.2	93.9	93.8	6491.3	7206.9	6359.9	7024.0
	3	144.9	94.4	94.2	6523.7	7252.7	6393.5	7050.8
	4	146.0	95.0	94.8	6556.9	7299.3	6476.9	7155.0
1994	1	146.8	95.4	95.0	6590.9	7346.8	6524.5	7218.5
	2	147.6	95.9	95.5	6625.8	7395.1	6600.3	7319.8
	3	149.0	96.4	96.3	6661.6	7444.4	6629.5	7360.5
	4	149.9	96.9	96.7	6698.2	7494.5	6688.6	7452.3
1995	1	151.0	97.6	97.3	6737.9	7546.5	6717.5	7480.4
	2	152.2	98.0	97.8	6779.4	7599.5	6724.2	7496.0
	3	153.0	98.4	98.3	6822.3	7654.3	6779.5	7555.0
	4	153.9	98.9	98.7	6866.0	7710.4	6825.8	7616.8
1996	1	155.1	99.5	99.2	6910.4	7767.6	6882.0	7671.4
	2	156.5	99.8	99.8	6955.6	7825.8	6983.9	7800.5
	3	157.4	100.2	100.2	7002.4	7884.6	7020.0	7843.3
	4	158.7	100.6	100.8	7050.1	7944.3	7093.1	7937.5
1997	1	159.7	101.1	101.3	7098.9	8004.9	7166.7	8033.4
	2	160.2	101.5	101.5	7148.9	8066.4	7236.5	8134.8
	3	160.9	101.8	101.8	7200.4	8129.0	7311.2	8214.8
	4	161.7	102.2	102.1	7253.1	8192.6	7364.6	8277.3
1998	1	162.1	102.4	102.2	7306.9	8257.3	7464.7	8412.7
	2	162.8	102.7	102.5	7361.9	8323.0	7498.6	8457.2
	3	163.5	103.1	102.8	7417.8	8389.7	7566.5	8536.0
	4	164.2	103.3	103.1	7474.6	8457.6	7677.7	8659.2
1999	1	164.8	103.8	103.4	7532.2	8526.7	7759.6	8737.9
	2	166.2	104.1	104.0	7590.7	8594.1	7790.6	8778.6
	3	167.3	104.4	104.5	7649.9	8663.5	.	8900.6
	4	168.5	104.9	105.1	7709.9	8734.7	.	9026.9

1. Source: BLS; SA, 1982-1984=100
2. Source BEA; SA, 1996=100
3. Source: CBO; SA, billions of chained 1992 dollars
4. Source: CBO; SA, billions of chained 1996 dollars
5. Source: BEA; SAAR, billions of chained 1992 dollars
6. Source: BEA; SAAR, billions of chained 1996 dollars

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Definitions

M1: the sum of: currency held outside the vaults of depository institutions, Federal Reserve Banks, and the U.S. Treasury; travelers checks; and demand and other checkable deposits issued by financial institutions, except demand deposits due to the Treasury and depository institutions, minus cash items in process of collection and Federal Reserve float.

MZM: M2 minus small denomination time deposits, plus institutional money market mutual funds. The label MZM was coined by William Poole (1991) for this aggregate, proposed earlier by Motley (1988). Due to distortions caused by regulatory changes, the largest of which the introduction of money market accounts, data for MZM begin March 1983 in this publication.

M2: M1 plus: savings deposits (including money market deposit accounts) and small denomination (less than $100,000) time deposits issued by financial institutions; and shares in retail money market mutual funds (funds with initial investments of less than $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 firms except depository institutions and money market mutual funds.

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).

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 series, a 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) and http://www.stls.frb.org/research/newbase.html.

Monetary Services Index: an index which 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; additional data are available at http://www.stls.frb.org/research/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 *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: **MZM,** or "Money, Zero Maturity" includes the zero maturity, or immediately available, components of M3. MZM equals M2 minus small denomination time deposits, plus institutional money market mutual funds (that is, the money market mutual funds included in M3 but excluded from M2). 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 http://www.stls.frb.org/research/swdata.html. For analytical purposes, MZM largely replaces M1. The **Discount Rate** and **Expected 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. **Treasury Yield Curve** shows constant maturity yields calculated by the U.S. Treasury Department for securities with 3 months and 1, 2, 3, 5, 7,10, 20 and 30 years to maturity. Daily data and a description are available at http://www.stls.frb.org/fred/data/wkly.html. See also *Federal Reserve Bulletin,* table 1.35.

Page 5: **Total Checkable Deposits** is the sum of demand and other checkable deposits. **Total Savings Deposits** is the sum of money market deposit accounts (MMDA), 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 *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 range as reported to the Congress in the February Humphrey-Hawkins Act testimony each year. Beginning February 2000, the FOMC began using the Personal Consumption Expenditures (PCE) price index to report its inflation range, and therefore is not shown on this graph. **CPI Inflation** is the percentage change from a year ago in the CPI for all urban consumers. **Real Interest Rates** are ex post measures, equal to nominal rates minus CPI inflation.

Page 9: **FOMC Expected Federal Funds Rate** is the level (or midpoint of the range, if applicable) of the federal funds rate that the staff of the Federal Open Market Committee expected to be consistent with the desired degree of pressure on bank reserve positions.

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), y_{t-1} is the log of the previous period's level of real GDP, and y_{t-1}^P is the log of an estimate of the previous period's level of potential output. **Potential real output** is as estimated by the Congressional Budget Office.

Monetary Base Growth and Inflation Targets shows the quarterly growth of the adjusted monetary base (modified to include an estimate of the effect of sweep programs) implied by applying McCallum's (1988, 1993) equation

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where ΔMB_t^* is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter "t" is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula $((y_t - y_{t-40})/40) \times 4 \times 100$, where y_t is the log of real GDP. The four-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 available at

http://www.stls.frb.org/research/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 $m = 1,..., 30$ 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. 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 Fed Funds Futures Contracts** each trace through time the yield on three specific contracts. **Implied Yields on Fed Funds Futures** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Protected Treasury Yield Spreads** equal, for 5, 10, and 30 year maturities, the difference between the Treasury constant maturity yield and the yield on the most recently issued inflation-protected security. **Inflation-Indexed Bonds** for Canada are the 31-year bond with a maturity date of 12/01/2026; for the U.K., the 37.5-year bond with a maturity date of 07/17/2024 and the 12.1-year bond with a maturity date of 10/21/2004; and, for the U.S., the 30-year bond with a maturity date of 04/15/2028 and the 10-year bond with a maturity date of 01/15/2007.

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. Two alternative opportunity costs are shown, one relative to the 3-month Treasury constant-maturity yield, the other to the 5-year constant-maturity yield.

Page 13: **Real Gross Domestic Product** is GDP as measured in chained 1992 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 1992 dollars.

Page 14: **Investment Securities** are all securities held by commercial banks in both investment and trading accounts.

Sources

Bank of Canada
Canadian inflation-linked bond yields.

Bank of England
U.K. inflation-linked bond yields.

Board of Governors of the Federal Reserve System
Monetary aggregates and components, nonfinancial debt: 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 and G.13 releases; nonfinancial commercial paper: Board of Governors web site; M2 and MZM own rates.

Bureau of Economic Analysis
Gross domestic product.

Bureau of Labor Statistics
Consumer price index.

Federal Reserve Bank of Philadelphia
Survey of Professional Forecasters inflation expectations.

Federal Reserve Bank of St. Louis
Adjusted monetary base and adjusted total reserves, monetary services index, one-year forward rates.

Organization for Economic Cooperation and Development
International interest and inflation rates.

University of Michigan Survey Research Center
Median expected price change.

Congressional Budget Office
Potential real GDP.

Dow Jones and Co. (Wall Street Journal)
Federal funds futures contracts, Eurodollar futures.

Standard and Poors Inc.
Stock price-earnings ratio, stock price composite index.

U.S. Department of the Treasury
U.S. inflation-protected security yields.

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Note: Articles from this Bank's *Review* are available on the Internet at www.stls.frb.org/research/reviewdat.html.