

Monetary Trends



Monetary Policy and Productivity

Many people have called recently on the Federal Reserve to ease monetary policy as, in the words of Federal Reserve Chairman Alan Greenspan, economic growth slows "from unsustainable to more modest rates of growth." During the third quarter, real GDP grew at its slowest pace in four years and private-sector job creation slipped to less than 125,000 jobs per month. In its December release, the Blue Chip consensus forecast of fourth-quarter-to-fourth-quarter growth during 2001 is only 3 percent. Yet, at the same time, the risk of higher inflation remains. During the third quarter of 2000, the chain-type price index for gross domestic purchases increased at a 2.3 percent pace versus increases of 1.7 and 1.1 percent, respectively, in the third quarters of 1999 and 1998. Excluding food and energy, the index increased at a 1.8 percent rate during the third quarter, versus 1.1 and 1.4 percent, respectively, in 1999 and 1998. Some measures of inflation expectations also have increased.

Many economists believe that the FOMC should aggressively act to forestall higher inflation. Ingrained expectations of higher inflation cause firms and households to divert resources to less-productive uses and are costly to reverse. Participants in the federal funds and Eurodollar futures markets, however, seem to expect that economic weakness will induce the FOMC to ease monetary policy in the near future. It is possible that no inflation threat looms: The recent pickup in inflation might be only a temporary reaction to elevated energy prices. Some indexes, such as the personal consumption expenditure deflator excluding food and energy, display little acceleration. But, labor markets remain tight, and productivity-enhancing investment has slowed. As a result, the economy may be more vulnerable than usual to an increase in core inflation triggered by shocks such as increases in energy prices.

Reacting appropriately to a slowdown in economic growth is complicated by uncertainty about future productivity growth. Is the current slowing cyclical, or does it signal a leveling-off of productivity growth? Suppose, for example, that technological change has both permanently increased the productivity of relatively lower-skilled workers and reduced the market power of higher-skilled workers. In this case, the long-run rate of unemployment consistent with a stable inflation rate might perhaps be 4 percent. If so, one might use monetary policy to lean against cyclical increases in unemployment above this rate without causing a future acceleration of inflation.

But, despite recent productivity trends, some analysts assert that the long-run rate of unemployment consistent with steady inflation remains near 5-1/2 percent. In their analysis, recent lower-than-anticipated inflation and unemployment has been due to a transitory productivity shock with two parts. First, decreases in the prices of computing and telecommunications equipment have encouraged an increase in the amount of capital used per hour of labor. Second, technological advances have changed business practices, contributing further to productivity growth. When such gains have been exhausted, the analysts argue, the *level* of productivity will be permanently higher, but its growth rate will slow. They cite lower-than-anticipated earnings of technology companies as a signal of such a turning point. If productivity growth has slowed, a sharp acceleration of inflation could occur if monetary policy is used to forestall increases in the unemployment rate. An expansionary monetary policy might be somewhat effective in the short-run, but its long-run expansionary effect will be thwarted by accelerating inflation.

Monetary policy must remain focused on a low, stable inflation rate. To do so—while also seeking to moderate cyclical fluctuations—is a challenge that requires improving our understanding of the recent acceleration in U.S. productivity growth.

--Richard G. Anderson



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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: $[(x_t / x_{t-12}) - 1] \times 100$.

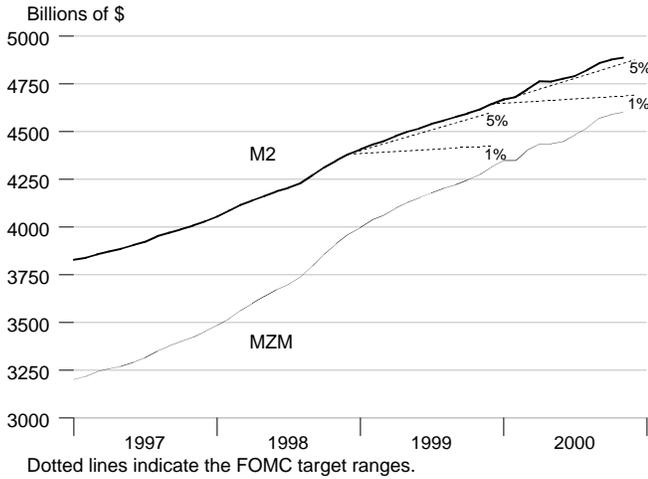
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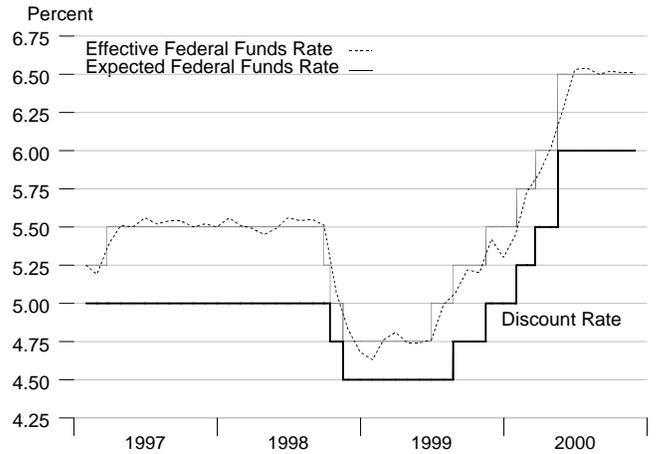
or to:

webmaster@stls.frb.org

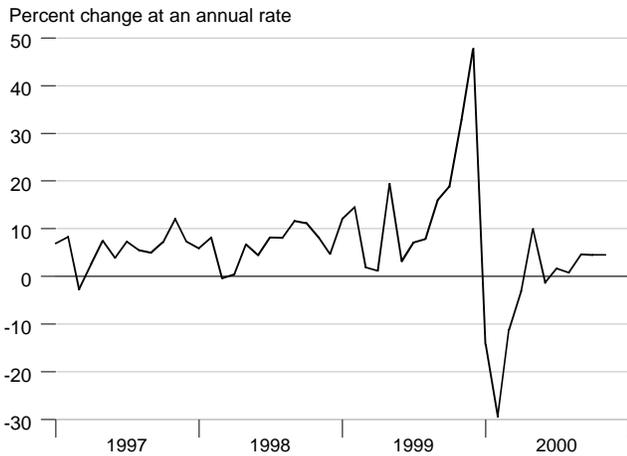
M2 and MZM



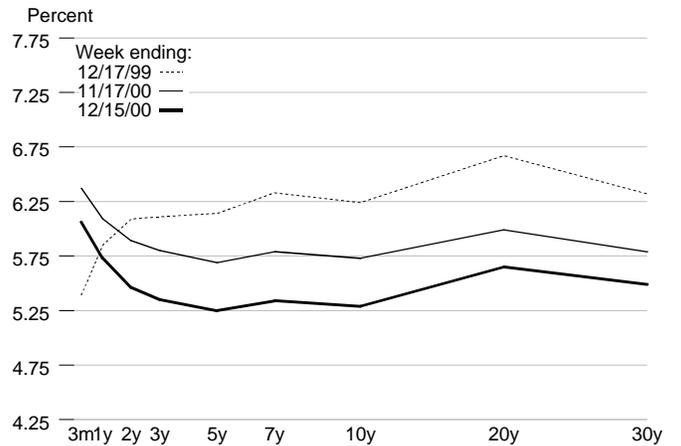
Reserve Market Rates



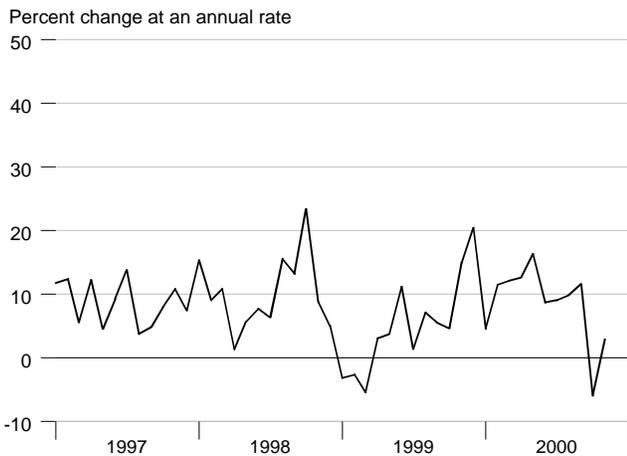
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

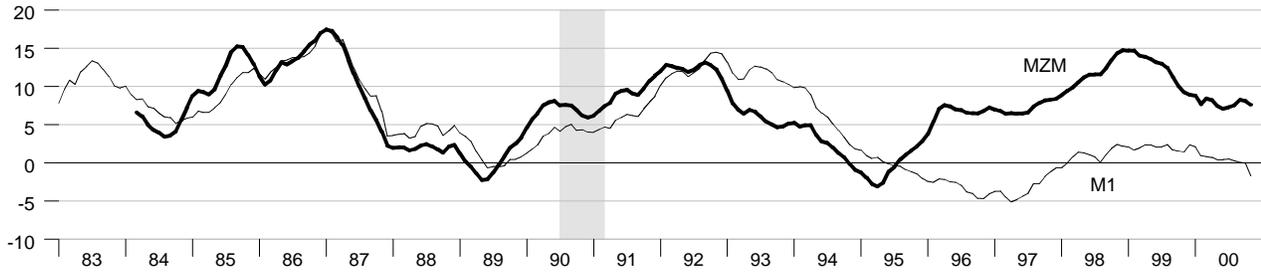


Interest Rates

	Sep 00	Oct 00	Nov 00
Federal Funds Rate	6.52	6.51	6.51
Discount Rate	6.00	6.00	6.00
Prime Rate	9.50	9.50	9.50
Conventional Mortgage Rate	7.91	7.80	7.75
Treasury Yields:			
3-month constant maturity	6.18	6.29	6.36
6-month constant maturity	6.25	6.32	6.34
1-year constant maturity	6.13	6.01	6.09
3-year constant maturity	6.02	5.85	5.79
5-year constant maturity	5.93	5.78	5.70
10-year constant maturity	5.80	5.74	5.72
30-year constant maturity	5.83	5.80	5.78

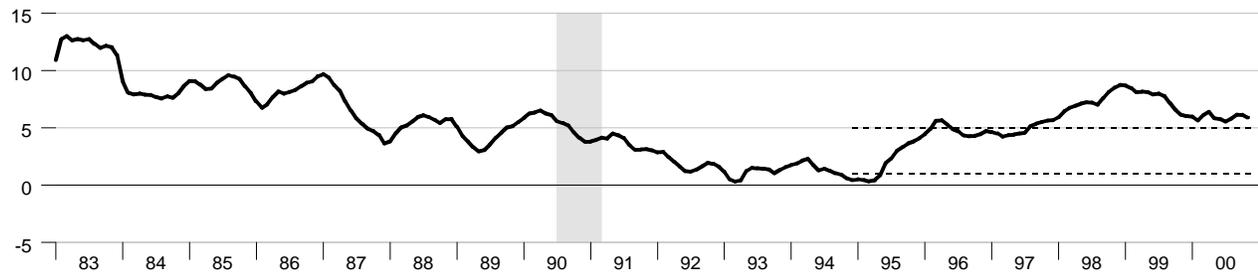
MZM and M1

Percent change from year ago



M2

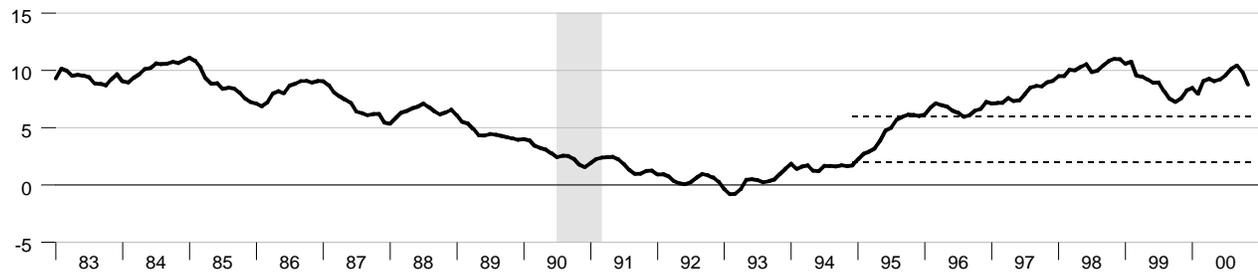
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

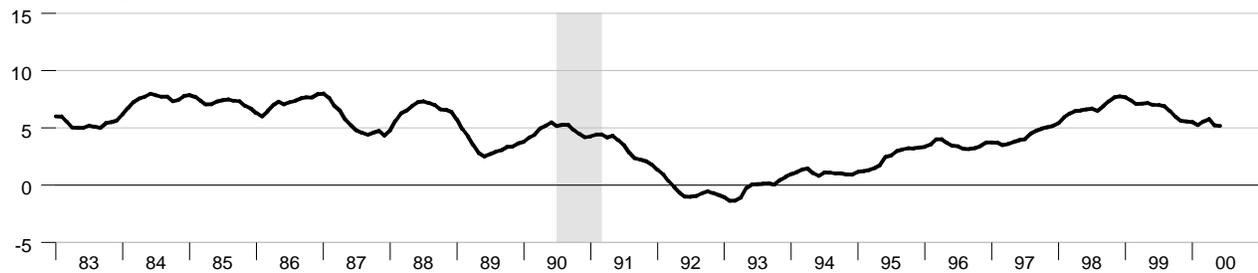
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

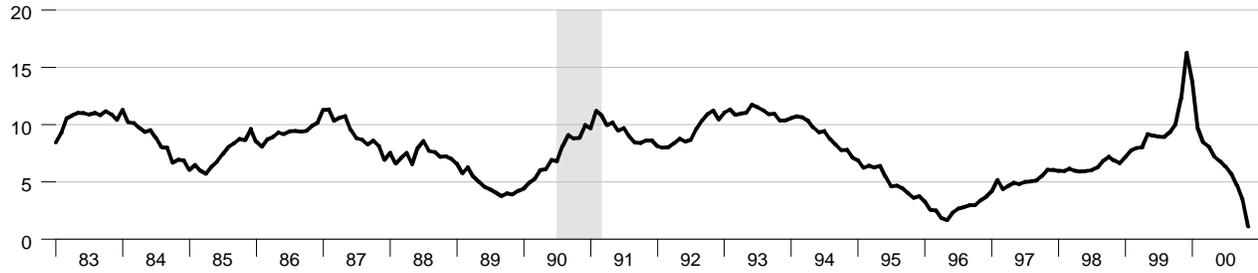
Monetary Services Index - M2

Percent change from year ago



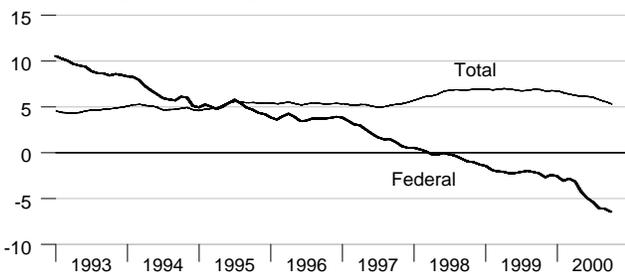
Adjusted Monetary Base

Percent change from year ago



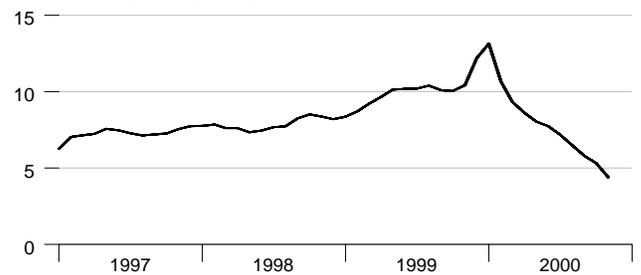
Domestic Nonfinancial Debt

Percent change from year ago



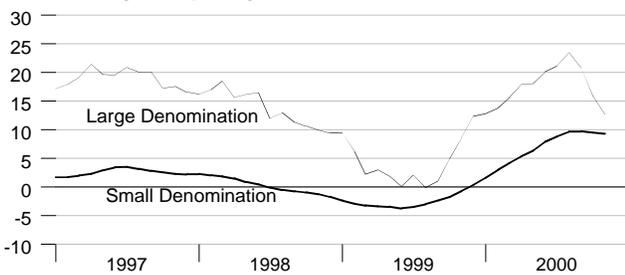
Currency Held by the Nonbank Public

Percent change from year ago



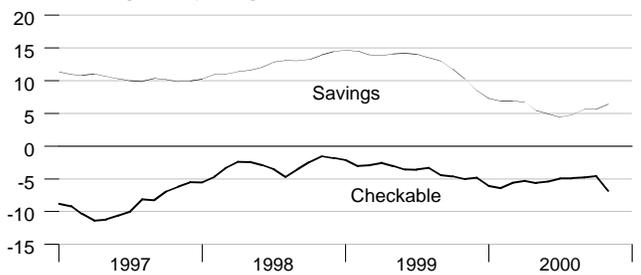
Time Deposits

Percent change from year ago



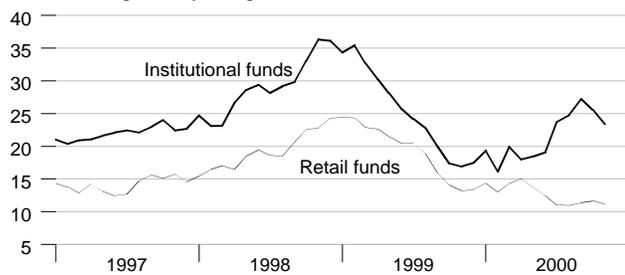
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

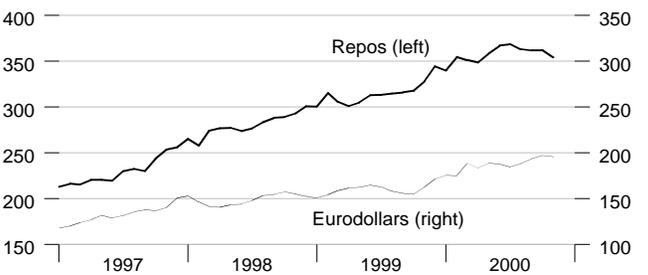
Percent change from year ago



Repurchase Agreements and Eurodollars

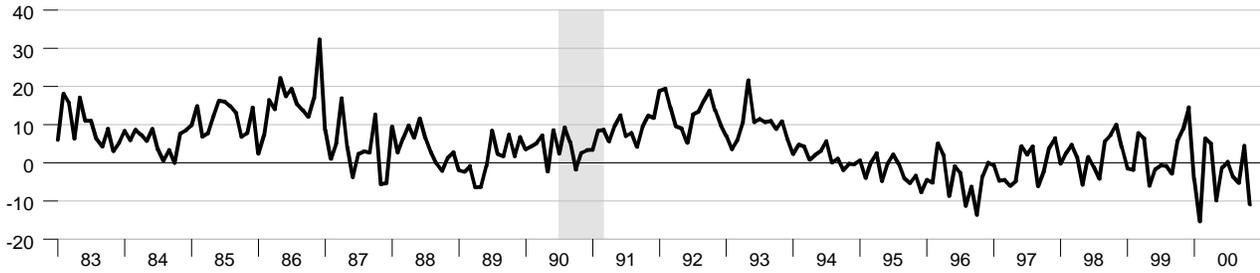
Billions of dollars

Billions of dollars



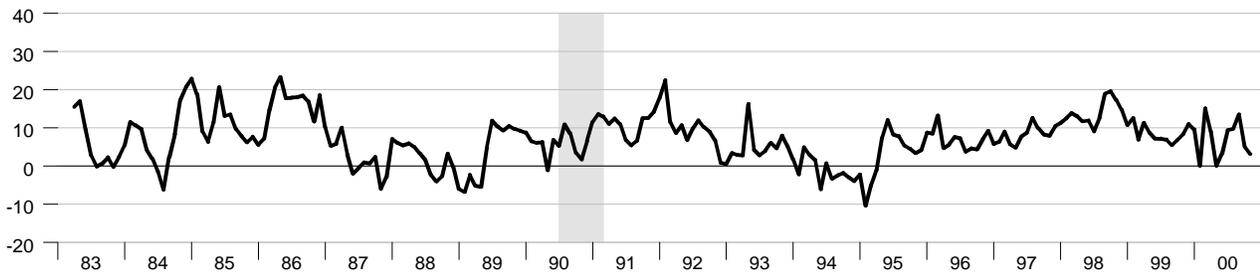
M1

Percent change at an annual rate



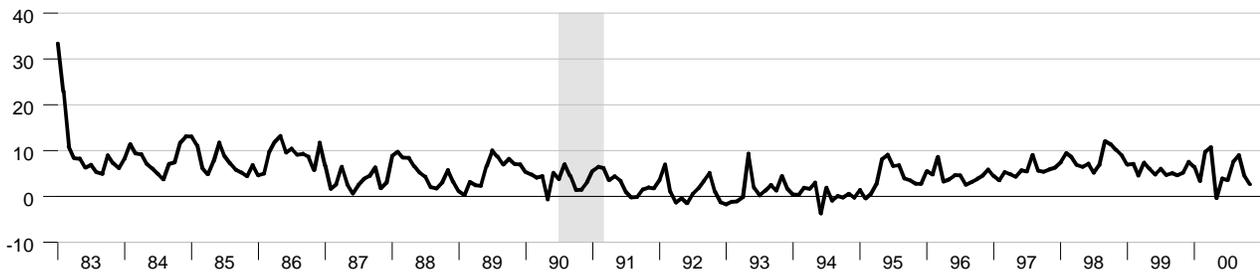
MZM

Percent change at an annual rate



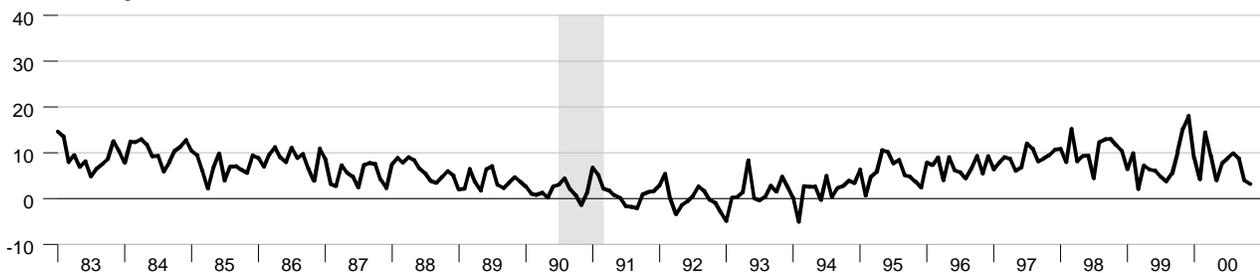
M2

Percent change at an annual rate

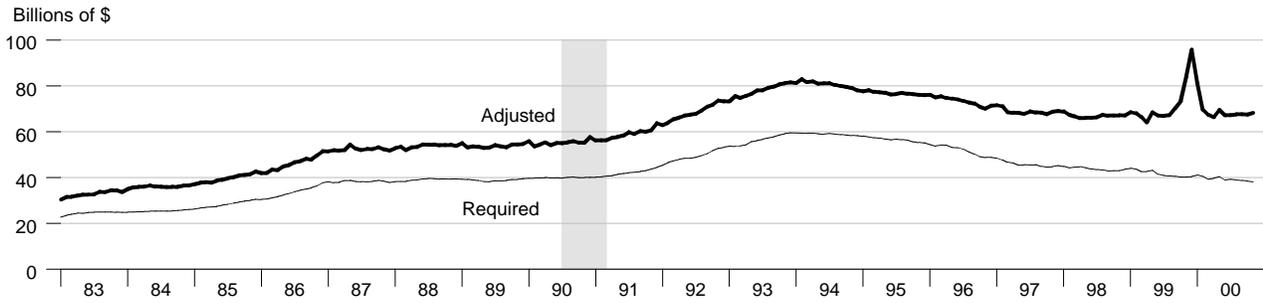


M3

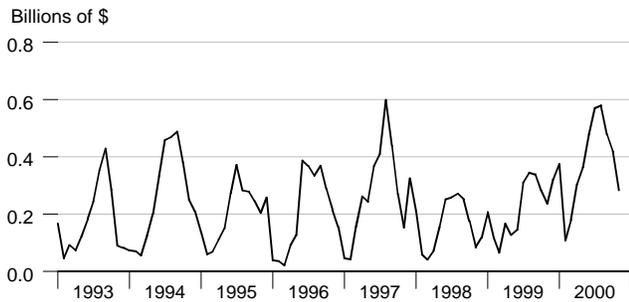
Percent change at an annual rate



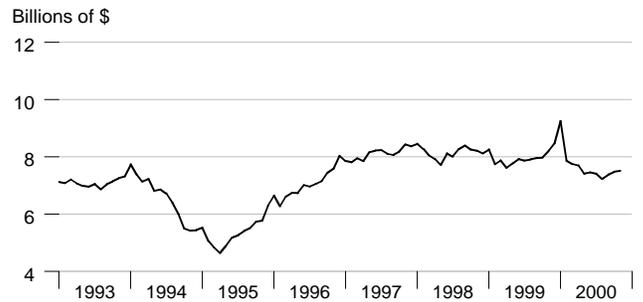
Adjusted and Required Reserves



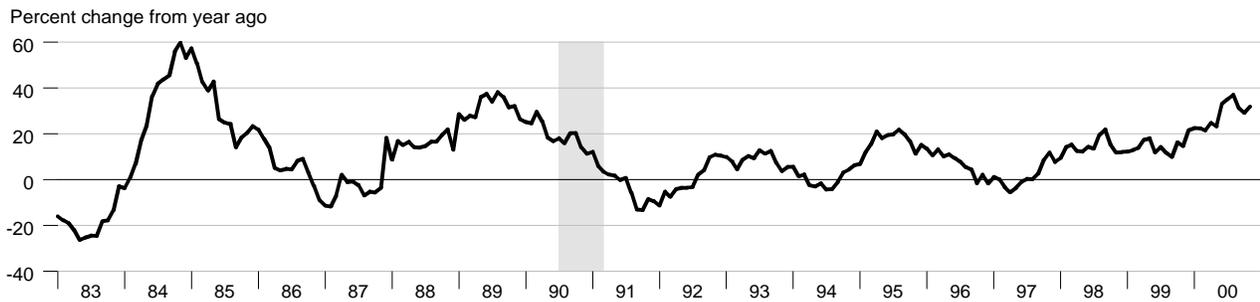
Total Borrowings, nsa



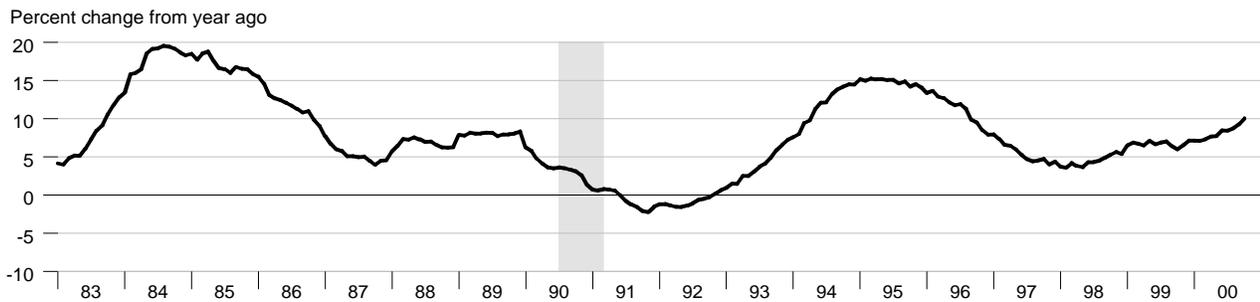
Excess Reserves plus RCB Contracts



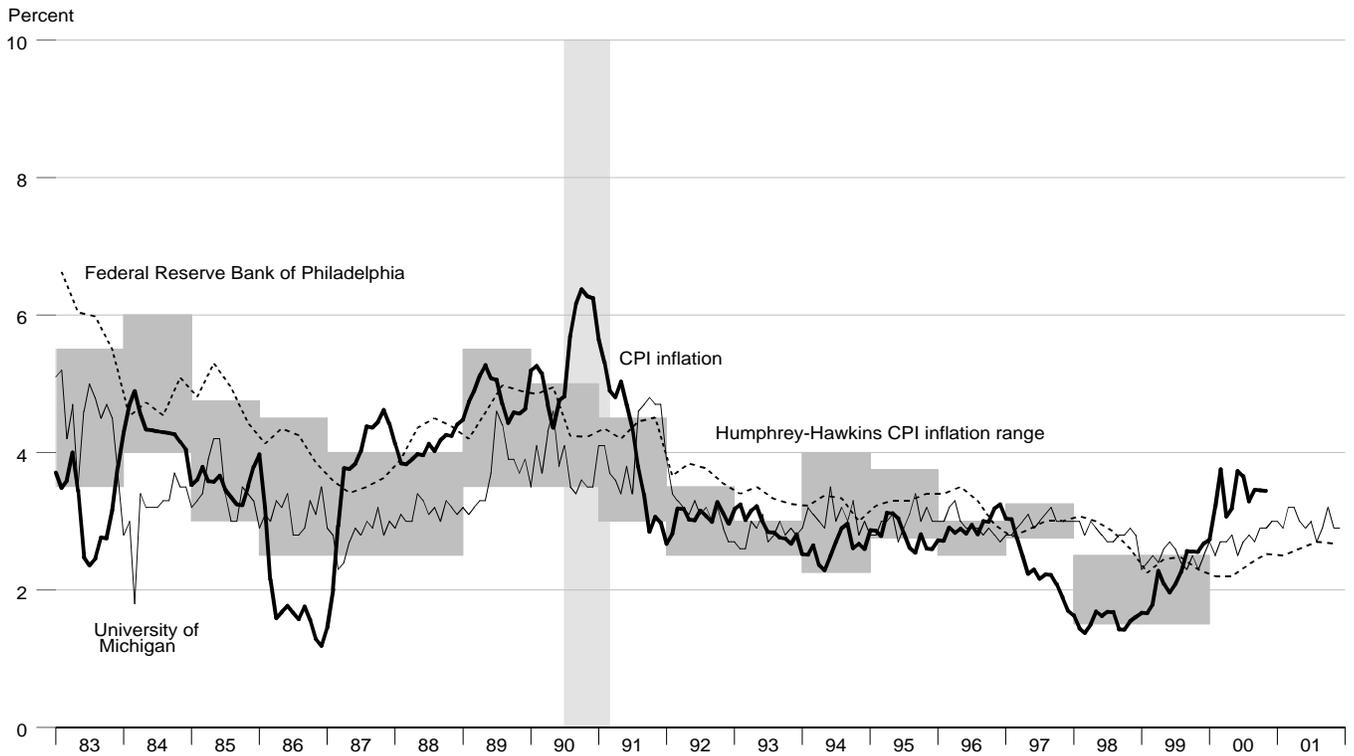
Nonfinancial Commercial Paper



Consumer Credit

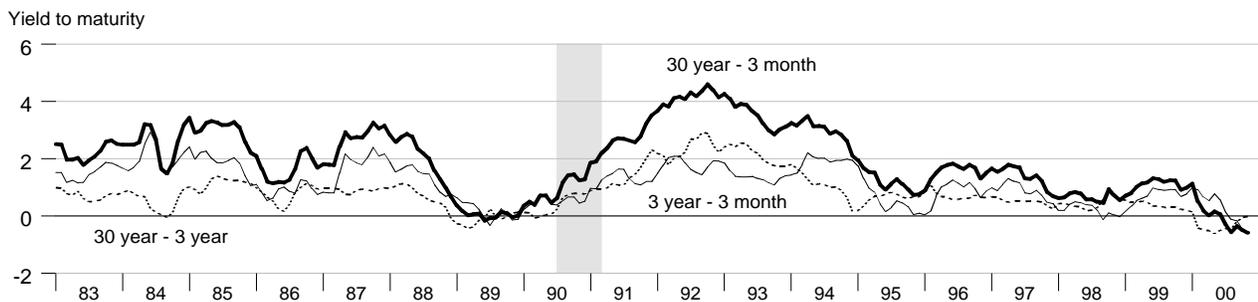


Inflation and Inflation Expectations

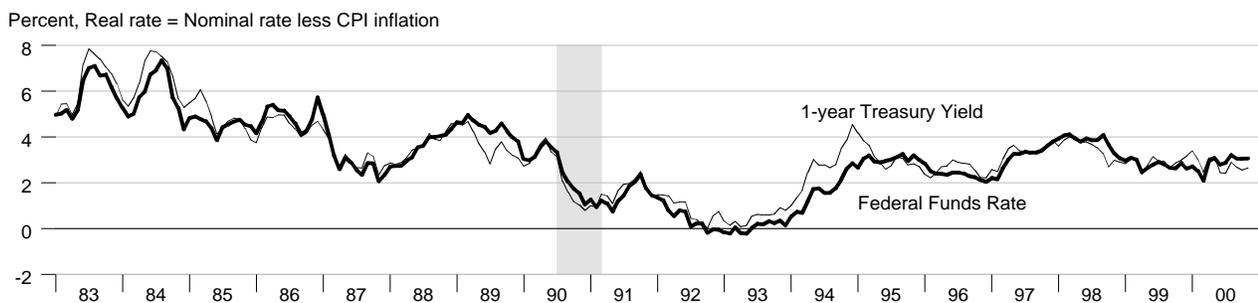


The shaded region shows the Humphrey-Hawkins CPI inflation range. Beginning in January 2000, the Humphrey-Hawkins inflation range was reported using the PCE price index and therefore is not shown on this graph. See page 19 for information.

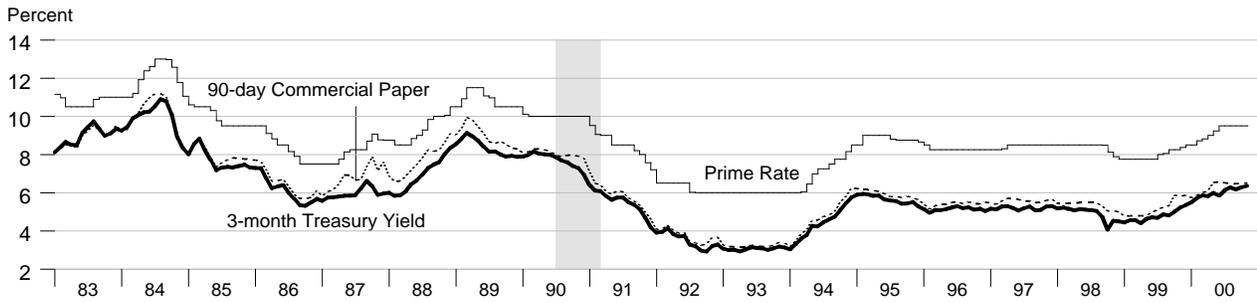
Treasury Security Yield Spreads



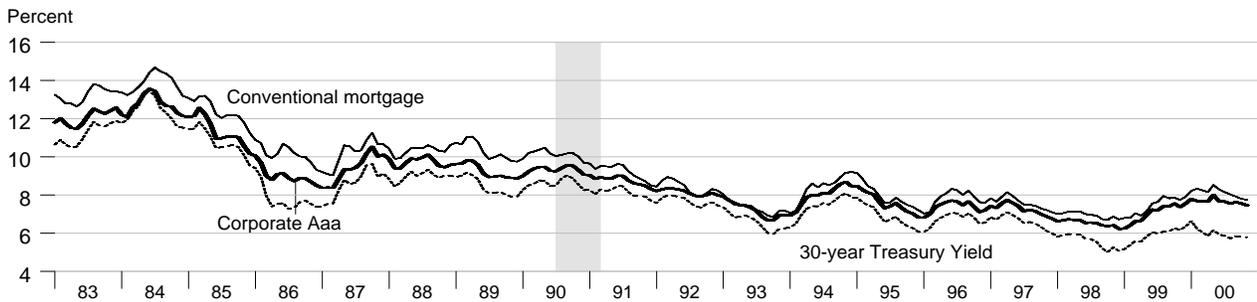
Real Interest Rates



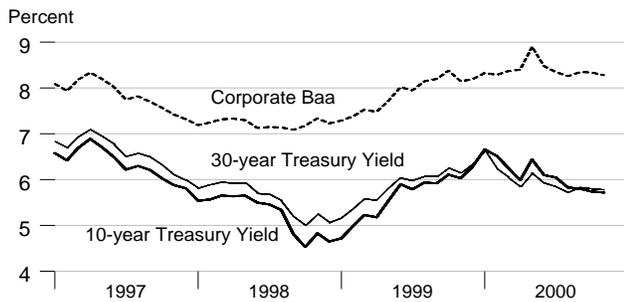
Short Term Interest Rates



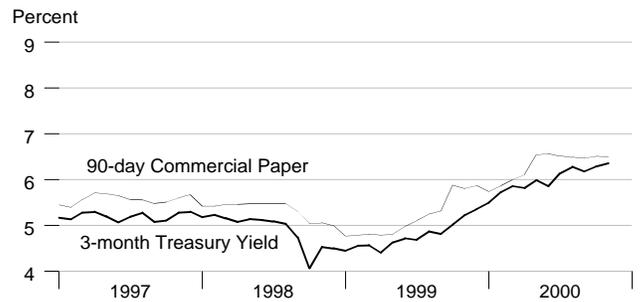
Long Term Interest Rates



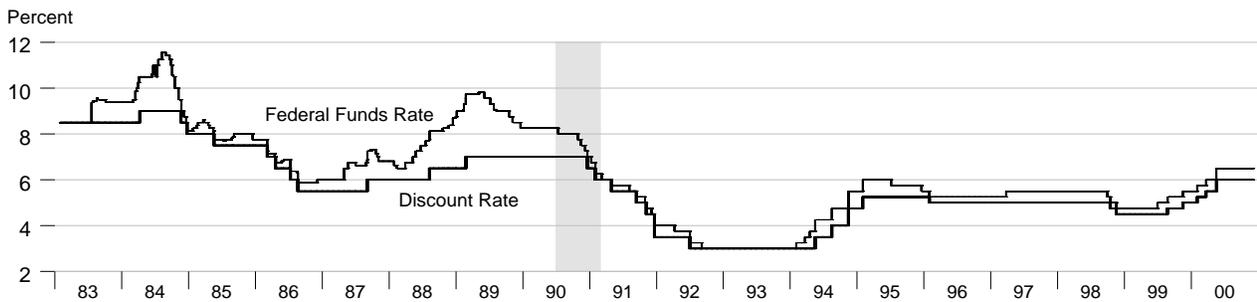
Long Term Interest Rates



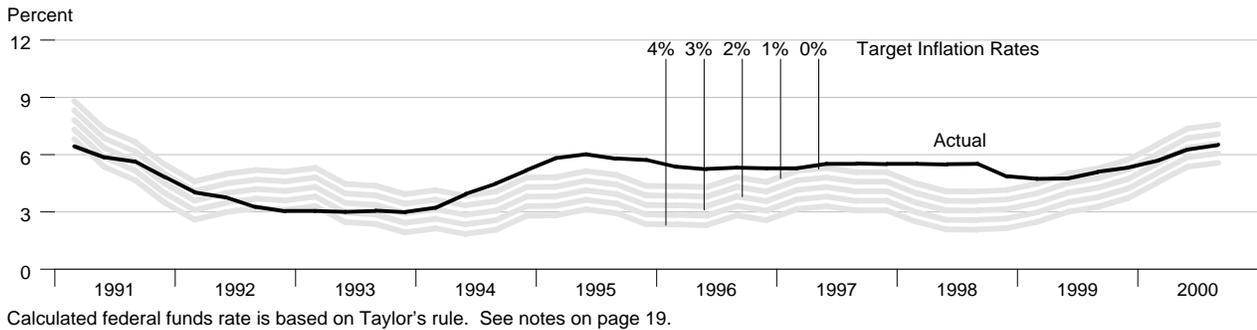
Short Term Interest Rates



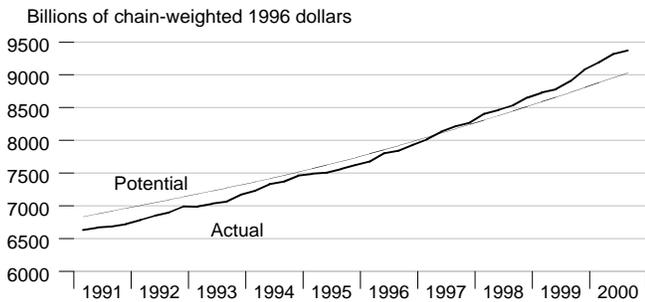
FOMC Expected Federal Funds Rate and Discount Rate



Federal Funds Rate and Inflation Targets



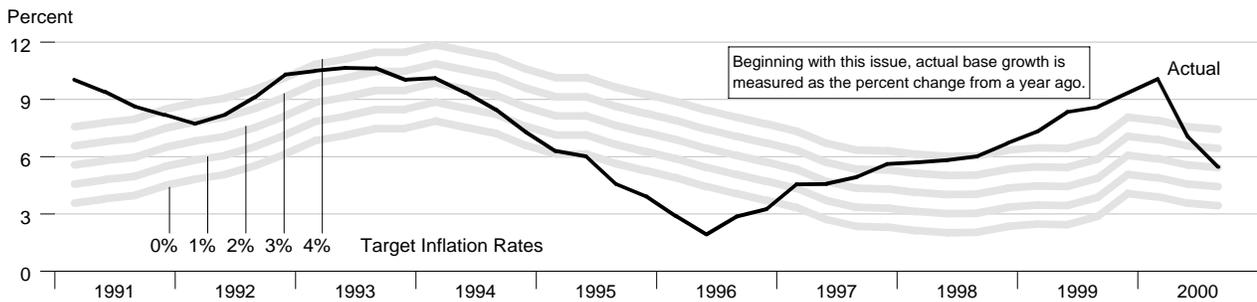
Actual and Potential Real GDP



PCE Inflation

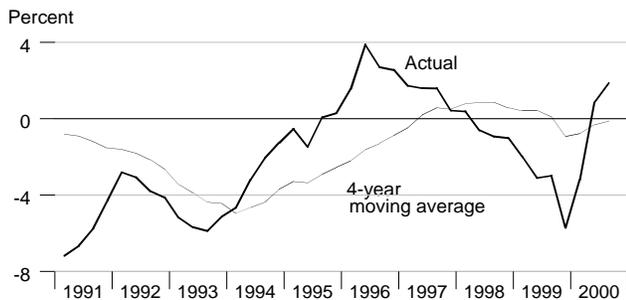


Monetary Base Growth* and Inflation Targets

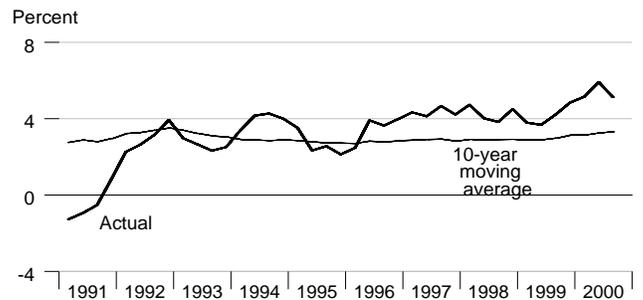


*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. Actual base growth is percent change from year ago. See notes on page 19.

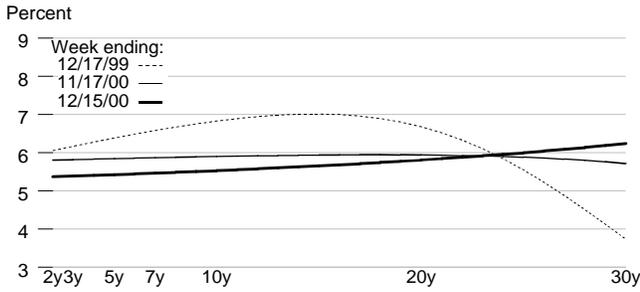
Monetary Base Velocity Growth



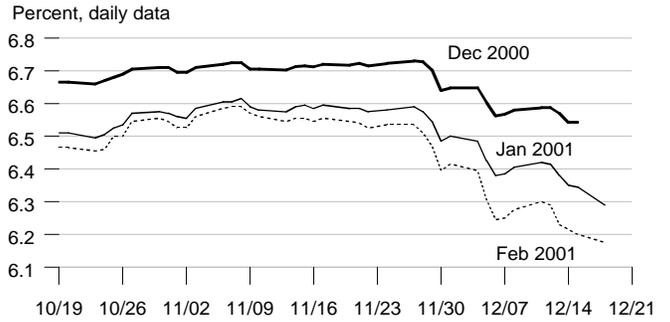
Real Output Growth



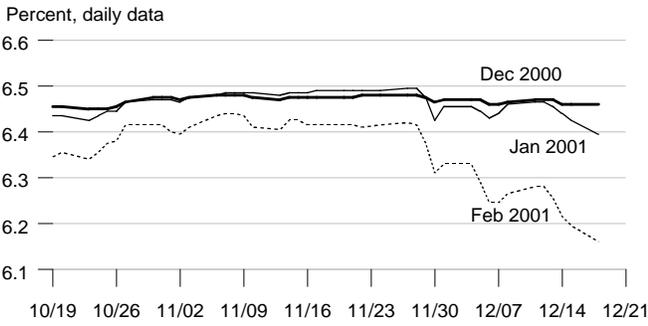
Implied One-Year Forward Rates



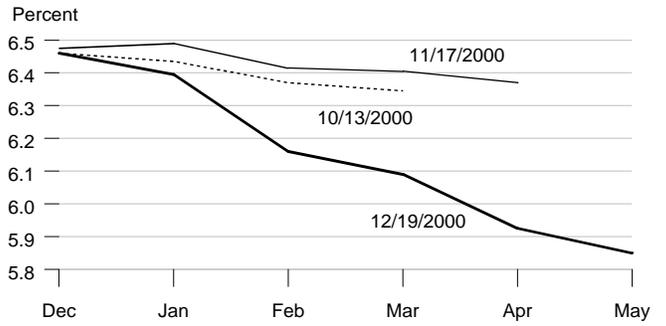
Rates on 3-Month Eurodollar Futures



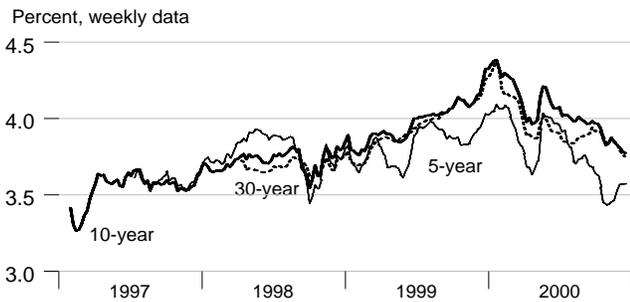
Rates on Selected Fed Funds Futures Contracts



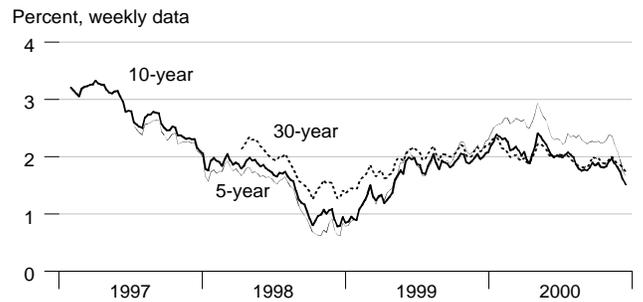
Implied Yields on Fed Funds Futures



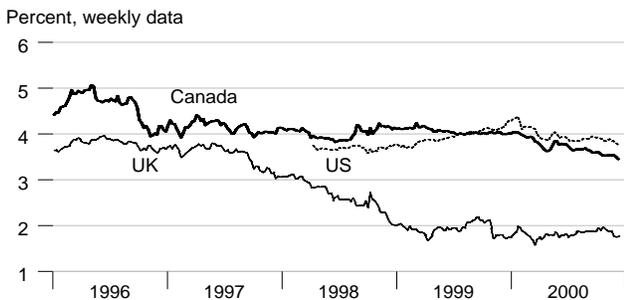
Inflation-Protected Treasury Yields



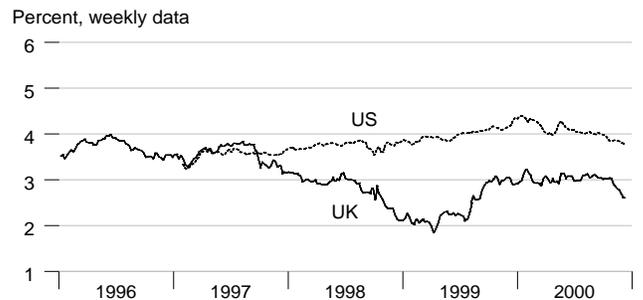
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds



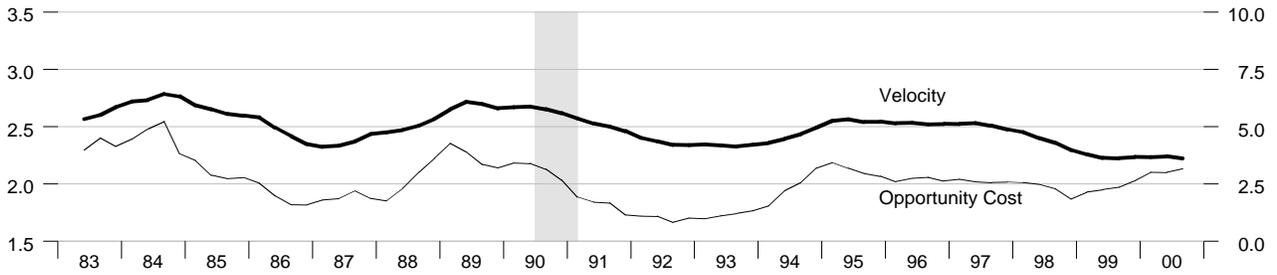
Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

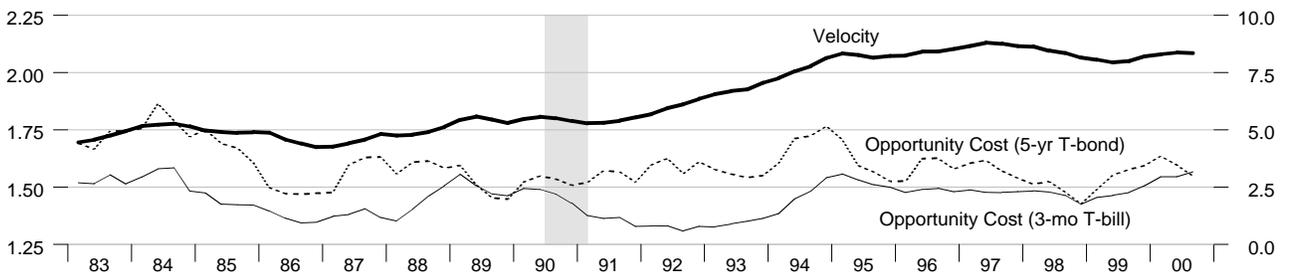
Opportunity Cost = 3 month T-bill rate less MZM own rate



M2 Velocity and Opportunity Cost

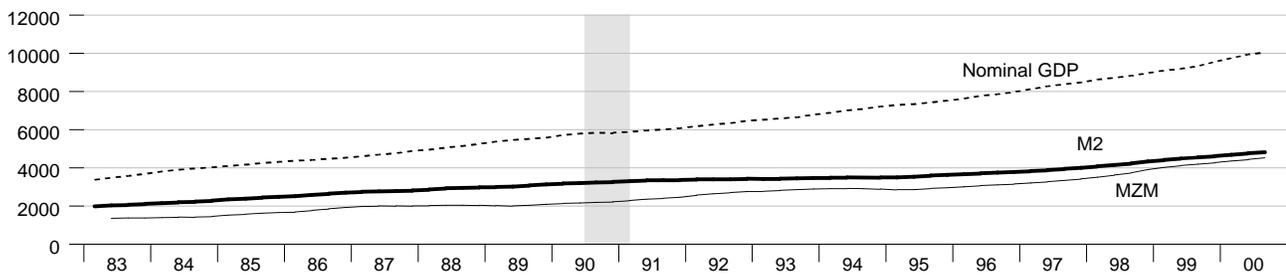
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



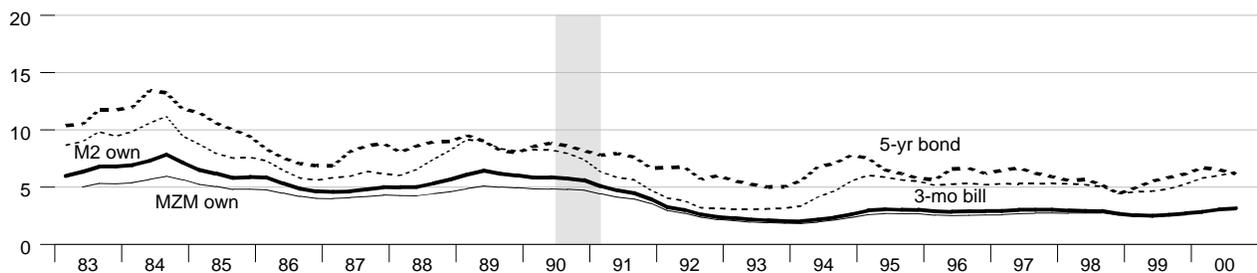
M2, MZM and Nominal GDP

Billions of \$



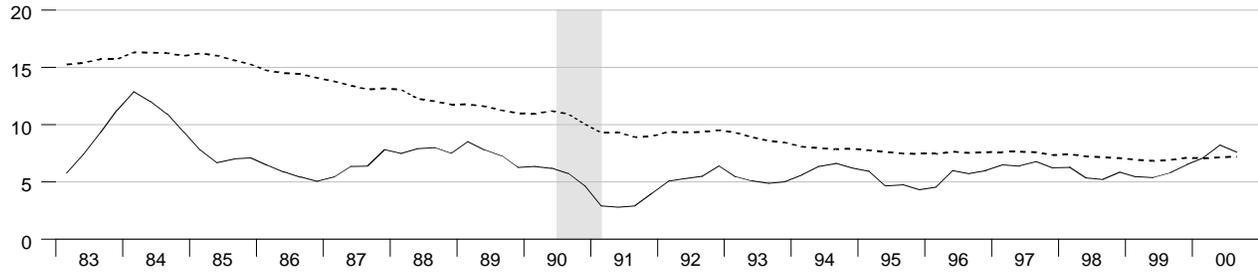
Interest Rates

Percent



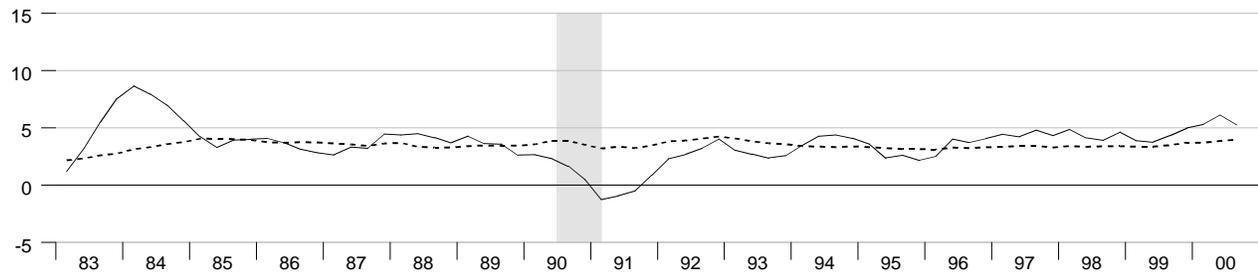
Gross Domestic Product

Percent change from year ago



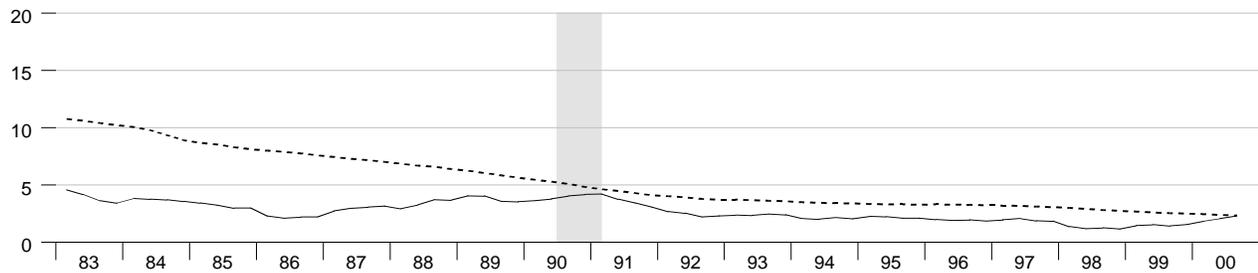
Real Gross Domestic Product

Percent change from year ago



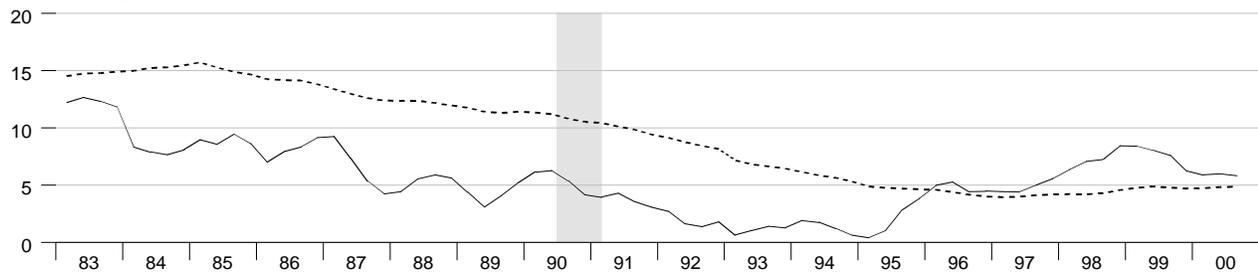
Gross Domestic Product Price Index

Percent change from year ago



M2

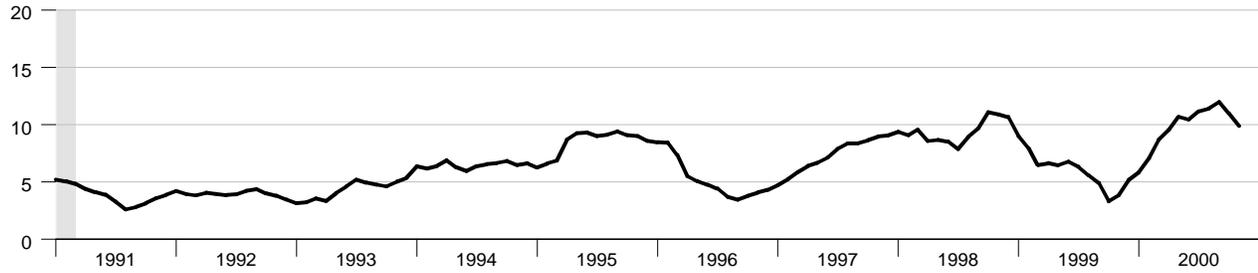
Percent change from year ago



Dashed lines indicate 10-year moving averages

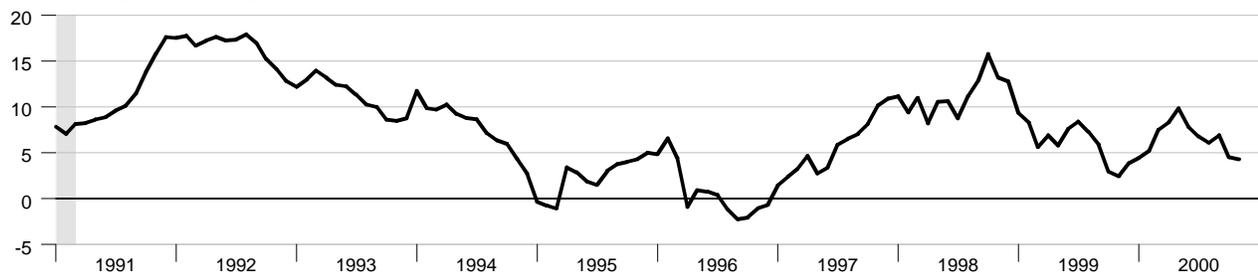
Bank Credit

Percent change from year ago



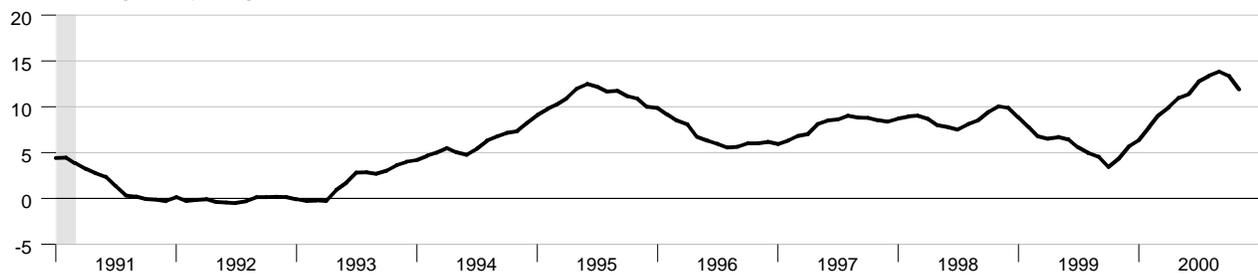
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



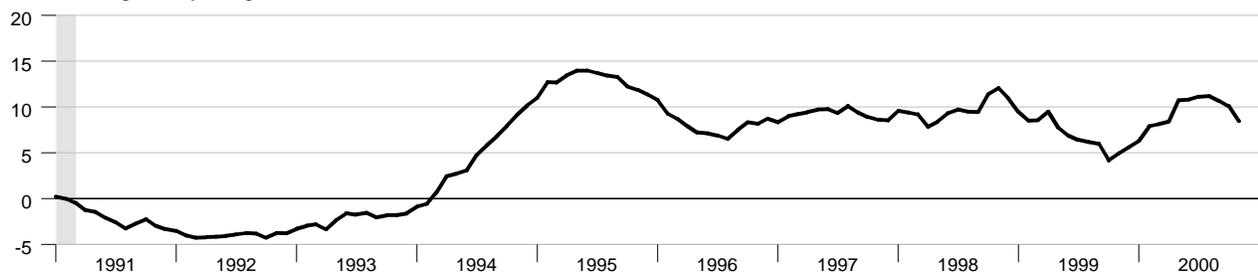
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

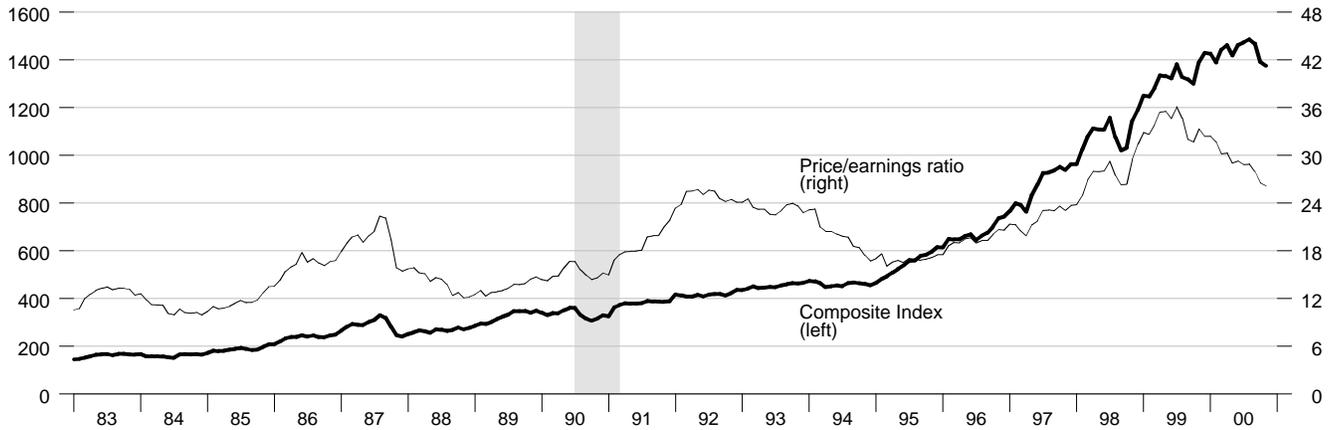


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



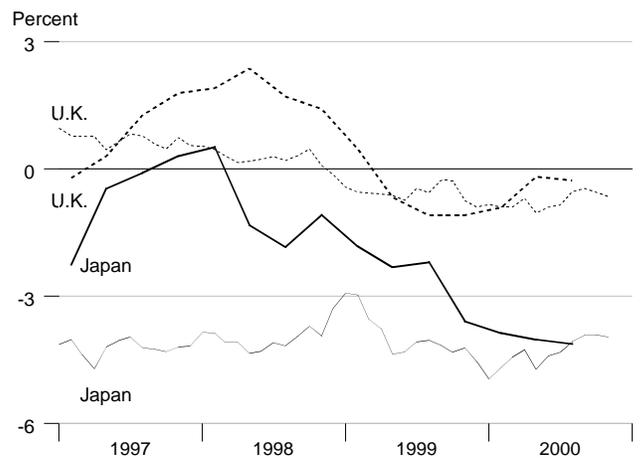
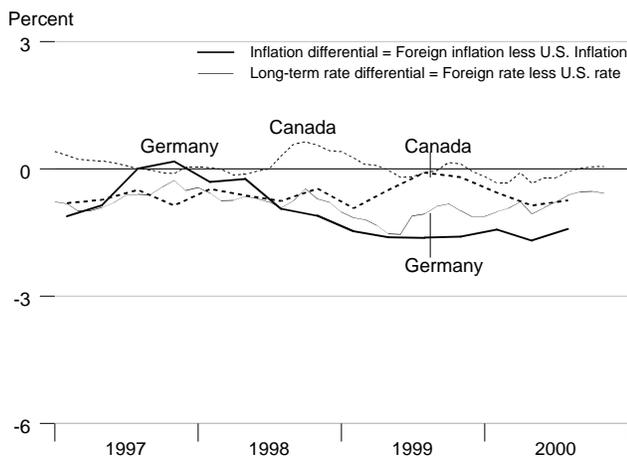
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1999Q4	2000Q1	2000Q2	2000Q3	Aug00	Sep00	Oct00	Nov00
United States	2.56	3.21	3.31	3.47	5.83	5.80	5.74	5.72
Canada	2.36	2.65	2.45	2.73	5.77	5.81	5.79	5.78
France	1.00	1.50	1.49	1.89	6.04	5.93	5.92	.
Germany	0.96	1.78	1.62	2.05	5.21	5.26	5.21	5.15
Italy	2.06	2.36	2.50	2.63	5.57	5.64	5.60	5.55
Japan	-1.04	-0.65	-0.72	-0.66	1.76	1.88	1.83	1.76
United Kingdom	1.47	2.30	3.13	3.20	5.29	5.34	5.19	5.07

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1995		1143.038	2903.150	3568.028	4497.345	3502.585	443.499	76.838	210.451
1996		1106.430	3093.410	3738.718	4793.925	3685.799	455.572	73.401	217.848
1997		1069.929	3315.754	3921.016	5176.679	3954.241	478.708	68.873	227.067
1998		1080.853	3702.780	4207.106	5708.436	4326.559	508.942	66.925	242.237
1999		1102.400	4159.262	4525.509	6212.795	4585.623	557.864	71.665	258.556
<hr/>									
1998	1	1076.722	3521.794	4085.079	5496.338	4187.981	498.320	67.645	235.943
	2	1078.669	3634.897	4162.077	5635.994	4250.816	502.020	66.044	239.950
	3	1076.068	3743.756	4234.539	5760.885	4351.522	511.546	66.905	243.733
	4	1091.952	3910.675	4346.728	5940.528	4515.917	523.882	67.105	249.320
1999	1	1097.197	4031.765	4429.060	6062.878	4513.960	536.334	67.691	253.370
	2	1102.979	4127.140	4497.396	6155.193	4532.026	545.912	66.526	257.003
	3	1098.119	4200.457	4557.975	6234.340	4595.157	557.969	68.112	260.280
	4	1111.305	4277.685	4617.605	6398.767	4701.349	591.242	84.333	263.570
2000	1	1111.269	4366.019	4690.295	6579.458	4838.941	593.096	72.685	267.157
	2	1108.565	4439.491	4766.625	6721.099	4995.213	586.041	67.693	270.860
	3	1101.051	4523.308	4823.245	6861.291	5124.028	589.062	67.482	
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1998	Nov	1093.735	3913.263	4348.047	5942.403	4520.532	524.380	67.183	249.420
	Dec	1097.367	3961.013	4380.572	5994.023	4539.415	526.458	67.074	251.010
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1999	Jan	1095.962	3996.326	4405.966	6026.173	4527.419	531.760	68.517	252.260
	Feb	1094.273	4037.902	4432.154	6075.920	4517.438	538.190	68.067	253.460
	Mar	1101.357	4061.068	4449.059	6086.542	4497.024	539.053	66.488	254.390
	Apr	1107.196	4099.173	4476.389	6123.050	4508.550	539.608	64.109	255.900
	May	1101.663	4128.831	4498.905	6155.539	4522.719	548.331	68.423	257.070
	Jun	1100.078	4153.415	4516.895	6186.991	4564.808	549.796	67.045	258.040
	Jul	1099.477	4178.117	4539.654	6211.804	4570.091	553.060	66.880	259.220
	Aug	1098.734	4202.067	4557.450	6231.366	4597.186	556.711	67.248	260.240
	Sep	1096.145	4221.187	4576.821	6259.851	4618.193	564.135	70.207	261.380
	Oct	1101.394	4245.144	4594.569	6312.867	4636.196	572.989	73.317	262.320
	Nov	1109.564	4274.449	4614.587	6393.659	4693.993	588.669	83.917	263.420
	Dec	1122.958	4313.463	4643.659	6489.776	4773.857	612.068	95.765	264.970
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2000	Jan	1118.851	4347.750	4668.784	6537.714	4792.067	604.790	81.107	266.190
	Feb	1104.547	4347.922	4682.027	6560.881	4837.941	589.978	69.560	266.760
	Mar	1110.409	4402.384	4720.073	6639.778	4886.814	584.520	67.387	268.520
	Apr	1115.069	4435.409	4762.344	6691.731	4938.403	583.046	66.400	270.670
	May	1105.886	4435.581	4760.986	6714.057	5005.504	587.857	69.490	270.510
	Jun	1104.739	4447.483	4776.546	6757.508	5041.732	587.219	67.189	271.400
	Jul	1104.937	4482.154	4790.931	6807.245	5079.693	588.034	67.256	
	Aug	1101.512	4518.586	4821.294	6863.266	5121.486	588.446	67.584	
	Sep	1096.705	4569.183	4857.511	6913.361	5170.906	590.705	67.606	
	Oct	1100.750	4588.446	4875.838	6936.154	5145.371	592.932	67.470	
	Nov	1090.728	4600.410	4886.774	6954.618	5157.770	595.168	68.205	

*All values are given in billions of dollars

		Federal	Discount	Prime	3-mo	Treasury Yields			Corporate	S & L	Conventional
		Funds	Rate	Rate		CDs	3 mo	3 yr	30 yr	Aaa Bonds	
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
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
2000	1	5.68	5.19	8.69	6.03	5.70	6.56	6.30	7.71	5.82	8.26
	2	6.27	5.74	9.25	6.57	5.89	6.52	5.98	7.77	5.72	8.32
	3	6.52	6.00	9.50	6.63	6.20	6.16	5.80	7.61	5.45	8.03
1998	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
	Mar	5.85	5.34	8.83	6.14	5.86	6.53	6.05	7.68	5.68	8.24
	Apr	6.02	5.50	9.00	6.28	5.82	6.36	5.85	7.64	5.60	8.15
	May	6.27	5.71	9.24	6.71	5.99	6.77	6.15	7.99	5.87	8.52
	Jun	6.53	6.00	9.50	6.73	5.86	6.43	5.93	7.67	5.69	8.29
	Jul	6.54	6.00	9.50	6.67	6.14	6.28	5.85	7.65	5.53	8.15
	Aug	6.50	6.00	9.50	6.61	6.28	6.17	5.72	7.55	5.43	8.03
	Sep	6.52	6.00	9.50	6.60	6.18	6.02	5.83	7.62	5.40	7.91
	Oct	6.51	6.00	9.50	6.67	6.29	5.85	5.80	7.55	5.46	7.80
	Nov	6.51	6.00	9.50	6.65	6.36	5.79	5.78	7.45	5.38	7.75

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

		M1	MZM	M2	M3
Percent change from previous period					
1995		-0.21	-0.45	2.05	4.57
1996		-3.20	6.55	4.78	6.59
1997		-3.30	7.19	4.88	7.98
1998		1.02	11.67	7.30	10.27
1999		1.99	12.33	7.57	8.84
<hr/>					
1998	1	0.73	2.84	1.92	2.65
	2	0.18	3.21	1.88	2.54
	3	-0.24	2.99	1.74	2.22
	4	1.48	4.46	2.65	3.12
1999	1	0.48	3.10	1.89	2.06
	2	0.53	2.37	1.54	1.52
	3	-0.44	1.78	1.35	1.29
	4	1.20	1.84	1.31	2.64
2000	1	-0.00	2.06	1.57	2.82
	2	-0.24	1.68	1.63	2.15
	3	-0.68	1.89	1.19	2.09
<hr/>					
1998	Nov	0.83	1.44	0.85	0.97
	Dec	0.33	1.22	0.75	0.87
<hr/>					
1999	Jan	-0.13	0.89	0.58	0.54
	Feb	-0.15	1.04	0.59	0.83
	Mar	0.65	0.57	0.38	0.17
<hr/>					
	Apr	0.53	0.94	0.61	0.60
	May	-0.50	0.72	0.50	0.53
	Jun	-0.14	0.60	0.40	0.51
<hr/>					
	Jul	-0.05	0.59	0.50	0.40
	Aug	-0.07	0.57	0.39	0.31
	Sep	-0.24	0.46	0.43	0.46
<hr/>					
	Oct	0.48	0.57	0.39	0.85
	Nov	0.74	0.69	0.44	1.28
	Dec	1.21	0.91	0.63	1.50
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2000	Jan	-0.37	0.79	0.54	0.74
	Feb	-1.28	0.00	0.28	0.35
	Mar	0.53	1.25	0.81	1.20
<hr/>					
	Apr	0.42	0.75	0.90	0.78
	May	-0.82	0.00	-0.03	0.33
	Jun	-0.10	0.27	0.33	0.65
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	Jul	0.02	0.78	0.30	0.74
	Aug	-0.31	0.81	0.63	0.82
	Sep	-0.44	1.12	0.75	0.73
<hr/>					
	Oct	0.37	0.42	0.38	0.33
	Nov	-0.91	0.26	0.22	0.27

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

$$r_t^* = 2.5 + \pi_{t-1} + (\pi_{t-1} - \pi^*)/2 + 100 \times (y_{t-1} - y_{t-1}^P)/2$$

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where r_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

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where ΔMB_i^* 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 $m = 1, \dots, 30$ 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 Euro-dollar 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.

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 1996, 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 1996, pp. 3 - 37.

____, 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 1997, pp. 31 - 82.

McCallum, Bennett T. (1988). "Robustness Properties of a Monetary Policy Rule," *Carnegie-Rochester Conference Series on Public Policy*, vol. 29, pp. 173 - 204.

____ (1993). "Specification and Analysis of a Monetary Policy Rule for Japan," Bank of Japan *Monetary and Economic Studies*, November, pp. 1 - 45.

Motley, Brian (1988). "Should M2 Be Redefined?" Federal Reserve Bank of San Francisco *Economic Review*, Winter, pp. 33 - 51.

Nelson, Charles R. and Andrew F. Siegel (1987). "Parsimonious Modeling of Yield Curves," *Journal of Business*, October, pp. 473 - 89.

Poole, William (1991). Statement before the Subcommittee on Domestic Monetary Policy of the Committee on Banking, Finance and Urban Affairs, U.S. House of Representatives, November 6, 1991. Government Printing Office, Serial No. 102-82.

Sharpe, William F. (1997). *Macro-Investment Analysis*, on-line textbook available at www.stanford.edu/~wsharp/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: Articles from this Bank's *Review* are available on the Internet at www.stls.frb.org/research/reviewdat.html.

