

# Monetary Trends



## Are Banks Making Riskier Loans?

Several bank supervisors have expressed concern during the past year about the risks assumed by banks. Measures of problem loans provide one indication of whether banks are taking increased risks, though the risks assumed by banks during recent years may not be evident in measures of problem loans until some time in the future when the pace of economic activity slows. Still, an increase in problem loan rates during the current period of strong economic growth would suggest that banks generally have tended to make riskier loans during recent years.

One measure of problem loans is the percentage of loans that are nonperforming: loans past due 90 days or more and nonaccrual loans. Another measure is the net charge-off rate: loans charged off as losses, minus recoveries by banks on loans previously charged off, as a percentage of loans. The net charge-off rate reflects more serious problems than the nonperforming rate, since many loans currently reported as nonperforming are not later charged off as losses.

The tables present problem loan rates for banks of various sizes. The relatively high levels of these problem loan rates among banks in each size group during 1991—the most recent recession year—reflect the effects of the business cycle on these measures. Problem loan rates have risen among relatively large banks during recent years, although they remain substantially below the rates of the early 1990s. Nonperforming loan rates (annual means of quarterly rates) have risen since 1997 among the banks with total assets over \$10 billion, especially those with total assets between \$10 billion and \$20 billion. In contrast, nonperforming loan rates during 1999 among the banks with total assets below \$10 billion were either at or below their levels during the mid-1990s.

Net charge-off rates (annual sums of quarterly rates) have risen since the mid-1990s among the banks with total assets greater than \$1 billion. Recoveries on loans previously charged off as losses contributed little to this increase. Net charge-off rates among the banks with total assets less than \$1 billion, in contrast, have remained relatively close to their levels during the mid-1990s. The increases in the problem loan rates at large banks during the recent years of rapid economic growth provide empirical support for the concerns expressed by bank supervisors about the risks assumed by banks.

—R. Alton Gilbert

Percentage of Commercial and Industrial Loans that are Nonperforming

Total assets of banks, millions of dollars

Period	Up to \$300	\$300 to \$1,000	\$1,000 to \$10,000	\$10,000 to \$20,000	Over \$20,000
1991	4.30%	3.24%	4.06%	5.02%	5.37%
1992	3.99	2.85	3.24	4.01	4.63
1993	3.21	2.13	2.17	2.52	2.89
1994	2.52	1.35	1.27	1.36	1.37
1995	2.18	1.05	0.95	1.15	1.19
1996	2.25	1.16	1.02	0.87	0.97
1997	2.13	1.12	0.92	0.72	0.75
1998	2.13	1.01	0.92	0.78	0.84
1999	2.06	0.99	1.00	1.15	1.05

Percentage of Commercial and Industrial Loans That Are Charged Off as Losses

Total assets of banks, millions of dollars

Period	Up to \$300	\$300 to \$1,000	\$1,000 to \$10,000	\$10,000 to \$20,000	Over \$20,000
1991	1.87%	1.75%	1.85%	1.71%	1.86%
1992	1.48	1.42	1.37	1.11	1.46
1993	1.01	0.70	0.71	0.72	0.69
1994	0.62	0.31	0.29	0.26	0.15
1995	0.63	0.35	0.14	0.33	0.16
1996	0.64	0.35	0.27	0.20	0.20
1997	0.64	0.35	0.25	0.34	0.22
1998	0.72	0.37	0.36	0.39	0.38
1999	0.67	0.35	0.57	0.50	0.58

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



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

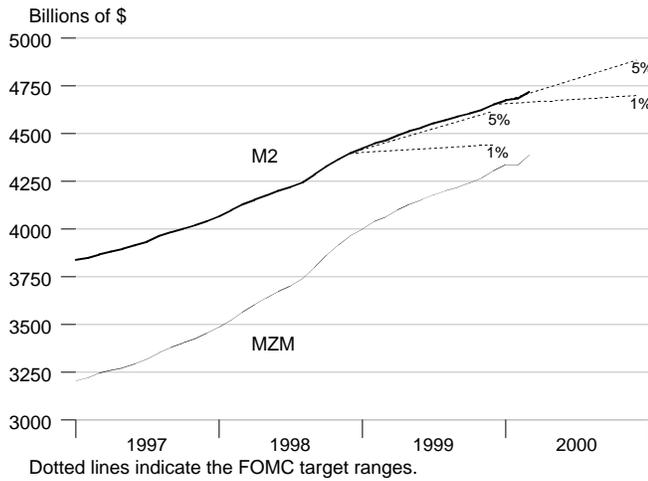
We welcome your comments addressed to:

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Research Division  
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St. Louis, MO 63166

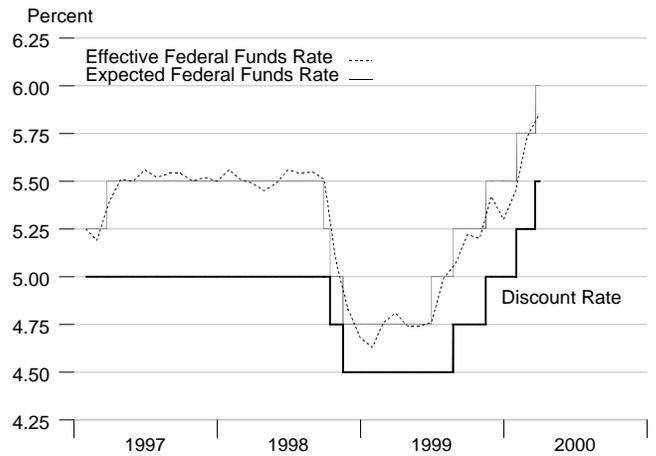
or to:

[webmaster@stls.frb.org](mailto:webmaster@stls.frb.org)

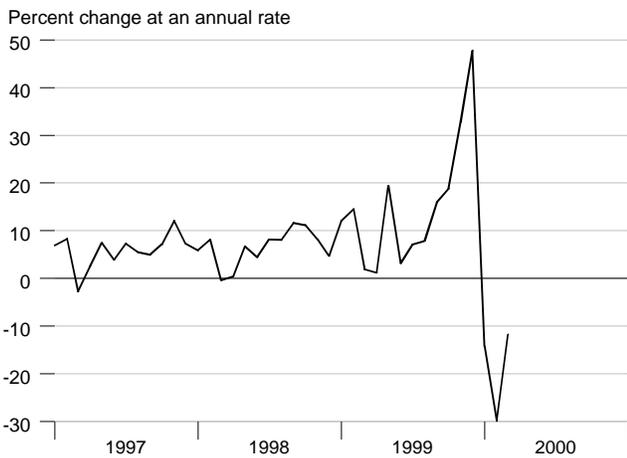
**M2 and MZM**



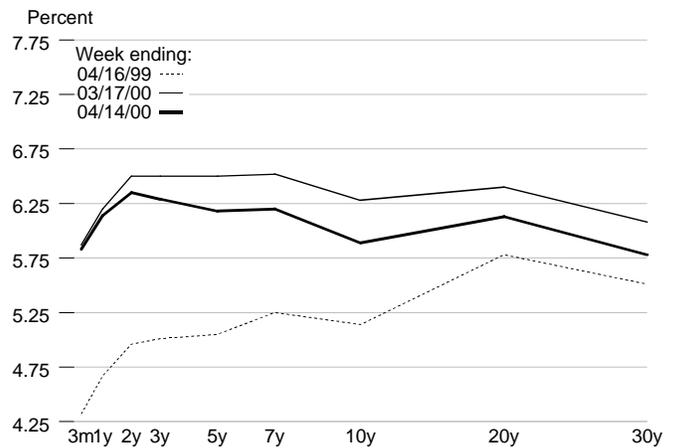
**Reserve Market Rates**



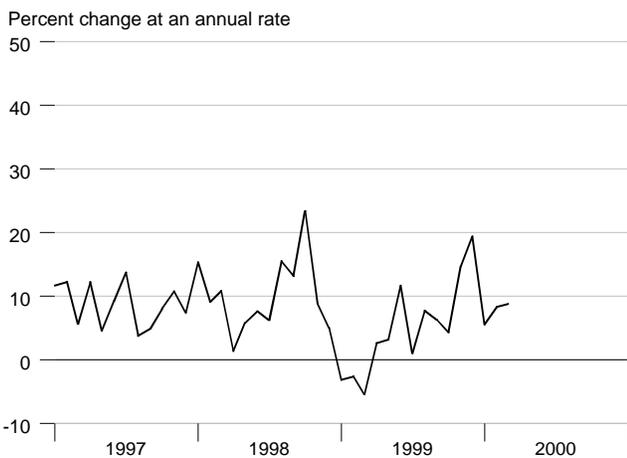
**Adjusted Monetary Base**



**Treasury Yield Curve**



**Total Bank Credit**

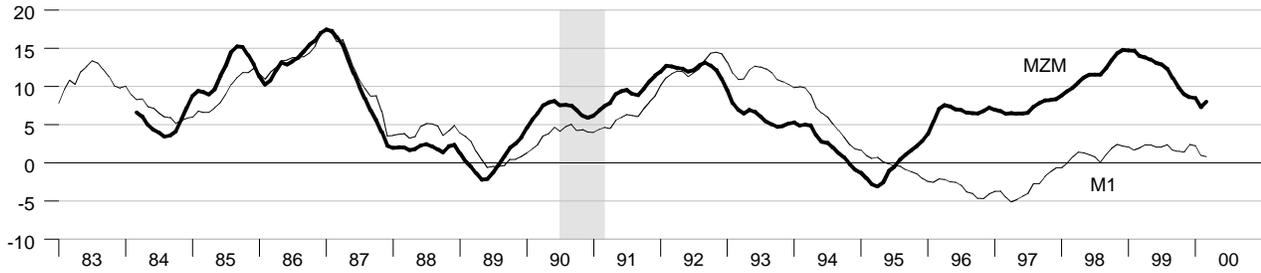


**Interest Rates**

	Jan 00	Feb 00	Mar 00
Federal Funds Rate	5.45	5.73	5.85
Discount Rate	5.00	5.24	5.34
Prime Rate	8.50	8.73	8.83
Conventional Mortgage Rate	8.21	8.33	8.24
<b>Treasury Yields:</b>			
3-month constant maturity	5.50	5.73	5.86
6-month constant maturity	5.76	6.00	6.11
1-year constant maturity	6.12	6.22	6.22
3-year constant maturity	6.49	6.65	6.53
5-year constant maturity	6.58	6.68	6.50
10-year constant maturity	6.66	6.52	6.26
30-year constant maturity	6.63	6.23	6.05

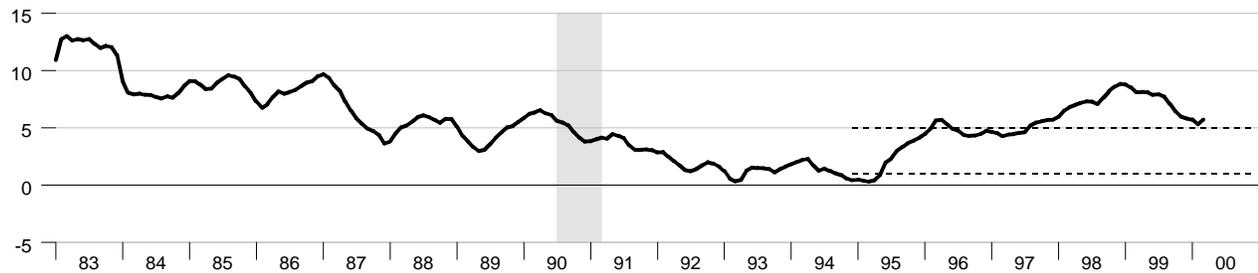
**MZM and M1**

Percent change from year ago



**M2**

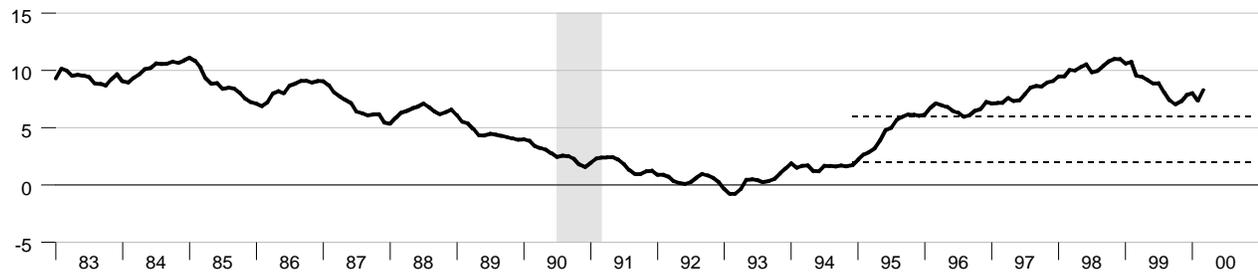
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

**M3**

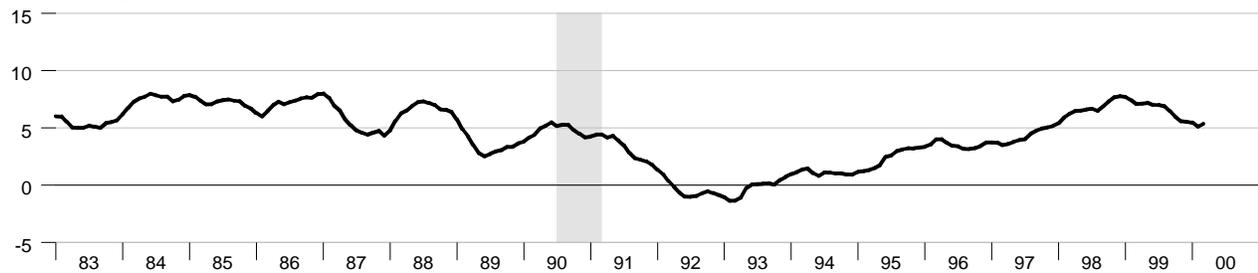
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

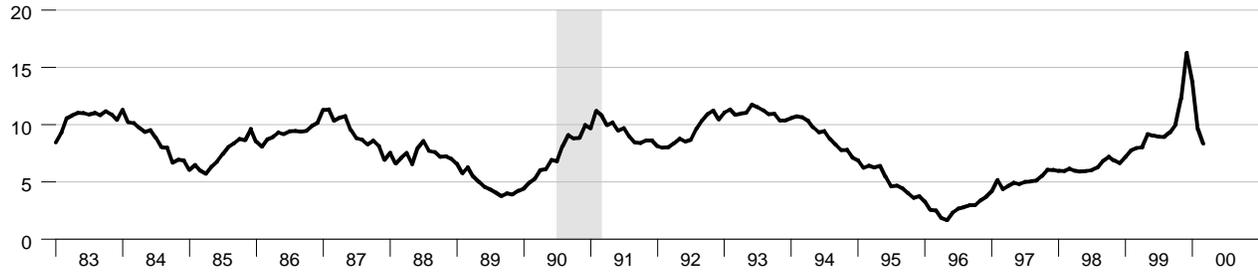
**Monetary Services Index - M2**

Percent change from year ago



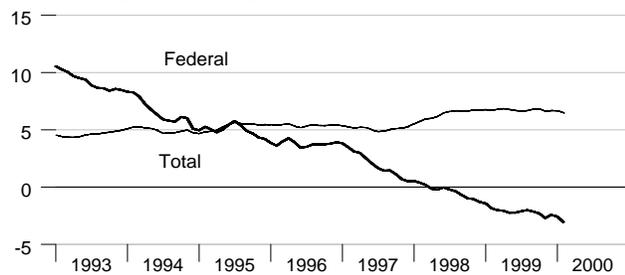
### Adjusted Monetary Base

Percent change from year ago



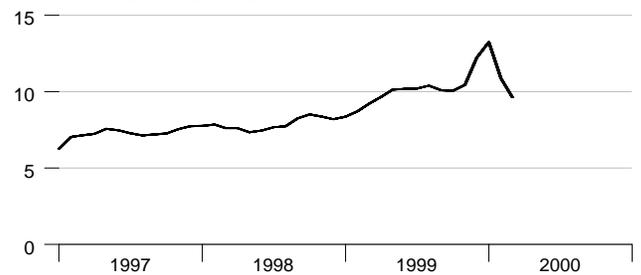
### Domestic Nonfinancial Debt

Percent change from year ago



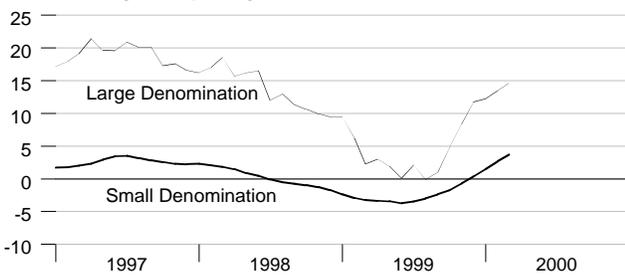
### Currency Held by the Nonbank Public

Percent change from year ago



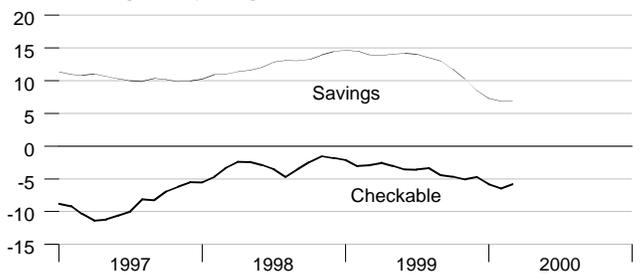
### Time Deposits

Percent change from year ago



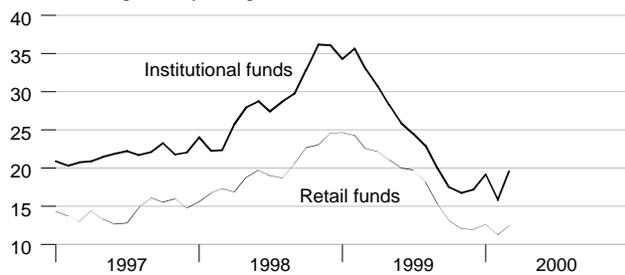
### Checkable and Savings Deposits

Percent change from year ago



### Money Market Mutual Fund Shares

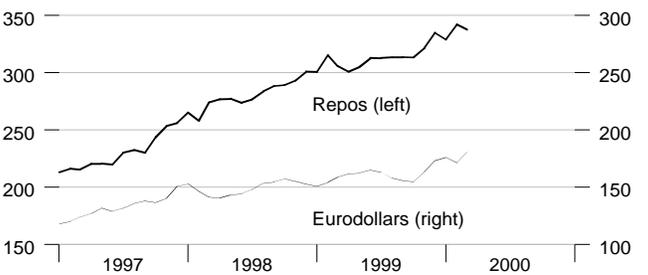
Percent change from year ago



### Repurchase Agreements and Eurodollars

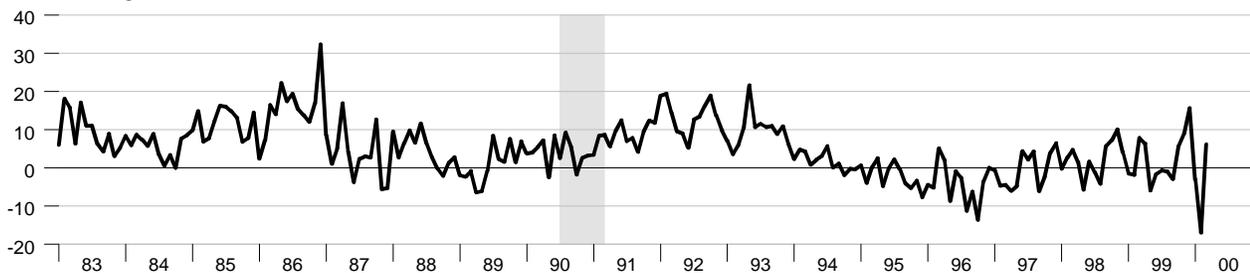
Billions of dollars

Billions of dollars



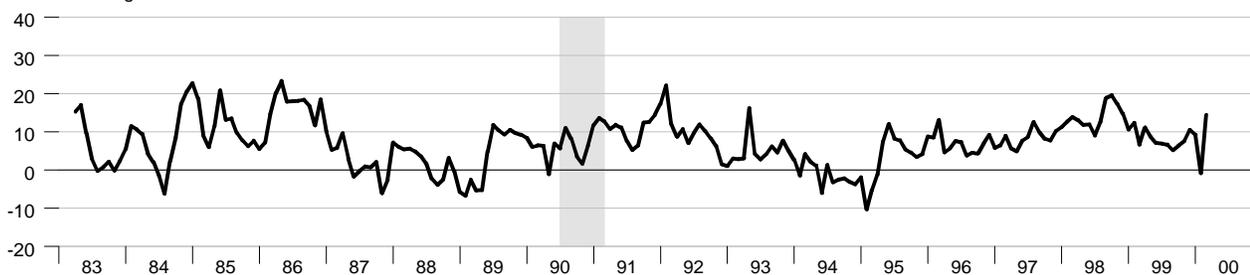
### M1

Percent change at an annual rate



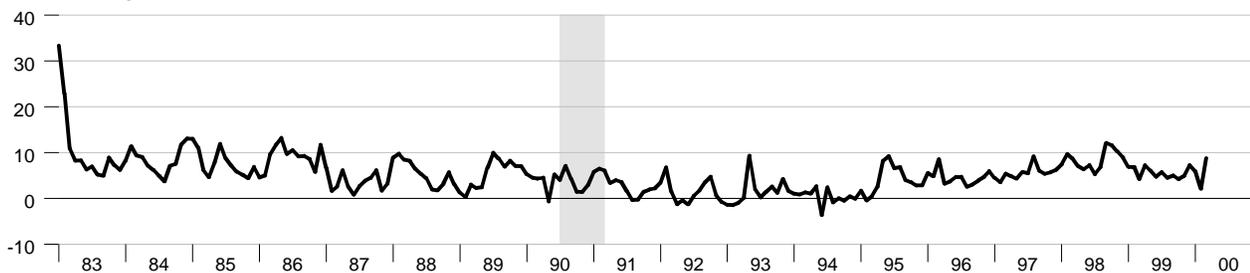
### MZM

Percent change at an annual rate



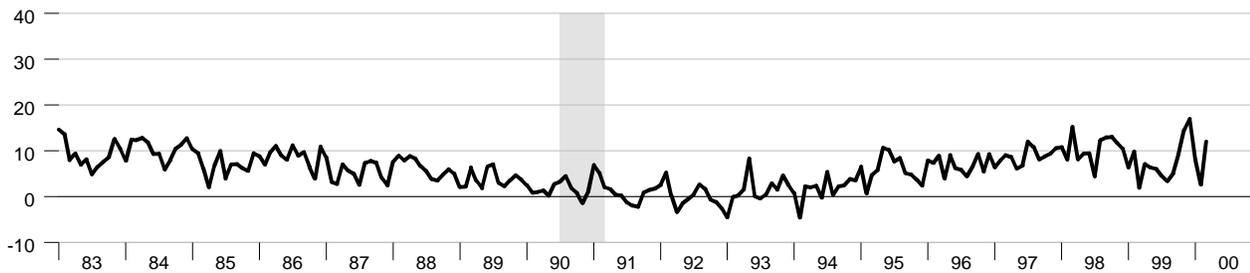
### M2

Percent change at an annual rate

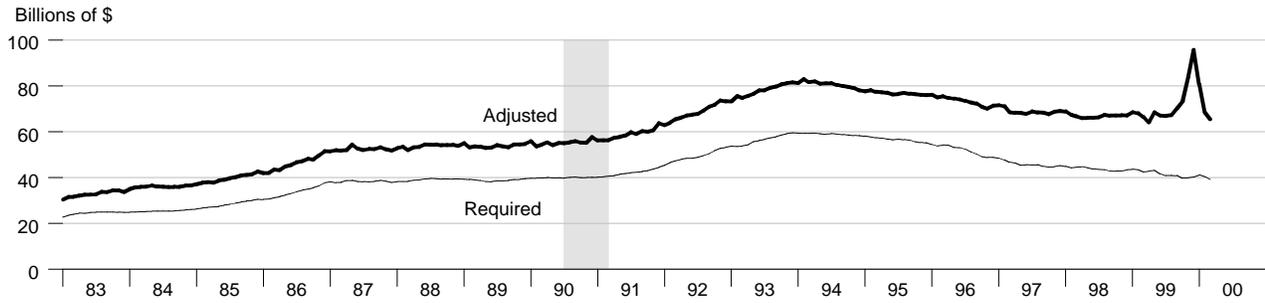


### M3

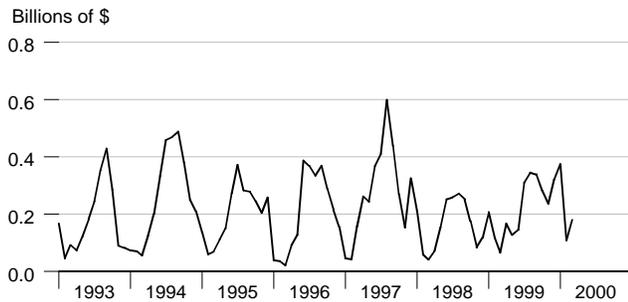
Percent change at an annual rate



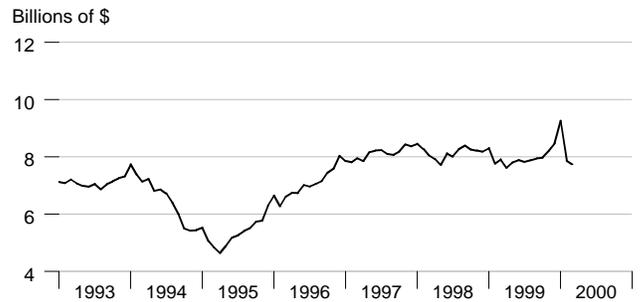
### Adjusted and Required Reserves



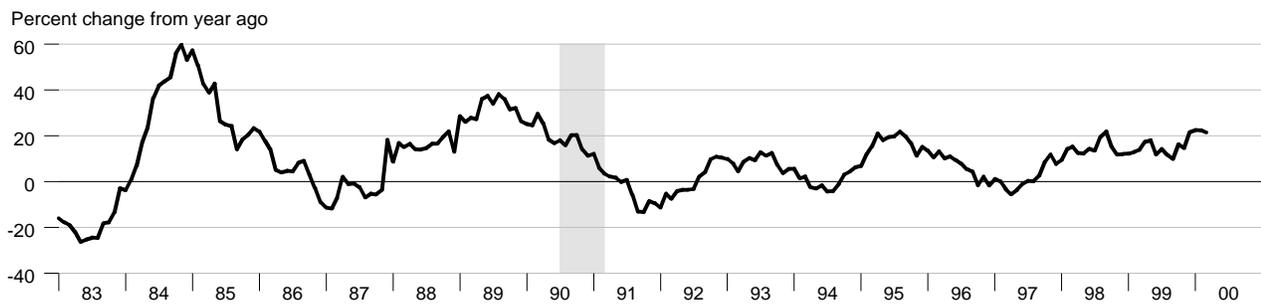
### Total Borrowings, nsa



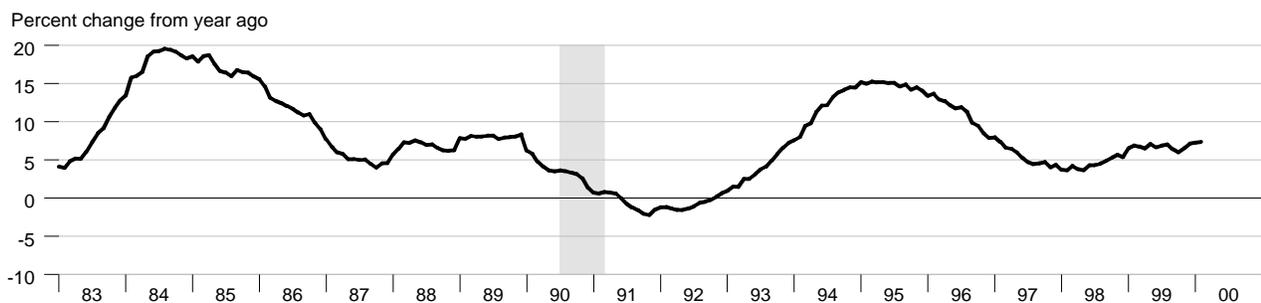
### Excess Reserves plus RCB Contracts



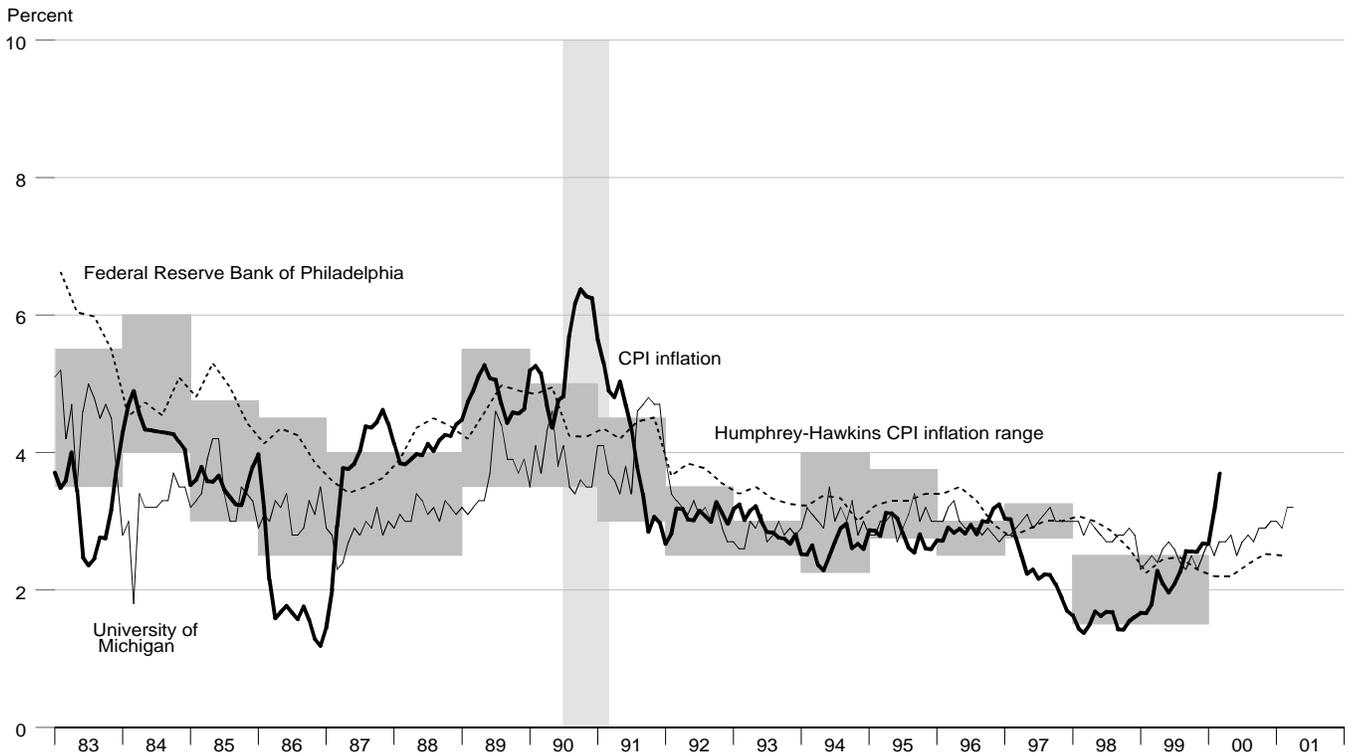
### Nonfinancial Commercial Paper



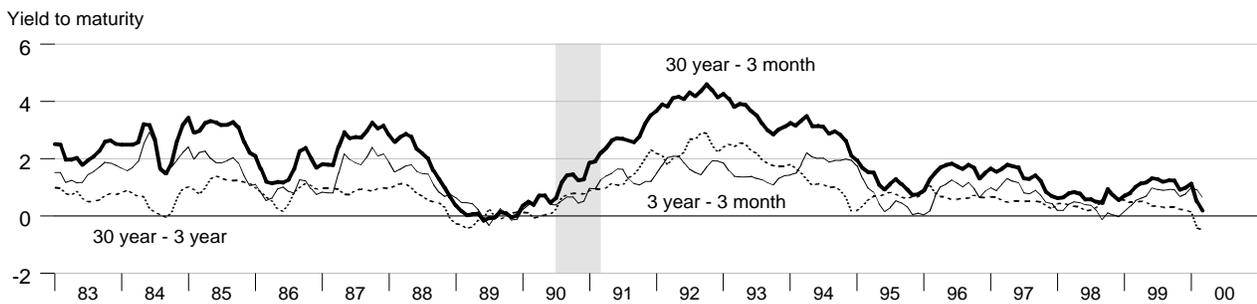
### Consumer Credit



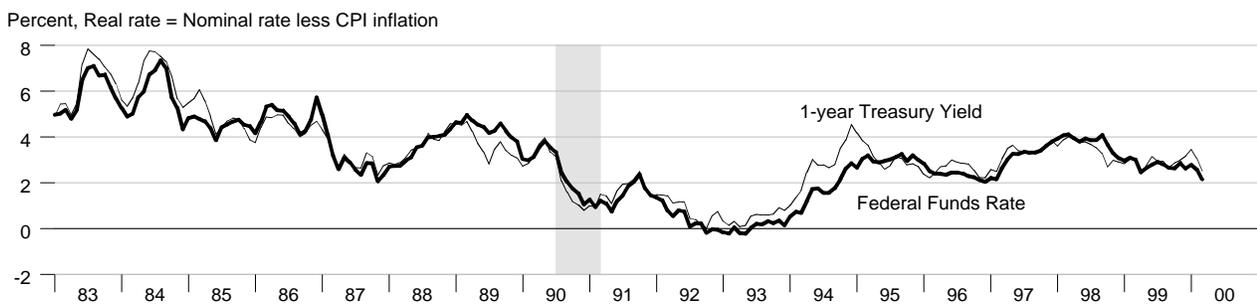
### Inflation and Inflation Expectations



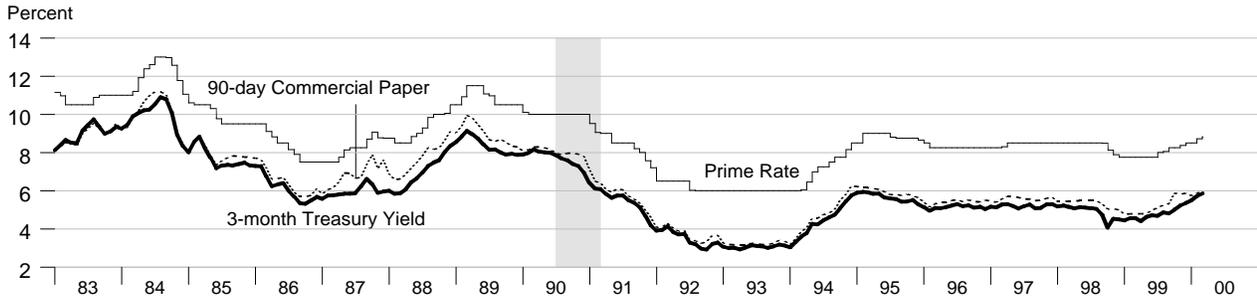
### Treasury Security Yield Spreads



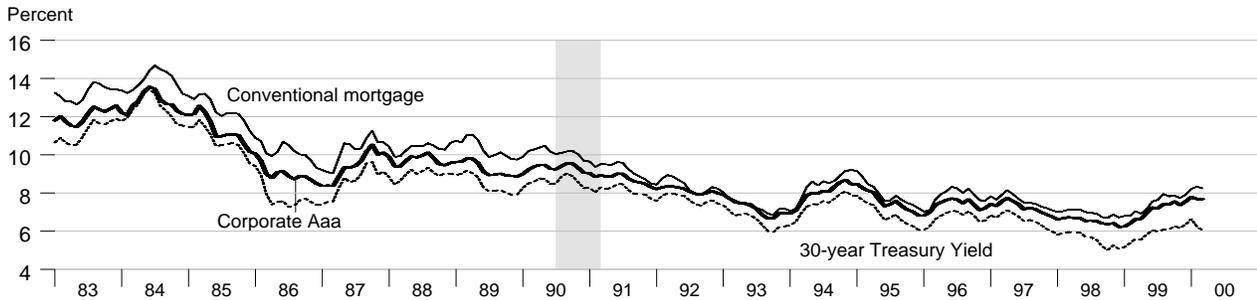
### Real Interest Rates



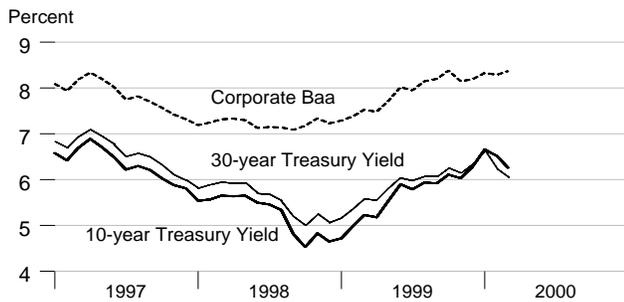
**Short Term Interest Rates**



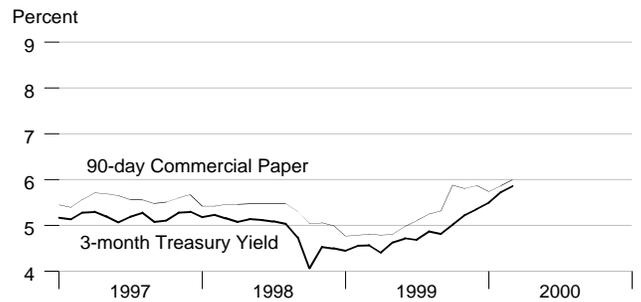
**Long Term Interest Rates**



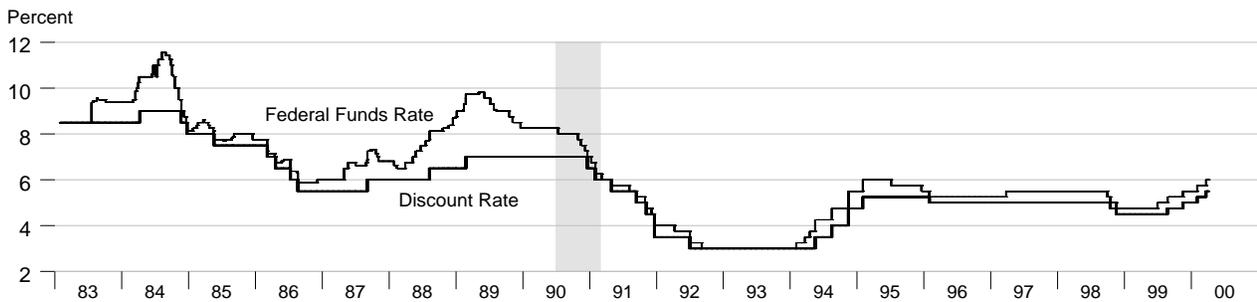
**Long Term Interest Rates**



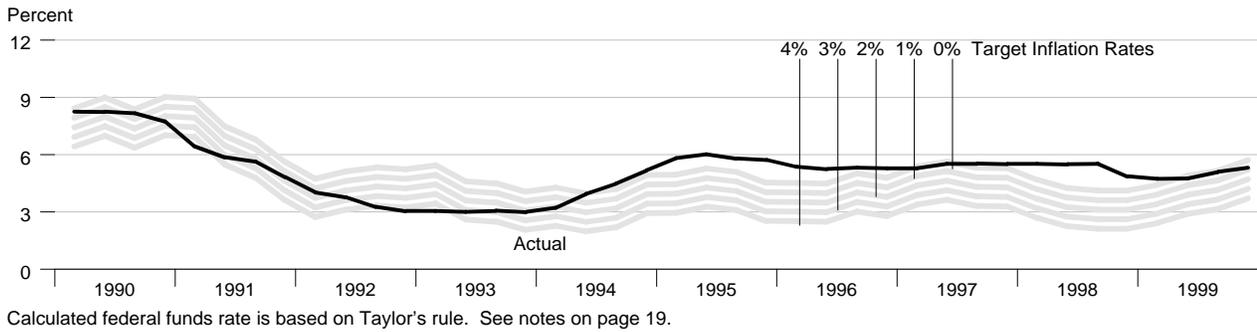
**Short Term Interest Rates**



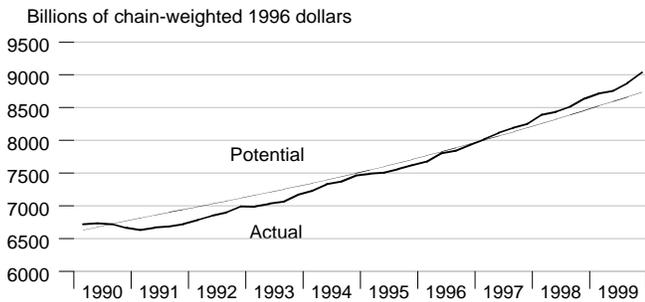
**FOMC Expected Federal Funds Rate and Discount Rate**



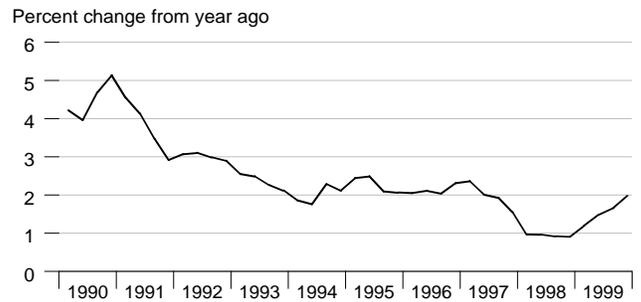
### Federal Funds Rate and Inflation Targets



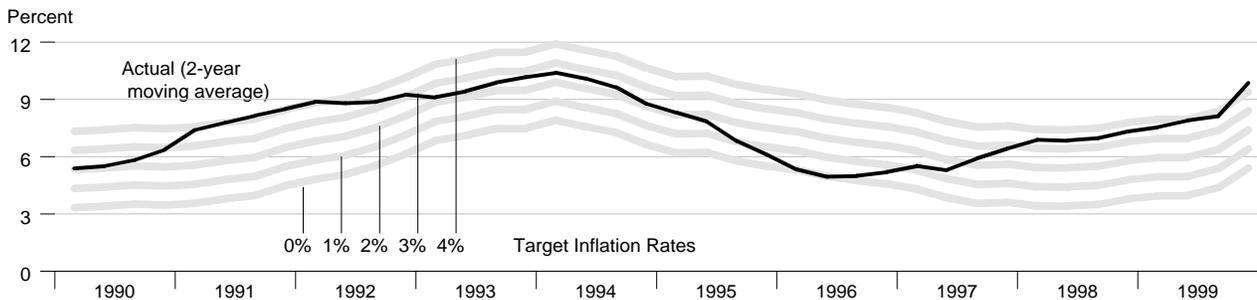
### Actual and Potential Real GDP



### PCE Inflation

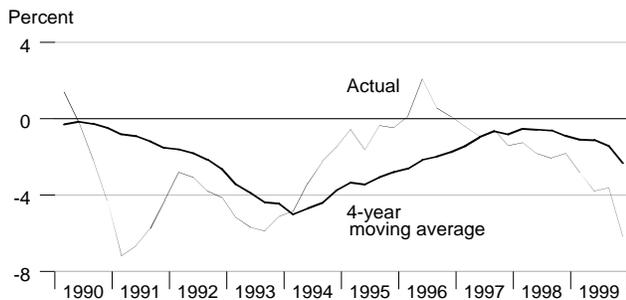


### Monetary Base Growth\* and Inflation Targets

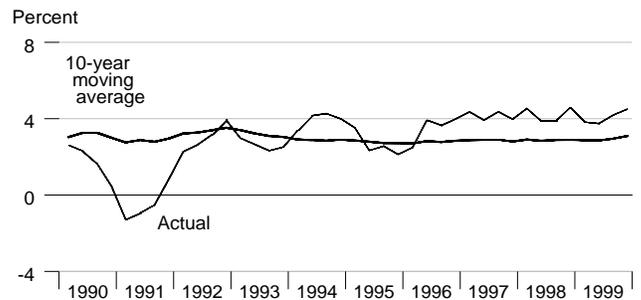


\*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. See notes on page 19.

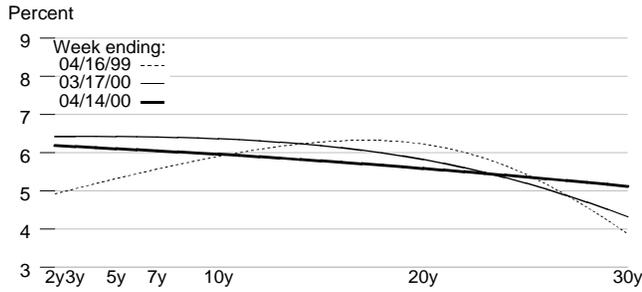
### Monetary Base Velocity Growth



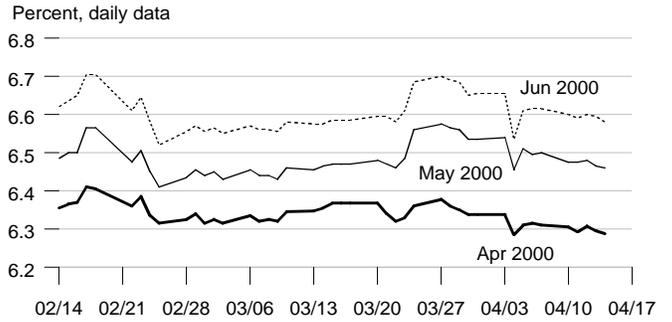
### Real Output Growth



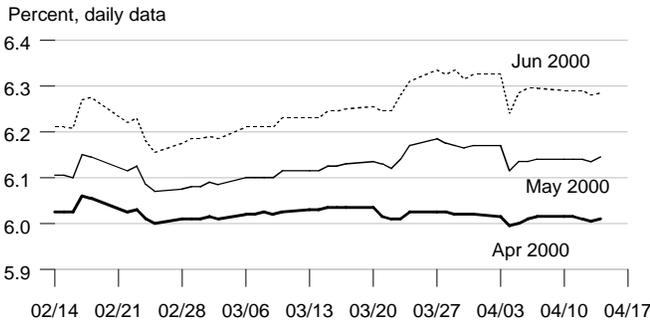
**Implied One-Year Forward Rates**



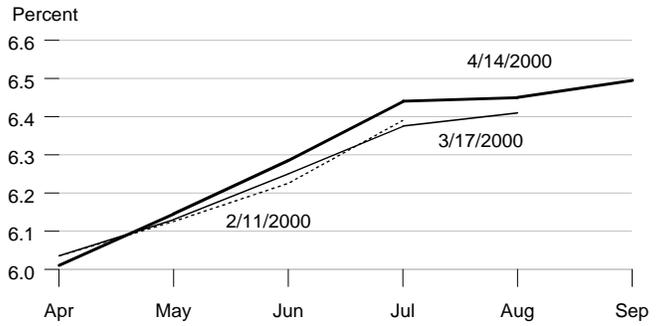
**Rates on 3-Month Eurodollar Futures**



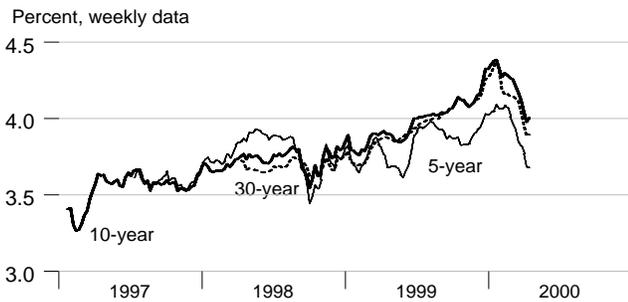
**Rates on Selected Fed Funds Futures Contracts**



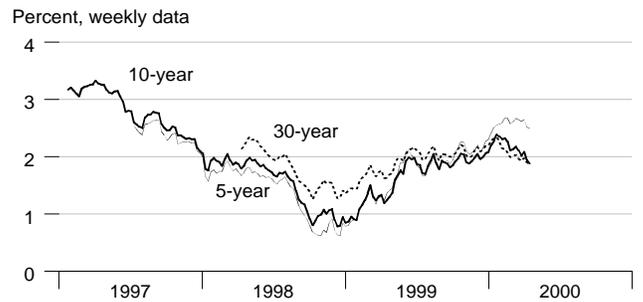
**Implied Yields on Fed Funds Futures**



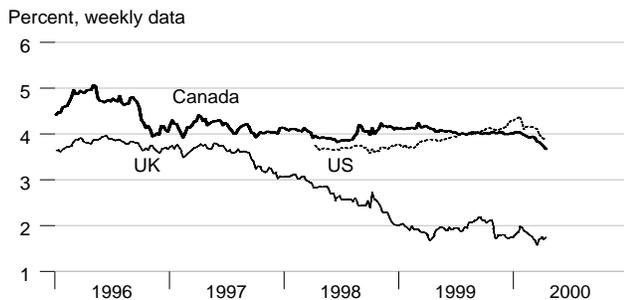
**Inflation-Protected Treasury Yields**



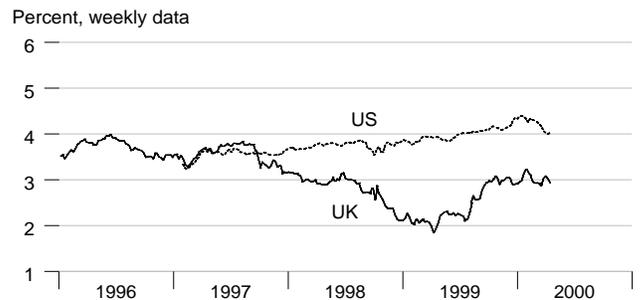
**Inflation-Protected Treasury Yield Spreads**



**Inflation-Indexed 30-Year Bonds**



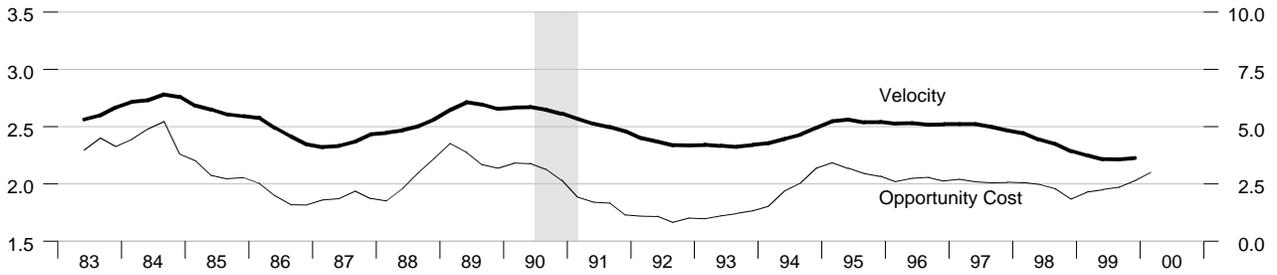
**Inflation-Indexed 10-Year Bonds**



### MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

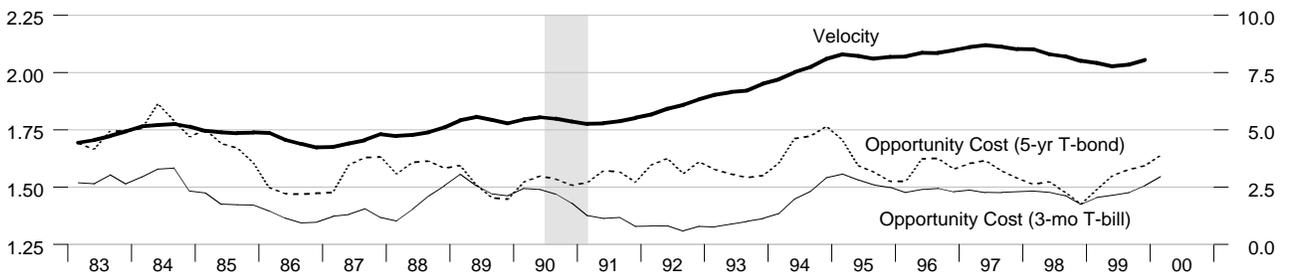
Opportunity Cost = 3 month T-bill rate less MZM own rate



### M2 Velocity and Opportunity Cost

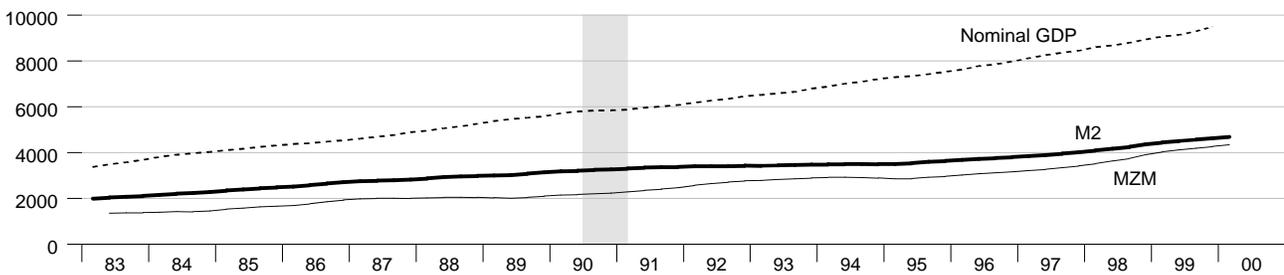
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



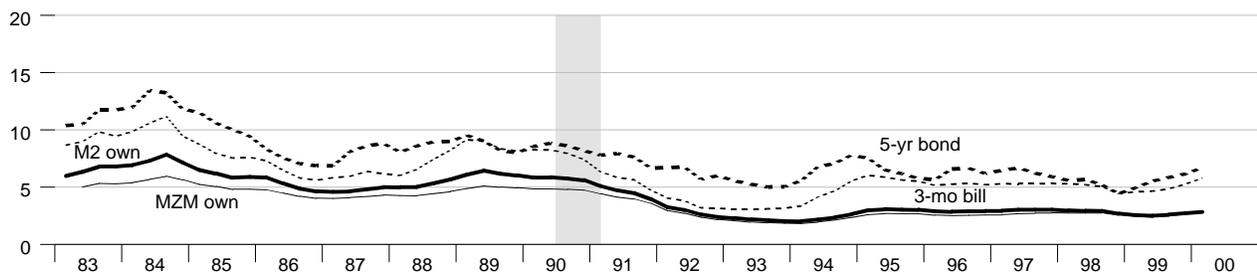
### M2, MZM and Nominal GDP

Billions of \$



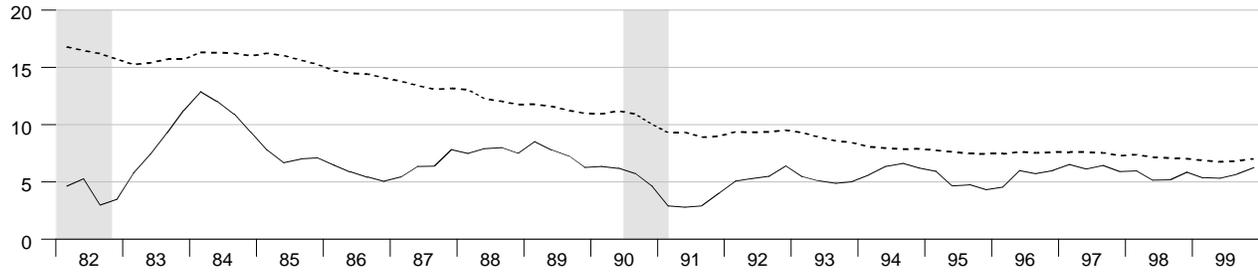
### Interest Rates

Percent



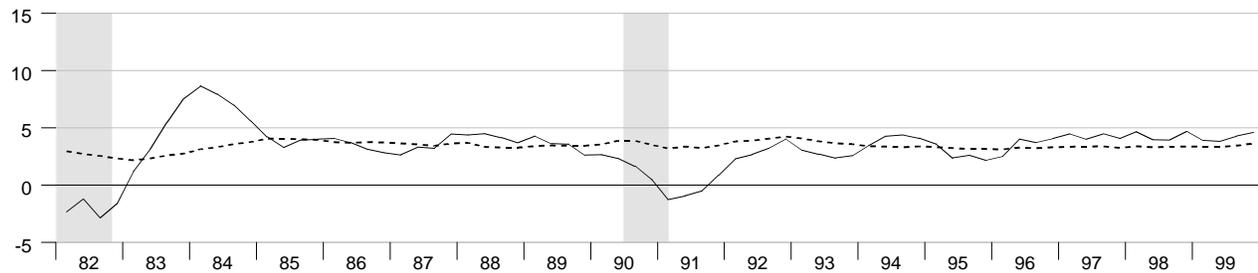
### Gross Domestic Product

Percent change from year ago



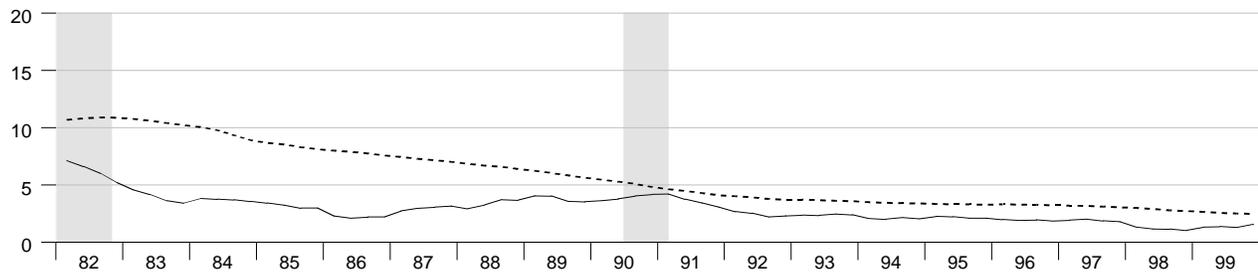
### Real Gross Domestic Product

Percent change from year ago



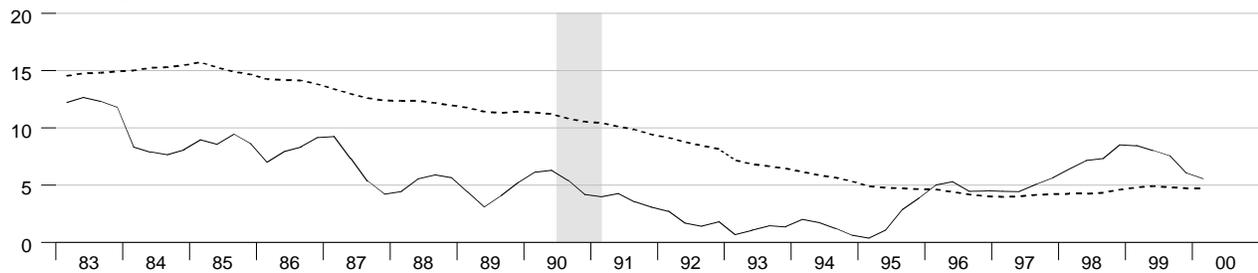
### Gross Domestic Product Price Index

Percent change from year ago



### M2

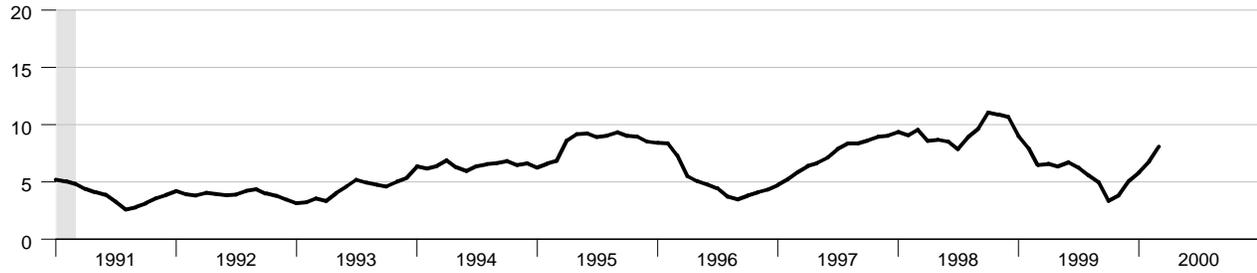
Percent change from year ago



Dashed lines indicate 10-year moving averages

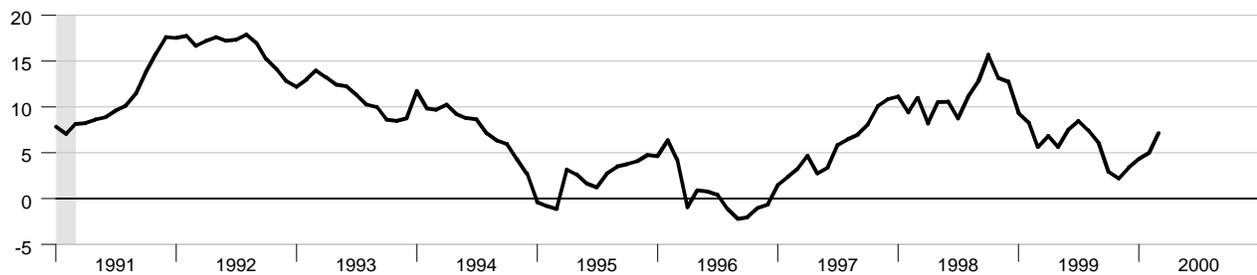
### Bank Credit

Percent change from year ago



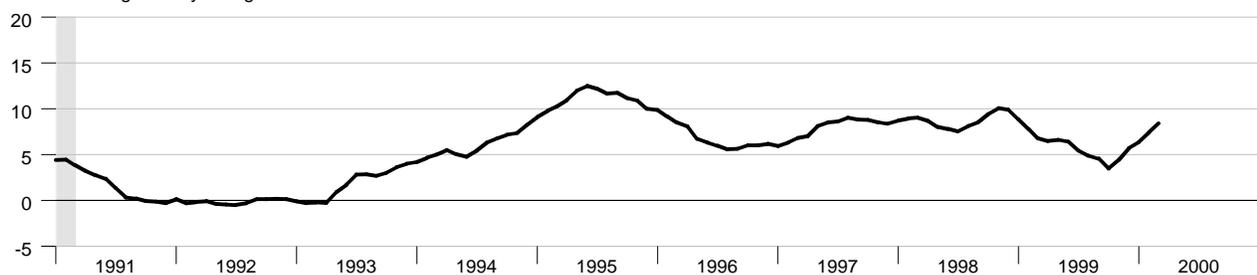
### Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



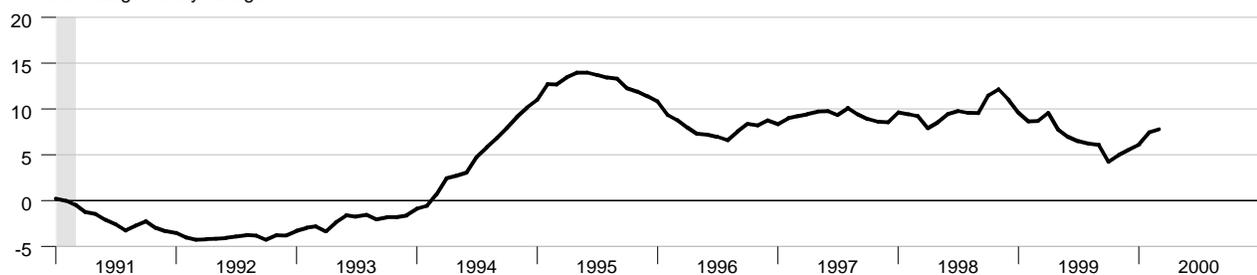
### Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

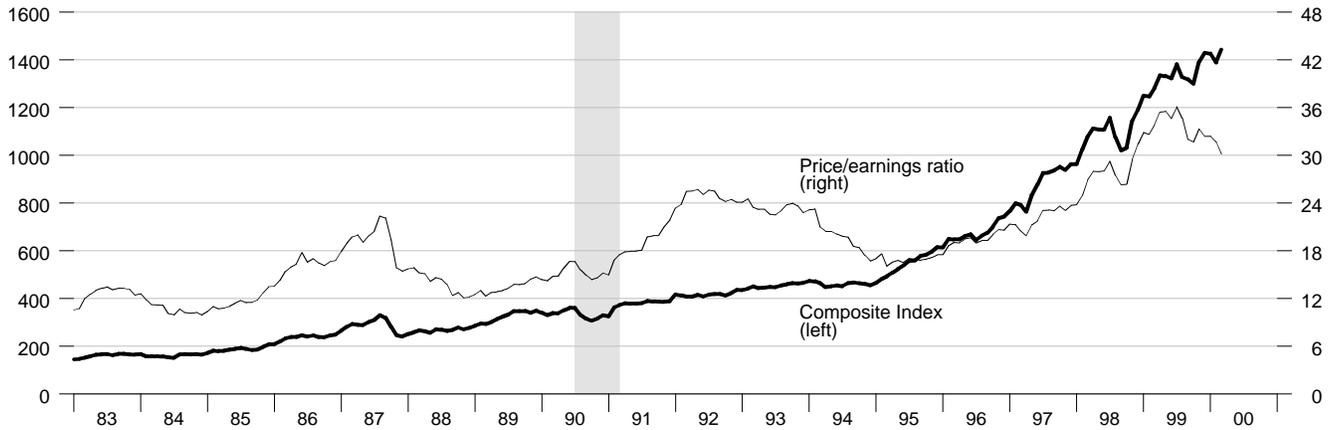


### Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



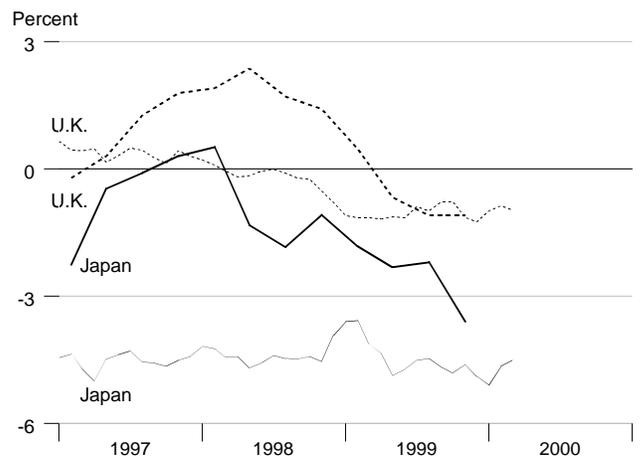
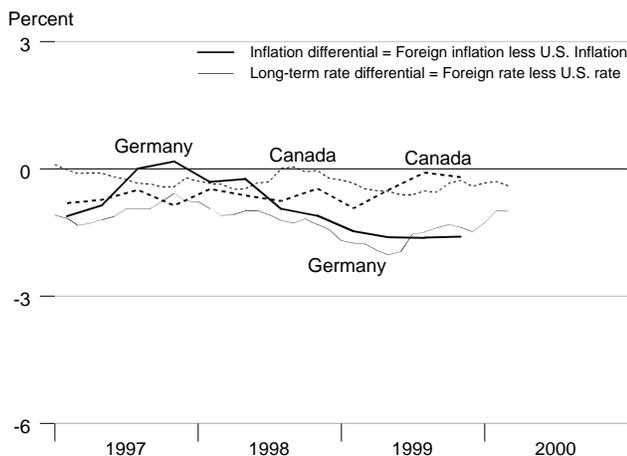
### Standard and Poor's 500



### Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1999Q2	1999Q3	1999Q4	2000Q1	Dec99	Jan00	Feb00	Mar00
United States	2.09	2.26	2.56	3.15	6.63	6.81	6.49	6.33
Canada	1.59	2.18	2.36	.	6.22	6.48	6.19	5.93
France	0.36	0.53	1.00	.	5.81	6.11	5.96	5.73
Germany	0.48	0.64	0.96	.	5.15	5.54	5.51	5.33
Italy	1.44	1.72	2.06	2.36	5.40	5.79	5.77	5.61
Japan	-0.22	0.07	-1.04	.	1.74	1.71	1.84	1.82
United Kingdom	1.42	1.17	1.47	.	5.38	5.82	5.62	5.36

### Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	M2M	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1995		1143.037	2906.093	3575.434	4500.288	3500.613	443.499	76.838	210.451
1996		1106.428	3096.347	3747.395	4796.863	3683.645	455.572	73.401	217.848
1997		1069.928	3318.613	3931.933	5179.573	3951.764	478.708	68.873	227.070
1998		1080.851	3705.090	4221.490	5710.897	4323.630	508.942	66.925	242.228
1999		1102.446	4157.564	4538.436	6208.921	4581.433	557.863	71.648	258.535
1998	1	1076.718	3523.710	4097.751	5498.386	4185.210	498.320	67.645	235.917
	2	1078.686	3637.300	4176.066	5638.533	4248.368	502.020	66.044	239.943
	3	1076.071	3746.116	4249.253	5763.384	4348.295	511.546	66.905	243.733
	4	1091.927	3913.233	4362.888	5943.284	4512.647	523.881	67.105	249.320
1999	1	1097.220	4033.485	4444.488	6064.827	4511.025	536.335	67.691	253.370
	2	1103.061	4127.357	4511.460	6155.764	4526.601	545.912	66.526	257.007
	3	1098.074	4198.569	4570.573	6231.278	4591.289	557.969	68.112	260.270
	4	1111.428	4270.844	4627.223	6383.813	4696.817	591.238	84.263	263.493
2000	1	1112.188	4352.897	4692.278	6543.889	4822.153	592.853	71.465	266.840
1998	Mar	1080.319	3563.019	4128.581	5556.968	4220.895	499.342	66.736	237.550
	Apr	1081.657	3601.717	4152.912	5594.709	4225.781	499.537	65.937	238.890
	May	1076.489	3637.081	4174.983	5638.310	4246.188	502.322	66.071	239.820
	Jun	1077.912	3673.103	4200.304	5682.580	4273.134	504.200	66.125	241.120
	Jul	1076.877	3700.662	4218.927	5703.551	4295.384	507.618	66.307	242.270
	Aug	1073.126	3739.452	4242.999	5762.211	4350.886	511.031	67.371	243.440
	Sep	1078.211	3798.233	4285.832	5824.390	4398.616	515.990	67.036	245.490
	Oct	1084.671	3860.123	4327.305	5887.775	4484.289	520.806	67.058	247.530
	Nov	1093.735	3915.841	4364.342	5945.154	4517.372	524.379	67.182	249.420
	Dec	1097.375	3963.734	4397.018	5996.923	4536.281	526.458	67.074	251.010
1999	Jan	1095.980	3998.710	4422.360	6028.749	4524.372	531.761	68.517	252.260
	Feb	1094.290	4039.737	4447.669	6077.971	4514.535	538.190	68.067	253.460
	Mar	1101.391	4062.008	4463.435	6087.761	4494.167	539.053	66.488	254.390
	Apr	1107.226	4099.557	4490.355	6123.735	4503.997	539.609	64.109	255.900
	May	1101.751	4129.187	4513.053	6156.255	4516.004	548.331	68.424	257.080
	Jun	1100.206	4153.327	4530.973	6187.303	4559.803	549.797	67.046	258.040
	Jul	1099.569	4177.179	4552.715	6210.837	4563.707	553.061	66.882	259.230
	Aug	1098.668	4200.217	4569.938	6228.405	4593.033	556.713	67.249	260.230
	Sep	1095.985	4218.310	4589.066	6254.592	4617.128	564.133	70.206	261.350
	Oct	1101.146	4240.711	4605.250	6302.928	4633.832	572.986	73.315	262.260
	Nov	1109.357	4267.264	4624.235	6379.251	4690.438	588.662	83.810	263.330
	Dec	1123.780	4304.557	4652.183	6469.259	4766.181	612.065	95.665	264.890
2000	Jan	1120.870	4337.577	4675.244	6512.570	4788.273	604.798	80.633	266.060
	Feb	1105.021	4334.522	4683.623	6526.876	4821.429	589.772	68.323	266.430
	Mar	1110.672	4386.591	4717.967	6592.221	4856.757	583.990	65.438	268.030

\*All values are given in billions of dollars

		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
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
1998	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
	Mar	5.85	5.34	8.83	6.14	5.86	6.53	6.05	7.68	5.68	8.24

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

		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
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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	2.45
2000	1	0.07	1.92	1.41	2.51
<hr/>					
1998	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	1.21
	Dec	1.30	0.87	0.60	1.41
2000	Jan	-0.26	0.77	0.50	0.67
	Feb	-1.41	-0.07	0.18	0.22
	Mar	0.51	1.20	0.73	1.00

## 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,  $\pi_{t-1}$  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  $\Delta MB_t^*$  is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter "t" is calculated as the average quarterly growth during the previous 40 quarters, at an annual rate, by the formula  $((y_t - y_{t-40})/40) \times 4 \times 100$ , 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 Index 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-sharpe.stanford.edu/mia.htm](http://www-sharpe.stanford.edu/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](http://www.stls.frb.org/research/reviewdat.html).

