

Monetary Trends



What Can “Buy-and-Hold” Stock Investors Expect?

The total nominal return on stocks (column 1 in the table) is the sum of the average dividend yield and capital gains, or price appreciation (columns 2 and 3, respectively). Annualized after-inflation (“real”) total returns on U.S. stocks—obtained by subtracting column 5 from column 1—were 7.5 percent between 1926 and 1997. For comparison, annual real total returns on short-term government securities were only 0.6 over this period.

What returns should investors expect from stocks in the future? Relatively high long-term returns on stocks in the past do not necessarily portend high future returns—particularly now. The dividend yield on the S&P 500 index was 1.2 percent in April 1999, the lowest ever recorded and far below either the 4.6 percent average for the period 1926-1997 or the 5.4 percent average for the period 1802-1997.* As for capital gains, stock prices tend to track GDP over time, as a comparison of columns 3 and 4 indicates. Thus, GDP forecasts are a critical input for making long-run capital-gains forecasts. Real GDP growth is likely to average 2 to 3 percent annually and current inflation expectations are also 2 to 3 percent. This adds up to a forecast of 4 to 6 percent annual nominal GDP growth, somewhat below the rates shown in column 4. Thus, with extremely low dividend yields and moderate expected GDP growth, one should probably expect total nominal returns on stocks to average no more than 5 to 7 percent in the future.

For “buy-and-hold-forever” investors—those who may add to but never sell off their portfolios completely—there is a second important reason to expect returns

far below the misleading historical total-return statistics given in the table. Examples of buy-and-hold-forever investors include endowment or pension funds, some family trust funds, or a government trust fund such as Social Security. All have theoretically unlimited investment horizons, so they may never sell off their portfolios altogether. For them, income consists mainly of dividends and interest, even if some securities are sold to generate income periodically. In a nutshell, these investors probably should ignore the capital gains component of total returns because these gains are available only if an investor sells out of the market, at least temporarily, in order to lock in a capital gain. Given that buy-and-hold-forever investors can only be out of the market temporarily—otherwise, they would give up the equity risk premium forever—realizing capital gains implies a risky strategy of attempting to time the market. Few investors can do this consistently well.

The unavoidable implication of low current dividend yields and low expected nominal GDP growth is that stock investors of all kinds may be forced to accept historically subpar total returns in the future. Given the likely unimportance of capital gains for buy-and-hold-forever investors, unprecedentedly low current dividend yields mean that endowments and other perpetual investors in stocks can expect little more than a trickle of true cash returns.

—William R. Emmons

Holding Period	(1) Total nominal return on stocks	(2) Return due to dividends paid to stockholders	(3) Return due to price appreciation	(4) Nominal GDP	(5) Consumer price inflation
1926-1997	10.6	4.6	6.0	6.4	3.1
1946-1997	12.2	4.3	7.9	7.3	4.3
1966-1997	11.5	3.9	7.6	7.8	5.2

All returns are annually compounded percentage rates.

*Jeremy J. Siegel, *Stocks for the Long Run* (New York: McGraw-Hill, 1998), 2nd Edition, pp. 13, 15.

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

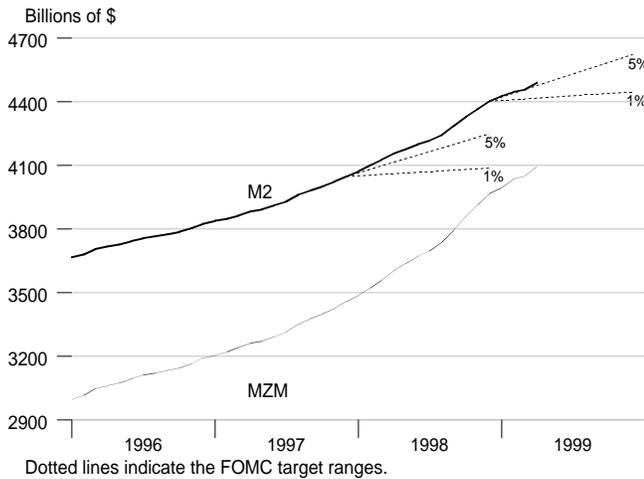
We welcome your comments addressed to:

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

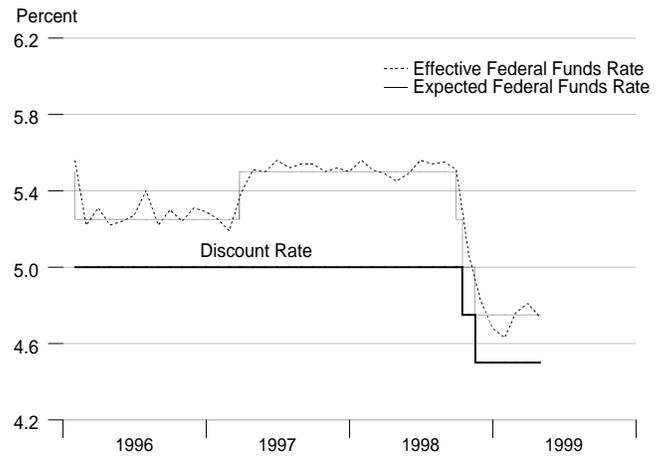
or to:

webmaster@stls.frb.org

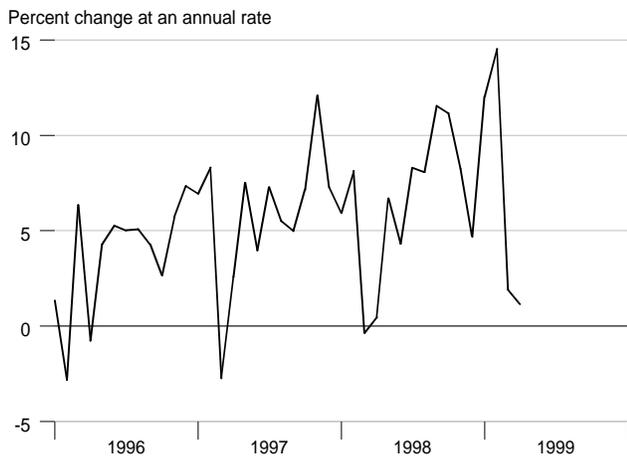
M2 and MZM



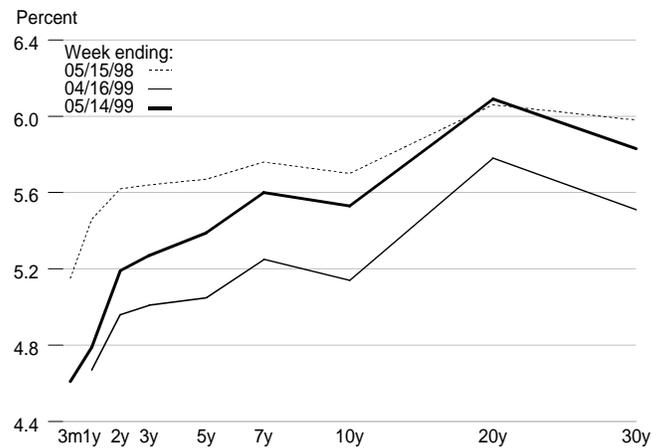
Reserve Market Rates



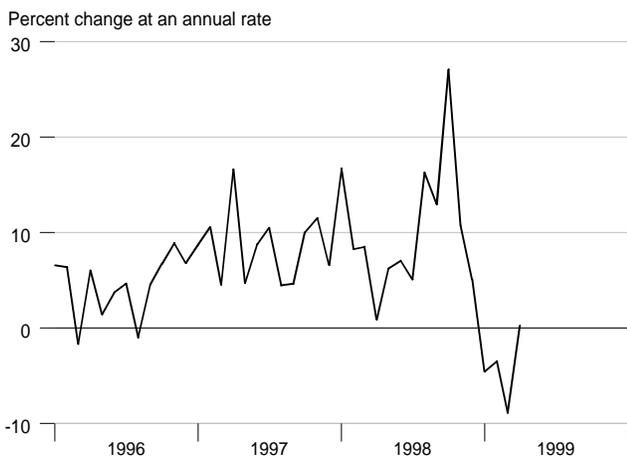
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

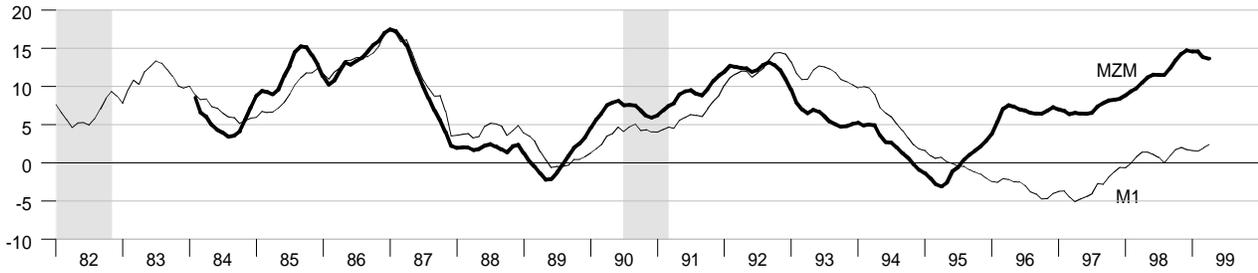


Interest Rates

	Feb 99	Mar 99	Apr 99
Federal Funds Rate	4.76	4.81	4.74
Discount Rate	4.50	4.50	4.50
Prime Rate	7.75	7.75	7.75
Conventional Mortgage Rate	6.81	7.04	6.92
Treasury Yields:			
3-month constant maturity	4.56	4.57	4.41
6-month constant maturity	4.61	4.65	4.54
1-year constant maturity	4.70	4.78	4.69
3-year constant maturity	4.90	5.11	5.03
5-year constant maturity	4.91	5.14	5.08
10-year constant maturity	5.00	5.23	5.18
30-year constant maturity	5.37	5.58	5.55

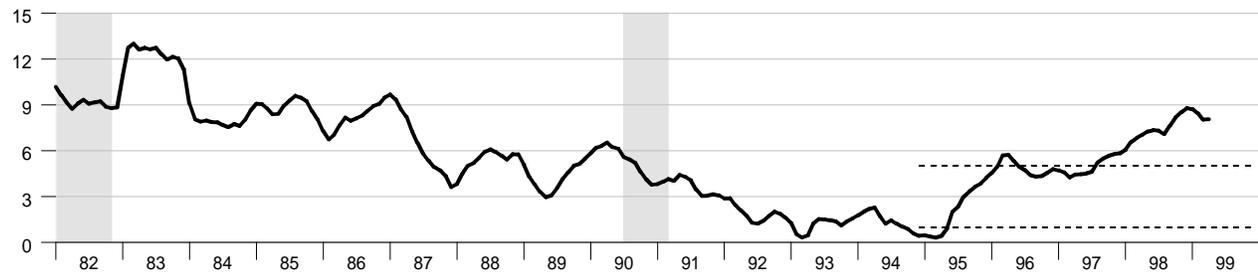
MZM and M1

Percent change from year ago



M2

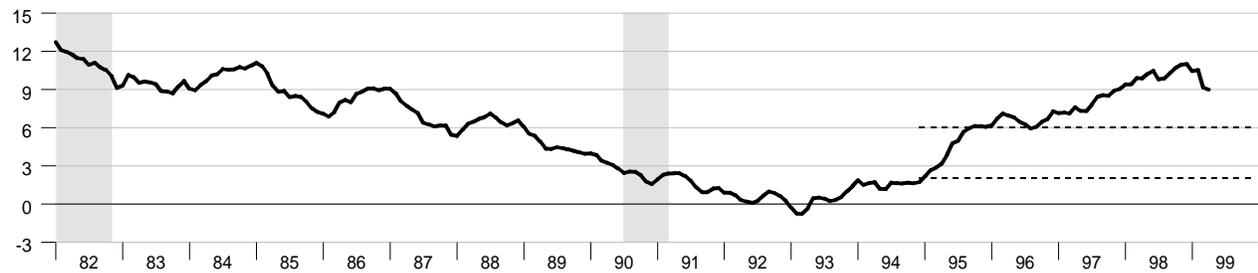
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

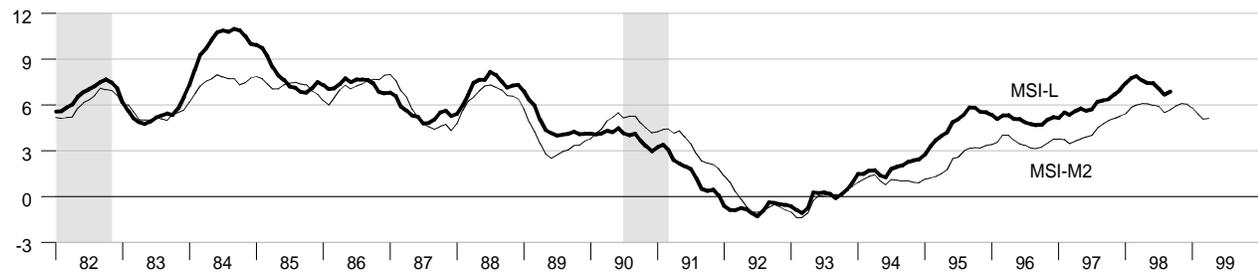
Percent change from year ago



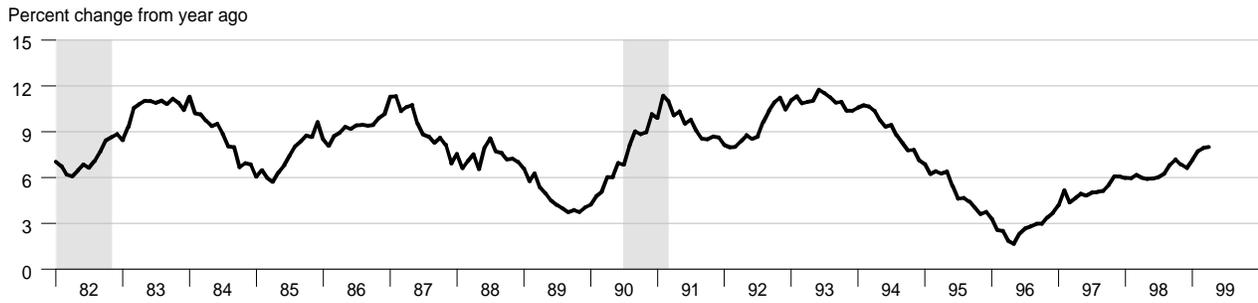
Dotted lines indicate the FOMC target ranges.

Monetary Services Indexes - M2 and L

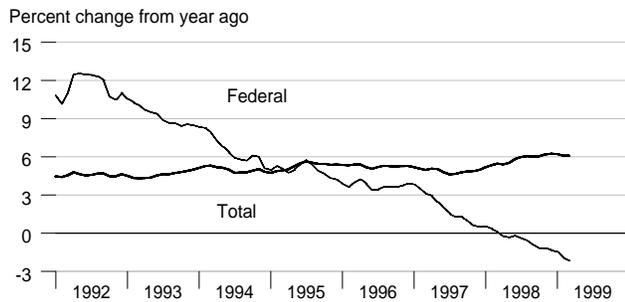
Percent change from year ago



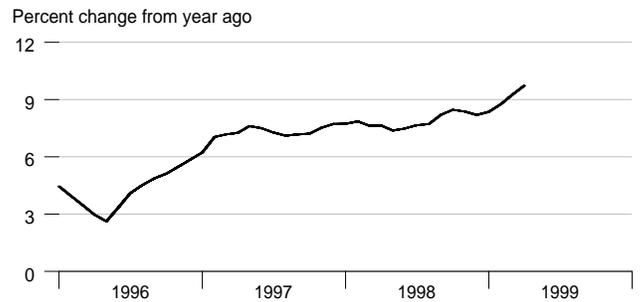
Adjusted Monetary Base



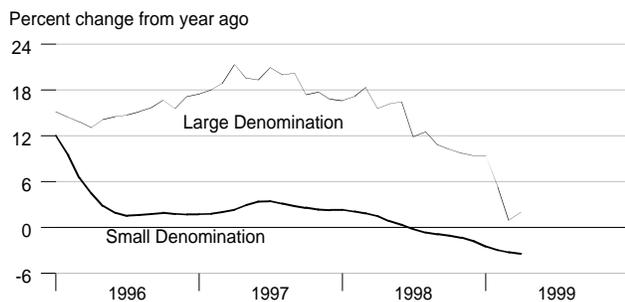
Domestic Nonfinancial Debt



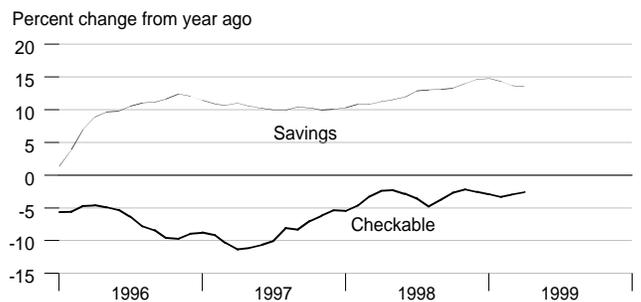
Currency Held by the Nonbank Public



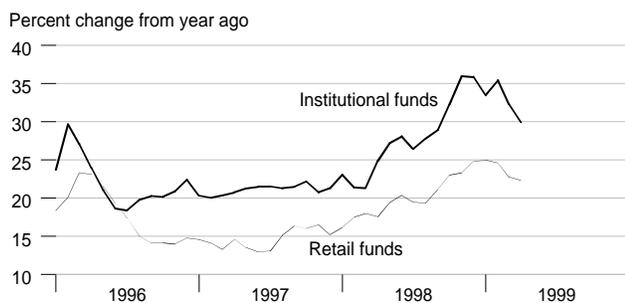
Time Deposits



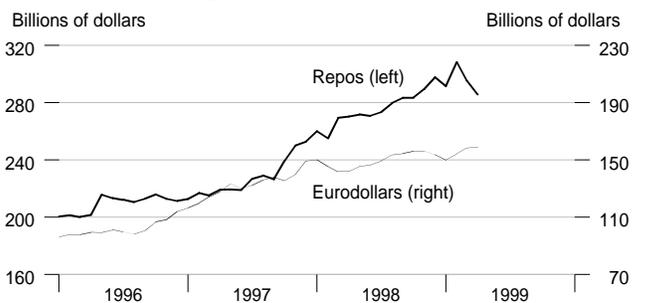
Checkable and Savings Deposits



Money Market Mutual Fund Shares

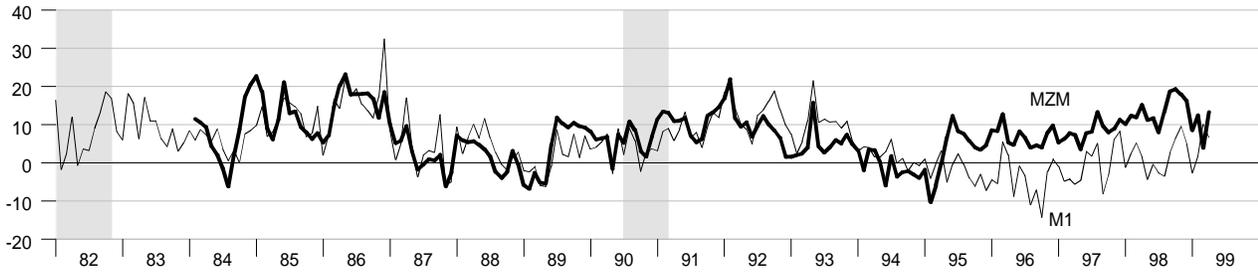


Repurchase Agreements and Eurodollars



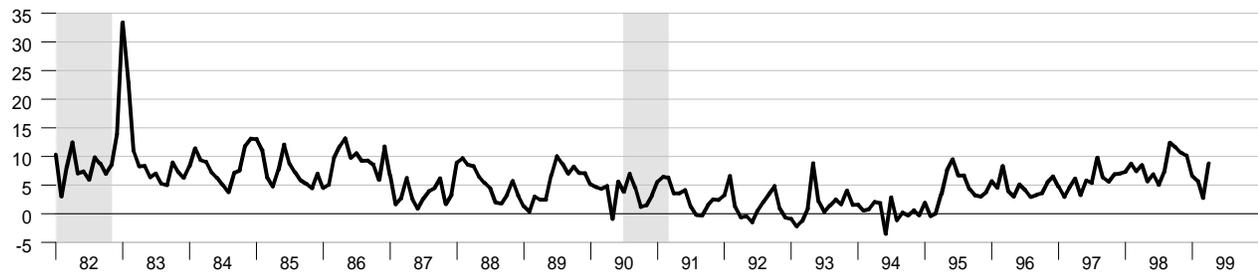
MZM and M1

Percent change at an annual rate



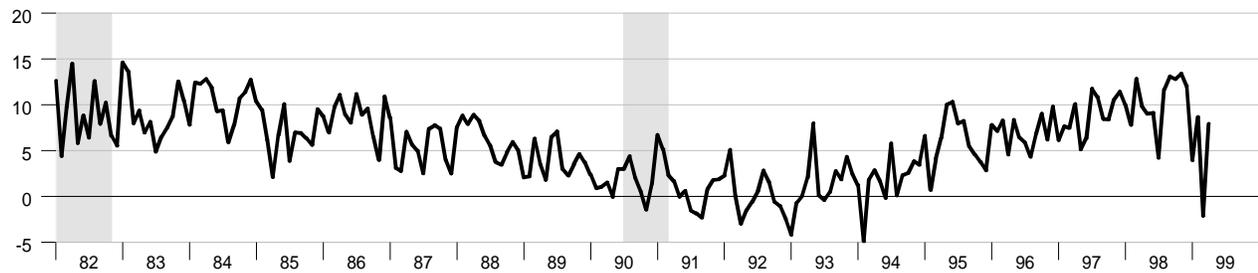
M2

Percent change at an annual rate



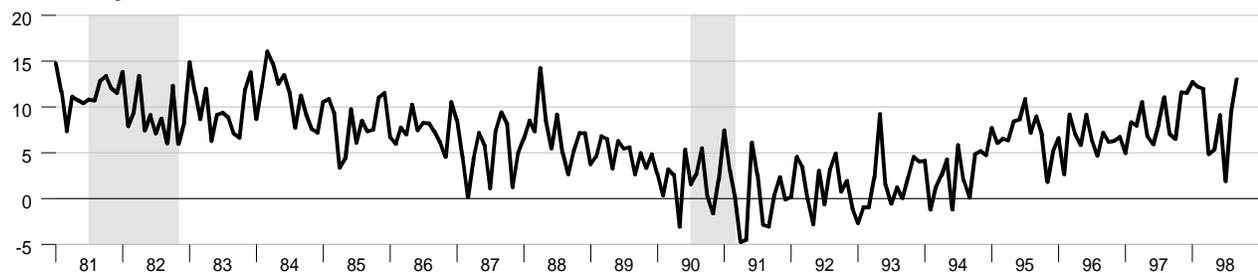
M3

Percent change at an annual rate

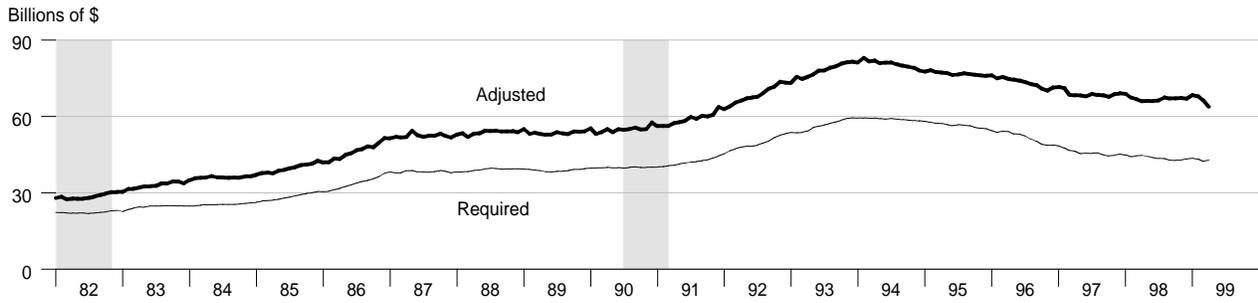


L

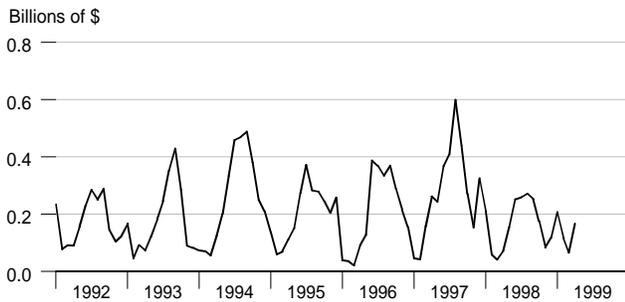
Percent change at an annual rate



Adjusted and Required Reserves



Total Borrowings, nsa



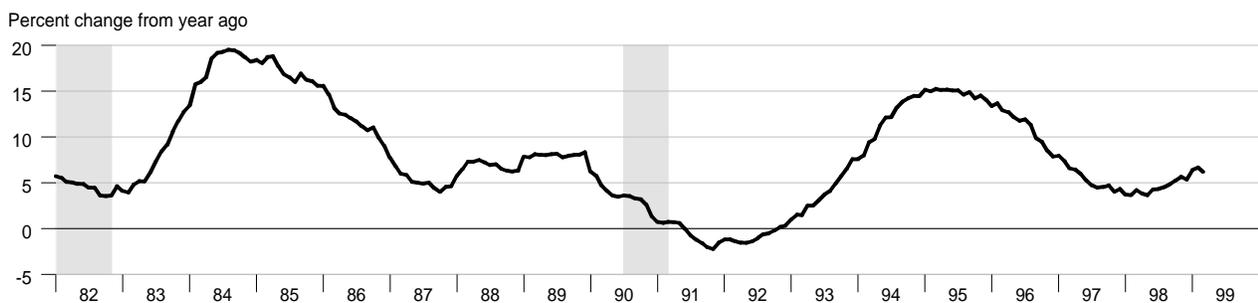
Excess Reserves plus RCB Contracts



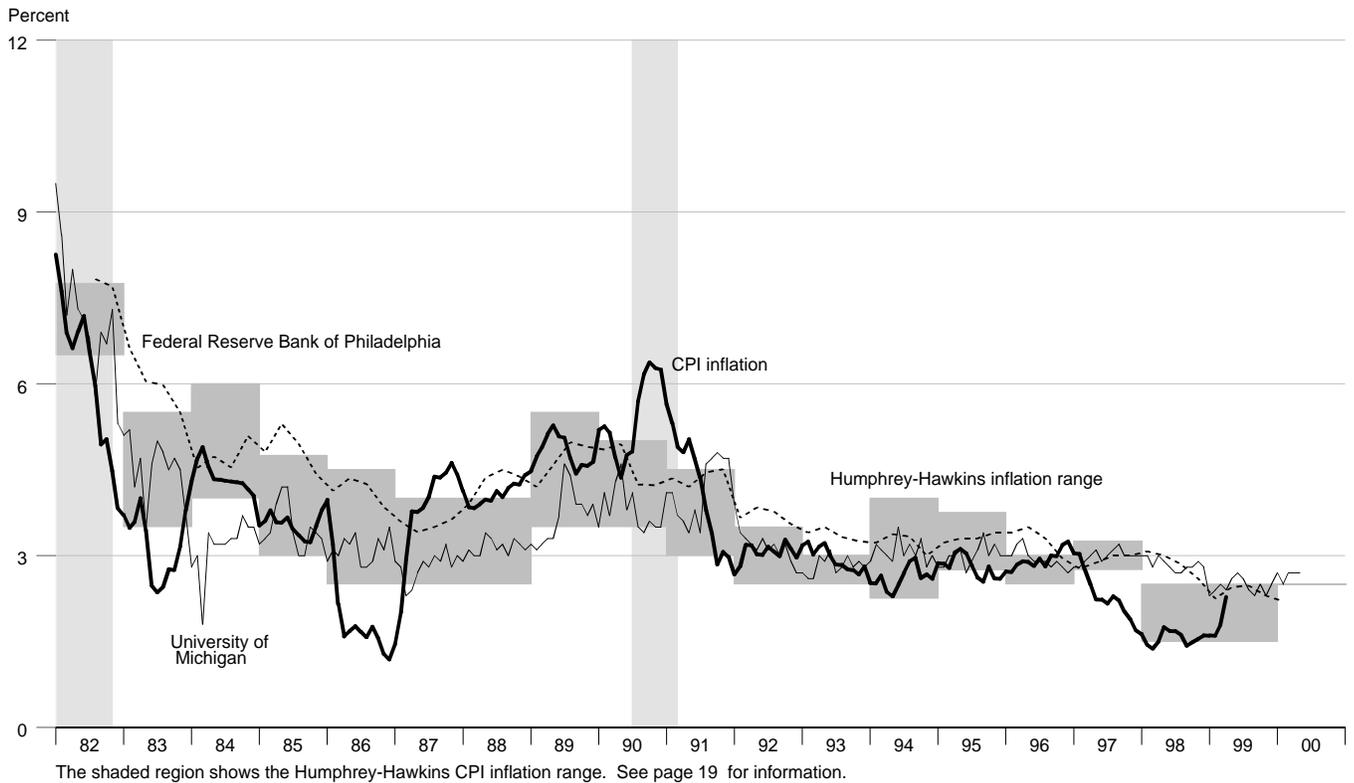
Nonfinancial Commercial Paper



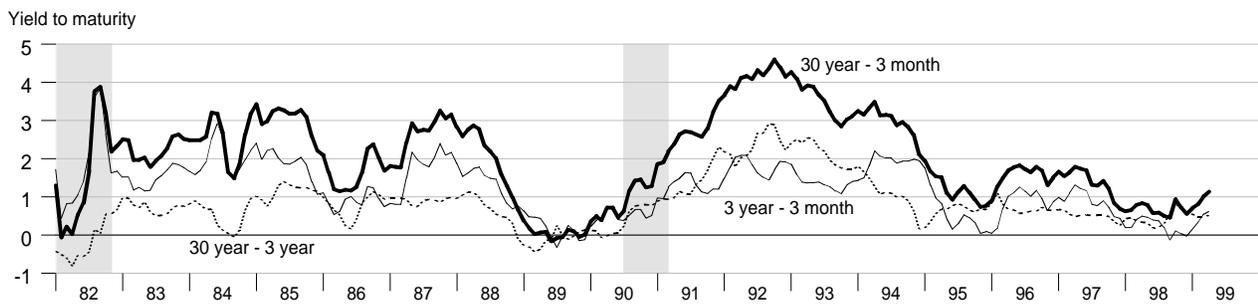
Consumer Credit



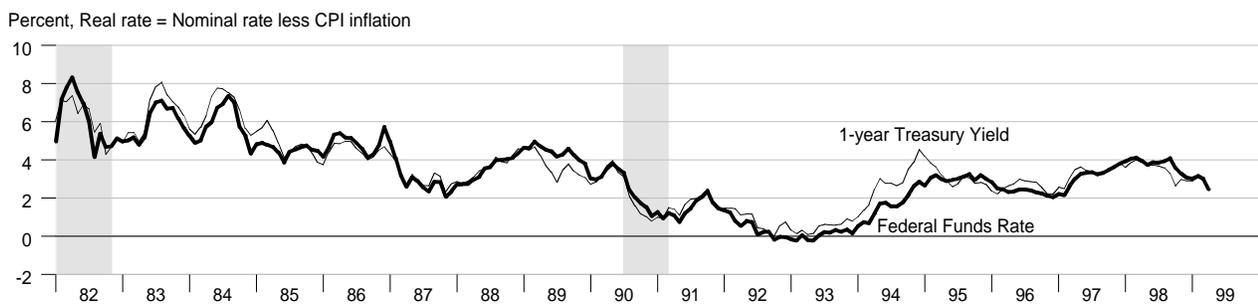
Inflation and Inflation Expectations



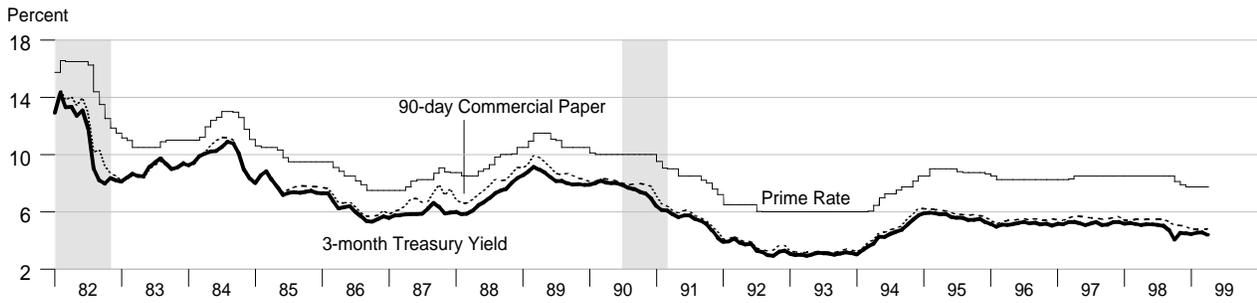
Treasury Security Yield Spreads



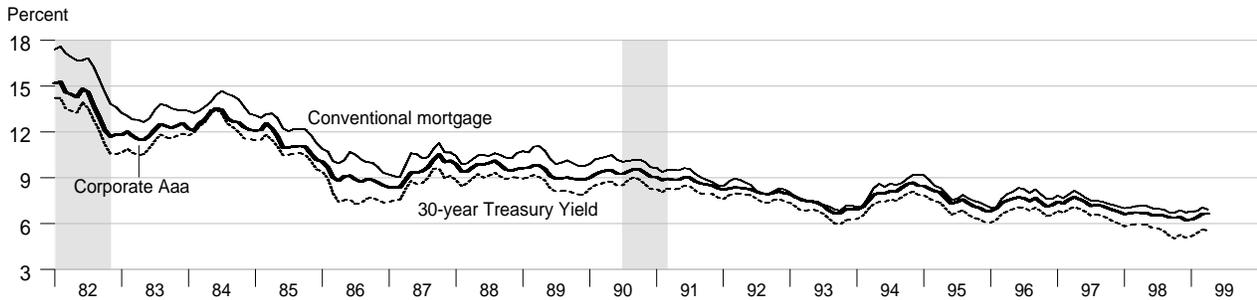
Real Interest Rates



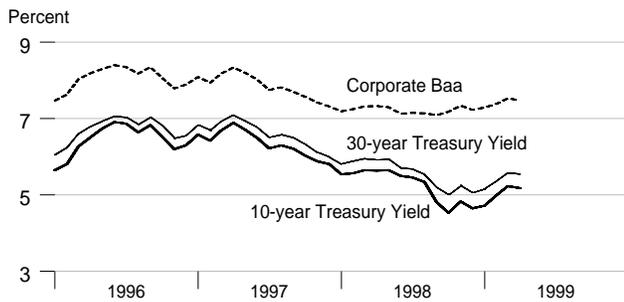
Short Term Interest Rates



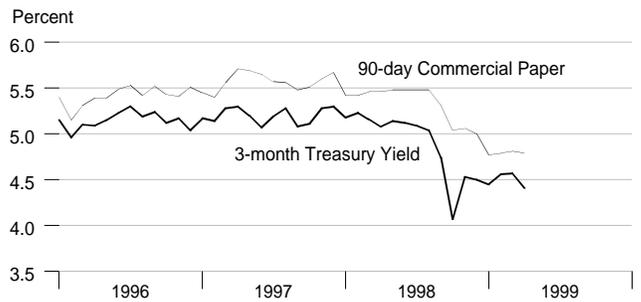
Long Term Interest Rates



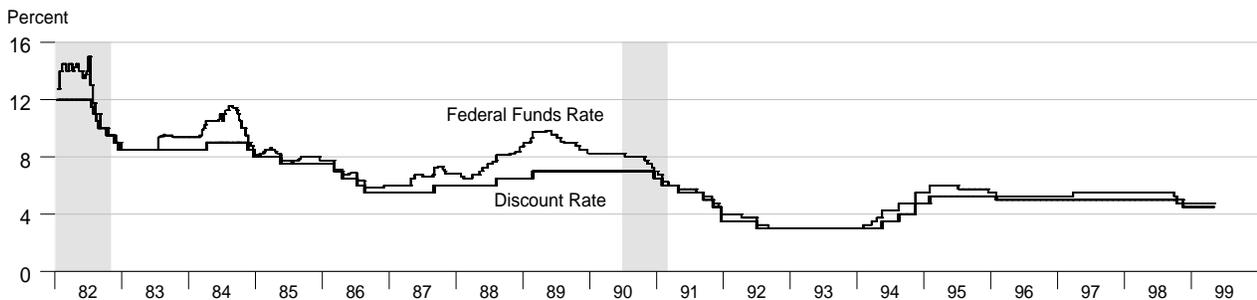
Long Term Interest Rates



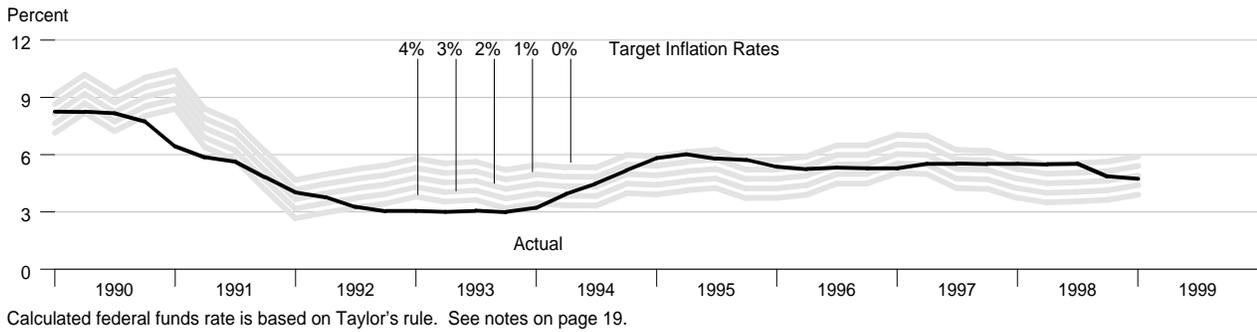
Short Term Interest Rates



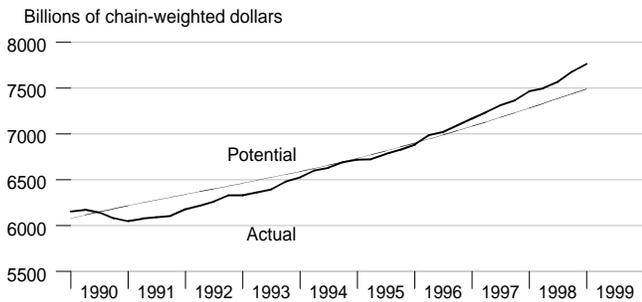
FOMC Expected Federal Funds Rate and Discount Rate



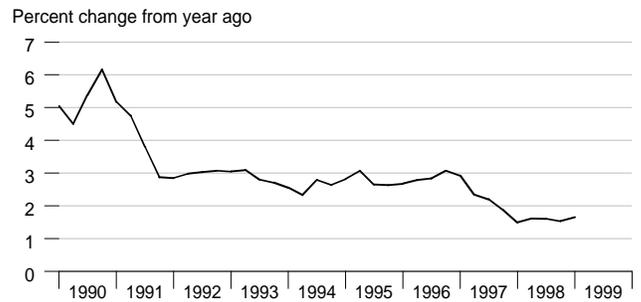
Federal Funds Rate and Inflation Targets



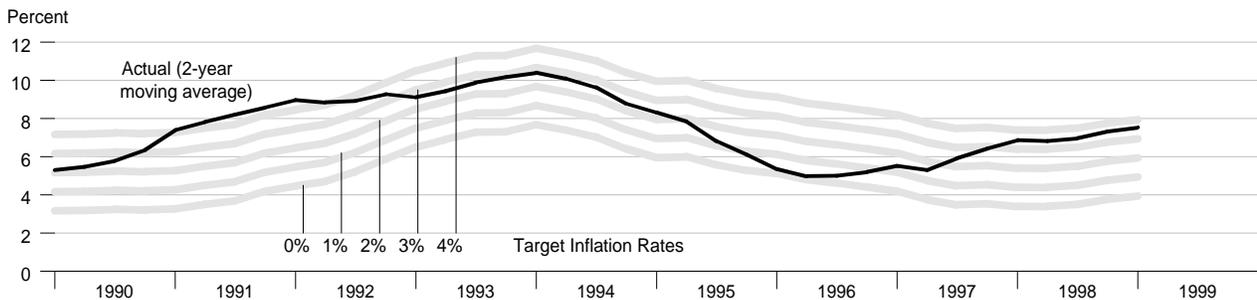
Actual and Potential Real GDP



Actual CPI Inflation

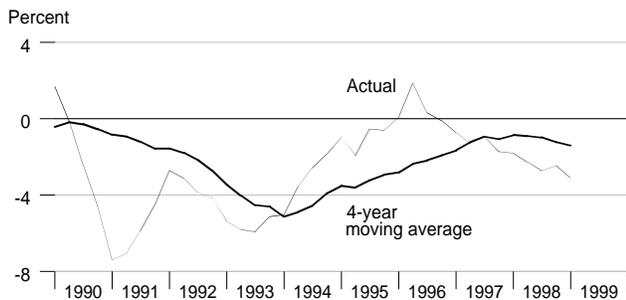


Monetary Base Growth* and Inflation Targets

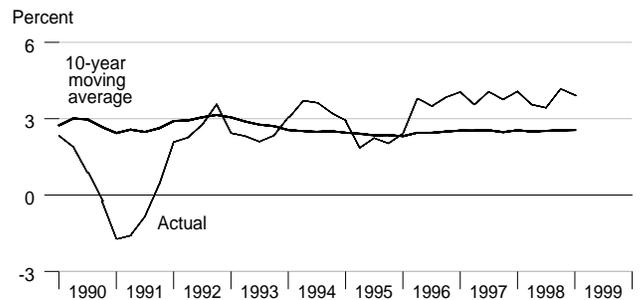


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. See notes on page 19.

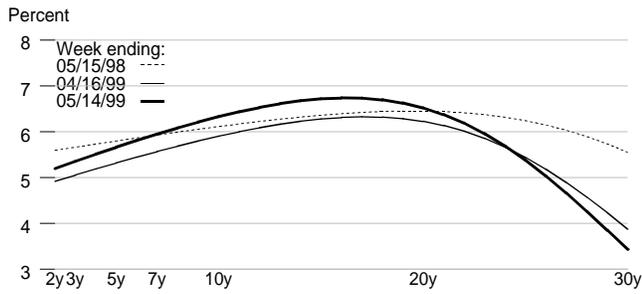
Monetary Base Velocity Growth



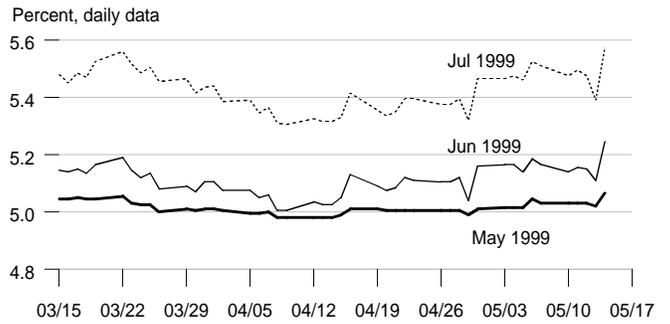
Real Output Growth



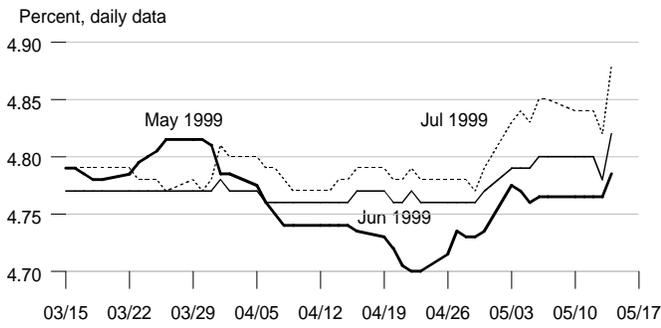
Implied One-Year Forward Rates



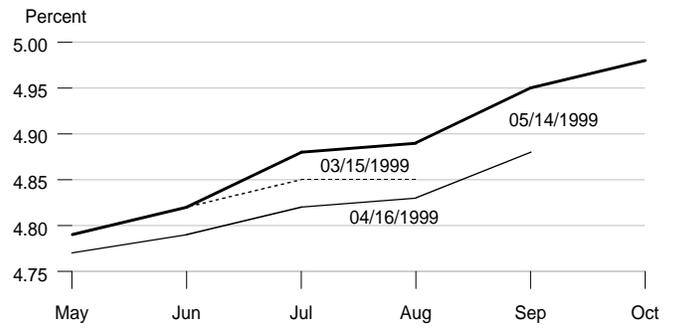
Rates on 3-Month Eurodollar Futures



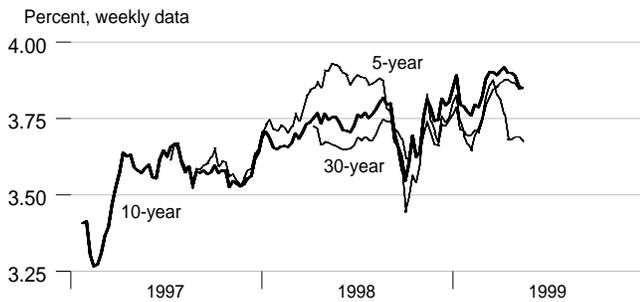
Rates on Selected Fed Funds Futures Contracts



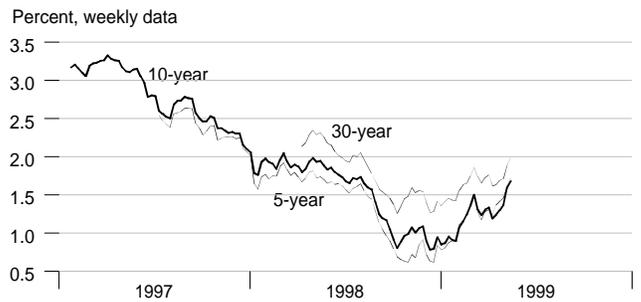
Implied Yields on Fed Funds Futures



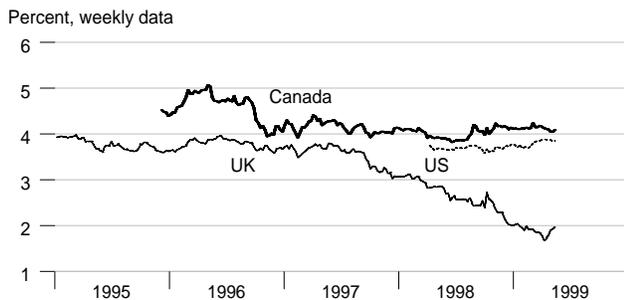
Inflation-Protected Treasury Yields



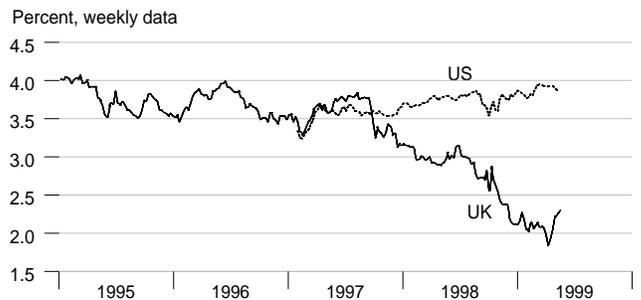
Inflation-Protected Treasury Yield Spreads



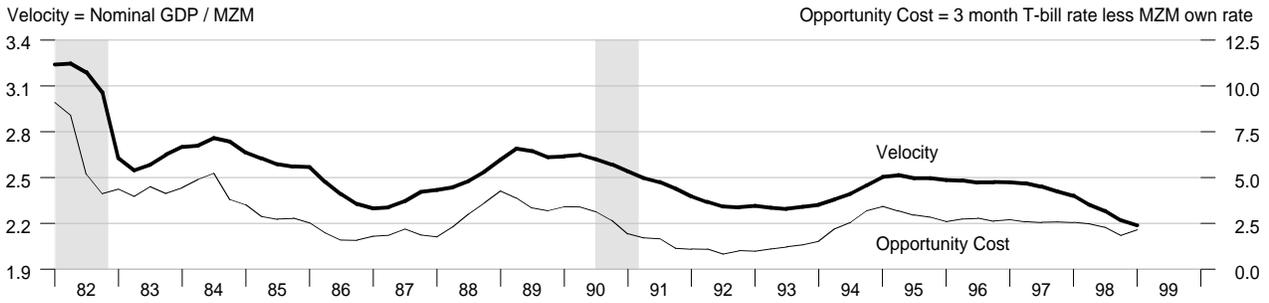
Inflation-Indexed 30-Year Bonds



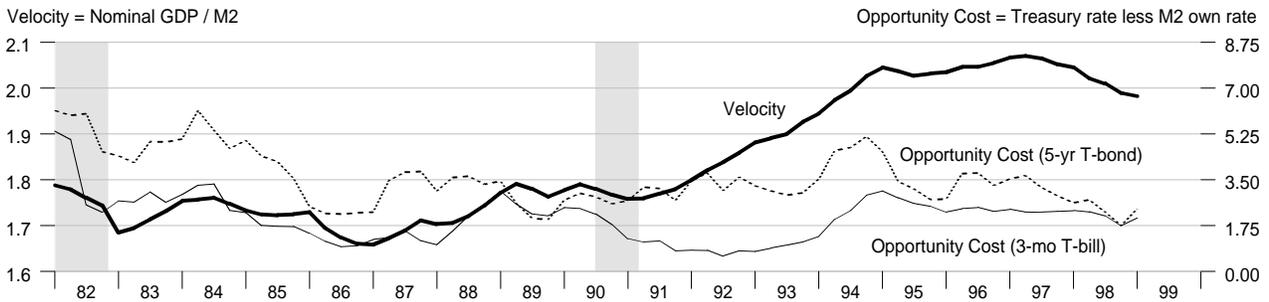
Inflation-Indexed 10-Year Bonds



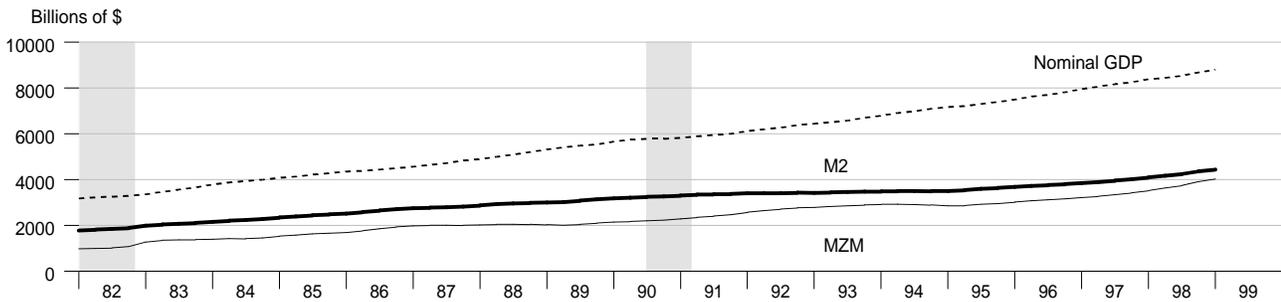
MZM Velocity and Opportunity Cost



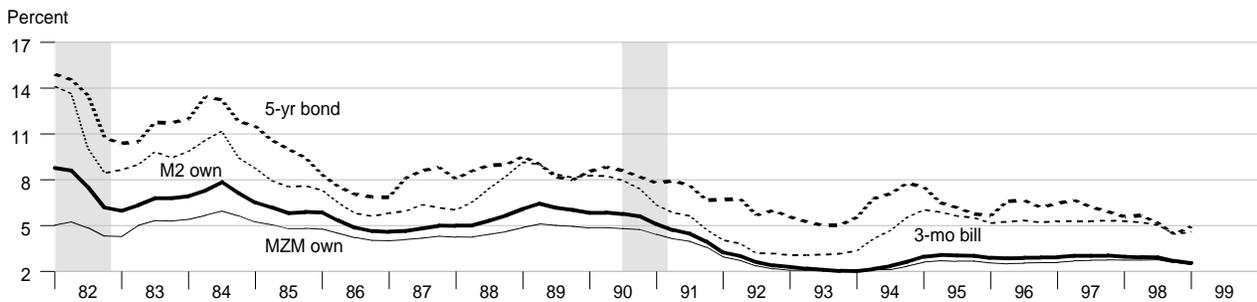
M2 Velocity and Opportunity Cost



M2, MZM and Nominal GDP

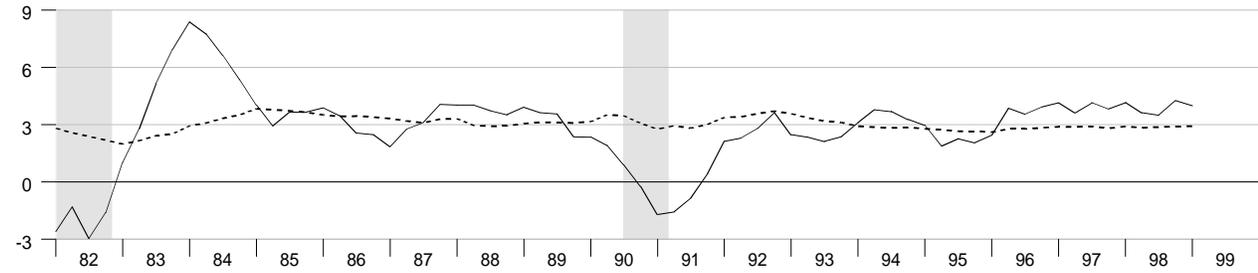


Interest Rates



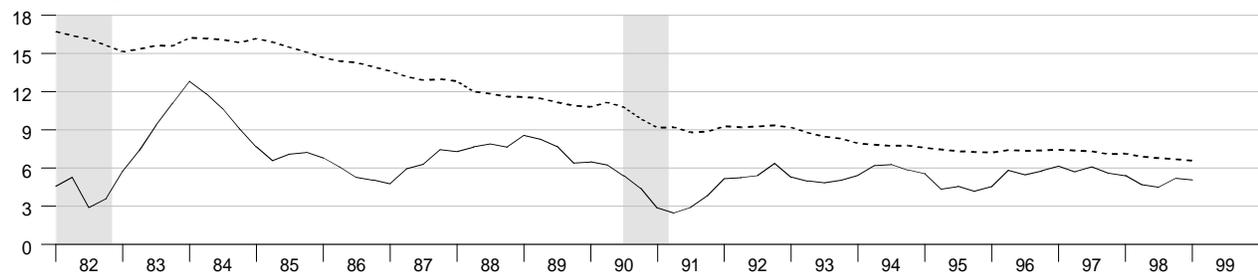
Real Gross Domestic Product

Percent change from year ago



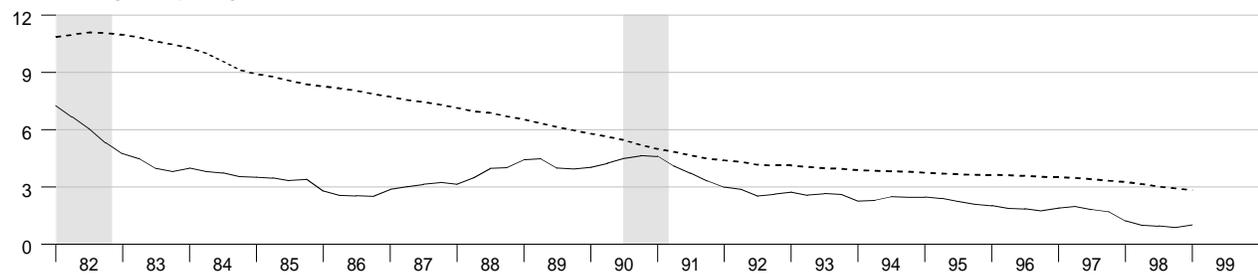
Gross Domestic Product

Percent change from year ago



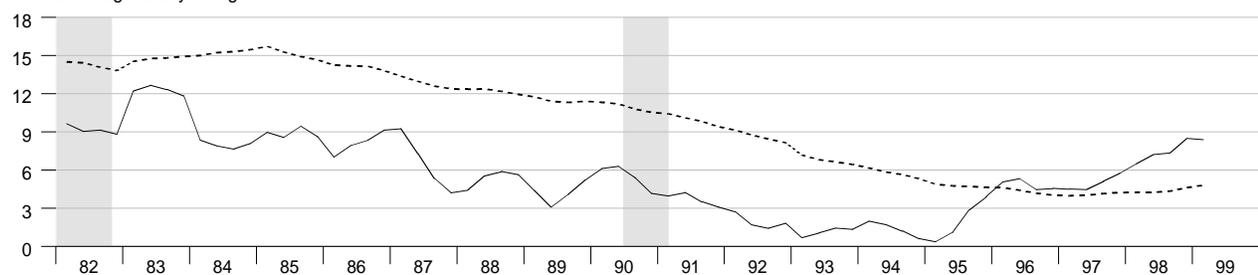
Gross Domestic Product Price Index

Percent change from year ago



M2

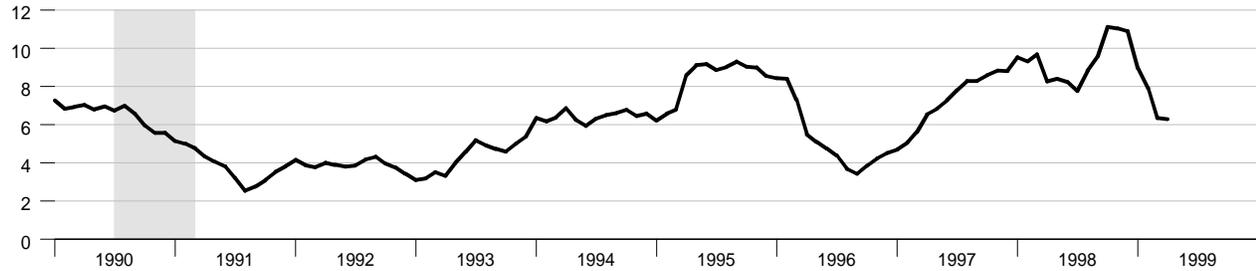
Percent change from year ago



Dashed lines indicate 10-year moving averages

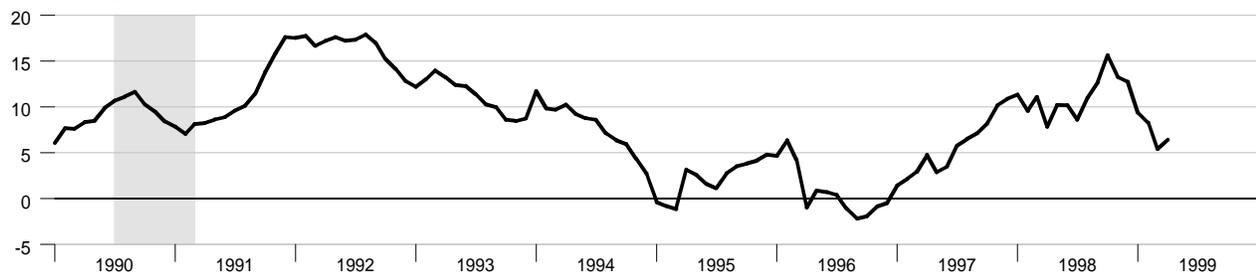
Bank Credit

Percent change from year ago



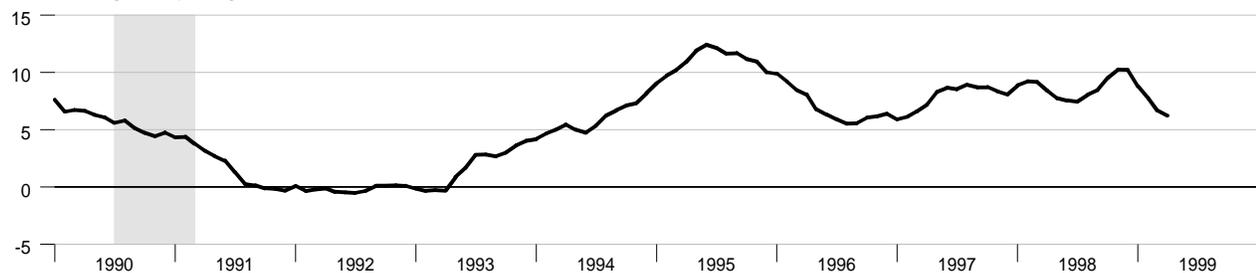
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



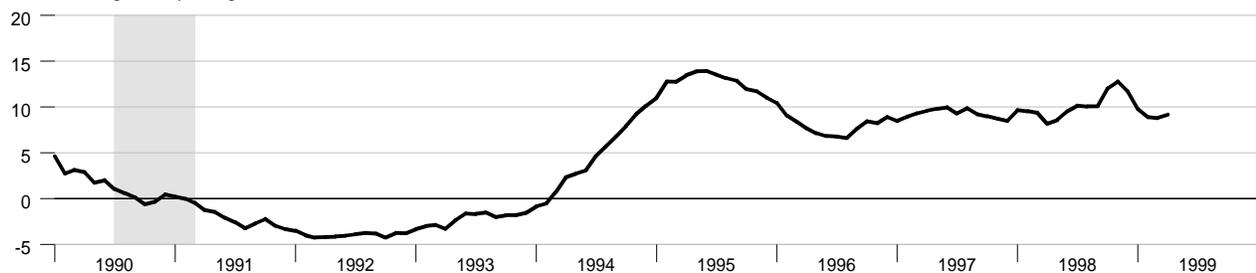
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

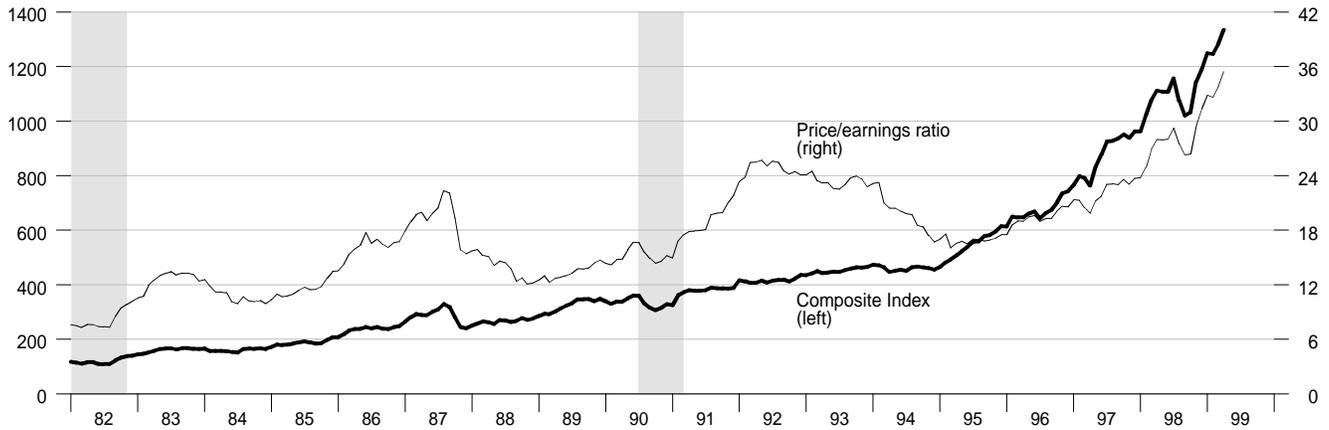


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



Standard and Poor's 500



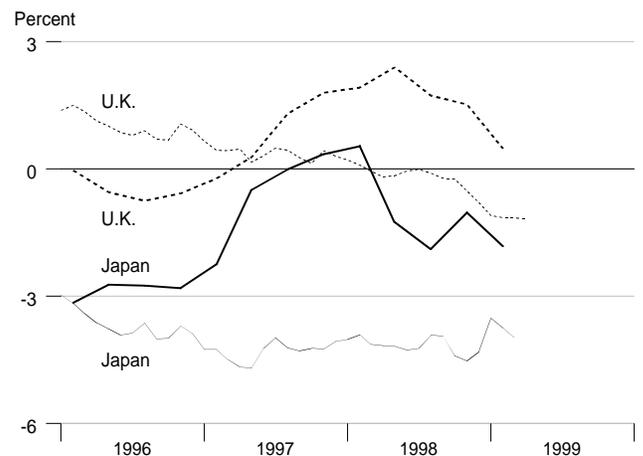
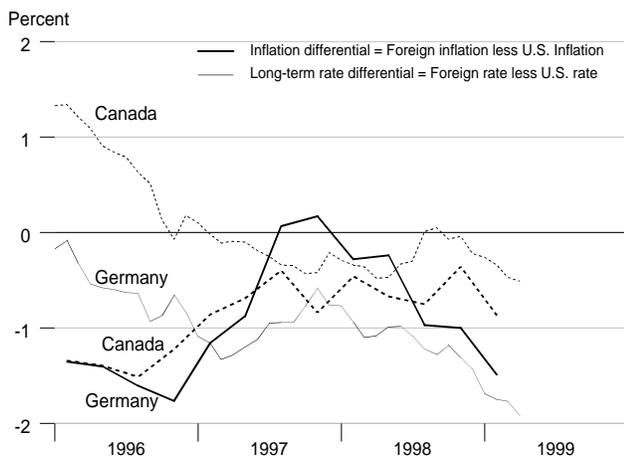
Inflation and Long-Term Interest Rates

Trend in Consumer Price Inflation Rates
Percent change from year ago

Recent Long-Term Government Bond Rates
Percent

	1998Q2	1998Q3	1998Q4	1999Q1	Jan99	Feb99	Mar99	Apr99
United States	1.62	1.62	1.48	1.73	5.39	5.60	5.81	5.77
Canada	0.95	0.87	1.13	0.86	5.13	5.26	5.34	5.26
France	1.13	0.69	0.43	0.35	4.13	4.42	4.39	.
Germany	1.38	0.65	0.48	0.24	3.70	3.85	4.04	3.85
Italy	2.06	2.06	1.75	1.38	3.93	4.06	4.28	.
Japan	0.37	-0.27	0.46	-0.09	1.87	1.85	1.84	.
United Kingdom	4.02	3.34	3.00	2.20	4.29	4.45	4.66	4.59

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	M2	M3	L	Credit	Monetary Base	Reserves	MSI M2
1994		1145.340	3500.100	4303.777	5256.565	3230.392	421.574	80.684	205.514
1995		1142.820	3572.376	4499.721	5554.661	3500.523	443.511	76.849	210.302
1996		1106.126	3745.602	4796.153	5928.831	3684.357	455.586	73.415	217.734
1997		1069.573	3931.523	5176.818	6372.562	3950.717	478.753	68.918	226.998
1998		1079.456	4222.044	5703.679		4321.939	508.978	66.952	240.360
1997	1	1076.381	3849.912	5012.702	6175.405	3823.026	470.027	70.409	222.783
	2	1065.603	3895.604	5110.126	6305.462	3916.848	473.896	68.177	225.083
	3	1068.155	3957.266	5229.446	6433.221	3990.468	480.945	68.565	228.293
	4	1068.155	4023.310	5354.997	6576.161	4072.524	490.144	68.519	231.833
1998	1	1076.826	4099.473	5492.880	6777.780	4186.508	498.387	67.711	235.607
	2	1079.349	4176.201	5631.574	6911.261	4241.883	502.060	66.084	238.710
	3	1074.077	4247.762	5752.079	7029.558	4338.289	511.592	66.951	241.310
	4	1087.571	4364.742	5938.181		4521.076	523.871	67.063	245.813
1999	1	1095.059	4443.501	6045.075		4509.926	536.287	67.543	248.393
1997	Apr	1067.451	3882.376	5086.521	6271.437	3897.099	471.405	68.336	224.360
	May	1063.367	3892.846	5108.331	6306.876	3912.407	474.355	68.255	224.940
	Jun	1065.992	3911.589	5135.525	6338.072	3941.038	475.927	67.939	225.950
	Jul	1067.570	3929.064	5185.878	6381.473	3975.484	478.813	68.897	226.850
	Aug	1072.076	3961.052	5232.781	6440.270	3990.249	481.011	68.465	228.460
	Sep	1064.818	3981.681	5269.679	6477.919	4005.672	483.012	68.333	229.570
	Oct	1062.064	4000.166	5306.691	6513.130	4039.196	485.892	67.709	230.580
	Nov	1067.528	4023.132	5353.640	6576.023	4077.962	490.783	68.772	231.760
	Dec	1074.873	4046.631	5404.660	6639.329	4100.414	493.756	69.076	233.160
1998	Jan	1073.810	4071.363	5449.626	6709.736	4157.540	496.198	68.918	234.340
	Feb	1076.021	4100.889	5485.171	6777.996	4186.141	499.555	67.414	235.700
	Mar	1080.646	4126.168	5543.843	6845.609	4215.842	499.408	66.801	236.780
	Apr	1082.094	4155.243	5589.265	6873.322	4218.975	499.601	66.000	238.030
	May	1078.171	4174.757	5631.330	6904.054	4240.895	502.385	66.134	238.610
	Jun	1077.782	4198.602	5674.127	6956.407	4265.779	504.193	66.117	239.490
	Jul	1075.365	4216.112	5694.154	6967.492	4283.885	507.677	66.366	240.270
	Aug	1072.214	4241.707	5749.666	7022.501	4342.020	511.093	67.434	241.030
	Sep	1074.653	4285.467	5812.418	7098.681	4388.961	516.006	67.052	242.630
	Oct	1080.404	4326.876	5874.561		4487.975	520.803	67.055	244.270
	Nov	1088.956	4365.256	5940.207		4528.082	524.379	67.183	245.870
	Dec	1093.354	4402.093	5999.774		4547.170	526.432	66.952	247.300
1999	Jan	1090.954	4426.170	6019.639		4529.842	531.713	68.375	247.960
	Feb	1092.527	4447.108	6063.092		4516.685	538.145	67.918	248.420
	Mar	1101.697	4457.225	6052.493		4483.252	539.003	66.336	248.800
	Apr	1107.821	4489.776	6092.500		4484.176	539.524	63.828	250.230

*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	
1994		4.20	3.60	7.14	4.63	4.37	6.26	7.37	7.96	5.77	8.35
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
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
1997	Apr	5.51	5.00	8.50	5.71	5.30	6.61	7.09	7.73	5.66	8.14
	May	5.50	5.00	8.50	5.70	5.20	6.42	6.94	7.58	5.48	7.94
	Jun	5.56	5.00	8.50	5.66	5.07	6.24	6.77	7.41	5.33	7.69
	Jul	5.52	5.00	8.50	5.60	5.19	6.00	6.51	7.14	5.24	7.50
	Aug	5.54	5.00	8.50	5.60	5.28	6.06	6.58	7.22	5.25	7.48
	Sep	5.54	5.00	8.50	5.60	5.08	5.98	6.50	7.15	5.19	7.43
	Oct	5.50	5.00	8.50	5.65	5.11	5.84	6.33	7.00	5.19	7.29
	Nov	5.52	5.00	8.50	5.74	5.28	5.76	6.11	6.87	5.19	7.21
	Dec	5.50	5.00	8.50	5.80	5.30	5.74	5.99	6.76	5.03	7.10
1998	Jan	5.56	5.00	8.50	5.54	5.18	5.38	5.81	6.61	4.88	6.99
	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

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

		M1	M2	MZM	M3	L
Percent change from previous period						
<hr/>						
1994		6.17	1.38	2.61	1.60	2.37
1995		-0.22	2.06	-0.47	4.55	5.67
1996		-3.21	4.85	6.54	6.59	6.74
1997		-3.30	4.96	7.18	7.94	7.48
1998		0.92	7.39	11.61	10.18	
<hr/>						
1997	1	-0.47	1.19	1.77	1.88	1.66
	2	-1.00	1.19	1.63	1.94	2.11
	3	0.24	1.58	2.23	2.33	2.03
	4	0.00	1.67	2.39	2.40	2.22
1998	1	0.81	1.89	2.76	2.57	3.07
	2	0.23	1.87	3.25	2.52	1.97
	3	-0.49	1.71	2.91	2.14	1.71
	4	1.26	2.75	4.53	3.24	
1999	1	0.69	1.80	2.93	1.80	
<hr/>						
1997	Apr	-0.46	0.51	0.61	0.84	0.88
	May	-0.38	0.27	0.29	0.43	0.57
	Jun	0.25	0.48	0.65	0.53	0.49
	Jul	0.15	0.45	0.68	0.98	0.68
	Aug	0.42	0.81	1.11	0.90	0.92
	Sep	-0.68	0.52	0.80	0.71	0.58
	Oct	-0.26	0.46	0.66	0.70	0.54
	Nov	0.51	0.57	0.74	0.88	0.97
	Dec	0.69	0.58	0.94	0.95	0.96
1998	Jan	-0.10	0.61	0.84	0.83	1.06
	Feb	0.21	0.73	1.02	0.65	1.02
	Mar	0.43	0.62	0.99	1.07	1.00
	Apr	0.13	0.70	1.26	0.82	0.40
	May	-0.36	0.47	0.93	0.75	0.45
	Jun	-0.04	0.57	0.97	0.76	0.76
	Jul	-0.22	0.42	0.67	0.35	0.16
	Aug	-0.29	0.61	1.11	0.97	0.79
	Sep	0.23	1.03	1.56	1.09	1.08
	Oct	0.54	0.97	1.61	1.07	
	Nov	0.79	0.89	1.50	1.12	
	Dec	0.40	0.84	1.35	1.00	
1999	Jan	-0.22	0.55	0.71	0.33	
	Feb	0.14	0.47	1.03	0.72	
	Mar	0.84	0.23	0.33	-0.17	
	Apr	0.56	0.73	1.11	0.66	

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.

M2: M1 plus: savings 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).

L: M3 plus: U.S. savings bonds, short-term Treasury securities, commercial paper, and bankers acceptances held by households and by firms other than depository institutions and money market mutual funds.

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.

Note: The above 6 series are constructed and published by the Board of Governors of the Federal Reserve System, Washington, D.C. For details, see *Federal Reserve Bulletin*, tables 1.21 and 1.26.

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). On pages 4 and 6, MZM prior to January 1984 is not shown due to distortions caused by regulatory changes, including the introduction of liquid deposit accounts not subject to binding interest rate ceilings.

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 and L; additional data are available at <http://www.stls.frb.org/research/msi/index.html>.

Note: The above 4 series are constructed and published by the Research Division of the Federal Reserve Bank of St. Louis, St. Louis MO.

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 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. **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

$$f_t^* = 2.0 + \pi_{t-1} + (\pi_{t-1} - \pi^*)/2 + 100 \times (y_{t-1} - y_{t-1}^P)/2$$

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 (CPI), 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_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.

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