October 1999

MonetaryTrends

THE FEDERAL RESERVE BANK of ST. LOUIS

Convergence in the Euro-zone?

During the three months leading up to the Jan. 1, 1999, debut of the euro, market yield spreads between participating countries' government bonds and the German benchmark government bond narrowed to 0.25 percentage points or less. The top chart shows vanishing yield spreads for the bonds of Italy, the Netherlands and France relative to Germany, a phenomenon that was widely anticipated. By meeting the Maastricht criteria for economic and fiscal convergence, the 11 participating countries had provided a basis for financial-market convergence, as well. If investors continued to believe that the pre-existing currencies would remain locked together forever in the form of the euro, then all exchange-rate risk premiums should vanish from bond yields. In recent months, however, yield spreads have increased. Why?

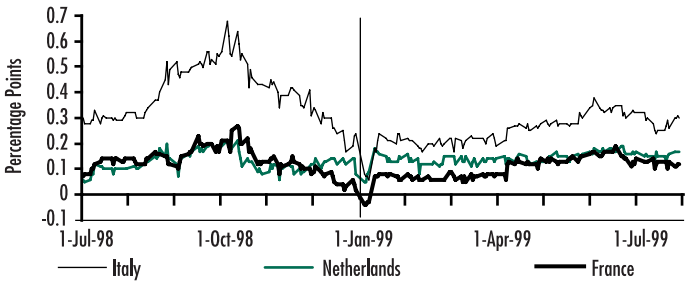
Positive yield spreads between a euro-zone member country's sovereign debt and German bonds could be due to any of several factors, including: (1) differences in market liquidity, (2) the risk of loss due to government default on bond payments, or (3) the risk that a country might leave the euro and devalue its new currency against the currency of Germany. Bond-market turbulence in the fall of 1998 and ensuing flight to highly liquid securities, such as German government bonds, clearly showed that differences in market liquidity contribute to yield spreads. The relative stability in the ranking of euro-zone members' yield spreads over time suggests that country-specific default risk is probably another component of the spread. Finally, devaluation risk is a plausible contributor to euro-zone yield spreads. For example, market speculation about Italy's long-run suitability for monetary union has caused periodic spikes in the Italian yield spread that have no counterpart in, say, French yield spreads.

How important is membership in European monetary union for maintaining low bond yields? The bottom chart shows that during 1999, the bond yield spreads (relative to German government bonds) of two European Union countries that are not currently participating in the monetary union—the United Kingdom and Sweden—have increased relative to the yield spread of Finland, a monetary-union participant. This suggests that countries firmly entrenched in the monetary union benefit from the market's view of the euro as a hard currency.

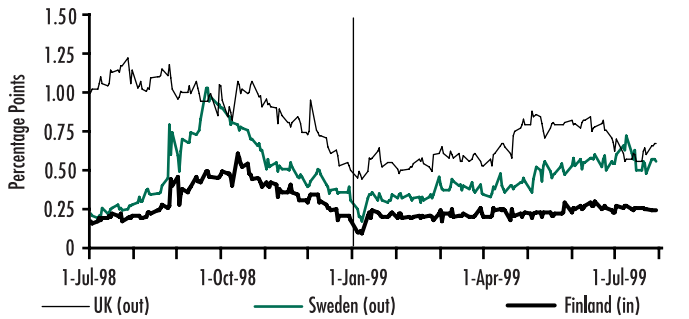
Persistent positive yield spreads against the German bond across the euro-zone indicate, however, that, despite initial "europhoria" at the outset of European monetary union, true bond-market convergence has failed to occur. Indeed, after six months, yield spreads on non-German euro-zone benchmark bonds were slightly higher than they were six months before monetary union took place.

—William R. Emmons

Government Bond Yield Spreads vs. Germany



"In and Out" Yield Spreads vs. Germany



Source: Financial Times, various issues

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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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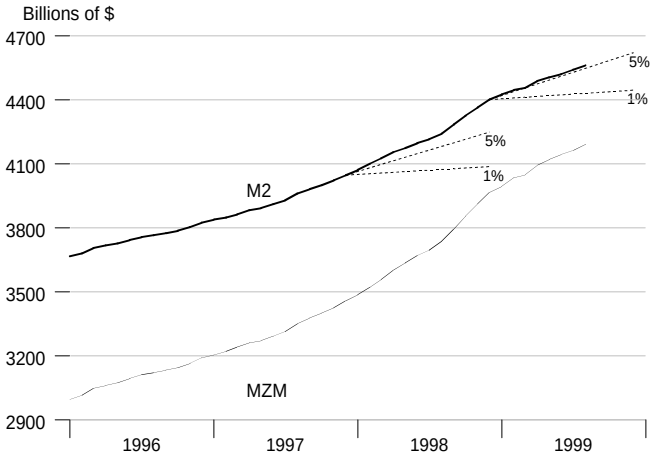
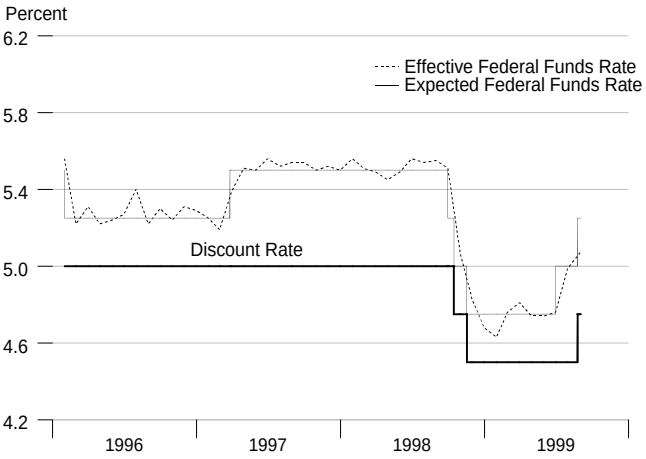
M2 and MZM

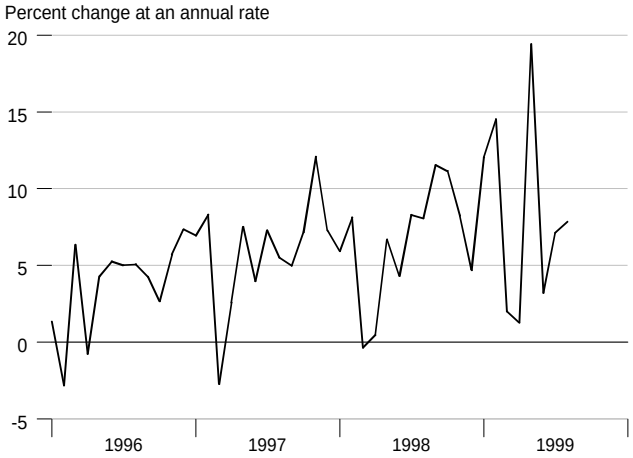


Dotted lines indicate the FOMC target ranges.

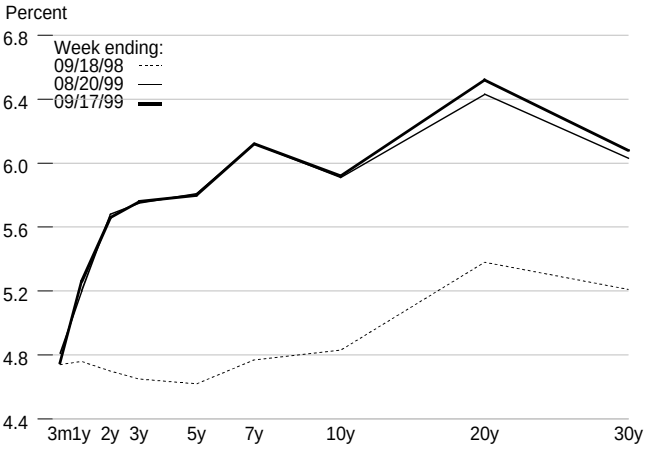
Reserve Market Rates



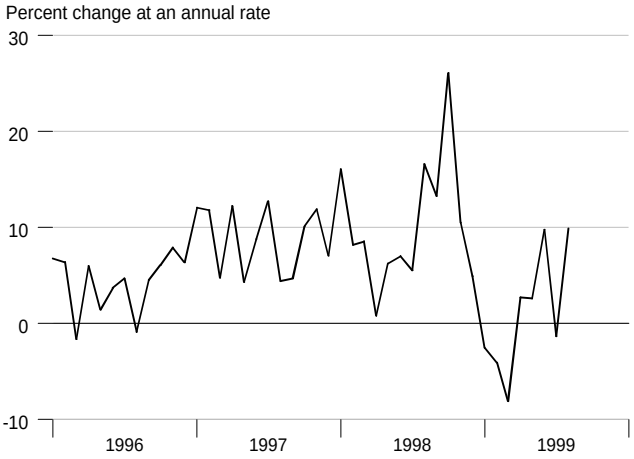
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

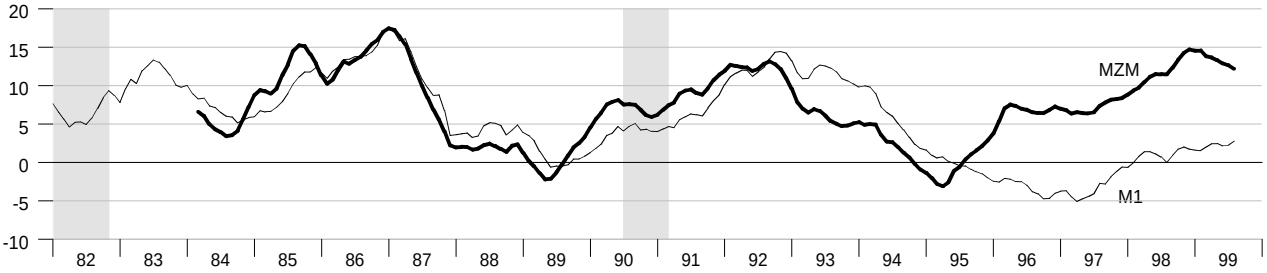


Interest Rates

	Jun 99	Jul 99	Aug 99
Federal Funds Rate	4.76	4.99	5.07
Discount Rate	4.50	4.50	4.56
Prime Rate	7.75	8.00	8.06
Conventional Mortgage Rate	7.55	7.63	7.94
Treasury Yields:			
3-month constant maturity	4.72	4.69	4.87
6-month constant maturity	5.03	4.75	5.09
1-year constant maturity	5.10	5.03	5.20
3-year constant maturity	5.70	5.62	5.77
5-year constant maturity	5.81	5.68	5.84
10-year constant maturity	5.90	5.79	5.94
30-year constant maturity	6.04	5.98	6.07

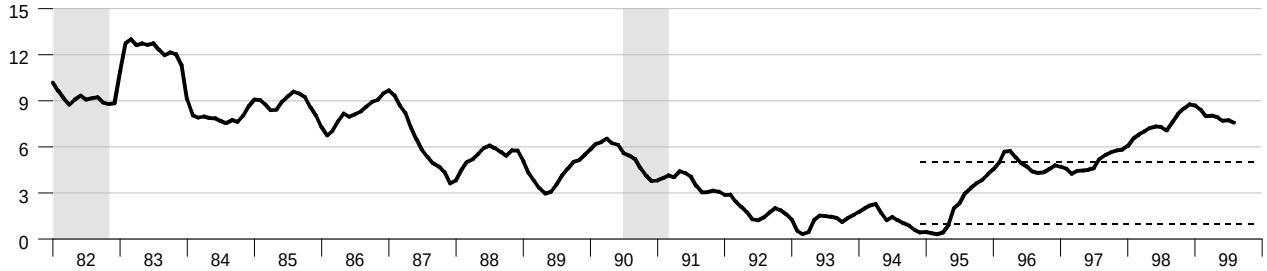
MZM and M1

Percent change from year ago



M2

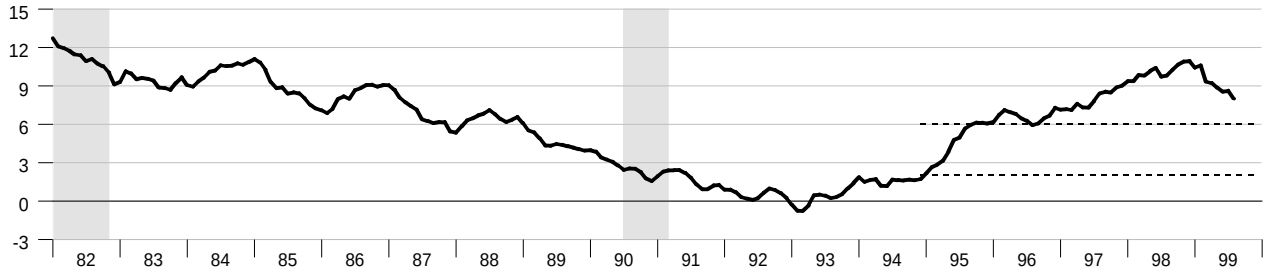
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

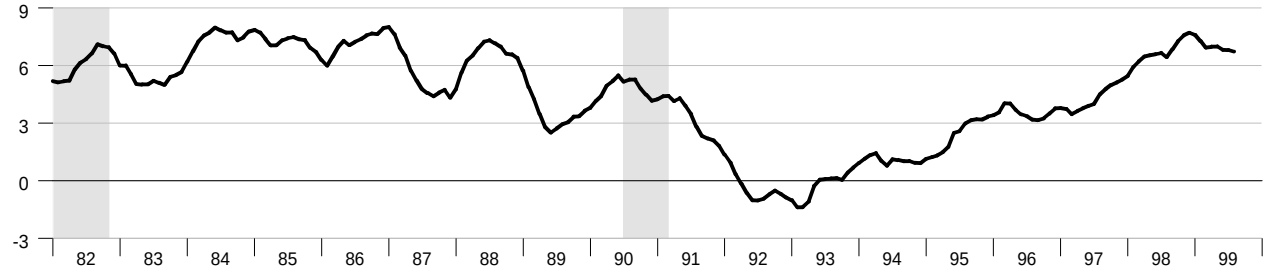
Percent change from year ago



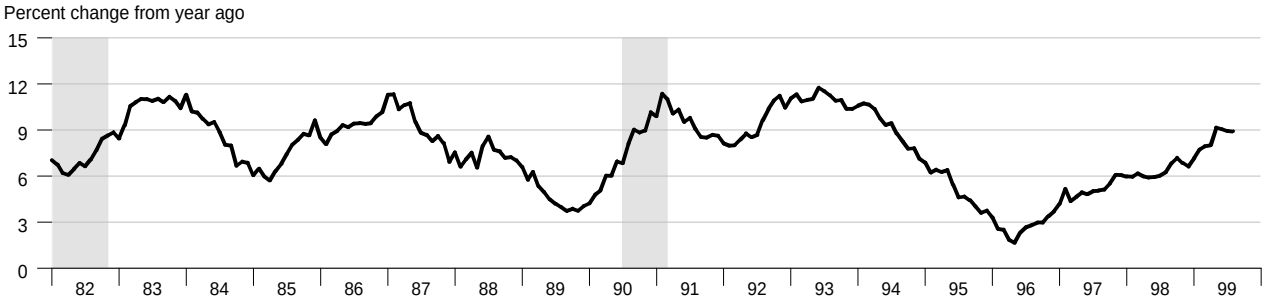
Dotted lines indicate the FOMC target ranges.

Monetary Services Index - M2

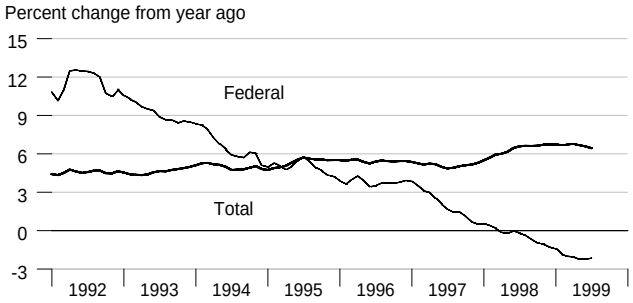
Percent change from year ago



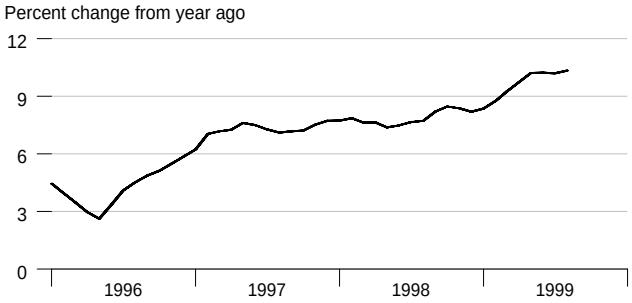
Adjusted Monetary Base



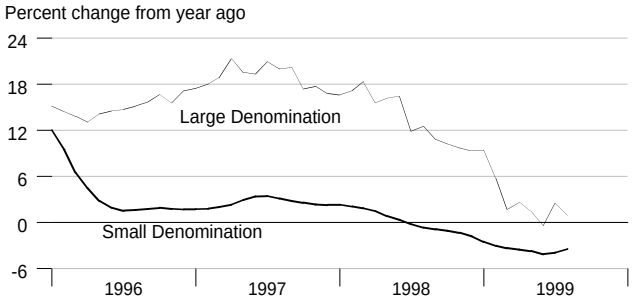
Domestic Nonfinancial Debt



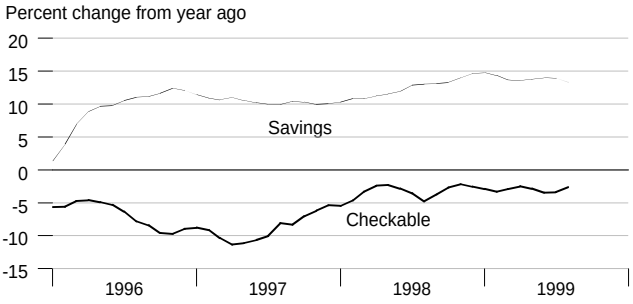
Currency Held by the Nonbank Public



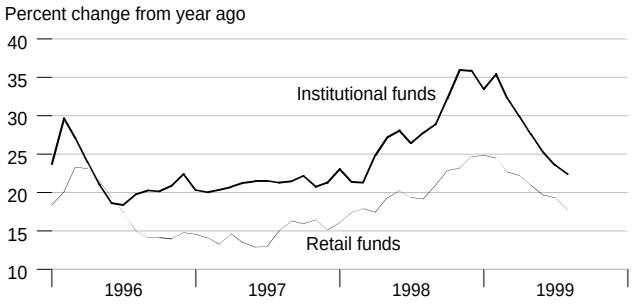
Time Deposits



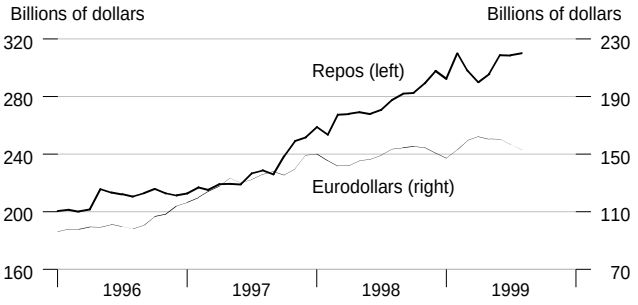
Checkable and Savings Deposits



Money Market Mutual Fund Shares

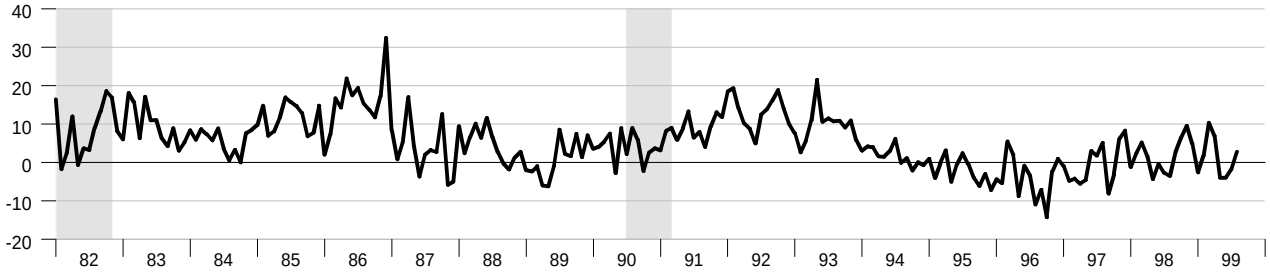


Repurchase Agreements and Eurodollars



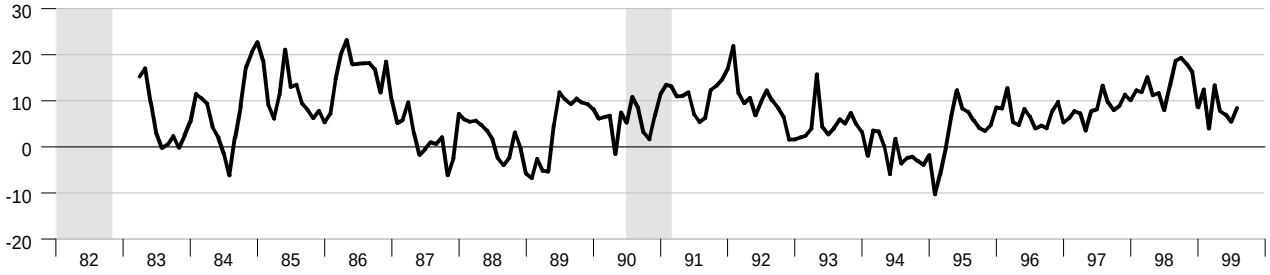
M1

Percent change at an annual rate



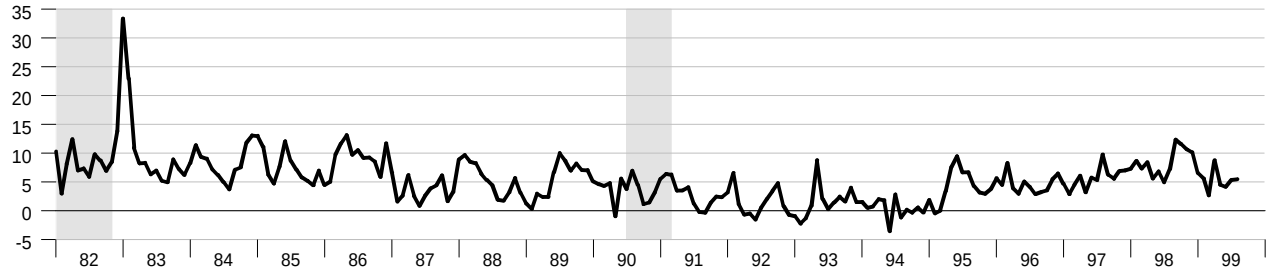
MZM

Percent change at an annual rate



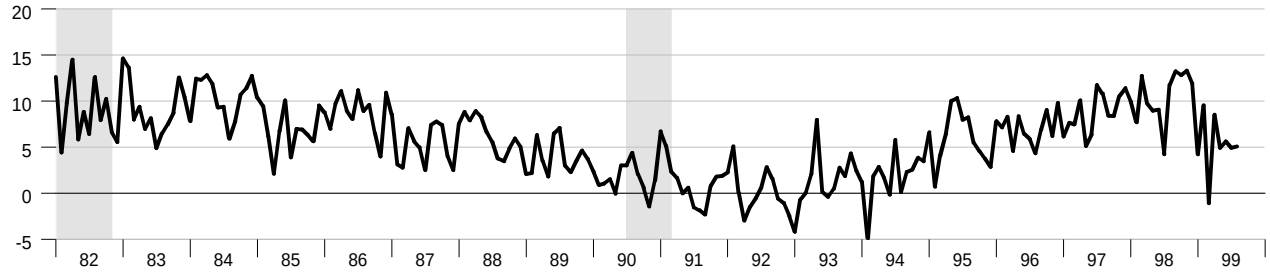
M2

Percent change at an annual rate

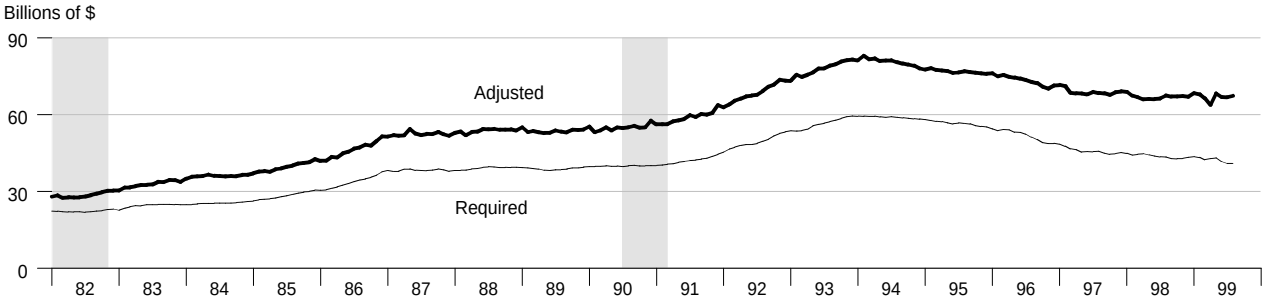


M3

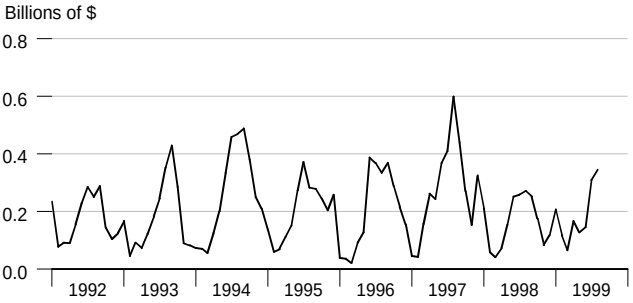
Percent change at an annual rate



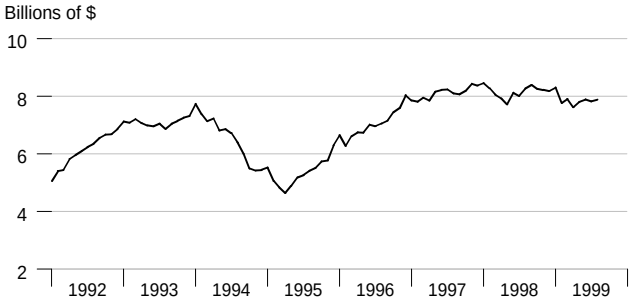
Adjusted and Required Reserves



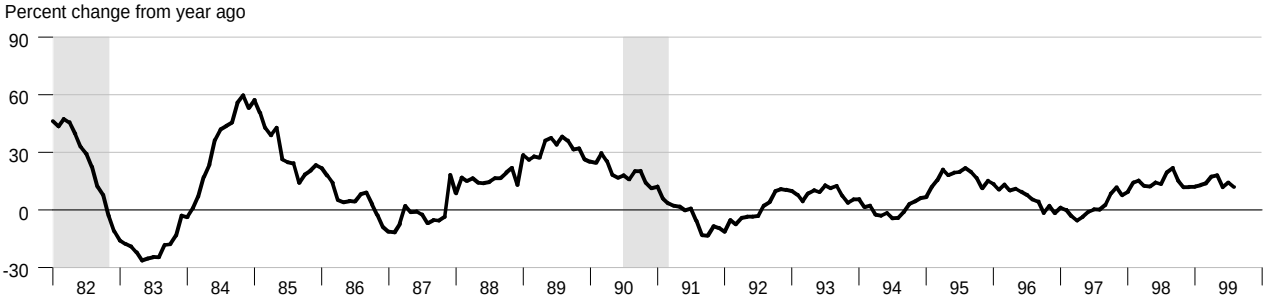
Total Borrowings, nsa



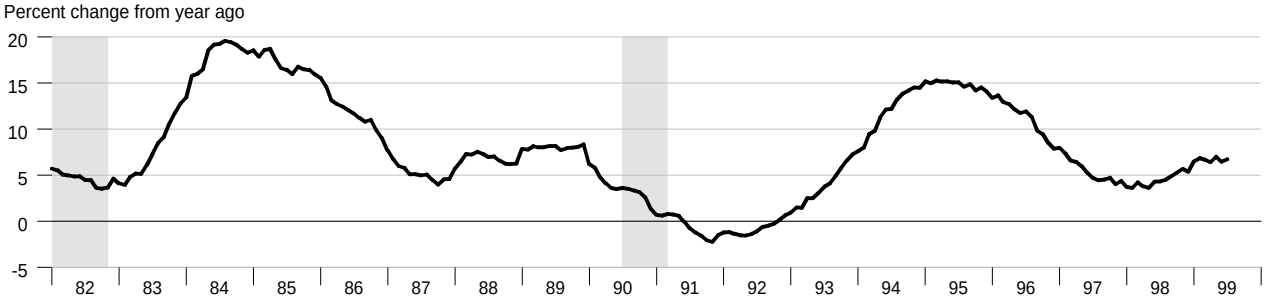
Excess Reserves plus RCB Contracts



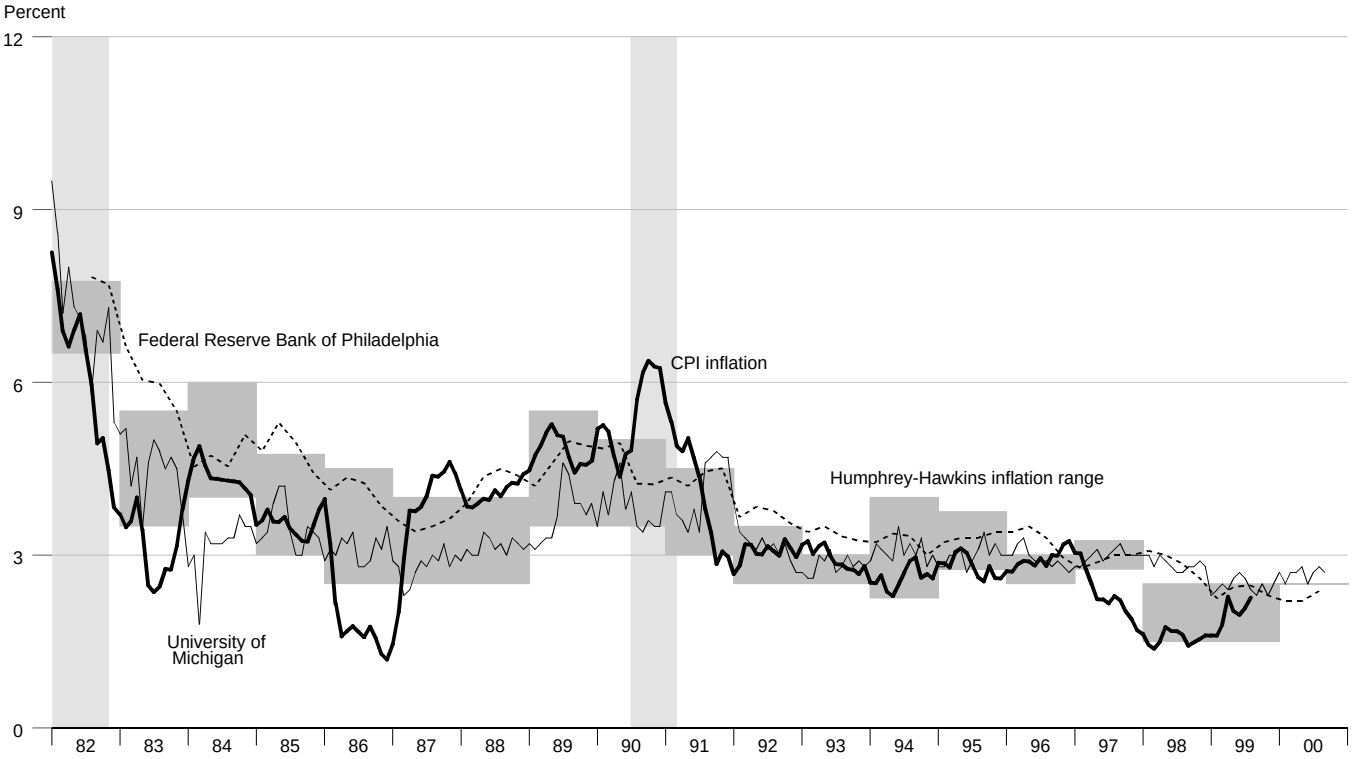
Nonfinancial Commercial Paper



Consumer Credit

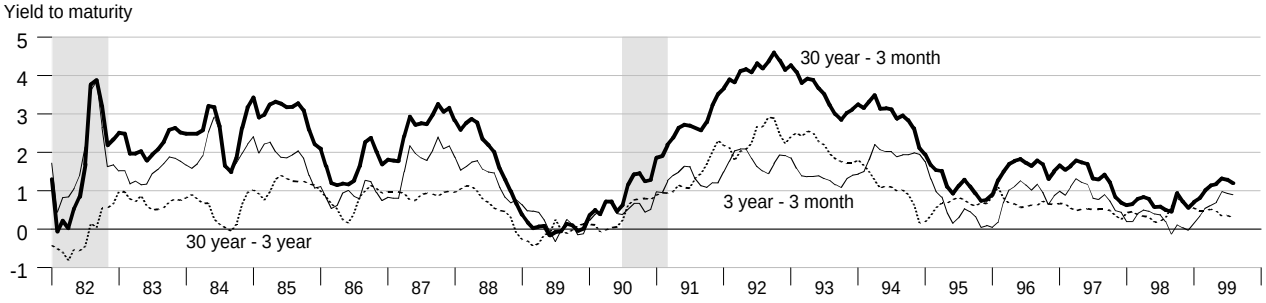


Inflation and Inflation Expectations

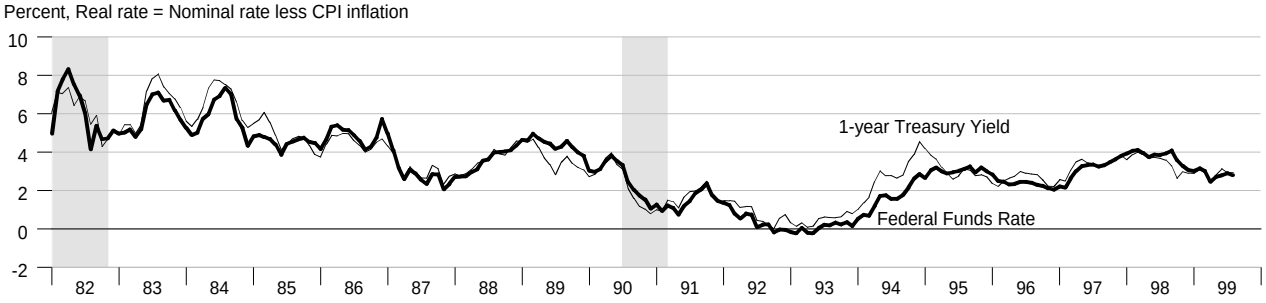


The shaded region shows the Humphrey-Hawkins CPI inflation range. See page 19 for information.

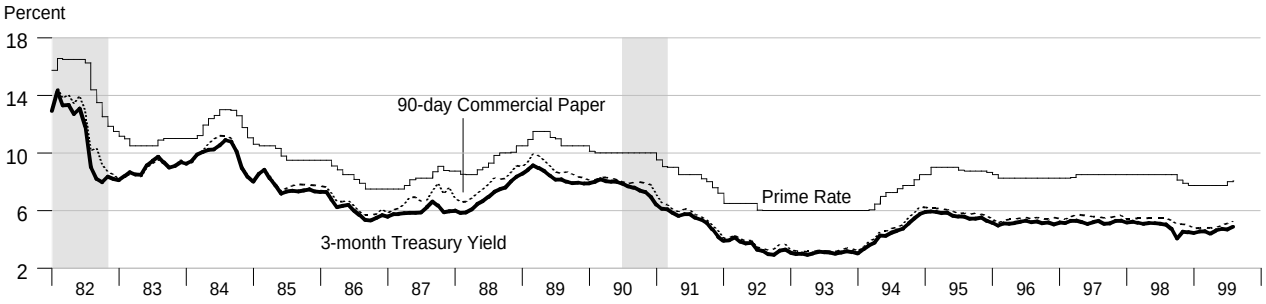
Treasury Security Yield Spreads



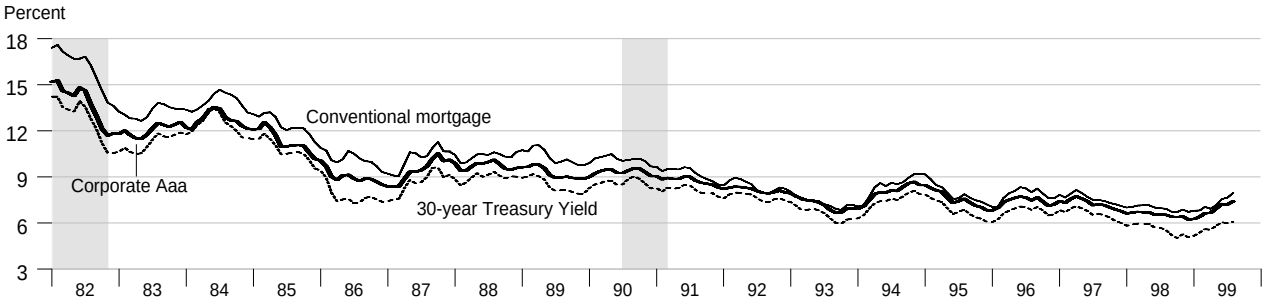
Real Interest Rates



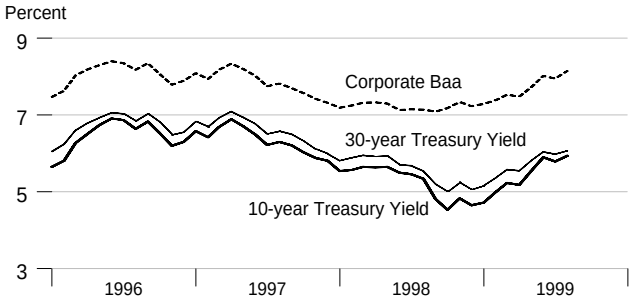
Short Term Interest Rates



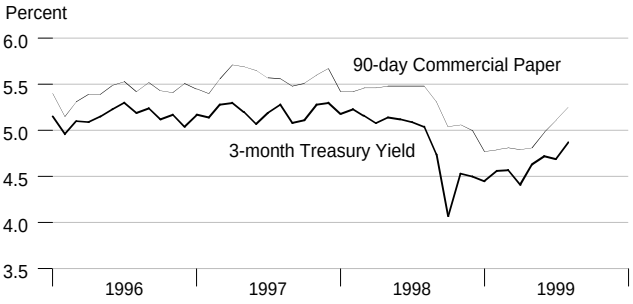
Long Term Interest Rates



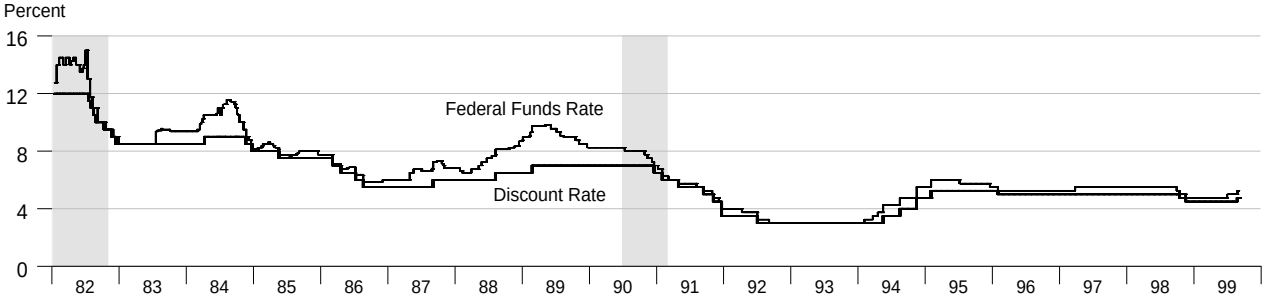
Long Term Interest Rates



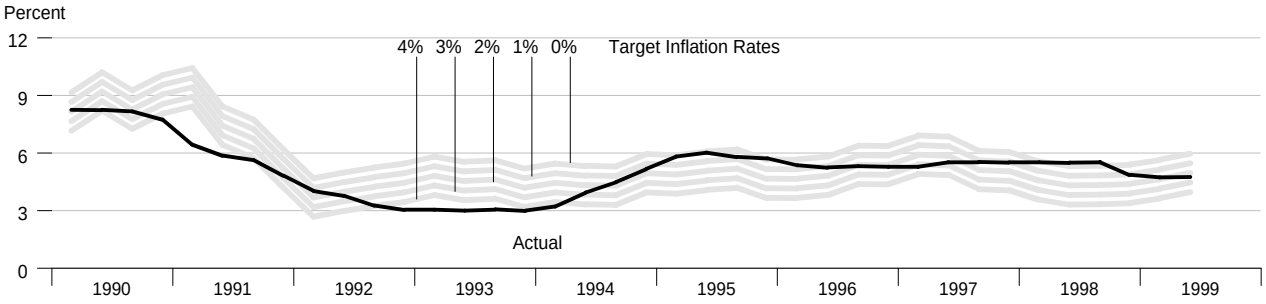
Short Term Interest Rates



FOMC Expected Federal Funds Rate and Discount Rate

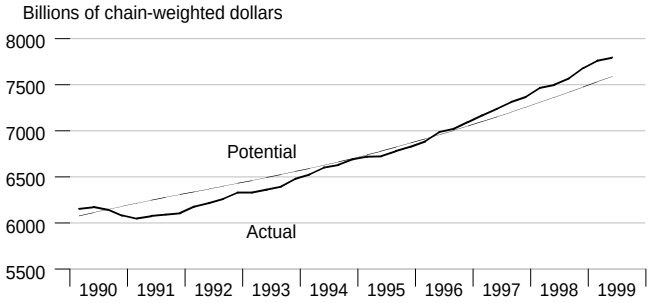


Federal Funds Rate and Inflation Targets

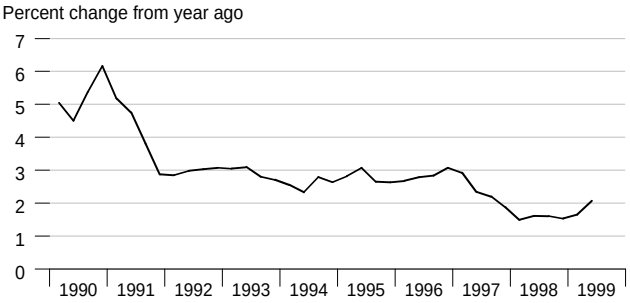


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

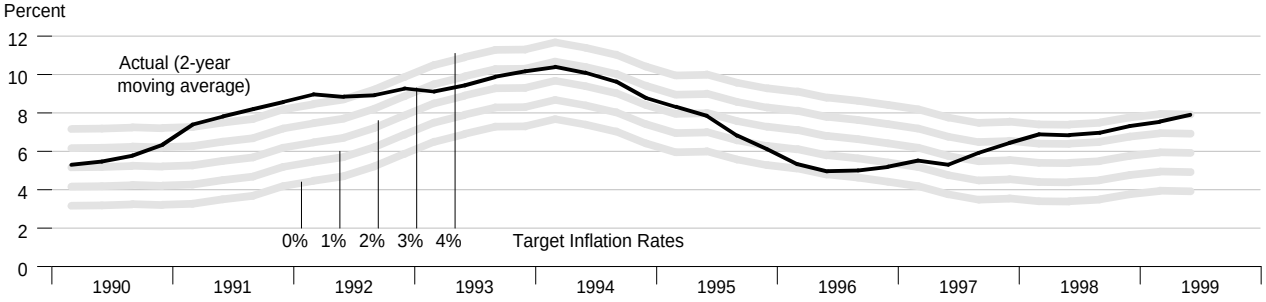
Actual and Potential Real GDP



Actual CPI Inflation

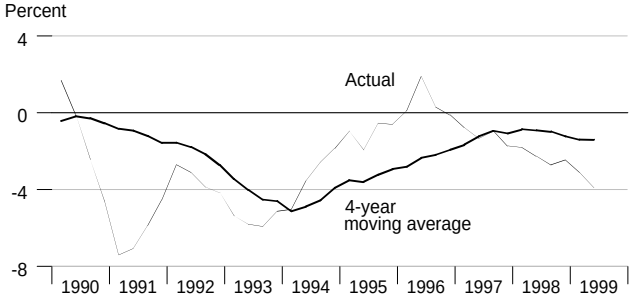


Monetary Base Growth* and Inflation Targets

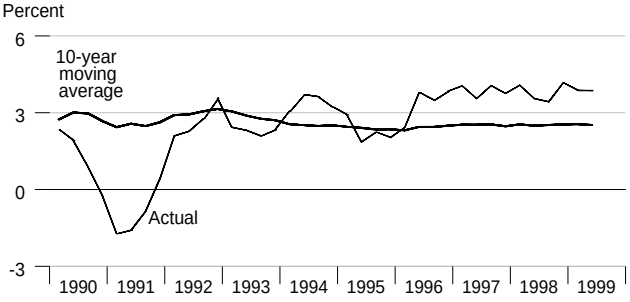


*Modified for the effects of sweeps programs on reserve demand.
Calculated base growth is based on McCallum's rule. See notes on page 19.

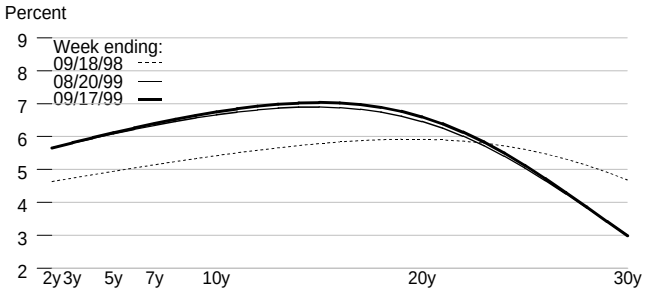
Monetary Base Velocity Growth



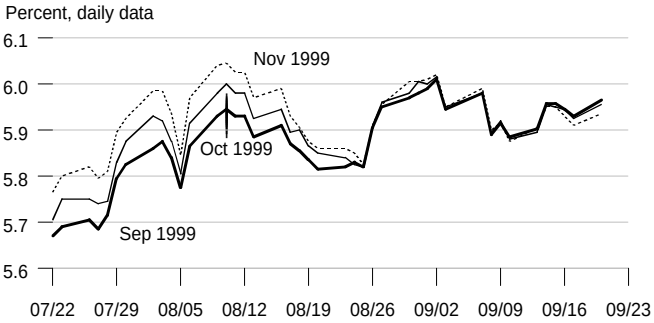
Real Output Growth



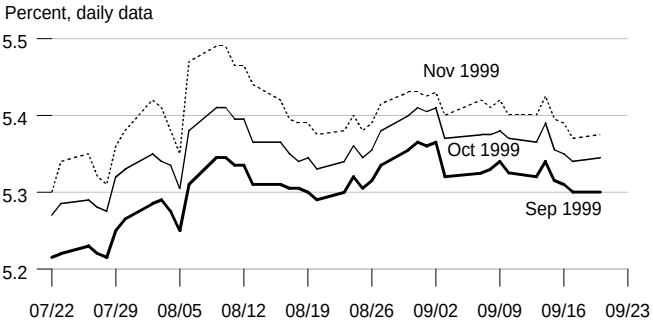
Implied One-Year Forward Rates



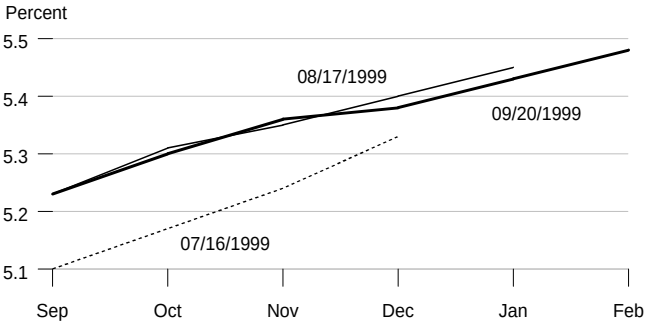
Rates on 3-Month Eurodollar Futures



Rates on Selected Fed Funds Futures Contracts



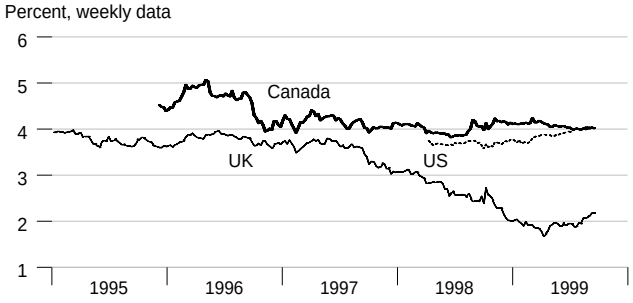
Implied Yields on Fed Funds Futures



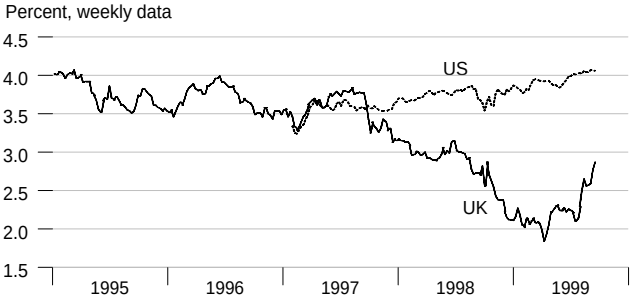
Inflation-Protected Treasury Yields

Inflation-Protected Treasury Yield Spreads

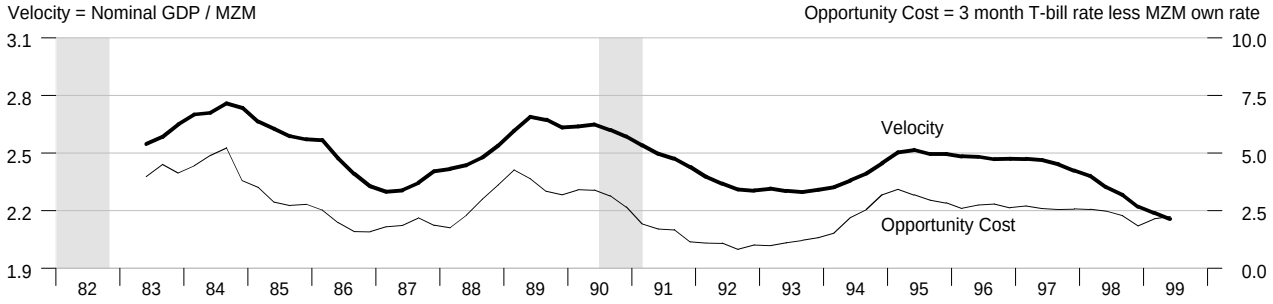
Inflation-Indexed 30-Year Bonds



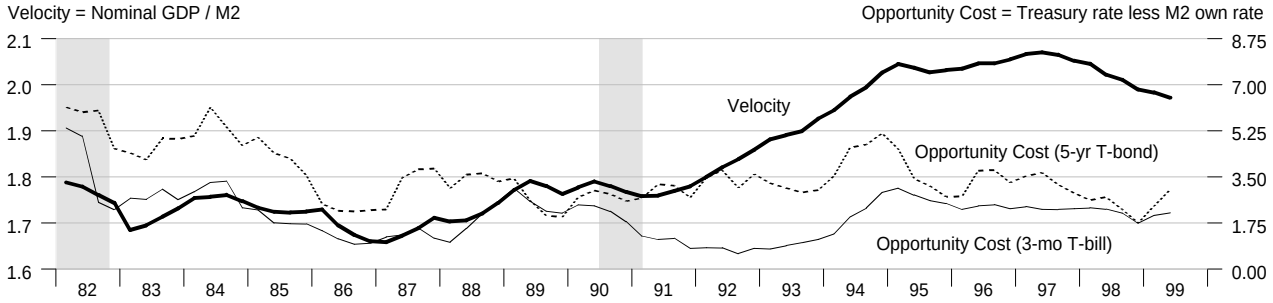
Inflation-Indexed 10-Year Bonds



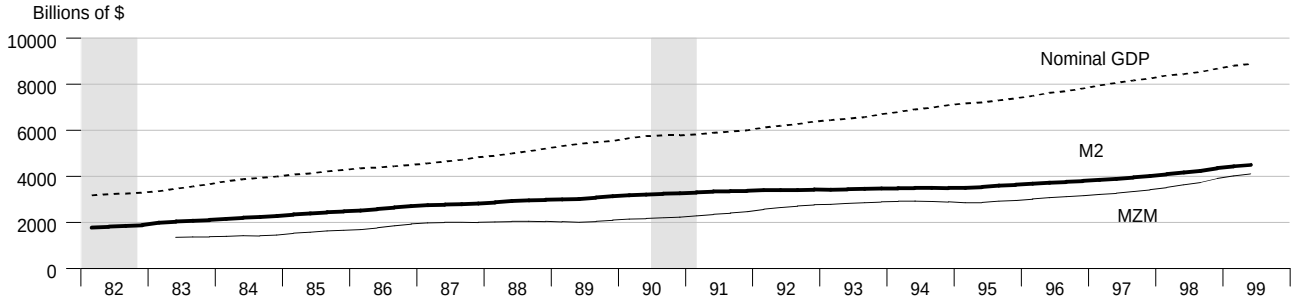
MZM Velocity and Opportunity Cost



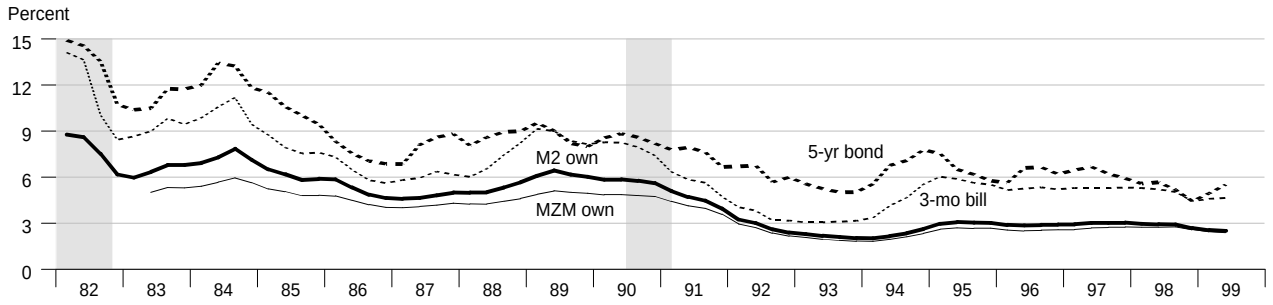
M2 Velocity and Opportunity Cost



M2, MZM and Nominal GDP

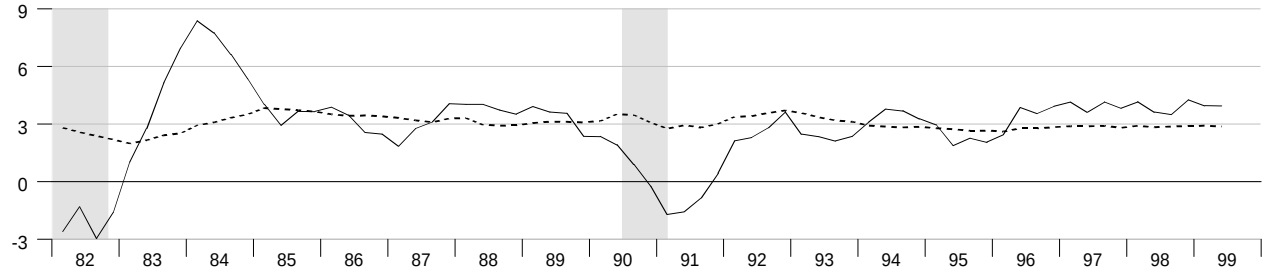


Interest Rates



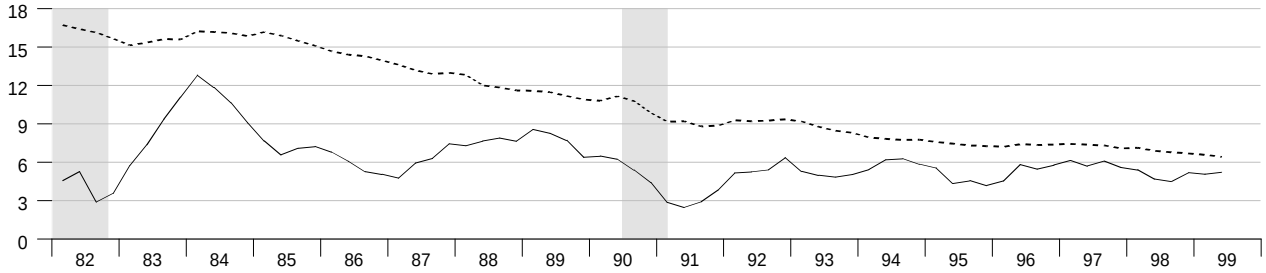
Real Gross Domestic Product

Percent change from year ago



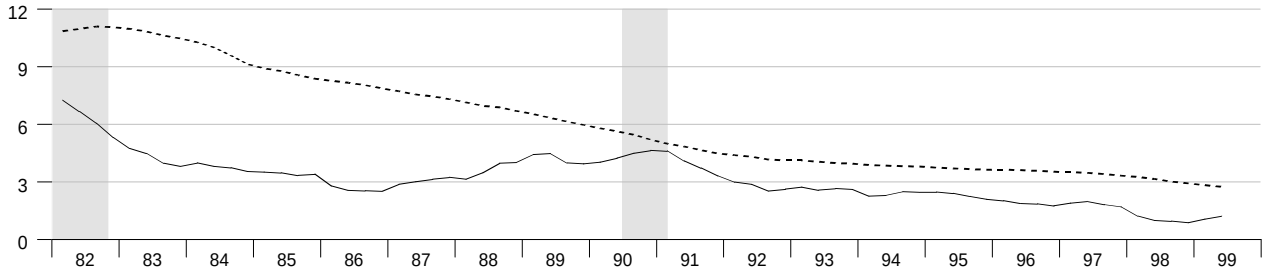
Gross Domestic Product

Percent change from year ago



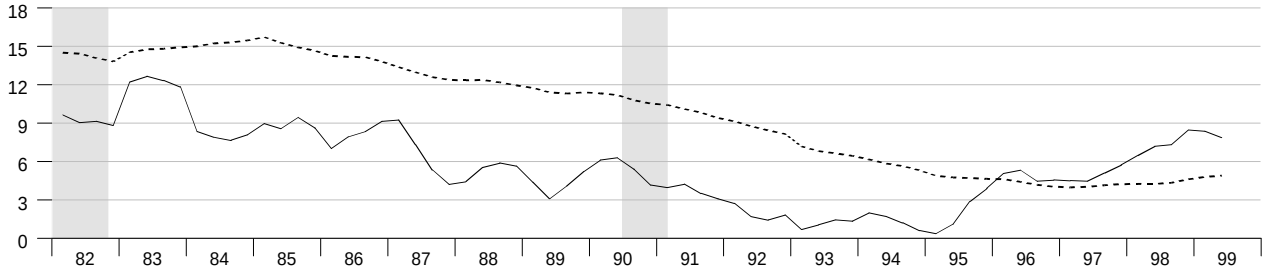
Gross Domestic Product Price Index

Percent change from year ago



M2

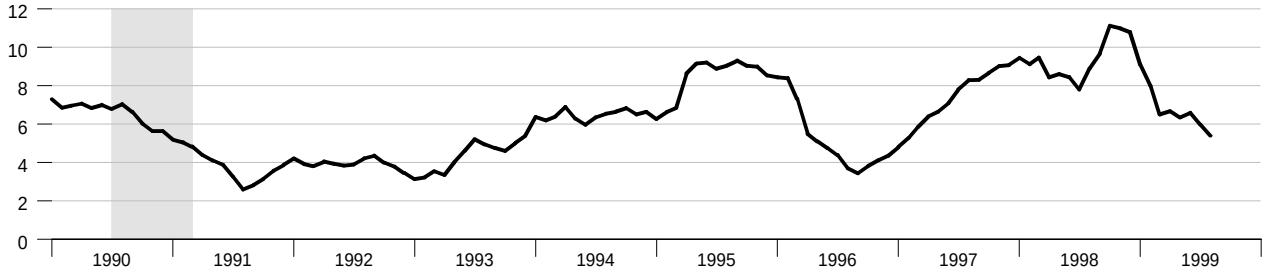
Percent change from year ago



Dashed lines indicate 10-year moving averages

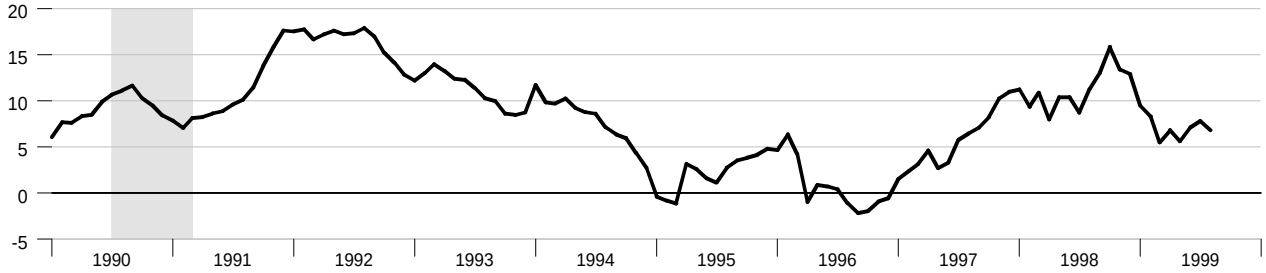
Bank Credit

Percent change from year ago



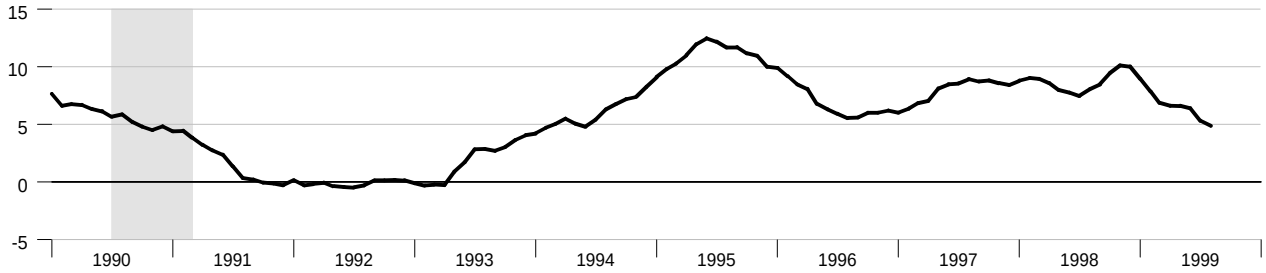
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



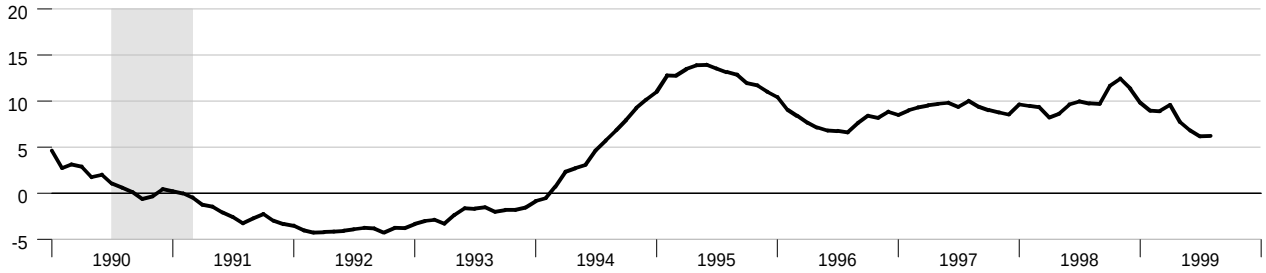
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

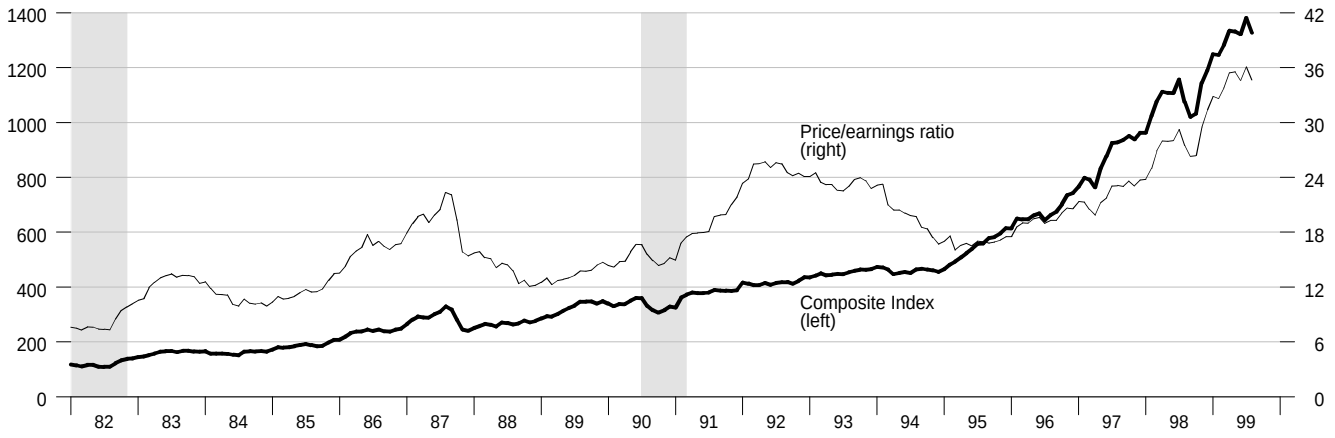


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



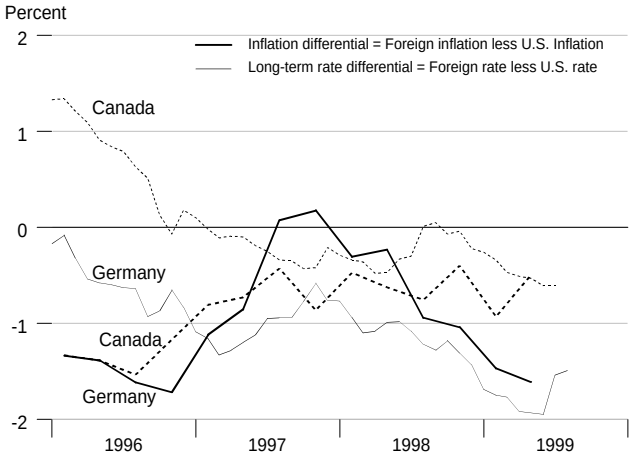
Standard and Poor's 500

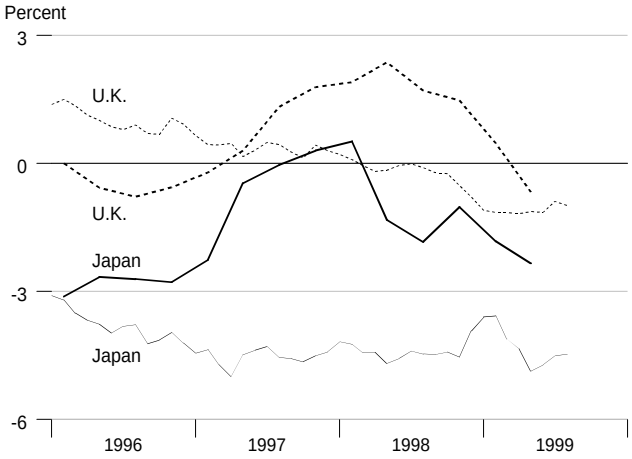


Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1998Q3	1998Q4	1999Q1	1999Q2	May99	Jun99	Jul99	Aug99
United States	1.62	1.48	1.73	2.09	6.04	6.31	6.22	6.37
Canada	0.86	1.08	0.80	1.59	5.51	5.70	5.61	.
France	0.73	0.37	0.26	0.36	4.45	4.94	5.02	5.17
Germany	0.67	0.44	0.26	0.48	4.01	4.36	4.68	4.88
Italy	2.04	1.74	1.39	1.44	4.31	4.65	4.95	5.16
Japan	-0.22	0.46	-0.10	-0.25	1.17	1.59	1.71	1.90
United Kingdom	3.32	2.96	2.20	1.42	4.91	5.16	5.33	5.38

Inflation and Long-Term Interest Rates Differentials





		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
	1994	1145.340	2919.235	3500.100	4303.777	3229.047	421.574	80.684	205.514
	1995	1142.820	2905.387	3572.376	4499.721	3499.794	443.511	76.849	210.302
	1996	1106.126	3095.474	3745.602	4796.153	3682.682	455.586	73.415	217.734
	1997	1069.573	3317.480	3931.295	5176.320	3950.710	478.753	68.918	226.990
	1998	1079.456	3702.138	4221.138	5700.668	4322.356	508.978	66.952	242.089
1997	1	1076.381	3221.703	3849.846	5012.635	3829.205	470.027	70.409	222.780
	2	1065.603	3274.106	3895.394	5109.916	3909.821	473.896	68.177	225.080
	3	1068.155	3347.031	3956.934	5228.843	3990.069	480.945	68.565	228.280
	4	1068.155	3427.080	4023.005	5353.888	4073.746	490.144	68.519	231.820
1998	1	1076.826	3521.466	4099.036	5490.882	4186.770	498.387	67.711	235.857
	2	1079.349	3635.433	4175.386	5628.141	4241.754	502.060	66.084	239.787
	3	1074.077	3741.066	4246.608	5748.823	4340.702	511.592	66.951	243.463
	4	1087.571	3910.588	4363.523	5934.823	4520.196	523.871	67.063	249.250
1999	1	1095.220	4025.483	4442.084	6047.049	4515.453	536.301	67.557	252.997
	2	1104.712	4118.712	4504.701	6128.673	4518.712	545.930	66.311	256.413
1997	Aug	1072.076	3350.325	3960.722	5232.179	3989.729	481.011	68.465	228.440
	Sep	1064.818	3377.073	3981.314	5268.874	4005.350	483.012	68.333	229.560
	Oct	1062.064	3399.477	3999.803	5305.715	4039.084	485.892	67.709	230.560
	Nov	1067.528	3424.764	4022.827	5352.541	4079.072	490.783	68.772	231.750
	Dec	1074.873	3457.000	4046.385	5403.407	4103.081	493.756	69.076	233.150
1998	Jan	1073.810	3486.131	4071.076	5448.172	4157.945	496.198	68.918	234.430
	Feb	1076.021	3521.706	4100.450	5483.148	4186.299	499.555	67.414	235.900
	Mar	1080.646	3556.561	4125.581	5541.327	4216.066	499.408	66.801	237.240
	Apr	1082.094	3601.279	4154.526	5586.189	4218.912	499.601	66.000	238.870
	May	1078.171	3634.842	4173.935	5627.871	4240.820	502.385	66.134	239.650
	Jun	1077.782	3670.178	4197.696	5670.364	4265.530	504.193	66.117	240.840
	Jul	1075.365	3694.535	4215.098	5690.425	4285.201	507.677	66.366	241.950
	Aug	1072.214	3735.309	4240.558	5746.351	4344.432	511.093	67.434	243.160
	Sep	1074.653	3793.355	4284.168	5809.694	4392.474	516.006	67.052	245.280
	Oct	1080.404	3854.353	4325.546	5871.776	4487.889	520.803	67.055	247.330
	Nov	1088.956	3912.146	4364.036	5936.876	4527.052	524.379	67.183	249.300
	Dec	1093.354	3965.264	4400.986	5995.818	4545.646	526.432	66.952	251.120
1999	Jan	1091.000	3993.526	4424.981	6016.975	4535.952	531.713	68.375	252.230
	Feb	1092.648	4034.796	4445.634	6064.790	4520.460	538.145	67.918	253.060
	Mar	1102.011	4048.127	4455.636	6059.383	4489.946	539.045	66.379	253.700
	Apr	1108.379	4093.070	4488.177	6102.405	4500.020	539.623	63.827	255.550
	May	1104.703	4119.532	4505.115	6127.467	4509.742	548.349	68.239	256.420
	Jun	1101.054	4143.534	4520.812	6156.146	4546.375	549.818	66.868	257.270
	Jul	1099.455	4162.328	4540.992	6181.441	4541.287	553.082	66.802	258.430
	Aug	1101.984	4191.475	4561.784	6207.626	4578.692	556.697	67.335	259.530

*All values are given in billions of dollars

		Federal Funds	Discount Rate	Prime Rate	3-mo CDs	Treasury Yields 3 mo	3 yr	30 yr	Corporate Aaa Bonds	S & L Aaa Bonds	Conventional Mortgage
	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
	2	4.75	4.50	7.75	4.98	4.59	5.35	5.80	6.93	5.05	7.20
1997	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
	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

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

		M1	MZM	M2	M3
Percent change from previous period					
	1994	6.17	2.61	1.38	1.60
	1995	-0.22	-0.47	2.06	4.55
	1996	-3.21	6.54	4.85	6.59
	1997	-3.30	7.17	4.96	7.93
	1998	0.92	11.59	7.37	10.13
1997	1	-0.47	1.77	1.19	1.87
	2	-1.00	1.63	1.18	1.94
	3	0.24	2.23	1.58	2.33
	4	0.00	2.39	1.67	2.39
1998	1	0.81	2.75	1.89	2.56
	2	0.23	3.24	1.86	2.50
	3	-0.49	2.91	1.71	2.14
	4	1.26	4.53	2.75	3.24
1999	1	0.70	2.94	1.80	1.89
	2	0.87	2.32	1.41	1.35
1997	Aug	0.42	1.11	0.81	0.90
	Sep	-0.68	0.80	0.52	0.70
	Oct	-0.26	0.66	0.46	0.70
	Nov	0.51	0.74	0.58	0.88
	Dec	0.69	0.94	0.59	0.95
1998	Jan	-0.10	0.84	0.61	0.83
	Feb	0.21	1.02	0.72	0.64
	Mar	0.43	0.99	0.61	1.06
	Apr	0.13	1.26	0.70	0.81
	May	-0.36	0.93	0.47	0.75
	Jun	-0.04	0.97	0.57	0.76
	Jul	-0.22	0.66	0.41	0.35
	Aug	-0.29	1.10	0.60	0.98
	Sep	0.23	1.55	1.03	1.10
	Oct	0.54	1.61	0.97	1.07
	Nov	0.79	1.50	0.89	1.11
	Dec	0.40	1.36	0.85	0.99
1999	Jan	-0.22	0.71	0.55	0.35
	Feb	0.15	1.03	0.47	0.79
	Mar	0.86	0.33	0.22	-0.09
	Apr	0.58	1.11	0.73	0.71
	May	-0.33	0.65	0.38	0.41
	Jun	-0.33	0.58	0.35	0.47
	Jul	-0.15	0.45	0.45	0.41
	Aug	0.23	0.70	0.46	0.42

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. **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

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

to five alternative target inflation rates $\pi^* = 0, 1, 2, 3, 4$ percent, where ΔMB_t^* is the implied growth rate of the adjusted monetary base. The 10-year moving average growth of real GDP for a quarter "t" is calculated as the average quarterly growth during the previous 40 quarters, at

an annual rate, by the formula $((y_t - y_{t-40})/40) \times 4 \times 100$, where y_t is the log of real GDP. The four-year moving average of base velocity growth is calculated similarly. To adjust the monetary base for the effect of retail-deposit sweep programs, we add to the monetary base an amount equal to 10 percent of the total amount swept, as estimated by the Federal Reserve Board staff. These estimates are imprecise, at best. Sweep program data are available at

http://www.stls.frb.org/research/swdata.html.

Page 11: **Implied One–Year Forward Rates** are calculated by this Bank from Treasury constant maturity yields. Yields to maturity, *R(m)*, for securities with $m = 1,...,$ 30 years to maturity are obtained by linear interpolation between reported yields. These yields are smoothed by fitting the regression suggested by Nelson and Siegel (1987)

$$R(m) = a_0 + (a_1 + a_2)(1 - e^{-m/50})/(m/50) - a_2 \times e^{-m/50},$$

and forward rates are calculated from these smoothed yields using equation (a) in Table 13.1 of Shiller (1990)

$$f(m) = [D(m)R(m) - D(m\text{-}1)] / [D(m) - D(m\text{-}1)]$$

where duration is approximated as $D(m) = (1 - e^{-R(m) \times m}) / R(m)$. These rates are linear approximations to the true instantaneous forward rates; see Shiller. For a discussion of the use of forward rates as indicators of inflation expectations, see Sharpe (1997). **Rates on 3-Month Eurodollar Futures** and **Rates on Selected Fed Funds Futures Contracts** each trace through time the yield on three specific contracts. **Implied Yields on Fed Funds Futures** displays a single day's snapshot of yields for contracts expiring in the months shown on the horizontal axis. **Inflation-Protected Treasury Yield Spreads** equal, for 5, 10, and 30 year maturities, the difference between the Treasury constant maturity yield and the yield on the most recently issued inflation-protected security. **Inflation-Indexed Bonds** for Canada are the 31-year bond with a maturity date of 12/01/2026; for the U.K., the 37.5-year bond with a maturity date of 07/17/2024 and the 12.1-year bond with a maturity date of 10/21/2004; and, for the U.S., the 30-year bond with a maturity date of 04/15/2028 and the 10-year bond with a maturity date of 01/15/2007.

Page 12: **Velocity** (for MZM and M2) equals the ratio of GDP, measured in current dollars, to the level of the monetary aggregate. **MZM** and **M2 Own Rates** are weighted averages of the rates received by households and firms on the assets included in the aggregates. Two alternative opportunity costs are shown, one relative to the 3-month Treasury constant-maturity yield, the other to the 5-year constant-maturity yield.

Page 13: **Real Gross Domestic Product** is GDP as measured in chained 1992 dollars. The **Gross Domestic Product Price Index** is the implicit price deflator for GDP, which is defined by the Bureau of Economic Analysis, U.S. Department of Commerce, as the ratio of GDP measured in current dollars to GDP measured in chained 1992 dollars.

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

Sources

Bank of Canada
Canadian inflation-linked bond yields.

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

Board of Governors of the Federal Reserve System
Monetary aggregates and components, nonfinancial debt: H.6 release; bank credit and components: H.8 release; consumer credit: G.19 release; required reserves, excess reserves, clearing balance contracts and discount window borrowing: H.4.1 and H.3 releases; interest rates: H.15 and G.13 releases; nonfinancial commercial paper: Board of Governors web site; M2 and MZM own rates.

Bureau of Economic Analysis
Gross domestic product.

Bureau of Labor Statistics
Consumer price index.

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

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

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

University of Michigan Survey Research Center
Median expected price change.

Congressional Budget Office
Potential real GDP.

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

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

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

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