

Monetary Trends



An Elastic Currency

Before the establishment of the Federal Reserve System in 1913, the banking system was occasionally beset by currency shortages, particularly in times of bank panics when currency demand rose sharply. Hence, one of the key mandates in the original Federal Reserve Act was “to provide an elastic currency.”

In this day and age, concerns about providing an adequate supply of currency are much less prominent. As the Federal Reserve prepared for the recent century date change (aka Y2K), however, the issue came to the forefront once again. The concern was that the public—lacking confidence in the ability of the banking system to handle Y2K-related computer problems—would withdraw funds from their deposit accounts. Although the Fed and the banking system hold sufficient reserves of currency to accommodate higher demand over holidays and long weekends, the possibility of unusually large cash withdrawals prompted special preparations.

The Fed took several measures to address this potential problem, starting with a high-profile public relations campaign to assure the public of the preparedness of the banking system to handle potential computer problems. In anticipation of the potential for strong currency demand, the Fed also accumulated a stockpile of extra currency to have on hand. As of the beginning of October, the System had over \$200 billion in the vaults of Federal Reserve Banks and their branches.

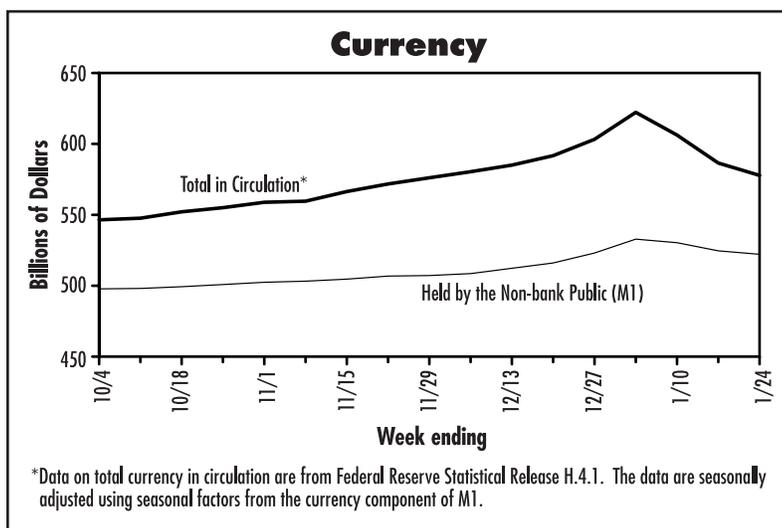
In addition, the Fed set up additional inventory locations throughout the U.S. for rapid distribution of currency. In case banks ran unexpectedly low on available reserves, streamlined procedures for discount borrowing from the Fed also were established.

In the event, the extra currency demand at year-end was modest and presented few problems. As shown in the chart, currency in the hands of the public (as measured in the M1

aggregate) rose only about \$20 billion above trend. Although individual institutions may have encountered temporary shortfalls in available reserves, the banking system as a whole retained reserves that were more than adequate to meet demand. Much of the increase in total currency in circulation reflected banks' higher cash holdings in preparation for possible customer withdrawals. Total cash in bank vaults peaked at about \$90 billion during the week that ended January 3—about \$40 billion more than would have been expected in the absence of Y2K concerns. Both the public and the banking system lowered cash holdings sharply after the New Year, with currency aggregates returning to near trend by the end of January.

In the wake of crisis concerns that never actually developed, it is tempting to question the merit of elaborate preparations. Awareness of those preparations, however, surely contributed to public confidence in the integrity of the banks' data systems and may have prevented the emergence of anything resembling an old-fashioned bank panic. By helping to insure the banking system's Y2K readiness, the Fed successfully acted to fulfill one of its original mandates.

—Michael R. Pakko



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

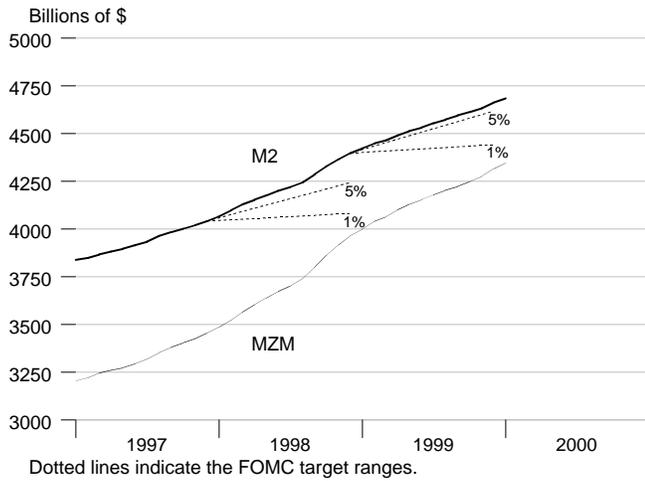
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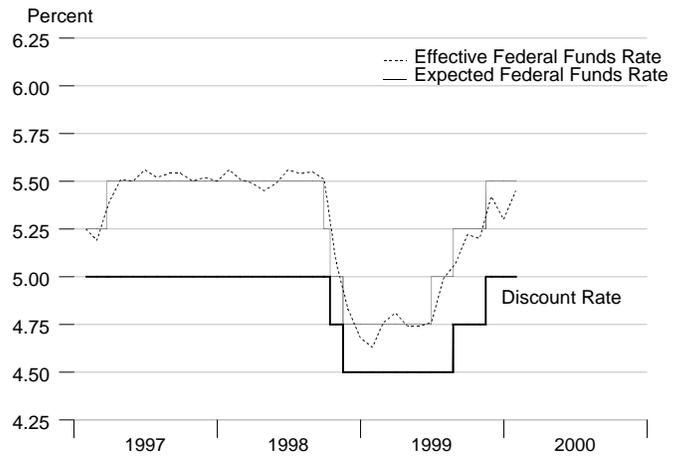
or to:

webmaster@stls.frb.org

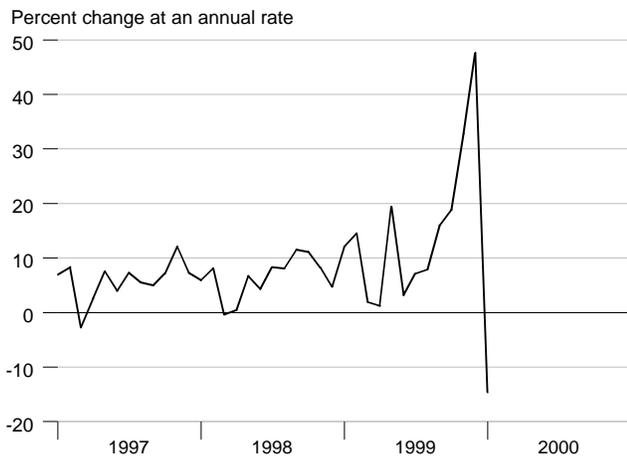
M2 and MZM



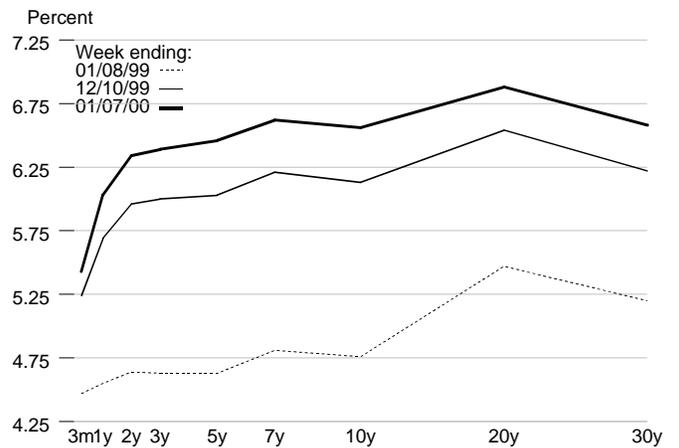
Reserve Market Rates



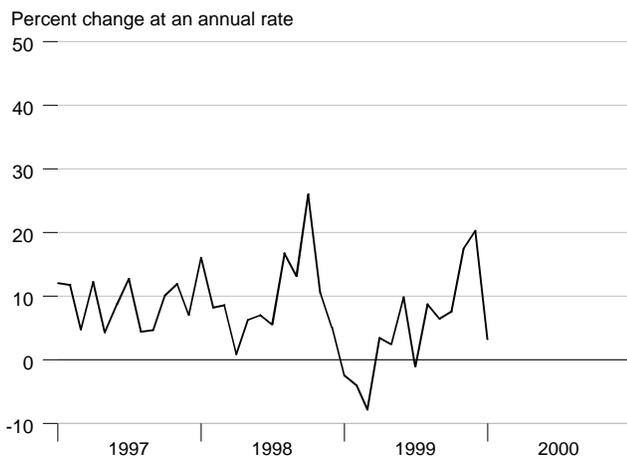
Adjusted Monetary Base



Treasury Yield Curve



Total Bank Credit

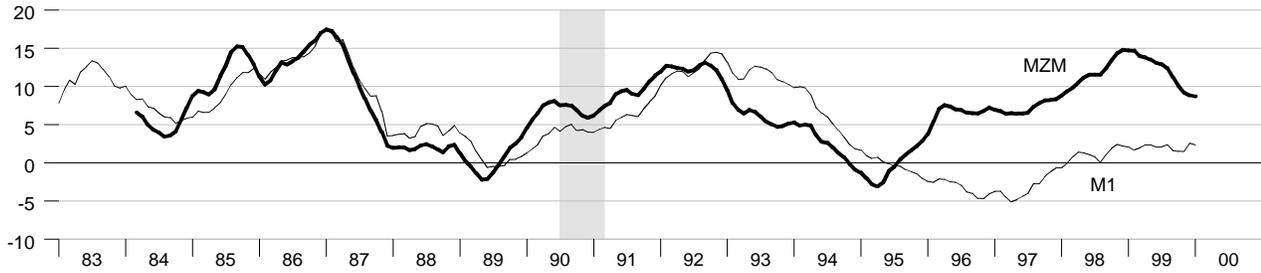


Interest Rates

	Nov 99	Dec 99	Jan 00
Federal Funds Rate	5.42	5.30	5.45
Discount Rate	4.86	5.00	5.00
Prime Rate	8.37	8.50	8.50
Conventional Mortgage Rate	7.74	7.91	8.21
Treasury Yields:			
3-month constant maturity	5.23	5.36	5.50
6-month constant maturity	5.43	5.68	5.76
1-year constant maturity	5.55	5.84	6.12
3-year constant maturity	5.92	6.14	6.49
5-year constant maturity	5.97	6.19	6.58
10-year constant maturity	6.03	6.28	6.66
30-year constant maturity	6.15	6.35	6.63

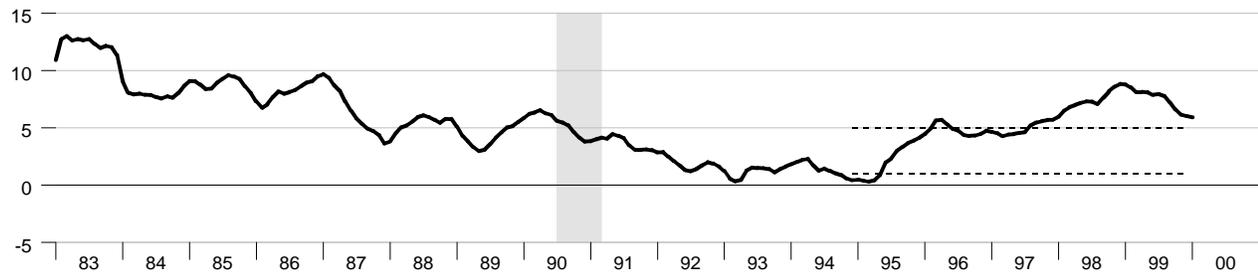
MZM and M1

Percent change from year ago



M2

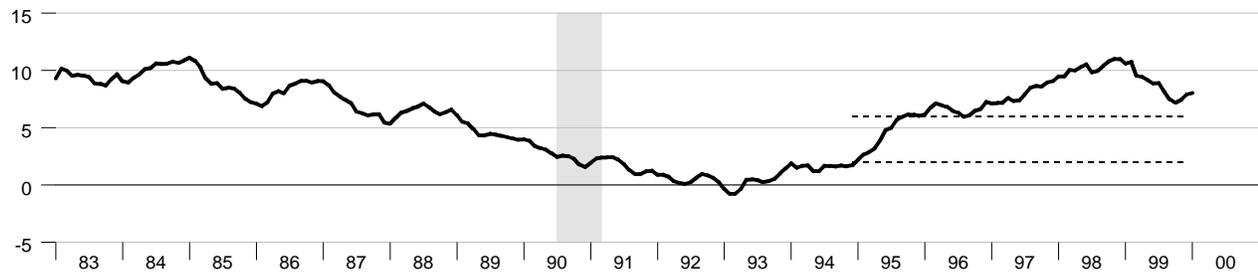
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

M3

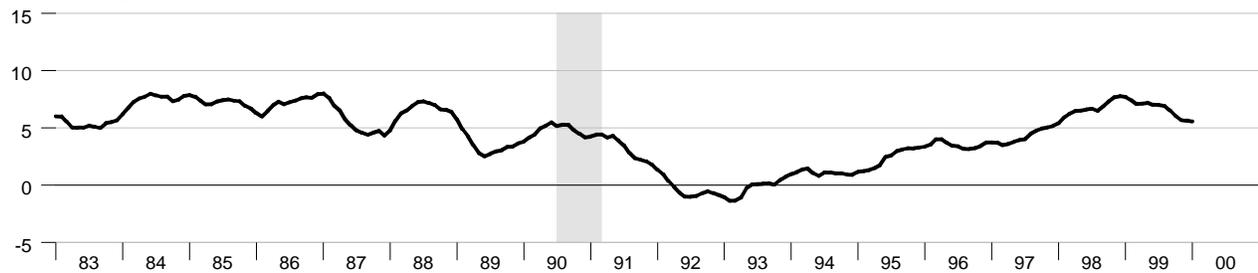
Percent change from year ago



Dotted lines indicate the FOMC target ranges.

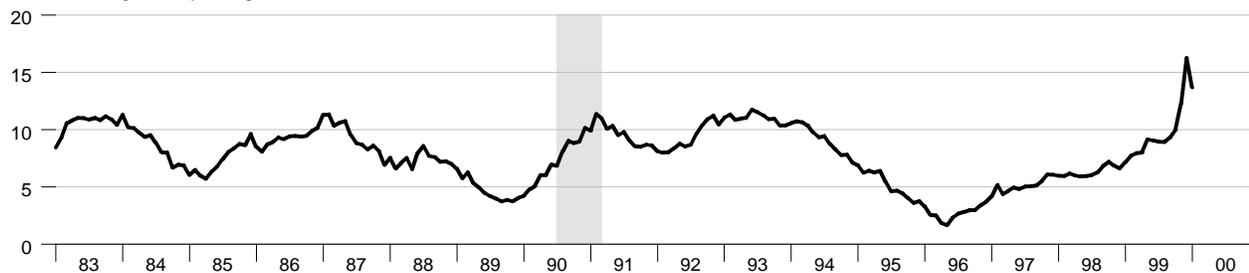
Monetary Services Index - M2

Percent change from year ago



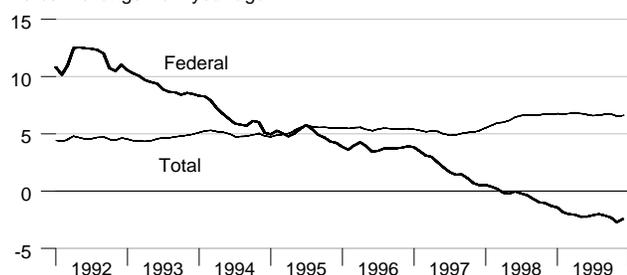
Adjusted Monetary Base

Percent change from year ago



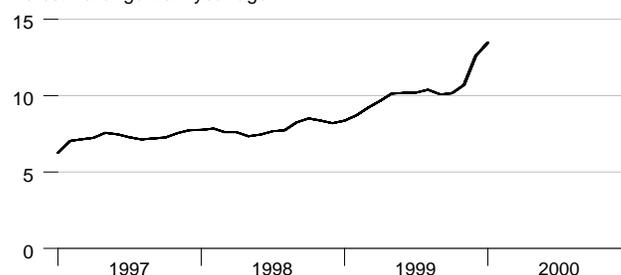
Domestic Nonfinancial Debt

Percent change from year ago



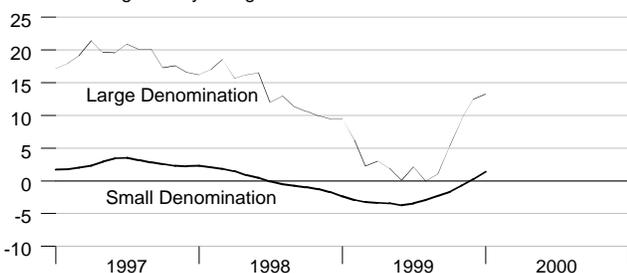
Currency Held by the Nonbank Public

Percent change from year ago



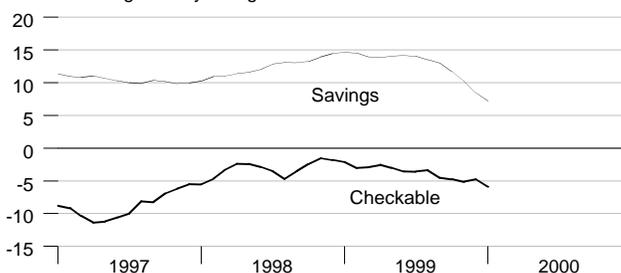
Time Deposits

Percent change from year ago



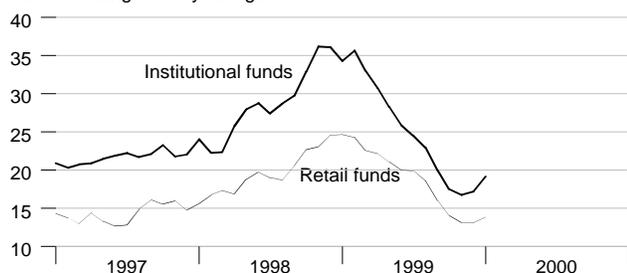
Checkable and Savings Deposits

Percent change from year ago



Money Market Mutual Fund Shares

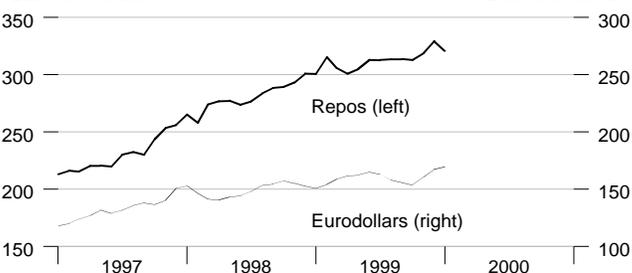
Percent change from year ago



Repurchase Agreements and Eurodollars

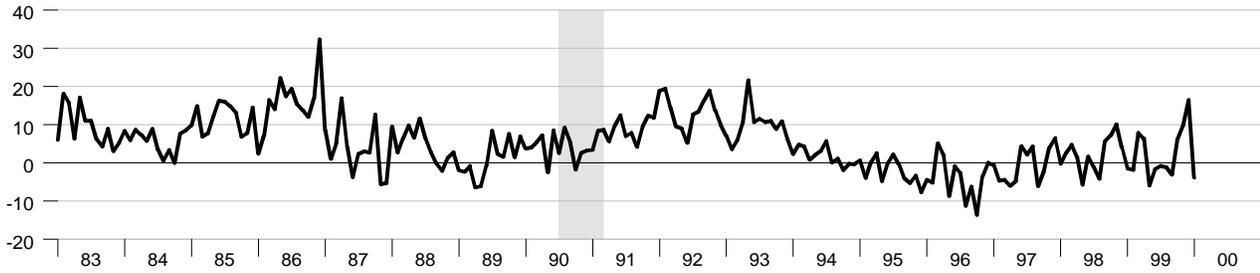
Billions of dollars

Billions of dollars



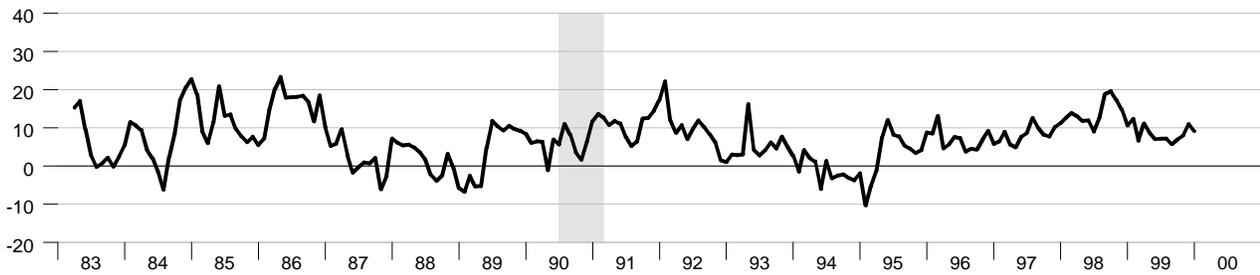
M1

Percent change at an annual rate



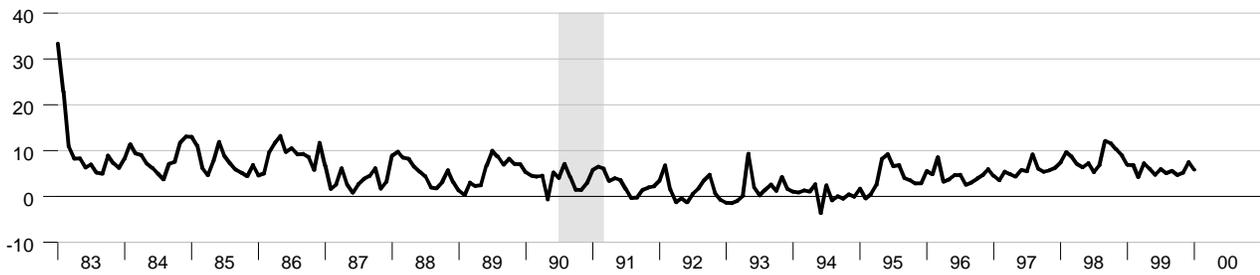
MZM

Percent change at an annual rate



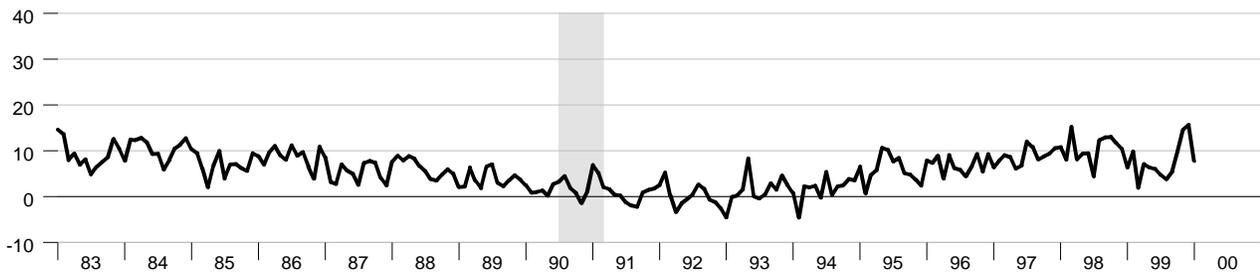
M2

Percent change at an annual rate

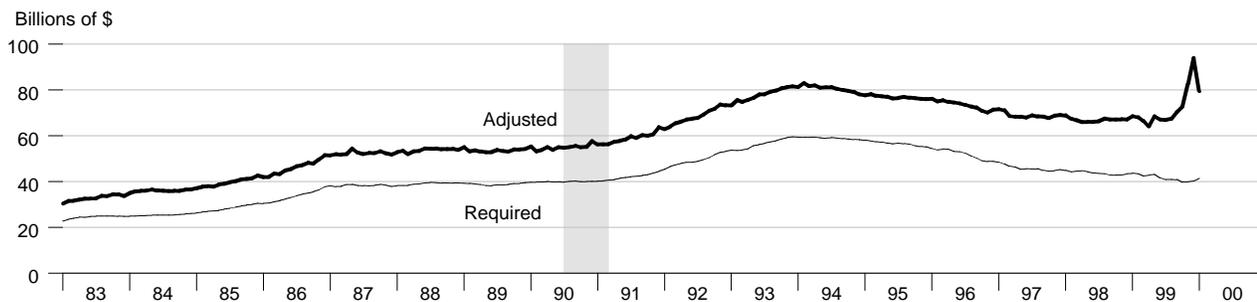


M3

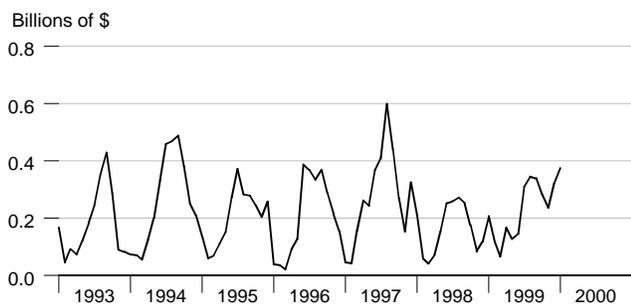
Percent change at an annual rate



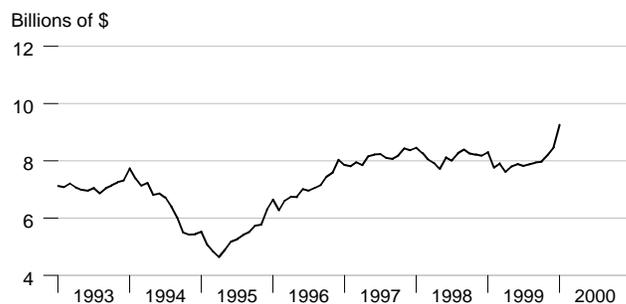
Adjusted and Required Reserves



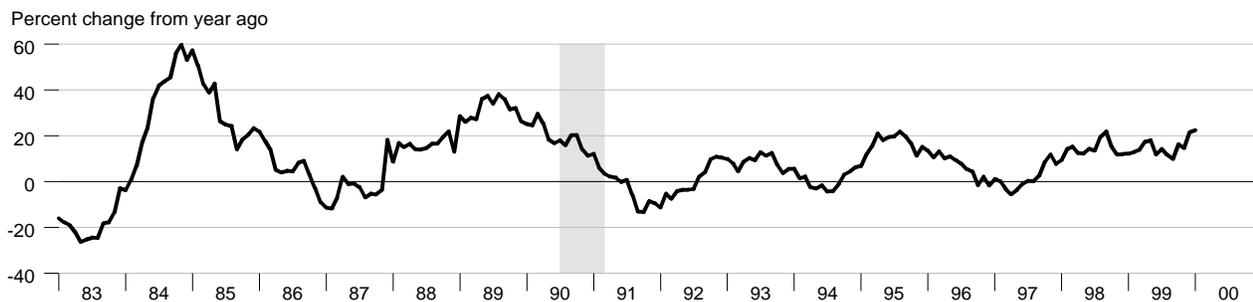
Total Borrowings, nsa



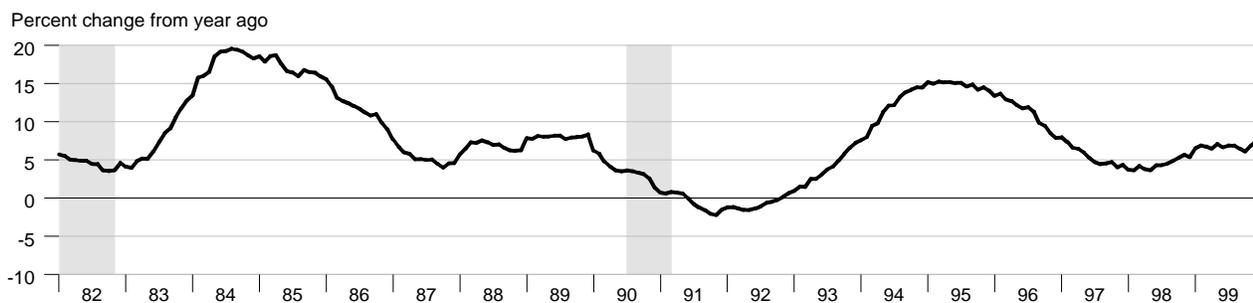
Excess Reserves plus RCB Contracts



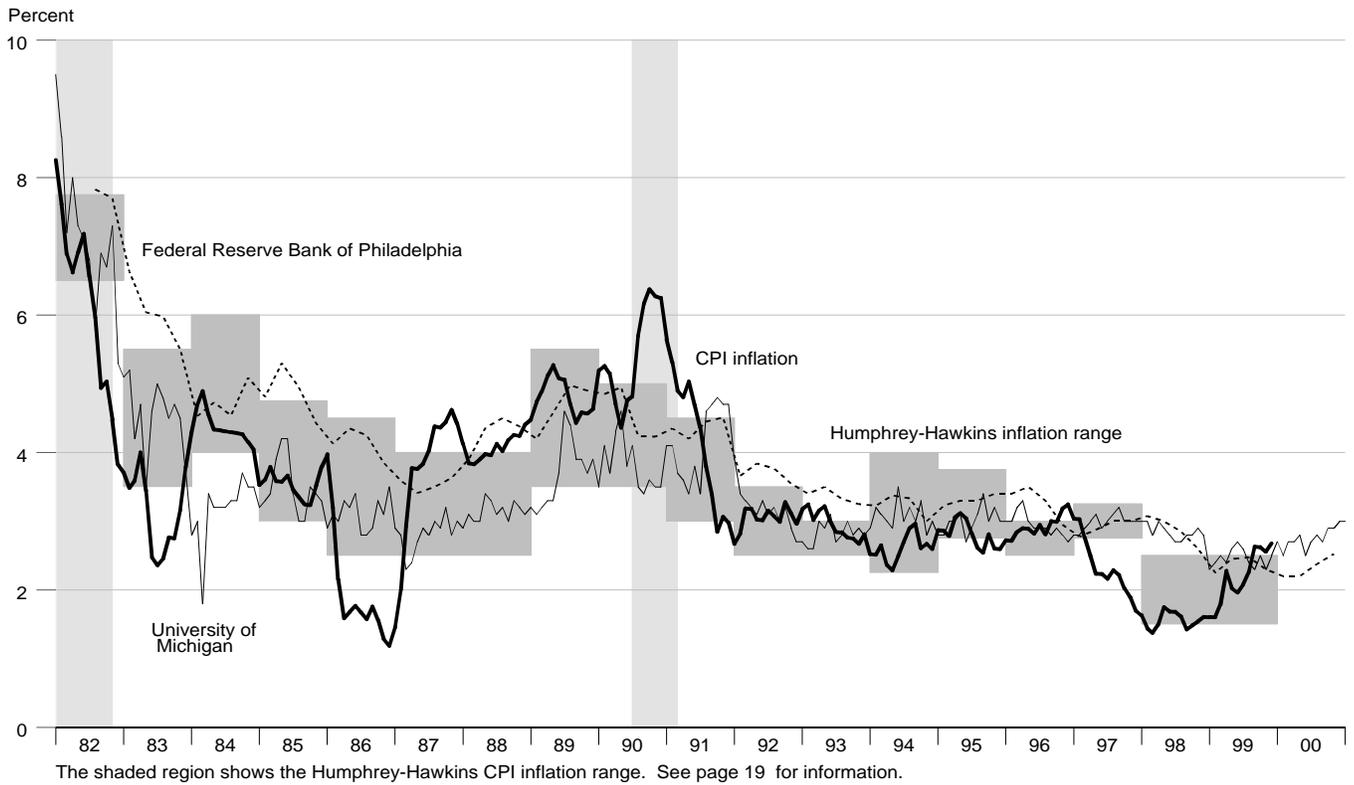
Nonfinancial Commercial Paper



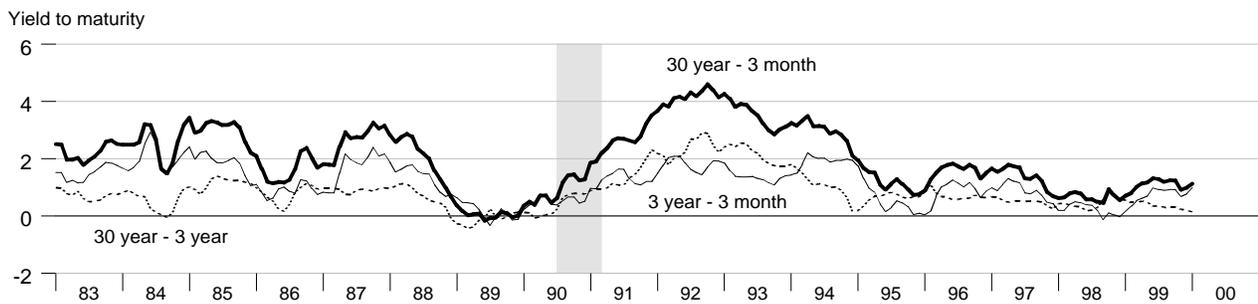
Consumer Credit



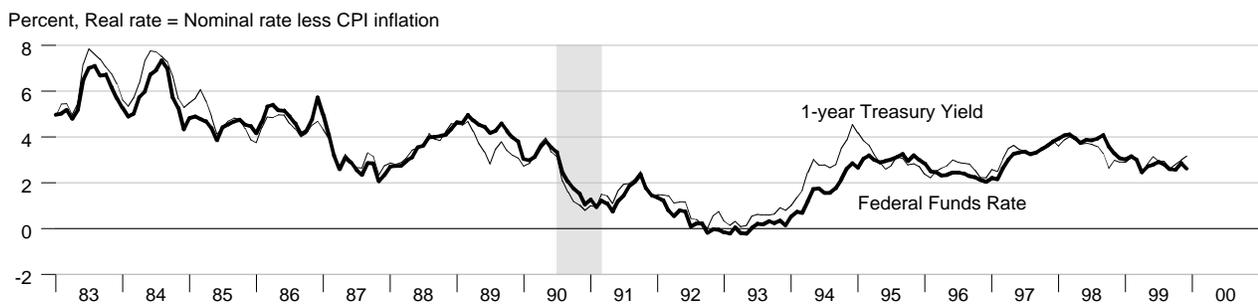
Inflation and Inflation Expectations



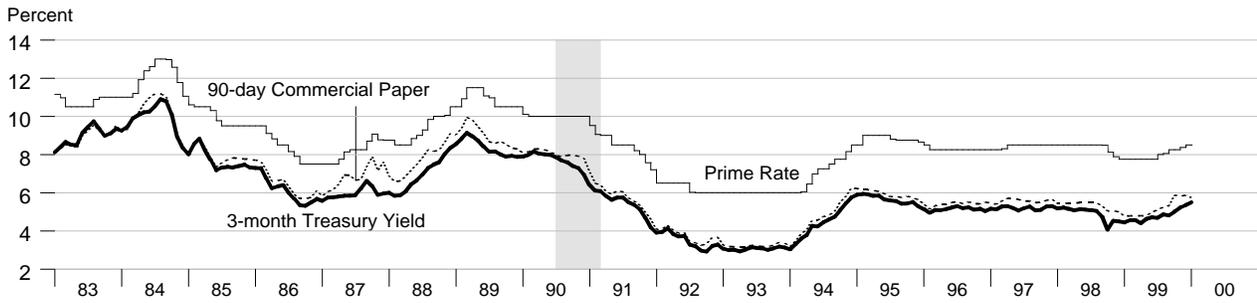
Treasury Security Yield Spreads



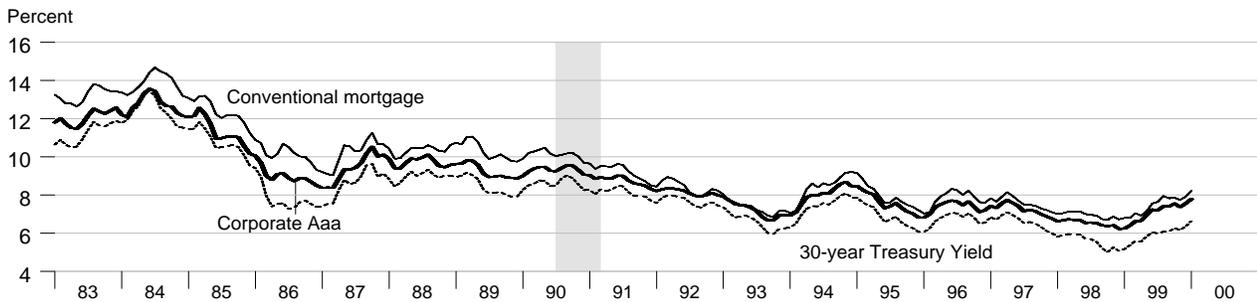
Real Interest Rates



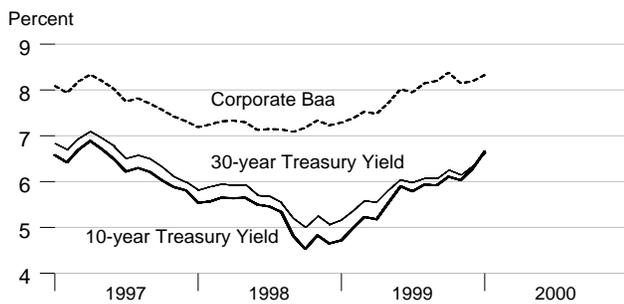
Short Term Interest Rates



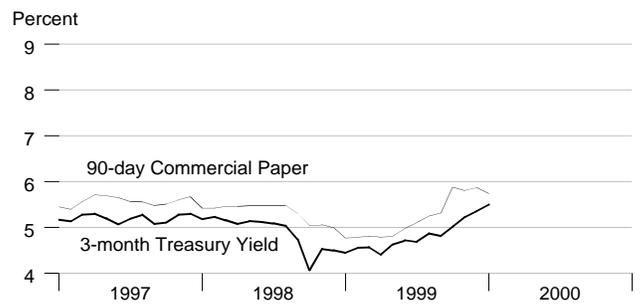
Long Term Interest Rates



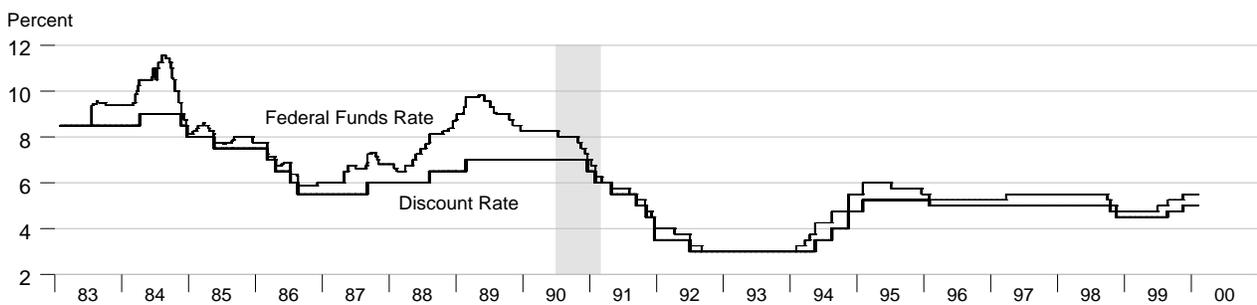
Long Term Interest Rates



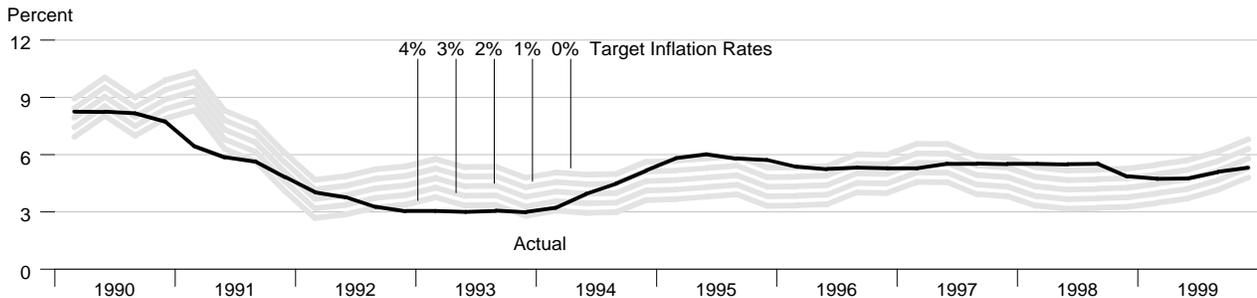
Short Term Interest Rates



FOMC Expected Federal Funds Rate and Discount Rate

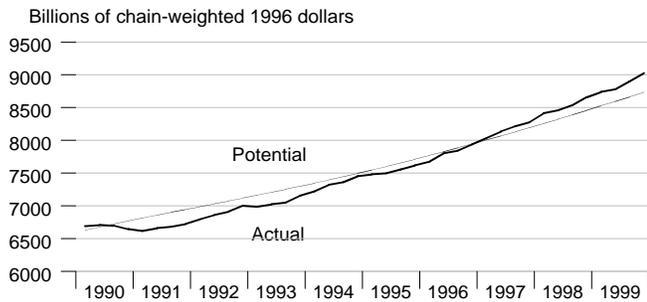


Federal Funds Rate and Inflation Targets

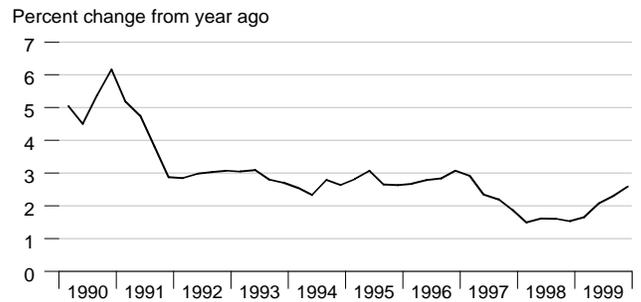


Calculated federal funds rate is based on Taylor's rule. See notes on page 19.

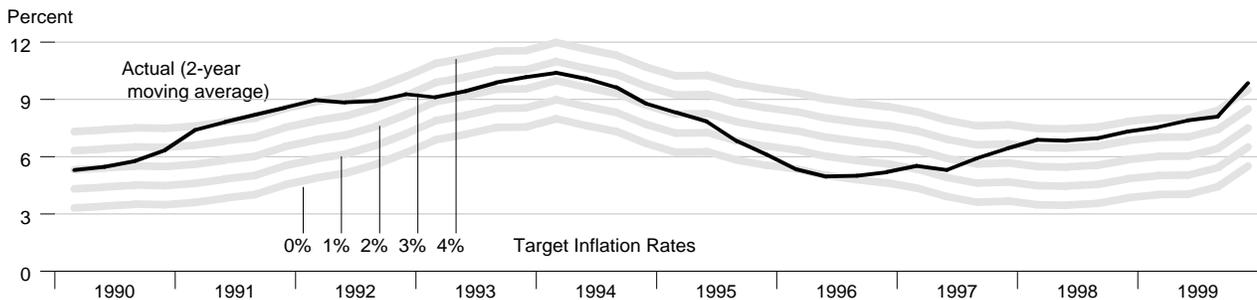
Actual and Potential Real GDP



Actual CPI Inflation

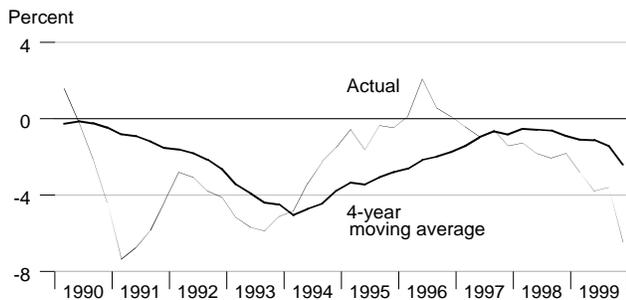


Monetary Base Growth* and Inflation Targets

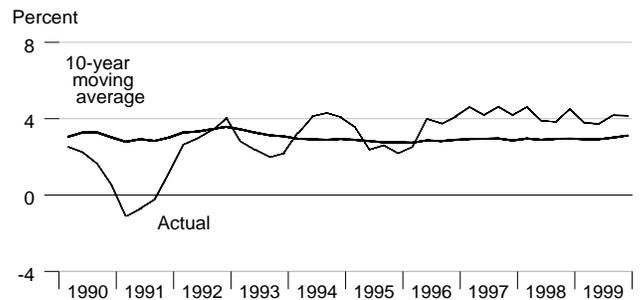


*Modified for the effects of sweeps programs on reserve demand. Calculated base growth is based on McCallum's rule. See notes on page 19.

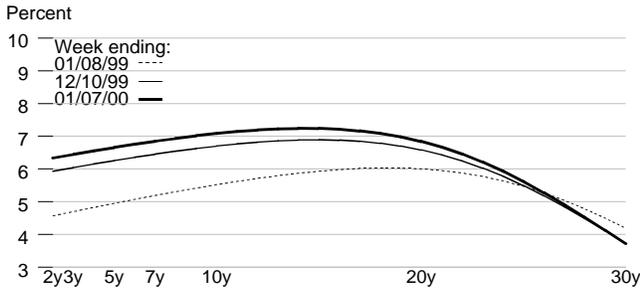
Monetary Base Velocity Growth



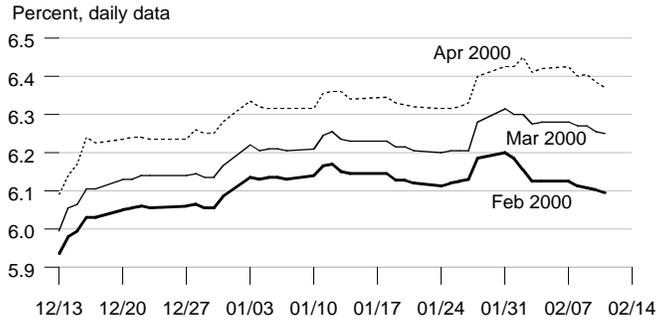
Real Output Growth



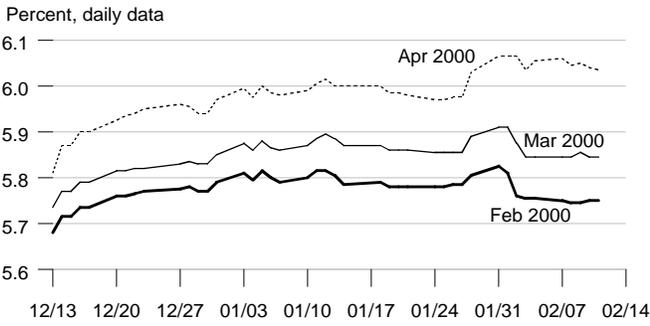
Implied One-Year Forward Rates



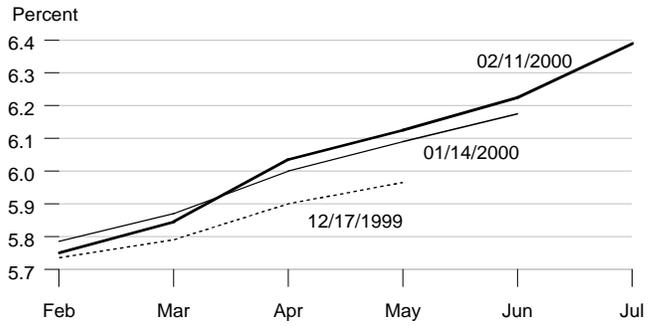
Rates on 3-Month Eurodollar Futures



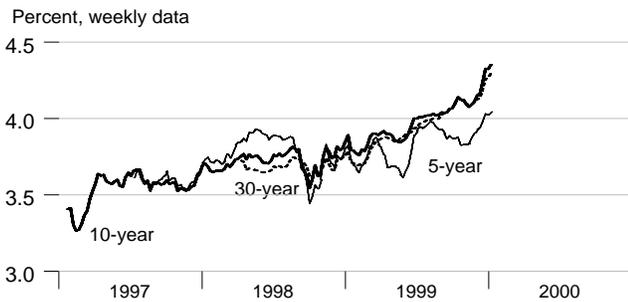
Rates on Selected Fed Funds Futures Contracts



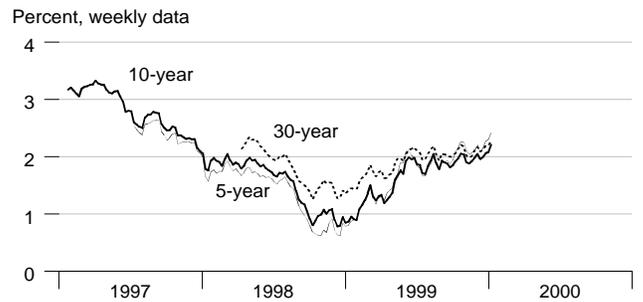
Implied Yields on Fed Funds Futures



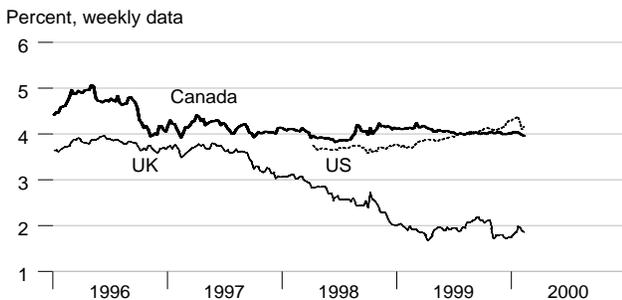
Inflation-Protected Treasury Yields



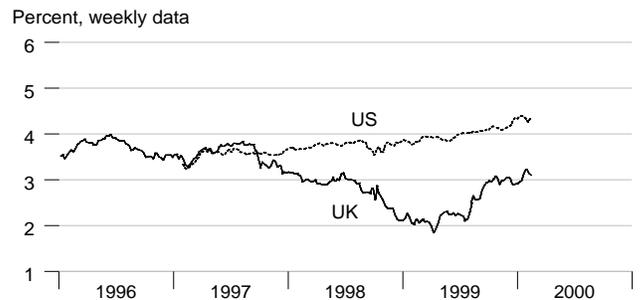
Inflation-Protected Treasury Yield Spreads



Inflation-Indexed 30-Year Bonds



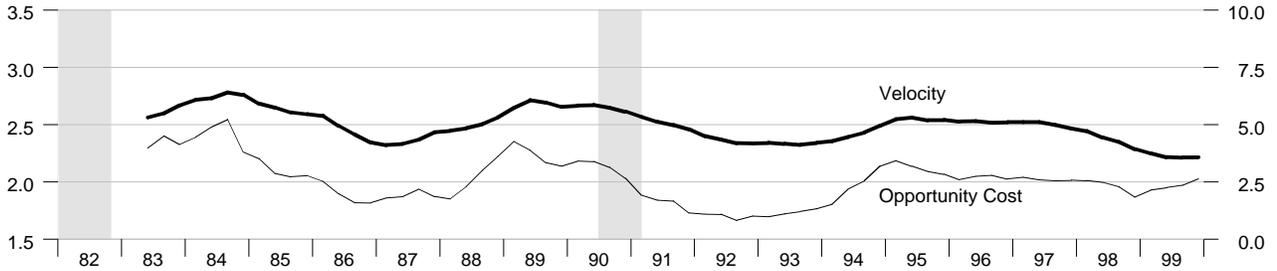
Inflation-Indexed 10-Year Bonds



MZM Velocity and Opportunity Cost

Velocity = Nominal GDP / MZM

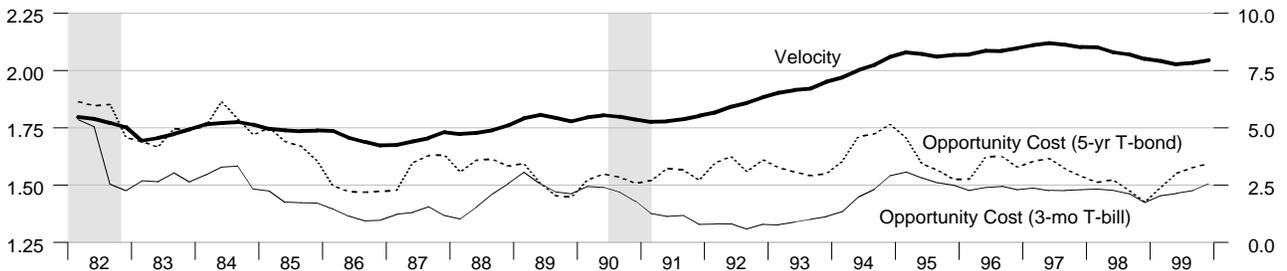
Opportunity Cost = 3 month T-bill rate less MZM own rate



M2 Velocity and Opportunity Cost

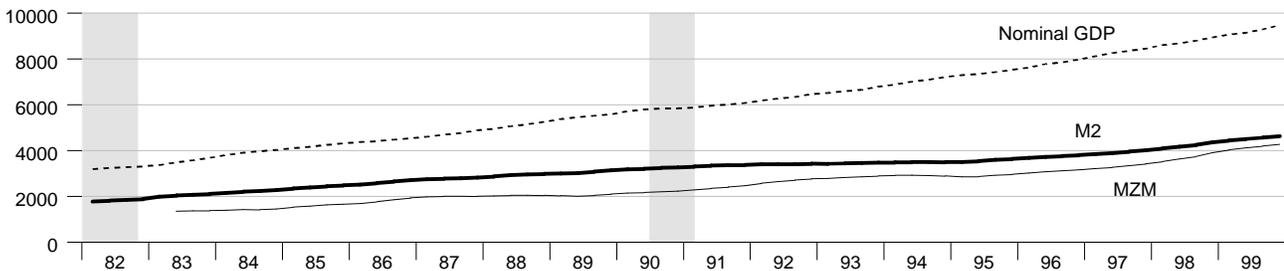
Velocity = Nominal GDP / M2

Opportunity Cost = Treasury rate less M2 own rate



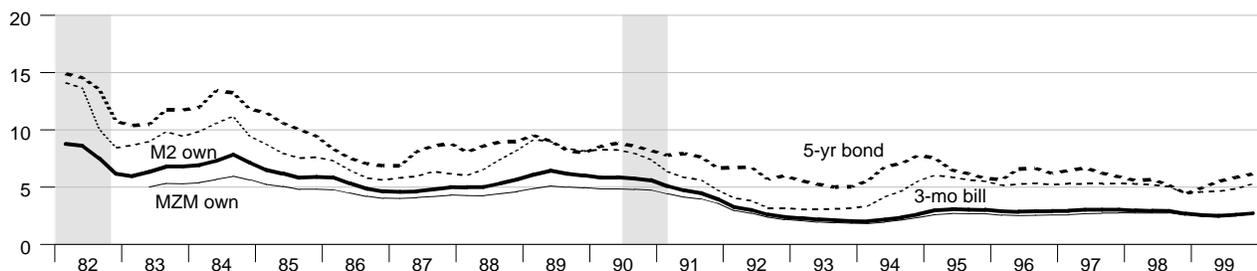
M2, MZM and Nominal GDP

Billions of \$



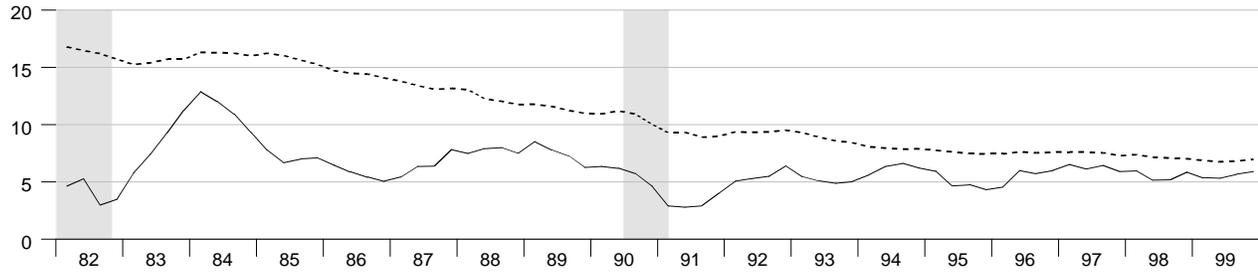
Interest Rates

Percent



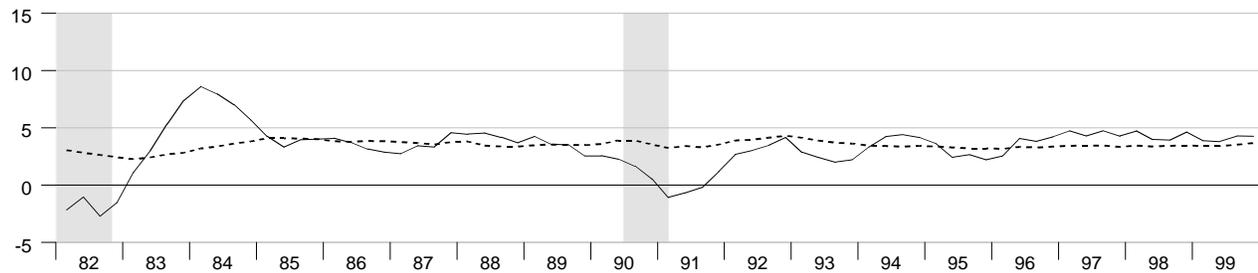
Gross Domestic Product

Percent change from year ago



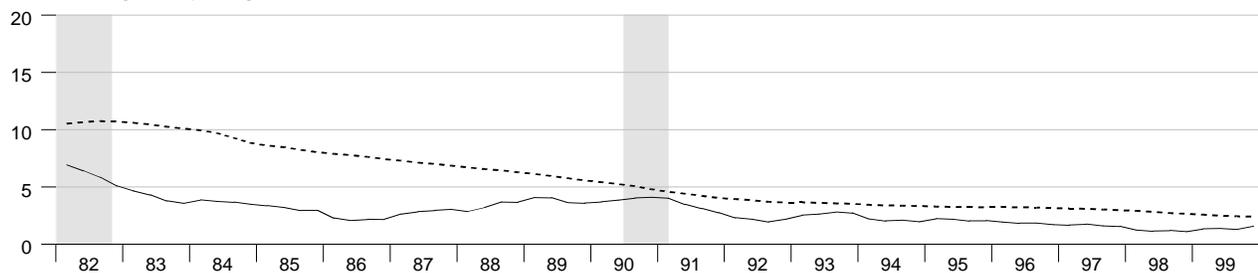
Real Gross Domestic Product

Percent change from year ago



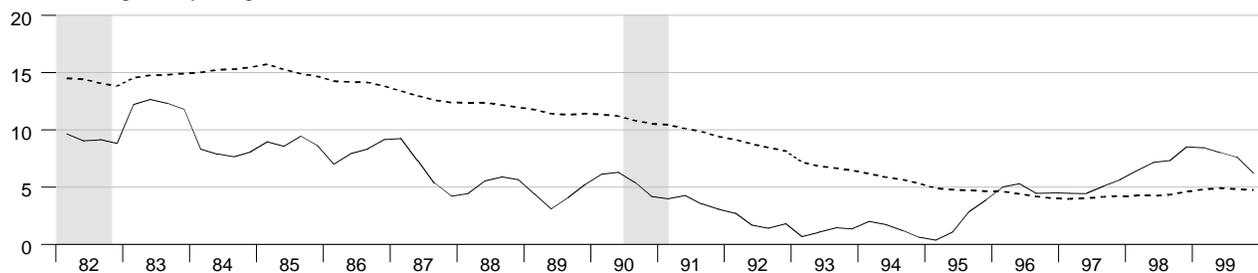
Gross Domestic Product Price Index

Percent change from year ago



M2

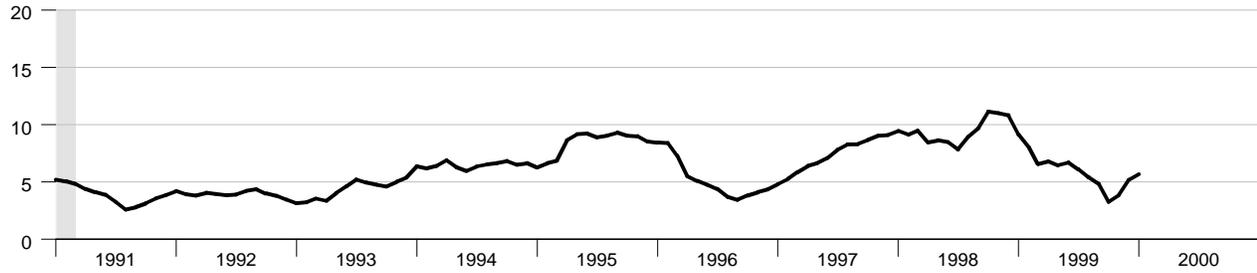
Percent change from year ago



Dashed lines indicate 10-year moving averages

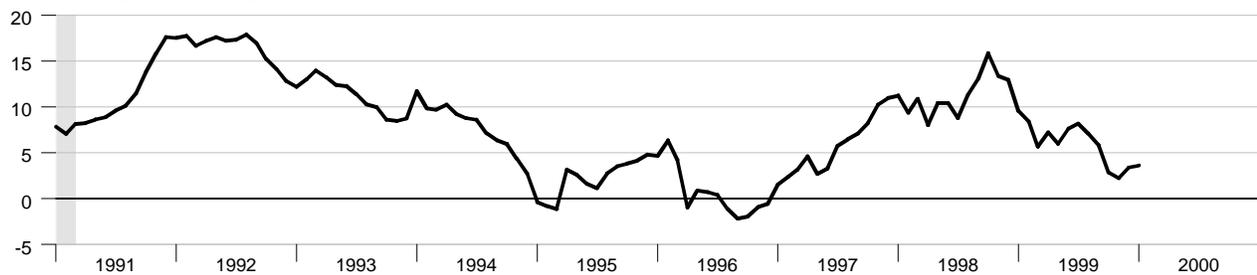
Bank Credit

Percent change from year ago



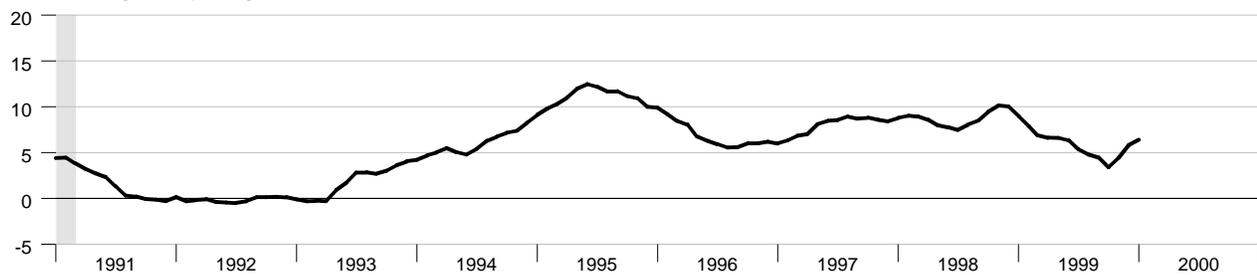
Investment Securities in Bank Credit at Commercial Banks

Percent change from year ago



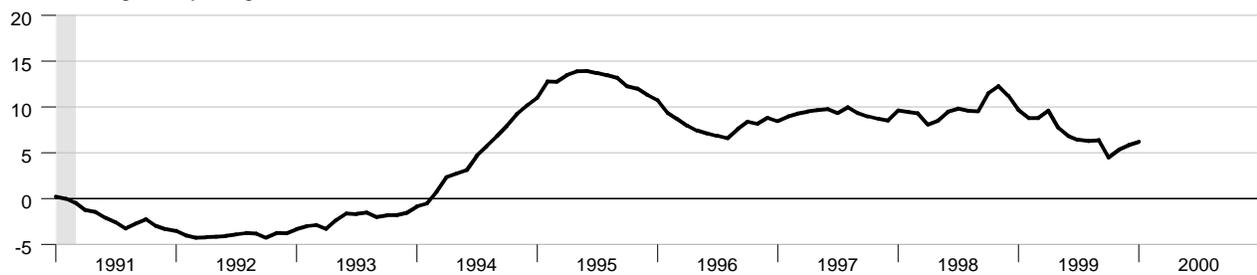
Total Loans and Leases in Bank Credit at Commercial Banks

Percent change from year ago

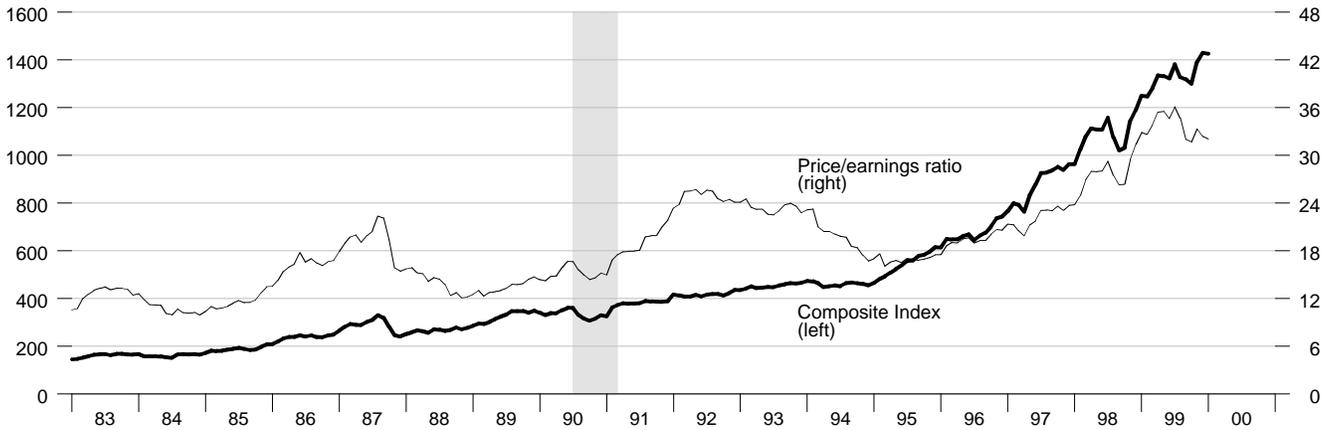


Commercial and Industrial Loans at Commercial Banks

Percent change from year ago



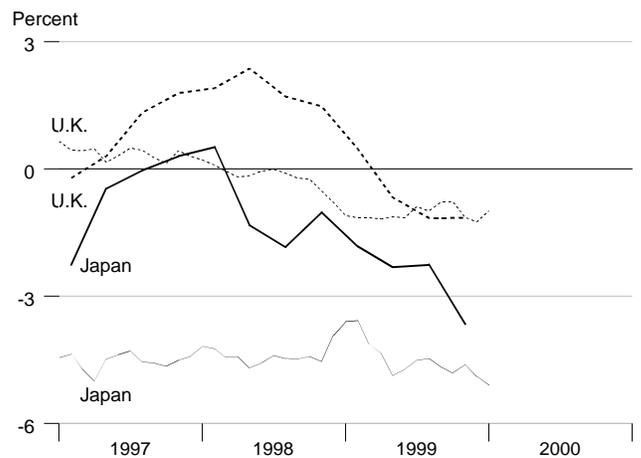
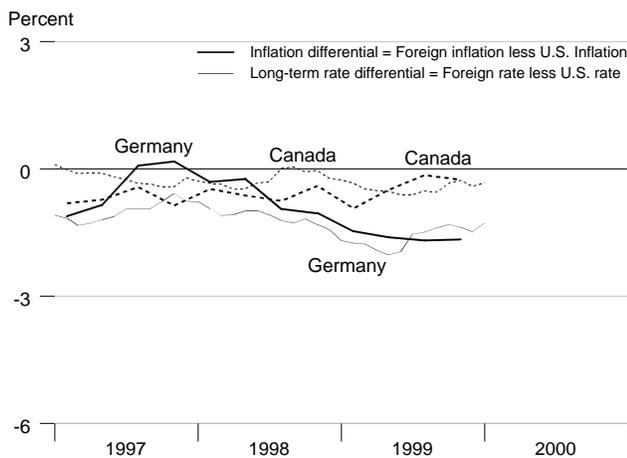
Standard and Poor's 500



Inflation and Long-Term Interest Rates

	Trend in Consumer Price Inflation Rates Percent change from year ago				Recent Long-Term Government Bond Rates Percent			
	1999Q1	1999Q2	1999Q3	1999Q4	Oct99	Nov99	Dec99	Jan00
United States	1.73	2.09	2.32	2.62	6.60	6.42	6.63	6.81
Canada	0.80	1.59	2.18	2.36	6.26	6.15	6.22	6.48
France	0.26	0.36	0.53	1.00	5.67	5.66	5.81	6.11
Germany	0.26	0.48	0.64	0.96	5.29	5.04	5.15	5.54
Italy	1.39	1.44	1.72	2.06	5.56	5.29	5.40	5.79
Japan	-0.10	-0.22	0.07	-1.04	1.79	1.81	1.74	1.71
United Kingdom	2.20	1.42	1.17	1.47	5.83	5.28	5.38	5.82

Inflation and Long-Term Interest Rates Differentials



		Money Stock				Bank			
		M1	MZM	M2	M3	Credit	Monetary Base	Reserves	MSI M2
1995		1143.037	2906.093	3575.434	4500.288	3501.096	443.511	76.849	210.451
1996		1106.428	3096.347	3747.395	4796.863	3684.031	455.586	73.415	217.848
1997		1069.928	3318.613	3931.933	5179.573	3952.233	478.753	68.918	227.069
1998		1080.851	3705.090	4221.490	5710.905	4324.891	508.981	66.963	242.228
1999		1102.574	4160.230	4541.154	6211.377	4583.496	557.858	71.381	258.622
1997	1	1076.355	3222.658	3850.581	5013.301	3830.528	470.027	70.409	222.859
	2	1065.335	3275.272	3897.351	5112.773	3911.279	473.896	68.177	225.233
	3	1069.092	3349.688	3959.375	5235.401	3991.694	480.946	68.565	228.455
	4	1068.930	3426.834	4020.424	5356.815	4075.431	490.143	68.518	231.730
1998	1	1076.718	3523.710	4097.751	5498.386	4188.627	498.386	67.710	235.915
	2	1078.686	3637.300	4176.066	5638.533	4244.182	502.060	66.085	239.944
	3	1076.071	3746.116	4249.253	5763.392	4343.683	511.594	66.953	243.731
	4	1091.928	3913.234	4362.890	5943.310	4523.073	523.881	67.105	249.321
1999	1	1097.235	4033.500	4444.508	6064.884	4519.495	536.335	67.691	253.373
	2	1103.078	4127.362	4511.474	6155.831	4526.141	545.912	66.526	257.008
	3	1097.752	4201.131	4573.520	6234.494	4580.197	557.969	68.179	260.353
	4	1112.231	4278.926	4635.112	6390.299	4708.149	591.218	83.126	263.756
1998	Jan	1073.724	3485.692	4065.935	5450.732	4159.652	496.198	68.917	234.242
	Feb	1076.110	3522.418	4098.736	5487.458	4188.132	499.554	67.413	235.959
	Mar	1080.319	3563.019	4128.581	5556.968	4218.098	499.407	66.800	237.545
	Apr	1081.657	3601.717	4152.912	5594.709	4221.203	499.601	66.000	238.892
	May	1076.489	3637.081	4174.983	5638.310	4243.301	502.386	66.136	239.821
	Jun	1077.912	3673.103	4200.304	5682.580	4268.041	504.194	66.119	241.120
	Jul	1076.877	3700.662	4218.927	5703.553	4287.942	507.679	66.368	242.266
	Aug	1073.126	3739.452	4242.999	5762.219	4347.715	511.095	67.436	243.438
	Sep	1078.211	3798.233	4285.832	5824.404	4395.391	516.009	67.055	245.488
	Oct	1084.671	3860.123	4327.305	5887.794	4490.574	520.806	67.058	247.528
	Nov	1093.736	3915.842	4364.343	5945.180	4529.764	524.379	67.182	249.420
	Dec	1097.377	3963.737	4397.021	5996.956	4548.880	526.458	67.074	251.014
1999	Jan	1095.988	3998.719	4422.371	6028.795	4539.480	531.761	68.517	252.265
	Feb	1094.305	4039.752	4447.689	6078.028	4524.252	538.190	68.067	253.460
	Mar	1101.412	4062.028	4463.463	6087.829	4494.753	539.053	66.488	254.393
	Apr	1107.247	4099.574	4490.381	6123.806	4507.611	539.609	64.109	255.904
	May	1101.773	4129.201	4513.077	6156.328	4516.925	548.331	68.424	257.078
	Jun	1100.213	4153.311	4530.965	6187.358	4553.888	549.797	67.046	258.041
	Jul	1099.423	4177.895	4553.550	6211.873	4549.912	553.061	66.882	259.246
	Aug	1098.329	4202.750	4572.866	6231.605	4583.003	556.713	67.350	260.311
	Sep	1095.504	4222.747	4594.145	6260.003	4607.677	564.133	70.306	261.503
	Oct	1101.159	4247.111	4612.102	6311.358	4636.720	572.986	72.806	262.483
	Nov	1110.186	4275.372	4632.152	6388.116	4704.165	588.662	82.709	263.592
	Dec	1125.348	4314.296	4661.082	6471.422	4783.561	612.005	93.863	265.193
2000	Jan	1121.698	4347.134	4683.948	6513.407	4796.453	604.552	79.433	266.320

*All values are given in billions of dollars

		Federal	Discount	Prime	3-mo	Treasury Yields			Corporate	S & L	Conventional
		Funds	Rate	Rate		CDs	3 mo	3 yr	30 yr	Aaa Bonds	
1995		5.84	5.21	8.83	5.92	5.66	6.26	6.88	7.59	5.80	7.95
1996		5.30	5.02	8.27	5.39	5.15	5.99	6.70	7.37	5.52	7.80
1997		5.46	5.00	8.44	5.62	5.20	6.10	6.61	7.26	5.32	7.60
1998		5.35	4.92	8.35	5.47	4.91	5.14	5.58	6.53	4.93	6.94
1999		4.97	4.62	7.99	5.33	4.78	5.49	5.87	7.04	5.28	7.43
1997	1	5.28	5.00	8.27	5.44	5.20	6.19	6.82	7.43	5.44	7.79
	2	5.52	5.00	8.50	5.69	5.19	6.42	6.93	7.57	5.49	7.93
	3	5.53	5.00	8.50	5.60	5.18	6.01	6.53	7.17	5.23	7.47
	4	5.51	5.00	8.50	5.73	5.23	5.78	6.14	6.88	5.14	7.20
1998	1	5.52	5.00	8.50	5.55	5.19	5.46	5.88	6.67	4.94	7.05
	2	5.50	5.00	8.50	5.59	5.11	5.57	5.85	6.64	5.00	7.09
	3	5.53	5.00	8.50	5.53	4.96	5.11	5.47	6.49	4.95	6.87
	4	4.86	4.66	7.92	5.20	4.37	4.41	5.11	6.33	4.82	6.76
1999	1	4.73	4.50	7.75	4.90	4.53	4.87	5.37	6.42	4.87	6.88
	2	4.75	4.50	7.75	4.98	4.59	5.35	5.80	6.93	5.05	7.20
	3	5.09	4.60	8.10	5.38	4.79	5.71	6.04	7.33	5.42	7.80
	4	5.31	4.87	8.37	6.06	5.20	6.00	6.25	7.49	5.79	7.83
1998	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
	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

*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		2.01	12.28	7.57	8.76
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1997	1	-0.53	1.79	1.19	1.90
	2	-1.02	1.63	1.21	1.98
	3	0.35	2.27	1.59	2.40
	4	-0.02	2.30	1.54	2.32
1998	1	0.73	2.83	1.92	2.64
	2	0.18	3.22	1.91	2.55
	3	-0.24	2.99	1.75	2.21
	4	1.47	4.46	2.67	3.12
1999	1	0.49	3.07	1.87	2.05
	2	0.53	2.33	1.51	1.50
	3	-0.48	1.79	1.38	1.28
	4	1.32	1.85	1.35	2.50
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1998	Jan	-0.02	0.93	0.62	0.90
	Feb	0.22	1.05	0.81	0.67
	Mar	0.39	1.15	0.73	1.27
	Apr	0.12	1.09	0.59	0.68
	May	-0.48	0.98	0.53	0.78
	Jun	0.13	0.99	0.61	0.79
	Jul	-0.10	0.75	0.44	0.37
	Aug	-0.35	1.05	0.57	1.03
	Sep	0.47	1.57	1.01	1.08
	Oct	0.60	1.63	0.97	1.09
	Nov	0.84	1.44	0.86	0.97
	Dec	0.33	1.22	0.75	0.87
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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	-0.07	0.59	0.50	0.40
	Aug	-0.10	0.59	0.42	0.32
	Sep	-0.26	0.48	0.47	0.46
	Oct	0.52	0.58	0.39	0.82
	Nov	0.82	0.67	0.43	1.22
	Dec	1.37	0.91	0.62	1.30
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2000	Jan	-0.32	0.76	0.49	0.65

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 was 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

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

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 01/15/2008.

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 1996 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 1996 dollars.

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

Sources

Bank of Canada

Canadian inflation-linked bond yields.

Bank of England

U.K. inflation-linked bond yields.

Board of Governors of the Federal Reserve System

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

Bureau of Economic Analysis

Gross domestic product.

Bureau of Labor Statistics

Consumer price index.

Federal Reserve Bank of Philadelphia

Survey of Professional Forecasters inflation expectations.

Federal Reserve Bank of St. Louis

Adjusted monetary base and adjusted total reserves, monetary services index, one-year forward rates.

Organization for Economic Cooperation and Development

International interest and inflation rates.

University of Michigan Survey Research Center

Median expected price change.

Congressional Budget Office

Potential real GDP.

Dow Jones and Co. (Wall Street Journal)

Federal funds futures contracts, Eurodollar futures.

Standard and Poors Inc.

Stock price-earnings ratio, stock price composite index.

U.S. Department of the Treasury

U.S. inflation-protected security yields.

References

Anderson, Richard G. and Robert H. Rasche (1996a). "A Revised Measure of the St. Louis Adjusted Monetary Base," Federal Reserve Bank of St. Louis *Review*, March/April 1996, pp. 3 - 13.

___ and ___ (1996b). "Measuring the Adjusted Monetary Base in an Era of Financial Change," Federal Reserve Bank of St. Louis *Review*, November/December 1996, pp. 3 - 37.

___, Barry E. Jones and Travis D. Nesmith (1997). "Special Report: The Monetary Services Indexes Project of the Federal Reserve Bank of St. Louis," Federal Reserve Bank of St. Louis *Review*, January/ February 1997, pp. 31 - 82.

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

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

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

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

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

Sharpe, William F. (1997). *Macro-Investment Analysis*, on-line textbook available at www-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.