

Interest Rates in the Short Run
Class Notes

1. Review
 - a. What does Fisher mean when he says that the real rate of interest is, in the long run, determined by the interaction of the patience of the population and the productivity of capital?
 - b. What sort of exogenous change (shock) would raise the long run rate of interest?
 - c. What sort of shock would lower the long run rate of interest?

2. In the short run, the nominal rate of interest is determined by the demand for and supply of loanable funds.
 - a. The supply of loanable funds is saving by households, firms, the components of government that are running surpluses.
 - b. The demand for loanable funds is investment demand by firms, demand for consumer durable goods and housing by households, and borrowing by the components of government that are running deficits.
 - c. The rest of the world is a source of funds (saving) when the United States is running a current account deficit. The rest of the world is a use of funds (investment) when the United States is running a current account surplus.

3. There are several important reasons why the short run rate of interest can be different from the long run rate of interest.
 - a. In the long run, the government budget is balanced. In the short run, it may be in deficit or surplus.
 - b. In the long run, the nation's current account is balanced. In the short run, it may be in deficit or surplus.
 - c. In the long run, the inflation rate is constant and inflation expectations are correct. In the short run, the inflation rate and inflation expectations may be changing. In the short run, inflation expectations may not be correct.

4. Discussion Questions
 - a. How, according to the demand and supply model, do the following shocks change the equilibrium rate of interest?
 - i. An increase in consumer confidence.
 - ii. An decrease in capital capacity utilization.
 - iii. An increase in the S&P 500 stock price index.
 - iv. A decrease in the value of the US dollar vis a vis the Euro.
 - v. An increase in the federal funds rate.

 - b. What is the relative importance of the various sources of saving in the US today?

Savings Equals Investment

For the economy as a whole, investment is identically equal to saving. The identity follows from the GDP identity ($Y = C + I + G + X - M$).

Let subscript H designate the household sector, subscript B the business sector, subscript G the government sector and subscript F the foreign sector.

We use two common decompositions of GDP:

$$Y = C + I_H + I_B + G + X - M$$

$$Y = \text{Wages} + \text{Profits} + \text{Rents} + \text{Interest Payments}$$

The first decomposition accounts for GDP according to how it is spent or absorbed. The second accounts for how GDP is earned by various productive factors.

The first step is showing that $S = I$ is to obtain expressions for the saving flows of each sector of the economy. In the following TNT_j is Taxes net of Transfer Payments in sector j.

$$H: \quad S_H = [\text{Wages} + \text{Rents} + \text{Interest} + \text{Dividends}] - TNT_H - C$$

$$B: \quad S_B = \text{Profits} - TNT_B - \text{Dividends}$$

$$G: \quad S_G = TNT_H + TNT_B - G$$

$$F: \quad S_F = IM - EX$$

Total Saving is the sum of the sector saving components

$$\begin{aligned} S &= S_H + S_B + S_G + S_F \\ &= [\text{Wages} + \text{Rents} + \text{Interest} + \text{Dividends} - TNT_H - C] \\ &\quad + [\text{Profits} - TNT_B - \text{Dividends}] + [TNT_H + TNT_B - G] + [M - X] \\ &= \text{Wages} + \text{Rents} + \text{Interest} + \text{Profits} - C - G - (X - M) \\ &= I_H + I_B \end{aligned}$$

Therefore, the sum of saving across sectors of the economy is identically equal to total investment in the household and business sector.

Questions:

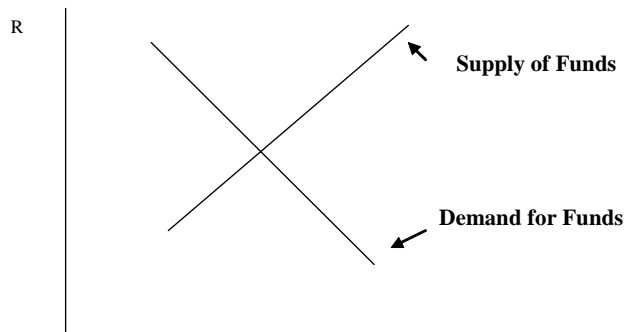
1. What is the intuition for considering $M - X$ as part of saving?
2. How have the components of US saving changed in the last twenty years?

Short Run Determination of the Rate of Interest

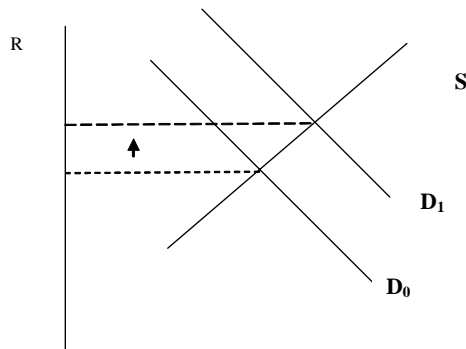
In the short run, the rate of interest is determined by equilibrium in the loanable funds market.

The demand for funds is the demand for funds to finance new investment projects, consumer durable purchases, construction of new housing, and government budget deficits.

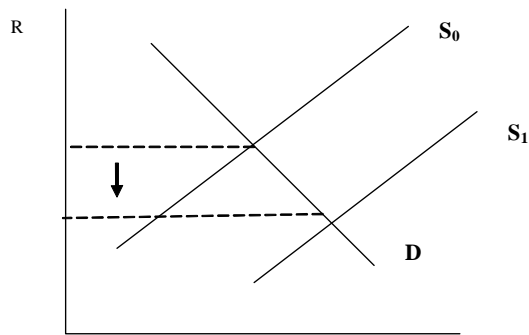
The supply of funds is household saving, firm saving, surpluses by components of the government (states and localities).



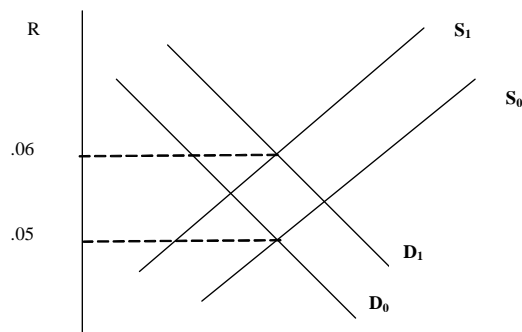
An increase in desired investment spending, an increase in government budget deficits, an increase in household demand for funds for durable purchases, all cause an increase in the demand for loanable funds and, other factors unchanged, an increase in the nominal interest rate.



An increase in household or firm saving, an increase in government budget surplus, or an increase in the current account deficit adds to the supply of loanable funds.



An increase in the expected rate of inflation, *ceteris paribus*, causes an increase in the demand for funds and a decrease in the supply of funds. The vertical size of the shift in demand and supply is exactly equal to the change in the expected rate of inflation.



An Alternative Approach: Demand for and Supply of Bonds

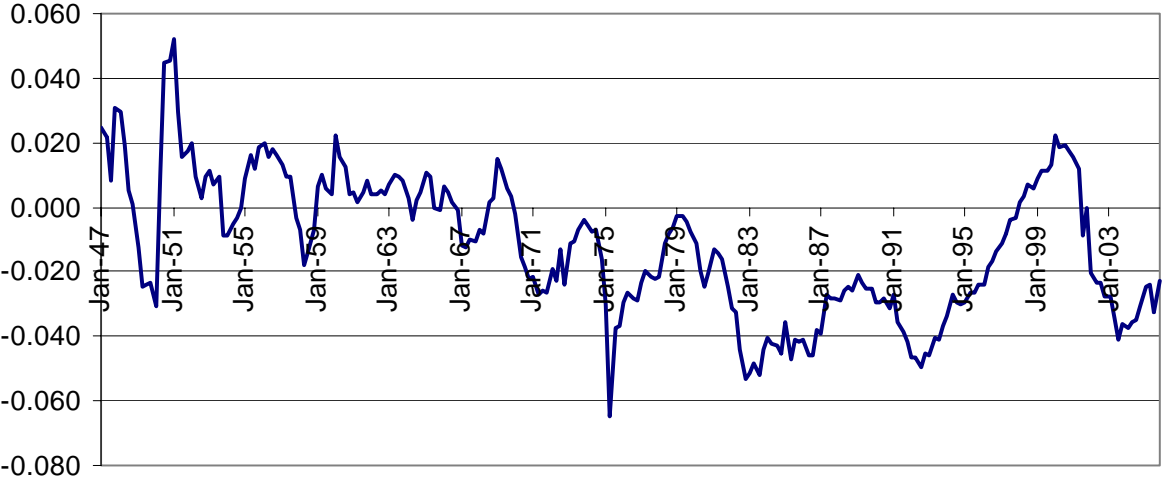
1. Mishkin explains that the demand and supply for loanable funds can be recast as the demand and supply for the financial asset (bond) issued by the agent who desires to borrow.
 - a. The agent who demands loanable funds supplies bonds.
 - b. The agent who supplies loanable funds demands bonds.
 - c. Demand and supply jointly determine the equilibrium price of the bond.
 - d. The equilibrium interest rate is the yield to maturity of the bond which is inversely related to its price.

2. The “bond” that is presumed to underlie the loanable funds approach can be taken to be one year commercial paper, a discount bond issued by borrowers who have good credit ratings.
 - a. One advantage of the “bond” approach is that it allows us more easily to understand how changes in the yield to maturity of one asset affect the yields to maturities of others.
 - b. Savers consider different bonds to be substitutes. If the yield on one rises, they are likely to sell the lower-yield bonds in order to buy the higher yield bond.

3. We will not cover the “liquidity preference” approach to the determination of interest rates.

In the short run, the government budget may be in surplus or in deficit.

Federal Govt Saving as Share of GDP



In the short run, the government current account may be in surplus or in deficit.

Current Account as Share of GDP

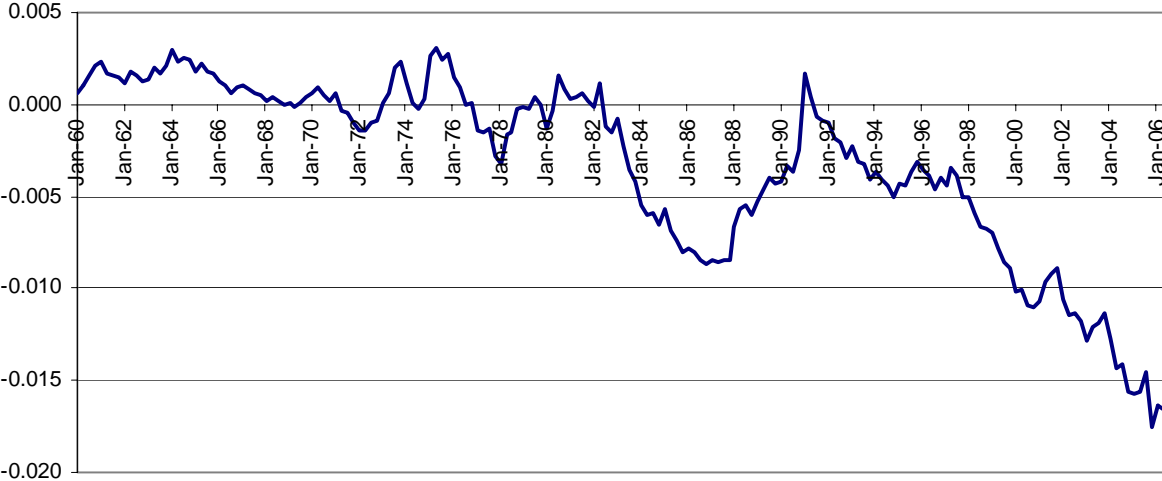


TABLE B-32.—Gross saving and investment, 1959–2005
 (Billions of dollars, except as noted; quarterly data at seasonally adjusted annual rates)

Year or quarter	Gross saving											
	Total gross saving	Net saving								Consumption of fixed capital		
		Total net saving	Net private saving				Net government saving					
			Total	Personal saving	Undistributed corporate profits ¹	Wage accruals less disbursements	Total	Federal	State and local	Total	Private	Government
1959	106.2	53.2	46.0	26.7	19.4	0.0	7.1	3.3	3.8	53.0	38.6	14.5
1960	111.3	55.8	44.3	26.7	17.6	.0	11.5	7.2	4.3	55.6	40.5	15.0
1961	114.3	57.1	50.2	32.2	18.1	.0	6.9	2.6	4.3	57.2	41.6	15.6
1962	124.9	65.7	57.9	33.8	24.1	.0	7.8	2.5	5.2	59.3	42.8	16.5
1963	133.2	70.8	59.7	33.3	26.4	.0	11.1	5.4	5.7	62.4	44.9	17.5
1964	143.4	78.4	71.0	40.8	30.1	.0	7.4	1.0	6.4	65.0	46.9	18.1
1965	158.5	89.1	79.2	43.0	36.2	.0	9.9	3.3	6.5	69.4	50.5	18.9
1966	168.7	93.1	83.1	44.4	38.7	.0	10.0	2.3	7.8	75.6	55.5	20.1
1967	170.5	89.0	91.4	54.4	36.9	.0	-2.4	-9.4	7.0	81.5	59.9	21.6
1968	182.0	93.6	88.4	52.8	35.6	.0	5.2	-2.3	7.5	88.4	65.2	23.1
1969	198.3	100.4	83.7	52.5	31.2	.0	16.7	8.7	8.0	97.9	73.1	24.8
1970	192.7	86.0	94.0	69.5	24.6	.0	-8.1	-15.2	7.1	106.7	80.0	26.7
1971	208.9	93.9	115.8	80.6	34.8	.4	-21.9	-28.4	6.5	115.0	86.7	28.3
1972	237.5	111.0	119.8	77.2	42.9	-3	-8.8	-24.4	15.6	126.5	97.1	29.5
1973	292.0	152.7	148.3	102.7	45.6	.0	4.4	-11.3	15.7	139.3	107.9	31.4
1974	301.5	139.0	143.4	113.6	29.8	.0	-4.4	-13.8	9.3	162.5	126.6	35.9
1975	297.0	109.2	175.8	125.6	50.2	.0	-66.6	-69.0	2.5	187.7	147.8	40.0
1976	342.1	137.0	181.3	122.3	59.0	.0	-44.4	-51.7	7.4	205.2	162.5	42.6
1977	397.5	167.5	198.5	125.3	73.2	.0	-31.0	-44.1	13.1	230.0	184.3	45.7
1978	478.0	215.7	223.5	142.5	81.0	.0	-7.8	-26.5	18.7	262.3	212.8	49.5
1979	536.7	236.6	234.9	159.1	75.7	.0	1.7	-11.3	13.0	300.1	245.7	54.5
1980	549.4	206.5	251.3	201.4	49.9	.0	-44.8	-53.6	8.8	343.0	281.1	61.8
1981	654.7	266.6	312.3	244.3	68.0	.0	-45.7	-53.3	7.6	388.1	317.9	70.1
1982	629.1	202.2	336.2	270.8	65.4	.0	-134.1	-131.9	-2.2	426.9	349.8	77.1
1983	609.4	165.6	333.7	233.6	100.1	.0	-168.1	-173.0	4.9	443.8	362.1	81.7
1984	773.4	300.9	445.0	314.8	130.3	.0	-144.1	-168.1	23.9	472.6	385.6	87.0
1985	767.5	260.7	413.4	280.0	133.4	.0	-152.6	-175.0	22.3	506.7	414.0	92.7
1986	733.5	202.2	372.0	268.4	103.7	.0	-169.9	-190.8	21.0	531.3	431.8	99.5
1987	796.8	234.9	367.4	241.4	126.1	.0	-132.6	-145.0	12.4	561.9	455.3	106.7
1988	915.0	317.4	434.0	272.9	161.1	.0	-116.6	-134.5	17.9	597.6	483.5	114.1
1989	944.7	300.4	409.7	287.1	122.6	.0	-109.3	-130.1	20.8	644.3	522.1	122.2
1990	940.4	258.0	422.7	299.4	123.3	.0	-164.8	-172.0	7.2	682.5	551.6	130.9
1991	964.1	238.2	456.1	324.2	131.9	.0	-217.9	-213.7	-4.2	725.9	586.9	139.1
1992	948.2	196.3	493.0	366.0	142.7	-15.8	-296.7	-297.4	7	751.9	607.3	144.6
1993	962.4	186.0	458.6	284.0	168.1	6.4	-272.6	-273.5	9	776.4	624.7	151.8
1994	1,070.7	237.1	438.9	249.5	171.8	17.6	-201.9	-212.3	10.5	833.7	675.1	158.6
1995	1,184.5	306.2	491.1	250.9	223.8	16.4	-184.9	-197.0	12.0	878.4	713.4	165.0
1996	1,291.1	373.0	489.0	228.4	256.9	3.6	-116.0	-141.8	25.8	918.1	748.8	169.3
1997	1,461.1	486.6	503.3	218.3	287.9	-2.9	-16.7	-55.8	39.1	974.4	800.3	174.1
1998	1,598.7	568.6	477.8	276.8	201.7	-7	90.8	38.8	52.0	1,030.2	851.2	179.0
1999	1,674.3	573.0	419.0	158.6	255.3	5.2	154.0	103.6	50.4	1,101.3	914.3	187.0
2000	1,770.5	582.7	343.3	168.5	174.8	.0	239.4	189.5	50.0	1,187.8	990.8	197.0
2001	1,657.6	376.1	324.6	132.3	192.3	.0	51.5	46.7	4.8	1,281.5	1,075.5	206.0
2002	1,489.1	197.1	479.2	184.7	294.5	.0	-282.1	-247.9	-34.2	1,292.0	1,080.3	211.6
2003	1,474.1	142.7	549.3	172.8	376.5	.0	-406.5	-382.7	-23.8	1,331.3	1,112.8	218.5
2004	1,572.0	136.8	549.1	151.8	397.3	.0	-412.3	-406.5	-5.9	1,435.3	1,206.2	229.1
2005 P				-41.6		.0				1,574.1	1,327.2	246.9
2002: I	1,535.7	253.7	497.4	225.4	272.0	.0	-243.8	-208.5	-35.3	1,282.0	1,073.1	208.9
II	1,512.6	224.4	500.9	221.2	279.7	.0	-276.5	-241.4	-35.1	1,288.2	1,077.5	210.8
III	1,461.5	166.7	445.4	153.0	292.4	.0	-278.7	-247.3	-31.4	1,294.9	1,082.4	212.5
IV	1,446.6	143.8	473.3	139.3	334.0	.0	-329.5	-294.6	-34.9	1,302.7	1,088.4	214.3
2003: I	1,413.3	101.4	465.2	154.0	311.3	.0	-363.8	-296.0	-67.8	1,311.8	1,095.7	216.1
II	1,456.8	133.0	532.9	169.6	363.4	.0	-399.9	-373.8	-26.1	1,323.8	1,105.8	218.1
III	1,470.0	132.8	602.8	205.1	397.7	.0	-469.9	-456.2	-13.8	1,337.2	1,117.8	219.3
IV	1,556.2	203.7	596.2	162.6	433.6	.0	-392.5	-405.0	12.5	1,352.5	1,131.8	220.6
2004: I	1,534.7	163.6	599.4	155.8	443.5	.0	-435.8	-429.3	-6.5	1,371.1	1,147.8	223.3
II	1,546.4	152.6	567.6	141.2	426.4	.0	-415.0	-413.4	-1.6	1,393.8	1,165.8	228.1
III	1,590.1	56.0	486.9	104.6	382.3	.0	-430.9	-411.6	-19.3	1,534.1	1,303.5	230.6
IV	1,617.0	174.9	542.6	205.4	337.2	.0	-367.7	-371.6	4.0	1,442.0	1,207.6	234.5
2005: I	1,635.5	187.1	478.1	47.4	430.7	.0	-290.9	-298.3	7.4	1,448.4	1,210.9	237.5
II	1,628.4	171.2	447.2	-21.5	468.7	.0	-276.1	-297.3	21.3	1,457.2	1,216.9	240.4
III	1,696.0	-167.8	253.8	-158.9	412.6	.0	-421.6	-415.2	-6.4	1,863.8	1,603.6	260.2
IV P				-33.3		.0				1,526.9	1,277.3	249.6

¹With inventory valuation and capital consumption adjustments.

See next page for continuation of table.

TABLE B-32.—Gross saving and investment, 1959–2005—Continued

[Billions of dollars, except as noted; quarterly data at seasonally adjusted annual rates]

Year or quarter	Gross domestic investment, capital account transactions, and net lending, NIPA						Statistical discrepancy	Addenda:							
	Total	Gross domestic investment			Capital account transactions (net) ³	Net lending or net borrowing (-) NIPA ⁴		Gross private saving	Gross government saving			Net domestic investment	Gross saving as a percent of gross national income	Net saving as a percent of gross national income	
		Total	Gross private domestic investment	Gross government investment ²					Total	Federal	State and local				
1959	106.7	107.8	78.5	29.3	.....	-1.2	0.5	84.6	21.6	13.6	8.0	54.8	20.9	10.4
1960	110.4	107.2	78.9	28.3	.....	3.2	-9	84.8	26.5	17.8	8.7	51.6	21.0	10.5
1961	113.8	109.5	78.2	31.3	.....	4.3	-6	91.8	22.5	13.5	9.0	52.3	20.8	10.4
1962	125.3	121.4	88.1	33.3	.....	3.9	.4	100.7	24.3	14.0	10.3	62.2	21.2	11.1
1963	132.4	127.4	93.8	33.6	.....	5.0	-8	104.6	28.6	17.5	11.1	65.0	21.4	11.4
1964	144.2	136.7	102.1	34.6	.....	7.5	.8	117.9	25.5	13.4	12.1	71.7	21.5	11.7
1965	160.0	153.8	118.2	35.6	.....	6.2	1.6	129.7	28.8	16.0	12.8	84.4	21.9	12.3
1966	175.0	171.1	131.3	39.8	.....	3.9	6.3	138.6	30.1	15.5	14.6	95.5	21.4	11.8
1967	175.1	171.6	128.6	43.0	.....	3.6	4.6	151.3	19.2	4.7	14.5	90.1	20.5	10.7
1968	186.6	184.8	141.2	43.6	.....	1.7	4.6	153.7	28.3	12.5	15.8	96.5	20.0	10.3
1969	201.5	199.7	156.4	43.3	.....	1.8	3.2	156.8	41.5	24.2	17.3	101.8	20.1	10.2
1970	200.0	196.0	152.4	43.6	.....	4.0	7.3	174.1	18.6	.9	17.7	89.3	18.6	8.3
1971	220.5	219.9	178.2	41.8	.....	.6	11.6	202.5	6.4	-11.9	18.3	104.9	18.6	8.4
1972	246.6	250.2	207.6	42.6	.....	-3.6	9.1	216.8	20.7	-7.7	28.5	123.7	19.2	9.0
1973	300.7	291.3	244.5	46.8	.....	9.3	8.6	256.3	35.8	5.8	30.0	152.1	21.1	11.0
1974	312.3	305.7	249.4	56.3	.....	6.6	10.9	270.0	31.5	4.5	27.0	143.2	20.0	9.2
1975	314.7	293.3	230.2	63.1	.....	21.4	17.7	323.6	-26.6	-49.3	22.7	105.6	18.2	6.7
1976	367.2	358.4	292.0	66.4	.....	8.9	25.1	343.8	-1.7	-30.3	28.6	153.2	18.8	7.5
1977	419.8	428.8	361.3	67.5	.....	-9.0	22.3	382.8	14.7	-21.0	35.7	198.8	19.6	8.3
1978	504.6	515.0	438.0	77.1	.....	-10.4	26.6	436.3	41.7	-1.5	43.2	252.7	20.9	9.4
1979	582.8	581.4	492.9	88.5	.....	1.4	46.0	480.5	56.2	15.7	40.5	281.2	21.1	9.3
1980	590.9	579.5	479.3	100.3	.....	11.4	41.4	532.4	17.0	-23.6	40.6	236.6	19.7	7.4
1981	685.6	679.3	572.4	106.9	.....	6.3	30.9	630.3	24.4	-19.4	43.9	291.2	20.9	8.5
1982	629.4	629.5	517.2	112.3	.....	-0.2	.0	686.0	-56.9	-94.2	37.3	202.6	19.1	6.1
1983	655.1	687.2	564.3	122.9	.....	-2	-31.8	695.8	-86.5	-132.3	45.8	243.4	17.3	4.7
1984	788.0	875.0	735.6	139.4	.....	-2	-86.7	830.6	-57.2	-123.5	66.3	402.4	19.6	7.6
1985	784.1	895.0	736.2	158.8	.....	-3	-110.5	827.3	-59.9	-126.9	67.0	388.3	18.1	6.2
1986	780.5	919.7	746.5	173.2	.....	-3	-138.9	803.9	-70.4	-139.2	68.8	388.4	16.5	4.6
1987	818.5	969.2	785.0	184.3	.....	-4	-150.4	822.7	-25.9	-89.8	63.9	407.3	16.8	5.0
1988	895.5	1,007.7	821.6	186.1	.....	-5	-111.7	917.5	-2.5	-75.2	72.7	410.1	17.8	6.2
1989	984.3	1,072.6	874.9	197.7	.....	-3	-88.0	931.8	12.9	-66.7	79.6	428.4	17.3	5.5
1990	1,006.7	1,076.7	861.0	215.7	.....	6.6	-76.6	974.3	-33.8	-104.1	70.3	394.2	16.3	4.5
1991	1,036.6	1,023.2	802.9	220.3	.....	4.5	9.0	1,042.9	-78.8	-141.5	62.7	297.3	16.2	4.0
1992	1,051.0	1,087.9	864.8	223.1	.....	.6	-37.5	1,100.4	-152.1	-222.7	70.6	336.0	15.1	3.1
1993	1,102.0	1,172.4	953.4	219.0	1.3	-71.7	1,139.5	1,083.3	-120.8	-195.5	74.7	395.9	14.7	2.8
1994	1,213.2	1,318.4	1,097.1	221.4	.....	1.7	-106.9	1,114.0	-43.2	-132.2	88.9	484.7	15.4	3.4
1995	1,285.7	1,376.7	1,144.0	232.7	.....	.9	-91.9	1,204.5	-19.9	-115.1	95.2	498.4	16.2	4.2
1996	1,384.8	1,485.2	1,240.3	244.9	.....	.7	-101.0	1,237.8	53.3	-59.7	113.0	567.1	16.6	4.8
1997	1,531.7	1,641.9	1,389.8	252.2	.....	1.0	-111.3	1,303.6	157.5	26.7	130.7	667.5	17.7	5.9
1998	1,584.1	1,771.5	1,509.1	262.4	.....	.7	-188.1	1,328.9	269.8	121.6	148.2	741.3	18.2	6.5
1999	1,638.5	1,912.4	1,625.7	286.8	.....	4.8	-278.7	1,333.3	341.0	188.5	152.5	811.2	17.9	6.1
2000	1,643.3	2,040.0	1,735.5	304.5	.....	.8	-397.4	1,334.1	436.4	276.6	159.8	852.1	17.7	5.8
2001	1,567.9	1,938.3	1,614.3	324.0	.....	1.1	-371.5	1,400.1	257.5	134.9	122.6	656.9	16.2	3.7
2002	1,468.1	1,926.4	1,582.1	344.3	.....	1.4	-459.7	1,559.6	-70.5	-159.1	88.6	634.4	14.2	1.9
2003	1,521.1	2,025.6	1,670.4	355.3	.....	3.2	-507.7	1,662.1	-188.0	-292.5	104.5	694.3	13.4	1.3
2004	1,648.9	2,300.6	1,928.1	372.5	.....	1.6	-653.4	1,755.3	-183.2	-312.7	129.4	865.3	13.4	1.2
2005 ^P	.....	2,499.4	2,099.5	399.9	.....	.....	.....	.....	.....	.....	.....	925.4	.....	.....
2002:1	1,482.1	1,903.1	1,564.1	339.0	.....	1.2	-422.2	1,570.5	-34.9	-119.9	85.0	621.1	14.7	2.4
II	1,455.9	1,915.4	1,571.4	343.9	.....	1.2	-460.7	1,578.3	-65.7	-152.8	87.0	627.2	14.4	2.1
III	1,476.1	1,939.7	1,592.9	346.8	.....	1.5	-465.1	1,527.7	-66.2	-158.4	92.2	644.8	13.9	1.6
IV	1,458.3	1,947.4	1,600.1	347.4	.....	1.6	-490.7	1,561.7	-115.2	-205.1	90.0	644.7	13.6	1.4
2003:1	1,429.8	1,958.9	1,610.0	349.0	.....	1.7	-530.8	1,560.9	-147.7	-206.4	58.7	647.1	13.2	.9
II	1,471.2	1,974.5	1,619.3	355.2	.....	6.4	-509.6	1,638.7	-181.9	-283.4	101.6	650.6	13.4	1.2
III	1,555.3	2,054.4	1,694.2	360.1	.....	3.3	-502.4	1,720.6	-250.6	-365.7	115.1	717.2	13.3	1.2
IV	1,628.2	2,114.7	1,757.9	356.8	.....	1.4	-487.9	1,728.1	-171.9	-314.3	142.5	762.2	13.8	1.8
2004:1	1,612.5	2,178.7	1,818.2	360.4	.....	1.7	-567.9	1,747.2	-212.5	-337.6	125.1	807.5	13.4	1.4
II	1,654.5	2,303.4	1,928.5	375.0	.....	1.5	-650.4	1,733.4	-187.0	-320.0	133.0	909.6	13.3	1.3
III	1,680.9	2,334.0	1,961.2	372.9	.....	1.6	-654.7	1,790.4	-200.3	-317.3	117.1	799.9	13.5	.5
IV	1,647.6	2,386.2	2,004.5	381.7	.....	1.8	-740.4	1,750.2	-133.2	-275.7	142.5	944.2	13.5	1.5
2005:1	1,675.0	2,441.9	2,058.5	383.4	.....	17.3	-784.3	1,688.9	-53.4	-201.4	148.0	993.5	13.4	1.5
II	1,706.6	2,453.5	2,054.4	399.1	.....	.5	-747.3	1,664.1	-35.7	-199.6	163.9	996.3	13.2	1.4
III	1,762.5	2,503.6	2,099.5	404.1	.....	.5	-741.6	1,857.4	-161.5	-316.0	154.6	639.8	13.5	-1.3
IV ^P	.....	2,598.8	2,185.7	413.1	.....	.....	.....	.....	.....	.....	.....	1,071.9	.....	.....

²For details on government investment, see Table B-20.

³Consists of capital transfers and the acquisition and disposal of nonproduced nonfinancial assets.

⁴Prior to 1982, equals the balance on current account, NIPA (see Table B-24).

Source: Department of Commerce, Bureau of Economic Analysis.