

The Influence of Housing and Durables on Personal Saving

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The rate of national saving declined sharply in the 1980s. Relative to national income, saving dropped from its postwar average of 8 percent to 2 percent by the end of the decade. The growth of federal deficits accounted for much of the drop, but more than one-half reflected a sharp decline in the private saving rate. Personal saving as a share of disposable income, the only official rate published by the U.S. Bureau of Economic Analysis, declined from 7 to 3 percent. This decline was puzzling, because it came after decades of stability and in the wake of the Economic Recovery Tax Act and other policies designed to increase saving and investment.

Explaining the drop in saving has become a major industry for economists. Great efforts have been made to determine whether the decline is a real phenomenon or a measurement problem. Some of the explanations for this puzzling performance have considered the influence of capital gains, a reduction in the need for precautionary saving, a decline in the need for retirement saving, the effect of slower income growth, and a host of other factors.

This article explores the relationship between personal saving and the treatment of owner-occupied housing and consumer durable goods in the national accounts. The 1970s was an extraordinary period for housing: housing transactions increased greatly, many homeowners made large capital gains and expected further gains, and in the 1980s the ratio of mortgage debt to the housing stock rose markedly. Moreover, consumers' purchases of durable goods rose noticeably during the economic recovery of the 1980s. Even if personal thrift had not changed in the last decade, these developments would have

Table 1
Saving as a Percent of Net National Product, 1951 to 1989

Item	1951-60	1961-70	1971-75	1976-80	1981-85	1986-89
Private Saving	8.6	8.3	9.2	8.8	6.3	4.0
Personal Saving	5.1	5.3	6.8	5.5	4.8	3.2
Private Pensions	.9	1.2	1.7	2.2	1.8	1.2
Other	4.2	4.1	5.1	3.3	2.9	2.0
Business Saving	3.5	3.0	2.3	3.4	1.5	.8
Government Saving	-.4	-.5	-1.4	-.8	-3.3	-2.6
Total National Saving	8.2	7.8	7.8	8.0	3.0	1.4
Addendum: Personal Saving as a Percent of Disposable Income	6.7	7.0	8.8	7.0	6.0	4.0

Note: Items may not sum to totals because of rounding.

Source: U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-82*, Tables 1.8, 2.1, 5.1, and 6.13; U.S. Bureau of Economic Analysis, 1986 to 1990, "National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Tables 1.9, 2.1, 5.1, and 6.13.

affected the measures of personal saving reported in our national accounts, because of the techniques used to account for homeowners' investment in their residences and the consumption of services provided by durable goods.

After an introductory section on national saving trends, sections II and III explore the treatment of housing and consumer durable goods in the national income and product accounts (NIPA). Section IV examines the potential consequences of understating the returns on owner-occupied houses and overstating the consumption of services of durable goods. This article concludes that the greater value of homeowners' investment in their residences after the 1970s and, to a lesser extent, rising outlays for consumer durable goods in the 1980s depressed reported personal saving during the last decade, as the NIPA underestimated income and overestimated consumption.

Although the national accounts attempt to measure only the value of currently produced goods and services, both the measurement of this output and the allocation of national income among its various factors of production depend on the expected rate of growth of output and the value of assets in the future. This dependency cannot be avoided as long as the valuation and allocation of national income are derived from the prices of long-lived physical assets, such as houses, and the yields on financial instruments, such as mortgage loans.

I. Trends in National Saving

The appropriate measure of national saving has been the subject of considerable controversy. A major dispute is whether or not to include capital gains (Bradford 1990). In some ways the controversy has been exaggerated; different measures are useful for different purposes. The figures presented in the national income and product accounts, which do not include capital gains, are designed to measure current production and the payments to the factors used to produce current output.

The NIPA saving data for the postwar decades are shown in Table 1. They are drawn directly from the published accounts, even though other authors have included a wide range of defensible modifications (Summers and Carroll 1987; Auerbach and Kotlikoff 1989; Hendershott and Peek 1989; Bradford 1990; Eisner 1991). National saving remained virtually unchanged as a share of income from the 1950s through the 1970s; the total averaged 8 percent, reflecting personal saving of 6 percent, business saving of 3 percent, and government saving of minus 1 percent. In the 1980s, national saving fell to 3 percent of income in the first half of the decade and to 1.4 percent in the second half. Each component contributed to the collapse of the national rate. The federal government's deficit rose from 1 percent to 3 percent of national income in the wake of tax cuts and continued spending on defense. Business saving fell

from 3 percent to 1 percent of income, as financial corporations suffered substantial losses and nonfinancial corporations paid out increasing shares of their income.

The personal saving rate also fell during the 1980s. The decline in saving through private pension plans reflected a reduction in employer pension contributions in the wake of the runup in stock prices during the 1980s (Munnell 1987). Many plan sponsors found themselves facing the Internal Revenue Code's full-funding limitation, which restricts tax-deductible contributions once plans have reached designated funding levels. State and local government plans, which were less well funded initially and not subject to the Revenue Code limitations, have maintained their funding contributions.

Despite a long list of reasons suggesting that personal nonpension saving should have increased in the 1980s, it also dropped sharply. The 1980s witnessed the introduction of numerous saving incentives, such as the introduction of individual retirement accounts (IRAs) and the expansion of 401(k) and 403(b) plans, that allowed individuals to make

pre-tax contributions and defer interest on earnings until withdrawal. The 1980s was also a decade during which the reduction of rapid inflation restored attractive real rates of return, which most observers would expect to stimulate saving. Moreover, to the degree that investors "pierced the corporate veil," they would have been expected to compensate for the low level of business saving by increasing their own direct saving. Finally, demographic trends also should have fostered greater personal saving during the 1980s: the young and the elderly, typically regarded as small savers, represented a declining share of the population, implying that the average rate of saving should have been rising.

The major explanation for the apparent drop in personal saving can be found in the treatment of housing and, to a lesser degree, of durable goods in the national accounts. The accounts understate homeowners' investment in their residences and overstate the consumption of durable goods. As will be shown below, adjusting the national accounts for these two phenomena eliminates the collapse of saving in the 1980s.

Table 2
Housing in the National Income and Product Accounts, 1989
Billions of Dollars

Product Approach				Earnings Approach			
Item	Tenant-Occupied	Owner-Occupied ^a	Total	Item	Tenant-Occupied	Owner-Occupied ^a	Total
Housing Consumption	142	371	513	Capital Consumption Allowance	37	89	126
Less: Intermediate Goods & Services Consumed	27	47	74	Taxes ^b	9	61	70
Gross Housing Product	116	324	440	Compensation of Employees	4		4
				Interest	41	197	238
				Net Rental Income ^c	25	-23	2
				Gross Housing Product	116	324	440

Addenda:

Personal Consumption Expenditures: 3,450
Gross National Product: 5,201

Note: Items may not sum to totals because of rounding.

^aIncludes farm (2.5 percent of the total) as well as nonfarm housing.

^bTaxes are indirect business tax and nontax liability plus business transfer payments plus subsidies less current surplus of government enterprises.

^cIncludes both proprietors' income and corporate profits.

Source: U.S. Bureau of Economic Analysis, 1990, "National Income and Product Accounts: Revised Estimates," in *Survey of Current Business*, vol. 70, no. 7 (July), Tables 1.1, 1.9, 1.23, and 8.9.

II. Housing in the National Income Accounts

In the national income accounts, saving is the difference between income and outlays; it is not measured directly. Income is calculated in two different ways, which turn out to be equivalent. The first sums the value of final products—consumption of goods and services and investment—produced each year. Adding only final products avoids the problem of double-counting that would result from summing the values of both the flour and the bread. The second approach sums the earnings of the land, labor, and capital that produce the nation's output. The two approaches yield identical results because profits (and a statistical discrepancy) eliminate any

difference between the value of final product and the payments to the factors of production.

The accounting for residences that are rented to tenants is easily accommodated by this framework (Table 2). Using the product approach, annual rents paid by the tenants are reduced by the cost of intermediate goods and services consumed, such as maintenance expenditures, in order to measure gross housing product. With the earnings approach, gross housing product consists of depreciation (capital consumption allowances), taxes (primarily property taxes), compensation of employees, such as wages for building superintendents, mortgage interest paid by the owners of buildings, and net rental income earned by building owners. All of these figures can be derived from the financial statements of building operators.

Table 3
Imputed Rental Income on Owner-Occupied Housing^a in the National Income and Product Accounts

Billions of Dollars

Year	Imputed Space Rent	Less Expenses				Net Rental Income
		Maintenance ^b	Capital Consumption Allowances	Taxes ^c	Interest	
Average:						
1951-60	24.0	3.6	6.0	3.5	4.3	6.7
1961-70	47.6	5.1	10.4	9.3	11.8	11.0
1971-75	86.0	11.9	20.6	18.3	25.5	9.5
1976-80	148.2	25.5	38.4	27.3	55.7	1.3
1981-85	246.7	38.3	60.0	40.3	116.1	-8.2
1986-89	337.2	46.5	78.2	55.2	172.7	-15.2
1976	114.2	18.5	28.4	24.0	37.5	5.8
1977	127.8	22.6	32.7	26.6	44.5	1.5
1978	145.4	25.0	37.9	27.3	53.4	1.7
1979	165.2	29.0	43.9	28.1	65.1	-0.9
1980	188.3	32.5	49.2	30.4	77.8	-1.6
1981	212.2	34.8	53.8	33.8	90.3	-0.7
1982	229.9	36.9	56.8	37.3	101.6	-2.8
1983	245.0	38.2	59.6	40.2	114.3	-7.3
1984	263.5	40.2	62.6	43.6	130.5	-13.4
1985	282.7	41.5	67.0	46.8	144.0	-16.7
1986	302.6	43.7	69.3	50.2	152.5	-12.9
1987	326.4	46.8	74.7	53.1	163.6	-11.9
1988	348.8	48.3	79.6	56.0	177.5	-12.7
1989	371.1	47.2	89.2	61.3	197.1	-23.4

Note: Items may not sum to totals because of rounding.

^aIncludes farm as well as nonfarm owner-occupied housing.

^bOfficially classified as intermediate goods and services consumed.

^cTaxes are net of small subsidy payments.

Source: U.S. Bureau of Economic Analysis, 1986, *National Income and Product Accounts of the United States, 1929-82*, Table 8.9; U.S. Bureau of Economic Analysis, 1986 to 1990, "The U.S. National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Table 8.9.

The case of owner-occupied housing is more complicated, because homeowners in the NIPA are treated as if they rent their homes to themselves. While this treatment recognizes appropriately that housing provides a long-term flow of services to the owner-occupant, it requires some assumptions.

Using the product approach, housing consumption is an imputed space rent, which is derived from data on the owner-occupied housing stock and rents for comparable units as reported in the decennial census. For years between the censuses, rents are revised according to the rent component of the consumer price index, and the number of housing units is adjusted to reflect the number of households in the Census Bureau's current population survey.

The earnings approach requires additional assumptions. Depreciation is estimated using the perpetual inventory method from the capital stock calculations of the Bureau of Economic Analysis. Taxes, which are primarily state and local, come from Census Bureau quarterly surveys of state and local tax collections. In decennial census years, interest payments are taken directly from the Census. In intermediate years, this interest figure is increased by the change in an indicator series. This indicator series is estimated by applying an appropriate market interest rate to the stock of mortgage debt on one- to four-family housing as reported by the Federal Reserve Board. Net imputed rental income is then calculated as space rent less intermediate goods and services purchased, expenses for depreciation, taxes, and interest.

Housing consumption for owner-occupants is the single largest imputation in the NIPA, amounting to \$371 billion, or about 11 percent of personal consumption expenditures in 1989. The estimation and classification of these numbers can alter measures of personal saving. The current method of imputing owner-occupied rents raises two issues. First, market rents for comparable units most likely understate the implicit rents of homeowners. Second, homeowners may regard a portion of their implicit rent as an investment.

Net Rental Income on Owner-Occupied Houses

The decennial census describes (1) the number and value of owner-occupied and tenant-occupied units and (2) mean contract rent—that is, rent including furnishings, utilities, and services for tenant-occupied units—arrayed by the market value of the

Table 4
Percent Change in Real Value of Housing Stock due to Net Investment and to Capital Gains, Selected Periods, 1951 to 1990

Period	Percent Change in Value of Housing Stock	Source of Change	
		Net Housing Investment (Percentage Points)	Capital Gains
1951-55	41.3	33.5	7.7
1956-60	22.5	23.5	-.9
1961-65	13.6	16.6	-3.0
1966-70	22.7	13.0	9.8
1971-75	28.4	15.1	13.3
1976-80	40.0	19.3	20.6
1981-85	6.6	10.9	-4.2
1986-90	8.9	17.1	-8.3

Note: Items may not sum to totals because of rounding.

Source: Authors' calculations based on Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24, pp. 61-66.

properties. Mean contract rent for owner-occupied units is then imputed on the basis of the rent charged for tenant-occupied units of the same value to derive space rent. Mortgage interest expense is calculated simply by multiplying the stock of outstanding mortgages on owner-occupied housing by the relevant interest rate.

Although this technique for estimating net rental income for owner-occupied housing might appear reasonable, since 1979 expenses have outstripped the income imputed to owner-occupants, producing negative net rental income (Table 3). These negative returns have not been offset by any real appreciation; real capital gains have also been negative over the same period (Table 4). The housing boom occurred during the 1970s; afterward, housing values for the nation as a whole failed to keep pace with inflation. This pattern is evident not only in the wealth data but also in data on median sales price of existing homes (Table 5).

These dismal financial rewards raise the question of why rational consumers would continue to invest in housing that yielded increasingly negative returns. One possible explanation is that the returns are not measured correctly, because the imputed space rent understates the receipts of homeowners.

Homeownership conveys potentially valuable benefits to households in addition to the standard

Table 5
Percent Change in the Real Median Sales Price of Existing One-Family Homes, Selected Periods, 1970 to 1990

Period	U.S.	Northeast	Midwest	South	West
1970-75	11.2	13.0	8.5	13.6	18.1
1975-80	20.5	5.8	17.9	14.5	54.2
1980-85	-5.8	13.5	-11.9	.1	-17.1
1985-90	3.5	30.0	2.8	-6.5	19.7

Source: U.S. Bureau of the Census, 1990, *Statistical Abstract of the United States 1990*, Table 1266; National Association of Realtors, 1991, *Home Sales*, vol. 5, no. 3 (March), p. 10.

rights of tenants. Some of these benefits should be attributed to consumption: homeowners are free to paint rooms any color they want, hang pictures, build bookcases and make other improvements that they can retain. They can also enjoy the sense of pride and stability that comes with owning one's home. Other benefits may be classified as investment: homeowners possess a hedge against future increases in rents; they also acquire the landlord's option to cancel their lease; and they assume the landlord's right to manage or dispose of the property.

For motives related to both consumption and investment, homeowners are almost certainly willing to pay more to own than to rent a given home. The features that accompany ownership, whether tangible or financial, are more valuable than those offered to renters. Because families are willing to pay a premium over market rents to own their home, the NIPA understate the imputed space rents received by homeowners. Not only would increasing implicit space rents increase the return to housing, thereby making this return more comparable to those on other investments, but the disposition of this additional rent also might alter the reported personal saving rate considerably.

Consumption and Investment Components of Space Rent

If the additional space rent that homeowners receive is attributed to consumption, then raising imputed space rents does not alter NIPA personal saving, because consumption and income increase by the same amount (see the Box). This premium would, however, lower the ratio of personal saving to disposable personal income, since higher space rents

would raise income. Therefore, increasing imputed space rents would not alter the puzzling decline in the personal saving rate, even though this premium would increase the estimated return on owner-occupied housing.

On the other hand, if the premium is attributed to saving, the return on owner-occupied housing rises, consumption remains unchanged, and reported personal saving and the personal saving rate rise with the imputed space rent premium. The case for regarding much of the premium as saving, as opposed to consumption, is compelling. In the wake of the housing boom, the cost of capital for homeowners increased compared to the implicit rental return on owner-occupied dwellings. In other words, homeowners became willing to pay higher prices for their residences given their opportunity cost for undertaking this investment. This increase in the value of homes occurred as many households regarded homeownership as a more attractive investment than they had previously.

Consider, for example, two situations: in the first, a family expects no change in real rents; in the second, the family expects real rents (and real house prices) to increase by 2 percent annually. In the first situation, where homeownership conveys no financial benefits, the family that could rent a house for \$5,000 annually would be willing to purchase that home for \$100,000 if its real discount rate were 5 percent. In the second situation, where the family expects rents to rise, the family would be willing to pay \$170,000 (\$5,000 capitalized at 2.94 percent ($1.0294 = 1.05/1.02$)).

The second family pays an additional \$70,000 for its home in order to avoid paying higher rents in the future. This higher price increases the family's annual outlays by \$3,500, reflecting 5 percent interest on the additional \$70,000.¹ The NIPA record the second family's additional outlay of \$3,500, but they do not credit the family's income with any additional space rent. Consequently, the reported income and saving

¹ This "outlay" will take the form of interest payments on any additional mortgage loans as well as the opportunity cost of funds on any additional equity investment (down payment). This example assumes that the real interest rate on mortgages and the real rate of return on families' financial investments equal 5 percent. Whenever the rate of interest on mortgage loans exceeds the yields on financial instruments held by families, the family's disposable personal income will fall with increased mortgage borrowing. Accordingly, the NIPA's measures of households' incomes and saving are particularly likely to fall after real house prices increase when the cost of mortgage financing is relatively high.

The National Income and Product Accounts

In the national income and product accounts (NIPA), personal income comprises wages, salaries, transfer payments, dividends, interest receipts, proprietors' incomes, and the implicit rental income of homeowners. In turn, implicit rental income equals the return on owner-occupied residences less mortgage interest expenses and other housing expenses, such as capital consumption, maintenance, and property taxes. Disposable personal income equals personal income less taxes and some other nontax payments.

$$(1) \quad Y^D = Y + Y^{INT} + (SR - INTM - OHE) - TAX,$$

where Y^D is disposable income,
 Y is all income other than the implicit income of homeowners and interest income,
 Y^{INT} is interest income,
 SR is the implicit return received by homeowners,
 $INTM$ is homeowners' mortgage expenses,
 OHE is other expenses attributed to owner-occupied residences, and
 TAX is personal tax and nontax payments.

The NIPA allocate disposable personal income among consumption, interest payments to business on loans other than mortgage loans, and saving.² Consumption includes the implicit space rents that homeowners pay themselves to occupy their residences.

$$(2) \quad Y^D = (C^O + SR^C) + INTB + S,$$

where C^O is personal consumption other than the implicit space rents paid by homeowners,
 SR^C is the market value of the implicit space rent on owner-occupied residences,
 $INTB$ is personal interest payments to businesses on loans other than home mortgage loans, and
 S is personal saving.

Together, this accounting for the sources and uses of disposable income implies

$$(3) \quad S = (Y - TAX - C^O - OHE) + (Y^{INT} - INTM - INTB) + (SR - SR^C).$$

Because SR equals SR^C in the NIPA, saving does not depend on the estimates of implicit returns or rents attributed to homeowners. Nevertheless, the personal saving rate tends to fall as

imputed rents increase, because disposable income rises with these returns. If SR were not required to equal SR^C , then disposable income, saving, and the saving rate would increase when the difference between SR and SR^C increases.

The NIPA account for personal interest payments on home mortgages differently than they account for other personal interest payments. $INTM$ is deducted from personal receipts in calculating disposable income, whereas $INTB$ is treated as an outlay similar to consumption. When personal interest payments (on either mortgage loans or consumer loans) increase, personal interest income also tends to increase. Should the increase in Y^{INT} match that of $(INTM + INTB)$, saving would not change. However, if the increase comes from $INTB$, disposable income would increase by the same amount, and the saving rate would fall. If $INTM$ increased, and Y^{INT} rose by the same amount, disposable income would remain unchanged and the saving rate would be unaffected.

If the accounting for consumers' durable goods matched that of owner-occupied residences, purchases of durables in consumption would be replaced by the implicit rents that consumers pay for using their durable goods. Therefore, the foregoing equations would be altered as follows:

$$(1a) \quad Y^D = Y + Y^{INT} + (SR - INTM - OHE) + (RD - INTB - ODE) - TAX,$$

$$(2a) \quad Y^D = (C^O - CD + RD^C + SR^C) + S, \text{ and}$$

$$(3a) \quad S = (Y - TAX - C^O - OHE) + (Y^{INT} - INTM - INTB) + (SR - SR^C) + (CD - ODE) + (RD - RD^C),$$

where RD is the implicit return to owners of durable goods,
 ODE is other expenses attributed to durable goods (principally capital consumption),
 CD is consumers' purchases of durable goods, and
 RD^C is the implicit rent paid by owners of durable goods.

Because CD has exceeded ODE and RD is no less than RD^C , these changes increase saving. Disposable income also increases when the rewards for owning durable goods exceed their expenses.

of the family in the second situation are \$3,500 less than those of the family in the first situation.

From the second family's perspective, its implicit return from homeownership is understated by \$3,500; consequently, its income and saving also are understated by \$3,500. The family is willing to pay an additional \$70,000 for its home, because the investment features of homeownership are worth \$3,500 annually. In purchasing its home, thereby fixing its rents, the family can increase its consumption and living standard in the future as much as it would if it accumulated financial assets at the rate of \$3,500 annually. Only in exchange for an annual payment exceeding \$3,500 would the family relinquish one of its benefits as a homeowner and assume the obligation to pay the greater rents expected in the future.

Although the foregoing example highlights the importance of expected changes in real rents, the relative value of homes can change for other reasons. For example, should the tax burden on owner-occupied homes fall relative to that on other investments, the real value of homeownership would rise. Should interest rates not adjust fully when the rate of inflation increases, as was the case in the late 1970s, the real value of homes would rise. Should interest rates adjust fully, a higher rate of inflation would not alter house prices, but it would increase the cost of financing residences compared to their rental returns.³ Consequently, the increase in the rate of inflation from the 1960s to the 1980s tended to depress the return on owner-occupied housing reported in the NIPA without necessarily reducing the total rate of return to homeowners.

Imputed net rental income became negative in the 1980s, because people were willing to pay a premium to own their own homes in the wake of the housing boom of the 1970s. The NIPA recorded a tripling of homeowners' mortgage debt, but they did not record the higher implicit rents accruing to homeowners. Consequently, the NIPA understated both income and saving in the 1980s, and the resulting decline in the reported personal saving rate did not in fact reflect a shift in the national attitude toward thrift.

III. Consumers' Durable Goods in the National Income Accounts

The NIPA classify purchases of durable goods by individuals as consumption rather than investment. Accordingly, the reported personal saving rate tends

to fall when savers shift from financial to tangible assets or when consumers increase their stock of durable goods, as is common during economic recoveries. Because the NIPA attribute no implicit rents to the stock of consumers' durable goods, the NIPA also understate national income and disposable personal income.

Disposable personal income is allocated to three general categories: consumption, saving, and interest payments to businesses on loans other than mortgage loans (see the Box). According to this accounting, reported saving may fall relative to income because either consumption or nonmortgage interest payments represent a greater share of income.

Measures of personal thrift that dwell only on the saving rate implicitly combine personal nonmortgage interest payments with consumption, which entails a degree of double-counting of consumers' outlays for services provided by their durable goods (other than their homes). When people buy new automobiles, the initial outlay is counted entirely as consumption. This outlay represents the present value of the transportation services that the buyers expect to receive over the life of their automobiles. The value of these services also is reflected in the buyers' annual interest payments on their auto loans. Subtracting both the purchase of the durable good and the annual interest payment from disposable income understates the saving rate.

Interest expense principally represents a transfer payment, not an outlay that absorbs current output. National product is the sum of goods and services that are consumed, purchased by governments, invested by businesses, and sold abroad (net of imported goods and services). The output that people do not consume becomes available for other uses, including investment. Unlike expenditures for food, interest payments do not represent a significant claim on national product.

² In the NIPA, disposable personal income is also allocated to a fourth category, net personal transfer payments to foreigners. This category is omitted from the following discussion because the volume of these transfers is negligible: in 1990, for example, these transfers were approximately \$1 billion which was less than 0.03 percent of disposable personal income.

³ Homeowners anticipate implicit rents rising at the rate of inflation, whereas the opportunity cost of financing a residence is constant (as long as the rate of inflation does not change). Although the cost of financing a residence initially exceeds its rental return if the rate of inflation is sufficiently high, rents eventually will rise to exceed the cost of financing (Poole 1972; Lessard and Modigliani 1975; Peek and Wilcox 1991).

If families seeking credit obtain their loans directly from other families, the resulting interest payments are neither net income for families as a whole nor a net outlay. But, if families obtain credit through a financial intermediary, which in turn obtains its funds from other families, the NIPA credit the lenders with interest income and the borrowers with interest expense. Except for the interest margin that financial intermediaries charge for handling this exchange, this transaction, too, is essentially a transfer of funds among households.

The classification of some personal interest payments as both income and outlays may alter the personal saving rate, even though it may not alter measures of consumption or saving. For example, suppose a country produces \$1 trillion of goods and services annually and that disposable personal income also is \$1 trillion, personal consumption spending is \$900 billion, and personal saving is \$100 billion. The personal saving rate is 10 percent. Suppose that a second country resembles the first in every respect, except that families have made loans to each other on which the annual interest is \$100 billion. In this case, national income, consumption, saving, and investment are the same as in the first. But, in this second case disposable personal income is \$1.1 trillion, and personal outlays include \$100 billion of interest expense. Consequently, in this second country the personal saving rate is only 9.1 percent ($\$100/\$1,100$). In both countries investment accounts for 10 percent of national product.

These examples suggest that subtracting personal interest outlays both from personal income and from total personal outlays is a simple remedy for this potential bias in measuring the personal saving rate. Accordingly, income would comprise only consumption and saving, and it would not be inflated by transfers of funds among people.

This simple remedy is only the first step toward an accounting for consumers' purchases of durable goods that would resemble more closely that used for owner-occupied houses, an accounting that would treat consumers' durables as investments (see the Box). By deducting the income on owner-occupied residences (net of mortgage interest expenses) from personal income, the NIPA already subtract homeowners' mortgage interest payments from personal income and from personal outlays. But, in the case of housing, the NIPA take two more steps. First, they do not include the purchase of residences in consumption, adding instead the value of services that homeowners derive from their dwellings each year.

Second, the NIPA attempt to add to personal income the returns that homeowners derive from their residences. A similar treatment for consumer durables would subtract the purchase of durable goods from consumption, adding instead an annual rent for using these goods (essentially the opportunity cost of funds plus capital consumption). Then, the net income from owning durable goods (the rent defined previously less interest payments on loans) would be added to personal income.

Classifying consumers' durable goods as investments and recognizing the implicit rents on these assets would have at least three consequences for the NIPA. First, national income would be increased by the amount of these implicit rents. Second, disposable personal income would be increased by the amount of these rents less personal interest payments. Third, personal saving would be increased by consumers' net purchases of durable goods less that portion of the implicit rent on existing durables that represents consumption.

IV. The Return to Housing, the Consumption of Durable Goods, and the Personal Saving Rate

Understating homeowners' investment in their residences and, to a lesser degree, overstating the consumption of durable goods have accounted for much of the recent decline in the personal saving rate. Table 6 compares the personal saving rate as reported in the NIPA to alternative measures that, first, attribute a competitive rate of return to owner-occupied housing and account for a portion of this return as saving; and second, treat consumers' durable goods as investments.

Column (2) of the table shows an alternative measure of the personal saving rate for which homeowners' implicit receipts equal the product of the value of their housing stock and their opportunity cost of funds, calculated as the sum of the mortgage rate and the rate of capital consumption for residences (Appendix Table 1). This approach produces a substantially larger space rent figure than that reported in the NIPA. The calculations in column (2) assume that all this difference in space rents could be viewed as consumption before the first signs of the housing boom appeared in 1966; the premium averaged roughly 7 percent between 1951 and 1966. After 1966, any premium in excess of 7 percent was attributed to investment.

Table 6
Personal Saving as a Percent of Disposable Income with Adjustments for Space Rent and Consumption of Consumer Durables, Selected Periods, 1951 to 1989

Period	Alternative Personal Saving Rates			
	Personal Saving Rate	NIPA plus Space Rent Adjustment	NIPA plus Durables Adjustment	NIPA plus Space Rent and Durables Adjustments
	(1)	(2)	(3)	(4)
1951-55	6.7	6.7	10.9	10.8
1956-60	6.8	6.7	9.2	9.1
1961-65	6.6	6.6	9.0	9.0
1966-70	7.3	8.5	11.9	13.0
1971-75	8.8	11.6	13.6	16.2
1976-80	7.0	13.8	12.3	18.5
1981-85	6.0	15.0	9.0	17.7
1986-89	4.0	9.5	8.1	13.5

Source: Authors' estimates.

By construction, these alternative estimates of the return on owner-occupied residences alter the personal saving rate negligibly before 1966, but afterward they increase the saving rate significantly. During the late 1960s, the alternative saving rate exceeds the reported saving rate by less than 2 percentage points. During the late 1970s and early 1980s, after

⁴ Although this alternative estimate of receipts generally exceeds that which appears in the NIPA, this alternative also may understate homeowners' income. The homeowners' discount rate for valuing their investment in their residences, for example, probably exceeds the mortgage rate, which reflects the discount rate for a more secure investment in housing. Accordingly, homeowners would not exchange their residence for an annuity or a bond, unless this alternative asset's yield exceeded the mortgage rate. Indeed, homeowners are willing to pay the mortgage rate to obtain financing because the net yield on houses exceeds the mortgage rate.

The mortgage rate also may understate the homeowners' gross discount rate because mortgages are less expensive to manage than houses. Although mortgage interest may be deducted from homeowners' taxable income while homeowners' implicit receipts are not taxed as income, the local property taxes that are levied against the value of residences amount to a substantial implicit tax on homeowners' implicit rents.

⁵ If one-half of the rental premium assigned here to homeowners' saving were, instead, classified as consumption, the personal saving rate for the last half of the 1980s would be approximately the same as that for the 1960s.

the value of houses had risen greatly in real terms and relative to personal income, the saving rate exceeds the reported saving rate by approximately 7 percentage points.⁴ Although this alternative saving rate fell in the last half of the 1980s, it remains greater than saving rates of the 1950s and 1960s, and it still exceeds the reported saving rate by 5.5 percentage points.⁵

Using this "bond equivalent" technique for estimating space rents removes an asymmetry in the current NIPA technique. Because of the importance of mortgage financing, the cost of homeownership assumes the form of an annuity, whereas the implicit space rents of homeowners resemble dividends on the stock of a growing business. Whenever a homeowner buys a dwelling, the initial interest payments are relatively great compared to the dwelling's rents. In time, however, rents are expected to surpass interest expenses. Consequently, whenever many new homes are sold or homeowners exchange dwellings, the implicit income of homeowners tends to fall in the NIPA, because the burden of mortgage financing is borne relatively early compared to timing of the expected rewards of homeownership.⁶

Column (3) of Table 6 shows an alternative measure of the personal saving rate for which the implicit rents for consuming personal durable goods equal the product of the value of the stock of consumers' durables and the opportunity cost of funds, which is measured as the sum of the consumers' discount rate and the rate of capital consumption on the stock of these durables (Appendix Table 2). The discount rate equals the three-year Treasury bill yield plus 3 percentage points.⁷

⁶ Even if homeowners were to purchase their dwellings without mortgage financing, resorting instead to selling securities held as assets, the opportunity cost of financing a house (the forgone interest income) would be relatively great compared to rents during the early years of the owners' tenure.

This "front-end loading" of financial costs compared to the accrual of rents is exaggerated by the standard, amortized mortgage loan. The payments are constant over the life of the loan (provided interest rates do not change in the case of an adjustable rate mortgage). But virtually all of the annual payment at the inception of the loan represents interest, whereas very little of the annual payment in the loan's last years represents interest. This mismatching of cash flows becomes especially great when the inflation premium in mortgage yields increases.

⁷ The 3-percentage-point margin is slightly greater than that common in pricing adjustable rate mortgage loans. If this margin is too great, then the alternative measure of disposable personal income, described in the next paragraph, also is too great and this, in turn, reduces the alternative personal saving rates shown in column 3.

This alternative accounting for the value of durable goods in consumption spending alters the measurement of both personal income and personal saving. The net income that consumers derive from owning their stock of durable goods, their implicit rents on their durables less the sum of capital consumption expenses and interest paid to business, is added to disposable personal income. Because of this adjustment and because the implicit rents for durable goods replace outlays on durables in consumption, the difference between these outlays and the amount of capital consumption on the stock of consumers' durable goods is added to personal saving.

The alternative estimates shown in column (3) exceed the reported saving rate by a significant margin in every period, because the acquisition of new durable goods by consumers consistently exceeded their consumption of these goods. The difference between the estimates of the saving rate in column (3) and those reported in the NIPA (column (1)) averages approximately 3.5 percentage points in the 1950s, 1960s, and 1980s. During the 1970s, this difference increased to 5 percentage points, as purchases of tangible assets represented a greater share of disposable personal income.

Although this alternative accounting for durable goods generally increases the personal saving rate, it alone does not eliminate the drop in saving that occurred in the late 1980s. During the 1950s and 1960s, the alternative saving rate shown in column (3) averaged almost 2.5 percentage points more than it did in the late 1980s. For the NIPA saving rate shown in column (1), this difference is almost 2.9 percentage points.

The course of the saving rate shown in column (4), which combines the adjustments described in columns (2) and (3), differs considerably from that of the reported personal saving rate. According to the figures in column (4), during the last half of the 1980s the personal saving rate declined from the extraordinarily high rates of the 1970s and early 1980s toward rates of saving that prevailed in the 1950s and 1960s.

Although the techniques used here for estimating these alternative saving rates are not above criticism, they suggest that the level and the course of the personal saving rate depend greatly on the NIPA's specific techniques for estimating the return to owner-occupied housing and the NIPA's classification of personal purchases of durable goods as consumption. Of the two adjustments considered here, the NIPA's underestimates of the implicit income and implicit saving attributed to owner-occupied resi-

dences appear to be primarily responsible for the low rates of personal saving reported during the late 1980s. Therefore, from this perspective, the challenge is to explain the high rate of personal saving in the 1970s and early 1980s, not the collapse in saving during the late 1980s.

V. Conclusions and Implications

Much of the decline in the personal saving rate during the 1980s may be attributed principally to the NIPA's accounting for homeowners' implicit investment in their residences and, to a lesser degree, to the NIPA's measurement of the consumption of durable goods. The NIPA attempt to measure only the value of currently produced goods and services. Yet, the measurement of income depends on the value of durable assets and the yields on financial instruments, both of which depend on expectations of the value of output in the future. This inconsistency is highlighted whenever a productive asset is financed with a security whose prospective stream of payments has a profile that does not closely resemble the asset's stream of receipts and does not change with economic conditions in the same way that the asset's stream of receipts changes. Much of the cost of financing owner-occupied housing, for example, is borne relatively early compared to the accrual of their rents. When investors expect rents to increase in the future, the financial burden of holding these dwellings rises along with their price, while their current "income" can fall significantly.

Using an alternative measure of implicit returns on housing that reflects the opportunity cost of financing housing, this article concludes that the NIPA generally understate personal income, personal saving, and the personal saving rate. Furthermore, the degree to which the NIPA understate this saving rate increased during the 1980s after the value of the stock of owner-occupied houses increased relative to rents and personal income. The NIPA understatement of the returns to owner-occupied residences also leads to an understatement of national product, which means that the resulting increase in personal saving also increases national saving, since it does not entail any offsetting reduction in business, government, or foreign saving.

Saving also would account for a greater share of personal income if consumption spending included the implicit rent on the stock of consumers' durable goods, rather than purchases of durables, because

consumers' purchases of new durables have exceeded the implicit rents on these assets. This alternative technique of measuring personal income and consumption tends to increase the saving rate by similar amounts in both the 1980s and the 1960s. Consequently, it alone does not explain why the personal saving rate reported in the NIPA is lower in the late 1980s than it was in the 1960s.

The foregoing restatement of returns and saving attributed to tangible assets need not be limited to owner-occupied housing or to consumers' durable goods. For example, the income attributed to business investments that are financed with debt will

tend to fall according to the NIPA whenever investors revise their forecasts, expecting the revenues accruing on these assets to increase more rapidly in the future.

The NIPA are not designed to measure all the returns on assets as perceived by investors; therefore, the NIPA do not account fully for investors' disposition of their returns between consumption and saving. Accordingly, a decline in national saving reported in the NIPA neither necessarily represents a fundamental change in the motives of consumers and investors, nor necessarily warrants new public policies designed to foster thrift.

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Appendix Table 1

Implicit Space Rents on Owner-Occupied Housing: NIPA and Adjusted, 1950 to 1989

Year	NIPA Implicit Space Rent	Value of Housing Stock	NIPA Rent As Percent of Housing Stock	Homeowners' Opportunity Cost of Funds	Adjusted Implicit Space Rent
1950	12.9	165.2	7.8	8.3	13.8
1951	14.6	188.1	7.8	8.5	15.9
1952	16.5	207.1	8.0	8.6	17.8
1953	18.6	222.1	8.4	8.8	19.4
1954	20.4	238.2	8.6	8.8	20.9
1955	22.1	260.0	8.5	8.8	22.8
1956	24.0	285.3	8.4	8.9	25.4
1957	25.8	305.8	8.4	9.5	29.1
1958	27.7	322.0	8.6	9.5	30.6
1959	29.8	340.1	8.8	9.7	33.1
1960	32.0	361.3	8.8	10.1	36.4
1961	34.0	380.4	8.9	9.8	37.3
1962	36.4	395.9	9.2	9.7	38.4
1963	38.4	409.2	9.4	9.9	40.5
1964	40.5	427.9	9.5	9.8	42.1
1965	43.1	451.7	9.5	9.8	44.3
1966	45.6	486.3	9.4	10.3	49.8
1967	48.5	523.7	9.3	10.5	54.8
1968	51.9	568.7	9.1	11.0	62.4
1969	56.3	628.0	9.0	11.8	74.2
1970	60.8	672.7	9.0	12.5	83.8
1971	66.6	728.9	9.1	11.7	85.6
1972	72.6	813.6	8.9	11.6	94.4
1973	79.2	928.4	8.5	12.0	111.0
1974	87.4	1067.6	8.2	12.9	137.9
1975	96.5	1185.4	8.1	13.0	154.1
1976	106.5	1324.5	8.0	13.0	172.2
1977	118.7	1550.4	7.7	13.0	201.9
1978	134.9	1850.4	7.3	13.6	250.9
1979	153.3	2169.7	7.1	14.8	320.7
1980	174.7	2446.2	7.1	16.7	407.5
1981	196.7	2707.2	7.3	18.7	506.3
1982	214.3	2825.0	7.6	19.1	540.7
1983	230.0	2933.4	7.8	16.6	486.1
1984	248.2	3152.7	7.9	16.4	516.4
1985	268.0	3326.9	8.1	15.6	517.3
1986	288.6	3553.7	8.1	14.2	503.6
1987	311.7	3891.5	8.0	13.3	518.0
1988	333.9	4202.9	7.9	13.2	554.4
1989	356.4	4490.2	7.9	14.1	634.5

Source: U.S. Bureau of Economic Analysis, 1991, unpublished data behind space rent calculation; Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24; Council of Economic Advisers, 1991, *Economic Report of the President*, Table B-71; Guttentag, Jack M. and Morris Beck, 1970, *New Series on Home Mortgage Yields Since 1951*, Appendix Table 3-2.

Appendix Table 2

Treatment of Consumer Durable Goods: NIPA and Adjusted, 1950 to 1989

Year	NIPA Purchases of Consumer Durable Goods	Value of Durables Stock	NIPA Purchases As Percent of Durables Stock	Opportunity Cost of Funds	Implicit Rents on Durables
1950	30.8	97.4	31.6	14.5	14.1
1951	29.9	116.3	25.7	14.9	17.4
1952	29.3	129.2	22.7	15.1	19.5
1953	32.7	138.5	23.6	15.5	21.4
1954	32.1	145.0	22.1	14.6	21.2
1955	38.9	152.2	25.6	15.5	23.5
1956	38.2	164.6	23.2	16.2	26.6
1957	39.7	174.0	22.8	17.0	29.5
1958	37.2	179.1	20.8	15.8	28.4
1959	42.8	185.5	23.1	17.5	32.4
1960	43.5	191.3	22.7	17.0	32.5
1961	41.9	195.2	21.5	16.5	32.3
1962	47.0	199.6	23.6	16.5	32.9
1963	51.8	207.6	24.9	16.7	34.6
1964	56.8	218.3	26.0	17.0	37.2
1965	63.5	229.9	27.6	17.2	39.6
1966	68.5	247.3	27.7	18.2	45.1
1967	70.6	270.8	26.1	18.0	48.8
1968	81.0	298.7	27.1	18.7	55.8
1969	86.2	329.0	26.2	20.0	65.9
1970	85.7	358.1	23.9	20.3	72.7
1971	97.6	383.1	25.5	18.7	71.4
1972	111.2	409.2	27.2	18.7	76.6
1973	124.7	447.6	27.9	20.0	89.3
1974	123.8	507.3	24.4	20.8	105.6
1975	135.4	569.9	23.8	20.5	116.8
1976	161.5	624.2	25.9	19.8	123.4
1977	184.5	689.1	26.8	19.7	135.7
1978	205.6	773.0	26.6	21.3	164.6
1979	219.0	872.9	25.1	22.7	198.2
1980	219.3	972.6	22.5	24.6	238.8
1981	239.9	1058.2	22.7	27.4	290.4
1982	252.7	1119.1	22.6	25.9	290.1
1983	289.1	1174.3	24.6	23.5	275.4
1984	335.5	1249.6	26.9	24.9	311.0
1985	372.2	1345.1	27.7	22.6	304.5
1986	406.0	1465.9	27.7	20.1	294.1
1987	423.4	1598.9	26.5	20.7	330.7
1988	457.5	1734.7	26.4	21.3	368.8
1989	474.6	1869.7	25.4	21.6	402.9

Source: U.S. Bureau of Economic Analysis, 1986, *The National Income and Product Accounts of the United States, 1929-1982*, Table 2.2; U.S. Bureau of Economic Analysis, 1986 to 1990, "The National Income and Product Accounts: Revised Estimates," in *Survey of Current Business* (July), Table 2.2; Board of Governors of the Federal Reserve System, 1991, "Balance Sheets for the U.S. Economy, 1945-1990," C.9 Release (April), pp. 19-24; Council of Economic Advisers, 1991, *Economic Report of the President*, Table B-71; Board of Governors of the Federal Reserve System, 1976, *Banking and Monetary Statistics, 1941-1970*, Table 12.7.