Alternative Measures of Personal Saving

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THE personal saving rate, as defined in the national income and product accounts (NIPA's), has declined sharply over the past two decades, falling from a high of about 11 percent in the early 1980s to 1 percent in 2000. This sustained decline has generated concern that saving is now too low to fund adequate capital accumulation or to ensure that the baby boom generation will move through its retirement years with reasonable financial security.

This article provides the necessary background for understanding personal saving as defined in the NIPA's and its role in determining aggregate capital accumulation and the financial status of households. It also investigates several of the many possible alternative measures of personal saving and wealth accumulation.

Changes in personal saving cannot generally be interpreted without considering what is happening to other measures of saving and wealth accumulation. For example, low personal saving rates may cause concern that national saving—defined as the amount of national income left over after all expenditures on goods and services other than capital items are deducted—will be too low to fund adequate levels of the new capital investments that power economic growth. However, personal saving is only one component of national saving. Therefore, to evaluate concerns about capital accumulation, one must examine trends in total national saving, not just the personal sector's contribution to that total.

Likewise, a decline in personal saving does not necessarily mean that households will have trouble financing their retirement years or other consumption needs. Measures of household wealth provide a more complete picture of the future consumption possibilities of

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households. Moreover, wealth—along with income, interest rates, and some others— has long been seen as a key variable in helping to explain household spending. Changes in net wealth reflect both personal saving and capital gains on existing assets. Capital gains are absent from calculations of personal saving in the NIPA's because capital gains are not a part of the NIPA concept of national income (see the box "Definition of National Income and Saving in the NIPA's"). However, they can be as important as personal saving in determining the future consumption possibilities of households. Indeed, over the last half of the 1990s, while personal saving declined to record lows, ratios of household wealth to income rocketed to record highs.

To highlight the uses and limitations of different measures of personal saving, this article first describes the simple process that governs the accumulation of wealth over time. Although the focus is on the concept of personal saving measured in the NIPA's, an alternative concept—the change in household net worth—that is published in the flow of funds accounts (FFA) is also discussed. The article then investigates several issues that arise in measuring and interpreting personal saving: The treatment of defined benefit pension plans, the treatment of consumer durable goods, the effect of inflation on measured personal saving rates, and the treatment of capital gains and capital gains taxes. For each issue, an adjusted measure of personal saving is provided to show the effect of altering the treatment in the NIPA's.[1]

The main conclusion is that the relevance of a personal saving measure depends on the question being asked. For example, if the question is how much households are contributing to national saving or how much of their current income is left over after spending on current consumption for purposes such as ac-

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1. Many authors have examined alternative measures of personal saving, including those presented in this paper. For a sampling of the most recent work, see Gale and Sabelhaus (1999), Peach and Steindel (2000), and Lusardi, Skinner, and Venti (2001).

quiring financial assets, then the most relevant measure is personal saving as defined in the NIPA's. However, for other questions, such as whether households in the aggregate are making adequate financial

preparation for retirement, the net worth measures from the FFA may be more appropriate. Still other questions may be best addressed by adjustments to the NIPA measure of personal saving to exclude defined

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Definition of National Income and Saving in the NIPA's

Personal saving, business saving, and government saving are the components of national saving. These components are measures of deferred utilization of resources: Current income not consumed for households; current earnings retained within the firm for business; and revenues not spent for government. Accordingly, national saving is viewed as a key indicator of the extent to which the Nation as a whole is setting aside resources today for the purpose of increasing its future standard of living.

The definition of national saving in the national income and product accounts (NIPA's) determines the total amount of saving that can be attributed to persons, to business, or to government. Net national saving measures the portion of national income made available to fund expansion of the capital stock. It is the amount of national income left over after current (that is, noninvestment) expenditures are subtracted. National income is, in turn, the amount of gross national product left over after nonfactor income (primarily indirect business taxes) and consumption of fixed capital (CFC) are subtracted. Subtraction of CFC, or depreciation, is necessary to account for the cost of replacing plant, equipment, and software that wears out or becomes obsolete.

The definition of national income reflects the NIPA goal of measuring production. The aggregate measure of production, gross domestic product (GDP), is the market value of the goods and services produced in the United States. The NIPA concept of national income is, then, the gross factor income arising from the production that GDP measures, minus CFC, plus an adjustment for net property income that U.S. residents receive from the rest of the world.

Because national income is defined as originating from current production of goods and services, it excludes capital gains. Capital gains originate from revaluations of existing assets rather than from production of new goods and services. Besides insuring the conceptual consistency of the NIPA's, the treatment of capital gains as separate from national income has three noteworthy advantages. First, with capital gains excluded from income, national saving becomes conceptually equal to domestic investment plus net foreign investment (though, as is shown in NIPA table 5.1 on page D–14 in this issue, measured saving differs from measured investment by an amount known as "the statistical discrepancy"). Second, in mak-

ing consumption decisions, households appear to treat capital gains differently from ordinary income, so a measure of income that includes capital gains would not relate as well to consumption as the NIPA concept of income. Third, because capital gains tend to be volatile, measures of income or saving that include them would exhibit large fluctuations that would limit their usefulness.

National saving as defined in the NIPA's is also important for understanding the behavior of business cycles and the current-account balance. In particular, this measure of saving and its relationship to investment play key roles in Keynesian macroeconomic models, which allow fluctuations in aggregate demand to affect national income via a "multiplier" that depends on the marginal propensity to consume. In addition, swings in national saving affect external balances unless domestic investment changes by the same amount; for example, in 1983, a large fall in national saving was accompanied by a jump in the current-account deficit. Similar effects can arise from swings in domestic investment that are unaccompanied by changes in national saving; for example, in 1999–2000, net foreign investment turned sharply negative as private domestic investment rose while national saving changed very little.

Alternatives to the definition of income that is used in the NIPA's are, of course, possible; indeed, how to define income has long been a subject of debate among economists. Haig (1921) and Simons (1938), in discussions of the income tax, define income as consumption plus change in wealth, which has the effect of including capital gains. At the opposite pole is Fisher, who identifies income with consumption (1906, 164) and treats it as a flow of services rendered by capital (1906, 118). The NIPA approach to defining income is sometimes attributed to Hicks (1946, chapter XIV), who defines income as the amount that could be consumed in the current period without diminishing wealth (or, alternatively, future consumption prospects). However, Zacharias (2002) points out that Hicks' main focus is on the importance of immeasurable, subjective expectations in determining the income that households consider in making consumption decisions. Moreover, detailed versions of the NIPA definition of income had already been used; see, for example, Kuznets (1934).

benefit pension plans, to include net investment in consumer durable goods, or to remove the inflation component of interest income from personal income. Finally, national saving is useful for questions about the funds made available in the United States for financing investment needs. The behavior of national saving can also sometimes help to explain swings in the current-account deficit, as well as business cycle developments.

A Simple Framework

As a first step in examining different concepts of personal saving, the role of personal saving is described in the broader context of wealth accumulation. In simplest terms, household wealth is determined by equation 1:

$$(1) \quad W_t = W_{t-1} + \frac{\Delta P_t}{P_{t-1}} W_{t-1} + i_t W_{t-1} + y_t - T_t - c_t$$

where W_t is wealth at time t, $\Delta P_t / P_{t-1}$ is the percentage change in the price of assets from time $t-1$ to time t, $i_t W_{t-1}$ is nominal interest, dividend, and rental income, y_t is income from sources other than wealth holdings, T_t is taxes paid, and c_t is consumption expenditures on goods and services. Therefore, wealth in a given period is equal to the stock of wealth in the previous period (W_{t-1}), plus any income ($i_t W_{t-1}$) and capital gains (or losses) associated with that wealth (($\Delta P_t/P_{t-1})W_{t-1}$), plus other household income (y_t), less taxes (T_t) and consumption expenditures (c_t). Typical life cycle models of consumption assume that households choose consumption (c_t) given a variety of constraints and possibly some uncertainty about future economic variables such as income (y_t) and investment returns ($i_t W_{t-1} + (\Delta P_t/P_{t-1})W_{t-1}$).

Rearranging equation 1 yields an expression for one concept of personal saving, the change in household wealth:

$$(1') \quad \Delta W_t = W_t - W_{t-1} = \underbrace{\frac{\Delta P_t}{P_{t-1}} W_{t-1}}_{\substack{\text{capital gains} \\ \text{(a)}}} + \underbrace{(i_t W_{t-1} + y_t - T_t - c_t)}_{\substack{\text{NIPA-concept saving} \\ \text{(b)}}}$$

According to equation 1′, the total change in wealth can be parsed into two categories: (a) Increments to wealth from net capital gains on existing assets and (b) NIPA-concept personal saving. NIPA-concept personal saving is calculated by subtracting consumption expenditures (c_t) from NIPA-concept disposable personal income (DPI) (rent, interest, and dividend income on assets ($i_t W_{t-1}$) plus nonasset income (y_t),

such as labor income or government benefits, less taxes paid (T_t)).[2] If households accumulate wealth to balance current consumption needs against future needs, then unexpected increases in the first component—capital gains on existing wealth—can affect the personal saving decisions as measured in the NIPA's. For example, a household whose stock market portfolio returns are more than expected this year may decide to boost spending immediately rather than to reserve all the gain to fund spending in the future. If noncapital income is unchanged, then the household's NIPA-concept saving rate must fall even though its wealth has increased.

The NIPA's distinguish between capital gains (shown in part (a) of equation 1′) and saving (shown in part (b)) because NIPA saving is designed to measure the funds that are taken out of current income and made available for new capital investment. Because capital gains reflect revaluations of existing assets, they do not derive from current production and are therefore excluded from NIPA measures of production, income, and personal saving. The FFA, however, presents a measure of total change in wealth.[3] Estimates from the FFA show that the stock market boom of the 1990s propelled the change in household wealth as a percentage of DPI to record highs even as the published measures of personal saving from the NIPA's fell to record lows. In a complete set of national accounts that combines the FFA with the NIPA's, the change in wealth arising from capital gains and losses would appear in the accumulation accounts. (For further details on an accumulation account, see table 2 at the end of the article.)

The NIPA concept of personal saving can be calculated with data from the FFA. The FFA records households' current investment in tangible and financial assets and net increases in household liabilities. As an accounting matter, household saving must be used to invest in assets, such as corporate equities and real estate, or it must be used to pay down liabilities, such as mortgages and credit card debt. Because the flows recorded in the FFA exclude capital gains associated with

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2. NIPA table 2.1 shows personal consumption expenditures and two additional items, personal interest payments and net transfers to the rest of the world, as subtractions from DPI in the calculation of personal saving. For simplicity, this article refers to all these items collectively as "consumption." Capital transfers and other special factors that change wealth but count neither as capital gains nor as income are ignored.

3. Net worth from the FFA is not valued strictly at market prices. Most tangible assets, as well as corporate equities and mutual funds, are valued at market prices, but fixed income assets (such as bonds) and liabilities are recorded at book value.

existing assets, the calculation of a NIPA-concept personal saving measure is straightforward: Personal saving equals the net acquisition of financial and tangible assets, less the net increase in liabilities of the personal sector and the net capital transfers received by the personal sector.[4]

Issues in Measuring Personal Saving

Sector definitions

The definition of sectors in the NIPA's can affect the amount of national saving that is attributed to the personal sector. National saving includes the funds that the three sectors of the domestic economy—the personal sector, the business sector, and the government sector—make available for investment. The boundary lines between sectors, particularly those between the business and personal sectors, are somewhat difficult to draw because of the complicated set of interactions among participants both within and across sector lines. Though sector definitions do not alter national saving, they can affect the allocation of saving across sectors; in particular, sector definitions have important implications for the measurement of personal consumption expenditures and personal income.

In the NIPA's, the personal sector consists of households and nonprofit institutions that primarily serve households. Pension funds, some insurance reserves, and private trust funds are treated as the property of persons.[5] As a result, payments of benefits from pension funds to retirees are treated as transfers within the personal sector rather than as personal income. In contrast, employer contributions to pension plans are considered to be compensation from the business or government sector to the personal sector; therefore, they are counted in personal income. The treatment of pension income is one way that the definitions of sector boundaries significantly affect the measure of personal saving in the NIPA's.

Treatment of defined benefit pension plans

Treating pension funds as part of the personal sector in the NIPA's causes the net saving by pension plans to be included in personal saving.[6] This treatment seems ap-

propriate for defined contribution (DC) pension plans, such as 401(k) accounts, which are in many ways similar to individual retirement accounts (IRAs). Although employers usually contribute to these pension plans and may exercise some control over investment decisions, the employee bears the investment risk and is generally entitled to all the funds accrued in the account at retirement. Because all funds in DC plans belong to employees, or persons, including them in the personal sector seems reasonable.

Inclusion of defined benefit (DB) pension plans in the personal sector has, however, generated some controversy.[7] In contrast to DC plans, employees are not entitled to all the funds that accrue in DB pension plans; rather, retirement benefits are based on a formula that typically includes salary and years of service. Conceptually, the personal-sector saving that is attributed to pension funds should be equal to the increase in the value of the benefits promised to employees in a given period. However, the firm's contribution to its pension plan does not have to equal the increase in actuarial value of the firm's expected pension liability.[8] Indeed, just as a household's saving may decline if it has capital gains on its assets, a firm that has large gains on its investments may not need to make pension contributions to meet its pension obligations. As a result, in periods of large capital gains, such as the 1990s, the pension component of personal saving may fall even if the actuarial value of promised pension benefits rises.[9]

Because businesses and governments are liable for payment of accrued retirement benefits according to the plan formula, a reasonable alternative treatment of DB plans would be to assign them to the business and government sectors.[10] If DB plans were part of the business and government sectors, then personal in-

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4. The net acquisition of tangible assets equals gross acquisition minus depreciation, or "consumption of fixed capital." Although the national saving measure highlighted at the top of NIPA table 5.1 is a gross measure, personal saving is a net measure because depreciation expenses are deducted from personal rental income, including homeowners' imputed rental income, and from proprietors' income. Net capital transfers received by the personal sector are composed primarily of Federal and State estate and gift tax payments and hence are typically negative. The treatment of net capital transfers is discussed in Moulton, Parker, and Seskin (1999).

5. Social security and other government transfer programs are included in the government sector.

6. Since employer contributions to pension plans, which represent funds set aside by business or government to pay retirement benefits, count as part of personal income, they are part of personal saving. Retirement plans with no employer contribution, such as individual retirement accounts, fall outside the definition of pension plans in the NIPA's.

7. Employer-sponsored group insurance plans are treated similarly to pension plans in the NIPA and thus could logically be included in any alternative treatment given to DB pension plans. Interest in an alternative treatment for benefit plans other than DB pensions has, however, been limited, in part because the effect of changing the treatment of these plans would be relatively small.

8. While a DB pension plan can be either underfunded or overfunded, there are rules against significant levels of underfunding, and there are disincentives to large amounts of overfunding.

9. Net private saving is unaffected by such changes in pension plan contributions because it combines personal and business saving. Like personal saving, net private saving falls relative to DPI, beginning in 1992, but it falls about 1 percentage point less.

10. Howrey and Hymans (1992) present estimates of "loanable funds saving," which treats all pension funds the way that social insurance is treated, that is, as part of the business or government sectors rather than the personal sector.

come and, therefore, saving would be recorded when benefits are paid to retirees rather than when employers contribute to the plans. This change in sector definition would shift saving from the benefits accrual stage to the payout stage and would significantly alter the contour of personal saving rates over the past two decades.

Chart 1 shows an alternative measure of personal saving that excludes the net saving of DB plans, which is equal to employer contributions plus employee contributions and interest and dividends on assets less benefit payments and administrative expenses.[11] Excluding DB plans from the personal sector reduces personal saving for most of the 1980–2000 period by nearly 2 percent of DPI in 1980 and by less through much of the 1980s and 1990s. However, starting in the mid-1990s, employers' pension contributions are so low that net pension saving in DB plans is actually negative.[12] Indeed, as the chart shows, altering the treatment of DB plans boosts the adjusted saving measure as much as ½ percent of DPI in 2000. Therefore, the personal saving measure adjusted to exclude DB plans did not decline as steeply as the published measure; the drop in saving by DB pension plans accounted for nearly 2½ percentage points, or about one-fourth of the 9¼-percentage-point decline in published personal saving rates over the past two decades. (See also table 1.)

Treatment of consumer durable goods

Saving is roughly equal to after-tax income less consumption, so the measurement of saving depends critically on whether certain expenditures are classified as consumption or investment. A defining feature of net investment—or increments to wealth net of capital gains and depreciation—is that it increases the future consumption possibilities of households whereas current consumption expenditures do not.

Classifying some types of transactions as either consumption or investment is simple. For example, a meal purchased at a restaurant is consumed immediately and is therefore part of current consumption expenditures. Alternatively, money placed in a bank account is clearly part of saving and is likely loaned out to support investment by the personal sector, the business

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CHART 1

Personal Saving Excluding Defined Benefit Pension Plans
[As a percent of disposable personal income]

Published measure

Excluding defined benefit pension plans

U.S. Bureau of Economic Analysis

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sector, or the government sector.

Expenditures on other types of goods, such as those that may last for several years, may not be so easy to classify as consumption or investment. Indeed, expenditures for housing and consumer durable goods include elements of both categories. For example, investments in housing raise future consumption possibilities because they yield a stream of housing services over time; therefore, housing is treated as an investment good in the NIPA's.[13] The measures of wealth held as produced assets in NIPA table 5.16 include the value of the housing stock.

However, the NIPA's treat net purchases of consumer durable goods, which also provide a stream of services over a period of years, as consumption rather than as investment. Consumer durable goods consist of items, such as television sets and automobiles, that are expected to provide a stream of services—like the transportation services provided by automobiles—for 3 years or more. Therefore, the acquisition of a durable good increases future consumption possibilities in much the same way that the acquisition of a financial asset or housing does, and for this reason many have argued that spending on durable goods should be treated as investment rather than consumption. If durable goods share the same characteristics as housing, then like housing, the stock of consumer durable
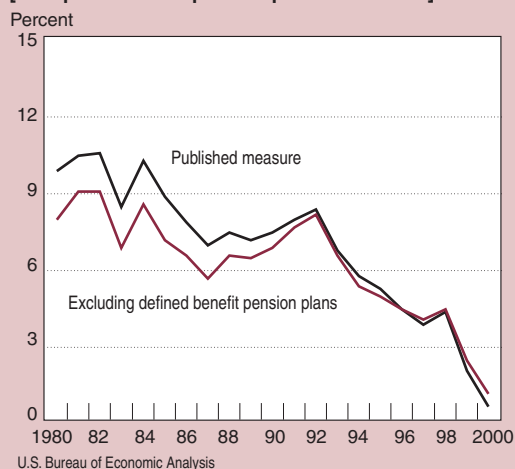
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11. The net saving of DB plans is equal to income less administrative expenses; only the income component of net saving (contributions plus interest plus dividends less benefits) is subtracted from DPI to construct the adjusted DPI used to calculate the saving rate. Administrative expenses are part of PCE and are therefore excluded from saving but not from income.

12. The stock market boom of the late 1990s is likely the major reason for the reductions in employer contributions to DB plans, but the decline in DB pension saving also reflects a shift away from DB plans in favor of DC plans. See Poterba, Venti, and Wise (2001).

13. In the NIPA's, net investment in housing is incorporated by imputing a housing service flow to PCE equal to the rental value of the house and by imputing an associated rental income to personal income (which is simply the imputed rental value net of depreciation and other costs). See the box "Treatment of Owner-Occupied Housing in the NIPA's."

goods should be included as a component of household wealth.[14] Indeed, durable goods are treated as assets in the FFA.[15]

However, conceptual and practical problems arise in counting consumer durable goods as capital assets in the NIPA's. On the conceptual side, treating durable goods as assets would imply that services furnished by these assets should count in gross domestic product (GDP). Yet these services, together with labor from household members, are inputs into household production activities that are out of scope for GDP. Because household production is out of scope for GDP,

the *System of National Accounts* (1993), which provides international guidelines for national accounts, recommends that spending on consumer durables be treated as consumption. On the practical side, the lack of vibrant rental markets for a broad variety of durable goods would make many rental values hard to impute.[16] In addition, the imputations for the expenditures and income from the services of the durables treated as assets would make the NIPA's more complex and make the market-based transactions that interest many users of the NIPA's harder to follow.

Nevertheless, a measure of personal saving that includes net investment in durable goods remains a reasonable alternative to the published NIPA measure.[17]

14. Expanding the definition of tangible assets to include consumer durable goods is a minor adjustment compared with some proposals for defining investment. In particular, since the discovery and diffusion of knowledge are important sources of economic growth, an expansion of measures of investment to include expenditures on intangible assets such as training, education, and research and development may be appropriate for some types of analysis. Some estimates imply that adding knowledge capital to investment boosts the net national saving rate between 15 percent and 25 percent of DPI from 1950 to the early 1990s (Nordhaus 1995). Similarly, as Jorgenson and Fraumeni (1989) found, investment in human capital is several times larger than investment in tangible assets. Nevertheless, the value and rates of depreciation of such intangible assets are subject to considerable uncertainty; therefore, most intangible assets are excluded from investment in the NIPA's.

15. Adding net investment in consumer durables to saving gives the same estimate of personal saving as imputing rental expenditures and rental income from durables. Under the latter approach, however, the measure of DPI in the denominator of the personal saving rate calculation would be larger by the amount of durable goods owners' imputed rental income, but not by enough to have an appreciable effect on the saving rate.

16. The rental-equivalence approach used to impute income and consumption for owner-occupied housing can also be applied to impute income and consumption for consumer durable goods. With this approach, the increment to saving from durable goods is equal to gross investment in durable goods plus the income generated from those goods less the consumption associated with them. As with owner-occupied housing, the imputed service flow from consumer durables is equal to an imputed rental value, and the imputed rental income from durables is calculated as the rental value less depreciation, personal property taxes, and interest on consumer loans. However, because property taxes and interest on consumer loans are already excluded from saving as part of tax payments and interest outlays, the net addition to saving from adopting rental equivalence for durables would equal gross investment in durables less depreciation on the stock of durables.

17. The FFA have always featured a measure of personal saving that includes net investment in consumer durable goods. This treatment is consistent with the net worth concept in the FFA, which counts consumer durables as a component of wealth on the household balance sheet.

Treatment of Owner-Occupied Housing in the NIPA's

The treatment of homeowners in the national income and product accounts (NIPA's) is designed to make GDP invariant to how much of the housing stock is occupied by owners. Homeowners are treated as landlords in the business sector who produce housing services that they consume as tenants in the personal sector. Their imputed rental expense is included in personal consumption expenditures, and their imputed net rental income is included in personal income.

BEA imputes the rental income of homeowners as a residual by subtracting the expenses that a landlord would pay from the imputed rents of residences occupied by their owners. Expenses considered in the calculation of homeowners' imputed rental income include services and materials to acquire and maintain the residence (closing costs, repairs, and property insurance), which count as intermediate inputs. Homeowners' expenses also include mortgage interest, indirect business tax and nontax liability (primarily property taxes), and consumption of fixed capital (depreciation). The largest and most variable of these items is mortgage interest, which, as an expense, reduces imputed rental income, personal

income, and personal saving. Mortgage interest payments are around 2 percent of DPI in the 1960s, reach a plateau of 5 percent of DPI in 1990, and remain under 4.5 percent of DPI after 1993.

NIPA table 8.21 shows the rental income imputed to homeowners. This income has slightly exceeded 1 percent of DPI since 1994, compared with a range of 0.1 to 0.7 percent of DPI in the 1980s. Inclusion of imputed rental income in personal income raises the value of the denominator in the calculation of the personal saving rate, but the effect on the calculation is negligible.

On the other hand, leaving net expenditures to purchase new residences out of personal consumption expenditures and deducting CFC for these residences from personal income has a substantial effect on the calculation of the personal saving rate. In most years, these procedures raise personal saving by enough to add about 3 to 3½ percentage points to the personal saving rate, compared with a measure that treats these purchases of new residences as current consumption. However, in 1981–82 and 1991–92, the effect on the personal saving rate was only about 2 percentage points.

Chart 2 compares the path of the published NIPA personal saving rate with a personal saving measure that has been augmented by net investment in durable goods.[18] The pattern of the saving rate adjusted to include consumer durable goods reflects the cyclical nature of spending on these goods: Net investment in consumer durables increased substantially in the 1990s, rising from about ½ percent of DPI at the end of 1991 to 3½ percent in 2000. As a result, the adjustment for consumer durables raises personal saving between ½ percent and 3½ percent of DPI compared with the published NIPA measure but does not significantly alter the decline in the saving rate in the late 1990s.

Effect of inflation on measured personal saving rates

Another issue that arises in implementing equation 1 is whether the equation should be stated in real terms or in nominal terms. The personal saving rate in the NIPA's is calculated from nominal values of income and consumption. To the extent that inflation simply scales up the value of income and consumption, it will have little effect on the saving rate. Inflation tends, however, to raise interest income and outlays by more than the change in the general price level. As a result, saving rates vary with the rate of inflation.
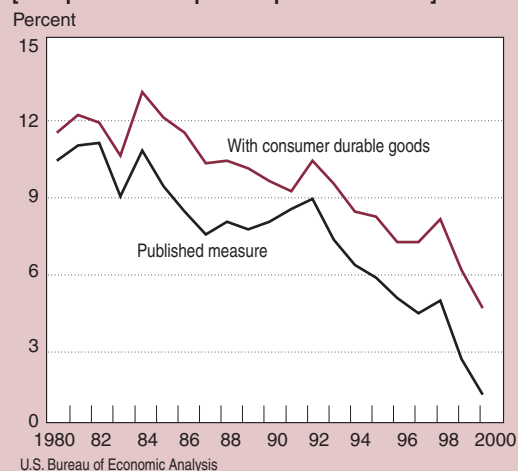
The mechanism that raises interest income and outlays in the presence of expected inflation is straightforward. If there were no adjustment to nominal interest rates, then households with interest-bearing wealth would clearly be worse off in inflationary periods because inflation erodes the purchasing power of their wealth. As a result, when those with money to lend anticipate inflation, they demand higher nominal rates of interest to compensate for the loss in purchasing power of both the principal and the interest income associated with that asset. Roughly, the required increase in nominal interest income is equal to the product of the inflation rate and the real value of the previous period's net interest-bearing assets.[19] If the value of interest-bearing assets exceeds the value of interest-bearing liabilities in the personal sector, the increase in nominal interest rates will raise measured personal saving

CHART 2

Personal Saving Measure with Consumer Durable Goods
[As a percent of disposable personal income]
Percent

With consumer durable goods

Published measure

U.S. Bureau of Economic Analysis

even though it leaves the purchasing power of household net worth unchanged.[20]

The effect of inflation on net interest income may cause difficulty in interpreting changes in personal saving rates over time. In particular, because the personal sector tends to be a net lender to other sectors, a decline in personal saving will be observed as inflationary pressures wane, even if the real values of interest income and outlays and of noninterest income and consumption are unchanged.

A measure of personal saving that removes the inflation premium—or the amount of interest income required to cover the loss of purchasing power induced by inflation—from nominal interest earned on assets and nominal interest paid on liabilities shows how real saving behavior has changed over time. The inflation premium is estimated by multiplying the realized inflation rate, as measured by the average change in the chain-type price index for PCE, by the average holdings of interest-bearing assets less liabilities for the personal sector recorded in the FFA. Assets held indirectly through pension plans, insurance contracts, personal trusts, and mutual funds are included. Since personal income includes the profits of noncorporate businesses, such as sole proprietorships and partnerships, the interest-bearing assets and liabilities of noncorporate businesses are also included in the adjustment. These businesses tend to be net borrowers, so the effect

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18. Net investment in durable goods differs slightly from PCE for durable goods (less depreciation) because of the treatment of used automobiles. In particular, net investment in automobiles is calculated as the change in the value of the depreciated stock of automobiles, whereas consumption expenditures include premiums charged by incorporated auto dealers.

19. The precise adjustment to nominal rates required to make the consumer as well off in an inflationary economy (where the inflation rate is given by π_t) as in a noninflationary economy is $\pi_t + \pi_t i_t$, where the first term compensates for the loss in purchasing power of the value of the asset and the second term compensates for the loss in purchasing power of the interest income generated by that asset. The adjustment can be derived by adjusting all the variables in equation 1 for inflation.

20. To a large extent, inflation-induced increases in saving by the personal sector will be offset by inflation-induced reductions in saving by the business sector and the government sector, leaving national saving little changed. Net foreign borrowing or lending prevents this offset from being complete.

of adjusting their net interest-bearing assets for inflation partly offsets the effect of adjusting the net interest-bearing assets of households, which tend to be net lenders.

Chart 3 shows the path of the inflation-adjusted personal saving rate over the past 20 years. When inflation is relatively high, as it was in the early 1980s, the inflation-adjusted saving rate is 1½ to 2½ percentage points below the published rate. As inflation rates come down, as they did in the 1990s, the gap between the inflation-adjusted saving rate and the published measure narrows; by 1998, the gap is just ½ percentage point. Although the inflation-adjusted measure falls less than the published measure, it still declines significantly from its peak of 9½ percent of DPI in 1982 to about zero in 2000.

Treatment of capital gains and capital gains taxes
In the NIPA's, personal income excludes capital gains (and losses) because they do not derive from current production. As a result, the large capital gains realized during the stock market boom of the 1990s failed to boost personal saving. Indeed, they effectively reduced measured personal saving over that period because taxes paid on those gains are included in personal tax payments, which are deducted from personal income in calculating DPI.

Some have argued that the NIPA treatment of capital gains is inconsistent with its treatment of capital gains taxes: If capital gains are not part of income, then taxes on those gains should not be counted against income as personal tax payments. Despite these argu-

ments, the NIPA treatment is appropriate given the purpose of the NIPA accounting framework. Changes in asset values due to price changes provide no new funds for investment—they merely represent changes in the asset and liability positions of some investors relative to others. Capital gains taxes, however, do represent payments from the personal sector to the government sector. The reason why a tax is due is generally not a consideration in deciding whether to account for it in the NIPA's.[21] Furthermore, if the NIPA's did not count capital gains taxes as personal tax payments, then the government could not be credited with the capital gains tax revenue. This treatment would have unsatisfactory consequences for the measure of the government surplus or deficit.

Nevertheless, if one steps outside the NIPA framework, a plausible implementation of equation 1 might be to expand the concept of income by including capital gains or to narrow the concept of tax payments by excluding capital gains taxes from personal tax payments. To show the effect of the treatment of capital gains taxes on personal saving over the past two decades, chart 4 presents a measure of saving that excludes those taxes from personal tax payments. Only Federal taxes on capital gains are considered; State capital gains taxes have been estimated to range between

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21. However, the NIPA's do not include estate and gift taxes in personal tax payments because those taxes are classified as net capital transfers. A defining feature of a net capital transfer is that it is a transaction in which one party gets something for nothing. Capital gains realized in the sale of stock or some other appreciated asset do not qualify under this criterion, as one investor pays an appreciated price for the asset that another investor is selling.
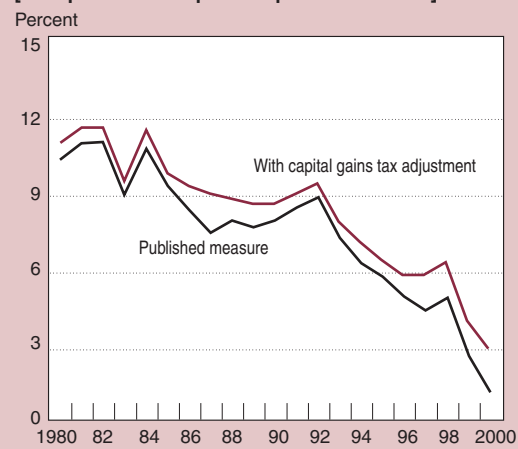

CHART 3

Personal Saving Measure with Inflation Adjustment
[As a percent of disposable personal income]

Percent

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CHART 4

Personal Saving Measure with Capital Gains Tax Adjustment
[As a percent of disposable personal income]

Percent

U.S. Bureau of Economic Analysis

one-tenth and one-fifth the size of Federal capital gains taxes.

The chart shows that Federal capital gains taxes typically accounted for between ½ percent and 1 percent of DPI in the past two decades, but they are estimated to have increased to 1½ percent from 1998 forward. Therefore, excluding capital gains tax payments from personal tax payments raises the adjusted saving measure by relatively more in recent years and eliminates at most 1 percentage point of the decline in the personal saving rate. The treatment of capital gains appears to be responsible for very little of the sharp decline in personal saving over the past 20 years.

Measures of Wealth Accumulation

Although saving measures that exclude capital gains are appropriate for the purposes of the NIPA's, broader concepts of saving that include capital gains along with NIPA-concept saving can be useful for understanding changes in the future consumption possibilities of households. Indeed, accounting for the capital-gains component of changes in wealth is important for understanding changes in the NIPA-concept saving rate. For example, households that are saving to accumulate enough funds for retirement may find that they can save less if they experience larger-than-expected gains in the value of their net worth.[22]

Published quarterly, the FFA provide estimates of household net worth, which is defined as the value of financial and tangible assets minus liabilities. They also provide a decomposition of sources of change in net worth. Any increase in the level of net worth from one period to the next must, in the absence of discontinuities, be due either to capital gains on existing assets or to money taken out of current income to purchase assets or pay down debt.[23] These sources of change in net wealth are tabulated in the accumulation account in table 2.

As chart 5 shows, the total change in household wealth averaged 36 percent of DPI over the past two decades, with capital gains accounting for about two-thirds of the total change in wealth, on average. However, the wealth accumulation measure exhibits considerable volatility; the change in wealth rises from 10

22. The phenomenon of reduced household saving in response to rising wealth has been dubbed the wealth effect on consumption. Recent work indicates that the magnitude of this effect is in the range of 3–5 cents of additional consumption per dollar of additional wealth (see, for example, Poterba 2000).

23. The net worth figures include capital gains on real estate as well as capital gains on corporate equity, held directly or indirectly through mutual funds, pension funds, life insurance contracts, and bank personal trusts and estates. Other financial instruments, such as bonds, are carried at book value; hence, the net worth figures do not include capital gains or losses on those assets and liabilities.

percent in 1990, balloons close to 75 percent of DPI in 1999, and then falls to a record low of nearly –10 percent in 2000. Besides revealing the large magnitude and volatility of capital gains, chart 5 suggests that the low rates of personal saving since the mid-1990s might be partly explained by the surge in household net worth caused by the stock market boom of the 1990s.
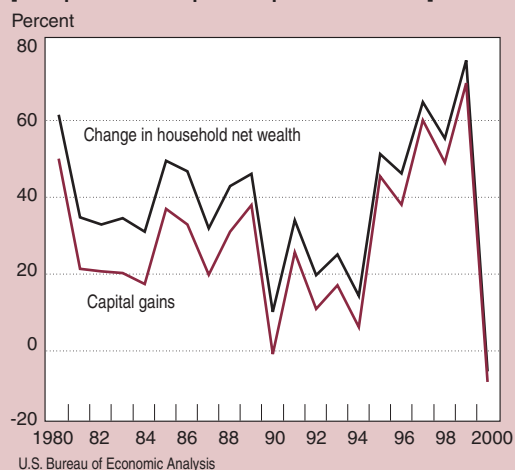
The large gains of the 1990s are especially unusual because they occurred when inflation was low. During periods of significant inflation, some gains in asset prices simply reflect changes in the general price level and therefore do not represent increases in the real consumption possibilities of the asset holders. In 1980, for example, the personal sector's nominal capital gains are around 50 percent of nominal DPI, but the chain-type price index for PCE indicates an inflation rate of around 10 percent per year. Deducting the price changes that merely maintain assets' real value in terms of consumption goods and services shows that in real terms the personal sector's capital gains are only around 5 percent of real DPI in 1980. In contrast, from 1995 to 1999, real capital gains range from 25 to 55 percent of real DPI, compared with a range of 36 to 68 percent for the ratio of nominal capital gains to DPI. (For data on real capital gains and real net worth, see table 3.)

National Saving

An important reason for concern about personal saving is its role in funding the capital accumulation that is vital for economic growth. The domestic source of funds for capital investments is net national saving, which includes personal saving, saving by businesses

CHART 5

Measures of Wealth Accumulation
[As a percent of disposable personal income]

Change in household net wealth

Capital gains

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(undistributed profits), and saving by governments (surpluses). Personal saving generally accounts for most of this total, and it is almost always larger than either of the other two components of net national saving.

However, low levels of personal saving need not imply inadequate national saving. National saving is more stable than the saving by individual sectors of the domestic economy because swings in personal saving and government saving tend to offset each other. For example, as shown in chart 6, net national saving rebounds from a trough of below 4 percent of net national product (NNP) in 1993 to over 7 percent of NNP in 1998, despite the decline in personal saving between those years. This rebound reflects an increase in government saving that exceeds the fall in personal saving. Nevertheless, net national saving averaged 9 percent of NNP in 1980–81, and viewed from a long-term perspective, net national saving is down substantially.

Conclusion

Personal saving provides funds for new capital investment, which in turn powers economic growth and raises the future consumption possibilities of households. Though the definition of personal saving is fairly simple—DPI less consumption—the definitions of personal income and consumption can be controversial.

The definitions of income and consumption explored in this article differ from those used in the NIPA's. These definitions (1) alter the boundaries of the personal sector by excluding defined benefit pen-

sion plans, (2) treat consumer durable goods expenditures as investment rather than consumption, (3) remove the effects of inflation from nominal interest income and outlays, and (4) narrow the definition of personal tax payments by excluding taxes paid on capital gains. These adjustments flatten the contour of personal saving, but not enough to alter the conclusion that personal saving rates have fallen to very low levels in recent years.

Since the personal sector is usually the main source of national saving, one concern raised by the decline in the NIPA personal saving rate over the past two decades is whether national saving is still adequate to fund needed capital accumulation. The record low of net foreign investment in 2000 shows the effects of low national saving. Nevertheless, the decline in personal saving in the late 1990s was offset by a large increase in government saving. As a result, net national saving actually increased through much of the 1990s, albeit not to the levels that prevailed before 1982. Furthermore, net domestic investment in new capital assets (which includes private domestic investment and government investment less consumption of fixed capital) increased even more as a percent of NNP, regaining the level it had at the beginning of the 1980s.

Two more concerns raised by the decline in personal saving are the retirement preparedness of households and the ability of households to weather unexpected shocks to their income or expenses. However, the recent decline in personal saving rates does not in itself indicate that households are ill-prepared to finance their retirement or to handle unexpected expenses. To get a sense of the strength of household balance sheets, a broader measure of wealth accumulation is useful. Perhaps the broadest concept of personal saving is the change in household net worth, which can be measured using data from the FFA. Change in net worth in the FFA includes increments to wealth that are unrelated to current production, in particular, capital gains on existing tangible and financial assets as well as net investment in consumer durable goods.

Capital gains in the last half of the 1990s were responsible for large gains in household net worth as measured by the FFA. However, capital gains can be quite volatile, particularly for financial assets such as equities, so relying exclusively on these gains for financial security, or even to finance longer term needs such as retirement, would be imprudent.

Furthermore, both the NIPA saving measures and the FFA wealth measures provide information about all households combined. Because they do not measure how wealth and saving are distributed across households, they have limited value for addressing

CHART 6

Net National Saving and Personal Saving
[As a percent of net national product]

Percent

Published personal saving

Net national saving

1980 82 84 86 88 90 92 94 96 98 2000

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many important policy questions, including those concerning retirement readiness.

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Table 1. Alternative Personal Saving Rates and Related Measures, 1980–2000

	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Personal saving rate defined by:																					
Published NIPA's	10.2	10.8	10.9	8.8	10.6	9.2	8.2	7.3	7.8	7.5	7.8	8.3	8.7	7.1	6.1	5.6	4.8	4.2	4.7	2.4	1.0
Excluding defined benefit pension plans	8.3	9.4	9.4	7.2	8.9	7.5	6.9	6.0	6.9	6.8	7.2	8.0	8.5	6.9	5.7	5.3	4.8	4.4	4.8	2.8	1.5
With consumer durables as investment	11.3	12.0	11.7	10.4	12.9	11.9	11.3	10.1	10.2	9.9	9.4	9.0	10.2	9.3	8.2	8.0	7.0	7.0	7.9	5.9	4.4
With inflation adjustment	7.6	9.0	9.4	7.3	9.3	7.8	7.2	5.6	5.9	5.5	5.4	6.8	7.4	6.1	5.0	4.6	3.7	3.6	4.2	1.4	–0.2
With capital gains adjustment	10.8	11.4	11.4	9.3	11.3	9.6	9.1	8.8	8.6	8.4	8.4	8.8	9.2	7.7	6.9	6.2	5.6	5.6	6.1	3.8	2.7
Growth of personal sector wealth:																					
Capital gains, percent of DPI	48.5	19.5	18.8	18.4	15.5	35.2	31.1	17.9	29.3	36.2	–3.0	23.8	8.9	15.1	4.1	43.8	36.3	58.6	47.5	68.4	–10.3
Change in net worth, percent of DPI.............	60.0	33.0	31.1	32.8	29.3	47.9	45.1	30.1	41.2	44.5	8.1	32.2	17.8	23.2	12.3	49.7	44.6	63.4	53.8	74.4	–7.5
Real capital gains, percent of real DPI...........	5.3	–11.0	–1.6	1.1	1.4	20.7	19.7	–0.6	9.7	16.6	–25.8	9.6	–3.9	5.7	–6.5	34.0	24.6	51.9	40.3	55.1	–23.7
Change in real net worth, percent of real DPI	16.8	2.5	10.7	15.5	15.2	33.4	33.7	11.7	21.6	24.8	–14.7	18.0	5.0	13.9	1.6	40.0	33.0	56.7	46.7	61.1	–20.9
Saving as percent of net national product:																					
Personal saving, NIPA definition	8.3	8.8	9.2	7.3	8.8	7.6	6.8	6.1	6.5	6.2	6.5	7.1	7.4	6.0	5.1	4.6	4.0	3.5	3.9	2.0	0.8
Net national saving.......................................	8.5	9.4	6.6	4.9	8.2	6.9	4.7	5.4	6.9	6.0	5.2	5.1	4.2	3.8	4.3	5.1	5.7	6.7	7.5	6.8	6.3

DPI Disposable personal income.
NIPA National income product accounts.

Table 2. Contributions of Saving and Capital Gains to Changes in Personal Net Wealth, 1980–2000

						Addenda:		
Year	Starting net worth	FFA saving as estimated from investment [1]	Capital gains or losses	Other factors [2]	Ending net worth	NIPA personal saving	Items in FFA saving but not NIPA saving [3]	FFA measure of NIPA saving concept
1980	8,356.9	238.6	980.3	–6.7	9,569.1	205.6	14.1	224.5
1981	9,569.1	319.8	439.0	–17.6	10,310.3	243.7	16.7	303.1
1982	10,310.3	329.9	452.5	–33.4	11,059.3	262.2	10.4	319.5
1983	11,059.3	335.7	476.5	37.1	11,908.6	227.8	34.4	301.3
1984	11,908.6	412.5	447.7	–14.0	12,754.8	306.5	61.2	351.3
1985	12,754.8	372.4	1,085.7	21.8	14,234.7	282.6	77.7	294.7
1986	14,234.7	481.1	1,013.1	–24.4	15,704.5	267.8	94.6	386.5
1987	15,704.5	409.5	620.5	12.9	16,747.4	252.8	89.4	320.1
1988	16,747.4	458.8	1,099.9	–12.6	18,293.5	292.3	79.7	379.1
1989	18,293.5	353.3	1,455.7	–23.1	20,079.4	301.8	84.5	268.8
1990	20,079.4	512.6	–128.1	–36.8	20,427.1	334.3	54.7	457.9
1991	20,427.1	386.0	1,064.2	–11.2	21,866.1	371.7	18.6	367.4
1992	21,866.1	429.4	422.8	–6.8	22,711.5	413.7	56.6	372.8
1993	22,711.5	419.0	743.6	–16.0	23,858.1	350.8	90.1	328.9
1994	23,858.1	398.8	214.1	22.2	24,493.2	315.5	91.8	307.0
1995	24,493.2	366.3	2,372.8	–42.8	27,189.5	302.4	112.6	253.7
1996	27,189.5	403.1	2,058.4	68.9	29,719.9	272.1	104.5	298.6
1997	29,719.9	329.6	3,497.4	–45.7	33,501.2	252.9	141.5	188.1
1998	33,501.2	429.1	3,018.4	–25.3	36,923.4	301.5	175.5	253.6
1999	36,923.4	337.4	4,523.7	62.2	41,846.7	160.9	196.5	140.9
2000	41,846.7	249.6	–725.5	–50.7	41,320.1	67.7	210.8	38.8

1. Equals investment in financial assets minus borrowing, plus investment in tangible assets minus consumption of fixed capital. Source: Table F.100 in the December 2001 release of the FFA.
2. Consists of statistical discontinuities, and differences between NIPA series for consumption of fixed capital. Source: Table R.100 from the FFA.
3. Consists primarily of net investment in consumer durables, but it also includes Federal employee life insurance reserves, Railroad Retirement Board reserves, and immigrants' transfers, less estate and gift taxes.
FFA Flow of funds accounts.
NIPA National income product accounts.

Table 3. Personal Sector Real Net Worth, Real Saving, and Real Capital Gains, 1980–2000

[Billions of chained (1996) dollars]

Year	Starting real net worth [1]	Real FFA personal saving	Real capital gains [2]	Memo: Real DPI	Memo: Real NIPA saving
1980	15,930.8	432.1	192.5	3,658.0	372.4
1981	16,543.3	532.3	–411.0	3,741.1	405.6
1982	16,635.4	519.7	–56.1	3,791.7	413.1
1983	17,046.2	507.2	41.1	3,906.9	344.2
1984	17,650.6	601.1	58.1	4,207.6	446.7
1985	18,289.5	524.6	898.6	4,347.8	398.1
1986	19,743.4	661.6	885.6	4,486.6	368.3
1987	21,257.1	542.5	–25.6	4,582.5	334.9
1988	21,791.2	585.0	462.8	4,784.1	372.7
1989	22,822.9	431.6	812.5	4,906.5	368.7
1990	24,038.8	598.6	–1,294.1	5,014.2	390.4
1991	23,300.2	434.1	486.7	5,033.0	418.1
1992	24,208.4	468.7	–198.6	5,189.3	451.5
1993	24,471.1	446.7	298.2	5,261.3	374.0
1994	25,198.7	416.7	–350.1	5,397.2	329.7
1995	25,288.6	374.2	1,883.8	5,539.1	308.9
1996	27,503.1	403.1	1,398.3	5,677.7	272.1
1997	29,373.3	323.3	3,030.7	5,854.5	248.1
1998	32,682.5	416.5	2,529.7	6,168.6	292.6
1999	35,604.2	322.2	3,441.9	6,320.0	153.7
2000	39,427.7	232.1	–1,633.1	6,539.2	63.0

1. Changes in real net worth do not equal the sum of real saving and real capital gains because of "other factors," which are shown in current dollars in table 2.
2. Real capital gains are calculated as the difference between the value of inflation-adjusted net worth at the close of each year and the total of inflation-adjusted opening net wealth and inflation-adjusted FFA saving during the year adjusted for "other factors."
Note. The price level at the start of any year *y* is measured by an average of the implicit PCE price indexes for the fourth quarter of *y*–1 and the first quarter of *y*. The index used to adjust saving flows during a year is an average of the four quarterly PCE price indexes for that year.
DPI Disposable personal income.
FFA Flow of funds accounts.
NIPA National income product accounts.
PCE Personal consumption expenditures.