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GOVERNMENT POLICY AND PERSONAL RETIREMENT SAVING

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Incentives to save for retirement have been an important component of government tax policy since the Revenue Act of 1942 made employer pension contributions tax-deductible. Since that time, pension funds have grown enormously. Private firm pension assets increased from \$13 billion in 1950 to \$1,836 billion in 1989.¹ But only about half of the work force is covered by a pension plan and thus benefit from this inducement to employers to save for their employees' retirement. To address this inequity and to provide a retirement saving incentive for employees not covered by pension plans, the Individual Retirement Account (IRA) was introduced in 1974. Under this plan, employees without an employer-provided pension plan could put up to \$1,500 each year in an IRA account. The contribution was tax-deductible and the return on the balance accumulated tax free. Taxes were paid on withdrawal. The non-

We are grateful to Art Kennickell for providing a cleaned version of the SCF data set (Avery and Kennickell, 1988). Some of the CES and SIPP data were made available by the Inter-University Consortium for Political and Social Research. We are grateful to Angus Deaton, Alan Gustman, James Poterba, Jonathan Skinner, and Richard Thaler for their comments on earlier drafts of the paper. Financial support was provided by the National Institute of Aging, grant number PO1 AG05842-06

¹ Including government pension funds the total was \$2,786 billion in 1989.

employed spouse of an employee could contribute up to \$250 per year. The self-employed were covered by Keogh plans introduced in 1962. The Economic Recovery Tax Act of 1981 extended the IRA to all employees beginning in 1982. In addition, the contribution limit, which was increased to \$1,750 in 1977, was raised to \$2,000.

The 1981 legislation sparked a wave of promotion by IRAs by banks and other financial institutions. IRA (and Keogh) assets grew from \$39 billion in 1981 to almost one-half trillion by 1989 (see Piacentini and Cerino, 1990). By 1989, IRA assets were equal to 27 percent of firm pension plan assets, an increase from only 4 percent in 1981. About 30 percent of households had IRA accounts by 1986. After firm pension plans, IRAs seemed destined to become the principal form of saving for retirement. IRAs are the focus of this paper. More recently there has been an explosion in 401(k) plans that do not have income restrictions and have higher contribution limits.

Largely because of their tax cost, IRAs were a major topic of discussion prior to passage of the Tax Reform Act of 1986. The original "Treasury I" plan proposed that the annual contribution limit be raised to \$2,500 and that the spousal contribution be raised from the \$250 to \$2,500. The Senate Finance Committee proposed that the existing plan be eliminated. The compromise solution left the existing plan intact for families with incomes less than \$40,000, for single persons with incomes less than \$25,000, and for all persons not covered by a firm pension plan. For those with a pension plan, the tax deduction of the contribution was phased out between \$40,000 and \$50,000 for families and between \$25,000 and \$35,000 for single persons. Even persons with incomes above these limits could contribute to an IRA without the tax deduction and the returns accumulated tax free, with the tax to be paid on withdrawal.

The Tax Reform Act of 1986 eliminated the tax deduction for about 15 percent of the 1985 contributors and partially restricted the deduction for another 12 percent (see Employee Benefit Research Institute, 1986). But the number of contributors and the amount contributed fell much more than these figures would suggest. The total amount deducted dropped from \$37.8 billion to \$14.1 billion, a 62.8 percent decline.² This "overreaction" is at least in part attributable to widespread misunderstanding of the legislation (often reported at the time to have eliminated IRAs) and to the marked decline in the promotion of IRAs. Indeed, a recent survey revealed that about half of all persons eligible for an IRA deduction

² The percent of tax returns showing an IRA deduction fell from 15.1 percent in 1986 to 6.8 percent in 1987, a 55.0 percent decline.

following the 1986 legislation mistakenly believed they were no longer eligible. (*IRA Reporter*, 1988).

The debate surrounding the 1986 legislation raised questions about the distribution of accounts by income and about the net saving effect of the accounts.³ The latter question has led to the most extensive empirical research. An early paper by Hubbard (1984) using a 1979 survey conducted for the President's Commission on Pension Policy suggested that IRAs stimulated new saving prior to 1982. He found that contributions to IRAs and Keoghs, unlike "saving" through private pensions or Social Security, increase household net worth, given permanent income and other household characteristics. In a series of papers based on the 1983 Survey of Consumer Finances, the Survey of Income and Participation, and the Consumer Expenditure Surveys, Venti and Wise (1986, 1987, 1990a, 1991a) concluded that additional IRA contributions represented "new" saving for the most part. Feenberg and Skinner (1989), using a 1980 to 1984 panel of taxpayers, found that IRA contributors increased their saving over time by more than noncontributors even after controlling for initial wealth. They were unable to find substitution of IRA for non-IRA saving. Gale and Scholz (1990), based on the 1986 Survey of Consumer Finances, concludes that most IRA saving is not new saving, but rather represents saving that otherwise would have occurred in other forms. Joines and Manegold (1991), using a taxpayer panel, offer a middle-ground estimate. All of the studies agree that about \$0.30 to \$0.35 of each dollar put in an IRA account is funded by reducing taxes. The various Venti and Wise estimates suggest that \$0.45 to \$0.66 of each dollar comes from reducing consumption expenditure, the Feenberg and Skinner estimates imply that about two-thirds of each dollar comes from reduced consumption, the Gale and Scholz estimates are from $-\$0.02$ to $\$0.25$, and the Joines and Manegold "best guess" is $\$0.305$.

The goal of this paper is not to review these studies, although such an endeavor would certainly be worthwhile. Instead, we present in a simple format the basic patterns of IRA and non-IRA saving behavior, without the constraints imposed by the more formal models, some of which are rather complex.

The paper begins with a review of the level of personal saving in the United States and a discussion of the distribution of IRA accounts by age

³ The proponents of the original 1974 IRA legislation emphasized the savings inducement for persons not covered by private pension plans. But whether this goal has been met has received little recent attention. We found in earlier work (Venti and Wise, 1988) that it was not. After controlling for individual attributes such as age and income, we found that persons without pension plans are no more likely than persons with pensions to contribute to an IRA account.

and income. The data suggest that at least 40 percent of households would have opened an IRA account over the course of their lives under the pre-1986 legislation. At least 60 percent of households with incomes above \$30,000 would have opened accounts. Evidence on the saving effects of IRAs is presented in sections II through IV. The exposition is primarily graphical. Although the analysis is nontechnical, by considering several types of data we attempt to account for factors, such as individual propensity to save, that may confound the interpretation of the data. We find that the data provide little support for the possibility that IRAs had no net saving effect. Finally, we comment on the simple theoretical model that has led some observers to conclude that IRAs had no saving effect. We conclude that this simple model does not capture the prominent features of IRA saving and thus that its implications are unlikely to be valid. In particular, the assumption that IRA saving and other saving are treated by actual decision makers as perfect substitutes is inconsistent with the empirical evidence.

I. BACKGROUND

Most of the data discussed here pertain to IRA contributions, IRA asset balances, and non-IRA asset balances. The data are from three sources: the Consumer Expenditure Surveys (CESs) for 1980 through 1989, the Survey of Income and Program Participation (SIPP) for 1985 through 1987, and the Survey of Consumer Finance (SCF) for 1983 and 1986. Although much of the data in the three surveys is overlapping, the exact coverage and definitions differ among the surveys. The CES data span the period before and after the IRA program. They provide data on non-IRA asset balances and on IRA contributions in each year, but not on IRA balances. Both the SIPP and the SCF provide detailed information on non-IRA asset balances and IRA balances, but not on IRA contributions. The household is the unit of analysis for the CES and the SCF data; the SIPP data allow analysis based on household and family units. The family is the more appropriate unit because it corresponds to the typical IRS tax filing unit. For comparability, however, we present household data in most instances. For all the analyses in this paper a household or family is excluded if either the respondent or the spouse of the respondent is self-employed. The self-employed had access to Keogh plans with very different contribution limits than IRAs. In most cases IRAs were not a feasible option for the self-employed. Elimination of the self-employed also minimizes a potential complication that arises because two of the surveys (the CESs and the 1986 SCF) ask respondents for

combined IRA and Keogh balances. Some details of each of the data sets are presented in the Appendix.

A. Low Personal Saving in the United States

On the eve of retirement the typical American family has only about \$6,600 in financial assets. Personal saving in the United States has declined substantially as a fraction of personal income since the early 1950s and a large proportion of families reach retirement age with little or no personal saving. Personal saving declined from between 3% and 6% of disposable private income in the 1950s to around 1 percent in the early 1980s, based on computations made by Summers and Carroll (1987).⁴ These numbers are adjusted for inflation and exclude saving by employers through defined-benefit pension plans.⁵ Without the inflation adjustment, the downward trend begins only after 1973.

Aggregate saving rates, of course, reflect the wealth accumulation of all households, some of whom save very large amounts. Micro data show that a large fraction of families have almost no personal saving. Based on the recent Survey of Income and Program Participation (SIPP), we (Venti and Wise 1991a) computed the composition of total wealth for all households in 1984. The results are summarized in Figure 1. The amounts reflect median wealth by asset category.⁶ It is clear that most families approach retirement age with very little personal saving other than housing equity. Among households with heads aged 60 to 65, median liquid wealth is only \$6,600; the median value of housing equity is \$43,000.⁷ The majority of families rely heavily on Social Security benefits for support after retirement, and to a much more limited extent on the saving that is done for them by employers through defined-benefit pension plans.⁸

⁴ Many other studies using different definitions of saving have reported a similar downward trend. See for example, Bosworth, Burtless, and Sabelhaus (1991).

⁵ The National Income Accounts include firm contributions to defined-benefit pension plans under "personal saving." Inflation-adjusted saving is measured saving, minus the inflation rate (the GNP deflator), times net interest-bearing assets.

⁶ Thus the component medians do not sum to the median of total wealth.

⁷ Liquid wealth is broadly defined to include interest earning assets held in banks and other institutions, mortgages held, money owed from sale of businesses, U.S. Savings Bonds, and checking accounts, equity in stocks and mutual fund shares, less unsecured debt. Other wealth includes net equity in vehicles, business equity, and real estate equity (other than owned home).

⁸ The SIPP data allow estimation of the value of Social Security and pension plan benefits only after the payments are received. Thus wealth in the form of Social Security and pensions is only recorded for persons who have begun to receive the payments. The median of Social Security and pension wealth combined is \$113,400 (the median of Social

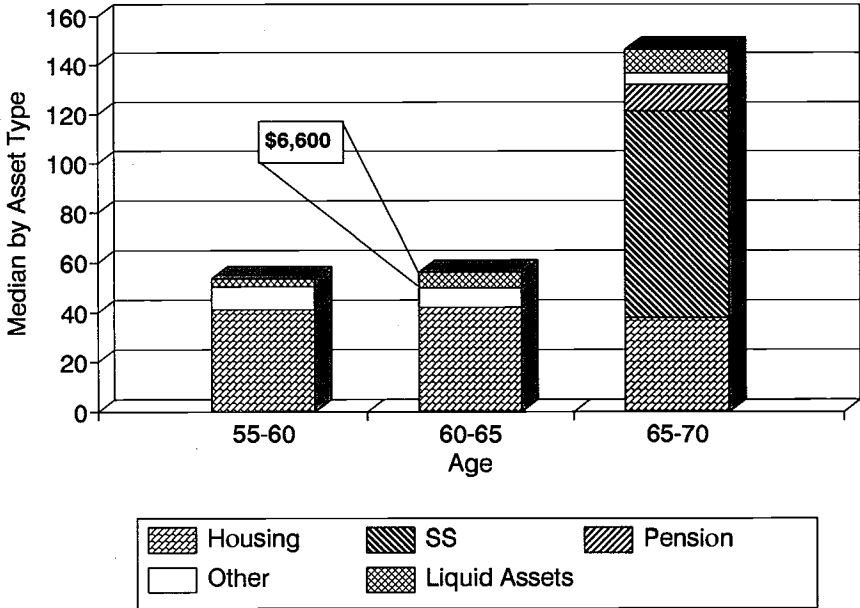


FIGURE 1. *Median asset balance by age and type of asset.*

B. IRA Assets and The Distribution of Accounts by Age and Income

The explosion of IRA saving after the 1981 legislation can be judged by comparing assets in IRA accounts to firm pension fund assets, reflecting the retirement saving by firms for their employees. The aggregate data are graphed in Figure 2. Assets in IRA (and Keogh) accounts were only about 4 percent as large as pension fund assets in 1981.⁹ By 1989, accumulation of personal saving in IRA accounts amounted to \$493.7 billion and was almost 27 percent as large as pension fund assets. Without the precipitous decline in IRA contributions after the 1986 bill, IRA assets apparently would have continued to grow.

At the individual level, the importance of IRAs for contributing house-

Security wealth is \$83,700 and the median of pension wealth \$11,200); the median of housing wealth is \$38,000 and the median of liquid financial assets is only \$10,000, for households with heads age 65 to 70.

⁹ The data are reported in Piacentini and Cerino (1990) and include IRA and Keogh assets together. It is apparent, however, that in the later years the vast majority of the assets are in IRA accounts.

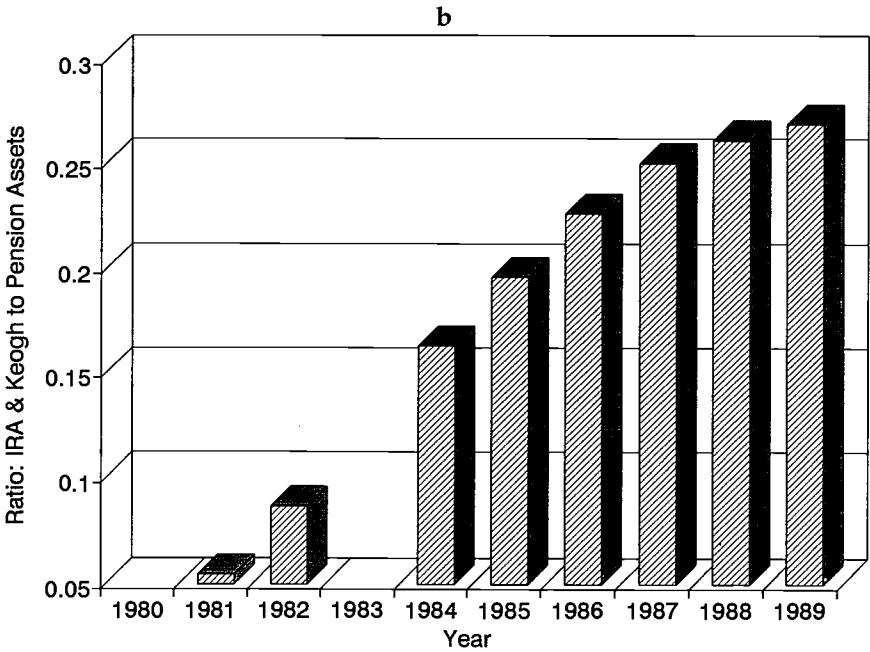
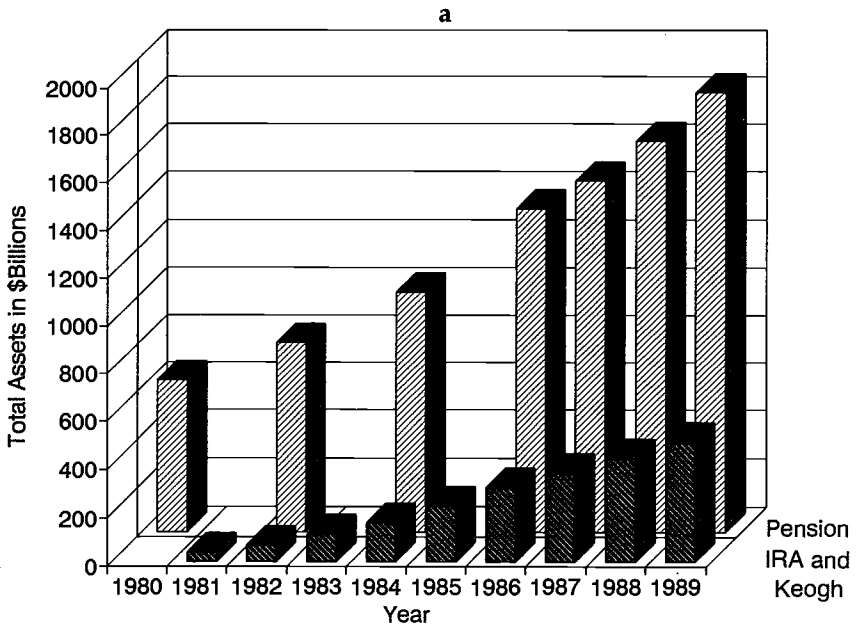


FIGURE 2. Private pension versus IRA and Keogh. a. total assets; b. ratio of total assets.

holds grew rapidly as well. The median ratio of IRA to other financial assets (excluding stocks and bonds) increased from essentially zero in 1980 to 0.75 in 1986, for households with accounts in 1986. If stocks and bonds are included, the ratio was 0.46. Most households without IRA saving in 1986 were essentially nonsavers, like the majority of American households. The median level of their financial assets was about \$1,500 in 1986. As the following discussion will show, a large fraction of IRA savers also saved very little before the advent of the IRA program.

The realization that a large fraction of Americans do not save at all is important in assessing the impact of the IRA program. The data presented below suggest to us that IRA savers increased their total saving substantially after 1982. Many were saving very little before they began to contribute to an IRA. But many households did not save before and still do not. A significant proportion of these nonsavers will have low lifetime incomes and Social Security retirement benefits will replace a large fraction of their annual preretirement earnings. They may expect to maintain their preretirement standard of living with no personal saving and may never save through an IRA account.

But a large fraction of households with modest lifetime incomes would have been IRA savers under the pre-1986 legislation. The percent of households with IRA accounts in 1986 ranged from close to zero for young households with very low incomes to over 70 percent among older households with high incomes, as shown in Figure 3.¹⁰ Like other saving, IRA saving increases with age and income. Over 50 percent of households with annual income above \$20,000 would have opened an IRA account before they retired, based on the 1986 participation rate of households with heads 55 to 65 and income over \$20,000. About 60 percent in this age bracket with incomes over \$30,000 had accounts and 65 percent of those with incomes over \$40,000.¹¹ Thus, relative to other saving, IRA saving is very widespread.

IRAs sometimes are portrayed as held by only a few and concentrated among the wealthy. About 60 percent of 1986 IRA accounts and 50 percent of IRA assets were held by households with incomes of less than \$50,000.¹² Only 34 percent of non-IRA financial assets are held by house-

¹⁰ Figure 3 is based on SIPP data. Over 80 percent of older high-income households contributed, according to SCF data.

¹¹ Based on SIPP data. Based on SCF data, 65 percent, 70 percent, and 77 percent, respectively, of households in this age group had accounts.

¹² Families with income less than \$50,000 held 76 percent of the accounts and 66 percent of the balances, according to SIPP data. The family data corresponds more closely to an IRS tax unit than the household data.

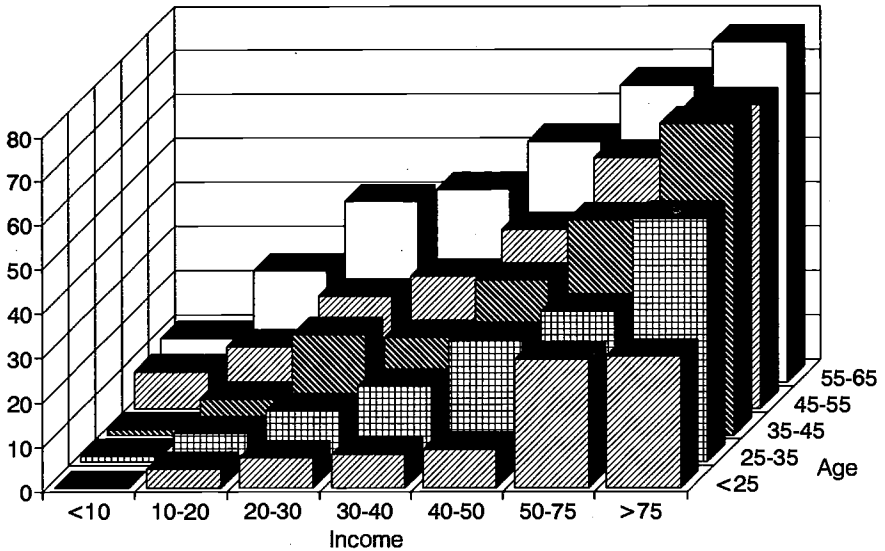


FIGURE 3. *Percent with IRA accounts, households, by income and age, 1986.*

holds with incomes less than \$50,000.¹³ Over one quarter of all households had accounts in 1986.¹⁴ And, a large fraction of families that did not have accounts in 1986 would have had accounts before they retired. Thus, it may be more accurate to say that IRAs are widespread among potential savers.

II. IRA SAVING VERSUS OTHER SAVING: 1980 to 1989

If IRA saving substituted for other saving, one might have expected the proportion of persons saving in other forms to decline as the proportion saving through IRAs increased. Graphed in Figure 4 are the proportion of households contributing to an IRA in each year and the proportion of households with positive saving in non-IRA assets. (Figure 4a includes stocks and bonds and Figure 4b excludes stocks and bonds.) The graphs show that between 1980 and 1989 there was essentially no change in the proportion of households with non-IRA financial asset saving. The pro-

¹³ Based on SCF data.

¹⁴ 26.1 percent based on SIPP and 29.7 based on SCF.

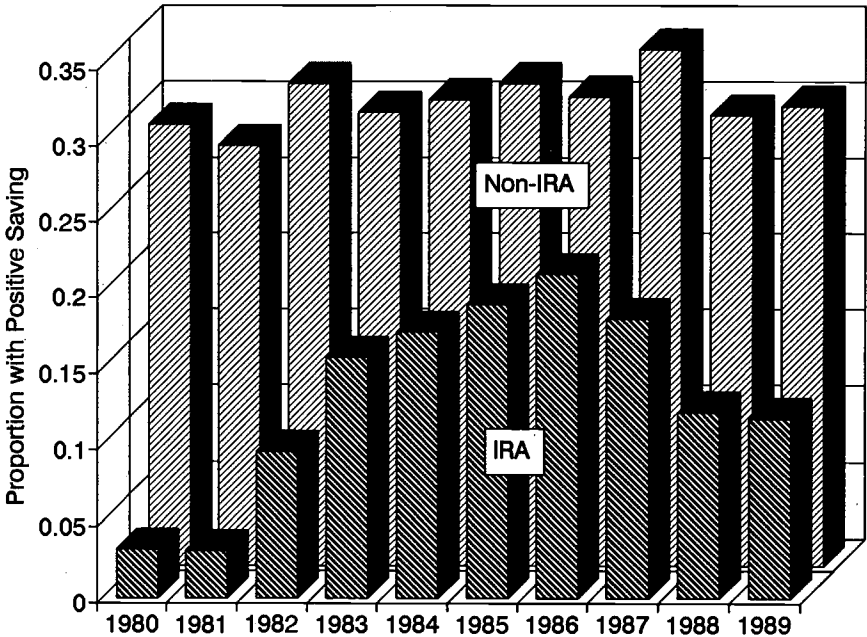


FIGURE 4a. *IRA versus non-IRA savings, 1980–1989. including stocks and bonds.*

portion making IRA contributions grew from 3 percent to 20 percent and then declined to 10 percent after the 1986 legislation.

Although we would expect the proportion of households with other saving to decline—if there were widespread substitution of IRA for other saving—it could be that even if IRA savers reduced other saving, most would still have some saving in other forms. In this case, the proportion with positive non-IRA saving would not change much. Thus we turn to consideration of the change in saving balances.

III. CHANGE IN IRA VERSUS NON-IRA ASSET BALANCES

In this section we consider whether the data appear consistent with the possibility that IRA contributions represented no addition to total saving, but only a reshuffling of existing asset balances or a switching of new saving from non-IRA to IRA accounts. The analysis is based on the changes in non-IRA financial asset balances as IRA balances increased.

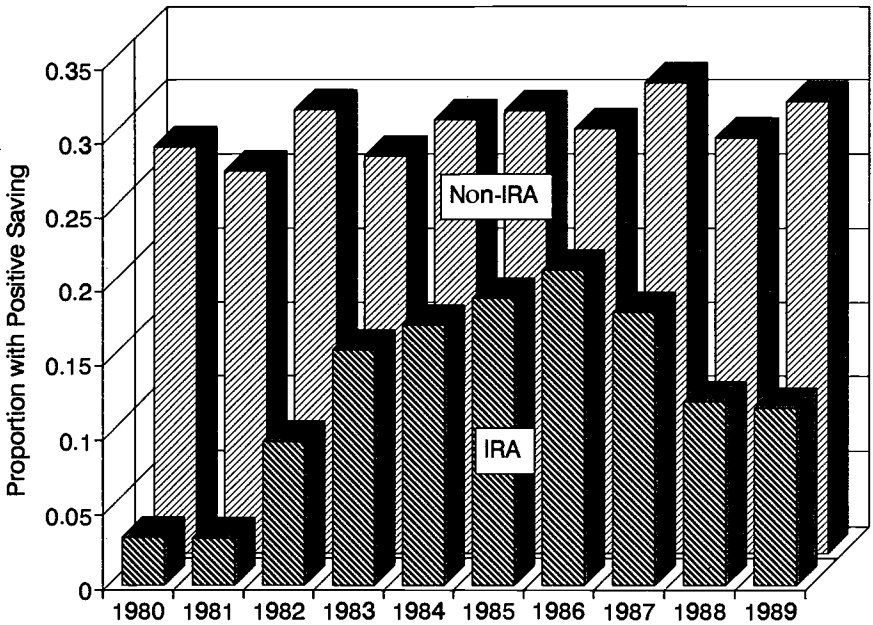


FIGURE 4b. *IRA versus non-IRA saving, 1980–1989, excluding stocks and bonds.*

In particular, we ask whether non-IRA balances declined, as the substitution (or reshuffling) hypothesis suggests. There are two ways that substitution could occur: one is that existing pre-1982 assets were transferred into IRAs in subsequent years. The other is that beginning in 1982 new saving was in the form of IRAs instead of non-IRA financial assets; IRA saving displaced non-IRA saving.

Three versions of the change in non-IRA balances are discussed. The first is based on the balances of respondents to successive Consumer Expenditure Surveys between 1980 and 1988. The second uses the same data but adjusts for the change in the attributes of contributor respondents to successive CES surveys. In both instances, the comparison is based on the balances of the random samples interviewed in successive surveys; the same respondents are not followed from year to year. The third version compares the balances of the same respondents interviewed through the Survey of Consumer Finances in 1983 and 1986. The goal is to judge whether the increase in IRA balances was accompanied by a transfer of assets from non-IRA accounts or by a reduction in new saving in non-IRA assets.

A. IRA versus Non-IRA Asset Balances: CES Data, 1980 to 1988

Each quarter the Consumer Expenditure Survey obtains information on a new random sample of households.¹⁵ Thus, each survey represents a snapshot of households in that quarter. Data are obtained on income, assets, and other household characteristics. The average age of the head of the respondent households was about forty-six in each of our quarterly samples. We have combined data from the quarterly surveys to obtain annual averages.¹⁶ These data are merged with IRA balances obtained from the SIPP (1985 to 1987).

The median IRA balance of contributors was about \$1,700 in 1982.¹⁷ By 1986 the median had increased to almost \$8,000, and over one-quarter of households had IRA accounts. What happened to other financial asset balances over this time period?

Recall the two substitution possibilities: transfers and displacement of new saving. If IRA balances were accumulated by making repeated transfers from other accounts, the balances in other accounts should have declined as the IRA balances increased. If IRA saving displaced non-IRA saving after 1982, so that post-1982 respondents had begun to save in IRA accounts instead of in other accounts, the typical 1986 respondent with an IRA account should have had less money in other assets than the typical 1982 respondent. That is, even if no transfers were made from existing 1982 balances, if new saving by households after 1982 were in the form of IRAs instead of other assets, then the accumulated balance in other assets should have been lower for households surveyed in 1986 than for households surveyed in 1982. This is because the typical 1986 respondent would have accumulated less saving in other accounts in the previous four years than the typical 1982 respondent would have accumulated over the four years prior to 1982. For example, suppose that in 1982 the typical forty-six-year-old had been saving \$2,000 per year in bank accounts for the past four years. That person would have accumulated \$8,000 in bank accounts by 1982 (ignoring interest accumulation). If after 1982 IRA saving completely

¹⁵ More precisely, a new panel is started each quarter and households in each panel are surveyed five times (each quarter) over the following fifteen months. Only households with heads 18 to 65 are included in this analysis and households with a self-employed member are excluded.

¹⁶ All quarterly surveys conducted in a calendar year are included in the annual average for that year. This means, for example, that the percent of households making IRA contributions in a year will not match the IRS figure for the percentage of tax returns showing an IRA contribution for a tax year.

¹⁷ The median contribution in 1982, based on CES data.

replaced other saving, the typical forty-six-year-old in 1986 would have saved \$2,000 a year between 1983 and 1986 in an IRA but nothing in other accounts. The person who was forty-six years old in 1986 would have \$8,000 in an IRA account but nothing in a regular bank account. IRA balances simply would have replaced other balances. Total assets of the 1986 forty-six-year-old would be the same as the total assets of the 1982 forty-six-year-old.

The data are shown in Figure 5. The figure shows that there was no systematic decline in the non-IRA balances of contributors as their IRA balances increased. These data show the assets of the typical household in different years, not the change over time for the same household. Thus, if there were no change in saving behavior, no change in returns on assets, and no change in household income, balances would be expected to be approximately the same over this time period. But nominal balances might be expected to rise as nominal income grows.

Figure 5a shows that by 1986, the median IRA balance was about the same as the median balance in other financial assets and was higher than pre-1982 balances in other financial assets (excluding stocks and bonds).

The total financial assets of 1982 respondent contributors (including IRAs but excluding stocks and bonds from other assets) was about \$9,427.¹⁸ A direct comparison with the total 1986 balance is not possible because the CES data do not provide the IRA balance. Thus the totals are not shown in the figures. But non-IRA asset balances based on SIPP data are essentially the same as the CES balances and the totals, including IRA balances, based on SIPP data should be close to the total assets of CES respondents. Based on this assumption, the total assets of 1986 contributor respondents were 90 percent greater than the total assets of 1982 contributor respondents, \$17,900 versus \$9,427. The increase between 1980 and 1986 was 248 percent.

Similar trends are revealed in Figure 5b, which includes stocks and bonds in non-IRA assets. The total financial assets of contributor respondents, including stocks and bonds, increased by 71 percent (\$21,650 versus \$12,660) between 1982 and 1986 and by 214 percent between 1980 and 1986.¹⁹

In summary, non-IRA assets of respondents to successive CES surveys did not decline as IRA assets increased between 1982 and 1986.

¹⁸ Assuming that the 1982 household IRA balance was equal to the 1982 IRA contribution.

¹⁹ The median asset balances appear to be unusually high in 1982 (see Figure 4a). On the other hand, the new 1982 contributors may have had asset levels that differed from those of earlier contributors, who did not have firm-provided pensions.

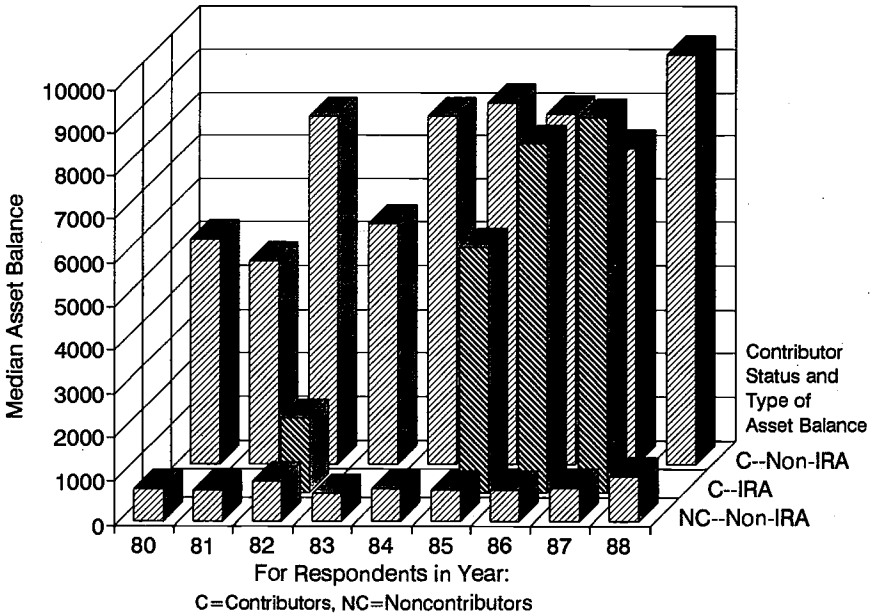


FIGURE 5a. IRA versus non-IRA asset balances by IRA contributor, excluding stocks and bonds.

Instead, non-IRA assets increased as well. Total assets of 1986 respondent contributors were much larger than the assets of respondents at the outset of or prior to the IRA program. It is apparent that IRA contributions were not funded by withdrawing funds from pre-1982 assets. Indeed, 1986 IRA balances were larger than pre-1982 non-IRA assets. It also seems apparent from the data that the typical IRA contributor was not accustomed to accumulating assets at an annual rate equal to the typical IRA contribution. In addition, the data suggest that the new IRA saving of contributors did not replace saving that otherwise would have gone into non-IRA assets. Assets in both forms were larger in 1986 than in 1982. Total assets were very much larger in 1986.

**B. IRA versus Non-IRA Balances of Like Groups:
CES Data, 1980 to 1988**

In the preceding section, the assets of the typical contributor respondent in a year such as 1986 were compared to the assets of the typical contributor respondent in an earlier year such as 1982, at the outset of the IRA program. The respondents to each CES represent a random sample of the

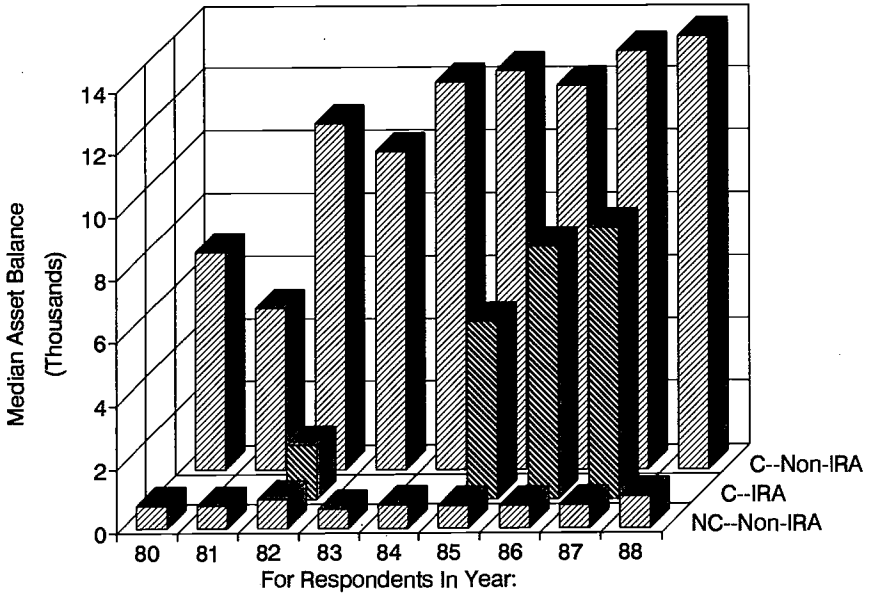


FIGURE 5b. *IRA versus non-IRA asset balances by IRA contributor, including stocks and bonds.*

population in that year. But the characteristics of families who were making IRA contributions may have changed over time. In particular, pre-1982 contributors did not have employer-provided pension plans and the non-IRA assets of these contributors may have differed from the assets of the much larger group that began to contribute after the 1982 legislation.

To correct for this ambiguity, we consider the non-IRA assets of more closely equivalent households. For example, instead of comparing the assets of the typical 1986 respondent contributor to the assets of the typical 1980 respondent contributor, we ask for the assets in 1980 of households that were "like" the households who made IRA contributions in 1986. In 1980 most of the like households were not eligible for an IRA. But by defining "like" groups, the 1980 and 1986 assets of "comparable" households can be compared. The groups are comparable except that the 1986 respondents had the opportunity to make IRA contributions for several years, while the 1980 respondents had not had the opportunity.

To identify groups of "contributor-like" households, 1985–1986 contributors are used to define the "contributor group." The 1985–1986 data are used to predict the probability that a household with given income

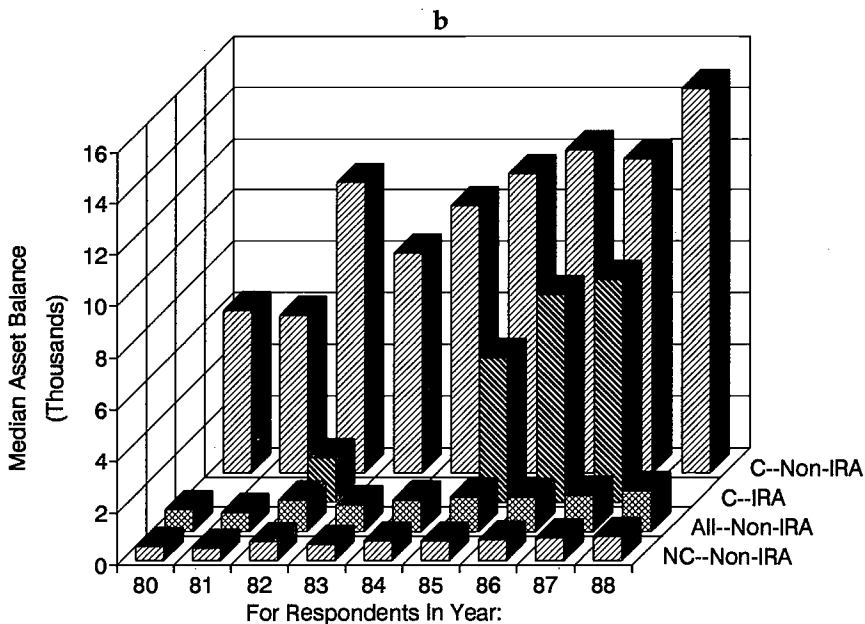
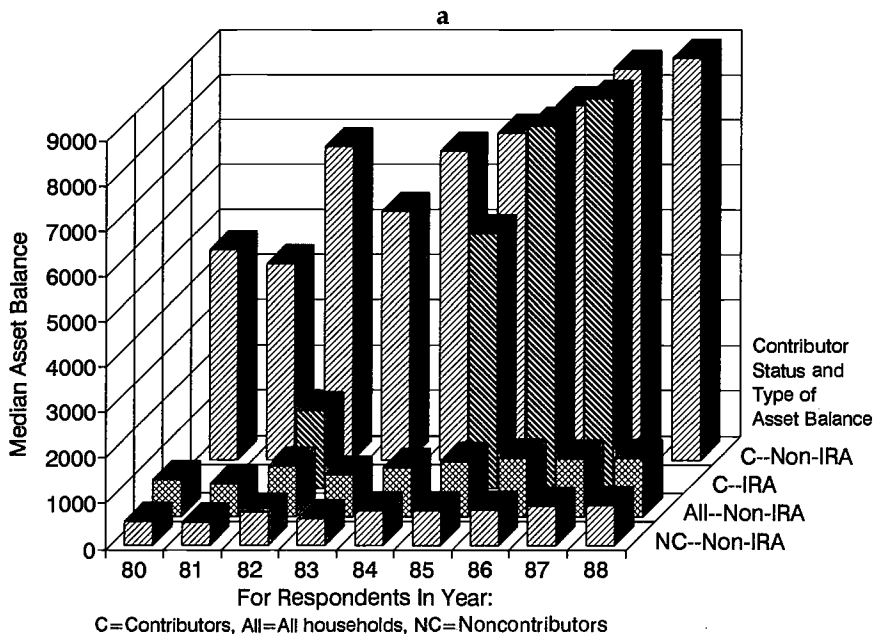


FIGURE 6. IRA versus non-IRA balances for like groups. a. excluding stocks and bonds, 1980–1988; b. including stocks and bonds, 1980–1988.

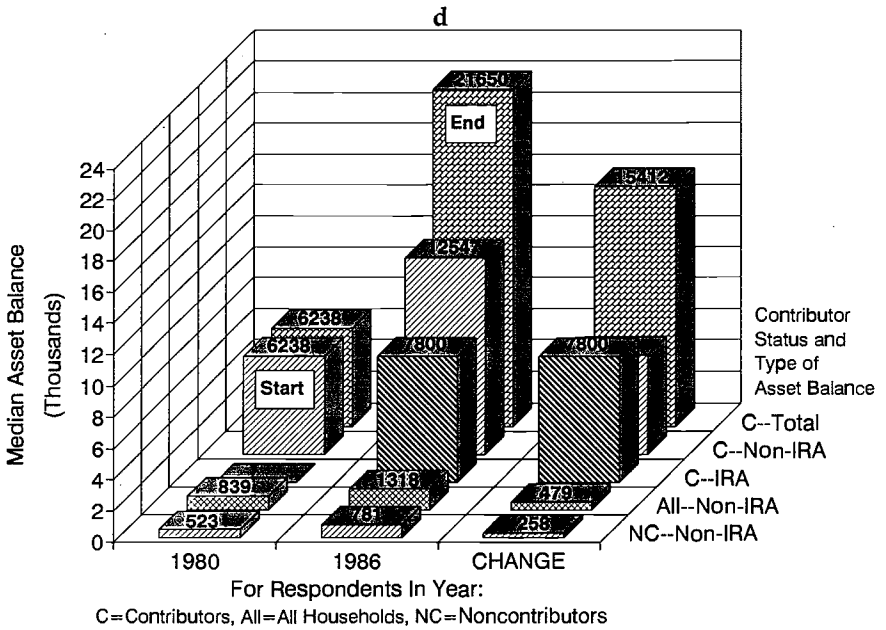
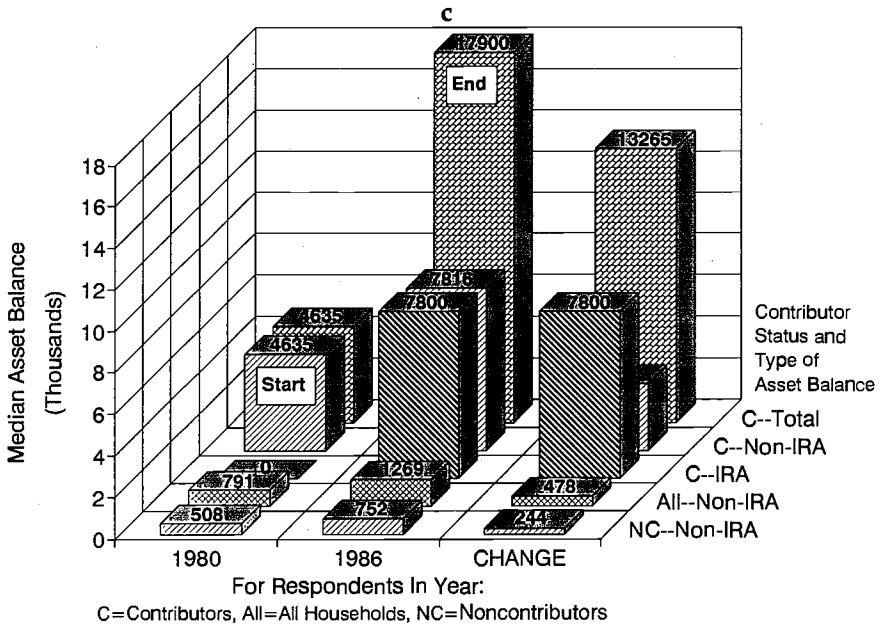


FIGURE 6. IRA versus non-IRA balances for like groups. c. excluding stocks and bonds, 1980–1986; d. including stocks and bonds, 1980–1986.

and age of head contributes to an IRA account. For example, about 68 percent of households with heads aged fifty-five to sixty-five and income over \$50,000 contributed to an IRA account; about 45 percent of those aged forty-five to fifty-five with incomes between \$30,000 and \$50,000 contributed. Based on the 1985–1986 proportions, 68% of the 1980 households in the fifty-five to sixty-five age range with income over \$50,000 are randomly assigned to the “contributor-like” group, and so forth for other groups. In practice the probabilities are calculated for sixteen age-income categories. An adjustment is then made for the “individual saving effect” reflected in the higher non-IRA assets of persons within each group who have IRAs.²⁰

Comparisons similar to those in the previous section can now be made. They are shown in Figures 6a and 6b for the years 1980 through 1988 and in Figures 6c and 6d for 1980 and 1986 only. The conclusions are much the same as those based on the unadjusted data, graphed in Figures 5a and 5b.

It is easiest to consider first the comparison between 1980 and 1986, shown in Figures 6c and 6d. These figures also show total assets of contributors, including IRA and non-IRA amounts. The data are summarized in Table 1. The 1980 IRA balance of contributor-like respondent households was close to zero. By 1986 the median had increased to \$7,800. Contributor-like 1980 respondents had a median of \$4,635 in non-IRA financial assets, as shown in Figure 6c (excluding stocks and bonds). The 1986 respondents had a median of \$7,816 in non-IRA assets, an increase of 69 percent.²¹ In addition to the increase in non-IRA assets, the 1986 contributors had an additional \$7,800 in IRA assets. Total financial assets of contributor-like respondents increased from about \$4,635 in

²⁰ The adjustment is based on the difference between the non-IRA assets of an actual contributor and the assets of a randomly predicted contributor in the same age and income cell. It is the ratio of the median assets of observed contributors to the median of predicted contributors within each of the 1985–1986 age-income cells. Non-IRA assets of the like group in other years are obtained by first using the contributor probabilities described in the text to identify the like group, then calculating actual non-IRA assets for this group, and then applying the adjustment ratio. Separate calculations are made for the contributor and noncontributor groups. Income is converted to 1986 dollars using the income growth observed in the CESs.

²¹ In years for which the assets of “contributor-like” respondents can be compared to the assets of actual contributors the correspondence is typically close. For example, the median non-IRA assets (excluding stocks and bonds) of actual 1983 respondents was \$5,500; the predicted assets of “contributor-like” respondents was \$5,472. The implication we draw is that the correspondence would also be close for 1980, for example, when the correspondence cannot be seen because then there were few contributors. It also means that the

TABLE 1.
CES-SIPP Summary.

Contributor status and asset	Respondents in		% Change
	1980	1986	
<i>Excluding stocks and bonds</i>			
<i>Contributor-like:</i>			
Non-IRA assets	4635	7816	68.6
IRA assets	0	7800	—
Total assets	4635	17900	286.2
<i>Noncontributor-like:</i>			
Total assets	508	752	48.0
<i>Including stocks and bonds</i>			
<i>Contributor-like:</i>			
Non-IRA assets	6238	12547	101.1
IRA assets	0	7800	—
Total assets	6238	21650	247.1
<i>Noncontributor-like:</i>			
Total assets	523	781	49.3

The 1986 IRA and total asset balances are from SIPP. Median 1986 non-IRA assets based on the CES and the SIPP are virtually the same (\$8,050 versus \$8,040 excluding and \$11,500 versus \$12,200 including stocks and bonds).

1980 to about \$17,900 in 1986, an increase of 286 percent.²² Comparable data are shown in Figure 6d, with stocks and bonds included in non-IRA financial assets. In this case, the increase in total assets between 1980 and 1986 was 247 percent.

conclusions using 1986 as a base would have been essentially the same if 1983 had been used as a base. For example, if 1983 was used as the base, the natural comparison would have been to ask if 1986 "contributor-like" respondents saved less in non-IRA assets than would have been predicted based on the distribution of assets of contributors by age and income in 1983. The answer would be no; they saved about the same, plus they accumulated a substantial balance in IRA accounts.

²² Again, based on the match between SIPP and CES median asset balances in 1986, as discussed in the previous section.

TABLE 2.
Time and Saving Deposit Rates in Commercial Banks.

Ending in	Average over the preceding			
	three years	four years	five years	six years
1980	7.53	7.02	6.72	6.59
1982	10.28	9.58	8.87	8.31
1983	10.07	9.82	9.35	8.80
1986	7.84	7.99	8.48	8.95

Is it likely that without the IRA program the assets of like households would have nearly tripled over this period? There are at least two reasons why non-IRA assets might have increased. One is that nominal income increased and nominal saving might have increased as well. The other is that changes in the rate of return on financial assets may have changed. The increase in median income between 1980 and 1986 was 48 percent, much less than the increase in total financial assets: 286 percent excluding and 247 percent including stocks and bonds. Indeed the income increase was less than the increase in non-IRA assets: 69.6 percent excluding stocks and bonds and 101.1 percent including stocks and bonds. Assets may also have increased because of capital gains in the stock market.²³ But the financial assets of most savers are not in stocks. Indeed, the increase in non-IRA assets excluding stocks and bonds was not much greater than the increase when they are included, suggesting that stock market capital gains is not the explanation.

It may be that non-IRA balances should be considered relative to the overall increase in financial assets for all respondents. The trend in financial assets for the non-contributor-like group is also shown in the figures. The increase between 1980 and 1986 was 48 percent, much less than the percent increase for contributors.

What about the return on commercial bank accounts, where the bulk of most households' financial assets are held? Average time and saving deposit rates in commercial banks in the years preceding 1980, 1982, 1983, and 1986 are shown in Table 2.²⁴ The data for 1983 are included in anticipation of the same issue that will be raised with respect to the data in the next section.

²³ The Standard and Poor stock market index more than doubled between 1982 and 1986. The expected increase in financial asset balances would be much less than this because only a small proportion of asset holders have significant equity in the stock market.

²⁴ The rates are from the *Savings Institutions Sourcebook*, U.S. League of Savings Institutions.

The rate of return in the years preceding 1986 was somewhat higher than the rate in the years preceding 1980, but the differences are not large enough to explain the large increase in financial assets. Even the increase in non-IRA financial assets seems large relative to the increase that might have been expected based on 1980 non-IRA assets.

Based on these data, it seems to us very unlikely that IRA replaced non-IRA saving; that there was no gain in net saving. Again, it is apparent from the low 1980 asset balances of contributor-like households (\$4,635) that before the advent of IRAs the typical contributor-like household had not been accumulating financial assets at an annual rate close to an IRA contribution, typically \$2,000 or \$4,000 in 1986. (The mean was \$2,308.) It is also clear that the increase in IRA balances was not funded by withdrawing funds from pre-1982 balances, which were substantially smaller than the \$7,800 put into IRA accounts.

Data for these two years, including stocks and bonds, are shown in Figure 6d. The data for all years from 1980 to 1988 (Figures 6a and 6b) reveal the same trends as the two-year comparison.

The adjusted CES data discussed in this section provide an informal picture very comparable to the results of the formal analysis in Venti and Wise (1990a), which also was based on these same CES data. Indeed a general test of the behavioral validity of the model used in that analysis was to predict the saving behavior of households in the pre-IRA period, using model estimates based on post-1982 data. In effect, with reference to Figure 6, the model predicted quite accurately the low non-IRA saving in 1980, based on estimates in later years when total saving (including IRA and non-IRA saving) was much higher. That is, the model predicted well what saving would be if the IRA limit was set to zero.

C. IRA versus Non-IRA Balances: SCF Data, 1983 to 1986

The discussion in the previous section is based on the comparison of the asset balances of the different respondents to successive surveys, before and after the general availability of IRAs. In that case, asset balances may have increased during the time between the surveys because of income growth, but age did not change systematically (the average age was about forty-six in each year). An alternative to comparing different household samples in different years is to compare the balances of the same households over time. In this case, asset balances may increase as the households age, and possibly as their incomes grow as well.

Such a comparison can be made using the 1983 and 1986 SCF data. We begin with respondents to the 1986 survey. Only households aged twenty-four to sixty-five are included in the analysis and households with self-employed members are excluded. Non-IRA and IRA median

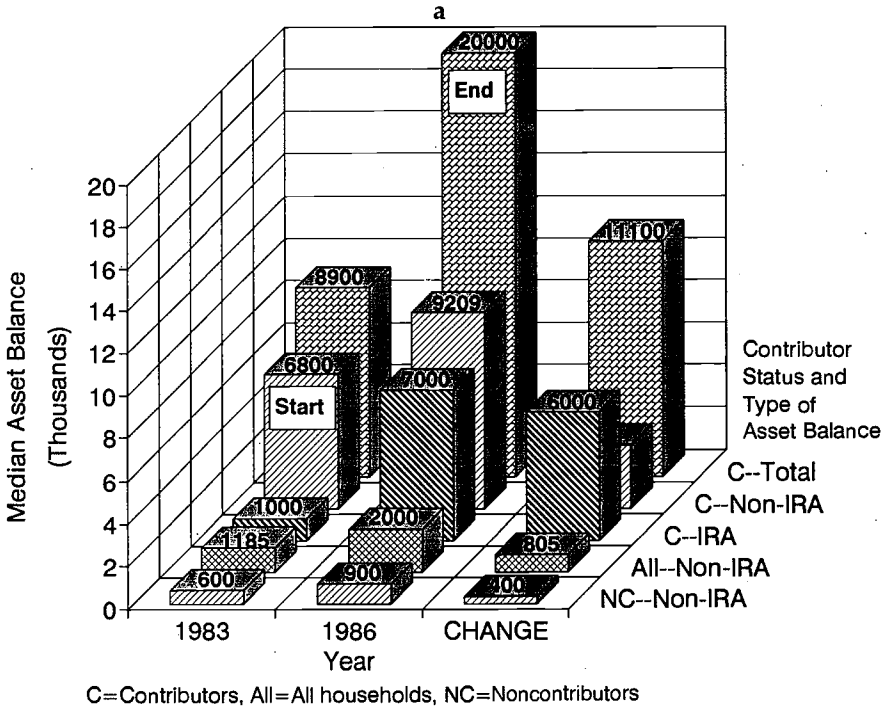


FIGURE 7a. IRA versus non-IRA balances, SCF 1986 respondents, excluding stocks and bonds.

balances for this group in 1983 and 1986 and the change in balances between these years by 1986 IRA contributor status are shown in Figure 7. Stocks and bonds are excluded from Figure 7a and included in Figure 7b. These figures also include total assets of contributors, including both IRA and non-IRA balances, and show the change in assets between 1983 and 1986. The data are reproduced in Table 3. Again, the non-IRA assets of contributors did not decline as IRA assets increased between 1983 and 1986; on the contrary, they increased substantially. The median 1983 non-IRA asset balance (excluding stocks and bonds) of households with IRA accounts in 1986 was \$6,360. Clearly, prior to 1983, this group had not been accumulating assets at the rate of the typical IRA contribution. And clearly the \$6,000 increase in IRA balances (from \$1,000 in 1983 to \$7,000 in 1986) was not funded by transferring funds from the 1983 balance (\$6,360) in non-IRA accounts.

Without the IRA program, what increase in this 1983 non-IRA asset balance would be expected over the next three years? In fact, the ob-

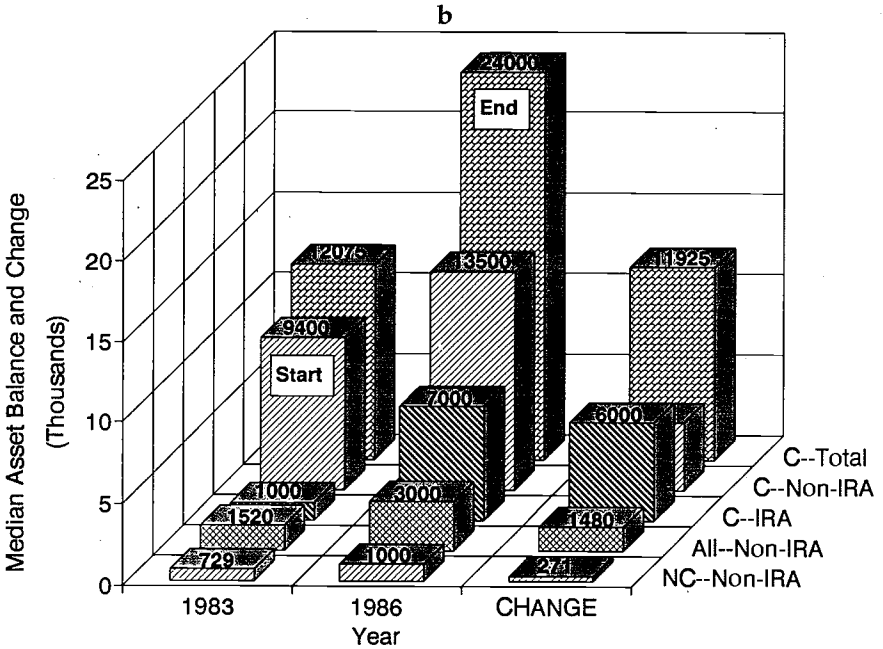


FIGURE 7b. *IRA versus non-IRA balances, SCF 1986 respondents, including stocks and bonds.*

served 44.8 percent increase was equivalent to an annual growth rate of over 13 percent. The increase in all assets combined, including IRAs, was much greater than this. IRA assets also grew, by \$6,000. The median of total assets more than doubled, increasing by \$11,100 from \$8,900 to \$20,000.

Without IRA contributions, would the 1983 balance of \$6,360 have been expected to increase by almost threefold, to \$20,000, by 1986? As discussed in the previous section, the increase in total assets may be determined in part by income growth and the increase in age, and the data could be confounded by differences in economic trends prior to the two dates, that is, differences in rates of return. The increase in non-IRA assets between 1983 and 1986 is apparently not the result of the growth in stock values over this period. The percentage increase in non-IRA assets was about the same when stocks and bonds were excluded as when they were included.

Assets may have been expected to increase with age and income. We have controlled for these effects by predicting 1986 assets based on the

TABLE 3.
SCF Summary.

Contributor status and asset	Year		% Change
	1983	1986	
<i>Excluding stocks and bonds</i>			
<i>Contributors in 1986:</i>			
Non-IRA assets	6360	9209	44.8
IRA assets	1000	7000	600.0
Total assets	8900	20000	125.7
<i>Non-Contributors:</i>			
Total assets	600	900	50.0
<i>Including stocks and bonds</i>			
<i>Contributors in 1986:</i>			
Non-IRA assets	9400	13500	43.6
IRA assets	1000	7000	600.0
Total assets	12075	24000	98.8
<i>Non-Contributors</i>			
Total assets	729	1000	37.2

distribution of contributor assets by age and income in 1983. Adjusting for the three-year age increase and the income increase between 1983 and 1986, the balance would have been expected to increase by about 25 percent, excluding stocks and bonds, and about 31 percent including stocks and bonds. Including IRA contributions the actual increase was almost 126 percent excluding stocks and bonds and almost 100 percent including stocks and bonds. Commercial bank rates in the years preceding 1986 were lower than the rates preceding 1983, as shown in the previous section. The asset growth cannot be explained by unusually high rates of return.

Thus, judging from the SCF data, it seems to us unlikely that the IRA contributions simply substituted for saving that would have occurred anyway. In particular, that inference seems implausible based on the information available in 1983. And again, based on the 1983 balance of \$6,360 the 1986 contributors prior to 1983 had not been accustomed to saving nearly as much as they saved over the next three years. Comparison of the SCF with the CES summary tabulation in the previous section shows that the two data sets yield essentially the same implications.

TABLE 4.
*Change in Non-IRA Saving when IRA Contributor Status Changes
Bank Accounts.*

	1985 Noncontributor	1985 Contributor
1984 Noncontributor	-64.6 (61.4)	-377.4 (248.7)
1984 Contributor	148.6 (317.0)	-470.3 (182.7)
	F = 2.565	

IV. CHANGE IN OTHER SAVING WITH CHANGE IN IRA STATUS

If non-IRA saving is reduced when IRA saving is increased, then when a household that was not contributing begins to add to an IRA, that household should reduce non-IRA saving. Likewise, when a household that was contributing stops, non-IRA saving should increase. The SIPP panel data allow calculation of the change in non-IRA saving when IRA contributor status changes. This simple calculation controls directly for changes in saving behavior across families because it is based on changes over time for the same families.²⁵

Table 4 shows that there is a small reduction (\$377.4) in non-IRA bank account financial asset saving for new contributors and a small increase (\$148.6) for households that stop contributing. But the changes are only a small fraction of the typical IRA contribution, about \$2,300.

Estimates incorporating all non-IRA financial assets—bank accounts, bonds, and stocks—are shown in Table 5. These data also reveal that the change in non-IRA saving is much less than the typical IRA contribution. Although these data suggest some substitution, none of the estimates is statistically significant. In particular, the hypothesis that there is no change in non-IRA saving with change in IRA contributor status cannot be rejected (as indicated by the F-statistics).

V. CHANGE IN SAVING BEHAVIOR AND THE COINCIDENCE HYPOTHESIS

The data in the previous section suggest that the IRA program induced substantial new saving. There is, however, one possible, although we

²⁵ The calculations and the data set are explained in detail in Venti and Wise (1990b).

TABLE 5.

Change in Non-IRA Saving when IRA Contributor Status Changes Bank Accounts, Bonds, and Stocks.

	1985 Noncontributor	1985 Contributor
1984 Noncontributor	89.4 (102.1)	-193.5 (413.6)
1984 Contributor	630.3 (527.2)	186.2 (303.9)
F = 2.565		

believe improbable, alternative scenario that could explain the dramatic increase in the financial assets of contributors: A sudden change in the saving behavior of IRA contributors that just happened to coincide with the introduction of IRAs. Change in behavior must be distinguished from change in saving and from the confounding influence of person-specific saving behavior. All of the data presented earlier rely on the change in saving over time—for the same or for “like” households—to infer whether IRAs replaced non-IRA saving. The SIPP data in the previous section show that non-IRA saving did not decrease much when households who were not previously contributing to an IRA began to make contributions. Consideration of the change in non-IRA saving when IRA contributor status changes controls explicitly for “individual-specific” saving behavior. Some households are “savers,” they save more than the typical household in all forms. Thus, the answer to the question, “Do IRA contributors have less non-IRA saving than non-contributors?,” is no, they have more assets in both forms. This could be because IRAs do not substitute for other saving. But it could also reflect the fact that IRA contributors are savers and, in the absence of the IRA option, they would save even more in other forms.²⁶ This “individual-specific” saving effect is dealt with by considering the change in non-IRA saving of a household when the IRA saving of that same household changes. If non-IRA saving of a household increased when IRA saving increased, for example, this could not be attributed to the generally high saving propensity of IRA

²⁶ This affect may make it difficult to draw conclusions from the comparison of IRA contributors and noncontributors at a point in time. Thus some commentators have resolved that no reliable inferences can be drawn from cross-section data, that is, pertaining to a sample of households for a single year. But all of the studies by Venti and Wise, (1986, 1987, 1988, 1990a, 1990b, 1991a, 1991b), for example, and the study by Gale and Scholz (1990), although based on cross-section data (or a series of independent cross sections) consider changes in asset balances to measure saving and use accumulated asset balances—given age and income and other personal attributes—to control for individual-specific saving behavior.

contributors. Using the SCF data, the issue is controlled for by considering the change in the non-IRA and IRA assets of the same households between 1983 and 1986. With respect to the CES data, individual-specific saving effects are controlled for by comparing random samples of "contributor-like" households in 1980 with "contributor-like" households in subsequent years. Thus the data are not confounded by comparing savers with nonsavers; the comparison pertains only to savers. The results from each of the three data sources control for the higher propensity of some households to save, in all forms.

But the results do not control for possible changes in saving behavior. Nonsavers could suddenly become savers or low savers could suddenly start to save more. This possibility cannot be addressed directly with either the SIPP or the SCF data but can be addressed with the CES data. With respect to the SIPP data, were the households that changed from non-IRA to IRA contributor status on the verge of changing their saving behavior, independent of the IRA program? Would they have increased their saving even without the IRA option? Was it that they did not reduce non-IRA saving when they contributed \$2,300 to an IRA account because they were going to increase total saving by \$2,300 anyway and the IRA was a convenient way to do it? This seems to us to be a possible but improbable coincidental explanation of the increase in saving.

With respect to the SCF data: Were the 1986 IRA contributors the households whose saving behavior—for reasons not apparent in 1983—was about to change dramatically over the next three years, independent of the new IRA option? Did the change in saving behavior just happen to coincide with the advent of the IRA? On its face, this possibility seems an improbable explanation. The dramatic increase in asset balances cannot be explained by a sudden increase in income. The median increase in income for 1986 contributors was only 15.7 percent over the entire period, from 1983 to 1986.

The same question may be posed with respect to the CES data. In this case, more formal testing provides evidence against the hypothesis. Were households with IRA accounts in 1986 those that in 1982 were about to change their saving behavior dramatically? And, did this unexpected change—based on past saving behavior—just happen to coincide with the advent of the IRA program? Based on the CES data, IRA "contributor-like" households had \$4,635 in non-IRA assets in 1980. By 1986, such households had a median of \$17,900, including IRA assets. Were these households on the verge of an abrupt change in saving behavior that was destined to lead to a three-fold increase in financial assets over the next four or five years? As with the SIPP and the SCF data, there is no evidence to support this possibility and such a coinci-

dence seems to us to be an improbable explanation for the change in financial asset balances.

But with respect to these data, the test reported in Venti and Wise (1990a) provides a more formal rejection of the coincidence hypothesis. Unlike the SCF data that pertain to the same households in 1983 and in 1986, the CES data pertain to random samples of similar households. For example, the 1980 survey respondents were about the same age as the 1986 respondents. If the saving behavior of contributors changed just as the IRA program was introduced, estimates of saving behavior based on post-1982 data should predict pre-1982 saving behavior poorly. But the formal model estimated on post-1982 data predicts well the pattern of saving by income in the absence of the IRA program, prior to 1982. If saving behavior had changed dramatically over this time period, one would expect a poor match between actual and predicted pre-1982 saving.

Because large-scale substitution of IRA for non-IRA saving is not found in the data, we have been drawn to consider a possible scenario in which the data might not reveal substitution that in fact occurred. But it is also possible that promotion of the IRA program spurred households to save more in other forms as well, which is consistent with the large increase in non-IRA saving as IRA assets began to accumulate. Or, the consideration of retirement needs concomitant with opening and funding an IRA may have induced more saving in other forms as well. Both the CES and the SCF data are consistent with the possibility that non-IRA—as well as IRA—saving increased after IRA contributions began. This possibility is consistent with evidence on the relationship between personal saving and firm pension plan saving, reviewed in Shefrin and Thaler (1988).

VI. LIMITATIONS OF THE THEORY

Many expressed views on the saving effects of IRAs are not based on empirical evidence but are speculations based on simple theoretical reasoning (see Gravelle 1989, 1991 for an extreme view). In some important respects, however, the empirical evidence is inconsistent with the predictions and the assumption embedded in the "theory-based" speculations. Although these models may provide some insight into how people should behave in a narrow financial sense, the predictions offer a poor description of how the public actually responded to the IRA program. Indeed, the assumptions are inconsistent with basic facts about IRA contributors and IRA saving. Moreover, the assumptions underlying the speculations virtually preclude any saving effect of IRAs. A more complete model must recognize the broader economic and psychological chan-

nels through which an aggressively promoted tax-advantaged savings plan may stimulate saving. Thus having presented the data, we emphasize the limitations of judgments based on restrictive assumptions about saving behavior that are embedded in the simple economic model. In our view it is important to determine from the data which assumptions are most consistent with the saving decisions of real people.

A. The Simple Model

The theoretical model underlying several recent judgments is what Burman, Cordes, and Ozanne (1990) call the "traditional approach" and what Gravelle (1989, 1991) calls the "conventional view." In this model, there is only one form of saving. Thus the assumption is that households treat IRA saving and other saving as perfectly fungible. Except for the tax advantage, a dollar saved in an IRA is no different than a dollar saved in another form. And, the "tax-price" difference is the only means by which the IRA program is permitted to affect individual behavior; IRAs simply provide a higher return on the one and only form of saving.

From this characterization of saving behavior, it is a short stride to the conclusion that IRAs will not stimulate saving. Burman, Cordes, and Ozanne (1990:266) state the case: "If saving is motivated by life-cycle consumption choices, two conditions must be satisfied if IRAs are to stimulate private saving. IRAs must change the after-tax return to the additional dollar saved for a significant number of savers and private saving must respond to such changes. The task is then to determine whether both of these conditions are likely to be met." Of course, if one assumes that IRAs and other saving are perfect substitutes, that only the marginal after-tax return matters, and that IRA savers were saving above the IRA limit, then there will be no change in the after-tax return on the next dollar saved and no change in saving. Furthermore, because the general consensus is that saving is not very responsive to the after-tax return, the boost to saving will be negligible even among those who were not saving above the IRA limit prior to the IRA program. Thus, following this simple model, the case against the saving effectiveness of IRAs can be closed without looking at the data.

More generally, there are four assumptions embedded in the simple theoretical framework that has been used by some to evaluate the saving effects of IRAs: The first is that most IRA contributors were already saving more than the IRA limit prior to the advent of the IRA program. (A related assumption is that the typical IRA saver had large accumulated financial asset balances that could be transferred easily to an IRA account.) The second is that the program inducement to save operates entirely through the after-tax rate of return. The IRA tax advantage

encourages saving by increasing the return on saving, up to the IRA limit. But a household that is already saving more than the limit does not benefit from the higher rate of return on an additional dollar saved. The third, and most important assumption, is that IRA saving and other forms of saving are treated by real people as perfect substitutes. The fourth, and related to the third, is that the promotion of IRA saving had no effect on their use.

B. The Evidence

We will consider these assumptions in turn, although it is not always possible to neatly separate them. In particular, it is not always clear whether an example should be thought of as contradicting the perfect substitutes assumption or the assumption that only the rate of return matters. Nonetheless, we have found it convenient to separate them in the discussion. The simple model does not explain several prominent features of IRA saving, let alone their saving effects, a much more complicated issue.

1. Contributors Were Saving More than the IRA Limit. From the data discussed previously, it seems apparent that the typical IRA contributor, prior to the advent of the IRA program, had not been saving nearly as much as the typical IRA contribution. Nor did the typical contributor fund IRA contributions by drawing down pre-1982, non-IRA financial asset balances. Both the CES and the SCF summary tabulations and Figures 6c and 7a, for example, show this clearly.

2. Only the After-Tax Rate of Return Matters. Much of IRA saving behavior is inconsistent with saving decisions based solely on the rate of return. First, if only the rate of return is considered, strictly financial calculations show no difference between a "front-loaded" IRA—with an up-front tax deduction but payment of tax on withdrawal from the IRA account—and the "back-loaded" version—with payment of taxes on the contribution but no tax payment when the funds are withdrawn (if tax rates do not change). But the evidence is that real people prefer the up-front deduction. The here and now tax saving takes precedence over the long-term equivalence calculation. The United Kingdom experience with the Personal Equity Plan (PEP) provides evidence of the difference as viewed by savers. The U.K. plan is patterned after the U.S. IRA, but contributions are made on an after-tax basis, with no taxes paid when funds are withdrawn. Unlike the U.S. experience, financial institutions have found it difficult to attract contributions to the U.K. plan.

Second, the narrow rate of return analysis suggests that consumers

can benefit by using tax-deductible borrowing (home equity loans in particular) to finance IRA contributions (Kotlikoff, 1990). The empirical evidence suggests, however, that this effect is either nonexistent or very small (Manchester and Poterba, 1989; Skinner, 1991; Venti and Wise 1991b).

Third, after the Tax Reform Act of 1986, households that were no longer eligible for the up-front tax deduction could still benefit from tax free compounding of the return. The dramatic drop in IRA contributions following the reform is inconsistent with saving decisions based strictly on the rate of return. This drop can be explained neither by changes in eligibility nor changes in marginal tax rates (Long, 1990). Instead, the response suggests that the up-front deduction is important. It is apparently what gets the attention of people.

3. People Treat IRA and Other Saving As Perfect Substitutes. To begin, consider the implications of these three assumptions: (1) IRA contributors would save more than the IRA limit in the absence of the IRA option, (2) only the after-tax rate of return matters, and (3) real people treat IRA and other saving as perfect substitutes. Based on these assumptions, the introduction of IRAs may even reduce saving. The reasoning is that if saving is subsidized, by reducing the consumption that must be given up today to save for tomorrow, a saver can give up less today and still have the same income to spend tomorrow. (A "target saver," for example, could save less today and still reach target asset accumulation at retirement.) Thus even less may be saved today. But this reasoning breaks down if all forms of saving are not perfect substitutes in the minds of the real people who make saving decisions.

Consider this example: I devote 2 percent of my earnings to a bank saving account and 98 percent to other things. A new subsidized saving vehicle is introduced—there is a sale on this type of saving—and it is heavily promoted as a means of assuring my financial well-being after retirement. If the old and the new types of saving are perfect substitutes, and the promotion has no effect on saving, new saving is likely to be financed by reducing old bank account saving. But if savers view the two types of vehicles as different accounts, like the mental accounts suggested by Shefrin and Thaler (1988) and Thaler (1990), for example, new saving may be financed by reducing the 98 percent of income devoted to other things rather than by reducing the 2 percent of income devoted to bank account saving. The standard marginal arguments do not hold if people think of the two forms of saving as different. This could be true even without the promotion; it would be more pronounced to the extent that the promotion is effective, as discussed later. Thus even people who

would otherwise save more than the IRA limit may increase their total saving with the "sale on IRA saving."

There are obvious reasons why IRAs and other saving are not perfect substitutes in theory. In particular, there is a penalty on withdrawal of IRA assets before age 59.5. They are less liquid. Thus persons who want to save for the short run may not want to use the IRA mechanism.²⁷ But, more important, what is the empirical evidence on substitutability?

Data for persons over 59.5 demonstrate the limitation of the perfect substitutes assumption. Persons over age 59.5 are able to take IRA deductions but do not face any penalty for withdrawal of IRA funds. In terms of availability and liquidity, IRAs for this age group are barely distinguishable from other forms of saving. The one difference is the higher after-tax rate of return available through the IRA account, apparently making the IRA unambiguously "better" than a conventional saving account. Yet even most persons over 59.5 do not have IRA accounts. The empirical fact is at odds with the implication of the perfect substitutability assumption, suggesting that there is more to the IRA program than the simple "tax-price" subsidy of a simple form of saving, the characterization at the heart of the simple model.

More general data for all age groups also reject the extreme perfect substitutes view. If all forms of saving were perfect substitutes, all savers would save first in the IRA form and only save in other forms if they saved more than the IRA limit. But a large fraction of persons that do not make IRA contributions save in other forms.

Another empirical regularity also suggests that the traditional model mischaracterizes the IRA as a perfect substitute for other saving. IRA contributions, unlike other saving, are bunched in the month preceding the filing of tax returns. If the distinction between IRAs and other saving is solely the tax advantage, then investors should open these accounts some fifteen months earlier to take advantage of the higher return on IRA accounts. That they do not behave this way suggests a behavioral motivation other than or in addition to the rate of return.

4. *The Promotion of IRAs Had No Effect on Their Use.* Different modes of saving may be treated by real people as distinct goods for several reasons. Whatever these reasons may be, to the extent that the promotion of IRAs is successful, the promotion may magnify the distinctions among modes of saving and indeed may help to create them. The greater

²⁷ The studies by Joines and Manegold (1991) and Gale and Scholz (1990) relax the perfect substitutability assumption by explicitly incorporating the withdrawal penalty in a three-period theoretical model. Their theoretical predictions of the saving effects of IRAs are ambiguous.

the promotional success, the more IRA saving may be distinguished by savers from other forms of saving. In particular the widespread promotion that accompanied the IRA program in the 1982 to 1986 period may have served in part to distinguish IRA saving from other forms. The simple theory leaves no role for the effect of advertising and other forms of promotion on IRA saving.

Although it is difficult to assess quantitatively the psychological and informational role played by the promotion, the direction of the effect seems clear. The IRA fanfare psychologically earmarked IRAs for retirement, possibly tending to limit the substitutability of IRAs for funds saved in other "mental accounts." A goal of the promotion was to make families more aware of the need to adequately save for retirement. Many may have concluded that a special account for retirement saving was a good way to foster behavior to which they would not otherwise have adhered. The "sale" on this type of saving, of course, made the idea especially appealing. Indeed the illiquidity of IRAs may be considered an advantage by many; it may help to ensure behavior that would not otherwise be followed. It may be a means of self-control. Thought of in this way, IRA saving may have promoted greater saving in other forms as well. The effect may be similar to the "recognition effect" advanced by Cagan (1965) to explain the empirical finding that pension coverage was associated with higher levels of saving (see also Katona, 1965). Thus the promotion of saving accounts dedicated to particular uses may both limit substitution between accounts and increase investor awareness of the need to save for specific goals.

Several aspects of the public response to IRAs in the 1982 to 1986 period suggest to us that the fanfare accompanying IRAs was an important ingredient of their success. First, the bunching of IRA contributions during the media blitz preceding April 15 each year suggests that contributors are responsive to promotion. As Summers (1986) noted, IRAs, much like insurance, may be sold, not bought. Apparently the public was an easy sell at tax time. For a typical taxpayer, the last minute choice between writing a \$800 check to the IRS or opening a \$2,000 IRA may have been too alluring to pass up.

A second indication of the role of promotion is provided by Feenberg and Skinner (1989) who found that a large number of households were "falsely constrained"; they contributed exactly \$2,000 when they were eligible to contribute more. Although transaction costs associated with opening a spousal account provide one explanation for this behavior, it is likely that the promotion, in which the amount \$2,000 figured prominently, played a key role.

Third, investor behavior following the Tax Reform Act of 1986 pro-

vides an indication of promotional effects. As emphasized earlier, IRA contributions fell by much more than would be predicted given the changes in eligibility rules. This "overreaction" is at least in part attributable to widespread misunderstanding of the legislation (often reported at the time to have eliminated IRAs) and to the marked decline in the promotion of IRAs. Indeed, a recent survey revealed that about half of all persons eligible for an IRA deduction following the 1986 legislation mistakenly believed they were no longer eligible (*IRA Reporter*, 1988).

The emphasis here on the promotion and the "psychology of saving" that it may have engendered does not mean that the tax-advantage was unimportant. Surely it was critical to the success of the program. It seems apparent, however, that the promotion and fanfare played a critical role in parlaying the tax break into IRA contributions. The simple economic models that do not recognize this are likely to be blinded to an important explanation of the public response. Thus it seems to us that a complete understanding of the effects of the IRA program must capture substantially more than the limited reasoning embodied in the simple model.

C. What Makes IRAs Different?

If individuals behave as if all forms of saving are not perfect substitutes, what fosters the behavioral distinctions? We believe that the advertising plays a role. But any answer to this question is speculative. Although the simple model is at odds with prominent features of IRA saving and, in particular, the perfect substitutes assumption cannot be supported by the data, the source of the distinction among different forms of saving is not as clear. A possible explanation is provided by individual motives for saving and possibly the "psychology of saving."

Personal motives for saving suggest compartmentalization. If IRAs are held for different purposes than conventional accounts, then substitution possibilities may be limited from the perspective of many savers. For instance, assets accumulated for short-term goals such as a down payment on a home or a child's education may be unaffected by the introduction of an IRA promoting saving for retirement. How much of conventional saving is closely related to IRA saving? Stated reasons for saving may provide a rough indication. Avery et al. (1986) tabulated responses to the following question from the 1983 Survey of Consumer Finances: "People have different reasons for saving. What are your (family's) most important reasons for saving? Anything else?" Results are summarized by age and income in Table 6. At all income levels the precautionary motive ("emergencies") dominates retirement as a motive for saving. And only at ages above 55 does retirement dominate "emergencies." Even in this age group only half say they are saving for retire-

TABLE 6.
Purposes of Saving, Families with Head in Labor Force, by Family Income and Age of Head (percent of families in each group mentioning purpose).

	Purpose						Expenses
	Emergencies	Retirement	Education	Purchase home	Purchase durables	Travel	
<i>Family income</i>							
< \$10,000	49.5	10.5	20.7	6.9	18.4	6.9	12.7
\$10,000-19,999	53.8	18.0	16.0	10.2	15.7	10.9	7.3
\$20,000-29,999	58.6	22.5	16.3	10.8	13.8	11.2	5.3
\$30,000-49,999	48.8	30.9	21.7	8.8	14.3	11.4	5.1
\$50,000 or more	50.9	37.8	23.4	4.3	11.1	10.8	4.9
<i>Age of head</i>							
Less than 25	52.5	4.9	16.2	16.1	24.2	12.0	10.2
25-34	55.6	8.8	18.6	15.3	18.5	8.9	7.2
35-44	55.4	20.7	26.4	7.6	13.9	12.6	5.4
45-54	52.4	35.9	18.2	3.1	11.5	10.0	5.2
55-64	44.5	52.0	11.1	1.9	8.2	10.9	7.3
65 and over	39.6	44.3	9.8	*	7.2	5.3	12.7

Source: Avery, Elliehausen, and Gustafson, 1986.

ment. Although such evidence is only suggestive, it indicates that much of non-IRA saving may be viewed as an imperfect substitute for IRA saving, which is narrowly targeted for retirement.

Further evidence on motives for saving is provided by the asset holdings of families on the eve of retirement. The data in Figure 1 suggest that the typical family saves little for retirement in the form of financial assets. For example, the median household financial asset balance including stock and bonds was \$6,600 in 1984 for households with head age fifty-five to sixty-five. The family median is less than \$3,700 (Venti and Wise, 1991b). Thus it appears that, for most families, the level of non-IRA financial asset saving destined to finance consumption in retirement is low. For the typical family it is thus unlikely that a new IRA contribution would substitute for funds that were previously targeted for retirement.

Shefrin and Thaler (1988) and Thaler (1990) have addressed these and other empirical regularities that they find inconsistent with the traditional life-cycle theory of saving. They argue that some of the limitations of the traditional theory can be overcome by modifications making the model more behaviorally realistic. One of their suggestions is to recognize that all forms of saving are not treated as fungible; individuals may have a system of "mental accounts" in which they save for various purposes. Some of these accounts may, by choice, be easily spent (e.g. checking). As a means of precommitment or self-control other accounts may be viewed as inaccessible. Shefrin and Thaler place pensions in the latter category. Apparently an IRA also would be viewed as inaccessible, according to their view. For many individuals the ability to place some saving "off-limits" may actually be a desirable attribute. To the extent that "mental accounts" reflect individual saving behavior, they would tend to limit substitution between funds saved for different uses.

D. Formal Analysis of the Perfect Substitutes Assumption

How individuals in fact behave is an empirical question that cannot be answered by theory alone. Our approach in earlier formal analyses has been to test statistically whether IRAs and other forms of saving are treated as different, without trying to quantify the importance of, or even identify, the possible reasons. We have developed and estimated an econometric specification that encompasses both possibilities, that is, permitting flexible substitution. In particular, a special case of the specification is the perfect substitutes possibility. This constraint is strongly rejected by the data (Venti and Wise, 1986, 1987, 1990a, 1991b).

Even less extreme substitution implies that other saving should increase once the IRA limit has been reached. But this pattern is not ob-

served in the data that we have analyzed, suggesting little substitution (Venti and Wise, 1991b).

As emphasized earlier, the simple theory leaves no role for the effect of advertising and other forms of promotion on IRA saving. Although it is difficult to quantify the effect of advertising, we are convinced that promotion played an important role in establishing the popularity of IRAs. To the extent that promotion is successful, it would tend to show up in our formal analysis as a preference for IRA saving over other forms of saving and as a rejection of the perfect substitutes assumption, as the data indicate.

To find that IRAs and other saving are not perfect substitutes is not anomalous but instead is consistent with other empirical findings on saving behavior. For example, one might expect that persons with firm pension plans would have lower balances in personal financial assets than persons without firm plans, controlling for personal attributes such as age and income. It might be presumed that firm pension benefits would substitute for personal saving. But the data do not show this. On the contrary, there is a tendency for those with firm pensions to have higher personal financial asset balances. The evidence is reviewed in Shefrin and Thaler (1988). What the data do seem to suggest, however, is that firm pensions reduce earnings by inducing earlier departure from the labor force. Instead of pension benefits substituting for personal saving, they may instead, by inducing earlier retirement, substitute for personal earnings, as emphasized in Lumsdaine and Wise (1990).

Closer to the IRA issue, it was presumed that IRAs would be more likely to be opened by persons without private pension plans, controlling for personal attributes such as income, age, and other financial asset balances. But the data do not show this tendency either; again, the IRA does not appear to be a substitute for firm pension plans (Venti and Wise, 1988).

We find that the simple model, which is the basis for much of the skepticism about the saving effect of IRAs, provides a poor description of actual IRA saving behavior. Simply economic theory provides an incomplete guide to saving behavior in other instances as well. Thus it should not be surprising if it were misleading in this instance. The primary tool of the simple theory is the rate of return. But the empirical evidence on balance shows little relationship between saving and observed rates of return (e.g., Bovenberg, 1989). Other factors apparently swamp whatever the effect of the return on new saving may be.²⁸ Per-

²⁸ It is even difficult to demonstrate a convincing relationship between rather wide-ranging individual tax rates and contributions to tax-deferred saving accounts, controlling for in-

sonal saving rates vary dramatically among countries but standard theory does not explain why. A plausible explanation is that habits, cultural norms, "taste" for saving, and the psychology of saving vary from country to country but are not incorporated in standard models.

Thus there is considerable motivation to look more broadly for explanations of saving behavior. Relaxation of the restrictive assumptions of the simple model is a start. But the data presented here suggest more, that a realistic explanation of saving must recognize much broader economic and psychological determinants of individual saving decisions.

DATA APPENDIX

Three sources of data were used to prepare tables and graphs in the text. Each data source and the principal adjustments that were made prior to calculation are described in this appendix.

1. Survey of Income and Program Participation (SIPP). The SIPP is a large, ongoing survey of the U.S. population that is designed principally to collect data on the income and participation in government transfer programs. It is organized by annual panels, with each panel consisting of eight or nine interview waves administered at four-month intervals. Most of the SIPP data used here come from wave 7 of the 1984 panel (administered September to December 1985), wave 7 of the 1985 panel (January to April 1987), and wave 7 of the 1986 panel (January to April 1988). In the text tables and figures these three sources are referred to as 1985, 1986, and 1987 data respectively because they are closest to year-end balances in those years. It is clear, however, that for each panel the responses used may be as many as four months "off" from being year-end figures, as many as four months early in 1985 and four months late in 1986 and 1987. In all cases the IRA and other financial asset data pertain to assets owned by the reference person and the spouse; assets owned by other members of the household are excluded. *Financial assets excluding stocks and bonds* include regular (passbook) saving accounts, money market deposit accounts, certificates of deposit or other saving

come, age, and other tax filer characteristics. Feenberg and Skinner (1989) conclude that there is a positive relationship between marginal tax rates and IRA contributions, based on U.S. tax returns. Long (1990) also concludes that the relationship is positive. But Wise (1984) finds that the conclusion is extremely sensitive to the functional form used in the statistical analysis. Indeed, using precise marginal tax rates calculated from tax returns, he finds no relationship between individual marginal tax rates and contributions to Registered Retirement Saving Programs in Canada, controlling for income and other tax filer attributes, and using a specification that fits the data best. The evidence in Venti and Wise (1988) suggests that the marginal tax rate may be associated with whether a household contributes to an IRA but suggests little relationship to the amount of the contribution.

certificates, NOW or other interest bearing saving accounts, money market funds, U.S. government securities, municipal or corporate bonds, other interest earning assets, and noninterest bearing checking accounts. The category *financial assets including stocks and bonds* also includes the market value of stocks and mutual funds (less debt or margin account) and the face value of U.S. savings bonds. Note that the former category, despite its title, contains some bonds. This arises because we were unable to separate out bonds from other interest earning assets in the SIPP and we wanted to keep the names of asset groupings consistent with the categories derived from the other data sources.

2. Survey of Consumer Finances (SCF). The SCF is a panel survey first administered between February and July 1983. A subsample of the original sample was reinterviewed between June and September of 1986. The 1983 SCF is much smaller than the SIPP but contains more detail on financial assets. The 1986 reinterview contains less detail. In both 1983 and 1986 the special high-income sample is used. Details on the 1983 and 1986 SCF are available in Avery and Kennickell (1988a, 1988b). *Financial assets excluding stocks and bonds* include checking, statement savings, passbook, share, draft, and other saving accounts; money market accounts; and certificates of deposit. The category *financial assets including stocks and bonds* also includes stocks and all holdings of bonds including U.S. saving bonds.

3. Consumer Expenditure Surveys (CES). The CES is a quarterly panel survey used to obtain information on household expenditure patterns. Households enrolled in a quarter are followed for five quarters. We use CES data for all quarters from 1980:1 through 1989:1. For the calculations in this paper, we have combined all four quarterly reports into a single annual average. Thus, for example, the CES asset figure for 1983 will include balances reported for all 12 months in 1983. For this reason, and possibly others as well, annual figures obtained from the CES may differ from figures based on the other two sources, and from tax year data reported by the IRS. *Financial assets excluding stocks and bonds* includes saving accounts in banks, savings and loans, credit unions, and similar accounts; checking accounts, brokerage accounts, and other similar accounts; and U.S. savings bonds. The category *financial assets including stocks and bonds* also includes securities such as stocks, mutual funds, private bonds, government bonds, or treasury notes.

A key objective was to obtain from each data source a sample representative of the "IRA-eligible" U.S. population. The following steps are common to each source of data:

- Households in which the head or reference person is age sixty-five or older are deleted. The minimum age is determined by the availability of data for each source. In the CESs the minimum age of a household head is eighteen, in the SIPP the minimum age is twenty-one, and in the SCF the minimum age of a household head is twenty-five.
- Households in which the respondent or spouse of the respondent is self-employed are excluded. The self-employed had access to Keogh plans with contribution limits very different from the IRA limits. Elimination of the self-employed also minimizes a potential complication that arises because two of the surveys (the CESs and the 1986 SCF) ask respondents for combined IRA and Keogh balances.
- SIPP and SCF are weighted to represent the national population. The CES is weighted to represent the national urban population.

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