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## How Retirement Saving Programs Increase Saving

James M. Poterba, Steven F. Venti, and  
David A. Wise

**A** large fraction of American families reach retirement age with virtually no personal financial assets. The median level of all personal financial assets of families with heads 55 to 64 was only \$8,300 in 1991; excluding Individual Retirement Accounts and 401(k) balances, the median was only \$3,000 (although mean values are substantially higher). Almost 20 percent of families had no financial assets at all. In 1991, the median value of the future Social Security benefits of retired families with heads 65 to 70 was about \$100,000, the median value of housing was about \$50,000, and the median value of future employer-provided pension benefits was about \$16,000. But other than Social Security and pension benefits, and illiquid housing wealth, the typical family has very limited resources to meet unforeseen expenses. In addition to individual hardship, the low U.S. saving rate foreshadows the prospect of limited future economic growth at the aggregate level.

Two saving programs introduced in the early 1980s were intended to encourage individual saving. Individual Retirement Accounts (IRAs) rapidly became a popular form of saving in the United States after they became available to all employees in 1982. Any employee could contribute \$2000 per year to an IRA account, and a nonworking spouse could contribute \$250. The contribution was tax-deductible. Annual contributions grew from about \$5 billion in 1981 to

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about \$38 billion in 1986, approximately 30 percent of total personal saving in that year. Contributions declined precipitously after the Tax Reform Act of 1986, even though the legislation limited the tax-deductibility of contributions only for families who had annual incomes over \$40,000 and who were covered by an employer-provided pension plan. By 1994, only \$7.7 billion was contributed to IRAs, and while over 15 percent of tax filers contributed in 1986, fewer than 4 percent contributed in 1994.

The other program, the 401(k) plan, meanwhile grew continuously and almost unnoticed, with contributions increasing from virtually zero at the beginning of the 1980s to over \$63 billion by 1992, when almost 25 percent of families contributed to a 401(k). Deposits in 401(k) accounts are also tax-deductible, and the return on the contributions accrues tax-free; taxes are paid upon withdrawal. These plans are available only to employees of firms that offer such plans. Prior to 1987, the employee contribution limit was \$30,000, but the Tax Reform Act of 1986 reduced the limit to \$7,000 and indexed this limit for inflation in subsequent years. The contribution limit was \$9,235 for both the 1994 and 1995 tax years.

By 1986, contributions to personal retirement saving plans exceeded contributions to traditional defined benefit and defined contribution employer-provided pension plans. In 1992, contributions to all personal retirement saving plans totaled \$81 billion, and contributions to traditional employer-provided pension plans totaled \$64 billion. It seems evident that if it were not for the discouraging effect of the Tax Reform Act of 1986, personal retirement plan saving would have been much larger. Whether these programs increase net saving can be of critical importance to future generations of older Americans and to the health of the economy in general. The issue remains an important question of economic debate. Based on a series of papers using very different methods of analysis, we have concluded that contributions to these accounts represent new saving in large part. This research is summarized here, together with additional results.

The key impediment to determining the saving effect of IRA and 401(k) plans is saver heterogeneity. Some people save and others don't, and the savers tend to save more in all forms. For example, families with IRAs also have more conventional savings than do families without IRAs. Thus, a continuing feature of our analyses has been the use of different methods to control for heterogeneity.

The next few sections of this paper present our reasons for believing that IRA and 401(k) contributions represent new saving, rather than simply being a substitute for other financial asset saving. The discussion is organized according to the method used to control for heterogeneity. While most work in this area has focused on the potential substitution between IRA assets and liquid financial assets, more recent analyses have considered the potential substitution between personal retirement saving plan assets and other assets like employer-provided pension assets and housing equity, so we offer some discussion of this issue. A final section of the paper seeks to explain the divergence between our conclusions, introduced in the next part of this paper, and those of Gale and Scholz (1994).

## Dealing with Heterogeneity

When Venti and Wise began work on the saving effect of IRAs in the mid-1980s, they used the available data to control for individual demographic characteristics, and then they used accumulated financial assets to control for “individual-specific” saving effects. The studies thus asked whether persons who save more in IRAs in a particular year save less in other financial assets, controlling for heterogeneity in this way. Studies along these lines were done using data from the 1983 Survey of Consumer Finances (Venti and Wise, 1986, 1987; Wise, 1987), the 1980–85 Consumer Expenditure Surveys (Venti and Wise, 1990) and the 1984 panel of the Survey of Income and Program Participation (Venti and Wise, 1991). The results suggested that the majority of IRA saving, even at the outset of the program, represented net new saving and was not accompanied by large-scale reduction in other financial asset saving.<sup>1</sup>

However, using accumulated non-IRA financial assets at the outset of the IRA program is clearly an imperfect way of controlling for heterogeneity in household propensities to save. As better data became available, we have used several different, and we believe more robust, methods to isolate the program effect in the face of heterogeneity. No method, other than a perfectly run, randomized, controlled trial, can control for every possible type of heterogeneity. Lacking such a trial, the reasonable alternative is to use several different methods that collectively control for many forms of heterogeneity. The discussion that follows tries to highlight both the way that heterogeneity is addressed and the potential types of heterogeneity that each method may not address. Each estimate of the program effect is a difference in saving or assets obtained in one of three ways: by following a given set of households over time and relying on *within*-group changes in assets or saving between two periods; by making *between*-group comparisons of the saving or assets of two different groups at the same point in time; and by using “cohort” analysis to compare the assets at a given age of persons who attain that age in different calendar years.

## Following Households Over Time at the Outset of the IRA Program

The most direct way to control for heterogeneity is to follow the same household over time, observing the change in its saving when program participation changes. This method was used by Venti and Wise (1995a), based on two waves of the Survey of Income and Program Participation (SIPP). They find that when the same families are tracked over time, there is little change in other financial asset

<sup>1</sup> In an earlier study, Hubbard (1984) found that the ratio of assets to income was higher for IRA participants, controlling for individual attributes and eligibility. Feenberg and Skinner (1989) show that IRA participants save *more* than nonparticipants, controlling for initial wealth.

saving when they begin to contribute to an IRA or when they stop contributing. For example, when families who didn't contribute to an IRA in 1984 began to contribute in 1985, the non-IRA financial asset saving of these new contributors declined by only \$193 between 1984 and 1985. This decline in other saving is only a small fraction of the increase in saving from the typical family IRA contribution, \$2,413 in 1985. In addition, it is clear that prior to their commencement of IRA saving, the annual saving of these families had not been close to typical IRA contributions; their median accumulated financial assets were only about \$4,000. These results suggest that even near the outset of the IRA program, there was only a small reduction in non-IRA saving when individuals began making IRA contributions.

It can be objected that if an individual's saving commitment changes at the same time that participation status changes, however, this estimate will capture the taste change as well as the participation effect. For example, if someone decided to save more between 1984 and 1985, and this change coincided with the newly available IRA option, then the newly awakened saver might have deposited the additional saving in an IRA. Without the IRA option, it could be argued, the person would have saved an equal additional amount in a non-IRA form.

Other analysts have also used within-group comparisons, and they obtain results not inconsistent with ours. Attanasio and De Leire (1994) present an analysis based on Consumer Expenditure Survey data. The CES data provide asset balances at two points in time, one year apart. They consider the difference between the annual non-IRA saving—measured by the change in asset balances—of “old contributors,” who made an IRA contribution in the previous year, and “new contributors,” who did not contribute in the previous year. Within a regression framework, they find that old contributors save \$1,740 more than new contributors. At first blush, such results may appear to contradict the evidence just presented. Their results imply, however, that in the first year that an IRA contribution is made, there is an equivalent drop in non-IRA financial assets, but after that, the IRA contributions continue while other saving reverts to its pre-IRA level. So over a period of time, according to the Attanasio and De Leire results, there would be essentially no offset of IRA saving by a reduction in other saving.<sup>2</sup>

Using a panel of individual tax returns, Joines and Manegold (1995) consider the change in the total annual financial asset saving of contributor households between the 1979–1981 and the 1982–85 periods as a function of the change in the IRA limit between these time periods. Thus, they considered not how much of IRA saving was new saving, but rather how much saving increased per dollar increase in the IRA limit. For example, if a person faced a \$2,000 increase in the limit but only increased contributions by \$1,000, a one dollar increase in the limit would increase saving by half a dollar, even if the entire

<sup>2</sup> To put it another way, the method used by Attanasio and De Leire (1994) can say very little about the saving effect of the IRA program. Their comparison will show no difference in the saving of old and new contributors when there is *complete* substitution as well as when there is *no* substitution at all.

*Table 1*  
**Summary of Survey of Consumer  
 Finances Data**

| <i>Contributor Status and<br/>Assets</i> | <i>Year:</i> |             |
|--|--------------|-------------|
|  | <i>1983</i>  | <i>1986</i> |
| Contributors in 1986                     |              |             |
| Non-IRA Assets                           | 9,400        | 13,500      |
| IRA Assets                               | 1,000        | 7,000       |
| Total Assets                             | 12,075       | 24,000      |
| Noncontributors in 1986                  |              |             |
| Total Assets                             | 729          | 1,000       |

*Source:* Venti and Wise (1992).

contribution were new saving. They find estimates of this relationship ranging from 17 to 73 cents for a dollar increase in the limit; their best guess is 26 cents. Joines and Manegold, however, find that the median of estimated total financial assets of new contributors was only \$4,396 in the 1979–1981 period. The typical IRA contribution in the 1982–85 period was about \$2,300. Since most contributors in this period were new contributors, the typical contribution of new contributors was clearly much greater than the amount that these new contributors had been accustomed to saving prior to the advent of the IRA program. Although the Joines and Manegold analysis does not purport to estimate the net saving effect of IRA contributions, their summary data suggest that the saving effect must have been substantial.

Another within-group comparison considers the change in non-IRA *assets* of contributors as their IRA savings accumulate. Using 1983 and 1986 Survey of Consumer Finances data, Venti and Wise (1992) considered how the assets of the *same* IRA-contributor households changed as their IRA assets accumulated. The results are summarized in Table 1. Households that made IRA contributions began the period with a median of \$9,400 in other financial assets. Between 1983 and 1986, the IRA assets of these families increased from \$1,000 to \$7,000 in current dollars. At the same time, their non-IRA financial assets increased from \$9,400 to \$13,500. They ended the period with \$24,000 in total financial assets, an increase of 100 percent. The increase in non-IRA financial assets exceeded the increase that would be expected from changes in age, income and rate of return. Thus, they concluded that it is unlikely that the IRA contributions simply substituted for saving that would have occurred anyway.

The numbers in Table 1 come from the same data used by Gale and Scholz (1994) in their analysis of the saving effect of the IRA program. We will return to consideration of their methodology and how the conclusions of their analysis could be so different from what we believe these simple data suggest.

## Within-Group Comparisons

The foregoing methods rely on comparing the same households over time, using changes within households to control for unobserved differences across households. Another way to account for differences across households is to group households with similar propensities to save and then to estimate the program effect by using the within-group difference in assets over time as exposure to retirement saving programs increased. This is a within-group difference between the assets of a particular group in one period with the assets of a like group, but not the same households, in a later period.

Poterba, Venti and Wise (1994a, 1995) use saving program participation itself as a signal of taste for saving. Families participating only in an IRA are one group; families who participate in both an IRA and a 401(k) are another; families with a 401(k) plan only are a third, and so forth. Random samples of families in each like group are available for 1984, 1987 and 1991, which is when data from the SIPP were collected. The focus here is on the *within*-group change in the *non-IRA-401(k)* saving of like groups sampled in 1984, in 1987 and then in 1991. Within each of the like groups, each of the three samples have similar demographic characteristics, like income and age, and thus would be expected to have similar asset balances if it were not for different periods of exposure to IRAs and 401(k)s. The key test is whether the non-IRA-401(k) asset balances are lower for families within each like group who have had longer exposure to the IRA and 401(k) programs.

The answer is typically that there was no noticeable reduction in other assets as IRA and 401(k) assets grew. Key data for three of the saver groups are shown in Table 2. For example, between 1984 and 1991, the median total financial assets of families with an IRA but not eligible for a 401(k) increased from \$20,686 to \$27,094 (in 1987 dollars). But there was little change in their other financial assets, which increased from \$13,098 to \$13,355, even though their IRA assets increased from \$5,348 to \$9,335. Or consider families with an IRA who were eligible for a 401(k): between 1987 and 1991 alone, their total financial assets increased from \$37,882 to \$44,432. Yet there was no decline in their other financial assets, which increased from \$16,881 to \$17,212. With one partial exception, in none of the six saver groups considered in Poterba, Venti and Wise (1995) was there a noticeable reduction in other financial assets as IRA and 401(k) assets grew.<sup>3</sup> Thus it is unlikely that the increase in their retirement plan assets was funded by a reduction in other financial asset saving.

Although the key comparison here is the *within*-group change over time in the other financial assets of persons who participated in (or were eligible for) the IRA and 401(k) programs, we also considered data for families that did not participate

<sup>3</sup> There was one partial exception: a decline in the median of other assets of 401(k)-only savers between 1984 and 1987. For this group there was a noticeable increase in total financial assets between 1987 and 1991, but little change in non-401(k) assets.

Table 2

**Conditional Median Assets for Selected Saver Groups, 1984, 1987 and 1991**  
(in 1987 dollars)

| <i>Saver Group and Asset Category</i>              | <i>1984</i> | <i>1987</i> | <i>1991</i> |
|--|-------------|-------------|-------------|
| Families with an IRA and a 401(k)                  |             |             |             |
| Total Financial Assets                             | —           | 42,655      | 45,724      |
| Other Than IRA or 401(k)                           | 15,653      | 16,795      | 16,253      |
| Families with a 401(k) Only                        |             |             |             |
| Total Financial Assets                             | —           | 8,566       | 9,808       |
| Other Than 401(k)                                  | 3,723       | 2,587       | 2,498       |
| Families with an IRA and Eligible for a 401(k)     |             |             |             |
| Total Financial Assets                             | —           | 37,882      | 44,432      |
| Other Than IRA or 401(k)                           | 16,881      | 16,032      | 17,212      |
| Families with an IRA but Not Eligible for a 401(k) |             |             |             |
| Total Financial Assets                             | 20,686      | 25,537      | 27,094      |
| Other Than IRA or 401(k)                           | 13,098      | 13,269      | 13,355      |

*Notes:* The estimates are conditional on age, income, education and marital status. The medians are evaluated at the means of these variables. 401(k) assets are not available for 1984.

*Source:* Poterba, Venti and Wise (1995).

in one or both of these programs. In each of these six groups, with one marginal exception, there was a decline in other financial assets between 1984 and 1991. For example, the median assets of persons with neither an IRA nor a 401(k) declined from \$1,060 to \$939. The assets of families without an IRA and who were not eligible for a 401(k) declined from \$1,261 to \$1,210. Because the assets of program participants and nonparticipants are typically very different, however, we avoid comparisons between these very dissimilar saver groups.

It could be that these programs affect households with limited assets but have little effect on wealthier households. We addressed this issue by comparing the entire distribution of assets in 1984 and 1991. Poterba, Venti and Wise (1994b) show that the higher levels of total financial assets held by IRA and 401(k) participants in 1991 were evident across the entire distribution of households, from those with the least to those with the greatest assets. On the other hand, across the entire distribution, there was almost no change between 1984 and 1991 in the non-IRA and non-401(k) assets of contributors. At all points in the distribution there was a fall over time in the assets of noncontributors.

For these estimates to control for heterogeneity, it is important that the attributes of a typical person within a "like saver" group not change substantially from year to year. To help to assure that this is true, we have controlled for age, income, education and marital status, although it remains possible that there were other changes not accounted for by these variables. One likely possibility is that less committed savers were drawn into the programs as they matured. But the direction of the bias caused by this dilution effect, as Bernheim (1994) calls it, is clear. If less



committed savers are entering the group, then the increase in total assets underestimates the program effect.

Engen, Gale and Scholz (1994) follow a very different *between*-group approach and present an alternative comparison as evidence of substitution. This journal is not the place for detailed evaluation of their methodology, but it is useful to point out some of the key differences in approach, which in turn lead to the different results.<sup>4</sup> Engen, Gale and Scholz look at two groups: all 401(k) participants, which is a composite of the first two groups shown in Table 2, and IRA participants not eligible for a 401(k), the last group shown in Table 2. The authors find a fall in the total financial assets of 401(k) participants and an increase in the total financial assets of the "control" group of IRA participants not eligible for 401(k) contributions, and they conclude that 401(k) contributions did not lead to an increase in financial assets between 1987 and 1991.

In our view, this approach is fraught with difficulties. First, instead of looking over time within each group separately, they make a comparison between two groups. But these two groups are not similar in their saving patterns, and thus one group does not serve as a good control for the other. Households that save only in an IRA are a far more select group of savers than are all 401(k) participants: the IRA participation rate has never exceeded 16 percent, while the 401(k) participation rate has been at least 60 percent among eligible households. Thus, it is no surprise that the non-IRA, non-401(k) assets of the 401(k) participants were only half as large as those of the IRA-only group in both 1984 and 1987. Since the saver groups are so different, comparing them will be a poor way to sort out any effect of a saving incentive program. Furthermore, the increase in the total financial assets of the "control" group is entirely due to the increase in their IRA assets! There was virtually no change in the non-IRA assets of this group, as shown in Table 2 above. In arguing that IRA and 401(k) plans have no effect on personal saving, it seems awkward to use evidence that suggests a substantial effect of IRAs on saving to show that the 401(k) plan had no effect.

The second problem with the Engen-Gale-Scholz comparison is also fundamental and leads to an incorrect interpretation of the fall in the assets of the composite 401(k) participant group. As pointed out above, their first group is a combination of two very different groups distinguished by Poterba-Venti-Wise: that is, the first two groups shown in Table 2, those who participated only in the 401(k) program and those who participated in both the 401(k) and the IRA programs. The fall in the assets of the composite group creates an illusion caused by the changing shares of the two subgroups.

Within the group of all those who have 401(k) accounts, the proportions of those with IRAs and those without changed dramatically between 1987 and 1991. Those with IRAs, whose assets are four to six times as large as those without an IRA,

<sup>4</sup> A more detailed discussion of the Engen, Gale and Scholz (1994) approach is presented in Poterba, Venti and Wise (1996).

fell from 47.6 percent to 37.1 percent of the total, while those without an IRA became a larger fraction of the composite group. *In fact, as shown in Table 2, the total financial assets of each subgroup increased!* Thus, the fact that the composite group of all 401(k) participants saved less is a result of the shifting composition of the group toward more low savers, not the result of lower saving by either subgroup.

This composition fallacy is a classic error in empirical analysis. The problem was made especially clear by Bickel, Hammel and O'Connell (1975) in their analysis of whether there was sex bias in graduate student admissions at the University of California at Berkeley. When looking at admissions as a whole, the acceptance rate was lower for women, which would seem to be evidence of discrimination against women. However, looking at individual departments made it clear that in no single department was there discrimination. Women were applying to departments where the admission rate was low and men to departments where the admission rate was high. The comparison used by Engen, Gale and Scholz (1994) suffers from this same problem.

### **The 401(k) Eligibility Experiment**

Still another approach to controlling for heterogeneity relies on the “experiment” that is provided by the fact that only persons whose employers establish a 401(k) plan are eligible to contribute to such a plan. If employees who work for firms that decide to offer 401(k) plans are much the same as those who work for employers who do not, then we can use this event to compare the saving of eligible and noneligible households. This approach is used in Poterba, Venti and Wise (1994a, 1995).

Poterba, Venti and Wise (1995) report that in 1984—before the program could have had much effect on accumulated assets—the ratio of the median of non-IRA, non-401(k) assets of eligibles to that of noneligibles, controlling for income and weighted by the number of observations within income intervals, was *exactly 1*. This is strong evidence that the households in both groups had similar saving behavior at the outset of the program, before some of them became eligible for 401(k)s. But with increasing exposure to the 401(k) plan, the ratio of the assets of the two groups increased enormously. By 1987, the ratio of total financial assets of eligible to noneligible families was 1.62, and by 1991, this ratio was 2.22. Total financial assets of eligible and noneligible households are shown by income interval in Table 3. The large difference in total financial assets is due to the difference in 401(k) assets; there is virtually no difference in non-401(k) assets of the two groups. Indeed, for all income groups, eligible households have greater total financial assets than noneligible households at virtually all points across the entire distribution of financial assets. There is also little difference in the other financial assets of eligible and noneligible households, as shown by Poterba, Venti and Wise. Thus, this approach suggests a sizable effect of 401(k) saving on the accumulation of financial assets, with little if any substitution of 401(k) contributions for other financial asset saving.

Table 3

**Conditional Median Total Financial Asset Balances by 401(k) Eligibility and Income Interval in 1991**

| Eligibility Status        | Income Interval |                    |                    |                    |                     |                     |                     |
|---------------------------|-----------------|--------------------|--------------------|--------------------|---------------------|---------------------|---------------------|
|                           | < 10            | 10-20              | 20-30              | 30-40              | 40-50               | 50-75               | > 75                |
| Eligible for a 401(k)     | 2,033           | 4,045 <sup>a</sup> | 5,499 <sup>a</sup> | 8,683 <sup>a</sup> | 14,470 <sup>a</sup> | 26,093 <sup>a</sup> | 51,080 <sup>a</sup> |
| Not Eligible for a 401(k) | 1,378           | 1,997              | 2,558              | 3,256              | 6,206               | 10,080              | 29,842              |

<sup>a</sup> Differences between eligibles and noneligibles is statistically at the 95 percent confidence level.  
Source: Poterba, Venti and Wise (1995).

Engen, Gale and Scholz (1994) question these results. They argue that “401(k) eligible families save more in non-401(k) assets than observationally equivalent non-eligible families, even after controlling for other factors.” Their results stem from using a different functional form. We control for income and other factors by making comparisons *within each income interval*; they use a single variable in a regression to control for income across the whole sample. But even so, they cite a statistically insignificant difference in median financial assets of only \$173 in 1994, which is trivial compared to accumulating balances in 401(k) accounts.<sup>5</sup>

### Cohorts and the Effects of Retirement Saving Programs

This method compares the assets of persons who are statistically similar, except that they reached a given age in different calendar years. As a result, some cohorts have had longer than others to contribute to special saving programs. Venti and Wise (1996) use this method. They find that younger families, who attained a given age in 1991, for example, had consistently larger total financial assets than families who reached that age in 1984. The larger assets of the younger cohorts are accounted for almost entirely by more assets in IRAs and 401(k) plans. On average, there is no difference between the other financial assets of the older and younger cohorts.

Table 4 illustrates the results. The mean financial assets of all families that attained age 60 to 64 in 1984 totaled \$42,250; the mean for those who attained that age in 1991 was \$50,419, measured in 1991 dollars and controlling for income, age,

<sup>5</sup> Engen, Gale and Scholz (1994) also find that 401(k)-eligible families are more likely than noneligible families to have a traditional defined benefit employer-provided pension plan. But whether this reflects a difference in saving propensity, in a way that would make the comparison between the two groups uncertain, is questionable. It could be that many people don't choose jobs based on the pension plan. Even for those who do, wanting a good pension plan could either reflect a strong preference for saving, or a nonsaving mentality where you depend on the employer to do it for you.

*Table 4*  
**Summary of Mean Cohort Effects at Age 60–64  
 for Contributors and Noncontributors  
 Combined**  
*(in 1991 dollars)*

|                                 | 1984 <sup>a</sup> | 1991   |
|---------------------------------|-------------------|--------|
| Personal Retirement Assets      | 5,118             | 14,156 |
| Other Personal Financial Assets | 37,132            | 36,263 |
| Total Personal Financial Assets | 42,250            | 50,419 |

<sup>a</sup> The means are controlling for age, income, marital status and education. The 1984 totals exclude 401(k) assets, which were small at that time.

Source: Venti and Wise (1996).

education and marital status.<sup>6</sup> The increase was accounted for almost entirely by personal retirement saving: \$5,118 for the cohort that attained ages 60 to 64 in 1984, compared to \$14,156 for the cohort that attained this age in 1991. There was essentially no cohort difference in other financial assets.

If the focus is solely on families who participated in retirement saving programs, rather than all families, the lesson remains the same. The median level of total personal financial assets of contributor families that attained age 60 to 64 in 1984 was \$34,975. Families that attained this age in 1991 had median total financial assets of \$50,182. The median level of personal retirement plan assets of the families that reached this age in 1984 was \$8,171, compared to \$22,148 for those who attained this age in 1991. In contrast, the other financial assets of these families were similar in 1984 and 1991 (\$22,983 and \$21,528, respectively). Thus, there is little evidence of substitution of personal retirement saving for other financial assets. In contrast, families that attained age 60 to 64 in 1991 but did not participate in the personal retirement plans had somewhat fewer financial assets than similar families who reached this age in 1984 (\$2,687 in 1984 and \$2,134 in 1991).

These results hold up across other age groups, as described in Venti and Wise (1996). The analysis suggests that if current patterns persist, families who reach retirement age 25 or 30 years from now will have much more in financial assets than families currently attaining retirement age, and the difference will be due primarily to assets in personal retirement accounts.

We believe that the cohort approach is the surest way of controlling for heterogeneity. The comparison of the assets of 401(k) eligible and noneligible households, for example, may be affected by differences in underlying saving behavior

<sup>6</sup> The median for all families is zero because fewer than half participate in the programs. Thus the median is uninformative and the mean is shown for all families.

of the two groups, although we don't believe this effect is large. Nor are the cohort estimates confounded by the possible—although we believe unlikely—“coincidence” that individuals who had just decided to save took advantage of the emergence of IRAs. The cohort estimates sidestep these forms of heterogeneity by considering participants and nonparticipants together and by comparing families who differ only in the calendar year in which they reached a given age.

A potential confounding influence that remains is the possibility that successively younger cohorts wanted to save more than the cohort just five years older. We find this possibility unlikely, however. Cohort effects are limited to personal retirement plan saving. There are no cohort effects for other saving, nor are there cohort effects for the saving of nonparticipants in these programs, as one would expect if there were a general underlying change in taste for saving.

## **The Canadian Experience**

Data from Canada also suggest that retirement saving programs raise personal saving. Registered Retirement Saving Plans (RRSPs), with the same tax advantages of the U.S. IRA, were first introduced in Canada in 1957. The contribution limits were increased substantially in the early 1970s, and RRSPs were widely promoted. Since then, they have become a prominent form of Canadian saving. In 1992, about 33 percent of families contributed, with an average contribution of \$4,180. RRSP contributions now exceed the total of employee and employer contributions to employer-provided pension plans.

Based largely on cohort analysis like the procedure described above, Venti and Wise (1995b) conclude that taken as a whole, the data suggest that RRSPs have contributed substantially to personal saving in Canada. In virtually no case do the micro data suggest direct substitution of RRSP for other forms of retirement saving. The comparison of financial assets by cohort shows that younger cohorts with larger RRSP assets also had larger total assets, and the difference was typically greater than the difference in RRSP assets. Comparison of net saving flows of younger and older cohorts over the 1969 to 1992 period also suggests that the greater saving of younger cohorts was due in large part to the larger RRSP saving of these cohorts.<sup>7</sup>

The personal saving rate in Canada used to be below the U.S. rate, but since the RRSP became popular, the personal saving rate in Canada has been persistently higher than in the United States. It is difficult to make judgments about the RRSP saving effect based only on the trends in U.S. and Canadian aggregate saving rates, but the coincidence in timing is striking.

<sup>7</sup> Engelhardt (1996b) analyzed the similarly tax-advantaged Registered Home Ownership Saving Program (RHOSP), designed to encourage saving for home purchase. He found that the RHOSP program also increased total personal saving.

## **Other Margins of Substitution: Home Equity**

The foregoing discussion addresses the substitution between contributions to special retirement saving plans and other financial assets. In addition to other financial assets, there are at least two other potential margins of substitution: employer-provided pension assets and home equity. Many analysts have considered the substitution between employer-provided pension assets and personal financial assets.<sup>8</sup> The results are mixed, but the weight of the findings suggests little substitution. Venti and Wise (1996) have also addressed this question. Considering the assets of retired persons for whom pension assets are known, and using Social Security benefit percentiles to control for lifetime income, they conclude that there is essentially no relationship between employer-provided pension assets and either personal retirement saving plan assets or other financial assets. They considered the same question for retired persons in Canada (Venti and Wise, 1995b), where the RRSP program has been widely used for several decades, with similar results.

A second potential margin of substitution is between housing equity and retirement saving plan assets.<sup>9</sup> For example, Engen and Gale (1995) conclude that the increase in the financial asset saving of 401(k) participants (or eligibles) between 1987 and 1991 was offset by a reduction in home equity. In our analysis of this issue, however, we do not find such an offset (Poterba, Venti and Wise, 1996).

Any interpretation of financial asset versus housing equity trends must be tempered by two factors. First, home equity in the late 1980s was negatively affected by stagnant or declining housing prices in certain regions and by the elimination of tax-deductibility of nonmortgage interest in the Tax Reform Act of 1986. Neither of these were induced by IRA or 401(k) contributions. Second, while increased mortgage debt may appear as a reduction in assets today, it may assure greater assets at retirement. A home equity loan that is repaid before retirement may not affect wealth at retirement. Moreover, many financial planners tout mortgage debt repayment as a means for a household to commit to a long-term saving strategy, as stressed by Thaler and Shefrin (1981), Shefrin and Thaler (1988) and Thaler (1990). With these understandings in mind, we consider the relation between retirement saving plan contributions and home equity using tools familiar from our earlier discussion: cohort analysis and comparison of 401(k) eligible and noneligible families.

There was an enormous increase in home mortgage debt between 1987 and 1991 for all age cohorts. Although assets in personal retirement saving plans continued to grow over this period, the increase was not as rapid as over the 1984 to 1987 period, when mortgage debt was declining. Indeed, new contributions to

<sup>8</sup> See the references in Gale (1995), for example.

<sup>9</sup> Several studies have considered the relation between housing prices and financial assets. In his review of the literature, Skinner (1994) finds little relation between housing value and personal financial assets. Since then, work by Skinner (1993), Hoynes and McFadden (1994) and Engelhardt (1996a) has tended to confirm that finding.

special retirement saving programs *declined* between 1986 and 1991. Thus, mortgage debt was falling when contributions were rising, and then mortgage debt was rising when contributions were falling. This pattern makes it seem unlikely that mortgage debt is offsetting contributions to retirement savings programs. It seems likely that the increase in mortgage debt for all cohorts after 1987 was prompted by the provisions of the Tax Reform Act of 1986 that eliminated the tax-deductibility of non-mortgage debt.<sup>10</sup>

Formal estimates of cohort effects confirm this intuition. Of course, identifying cohort effects in any statistical sense is hampered by the two large exogenous (to retirement saving) effects already noted: swings in home prices over the 1980s and the exogenous growth in mortgage debt that followed the Tax Reform Act of 1986. But in general, cohort estimates show that successively younger cohorts live in more expensive homes, have more mortgage debt, and also tend to have greater home equity than the oldest cohorts.<sup>11</sup> As a result of this pattern, taking home equity into account *magnifies* the cohort differences in financial assets, showing successively greater total wealth with each younger cohort. As younger cohorts invest in IRAs and 401(k) plans, they are not reducing their home equity; instead, they are saving both in the form of special retirement accounts and in the form of housing equity.

A second method to examine whether housing equity is being used to substitute for contributions to IRA and 401(k) plans is to return to the comparison of those whose employers offer a 401(k) plan and those whose employers do not. This eligibility comparison is not hampered by problems like changes in housing prices or the tax code, because it depends on differences at a common point in time. As in the previous use of this methodology, the first step must be to establish that the non-IRA, non-401(k) saving patterns of eligible and noneligible households were similar in 1984, before 401(k) plans became popular, and then to compare eligible and noneligible households at later points in time after the programs had the opportunity to affect asset accumulation.

In 1984, at the outset of the 401(k) program, the total of financial assets (not including IRA and 401(k) balances) and home equity of eligible and noneligible households were very similar overall (Poterba, Venti and Wise, 1996). But by 1991, the total assets of eligible households were much greater, as shown in Table 5. The difference is accounted for by program contributions; 1991 balances in nonprogram financial assets and in home equity were still about the same for eligibles and noneligibles, as they were in 1984. Thus, these data suggest that the greater financial assets of 401(k)-eligible families were not offset by a disproportionate reduction in the housing equity of noneligible families.

Furthermore, the data presented in Poterba, Venti and Wise (1996) reveal a striking and possibly more fundamental result. The net non-IRA, non-401(k) assets

<sup>10</sup> Skinner and Feenberg (1990) find that each dollar of reduced consumer debt following the Tax Reform Act of 1986 was offset by a 67 cent increase in mortgage debt.

<sup>11</sup> Although, our estimates suggest that cohorts in their fifties in 1984 had somewhat more home equity than the very youngest cohorts.

**Table 5**  
**Conditional Median Asset Balances by 401(k) Eligibility and Income Interval,**  
**1991**  
*(in 1991 dollars)*

| Asset Category and Eligibility Status                      | Income Interval <sup>a</sup> |        |                    |                    |                     |                     |                     |
|--|------------------------------|--------|--------------------|--------------------|---------------------|---------------------|---------------------|
|  | <10                          | 10-20  | 20-30              | 30-40              | 40-50               | 50-75               | >75                 |
| Net Total Financial Assets<br>Plus Housing Equity          |                              |        |                    |                    |                     |                     |                     |
| Eligible   | 14,509                       | 14,150 | 20,538             | 32,875             | 49,361              | 84,511              | 151,834             |
| Not Eligible   | 9,185                        | 13,121 | 15,106             | 28,502             | 38,139              | 60,945              | 122,341             |
| Difference   | 5,324                        | 1,029  | 5,432 <sup>b</sup> | 4,373 <sup>b</sup> | 11,222 <sup>b</sup> | 23,566 <sup>b</sup> | 29,499 <sup>b</sup> |
| Net Non-IRA-401(k)<br>Financial Assets Plus<br>Home Equity |                              |        |                    |                    |                     |                     |                     |
| Eligible   | 9,030                        | 10,361 | 14,017             | 24,168             | 34,682              | 61,358              | 108,290             |
| Not Eligible   | 8,059                        | 11,557 | 13,522             | 25,468             | 35,275              | 56,360              | 105,924             |
| Difference   | 971                          | -1,196 | 495                | -1,300             | -593                | 4,998 <sup>b</sup>  | 2,366               |

<sup>a</sup> Income intervals are indexed to 1987 dollars. Estimates control for age, education and marital status, as well as income.

<sup>b</sup> Statistically significant at the 5 percent level.

Source: Authors' tabulations from the 1991 SIPP.

of most families were either negative or very small in 1984. Even families with incomes between \$50,000 and \$75,000 had less than \$7,000 in median net non-IRA, non-401(k) financial assets. Thus, any significant contributions to a saving plan—in which assets remain until retirement—would represent a net increase in financial asset saving for most families.

Why do our results differ from those obtained by Engen and Gale (1995)? A complete understanding will have to await further analysis and discussion, but a sense of what methodology produced their result, and how their approach differs from ours, may be helpful. Engen and Gale use a variety of comparisons, including families who are eligible for 401(k) plans versus those who are not; and families with an IRA and eligible for a 401(k) versus IRA families who are not eligible; families without an IRA and eligible for a 401(k) versus families without an IRA who are not eligible. They compare the *change* over time for one group with the change for the other. Notice that these are not the within-group comparisons that we discussed earlier in this paper; these are between-group comparisons, so the results of this method depend critically on whether the groups being compared had the same propensity to save and to accumulate housing equity at the outset.

For evidence on this point, consider the comparison of home equity between those who are eligible for 401(k) plans and those who are not. In 1984, the median level of home equity (controlling for income and other covariates) was \$32,658 for eligibles and \$18,699 for noneligibles. This difference is in sharp contrast to the



within-income interval differences discussed above, which show little or no difference in home equity. In 1991, the medians for eligible and noneligible households had declined to \$24,230 and \$14,215, respectively. The *percentage* reduction was approximately the same for both groups, suggesting that 401(k) eligibility had little differential effect on the propensity of the two groups to accumulate housing equity between 1984 and 1991. Thus, it is misleading to ascribe to 401(k) eligibility the greater decline in the housing equity of the 401(k)-eligible group. Yet a between-group estimator yields a large negative eligibility effect ( $-\$8,428 = [24,230 - 32,659] - [14,215 - 18,699]$ ). For this reason, we used cohort methods and the comparison of 401(k)-eligible and -noneligible households at a point in time to analyze the effect of the 401(k) plans on the accumulation of total wealth. In addition, we also used within-group comparisons to analyze the effect of 401(k) and IRA programs on financial asset accumulation, as discussed in an earlier section of this paper.

### **When Opposing Conclusions Come from the Same Data**

Earlier in this paper, we laid out the evidence behind our belief that contributions to IRA accounts largely represent net new saving. One of those pieces of evidence, the reader may recall, was a Venti and Wise (1992) analysis of the 1983 and 1986 Survey of Consumer Finances (SCF), which compared how assets of IRA contributor households changed as their IRA assets accumulated and found no evidence that other assets were being reduced as IRA assets accumulated (as shown in Table 1). Gale and Scholz (1994) offer an analysis of the same data, but they conclude that virtually none of the additional IRA saving resulting from an increase in the IRA limit would be new saving. Although the two different conclusions—that most contributions represented new saving and a limit increase would not increase saving—are not *necessarily* inconsistent, it seems unlikely that both are true. It is useful and revealing to consider what lies behind the different conclusions.

The Gale and Scholz (1994) analysis is based on families surveyed in both the 1983 and 1986 SCF surveys. They limit this sample in various ways, including by age, employment, and marital status, which leaves them with about 1,670 households. Interestingly, when we analyze the 1,670 observations that we find meet their criteria for inclusion, we still see no evidence of substitution in the raw data. Households with IRA accounts in 1986 had a median non-IRA asset balance of \$8,800 in the 1983 survey. Clearly, prior to 1983, this group had not been accumulating assets at the rate of the typical household IRA contribution, about \$2,300 per year. These households increased their IRA balances from \$600 in 1983 to \$6,857 in 1986. Meanwhile, the non-IRA assets of contributors did not decline at all as their IRA assets increased between 1983 and 1986. On the contrary, they increased over 52 percent, from \$8,800 to \$13,400. Based both on this straightforward explanation, as well as on more formal analyses controlling for different factors, it seems to us extremely unlikely that the IRA contributions simply substituted for saving that would have occurred anyway.

How do Gale and Scholz (1994) view the same data in such a way as to reach such a different conclusion? The descriptive data they present suggest that limit contributors in particular, but nonlimit contributors as well, had substantial non-IRA financial assets in 1986. The implication is that if the limit were raised, these families could easily fund an IRA by transferring assets from non-IRA to IRA accounts without increasing net saving, and that because they could do that, they would. We emphasize the low level of non-IRA assets of contributors in 1983, at the outset of the program, and the increase in these non-IRA assets as IRA contributions were accumulating, with the implication that the IRA accumulation could not possibly have been funded by withdrawing funds from non-IRA balances or by reducing new non-IRA saving. What accounts for the difference between the \$8,800 level that we emphasize and the much higher \$41,269 for limit contributors and \$21,695 for all contributors that Gale and Scholz (1994) present? Part of the difference is simply their emphasis on 1986 assets versus our emphasis on 1983 assets. Since non-IRA assets increased dramatically among IRA holders between the two periods, the 1986 figure overstates the asset balances available to fund IRAs at the outset of the period. Part of the difference comes from very large differences between actual limit contributors and those who are called "limit contributors" in the Gale and Scholz analysis. Part of the difference is the definition of non-IRA financial assets.

In judging the effect of a limit increase, the fraction of *individual annual contributions* made at the limit is relevant. Presumably families contributing below the limit would not be affected by a limit increase, but each contribution made at the limit would have been at least somewhat greater had the limit been higher. In and of itself, the focus on limit contributors does not challenge our conclusions. Between 60 percent and 85 percent of individual contributions are at the annual limit (Burman, Cordes and Ozanne, 1990; Engen, Gale and Scholz, 1994). Given such a large fraction of individual contributions at the limit, if all limit contributors had funded IRA contributions by transferring funds from non-IRA assets, or by reducing other saving, the summary data would show it, but they don't. We infer, therefore, that if the limit had been higher, the increase in total financial assets by 1986 would have been even greater as well.

However, Gale and Scholz (1994) emphasize an entirely different calculation. They face the problem that the SCF does not report annual IRA contributions, only 1983 and 1986 balances. Gale and Scholz use these balances, assuming a 14 percent rate of return on IRA assets and assuming the same contribution in each of the three years, to calculate a "three-year" IRA contribution. Thus the families that Gale and Scholz call "limit contributors" are those who are estimated to have contributed at the limit *in each of the three consecutive years*. Gale and Scholz place 21.8 percent of contributors in this select category. As noted, the proportion of those who make annual contributions at the limit is perhaps three to four times as large as this. Recognizing that a much larger share of contributions are at the limit may well alter one's prior expectations about the saving effect of raising the limit.

In addition, Gale and Scholz (1994) also use a broader definition of nonfinancial

assets than our measure. Their measure includes the cash value of life insurance, trusts, managed life insurance, managed investment accounts, and notes and land contracts owed by households. We believe it is unlikely that these assets are used to fund IRA balances. Finally, Gale and Scholz include in their descriptive data households with heads over 65. We omit such households because even though they may have positive IRA balances, they are unlikely to be active IRA contributors.

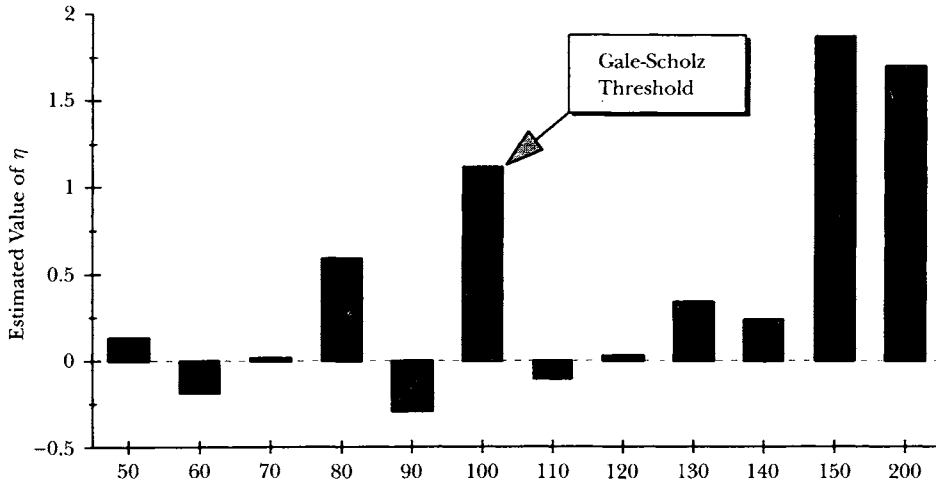
Using their three-year limit contributors, their more inclusive definition of non-IRA financial assets and including persons over 65, Gale and Scholz (1994) calculate that in 1986, the median level of non-IRA financial assets of contributors was \$21,695 and the median for limit contributors was \$41,269. This figure should be compared to our emphasis on the very low median level of non-IRA assets in 1983, \$8,800, at the outset of the program. Based on 1983 and 1986 Consumer Expenditure Surveys, we calculate that the median non-IRA financial assets of 1983 limit contributors was only \$14,250, and the median in 1986 was \$19,500. Thus, it is not surprising that the judgments we make based on the descriptive data differ from the inferences that might be made based on the data presented by Gale and Scholz.

Gale and Scholz (1994) draw their main conclusions based on a formal estimation procedure. This journal is not the place for a detailed analysis of the merits of the modeling choices involved there. For that discussion, we refer readers to an expanded discussion in Poterba, Venti and Wise (1996). However, we do discuss here two critical features of their model.

The key aspect of the Gale and Scholz model is an equation for other (non-IRA) saving of persons who contribute to the IRA limit. This equation has two components: the first describes other saving before the IRA limit is reached, which we call “underlying” saving; the second describes saving after the IRA limit has been reached and allows other saving to increase once the opportunity for IRA saving has been exhausted. This part contains the key parameter,  $\eta$ , which is the coefficient on the difference between desired IRA saving and the level of saving permitted by the IRA limit. It is intended to represent the proportion of the difference that is made up by other saving. If  $\eta$  is 1, then other saving increases to make up for all IRA saving that was curtailed by the IRA limit, and there is no net effect of raising the IRA limit on saving. If  $\eta$  is zero, none of the difference is made up and IRA saving is entirely new saving. Together, the two parts—the underlying saving component and the  $\eta$  component—predict other saving. Thus a decrease in underlying saving predicted by the first part, can be counterbalanced by an increase in the second part—that is, in  $\eta$ .

We have replicated their model and estimated various versions of it. Our results show that the conclusions are extremely fragile and in our view the findings do not support the conclusion that IRAs have no effect on savings. We find that the estimated value of the key parameter  $\eta$  is extremely sensitive to the sample that is used for estimation, and indeed is more likely to be close to zero than close to one. In addition, we find that their attempt to control for past saving behavior by using the 1983 level of non-IRA financial assets to predict non-IRA saving between 1983 and

Figure 1

**Estimated  $\eta$  Values**(by three-year saving threshold:  $\pm$ \$000s)

1986 introduces enormous measurement error that strongly biases their estimate of the saving effect.

To illustrate the sensitivity of the results, consider one choice made in Gale and Scholz (1994): they delete all families with 1983 to 1986 estimated non-IRA saving less than  $-\$100,000$  or greater than  $+\$100,000$ . Of the 168 families in the sample that meet their other criteria and contributed the full limit to their IRA, 61 are excluded by this criterion. The deletion of these families makes a substantial difference to the properties of the sample. It reduces the mean of nonfinancial assets for the sample from  $\$217,668$  to  $\$21,244$  and increases mean estimated saving between 1983 and 1986 from  $-\$13,303$  to  $+\$2,378$ . Because the results of the Gale and Scholz procedure depend critically on the small number of limit contributors—117 in their estimates—any selection that changes this small sample is likely to affect the result, and we find that the results are extremely sensitive to the sample that is used. Estimates for selection thresholds ranging from  $\pm\$50,000$  to  $\pm\$200,000$ , including the  $\pm\$100,000$  threshold used by Gale and Scholz, are shown in Figure 1. Gale and Scholz focused on a sample that happens to lead to an  $\eta$  estimate just above 1, suggesting complete substitution. But estimates based on the other samples vary widely and most are small, suggesting little if any substitution of IRA saving for other saving.

Gale and Scholz use the 1983 level of non-IRA financial assets as a way of controlling for past saving behavior. The use of this variable is crucial to their results. We estimated several variations of the Gale and Scholz model—distinguished by method of estimation and by the variables that predict underlying

saving and the variables that predict  $\eta$ . In each of the 20 variations we considered, the estimated  $\eta$  jumps wildly when non-IRA financial assets are added to the model, sometimes from a large negative to a large positive value.<sup>12</sup>

However, using the 1983 level of non-IRA financial assets delivers some highly implausible parameter estimates. The 1983 level of non-IRA financial assets has a large and *negative* effect on underlying saving, suggesting that a one standard deviation increase in the 1983 level of non-IRA financial assets (about \$100,000) is associated with a *decrease* in saving of over \$35,000 in the 1983–86 period!<sup>13</sup> Taken literally, this result says that the greater the level of non-IRA assets in 1983—controlling for age, income and other variables—the *lower* the level of saving over the subsequent three years.

On the other hand, when 1983 non-IRA financial assets are included as a predictor of  $\eta$ , their estimated effect is large and positive, offsetting the large negative effect in the underlying saving equation. The estimated coefficient implies that a one standard deviation increase in the 1983 level of non-IRA financial assets (about \$100,000) will increase  $\eta$  by almost 10!

Without using the 1983 non-IRA financial assets variable, predicted underlying saving of limit contributors is higher than that of nonlimit contributors (\$4533 versus \$1651), as we would expect. But when 1983 non-IRA financial assets are added, the underlying other saving of limit contributors is *lowered* from \$4533 to -\$760, leaving a large gap between predicted underlying other saving and actual other saving, which is \$3089. Effectively, the gap between underlying and actual saving of limit contributors is bridged by the large estimated value of  $\eta$ ; the underlying saving component is decreased and the slope of the second component must be increased to offset this decrease. This is simply an artifact of the estimation procedure, and no behavioral interpretation can be ascribed to the estimated value of  $\eta$ .<sup>14</sup>

It seems evident from these results that the key variable in the model—the 1983 level of non-IRA financial assets—is not properly controlling for past saving behavior. Instead, inclusion of this variable has created a serious measurement error problem. Other saving over the period is inferred from 1983 and 1986 non-IRA financial balances; as mentioned before, this involves taking the 1986 figure for non-IRA financial balances, subtracting what the 1983 balance would have been if

<sup>12</sup> In our replication of the Gale and Scholz specification and estimation procedure,  $\eta$  is 1.116 when this variable is included but -0.222 when it is excluded.

<sup>13</sup> Our estimate is -3.512 with a t-statistic of 12.5, and the Gale and Scholz estimate is -3.686 with a t-statistic of 9.2. Of the 10 variables used to predict underlying saving, only 1983 non-IRA financial assets, income and debt were statistically significant.

<sup>14</sup> An additional problem is that  $\eta$  is estimated as a function of many variables, but without a constant term. It is generally true, however, that setting a constant term to zero will yield coefficients with no behavioral meaning. Although the mean of predicted values of  $\eta$  may not be affected much by this omission, the comparison of predicted  $\eta$  for persons with different demographic characteristics is not meaningful. Indeed, predictions of  $\eta$  vary wildly in response to small changes in  $X$  variables, as shown in Poterba, Venturi and Wise (1996, Table 23).

it had accumulated at a 14 percent rate of return, and then assuming that the difference was contributed evenly over three years. Thus, any measurement error in the 1983 balance means that other saving is also mismeasured. In this case, the resulting measurement error bias swamps any role that 1983 non-IRA financial assets might have played as a control of heterogeneity.

## Conclusion

Different analyses, even when applied to the same data, can lead to different conclusions. All methods have limitations. In our judgment, however, the weight of the evidence, based on the many approaches we have used, as well as our evaluation of other methods, provides strong support for the view that the bulk of IRA and 401(k) contributions are net additions to saving. We believe these plans do work to increase saving.

■ *This paper draws heavily from Poterba, Venti and Wise (1996), which provides greater explanation of many of the technical details, as well as supplementary tables. Our research on this topic has been supported primarily by a series of grants from the National Institute on Aging. We also acknowledge the support of the Hoover Institution (Wise) and the National Science Foundation (Poterba). We are grateful to Jon Gruber, Jon Skinner and Richard Thaler for comments on an earlier draft of this paper. We have also benefitted from the comments of Alan Auerbach and from the detailed suggestions of Timothy Taylor.*

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