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EDUCATION SAVING INCENTIVES  
AND HOUSEHOLD SAVING:  
EVIDENCE FROM THE 2000 TIAA-CREF  
SURVEY OF PARTICIPANT FINANCES

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Education Saving Incentives and Household Saving:  
Evidence from the 2000 TIAA-CREF Survey of Participant Finances  
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**ABSTRACT**

This paper examines the effects of education saving incentives on the level of private saving by households. Little is known about this subject. One explanation for this gap in the literature is that because education saving incentives are relatively new, data on education saving are not readily available. Using wealth data from a survey of TIAA-CREF participants, this paper attempts to estimate whether saving in education saving programs offsets other household saving. As in the extant literature of the impact of retirement saving programs on household saving, an empirical challenge is how to deal with the issue of saver heterogeneity. In this paper, two strategies are used to address this issue. The first strategy distinguishes savers from non-savers by whether households have an IRA or a supplemental pension plan. The second strategy uses the propensity score approach to control for unobserved heterogeneity in taste for saving. Results from both strategies suggest that education saving incentives in general do not offset other household saving and stimulate saving for households with high propensities to use education savings accounts.

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## 1 Introduction

College tuition inflation in the past thirty years has averaged two to three percentage points higher than the general price inflation and is showing no sign of slowing down. For the 2001-2002 academic year, the average in-state tuition and fees at four-year public colleges and universities was \$3,754, a 7.7 percent increase from the previous year. For the same academic year, the average tuition and fees at four-year private colleges and universities was \$17,123, a 5.5 percent increase from the previous year.<sup>1</sup>

As the cost of college continues to rise at a fast pace, financing a college education has become a growing concern for many families. In order to help families save for college, the federal government has introduced two tax-favored education saving instruments in recent years: the 529 plan and the Education IRA (recently renamed the Coverdell Education Savings Account). These saving instruments are just “Roth IRAs for education expenses.” Contributions to these education saving instruments are not deductible for federal tax purposes, but earnings on qualified withdrawals are exempt from federal income tax.<sup>2</sup> These education saving instruments, the 529 plans in particular, have grown rapidly since their inception and will likely grow even more quickly under the new tax law passed in 2001.

Education saving instruments are only one of the government’s interventions in the capital market for higher education investments. However, they are an important one. The new education saving instruments represent an important redirection of state and federal efforts toward saving and away from two major forms of public subsidy to higher education — state-

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<sup>1</sup> Source: *Trends in College Pricing 2001*, the College Board.

<sup>2</sup> Note that the tax law that provides federal tax exemption on earnings of qualified 529 plan withdrawals

subsidized public tuition prices and needs-based federal financial aid such as grants and student loans. For example, while state and local appropriations accounted for 48 percent of the total current-fund revenue for public degree-granting institutions in the 1980-81 academic year, they accounted for only 36 percent in the 1996-97 academic year.<sup>3</sup>

Enthusiasm for the tax-favored education saving instruments was partly spurred by the idea that they would raise households' saving rate by targeting a segment of the population that is not targeted already by IRAs and 401(k)s. Moreover, by offering tax incentives, education saving instruments may encourage marginal families to save and plan for college, which may have a positive influence on students' college experience.<sup>4</sup>

As in the case of other tax-favored saving programs, whether saving in education saving instruments represents new saving is an empirical issue. In the last two decades, a large and contentious literature has developed over the impact of IRAs and 401(k)s on private and national saving. Some researchers (Poterba, Venti, and Wise) have found evidence that suggests the majority of saving in tax-favored retirement accounts represents new saving while other researchers (Gale and Scholtz) have found evidence that suggests just the opposite.

While the debate on the impact of retirement saving programs has continued for years, little is known about how education saving programs affect household saving. One explanation for this gap in the literature is that because education saving programs are relatively new, data

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is scheduled to expire on December 31, 2010. Congress may or may not extend the law beyond this date.

<sup>3</sup> Source: *Digest of Education Statistics 2001*, Department of Education.

<sup>4</sup> Despite the fact that loans are available and can be made the responsibility of the student himself, anecdotal evidence suggests that many families with a record of successful college attendance make considerable use of internal family financing (i.e. parental savings). Although the greater college success of savers may be due to their greater incomes or superior planning, it is also possible that saving and debt do not have parallel effects on students' college experience. Perhaps piling up debt worries students and causes them to disengage from college in order to earn money. It is also possible that act of saving for college causes a family to think more concretely about college and prepare for it better.

on education saving are not readily available. Using wealth data from a survey of TIAA-CREF participants, this paper attempts a first check on whether education saving incentives offset other household saving, controlling for saver heterogeneity. Results suggest that in general education saving instruments do not seem to offset other forms of household saving. For households with high likelihood of using education savings accounts, education saving seems to be positively correlated with other household assets.

The remainder of the paper is structured as follows. Section 2 describes the 529 plan and the recently renamed Coverdell Education Savings Account. Section 3 describes the data and presents some summary statistics. Section 4 provides a brief summary of the IRA and 401(k) literature and discusses the empirical strategies used in this paper to identify savers from non-savers. Section 5 presents the regression results. Section 6 provides some concluding remarks.

## **2 The 529 Plan and the Coverdell Education Savings Account**

### ***2.1 The 529 Plan***

Named after the section of the Internal Revenue Code (IRC) that created them, 529 plans are qualified tuition programs designed to help families save for college expenses. Two types of 529 plans are available: savings and prepaid. Savings plans are investment programs that typically offer a variable rate of return. Prepaid plans usually allow the plan purchaser to prepay future tuition credits at current prices. All of the existing 529 savings and prepaid plans are sponsored by individual states. However, some private colleges and universities may establish their own prepaid plans in the near future.

Although the first prepaid plan (Michigan Education Trust) was introduced in 1988, it

was not until 1996 that Section 529 was added to the IRC to clarify the federal tax treatment of state-sponsored plans. Under Section 529, earnings in state-sponsored plans grow federal and state tax-free until withdrawal. Contributions to 529 plans are not deductible for federal income tax purposes. However, they are deductible (usually subject to an annual maximum) in some states for state income tax purposes.

Before 2002, when withdrawals from a 529 plan were made to pay for qualified higher education expenses, the earnings portion was subject to federal income tax at the beneficiary's rate. The state tax treatment on earnings of qualified withdrawals depended on the state. While some states followed the federal tax treatment, many exempted earnings of qualified withdrawals from state tax to provide additional tax benefits.

The *Economic Growth and Tax Reconciliation Act of 2001* (the *2001 Tax Act*) provided more favorable tax treatment for 529 plans, as the earnings of qualified withdrawals from state-sponsored plans were made exempt from federal income tax, starting in 2002. States that currently do not exempt earnings from state income taxes may follow suit and exempt earnings from state taxes. Starting in 2004, prepaid plans established by private colleges and universities will also be eligible for the same benefits as state-sponsored plans.<sup>5</sup>

The 529 plan is also more flexible than most tax-favored saving vehicles. There is no income restriction on participation or tax benefits. Anyone, regardless of income, can contribute to a 529 plan. Withdrawals may be used to pay for tuition, fees, room and board, books, supplies, and equipment required for enrollment or attendance at an eligible undergraduate, graduate, or professional institution of higher education, or any approved

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<sup>5</sup> Note that the provisions of the *2001 Tax Act* regarding Section 529 of the IRC are scheduled to expire on December 31, 2010. Congress may or may not extend the tax benefits beyond this date. If the law is not

vocational/technical school. Eligible postsecondary institutions include those that are accredited and are eligible to participate in student aid programs administered by the Department of Education.

While most state-sponsored prepaid plans are open to state residents only, most savings plans allow anyone from any state to open an account. There is generally no annual contribution limit for 529 plans. Most plans impose a lifetime limit per beneficiary on account balances (the sum of contributions and earnings less fees and expenses); a few plans impose a lifetime limit on gross contributions. Lifetime limits vary widely across states and are usually adjusted once a year to reflect inflation. Table A1 shows as of September 2002, the lowest lifetime limit on account balances was \$122,484 (California) and the highest was \$305,000 (South Dakota).<sup>6</sup> Table A1 also shows that minimum contribution requirements are generally low.

Awareness of and interest in 529 plans have increased considerably after the *2001 Tax Act* made the earnings of qualified withdrawals exempt from federal income tax. As of March 2002, there were approximately 3.1 million accounts with a total asset value of \$18.9 billion across all 529 savings and prepaid plans, an increase of 75 percent compared to June 2001. As of September 2002, forty-eight states had 529 savings plans in operation. The rest of the states and District of Columbia had 529 savings plans under development. Twenty-two states had 529 prepaid plans either in operation or under development.<sup>7</sup>

With increased interest in 529 plans, more and more employers are offering 529 plan

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extended the federal tax treatment of 529 plans will revert to its status prior to January 1, 2002.

<sup>6</sup> See Ma, Warshawsky, Ameriks, and Blohm (2001) for a study of using an economic approach to set the contribution limits for 529 plans. In practice, limits are set by states according to broad considerations set forth in the IRC and regulations. In states with lifetime limits on account balances, once the combined balance for a designated beneficiary reaches the maximum limit, the program will stop taking new contributions.

automatic payroll deductions for their employees. To take things one step further, it would be interesting for employers to make 529 plan enrollment a default for some employees (for example, those with young children).

The earnings of non-qualified withdrawals from 529 plans are subject to federal and state income taxes at the distributee's rate in addition to a ten-percent penalty tax. However, the account owner may make a penalty-free, tax-free rollover by designating another "member of the family" as the new beneficiary. The ten-percent penalty does not apply in the event there is a withdrawal due to the beneficiary's death or disability. If the beneficiary receives a tax-free scholarship, educational assistance allowance, or other tax-free educational benefits, then the distribution from a 529 plan is not subject to the ten-percent penalty to the extent that the distribution is not more than the amount of the scholarship, educational allowance, or other similar benefits.

## **2.2 *The Coverdell Education Savings Account***

The recently renamed Coverdell Education Savings Account was introduced as part of the *Taxpayer Relief Act of 1997*. Contributions to the Coverdell are not tax-deductible. However, earnings are exempt from federal and state income taxes if withdrawals are used to pay for qualified education expenses. Before 2002, qualified expenses included higher education expenses only. The *2001 Tax Act* provided that starting in 2002, qualified expenses would also include elementary and secondary school expenses at public, private, or religious schools.<sup>8</sup>

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<sup>7</sup> Source: College Savings Plan Network.

<sup>8</sup> Allowable higher education expenses are the same as those for 529 plans. Allowable elementary and secondary school expenses include tuition, fees, academic tutoring, books, supplies, other equipment, "special needs services", room and board, uniforms, transportation and "supplementary items and services".



There is an income restriction on participation in the Coverdell. For 2001, the phase-out range was between \$95,000 and \$110,000 for single tax filers and between \$150,000 and \$160,000 for joint tax filers. In 2002, more families are eligible for the Coverdell, as the *2001 Tax Act* raised the income phase-out range for married couples to between \$190,000 and \$220,000. The *2001 Tax Act* also raised the annual contribution limit for the Coverdell from \$500 to \$2,000 per beneficiary, starting in 2002.

The earnings on non-qualified withdrawals from Coverdells are subject to federal and state income taxes at the distributee's rate in addition to a ten-percent penalty (with similar exceptions as those for 529 plans). Before the tax law changes in 2001, an excise tax was imposed if individuals contributed to both a 529 plan and a Coverdell on behalf of the same beneficiary in the same year. The new law provided that starting in 2002, the excise tax would no longer apply. However, the federal law prohibits the use of same education expenses to support tax-free distributions from both a 529 plan and a Coverdell. Furthermore, the education expenses used to support tax-free distributions from a 529 plan or a Coverdell may not be used to claim a Hope or Lifetime Learning Credit.

Table 1 summarizes some key features of the 529 plan and Coverdell. Since the 529 plan and Coverdell have very similar tax treatment on earnings and contributions, a comparison of the attractiveness of the two education saving instruments reduces to a comparison of fees (Ma and Fore, 2001). Currently, the fees charged by 529 plans range widely from a low of 0.3 percent to a high of over 2 percent. Assuming the same rates of return for a 529 plan and Coverdell, the plan with lower fees will result in a higher level of asset accumulation. Another difference between the two saving instruments is that 529 plan investors may not make direct investment decisions, while Coverdell investors may. Finally, when it comes to calculating a

student's Expected Family Contribution (EFC) for financial aid purposes, assets in a Coverdell account will be considered as the student's assets and assessed at a 35 percent rate, while assets in a 529 account will be considered as the parents' assets (if the owner is a parent) and assessed at a 5.6 percent rate. Since a higher EFC means a lower level of financial needs, assets in a Coverdell account will reduce a student's financial aid more than assets in a 529 plan will.

Table 2 illustrates how families may use the 529 plan and Coverdell to save for future college expenses. Column 1 of Table 2 indicates a monthly contribution of \$22 over an 18-year investment horizon would be sufficient to fund the average cost of a two-year education at a public two-year college. Columns 2 and 3 indicate that monthly contributions of \$240 and \$630 over an 18-year investment horizon would be sufficient to fund the average cost of a four-year education at a public four-year and private four-year college, respectively.

It is also worth noting that the Registered Education Savings Plans (RESPs) in Canada are similar to the 529 plan and Coverdell. Contributions to the RESPs are not tax-deductible. However, earnings grow tax-free until withdrawal. When withdrawals are used to pay for qualified higher education expenses, earnings are taxed as the beneficiary's income. Earnings on non-qualified withdrawals (withdrawals not used for higher education) are taxable as the account subscriber (owner)'s income. For each beneficiary, the current annual contribution limit is CAD 4,000 and the lifetime limit is CAD 42,000.

### **3 The 2000 TIAA-CREF Survey of Participant Finances**

To examine the impact of education saving instruments on other household saving, information on contributions or accumulations in education saving, other saving, and demographics is required. Currently, there is no publicly available wealth data that contain

information on contributions or accumulations in education saving programs. The 2001 Survey of Consumer Finances (SCF) conducted by the Federal Reserve Board includes questions on education saving programs such as the 529 plans and Coverdells. However, the 2001 SCF data will not be available until 2003.

The data used in this study are drawn from the 2000 TIAA-CREF Survey of Participant Finances (SPF) conducted by TIAA-CREF. TIAA-CREF is a non-profit organization that provides retirement plans at more than 12,000 colleges, universities, research centers, medical organizations and other nonprofit institutions throughout the United States. The 2000 TIAA-CREF SPF sample consists mostly of employees of colleges and universities. A small portion of the sample consists of employees of research and other nonprofit organizations.

The 2000 TIAA-CREF SPF was conducted among members of the TIAA-CREF “Research Panel.” The TIAA-CREF Research Panel was established in 1993 when 60,000 TIAA-CREF participants were randomly selected to participate in the TIAA-CREF Research Panel Project. The purpose of the Research Panel Project was to select a sample of TIAA-CREF participants for future studies of participant financial decisions. A brief questionnaire was mailed to these 60,000 randomly selected participants asking information about themselves and their families. Of these 60,000 individuals selected, 9,847 responded to the 1993 Research Panel questionnaire and formed the initial TIAA-CREF Research Panel. In the subsequent years, some members were dropped from the Research Panel due to death, change of participant status, or change of address. Several sample replenishment efforts were made in 1995, 1997, and 1999.

The 2000 TIAA-CREF SPF is a comprehensive survey of household finances. It was designed to examine in detail the types and amounts of financial assets owned by TIAA-CREF

participants, and apply this information to the study of household asset allocation and other financial decisions. Survey packets containing a cover letter and an eight-page questionnaire were mailed in January 2000 to a total of 9,234 Research Panel members. A total of 2,835 completed questionnaires (2,793 usable) were received representing an overall response rate of 31 percent.

The 2000 TIAA-CREF SPF gathered a wide range of information on household finances and demographics. The demographic information gathered includes respondent's age, gender, education, employment status, occupation, marital status, and the number of children for whom the respondent's household is financially responsible. The financial information gathered includes the amount and sources of the respondent's income, the types of retirement investments, non-retirement financial accounts, real estate holdings in the household, and the estimates of the current value for each of those investments. Information on household mortgages and other types of financial commitments was also gathered. For married respondents, information on the spouse's employment status, income, and retirement assets was also collected. Most importantly, respondents were asked whether anyone in his/her household had a Coverdell, a 529 savings account, or a 529 prepaid contract. Respondents were asked to provide a value if they answered yes to any of these questions. Respondents were also asked to measure on a 1-10 scale how important it was for them to leave a bequest.

### ***3.1 A Comparison of the 2000 TIAA-CREF SPF with the 1998 SCF***

Table 3 shows the summary statistics of households from the 1998 SCF and households from the 2000 TIAA-CREF SPF. Clearly, households from the two surveys are quite different in terms of both demographic and financial characteristics. As Table 3 shows, the respondents in the 2000 TIAA-CREF SPF are older and much more educated than the respondents in the

1998 SCF. For example, while only 33.2 percent of the 1998 SCF respondents have a college degree, 87.5 percent of the 2000 TIAA-CREF SPF respondents have at least a college degree and 33.4 percent have a Ph.D. degree.

Table 3 also shows that households from the 2000 TIAA-CREF SPF on average earned much higher income than those from the 1998 SCF. The median 1999 household income from the 2000 TIAA-CREF SPF was more than twice as much as the median 1997 household income from the 1998 SCF. Even when the median household income from the 1998 SCF is inflated by 10 percent to the 1999 level, it is still less than half of that from the 2000 TIAA-CREF SPF. (The March Current Population Survey data suggest that for households with householders 25 years and older, the median income in current dollars rose by 10.1 percent between 1997 and 1999 while the mean income in current dollars rose by 10.6 percent.) Moreover, households from the 2000 TIAA-CREF SPF are much wealthier than those from the 1998 SCF. The median net worth for households from the 1998 SCF is only \$71,700, compared to \$467,728 for those from the 2000 TIAA-CREF SPF.

The above comparisons suggest that the sample in the 2000 TIAA-CREF SPF is quite different from the general population. The respondents in the 2000 TIAA-CREF SPF are older, much more educated and wealthier than the general population. These unique characteristics make the 2000 TIAA-CREF SPF particularly well suited to the task of assessing the effectiveness of education saving programs mainly for two reasons. First, the TIAA-CREF sample is more likely to be saving-prone and more likely to plan for college. Thus, they are more likely to use the new education saving instruments than the typical American household, especially when the instruments are new and unfamiliar to most people. In fact, as of December 1999, while 2.4 percent of the TIAA-CREF SPF households reported owning a 529

savings or prepaid plan, less than 1.2 percent of the U.S. households owned a 529 plan.<sup>9</sup> This confirms the TIAA-CREF sample is much more likely to use education saving instruments than the general population. The proneness of the TIAA-CREF sample to use saving instruments allows one to find a sufficient number of users in a small sample.

Second, estimates from the TIAA-CREF sample will likely overstate the extent to which education saving crowds out other saving. Research on retirement saving suggests that reshuffling of assets is more likely to occur for high-income households (Gale and Scholtz, 2000). Moreover, not only is the TIAA-CREF sample wealthier and has accumulated higher levels of saving (and more saving to crowd out), it also consists largely of education-sector workers who are very consciously dedicated to ensuring their children's college opportunities. These individuals are far more likely to have been saving explicitly for college even in the absence of tax-favored instruments, which also raises the likelihood of crowding out. Therefore, one can confidently predict that there would be much less crowding out in the overall population than in the TIAA-CREF sample.

### ***3.2 Non-responses in the Survey and Sample Selection***

Although missing data are common for many wealth surveys, the item response rates in the 2000 TIAA-CREF SPF are quite high. Table 4 presents the proportions of non-responses to financial asset questions in the 2000 TIAA-CREF SPF survey. As Table 4 shows, the item

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<sup>9</sup> These comparisons are on 529 plans only because data on the aggregate number of Coverdell accounts are not readily available.

Source: Author's calculations. The percentage of U.S. households owning a 529 plan was calculated by dividing the total number of 529 accounts in the U.S. by the total number of households, as of December 1999. Data on the total number of 529 accounts are from the College Savings Plans Network and data on the total number of households are from the U.S. Census Bureau. It is worth noting that to the extent that some households may have multiple 529 accounts, the actual percentage of households owning 529 plans may be slightly lower than the calculated 1.2 percent.

response rates for the 2000 TIAA-CREF SPF are over 90 percent for most of non-retirement financial assets (Column 4).

Missing data could arise as a result of non-response to ownership questions or value questions, or sometimes, both. Column 1 in Table 4 indicates that between 2.0 and 16.3 percent of respondents did not provide an answer to the ownership question for various types of financial assets. Column 3 suggests that among those who answered yes to the ownership questions, between 6.2 and 20.6 percent did not provide a value. As a result, between 5.9 and 23.2 percent of respondents had missing data for various assets (Column 4).

Of all of the assets listed in Table 4, TIAA-CREF retirement assets (Row 1) seem to have a much higher non-response rate (23.2 percent) than other assets. One reason for this is that a third of the sample consists of annuitant respondents who were already receiving life-annuity income from TIAA-CREF. For these respondents, it is difficult for them to report the value of their TIAA-CREF retirement assets. In other words, since they had already annuitized part or all of their TIAA-CREF retirement assets, they would need to calculate the present value of their future annuity income in order to figure out the total value of their TIAA-CREF retirement assets. Fortunately, for annuitants, the value of their total TIAA-CREF retirement assets can be calculated by adding together their non-annuitized assets and their annuity reserves from the TIAA-CREF accounting data. The annuity reserve for an annuitant is the amount of reserve set aside to fund the annuitant's life-annuity income. The value of an annuitant's annuity reserve can be considered as the present value of the annuitant's life-annuity income, using the TIAA-CREF guaranteed interest rate as the discount rate.

Non-responses become more of an issue when one calculates aggregate wealth levels, even though the non-response rates for individual assets are rather low. For example, when one

calculates households' self-reported non-education net worth, 54.9 percent of respondents have missing data due to non-responses to the ownership and/or value questions for at least one of the assets. In order to reduce the number of observations with missing net worth, the respondent's self-reported data on TIAA-CREF retirement assets were replaced with TIAA-CREF accounting data. As a result, the proportion of respondents with missing data for net worth reduced to 51.1 percent. It is worth noting that the net worth calculated from TIAA-CREF accounting data is highly correlated with that from self-reported data with a correlation coefficient of 0.96.

Also of special attention are the non-responses for the three education saving questions. At first glance, the non-response rates for the three education saving questions seem much higher than those for other financial assets. Further investigation of the data reveals that majorities of the non-responses to education saving questions represent non-responses to all three education saving questions (440 cases). Of these 440 cases, household's non-education net worth (the sum of net non-education financial assets and real estate equity) is available for 184 cases. This indicates that these 184 respondents filled out all the necessary information needed for the calculation of household non-education net worth, but left the education saving questions blank. Because these education saving instruments were rather new at the time of the survey (approximately two years after their introduction), it is likely that many respondents were not familiar with these incentives and did not understand the questions. However, those respondents who did report having such education saving seemed to understand the questions and most of them provided a valid and positive answer for the value question. Therefore, it seems reasonable to assume that these 184 respondents did not have such accounts. Under such



an assumption, the non-response rate for the education ownership questions dropped to around ten percent.

Of the 2,793 respondents, 171 reported having at least one of the three education saving instruments. The number of respondents reported having a Coverdell, a 529 savings account, and a 529 prepaid contract was 109, 57, and 13, respectively. Moreover, 96, 53, and 11 provided a non-zero account balance. The reported median balance for the three types of accounts was \$2,000, \$10,000, and \$5,000, respectively. Due to the small number of respondents who reported having these education saving accounts, it is difficult to empirically distinguish the impact of each of these education incentives on household wealth. Therefore, all three education saving instruments are treated equally in the empirical analysis. In other words, the balances of all education saving accounts are aggregated to create a variable that measures a household's total education saving.

Observations with missing values for explanatory variables in the regressions are excluded from the analysis. Also excluded from the regression analysis are observations with extreme values of net worth (over \$10 million, 1 case) and observations with missing values for net worth. The final regression sample includes 1265 cases.

#### **4 Empirical Strategy — How to Control for Saver Heterogeneity?**

As mentioned earlier, one important public policy question for tax-favored saving programs is whether saving in these tax-favored programs represents new saving. In other words, does saving in education saving programs offset other household saving? The answer to this question in large part depends on the source of contributions to these programs. If the source of contributions is reduced consumption or tax saving, then saving in these programs

represents new saving. However, if the source of contributions is borrowing, existing assets, or the portion of wealth that would have been saved anyway even in the absence of these tax-favored saving programs, then tax-favored saving programs do not stimulate new saving.

In empirically estimating the saving effects of tax-favored retirement or education saving programs, a challenging issue is how to deal with saver heterogeneity. Individuals' saving behaviors may be different due to unobservable individual-specific preferences such as their propensity to save. For example, participants in tax-favored saving programs may have stronger tastes for saving than others and may tend to save more in all forms. Econometric models that do not control for saver heterogeneity are likely to overestimate the saving effects of tax incentives.

In the retirement saving literature, a substantial amount of research has been devoted to estimate the impact of IRAs and 401(k) plans on households' wealth. This section provides a summary of selected studies in the retirement saving literature.

#### ***4.1 A Summary of Selected Studies in the Retirement Saving Literature***

Two major retirement saving incentives, the IRA and the 401(k) have been the subject of substantial public discussion and economic analysis. When first introduced in 1974, IRAs were only available to individuals not covered by an employer pension plan. There was no income restriction. Contributions were tax deductible and capped at \$1,500 per year. The entire proceeds were subject to income taxes upon withdrawals. There was a 10 percent penalty on withdrawals made before the owner turned 59½.

The IRAs grew rapidly after the *Economic Recovery Act of 1981* raised the annual contribution limit to \$2,000 and made all wage earners and their spouses eligible. However, the *Tax Reform Act of 1986* reduced the tax benefits so that contributions were no longer

deductible for higher-income individuals covered by a pension plan. Consequently, contributions to IRAs dropped sharply.

The 401(k) plan became popular in the 1980s and is one of the most important retirement saving programs. Sponsored by employers, only employees of firms that offer such plans are eligible to participate in a 401(k) plan. The 401(k) plan offers tax deduction on contributions, tax-free growth on earnings, and very often, employer matching contributions. The entire proceeds are subject to income taxes upon withdrawal. There is a 10 percent penalty on withdrawals made before the owner turned 59½. Before 1987, participants were allowed to contribute up to \$30,000 per year. The *Tax Reform Act of 1986* reduced the annual contribution limit to \$7,000. The limit is adjusted annually to reflect inflation. The contribution limit for the 2002 tax year is \$11,000.

Since the introduction of the IRA and 401(k), there has been a growing literature on the saving effects of these tax-favored retirement programs. The focus has been whether and to what extent IRA and 401(k) saving represents new saving. A central theme of this body of research is how to deal with saver heterogeneity. In dealing with saver heterogeneity, various methods have been used to identify savers from non-savers, some of them described below. For more detailed reviews of this literature, see Bernheim (1999), Poterba, Venti, and Wise (1996), and Engen and Gale (2000).

#### *Comparing the Same Individuals or Similar Individuals Using Multiple Waves of Data*

When panel data are available, one method to control for saver heterogeneity is to follow the same households and compare the retirement and non-retirement assets of the same households over time. This method relies on the assumption that any unobserved individual-specific preferences in tastes for saving can be “differenced out” when one calculates the

change in wealth levels of the same individuals over a certain time period. Studies that have used this identification strategy include Venti and Wise (1992, 1995), and Gale and Scholz (1994). Venti and Wise (1995) estimate whether IRA contributions reduce other non-IRA financial assets, using two waves of the Survey of Income and Program Participation (SIPP) data. They find that whether households contributed to IRAs had little impact on their non-IRA financial assets.

Another strategy to identify savers is to compare households with similar characteristics, using multiple waves of cross-section data. Using data from the 1984, 1987 and 1991 waves of the SIPP, Poterba, Venti and Wise (1995) estimate the saving effects of retirement programs. They group households by whether households participated in IRA or 401(k) saving programs. They find that after controlling for age, income, education, and marital status, a family's IRA or 401(k) ownership or contribution status does not affect other non-IRA non-401(k) financial assets. Therefore, they conclude that contributions to IRAs or 401(k)s do not reduce other saving.

Engen and Gale (1995) use the 1987 and 1991 waves of the SIPP data and compare the wealth accumulations of the same comparison groups as Poterba, Venti and Wise (1995). They find that controlling for some demographics and income, 401(k)-eligible households accumulated more financial assets than other households. However, when they use a broad measure of wealth that includes net financial assets and home equity, 401(k)-eligible households did not accumulate more wealth than other households. They find similar results when comparing the wealth accumulations of IRA owners and non-owners. They argue that between 1987 and 1991, the housing value of 401(k)-eligible households rose compared to non-eligible households, but the mortgage debt level of those households rose even more. As a

result, the home equity of 401(k)-eligible households fell during that period. Their results suggest that 401(k)-eligible households substitute 401(k) assets for home equity.

### *The Eligibility Experiment*

Another identification strategy, employed by Poterba, Venti, and Wise (1995) and Engelhardt (2000), relies on the assumption that the determination of 401(k) eligibility status is exogenous and uncorrelated with the observed or unobserved household characteristics.

Poterba, Venti, and Wise (1995) estimate whether 401(k) contributions offset other conventional personal financial asset saving and IRA saving, assuming the 401(k) eligibility status is independent of households' preferences for saving, given income. Using data from the 1984, 1987, and 1991 waves of SIPP, they find little substitution between 401(k) saving and other conventional personal financial asset saving. They also find very little substitution between 401(k) saving and IRA saving. They conclude that most 401(k) contributions represent net new saving.

Using the 1992 Health and Retirement Study, Engelhardt (2000) finds results that are similar to those in Poterba, Venti, and Wise (1995), when non-401(k) pension wealth is not taken into account. However, when non-401(k) pension wealth is included in the wealth measure, he finds that the total wealth levels of eligible and non-eligible families are similar. Thus, his results suggest that families tend to substitute 401(k) pension wealth for non-401(k) pension wealth.

In an effort to reconcile the discrepancies in findings of different studies, Engen and Gale (2000) estimate the effects of 401(k) plans on household wealth. Their new econometric specification allows the impact of 401(k) to vary over both time and earnings groups. Using data from the 1987 and 1991 waves of the SIPP, they find that 401(k) contributions by low

earning groups are more likely to represent new saving than those by high earning groups. Because high earning groups hold the majorities of 401(k) balances, they estimate that only between 0 and 30 percent of 401(k) balances represents net additions to private saving between 1987 and 1991.

Given the wide range of estimates of the impact of retirement saving programs on household saving, what studies' results are closer to the "truth"? In a review of several studies, Hubbard and Skinner (1996) argue that the saving effects of retirement programs are likely to lie somewhere between the extremes of "no new saving" and "all new saving". Their conservative estimate is that 26 cents per dollar of IRA contribution represent new saving.

#### ***4.2 The Empirical Strategy to Control for Saver Heterogeneity in This Study***

To examine the issue of saver heterogeneity in this study, Table 5 presents some summary statistics of the respondents to the 2000 TIAA-CREF SPF by the ownership status of education saving instruments. Clearly, households who own education saving have quite different economic and demographic characteristics than those who do not own. Households who own education savings tend to be slightly more educated, earn higher incomes, more likely to own a home, to be married, and to have an IRA or Keogh. For example, the median 1999 household income for households who own education saving was \$100,000, compared to \$73,000 for households who do not own education saving. The difference is statistically significant at the one percent level. Not surprisingly, households who own education saving on average have more and younger children than those who do not own.

Table 5 also shows that households with education saving have slightly more net worth than those without education saving. But this does not necessarily mean that education saving instruments stimulate new saving. It is possible that there may be systematic differences

between households who own and do not own education saving. Therefore, analyses that do not take into account these fundamental differences are likely to attribute higher levels of wealth of the participant group to education saving participation and thus lead to an upward bias in the estimates of the effectiveness of education saving instruments.

Generally, panel data or multiple waves of cross-sectional data are better suited to assessing the impact of saving programs than a single wave of cross-sectional data in that they allow one to compare changes in household saving over time. However, because only one wave of the survey data is available for this study, any longitudinal, “over time” comparisons are not feasible for this paper.<sup>10</sup> Furthermore, unlike 401(k) plans, almost anyone is eligible for saving with 529 plans and Coverdells. Therefore, there is no eligibility experiment here, either.

However, whether households have an IRA or Supplemental Retirement Annuities/Group Supplemental Retirement Annuities (SRA/GSRA) may be used to identify savers.<sup>11</sup> SRAs or GSRAs are offered by TIAA-CREF and available through employers. SRAs or GSRAs provide similar tax benefits as 401(k)s. Contributions are voluntary and tax-deductible. The annual contribution limit for a SRA or GSRA account is \$11,000 in 2002 and \$12,000 in 2003. Earnings in SRAs or GRSAs grow tax-free and the entire proceeds are subject to income taxes upon withdrawal.

Because participation in an IRA or a SRA/GSRA is entirely voluntary, it may be considered a reasonable signal of taste for saving. For example, Poterba, Venti and Wise

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<sup>10</sup> Although a previous wealth survey was conducted among the Research Panel members in 1996, less than 400 members responded to both the 1996 and the 2000 surveys, not enough to conduct a longitudinal comparison. See Bodie and Crane (1997) for a paper that used data from the 1996 Survey to analyze household asset allocation decisions.

<sup>11</sup> For annuitants who had already annuitized part or all of their TIAA-CREF retirement assets, many of them no longer had existing contracts (including SRAs or GSRAs) with TIAA-CREF at the time of the survey. Therefore, the ownership status of SRA/GSRA for annuitants is determined by whether they ever owned a SRA or

(1994, 1995) use whether households participated in IRA or 401(k) saving programs as a signal of taste for saving. In addition, participation in an IRA or a SRA/GSRA is also a good signal for households' familiarity with tax-favored saving instruments. As Table 5 shows, 63.4 percent of the households who owned education saving also reported owning an IRA, compared to only 54.1 percent for households who did not own education saving.

To the extent that the ownership status of IRA or SRA/GSRA only distinguishes savers from non-savers to a certain degree, heterogeneity in individuals' propensities to save may still exist within the owner or non-owner group. Therefore, the propensity score approach is used to better control for unobserved saver heterogeneity. The propensity score approach is a recently developed technique often used to estimate the average treatment effects of program participation. The propensity score approach has successfully reduced the selection bias in many studies. For example, Dehejia and Wahba (1999) use the propensity score approach to estimate the treatment effects in observational studies. They find that the propensity score approach succeeds in replicating the treatment effects of a random experimental study presented in Lalonde (1986).

In this paper, the propensity score approach is applied as follows. In the first step, a probit model is used to estimate the propensity of household having an education savings account. In the second step, households are sorted by their estimated propensities, from lowest to highest. Households who do not own an education savings account and have an estimated propensity score higher than the maximum or lower than the minimum estimated propensity score for those who do own are discarded. In the third step, households are stratified into different strata based on their propensities to have an education savings account estimated from

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GSRA account before they annuitized their assets.



the first step. Strata with too few numbers of observations (less than 5) with education savings accounts are discarded. The strata are chosen so that the covariates are “balanced” within each stratum, i.e., no statistical differences in means of covariates among households who have and who do not have education savings account. Fourth, within-stratum robust regressions are run to estimate the impact of education saving on other household assets.

The propensity score approach greatly reduces the saver heterogeneity within each stratum in that by design, within a stratum households who have and who do not have an education savings account have similar propensities to use an education savings account and similar covariates. In other words, there is no systematic difference between those who have and who do not have an education savings account within a stratum. Therefore, the propensity score approach should provide reliable estimates.

#### 4.3 *Empirical Model and Specifications*

The empirical model to be estimated is as follows:

$$W = \alpha + \beta X + \gamma \text{Edsave\_balance} + g \quad \text{EQ (1)}$$

Where  $W$  is a wealth measure and  $\text{Edsave\_balance}$  is the aggregate balance of a household’s education saving.  $X$  is a vector of household demographic variables including respondent’s age, gender, education, marital status, household income, number of children, bequest motive, whether the respondent is an annuitant, and whether the household is covered by a defined benefit pension. For married respondents, the household income is the sum of the respondent and the spouse’s income. For other respondents, household income is set equal to the respondent’s income. The income measure includes labor income, pension and social security income, rental income, interests, dividends, and capital gains.

In the regression analysis, two wealth measures are employed as the dependent variable.

The first measure is net non-education financial assets, which is the total of non-education retirement and non-retirement assets including stock mutual funds, bond mutual funds, money market mutual funds, individual stocks, bonds, savings account, checking account, and certificate of deposit less personal loans, educational loans, and credit card balances. The second wealth measure is non-education net worth, which is the sum of net non-education financial assets and real estate equity. Real estate equity is defined as the difference between the total value of the household's primary home and other properties the household owns and the mortgage debt against these real estate properties.

## **5 Results**

### ***5.1 Using IRA Ownership to Identify Savers***

This section presents results from estimating the model described in Section 4.3. The model is estimated separately for households who own and do not own an IRA. Table 6 presents the summary statistics for the full regression sample and by IRA ownership. Table 6 indicates a higher proportion of IRA owners have an education savings accounts than non-owners. Perhaps this is related to the fact that IRA owners on average have more children in the household.

Because wealth distribution is skewed, mean regressions are often driven by outliers. Therefore, median regressions are used instead. Heteroskedasticity in the error term is corrected by estimating the standard errors using bootstrap estimation with 200 iterations.

Table 7 presents results from using net non-education financial assets as the dependent variable. The coefficient estimates of most explanatory variables have the expected signs. Not surprisingly, net non-education financial assets increase with household income and age for

both IRA owner and non-owner groups. For both groups, having an SRA/GRSA account has a positive and significant impact on net non-education financial assets. Bequest motive (measured on a 0-10 scale) seems to be positively associated with net non-education financial assets for both groups and the estimate is somewhat significant for IRA owners.

For both groups, education saving is positively associated with net non-education financial assets and the estimate is statistically significant for IRA owners. This suggests that for IRA owners, saving with education saving instruments seems to have a positive impact on other household financial assets.

Not surprisingly, having a defined benefit retirement plan has a negative and statistically significant impact on net non-education financial asset for both groups. This indicates that households who are covered by a defined benefit plan may save less in other forms.

Because there is a penalty on non-qualified withdrawals from tax-favored education saving instruments, education saving may be considered illiquid. Furthermore, education saving may be considered long-term investment because many households are saving for their young children's future college expenses, which very often will occur many years later. To the extent that both housing and education saving may be considered illiquid and long-term investment, households may increase education saving by taking out more home mortgage debt. Therefore, regressions that use wealth measures that do not include home equity may overestimate the impact of saving incentives.

To address this issue, the model is estimated using non-education net worth (the sum of net non-education financial assets and real estate equity) as the dependent variable. Results are presented in Table 8. Most parameter estimates are similar to those presented in Table 7. The

estimates of the education saving variable for both groups are still positive, yet statistically insignificant. This indicates that after real estate equity is taken into account, education saving has a negligible impact on households' non-education net worth.

## **5.2 *Using the Ownership Status of SRA/GSRA to Identify Savers***

This section presents results from estimating the model separately for SRA/GSRA owners and non-owners. Again, two wealth measures are used as the dependent variable. Table 9 presents the summary statistics for the full regression sample and by SRA/GSRA ownership. Surprisingly, the proportions of SRA/GSRA owners and non-owners who have an education savings account are almost identical. Moreover, the mean value of total education saving is higher for SRA non-owners than for owners (\$949 vs. \$471). This indicates that the saver and non-saver groups defined by the ownership status of SRA/GSRAs are somewhat different from those defined by the ownership status of IRAs.

Table 10 presents results from using net non-education financial assets as the dependent variable. The coefficient estimates of many explanatory variables are similar to those presented in Table 7. For both SRA/GSRA owner and non-owner groups, net non-education financial assets increase with income and age. For both groups, having an IRA is positively associated with net non-education financial assets. Having a defined benefit pension plan is negatively associated with net non-education financial assets and the estimate is statistically significant for SRA non-owners.

Total education saving is positively associated with net non-education financial assets and the estimate is statistically significant for SRA non-owners and somewhat significant for SRA owners. This suggests that saving with education saving instruments seem to be positively associated with other household financial assets for both groups.

Table 11 presents results from using non-education net worth as the dependent variable. Table 11 suggests that when real estate equity is taken into account, total education saving is positively associated with non-education net worth and the estimates are statistically significant for both SRA owner and non-owner groups. The estimates of most other explanatory variables are similar to those reported in Table 10.

### ***5.3 Using the Propensity Score Method to Control for Saver Heterogeneity***

The results from using the ownership status of IRA or SRA/GSRA suggest that total education saving seems to be positively associated with other household assets and the estimates are statistically significant in many cases. Specifically, total education saving has a positive and statistically significant impact on net non-education financial assets for IRA owners. However, when real estate equity is taken into account, the estimate becomes statistically insignificant. Total education saving has a positive impact on net non-education financial assets and non-education net worth for both SRA/GSRA owners and non-owners and most of the estimates are significant.

As mentioned earlier, the saver and non-saver groups defined by the IRA ownership are somewhat different from those defined by the SRA/GSRA ownership. This suggests that the ownership status of IRA or SRA/GSRA controls for saver heterogeneity only to a certain degree and potential unobserved heterogeneity in individuals' propensities to save might still exist within the owner or non-owner group.

One way to better control for unobserved saver heterogeneity is to use the propensity score approach. This section presents the results from using the propensity score approach to control for saver heterogeneity. In order to estimate the impact of education saving on household net worth, a reasonable number of households with education saving is needed.

Therefore, strata with less than 5 observations that have an education savings account are discarded. The discarded strata are those in the bottom 40 percentile of the estimated propensity score distribution.

Table 12 presents results from robust regressions within each of the remaining propensity score strata. Table 12 indicates total education saving has a positive and significant impact on other household net worth for the top two propensity score strata (Strata 4 and 5). Moreover, the estimates are consistent with those obtained from using IRA or SRA/GSRA ownership to identify savers. Because Stratum 5 has the most reasonable balance of households who own and those who do not own education savings accounts, estimates for Stratum 5 should be considered the most reliable estimates. For propensity score strata 1-3, total education saving does not seem to have a significant impact on other household net worth.

As a sensitivity analysis, the propensity score approach is applied to only households with children (365 cases, slightly less than one third of the full regression sample). Again, households are sorted into strata based on their estimated propensity to use an education savings account. The lowest stratum is discarded due to the low number of households with an education savings account (three cases).

Table 13 presents the results using the subsample of households with children. Table 13 reiterates the findings in Table 12. That is, total education saving has a positive and significant impact on other household net worth for the high propensity score strata (Strata 2 and 3). Moreover, the estimates are very similar to those in Table 12. This further confirms that the propensity score approach provides reliable and robust estimates. The estimates are especially robust for high-propensity-strata.

## 6 Concluding Remarks

Whether saving incentives increase total private and public saving has been the subject of an ongoing debate. In the last two decades, a substantial amount of research has been devoted to address this issue with a focus on the saving effects of retirement saving incentives on total household saving.

In recent years, the federal government has introduced several education saving instruments in support of saving for education expenses. As in the case of retirement saving incentives, an important public policy issue is whether these education saving instruments stimulate new saving. Because these education saving instruments are relatively new, data are not readily available. The lack of data makes it difficult to empirically estimate the saving effects of these education saving instruments.

Using wealth data from a survey of TIAA-CREF participants, this paper attempts to estimate the impact of education saving instruments on household non-education assets. In the analysis, two strategies are used to control for saver heterogeneity. The first strategy uses the ownership status of IRA or SRA/GSRA as a signal of household's taste for saving. The second strategy uses the propensity score method to control for saver heterogeneity.

Using IRA or SRA/GSRA ownership to identify savers from non-savers, median regression results suggest that education saving does not offset other household assets. In many cases, education saving seems to be positively associated with other household assets and the estimates are significant. Results from the propensity score method confirm these findings. Specifically, education saving is positively associated with other household assets for households with higher propensities to use education savings accounts.

It is not surprising that this study finds no evidence of household shifting assets from

other accounts to tax-favored education savings accounts. This is the case because if withdrawals are not used for college expenses, a ten-percent penalty as well as regular income tax is imposed on earnings. If an individual withdraws money from an education savings account for non-education purposes, the after-tax, after-penalty asset accumulation could be easily trumped by that from a tax-efficient mutual fund, assuming the same rates of return for the mutual fund and the education savings account. Therefore, if an individual anticipates that there is a high probability that withdrawals will not be used for education purposes, he/she would be unlikely to use an education savings account.

Also of considerable interest are the potential institutional responses to tax-favored education saving programs. Some researchers argue that these saving programs may have long-term impact on admission policies. For example, Olivas (2000) argue that some higher education institutions may predicate admissions on ability to pay. These programs may also present an opportunity for some institutions to raise tuition even more.

As 529 plans and Coverdells continue to grow, new data may become available. With new and hopefully better data, alternative and possibly more robust methods may be used to control for saver heterogeneity. Such methods may include using panel data to compare changes in household assets for those who own and those who do not own education savings account. State variation in 529 plans may be used to examine the impact of plan features on individuals' saving behaviors. Future research should also examine the impact of education saving instruments on national saving.



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Table 1. Key Features of the 529 Plan and Coverdell Education Savings Account

	(1) 529 Plan	(2) Coverdell Education Savings Account
Tax Benefits	Earnings federal and state income tax deferred and federal income tax free, if withdrawals are used for qualified higher education expenses. Most states exempt earnings of qualified withdrawals from state tax. Some states also allow contributions to be deducted from state income tax (usually subject to an annual limit).	Earnings federal and state income tax free, if used for qualified elementary, secondary and higher education expenses.
Is the Value of the Account <u>Excluded</u> from the Owner's Taxable Estate?	Yes.	Yes.
How Much Can Be Invested ?	Varies by state. Some states allow new contributions until the account balance reaches \$305,000.	Up to \$2,000 per year.
Qualified Education Expenses	Tuition, fees, books, supplies, room and board, and equipment at an eligible post-secondary education institution.	Same as (1) for higher education expenses. Elementary and secondary education expenses also qualify.
Financial Aid Treatment	Savings plans: parents' assets if the account is under a parent's name; prepaid plans may reduce aid dollar-for-dollar.	Student's assets.
Who Makes Investment Decision?	State sponsor with input from program manager.	Owner.
Income Restriction	No.	Yes.
Impact on Hope and Lifetime Tax Credits	Education expenses used to support tax-free distributions from a 529 plan may not be used to claim a Hope or Lifetime Learning credit.	Education expenses used to support tax-free distributions from a Coverdell may not be used to claim a Hope or Lifetime Learning credit.
Flexibility	Earnings on non-qualified withdrawals taxed at the distributee's income tax rate plus an additional 10% tax.	Earnings on non-qualified withdrawals taxed at the distributee's income tax rate plus an additional 10% tax.

Table 2. Examples of Saving for a College Education

	Type of College		
	Public two-year	Public four-year	Private four-year
<u>Current annual cost:</u>			
2001-2002 average total charges including tuition, fees, and room and board <sup>1</sup>	\$1,738	\$9,008	\$23,578
<u>Projected cost (savings goal)<sup>2</sup>:</u>			
Average cost of a four-year education (or two-year for public two-year colleges) for a student enrolling in 2019	\$8,575	\$93,438	\$244,571
Investment period (years)	18	18	18
Monthly saving needed to meet the goal <sup>3</sup>	\$22	\$240	\$630
Saving instruments may be used	Coverdell or 529 plan	529 plan or combination of 529 plan and Coverdell	529 plan or combination of 529 plan and Coverdell

Note:

- 1) Tuition and fees only for public two-year colleges. Source: *Trends in College Pricing 2001*, the College Board.
- 2) Assuming the average college costs increase by 5% per year into the future.
- 3) Assuming a 6% annual nominal rate of return for saving.

Table 3. Summary Statistics of Households from the 1998 SCF and 2000 TIAA-CREF SPF

	Median	25th percentile	75th percentile	Mean
<u>1998 SCF</u>				
<u>Financial characteristics</u>				
Household Income	\$33,000	\$17,000	\$60,000	\$52,296
Total financial assets	\$17,320	\$1,500	\$85,000	\$134,234
Total personal debt	\$1,530	\$0	\$11,000	\$9,920
Total real estate assets	\$70,000	\$0	\$140,000	\$109,063
Total mortgage debt	\$0	\$0	\$55,000	\$37,621
Total net worth	\$71,700	\$9,920	\$208,850	\$282,592
Percent own primary residence	--	--	--	66.3%
<u>Demographics</u>				
Respondent's age	46.0	35.0	61.0	48.7
Respondent's education level				
Less than high school	--	--	--	16.5%
High school or GED	--	--	--	31.9%
Some college	--	--	--	18.5%
College and above	--	--	--	33.2%
<u>2000 TIAA-CREF SPF<sup>1</sup></u>				
<u>Financial characteristics</u>				
Household Income	\$75,000	\$48,000	\$111,000	\$94,550
Total financial assets	\$336,750	\$119,117	\$859,000	\$665,330
Total personal debt	\$0	\$0	\$5,000	\$9,221
Total real estate assets	\$160,000	\$95,000	\$300,000	\$257,469
Total mortgage debt	\$15,000	\$0	\$89,000	\$62,943
Total net worth	\$467,728	\$187,375	\$1,108,500	\$837,333
Percent own primary residence	--	--	--	85.7%
<u>Demographics</u>				
Respondent's age	59.0	48.0	69.0	57.9
Respondent's education level				
High school or less	--	--	--	3.2%
Some college	--	--	--	9.1%
College graduate	--	--	--	18.9%
Master or first professional	--	--	--	35.2%
Ph.D.	--	--	--	33.4%

Source: Author's calculations based on the 1998 SCF and the 2000 TIAA-CREF SPF.

Note: 1) For 2000 TIAA-CREF SPF, financial assets and demographic information was as of December 31, 1999.

Table 4. Non-responses to Financial Asset Questions in the 2000 TIAA-CREF SPF

Type of Asset	Non- response to Ownership questions (%)	"Yes" to ownership questions (%)	Among those who answered "yes" to ownership, did not provide a value (%)	Observations with missing information (%)
	(Column 1)	(Column 2)	(Column 3)	(Column 4)
<u>Respondent's Retirement Assets</u>				
(1) TIAA-CREF Employer-Sponsored Retirement Accounts	7.2	77.8	20.6	23.2
(2) Non-TIAA-CREF Employer-sponsored Retirement Accounts	7.7	31.2	17.3	13.1
(3) IRA or KEOGH Account	7.7	44.3	10.9	12.5
(4) Other Tax-Deferred Annuities	10.2	17.8	19.8	13.7
<u>Other Financial Assets</u>				
(5) Stock mutual funds	5.8	46.8	10.6	10.7
(6) Publicly traded stock	4.1	48.2	11.5	9.6
(7) Tax-free bond mutual funds	5.8	16.0	17.9	8.7
(8) Other bond mutual funds	6.3	11.7	17.7	8.4
(9) U.S. government savings bonds	5.4	24.3	11.6	8.3
(10) Corporate bonds or foreign bonds	6.4	5.7	20.3	7.6
(11) Savings accounts	2.0	71.0	6.2	6.4
(12) Checking accounts	2.1	94.9	6.3	8.1
(13) Certificates and deposit	3.3	29.9	8.9	5.9
(14) Money market mutual funds	5.2	41.9	11.2	9.9
<u>Education Saving</u>				
(15) Education IRA	16.3	3.9	11.9	16.8
(16) 529 Savings plan	16.0	2.0	7.0	16.2
(17) 529 Prepaid contract	16.0	0.5	15.4	16.0

Source: Author's calculations based on the 2000 TIAA-CREF SPF data.

Total number of respondents: 2,793.

Table 5. Summary Statistics of Respondents to the 2000 TIAA-CREF SPF  
by Ownership of Education Saving

	Own at least one of the three types of education savings accounts (171 cases)	Do not own any education savings accounts (2,347 cases)
<i>Median</i>		
Respondent's age (years)	52.0	59.0 **
Household 1999 income	\$100,000	\$73,000 ***
Household net non-education financial assets	\$346,493	\$332,500
Household non-education net worth	\$473,000	\$465,000
Number of children the household is financially responsible for	1	0 ***
Age of oldest child in the household	8.0	13.0 ***
<i>Mean</i>		
Respondent's age (years)	55.3	57.6 **
Household 1999 income	\$119,390	\$93,995 **
Household net non-education financial assets	\$680,093	\$664,998
Household non-education net worth	\$892,684	\$832,778
Number of children the household is financially responsible for	1.00	0.45 ***
Age of oldest child in the household	7.6	12.5 ***
Percent with a Ph.D. degree	38.2%	34.4%
Percent own home	92.9%	85.2% ***
Percent with IRA or Keogh	63.4%	54.1% **
Percent with supplemental pension	46.0%	43.4%
Percent married	82.5%	65.0% ***

Note: \*\* indicates the medians (means) of the two groups are statistically different at the 5% level.

\*\*\* indicates the medians (means) of the two groups are statistically different at the 1% level.

Table 6. Summary Statistics of Dependent and Explanatory Variables

Variable	By IRA Ownership				Full Regression Sample	
	Own		Do Not Own		Sample	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Non-education Net worth (in \$000's)	1044.482	1063.457	543.162	839.841	803.928	994.371
Net non-education financial assets (in \$000's)	850.548	939.772	406.805	679.972	637.621	854.347
Education saving (in \$000's)	1.230	9.822	0.231	1.660	0.751	7.191
Respondent's age <sup>1</sup>						
45-54	0.243	0.429	0.242	0.429	0.243	0.429
55-64	0.237	0.426	0.181	0.386	0.210	0.408
65 and older	0.274	0.446	0.252	0.435	0.263	0.441
Respondent is male	0.576	0.495	0.557	0.497	0.567	0.496
Household income (in \$000's)	108.802	112.936	77.532	78.905	93.798	99.291
Respondent's education <sup>2</sup>						
Master's degree	0.388	0.488	0.329	0.470	0.360	0.480
Doctorate degree	0.340	0.474	0.316	0.465	0.329	0.470
Respondent is an annuitant	0.229	0.421	0.249	0.433	0.239	0.426
Other household variables						
Has an SRA/GSRA	0.447	0.498	0.379	0.486	0.414	0.493
Covered by a DB plan	0.348	0.476	0.298	0.458	0.324	0.468
Number of children	0.448	0.852	0.623	1.020	0.532	0.940
Bequest motive	4.711	3.269	4.890	3.330	4.797	3.298
Respondent's marital status <sup>3</sup>						
Single	0.157	0.364	0.201	0.401	0.178	0.383
Divorced	0.099	0.299	0.125	0.331	0.111	0.315
Widowed	0.043	0.202	0.051	0.220	0.047	0.211
Percent owning a Coverdell, a 529 savings, or a 529 prepaid account	0.071	0.258	0.046	0.210	0.059	0.236
Number of Observations	658		607		1265	

Note:

- 1) The reference group consists of those respondents who are younger than 45.
- 2) The reference group consists of those respondents with a college degree or less.
- 3) The reference group consists of those respondents who are married.



Table 7. Median Regression Estimates by IRA Ownership Status  
 Dependent Variable: Net Non-education Financial Assets

Explanatory Variable	IRA Ownership					
	Own			Do Not Own		
	Coefficient	Standard Error	Pr >  t	Coefficient	Standard Error	Pr >  t
Total education saving	5.553	2.721	0.042	10.859	10.808	0.315
Respondent's age						
45-54	198.766	58.879	0.001	103.189	26.457	0.000
55-64	422.272	67.675	0.000	311.243	61.304	0.000
65 and older	548.297	90.015	0.000	475.196	66.590	0.000
Respondent is male	129.881	43.938	0.003	18.817	20.758	0.365
Household income	3.471	0.912	0.000	3.349	0.989	0.001
Respondent's education <sup>2</sup>						
Master's degree	74.682	50.279	0.138	-6.428	20.332	0.752
Doctorate degree	155.424	70.704	0.028	34.968	31.145	0.262
Respondent is an annuitant	-82.818	73.102	0.258	-141.594	60.170	0.019
Other household variables						
Has an SRA/GSRA	135.517	41.603	0.001	57.015	24.088	0.018
Covered by a DB plan	-98.677	41.094	0.017	-64.311	23.796	0.007
Number of children	3.391	33.515	0.919	7.986	11.315	0.481
Bequest motive	11.582	7.236	0.110	3.166	2.448	0.196
Respondent's marital status <sup>3</sup>						
Single	53.758	64.898	0.408	57.465	33.338	0.085
Divorced	-125.311	63.726	0.050	-2.679	42.346	0.950
Widowed	87.716	107.929	0.417	-57.123	58.336	0.328
Constant	-258.595	73.870	0.000	-189.379	61.329	0.002
Pseudo R-squared		0.248			0.255	
Number of Observations		658.000			607.000	

Note: Standard errors are bootstrapped with 200 iterations.

Table 8. Median Regression Estimates by IRA Ownership Status  
 Dependent Variable: Non-education Net Worth

Explanatory Variable	IRA Ownership					
	Own			Do Not Own		
	Coefficient	Standard Error	Pr >  t	Coefficient	Standard Error	Pr >  t
Total education saving	6.480	5.269	0.219	10.859	11.422	0.342
Respondent's age						
45-54	316.490	66.325	0.000	103.189	27.820	0.000
55-64	566.248	83.876	0.000	311.243	57.901	0.000
65 and older	731.023	90.442	0.000	475.196	69.941	0.000
Respondent is male	141.981	52.787	0.007	18.817	17.625	0.286
Household income	4.119	1.127	0.000	3.349	0.860	0.000
Respondent's education <sup>2</sup>						
Master's degree	111.187	56.957	0.051	-6.428	19.727	0.745
Doctorate degree	162.612	78.517	0.039	34.968	28.265	0.217
Respondent is an annuitant	-19.477	83.469	0.816	-141.594	59.597	0.018
Other household variables						
Has an SRA/GSRA	178.298	54.753	0.001	57.015	24.482	0.020
Covered by a DB plan	-116.012	50.519	0.022	-64.311	24.223	0.008
Number of children	4.087	35.706	0.909	7.986	10.296	0.438
Bequest motive	18.604	8.809	0.035	3.166	2.588	0.222
Respondent's marital status <sup>3</sup>						
Single	30.548	71.989	0.671	57.465	34.433	0.096
Divorced	-149.417	83.689	0.075	-2.679	41.091	0.948
Widowed	34.226	140.933	0.808	-57.123	58.533	0.330
Constant	-331.607	103.815	0.001	-189.379	54.773	0.001
Pseudo R-squared		0.270			0.255	
Number of Observations		658.000			607.000	

Note: Standard errors are bootstrapped with 200 iterations.

Table 9. Summary Statistics of Dependent and Explanatory Variables

Variable	By SRA/GSRA Ownership				Full Regression Sample	
	Own		Do Not Own		Sample	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Non-education Net worth (in \$000's)	924.168	1092.158	718.900	910.182	803.928	994.371
Net non-education financial assets (in \$000's)	743.893	939.874	562.471	780.249	637.621	854.347
Education saving (in \$000's)	0.471	3.623	0.949	8.885	0.751	7.191
Respondent's age <sup>1</sup>						
45-54	0.250	0.433	0.238	0.426	0.243	0.429
55-64	0.198	0.399	0.219	0.414	0.210	0.408
65 and older	0.225	0.418	0.290	0.454	0.263	0.441
Respondent is male	0.544	0.499	0.583	0.493	0.567	0.496
Household income (in \$000's)	100.456	99.463	89.089	98.966	93.798	99.291
Respondent's education <sup>2</sup>						
Master's degree	0.355	0.479	0.363	0.481	0.360	0.480
Doctorate degree	0.336	0.473	0.324	0.468	0.329	0.470
Respondent is an annuitant	0.158	0.365	0.296	0.457	0.239	0.426
Other household variables						
Has an IRA	0.561	0.497	0.491	0.500	0.520	0.500
Covered by a DB plan	0.323	0.468	0.325	0.469	0.324	0.468
Number of children	0.529	0.938	0.534	0.942	0.532	0.940
Bequest motive	4.908	3.281	4.748	3.310	4.797	3.298
Respondent's marital status <sup>3</sup>						
Single	0.179	0.384	0.177	0.382	0.178	0.383
Divorced	0.105	0.307	0.116	0.321	0.111	0.315
Widowed	0.038	4.821	0.053	0.223	0.047	0.211
Percent owning a Coverdell, a 529 savings, or a 529 prepaid account	0.0592	0.2361	0.0594	0.2365	0.0593	0.2363
Number of Observations	524		741		1265	

Note:

- 1) The reference group consists of those respondents who are younger than 45.
- 2) The reference group consists of those respondents with a college degree or less.
- 3) The reference group consists of those respondents who are married.

Table 10. Median Regression Estimates by SRA/GSRA Ownership Status  
 Dependent Variable: Net non-education Financial assets

Explanatory Variable	SRA/GSRA Ownership					
	Own			Do Not Own		
	Coefficient	Standard Error	Pr >  t	Coefficient	Standard Error	Pr >  t
Total education saving	19.461	12.759	0.128	5.704	2.586	0.028
Respondent's age						
45-54	174.266	50.506	0.001	119.547	28.422	0.000
55-64	526.887	91.981	0.000	298.150	51.675	0.000
65 and older	808.783	154.705	0.000	449.203	60.519	0.000
Respondent is male	97.545	38.312	0.011	23.441	18.987	0.217
Household income	4.049	1.382	0.004	2.860	0.772	0.000
Respondent's education <sup>2</sup>						
Master's degree	13.354	40.578	0.742	39.874	25.280	0.115
Doctorate degree	99.337	73.087	0.175	82.344	32.122	0.011
Respondent is an annuitant	-166.672	144.350	0.249	-102.114	50.565	0.044
Other household variables						
Has an IRA	141.057	39.432	0.000	133.961	25.738	0.000
Covered by a DB plan	-31.770	48.722	0.515	-85.668	24.119	0.000
Number of children	-6.450	22.351	0.773	0.899	13.962	0.949
Bequest motive	5.619	6.272	0.371	7.705	2.880	0.008
Respondent's marital status <sup>3</sup>						
Single	80.574	60.783	0.186	36.832	39.108	0.347
Divorced	-26.046	88.076	0.768	-56.097	35.198	0.111
Widowed	-51.430	157.248	0.744	-38.469	57.526	0.504
Constant	-297.439	108.130	0.006	-185.444	48.093	0.000
Pseudo R-squared		0.294			0.276	
Number of Observations		524.000			741.000	

Note: Standard errors are bootstrapped with 200 iterations.

Table 11. Median Regression Estimates by SRA/GSRA Ownership Status  
 Dependent Variable: Non-education Net Worth

Explanatory Variable	SRA/GSRA Ownership					
	Own			Do Not Own		
	Coefficient	Standard Error	Pr >  t	Coefficient	Standard Error	Pr >  t
Total education saving	25.411	15.320	0.098	6.190	2.738	0.024
Respondent's age						
45-54	281.438	60.139	0.000	153.994	39.615	0.000
55-64	630.262	89.600	0.000	397.628	56.849	0.000
65 and older	942.358	149.970	0.000	574.394	63.820	0.000
Respondent is male	98.371	43.115	0.023	39.231	29.331	0.181
Household income	4.802	1.489	0.001	4.207	1.135	0.000
Respondent's education <sup>2</sup>						
Master's degree	19.526	49.788	0.695	68.008	31.335	0.030
Doctorate degree	142.515	78.821	0.071	98.484	43.687	0.024
Respondent is an annuitant	-78.273	128.859	0.544	-96.857	57.587	0.093
Other household variables						
Has an IRA	180.751	51.217	0.000	172.117	34.098	0.000
Covered by a DB plan	-27.206	58.012	0.639	-116.607	30.960	0.000
Number of children	3.490	25.240	0.890	-7.758	18.330	0.672
Bequest motive	12.680	7.139	0.076	7.625	3.928	0.053
Respondent's marital status <sup>3</sup>						
Single	118.639	72.100	0.100	6.973	51.340	0.892
Divorced	-61.597	88.419	0.486	-64.798	47.706	0.175
Widowed	-84.079	191.382	0.661	-115.048	68.197	0.092
Constant	-387.224	122.123	0.002	-227.520	68.632	0.001
Pseudo R-squared		0.3239			0.2903	
Number of Observations		524			741	

Note: Standard errors are bootstrapped with 200 iterations.

Table 12. Robust Regression Estimates Within Propensity Score Stratum  
 Dependent Variable: Non-education Net Worth

Explanatory Variable	Stratum 1	Stratum 2	Stratum 3	Stratum 4	Stratum 5
Total education saving	-0.800 (8.886)	33.378 (22.766)	-1.630 (3.227)	43.720 (5.792)	6.987 (1.612)
Respondent's age					
45-54	137.424 (116.349)	284.086 (147.428)	131.981 (128.090)	514.630 (120.373)	117.176 (61.603)
55-64	334.479 (112.218)	505.351 (146.733)	420.808 (153.895)	1000.985 (175.217)	574.172 (139.212)
65 and older	568.080 (119.067)	1122.364 (145.528)	889.738 (163.574)	1602.332 (189.815)	315.813 (297.402)
Respondent is male	183.186 (65.856)	-94.846 (90.872)	214.522 (111.123)	166.300 (84.128)	97.101 (59.423)
Household income	7.492 (0.466)	2.265 (0.245)	6.192 (0.870)	1.171 (0.282)	4.156 (0.362)
Respondent's education <sup>2</sup>					
Master's degree	-52.866 (75.267)	-27.975 (100.989)	-76.745 (122.333)	133.015 (90.734)	9.418 (71.019)
Doctorate degree	90.631 (77.299)	145.729 (104.068)	-233.562 (124.768)	24.053 (105.587)	26.835 (71.649)
Respondent is an annuitant	10.668 (88.019)	-359.587 (118.841)	-149.138 (144.527)	-812.914 (184.435)	1172.186 (369.222)
Other household variables					
Has an IRA	204.630 (86.250)	237.669 (112.528)	496.727 (165.217)	191.161 (121.449)	116.935 (73.718)
Has an SRA/GSRA	171.909 (62.528)	184.538 (76.265)	168.087 (92.100)	77.488 (76.583)	117.145 (54.699)
Covered by a DB plan	-132.100 (64.673)	22.728 (79.958)	-110.346 (94.594)	-87.377 (74.608)	-90.475 (54.713)
Number of children	100.496 (101.888)	68.385 (85.665)	105.115 (94.173)	60.098 (56.592)	15.151 (40.904)
Bequest motive	28.097 (19.915)	18.675 (23.369)	12.485 (19.704)	22.126 (18.070)	-4.947 (10.231)
Respondent's marital status <sup>3</sup>					

Single	-35.388 (144.566)	-89.058 (214.701)	dropped	157.695 (353.224)	dropped
Divorced	-85.597 (154.525)	-49.300 (235.296)	-241.135 (376.450)	dropped	315.586 (304.061)
Widowed	48.988 (185.194)	133.810 (536.131)	dropped	dropped	dropped
Constant	-664.085 (151.256)	-264.749 (206.924)	-625.249 (214.536)	-365.156 (189.813)	-245.880 (149.174)
F-statistics	30.15	15.64	14.99	31.03	21.30
Number of Observations	253	195	104	96	125
Number of Observations with an education savings account	5	10	15	12	25

Note: The first stage probit model includes the following covariates: a dummy variable for household owning an IRA, age, age squared, the number of kids in the household, bequest motive, a dummy variable indicating the respondent is married, and an interaction term of the number of kids and bequest motive. Results from the probit model are not sensitive to the addition of other covariates.

Table 13. Robust Regression Estimates Within Propensity Score Stratum  
Including Only Households with Children in the Analysis  
Dependent Variable: Non-education Net Worth

Explanatory Variable	Stratum 1	Stratum 2	Stratum 3
Total education saving	19.105 (29.630)	63.864 (13.440)	6.666 (1.469)
Respondent's age			
45-54	120.958 (133.670)	182.047 (133.913)	144.011 (72.945)
55-64	552.632 (253.275)	278.244 (189.202)	dropped
65 and older	1211.519 (357.479)	dropped	dropped
Respondent is male	-83.223 (93.673)	135.956 (74.563)	51.762 (68.098)
Household income	3.372 (0.920)	1.191 (0.220)	4.330 (0.357)
Respondent's education <sup>2</sup>			
Master's degree	44.676 (114.485)	185.003 (87.852)	-0.595 (80.848)
Doctorate degree	39.580 (112.901)	87.583 (95.765)	18.004 (77.512)
Respondent is an annuitant	dropped	1412.520 (369.338)	dropped
Other household variables			
Has an IRA	355.351 (205.025)	406.870 (141.415)	117.019 (88.270)
Has an SRA/GSRA	194.686 (99.469)	-22.755 (65.994)	99.548 (58.624)
Covered by a DB plan	-54.315 (103.928)	-68.183 (72.293)	-107.001 (56.576)
Number of children	-46.238 (65.245)	-59.692 (44.004)	57.746 (40.719)
Bequest motive	12.757 (18.554)	-8.072 (15.219)	1.060 (10.168)



Respondent's marital status <sup>3</sup>			
Single	-419.492 (298.516)	289.475 (360.191)	dropped
Divorced	-75.292 (261.743)	dropped	dropped
Widowed	dropped	dropped	dropped
Constant	-41.174 (274.015)	114.553 (153.946)	-346.402 (120.001)
F-statistics	9.25	19.42	23.90
Number of Observations	60	118	91
Number of Observations with an education savings account	9	10	30

Note: The first stage probit model includes the following covariates: a dummy variable for household owning an IRA, age, age squared, household income, respondent's education, the number of kids in the household, bequest motive, a dummy variable indicating the respondent is married, and an interaction term of the number of kids and bequest motive. Results from the probit model are not sensitive to the addition of other covariates.