RETIREMENT PLANS AND SAVING DECISIONS:

THE ROLE OF INFORMATION AND EDUCATION

Robert L. Clark
Professor
North Carolina State University

Madeleine B. d'Ambrosio
Executive Director
TIAA-CREF Institute

Ann A. McDermed
Associate Professor Emeritus
North Carolina State University

Kshama Sawant
Visiting Assistant Professor
Washington and Lee University

We acknowledge the cooperation of numerous consultants in TIAA-CREF Client Services who administered the surveys in conjunction with seminars around the country. We would like to thank Pirie McIndoe, Al Gonzalez and Brian Usischon, TIAA-CREF Raleigh-Durham Office, for their assistance in pre-testing the survey and Robert Romano, TIAA-CREF Sales Support, for his efforts in coordinating the integration of the surveys with the financial education seminars. Paul Mulvey played a major role in the design of the survey. Juanita Kreps contributed to the development of the overall project. Research on this project by Clark and Sawant has been supported by a grant from the TIAA-CREF Institute.

Defined contribution plans have become the dominant form of private employer-sponsored retirement plans in the United States. In defined contribution plans, such as 401(k) plans, the responsibility of ensuring adequate financial preparedness for retirement rests primarily on workers themselves. Individuals must decide when to start saving, how much to save, and how to invest their account balances. Participants in defined benefit plans must also decide whether their basic retirement plan will provide sufficient income in retirement or whether they need to contribute to a supplemental plan. Recent studies have shown that many individuals have limited knowledge of financial markets, the level of risks associated with specific assets, and how much they need to save to achieve their retirement income goals. Survey results suggest that after completing a financial education program, individuals are likely to reevaluate their lifetime plans for work, retirement, saving, and consumption.

The need for financial education to improve the level of financial literacy of individuals is an important policy issue facing our society. Federal Reserve Chairman, Alan Greenspan (2002) commented that helping Americans understand basic concepts about budgeting and financial markets through financial education programs should enable them to make more appropriate short and long-term saving decisions. Greenspan stated that

> …education can play a critical role by equipping consumers with the knowledge required to make wise decisions when choosing among the myriad of financial products and providers. …. Having these basic financial planning skills can help families to meet their near-term obligations and to maximize their longer-term financial well being. While data available to measure the efficacy of financial education are not plentiful, the limited research is encouraging.

It seems obvious that increased financial awareness would be beneficial to workers planning for retirement. Employer-sponsored education programs can play a

major role in disseminating specific information in order to increase the knowledge related to retirement planning. Few empirical studies have explored the effectiveness of the various education programs in filling the crucial information gaps. A primary objective of the current study is to examine the impact of financial education on individuals' awareness of the savings process and of their specific retirement goals. We explore how individuals alter their stated goals on retirement age and income, how they modify their investment choices in their retirement accounts, and how they change their desired saving behavior.

SETTING RETIREMENT GOALS

Economic life-cycle models explain how individuals divide their time between work and leisure including a period of retirement at the end of life. They predict the age of retirement, annual saving rates, the level of retirement income subject to individual and household characteristics, and other factors such as returns on investments. To finance consumption during nonworking years, individuals save a portion of their earnings earlier in life. They decide on the optimal path of earnings and saving that will achieve their desired level of consumption in each period of their expected life. These consumption and saving decisions determine retirement income at their chosen retirement ages.

In order to get predictions from the life-cycle models, researchers often make simplifying assumptions such as:

- Individuals know their lifetime path of annual earnings and the amount of retirement income needed to provide the desired levels of consumption in retirement.

- Individuals know rates of return on various types of investments, present value calculations, and the process of compounding returns.
- There is either a known rate of return on a single investment possibility, or several different assets are available, and individuals know the risk and return characteristics of the various assets.
- The age of retirement is exogenous and fixed.
- Current and future tax rates are known with certainty.

In a model with such assumptions, the primary choice facing individuals is to select the savings rate that yields the desired pattern of annual consumption while working and in retirement. In reality, however, individuals may lack knowledge of the saving process and have incorrect assessments of potential rates of return on various assets. Individuals select retirement goals and objectives such as the age of retirement and the desired level of retirement income based on their current knowledge. If new information becomes available, individuals should review their choices and alter their behavior. The result of any reassessment could be changes in retirement goals or changes in retirement saving behavior.

DOES FINANCIAL EDUCATION INFLUENCE RETIREMENT SAVING?

A lack of financial education may cause workers to start saving too late in life to realize their stated retirement goals. As a result, they are unlikely to achieve an optimal balance between current consumption while working and future consumption in retirement. In addition, a lack of information concerning the risk-return distribution of various investments might lead them to misallocate their retirement portfolios. Bernheim

(1998) presents evidence that questions whether the typical household has enough financial literacy to make appropriate saving decisions in their pension plans.

Recognizing this lack of financial knowledge, some employers now offer financial education programs for their employees.[1] Employer-provided financial information consists of written communications explaining company retirement saving options, general information about financial markets and economic conditions, and financial education or retirement seminars led by in-house staff, pension providers, or third party experts. Other firms provide subsidies for their employees to hire a financial advisor to develop a financial plan.

Relatively few studies have attempted to estimate the effectiveness of financial education programs in altering retirement goals or retirement savings behavior. Using data from the KPMG Peat Marwick Retirement Benefits Survey, Bayer, Bernheim, and Scholz (1996) estimated that workers employed by firms that offered financial education programs had higher participation rates in and contribution rates to 401(k) plans compared to firms that did not provide this type of program. Their analysis indicated that seminars were the most effective type of communication.[2] Clark and Schieber (1998) examined employment records gathered by Watson Wyatt Worldwide from 19 firms covering over 40,000 employees. They found that company-provided written communications played a significant role in increasing the probability of participating in a 401(k) plan and in increasing the contribution rate to that plan.[3]

Madrian and Shea (2001) examined the administrative records of a large employer in the health care and insurance industry. The only retirement plan offered by this company is its 401(k) plan. In 2000, the company offered one-hour financial

education seminars at 42 different sites. Madrian and Shea reviewed participation and saving behavior in the 401(k) plan before and after the seminar. Their estimates indicated that attendees tended to have increased rates of participation in the 401(k) plan and they tended to have greater diversification in their retirement plan portfolios. Lusardi (2000) used data from the Health and Retirement Survey to examine the role of planning and the lack of financial literacy in retirement saving. She found that individuals who did not plan for retirement have lower net wealth and were less likely to invest in assets with higher expected returns such as equities.

The general conclusion of this limited literature is that financial education provided by employers can increase retirement saving and potentially alter the investment allocation of assets in retirement accounts. The precise mechanism by which education alters retirement saving and investment decisions is unclear. Maki (2004) provides three possibilities. First, financial education could increase household saving by causing the family to reduce its discount rate. Second, increased knowledge could lead the household to become less risk averse and thus increase investment in assets with a greater level of risk and expected return. Finally, financial education programs could change the household's knowledge of its investment choice set. For example, the information may reveal to workers that it is impossible to achieve the current goal of retiring at a specific age with a certain level of income using their existing saving and investment strategy. Maki dismisses the first two possibilities and argues that greater knowledge of what is possible is the primary mechanism through which these programs alter household decision-making.

We assess the impact on the intended and actual retirement goals and retirement saving behavior of participation in financial education seminars offered by TIAA-CREF. After participating in a seminar that provides an overview of the retirement saving process, do individuals intend to revise their retirement goals and modify their saving behavior? More importantly, do respondents actually follow through and make the desired changes in their plan of saving for retirement? The answers to these questions are explored by analyzing the data from three participant surveys using a series of logit models.

TIAA-CREF FINANCIAL EDUCATION SEMINARS

The Client Services division of TIAA-CREF conducts Financial Education Seminars at educational institutions and other non-profit organizations across the United States. Seminars are open to all employees of these institutions. Thus, participants at colleges and universities may include administrative, technical, clerical and service workers as well as faculty. Seminar attendees may participate in a defined contribution plan offered by TIAA-CREF or another pension provider, or in a defined benefit plan. Seminars are also given in community settings with participants coming from many different institutions.

The seminars are aimed at audiences in different lifestages including newly hired employees, mid-career workers, and pre-retirees. In addition, there are special seminars developed for female employees. The objective of all of these seminars is to provide financial information that would assist individuals in the retirement planning process. Consultants discuss retirement goals such as the amount of money needed in retirement to maintain the same level of consumption as during the working years and the

relationship between the age of retirement and the annual amount of saving needed to achieve the retirement income goal. Consultants also devote considerable time in the seminars to examining the risk-return characteristics of alternative investments. Although they differ somewhat in content, all of the seminars provide this basic information concerning retirement saving and retirement income goals.

The analysis is based on the response of individuals to participation in a single financial education seminar. Some of the participants had engaged in other forms of financial education or had attended previous seminars. Prior financial education activities are used as control variables in this analysis. Participation in multiple seminars or other forms of educational events have been found to have positive effects on participation rates in 401(k) plans (Bayer, et al, 1996).

RESEARCH METHODOLOGY

The lifecycle hypothesis predicts that individuals select the retirement age and the level of consumption each period before and after retirement to maximize lifetime utility Throughout their working careers, individuals make work, saving and investment decisions so as to achieve these objectives. Optimal decision making requires that they understand the saving process, the expected risk-return distribution of various investments, and the magnitude of annual saving necessary to accumulate sufficient wealth to retire at the expected age with the desired level of income. Without this knowledge base, individuals are likely to form goals that are unrealistic and find themselves with inadequate saving at retirement. When new information is incorporated into to the individual's information set, he or she will re-optimize and revise the lifetime

plan for consumption and saving. In principle, this could lead to individuals increasing or decreasing their saving rate.

A Lifecycle Model for Retirement Planning

The lifecycle model, based on the widely accepted permanent income lifecycle hypothesis, has been the framework used most often to explain intertemporal choices regarding time allocations between work and leisure and income allocations between consumption and saving. The hypothesis predicts that individuals are averse to income fluctuations and engage in consumption smoothing. Some of the most important long-term decisions made by individuals are related to retirement. The lifecycle model has been used extensively to explain how individuals make retirement-related decisions by smoothing consumption across working and retirement years.

The central predictions of the lifecycle model rest on the assumptions that individuals are far-sighted and rational, and that they are correctly informed about the various factors that determine wealth accumulation. The model implies that the saving decisions of different individuals reflect their rationality and knowledgeable status, given their preferences and other exogenous factors. That is, if people with similar socio-economic conditions are observed to have different saving rates, the model predicts that those differences can be attributed to differences among the individuals in rates of time preference, health, and desires for leisure. Recent empirical evidence suggests otherwise. Bernheim et al (2001) find that such differences among individuals cannot easily be accounted for in the lifecycle model framework. Rather, the evidence seems to suggest that individuals may be boundedly rational, dynamically inconsistent, and making saving decisions by rule-of-thumb. Their evidence suggests that individuals who follow rule-of-

thumb procedures may not be adequately prepared for retirement and the inadequacy of saving can come as bad news to them when they retire. This leads us to ask the following question. Is the rule-of-thumb behavior caused by, among other things, lack of or faulty information? Further, if correct information is provided before retirement, do individuals updated their saving behavior?

A version of the standard lifecycle model is adopted for this analysis. In this model an individual makes forward-looking optimal choices of consumption for every period by maximizing lifetime utility. The model has two specific objectives. First, it incorporates into the standard lifecycle model the process by which most people think about their retirement in the real world. Data from seminars disseminating financial education show that most Americans desire to have retirement consumption be equal to that in the last years prior to retirement. This is a slight departure from the classroom version of the lifecycle model, in which, over the individual's lifetime, income follows a hump-shaped profile, and consumption is flat. We assume that wage income and consumption are rising during working years, and during retirement, earnings are zero and consumption, financed by pre-retirement savings is equal to a predetermined proportion of pre-retirement income.

Second, we illustrate the process by which an individual incorporates new information into the optimization framework. The formation of the optimal consumption values depends on the individual's knowledge of the various external factors governing the optimization problem, such as the interest rates on various assets. If people preparing for retirement are not correctly informed of all the relevant factors or are not completely knowledgeable of the nature of the retirement savings process, it follows that they will

not achieve their retirement objectives. If individuals acquire new knowledge in some period of their working lives, they will re-solve the optimization problem with the new parameter values.

In our model, we take into account the fact that both the consumption desired in retirement, and the desired retirement age, are explicit choices people make in retirement planning. Because the year of retirement is a highly non-linear choice, the optimization problem cannot be solved analytically. Therefore, a discrete model was developed and simulations were run to provide baseline choices of work, saving and consumption. The individual was then assumed to update their knowledge base and to remaximize their lifecycle model. Results clearly revealed changes in retirement goals and saving behavior following an educational event.

Our empirical model assumes that the individual desires a level of consumption during the retirement years that is similar to consumption in the immediate pre-retirement years. This assumption is consistent with survey responses of individuals concerning their retirement income goals and also matches the basic structure of many pension plans. In this model, the individual selects a level of consumption that is a fraction θ of the wage income in the last working period R. Thus, consumption in each period is $C_t = \theta W_R$, for t>R. θ is selected by the individual as part of the optimization process. T is the last period the individual is alive, e.g. all individuals are assumed to die with certainty at the end of period T.[4] Thus, an individual saves enough to finance consumption of θW_R every period from R+1 to T. Implications of this model are shown in Figure 1.

[Figure 1]

Assume the individual's lifetime utility function is

$$U = \sum_{t=1}^{T} u_t(C_t, L_t) / (1 + p)^{t-1}, \text{ where} \qquad (1)$$

u_t is the per-period utility. C_t is the per-period (or annual) consumption. We assume consumption smoothing in retirement, so that $C_t > 0$ for $t \leq R$, and $C_t = C_R$ for $t > R$. L_t is the per-period leisure choice. $(1 - L_t)$ is the fraction of the period (year) allocated to non-work activities. We assume that L_t is exogenous and constant during working years.

$L_t = \mathbf{L}$, $0 \leq \mathbf{L} < 1$ for $t \leq R$, and $L_t = 1$ if $t > R$.

The individual faces an income constraint

$$M = A_0 + \sum_{t=1}^{R} \frac{W_t \cdot (1 - L_t)}{(1+r)^{t-1}} = \sum_{t=1}^{T} \frac{C_t}{(1+r)^{t-1}} .$$

p = the individual's impatience rate

T = number of years in the planning horizon

A_0 = initial value of assets

W_t = full annual wage at t

g = the growth rate of wages, $W_t = W_0 \cdot (1+g)^{t-1}$

r_S = the return on stocks, the risky asset

r_B = the return on bonds, the non-risky asset

d = the fraction of assets invested in stocks (a decreasing function of the individual's degree of risk aversion)

r = the effective return on investments, $r = d \cdot r_S + (1-d) \cdot r_B$.

This model can be simulated for a fixed value of T, with a standard utility function and parameter values, to find how the optimal choices are altered when there are information updates.

The Role of Information in Retirement Planning

The individual solves the optimization problem given current information. If new information is received, the retirement goals based on prior optimization will change. Information is multi-dimensional, and there are several ways that it could enter the problem of optimal planning for retirement. New information might influence the optimal choices through changes in parameters of the specific utility functions, such as the relative weights on C and L. Information could also prompt the individual to alter investment strategies, which would imply an update in the effective return on saving, r. Information could cause the individual to alter her impatience rate.

A higher effective interest rate would increase saving in the early periods relative to the later periods in the individual's lifetime. On the other hand, a higher impatience rate would cause the individual to want to consume more (and hence save less) in the earlier periods, and consume less in the later periods. Thus, how the optimal solution changes when new information is received will depend on the specific channel of information update, and on the set of parameters the individual uses in order to optimize. For instance, if the individual discovers that r_S is lower than previously known, then she can choose to keep θ unchanged, and retire later, or reduce θ to an extent that allows her to maintain the previous optimal value of R.

Another example of changes in the optimal choices occurs when new and better information increases the understanding of the individual about the riskiness of different savings instruments. This enhanced understanding could either increase or decrease the individual's risk aversion, and accordingly, result in either a lower or higher value of the parameter, d. This process by which new information is incorporated into retirement

decision-making can be demonstrated by performing simple computer simulations and can be estimated if appropriate data are available. This study uses the responses of participants in TIAA-CREF Financial Education Seminars to measure the effect of new financial education on the desired age of retirement, the desired level of retirement consumption, and saving behavior. The primary objective is to determine if participants altered their goals and behavior based on the information presented at the seminars.

Survey Content and Procedures

The analysis of retirement saving is based on information obtained in three surveys of participants in TIAA-CREF Financial Education Seminars.[5] Survey One is given to participants at the beginning of the seminar, Survey Two is completed at the end of the seminar before participants leave the room, and Survey Three is sent to participants several months later.[6] Survey One asks participants to indicate the age at which they hope to retire and the annual retirement income as the percent of their final working year's earnings that they hope to have in retirement. Respondents are asked to indicate the likelihood that they will achieve this goal, how strongly committed they are to this goal, and whether other priorities might make it difficult for them to attain this goal. Survey One provides demographic information and baseline data on the participants' retirement goals and savings behavior prior to the seminar.

After completing Survey One, individuals participate in the financial education seminar for approximately one hour. These seminars include information on setting retirement goals, employer-provided savings plans, the risk and return properties of various assets, and the amount of annual saving needed to achieve specific retirement income objectives. At the conclusion of the seminar, participants are asked to complete

Survey Two. In this survey, respondents are asked to indicate whether, based on the information provided in the seminar, they have changed their retirement age goals or revised the level of retirement income they desire. In addition, individuals are asked whether they intend to change their allocation of invested funds in their basic defined contribution plan. Respondents with a supplemental retirement plan are asked if they intend to increase their contributions or change their investment allocations. Individuals who do not have a supplemental plan are asked if they plan to establish one.

The research project is based on seminars conducted from March 2001 to May 2002. A total of 36 seminars at 24 institutions along with 24 community-based seminars in eight different locations are included in the analysis. A total of 633 usable responses in which participants completed both Survey One and Survey Two have been obtained.[7] The responses to Survey One and Survey Two of these respondents are described below. We received 110 completed Survey Three questionnaires or only 17 percent of the 633 respondents who completed Surveys One and Two. The substantial decline in the number of respondents is due to several factors including: (1) not all respondents provided a contract address so they could be sent Survey Three, (2) some incorrect addresses were given or individuals had moved, and (3) some simply did not want to provide the additional information requested.

Table 1 presents the mean values for demographic and economic variables for respondents who completed Surveys One and Survey Two. The sample is reasonably diverse. The average age of the sample is 54 and women account for slightly more than half of the sample. The distribution of educational attainment is 11 percent with a high school degree, 25 percent with a college degree, 31 percent with a master's degree, 27

percent with a doctoral degree, and 6 percent with a professional degree. Mean annual household income is $102,677 with $63,823 coming from the respondents' earnings. Respondents indicated on the pre-seminar survey that they were on average 72 percent sure that they would achieve their retirement age goal and 63 percent certain that they would achieve their retirement income goal.

[Table 1]

Initial Retirement Goals

The average participant set a retirement age goal of 64 and retirement income goal of 80 percent of pre-retirement earnings before the seminar. However there is considerable variation in participants' retirement goals. About 40 percent of the respondents reported their age goals were between age 60 and age 64, but some respondents stated desired retirement ages as young as age 50. To explain the differences in retirement ages across participants, we estimate a logit probability model. In this specification, the probability of seminar participants setting retirement age goals younger than age 60, between ages 60 and 64, age 65, or over 65 is a function of individual, household and demographic characteristics. The demographic characteristics included age, gender, marital status, and children. Human capital variables are education, occupation, and years of service with their employers. Measures of financial resources are household income, whether respondents are the sole income earners in their households, and whether their basic pension plans are defined benefit. Finally to control for potential differences in financial knowledge before the seminar, an indicator variable for whether or not they worked with a financial advisor is included.

The marginal effects derived from the logit estimates are presented in Table 2.

The marginal effects estimate the change in the probability of observing an individual reporting an expected retirement age in each of the four age groups given a change in each characteristic holding the other characteristics constant at the sample means. The logit model is ordered. Because the probabilities across the four age groups add to one, the marginal effects sum to zero for each characteristic.

[Table 2]

The results show that pre-seminar retirement ages varied across demographic groups. Compared to men, women planned to retire at younger ages. They were more likely by 5 percentage points to set a retirement age goal younger than 60 and more likely by 9 percentage points to set one between ages 60 and 64. Also planning to retire at earlier ages, were participants under the age of 45 and married individuals. But those with children set older retirement ages of 65 and over. Respondents' education and work experience also account for differences in retirement age goals. Those without advanced graduate and professional degrees reported younger desired retirement ages than did respondents who had them. Similarly secretarial, clerical, and maintenance personnel were more likely to set younger retirement ages than teaching and professional employees. Participants who were working with financial advisors planned to retire earlier than those who weren't.

Almost half of participants set their retirement income goals between 65 and 85 percent of pre-retirement income. Some, 19 percent, set low goals of less than 65 percent while others, 35 percent, set high goals of over 85 percent. We estimate a logit probability model to explain these differences in retirement income goals. The probability of seminar participants setting retirement income less 65 percent, between 65

and 85 percent, or over 85 is modeled as a function of individual and household characteristics. They include the same demographic characteristics as in the retirement age equation along with years of service, annual job earnings, whether respondents are the sole income earners, and whether their basic pension plans are defined benefit. The estimates of the marginal effects from the retirement income goal equation are reported in Table 3.

[Table 3]

Participants younger than age 45 were more likely by 10 percentage points to set income replacement goals greater than 85 percent while those with children were more likely by 7 percentage points to set income goals less than 65 percent. Employees with more years on the job tended to have higher target levels of income in retirement. Financial resources were a consideration when setting retirement income goals. Individuals with higher job earnings were more likely to set relatively low income replacement goals compared those with lower job earnings. For example, compared to participants earning $50,000, those earning $60,000 were more likely to set income goals less than 65 percent by one percentage point and more likely to set them between 65 and 85 percent by 0.5 percentage points. Respondents who were the sole income earner in their households were more likely by 9 percentage points to set retirement income goals below 65 percent.

RESPONSES TO FINANCIAL EDUCATION

After completing the seminars, respondents indicated whether they were likely to change their retirement goals and saving behavior. The response of individuals obviously depends on how they viewed the quality of the information they received. In

general, participants thought they had been part of a high quality financial education program with 36 percent rating the seminar excellent and 54 percent good. In response to the statement that the seminar had improved their understanding of the need for retirement saving, 32 percent strongly agreed with the statement and 58 percent agreed with the statement. Respondents also indicated that they now had a greater likelihood of achieving their retirement age goal and their retirement income goal.

Did participants alter their retirement goals and/or their retirement saving behavior after attending the seminar? This section examines the post-seminar plans of the participants and estimates the factors that differentiate their responses to the seminar. The seminar may have provided participants with new information concerning how much money is needed to equalize consumption in retirement with that during the working years, the basic mathematics of retirement saving, and the risk-return characteristics of investment alternatives. Based on this new information, participants would be expected to reconsider their retirement plans and alter their saving behavior. A comparison of responses given in Survey Two after the seminar to those selected prior to the seminar indicates how participants adjusted their retirement goals and saving behavior based on this new information. Participants might also have learned more about the mathematics of retirement saving and have a more realistic assessment of the amount of retirement income that they will have based on their current savings rates. This new information could result in respondents deciding to increase or decrease their contributions to retirement plans. Finally, participants may have a better grasp of the risk associated with various types of financial instruments, inflation, and longevity. These new data might lead them to alter the investment allocations in their retirement accounts.

Among the participants, 34 percent altered either their income goal or their retirement age goal. When revising either the age goal or their income goal, respondents were more likely to raise them. Only 6 percent of the participants changed both goals after the seminar while 22 percent changed only their income goal and 6 percent changed only their retirement age goal. Compared to changes in retirement goals, a much higher proportion of participants indicated that they planned to alter their saving behavior. Ninety-one percent of respondents reported that they anticipated making changes in their retirement saving plans. These changes included increasing contributions to tax deferred accounts or altering their investment allocations. Individuals who changed their age goals but not their income goals were more likely to plan to increase tax-deferred saving or change their investment allocations. Among respondents who changed both goals, a higher percentage of those without supplemental plans indicated that they planned to establish one. Similarly, higher percentages of those with a supplemental plan indicated that they planned to increase their contribution rate and/or change their investment allocations in the plan. A smaller percentage of those making changes to their age goal were in defined contribution plans, but a higher percentage of those that were said that they planned to change their investment allocations in that plan. These expected changes imply that after the seminar, most participants anticipated making some changes in their planned lifetime pattern of work, retirement, consumption, and saving.

Altering Retirement Goals

A small percentage of respondents changed their desired retirement age while over a quarter of participants altered their retirement income goal. After the seminar, 7 percent of the sample reported having increased their retirement age goal by an average

of three years and 4 percent of respondents reduced this goal by an average of 4 years. As one might expect, a larger proportion of people with relatively low initial desired retirement ages tended to increase them. For example, 15 percent of participants who initially setting a retirement age goal younger than age 60 indicated a later retirement age goal after the seminar. The average increase was over four years. In contrast, only 2 percent of those with an initial expected retirement age greater than age 65 indicated an older retirement age after the seminar. The tendency to lower retirement ages was greatest for participants whose pre-seminar retirement age goal was 65. On average they lowered their age goals by 5 years.

Table 4 presents the results of a logit probability model explaining how these changes in retirement age goals varied across individual and household characteristics. Variables included in addition to those in Table 2 are indicator variables for whether the participants considered themselves conservative or moderately conservative investors and for the planning horizon for their saving. Compared to older seminar participants, respondents under age 45 were less likely to increase their desired retirement ages. Individuals without advanced degrees were more likely to increase their target ages of retirement while secretarial, clerical, and maintenance workers were more likely to lower their retirement ages.

[Table 4]

There was a much greater tendency to adjust retirement income goals than age goals. A little over 20 percent increased their income goal while another 8 percent decreased their income objective. Over one third of the participants who set an income goal less than 65 percent before the seminar revised their retirement income goal upward

by an average of 19 percentage points. This suggests that based on the information provided in the seminar these individuals determined that their goal was too low and that they should attempt to achieve a higher standard of retirement consumption. About one fourth of those with pre-seminar goals of between 65 and 85 percent revised their retirement income goal upward while less than 5 percent of those with initial targets greater than 85 percent revised their income goals upward. People with higher initial retirement income goals were more likely to revise their income targets downward.

The results of a logit model explaining these changes in income goals as a function of individual and household characteristics are in Table 5. They show significant differences across participants. Women were more likely by 6 percentage points to increase their income goal compared to men.[8] Participants with higher earnings were also more likely to raise their desired income replacement rates. Compared to respondents earning $50,000 those earning 20 percent more, $60,000, were more likely by one percentage point to raise their income goals after the seminar. Individuals with defined benefit plans were more likely by 12 percentage points to raise their income goals.

[Table 5]

Change in Retirement Saving Behavior

On the basis of the information provided in the seminar, respondents indicated that they planned to be more active in planning for their retirement. Forty percent of those who did not have a supplemental pension plan said that they planned to establish one with their employer. Among respondents that currently had a supplemental plan, 37 percent stated that they would increase their contributions to them. After completion of

the seminar, 29 percent of the respondents stated that they planned to open a new individual retirement account (IRA) or increase their contributions to an existing IRA.

To further examine these changes in saving behavior we estimate two logit models:

1. If the respondent had not previously established a supplemental retirement plan, did they plan to do so and
2. If the respondent already had a supplemental plan, did they plan to increase their contributions to that plan?

Each choice is estimated as a function of household and personal characteristics. The results are in Table 6. The entries indicate the mean change in the probability of establishing a new plan or increasing contributions to an existing plan from a one-unit change in the corresponding explanatory variable while holding the others shown in the table constant.

[Table 6]

Respondents in basic defined benefit pension plans had a 30 percentage points higher probability of stating that they wanted to start a new supplemental plan compared to respondents in basic defined contribution plans. Compared to younger individuals, respondents aged 60 and older were less likely by 21 percentage points to want to start a new plan. Women were more likely than men by 22 percentage points to say that they planned to start a new supplemental plan, and married respondents had a 28 percentage points higher likelihood than others of wanting to start a new plan. As one might expect, individuals with longer-term saving horizons were more likely to report that they now want to establish a pension plan. Finally, the desire to establish a new plan is positively

influenced by having worked for their current employer for less than five years, and their share of total household income.

The second column of Table 6 reports the results from the logit estimation of the probability of increasing contributions to a supplemental plan for participants who currently had them. Compared to respondents age 45 to 59, individuals age 44 or younger were more likely by 17 percentage points to report that they were going to increase their contributions to their supplemental plan after participating in the seminar. Those 60 and older were less likely by 29 percentage points to indicate a desire to increase their contributions. Once again women had a greater likelihood of wanting to increase contributions than men did. The difference is 14 percentage points. Secretarial, clerical, and maintenance workers had a much higher desire to increase contributions after the seminar than did faculty, other professionals, and administrators.

These results indicate significant differences in the reaction of individuals to the information presented in the seminars. As one might expect, younger workers were more likely to indicate that they planned changes in their retirement saving. Perhaps the seminar showed them the power of compounding returns and the payoff to saving earlier in life. Women, and individuals employed in secretarial and maintenance positions were also more responsive to the information provided. This may reflect a greater gain in knowledge concerning saving and financial markets among these individuals or simply a different reaction to the same gain in knowledge. Another key finding is that individuals in a basic defined benefit plans were more likely to increase retirement saving than were those in a basic defined contribution plans. An interpretation of this finding is that participants in the defined contribution plan have had greater exposure to the retirement

saving process and thus may be less surprised by the information presented in the seminar.

Change in Investment Behavior

In addition to changing their saving rate, some individuals may choose to alter their choices of assets in their pension accounts. Ten percent of all respondents with basic defined contribution plans indicated that they intended to increase the proportion of their investment in equities while 20 percent reported that they intended to increase their investment in bonds. In addition, one third of those with supplemental retirement plans intended to change their investment allocations in those plans. The change in investment allocations is estimated separately for balances in the basic retirement plan and in supplemental plans. The results are shown in Table 7. Women were more likely to plan to alter their investment allocations, especially in their supplemental plans, than men were. Married individuals had a higher probability of changing their investment patterns in both plan types. Those with basic defined benefit plans were less likely to indicate a desire to reallocate their investment allocations in their supplemental plans. Respondents attending a financial seminar for the first time were more likely, after the seminar, to plan to reallocate their investments.

[Table 7]

ACTUAL AND INTENDED CHANGES

Responses to Survey Two provided information on respondents' desire to change their saving behavior while in Survey Three, individuals were asked to report whether they actually had altered their saving behavior in the first few months following the seminar. In Survey One, half of the respondents reported that they did not have a

supplemental retirement plan. Of these, 41 percent indicated in Survey Two that in response to the seminar they planned to establish a supplemental plan. Of the individuals who returned Survey Three and who had indicated that they planned to open a new account, 25 percent had actually established a new plan and 63 percent stated that they still intend to open a new supplemental plan. Of those who did not initially have a supplemental plan and who indicated in Survey Two that they did not plan to open one, 72 percent reported that they had not opened a plan and still did not plan to open a plan while 22 percent now indicated that they intended to establish a supplement plan.

Among those who had pre-existing supplemental plans, 37 percent indicated in Survey Two that they were going to increase future contributions. Of these respondents who completed Survey Three, 42 percent had increased contributions. In contrast, 30 percent of those who stated that they were not going to increase contributions had actually increased their contributions to the supplemental plan. Limited follow-up was also found among those that indicated that they were going to be more active in their retirement planning. About 40 percent of individuals who said that they were going to use automated telephone services or the Internet to monitor retirement accounts reported that they had done so and only about 20 percent had used a telephone counseling center or a financial adviser since the seminar.

The number of respondents in Survey Three is much smaller than that in the first two surveys. The drop off in the sample size is due to various reasons some of which are related to self-select. The results available from Survey Three indicated a substantial disconnect between the stated intent to change saving behavior immediately following the seminar and the actual actions taken in the next three months. Individuals who had

stated in Survey Two that they intended to increase retirement saving but who reported on Survey Three that they had not taken any such action were asked why they had failed to fulfill their intentions. Just over one fifth replied that funds were diverted to paying off existing debts, 16 percent stated that they had lower than expected income following the seminar and thus could not increase their saving, and 16 percent replied that they had changed their minds and now did not want to increase retirement saving. However, one third of these respondents reported that they had simply failed to take necessary steps to increase their retirement saving.

The weak link between stated goals and actual changes by individuals planning for retirement is consistent with recent research in behavioral economics, particularly relating to retirement saving. Our results from Survey Three support the findings of Choi et al (2001), who conclude that despite the best intentions of action on retirement planning, most employees with 401(k) plans will engage in a 'passive decision' of inactivity. Our analysis provides further evidence that employers can play a more active role in worker retirement planning.

The findings imply that financial education programs would be more effective if they included methods that would facilitate timely changes in retirement plans or the programs included formal follow-up or reminder messages. This form of inertia is similar to the effects found in papers examining automatic enrollments in 401(k) plans (Madrian and Shea, 2001). The current results are based on a relatively small sample of individuals who completed all three of the surveys. It may be likely that choosing to complete Survey Three is endogenous to whether the intended changes were carried out. Despite this, the results provide key insights into how educational programs can assist

individuals in effective planning for retirement. Further research is needed to explore the actual responsiveness of participants to educational programs, the reasons why desired actions are not taken, and what policies would increase the link between desired changes in retirement plans and the actions necessary to achieve new retirement goals.

CONCLUSIONS AND IMPLICATIONS

Individuals develop lifetime saving plans to ensure that they will have the desired level of income in retirement. These plans are based on individuals' current knowledge and their level of understanding of financial markets. It is becoming increasingly apparent that many people might not have an adequate knowledge or understanding of financial planning. Ignorance is not bliss and can lead to people saving too little, and getting (unpleasantly) surprised as they approach and enter retirement. (Of course, individuals can have positive surprises such as the rapid increase in equity prices during the late 1990s.) Given the state of knowledge, the question is: does financial education lead to different and better choices? Do individuals revise their retirement goals when provided with better information? Do they change their saving behavior and do they intend to acquire additional information about their retirement income needs and the retirement saving process? While the conclusion seems obvious, very little, so far, is actually known about how education influences savings decisions. This paper provides significant new findings on the impact of financial education on retirement saving.

Survey responses indicate that after an educational event, individuals might alter their retirement goals and/or change their retirement saving behavior. To determine the influence of new information, we examine the responses from three surveys completed by individuals before and after participation in a financial education seminar. The results

are clear. A significant proportion of the respondents indicated that they had revised their goals and planned to modify their saving and investments.

Women had younger retirement age goals and lower retirement income goals than men. Following the seminar, they were more likely to raise retirement goals. They were also more likely to start new tax deferred saving accounts, to increase contributions to existing retirement plans, and to change their investment allocations. Younger participants had earlier retirement age and higher income goals and were not likely to increase them after the seminar. They did plan to make changes in their saving behavior in order to achieve these objectives. Secretarial, clerical, and maintenance personnel had lower retirement age goals and did not increase them. But they did plan to increase their retirement saving in order to increase the likelihood that they will attain their goals.

In the twenty first century, workers will be more responsible for their own retirement income. In order to make optimal retirement plans, an appropriate level of financial knowledge and understanding is necessary. Otherwise many Americans will make suboptimal saving choices without recognizing the consequences of their actions. Financial education can improve their knowledge base and help future retirees enjoy their retirement years. These findings have important implications for employers that offer pension plans, especially those with defined contribution plans. While many companies already provide some financial education, the quality of these programs has been questioned. This paper has shown the importance of financial education to successful retirement planning. Greater efforts by employers can provide the resources needed to assist workers in the retirement planning and enable them to achieve their retirement objectives.

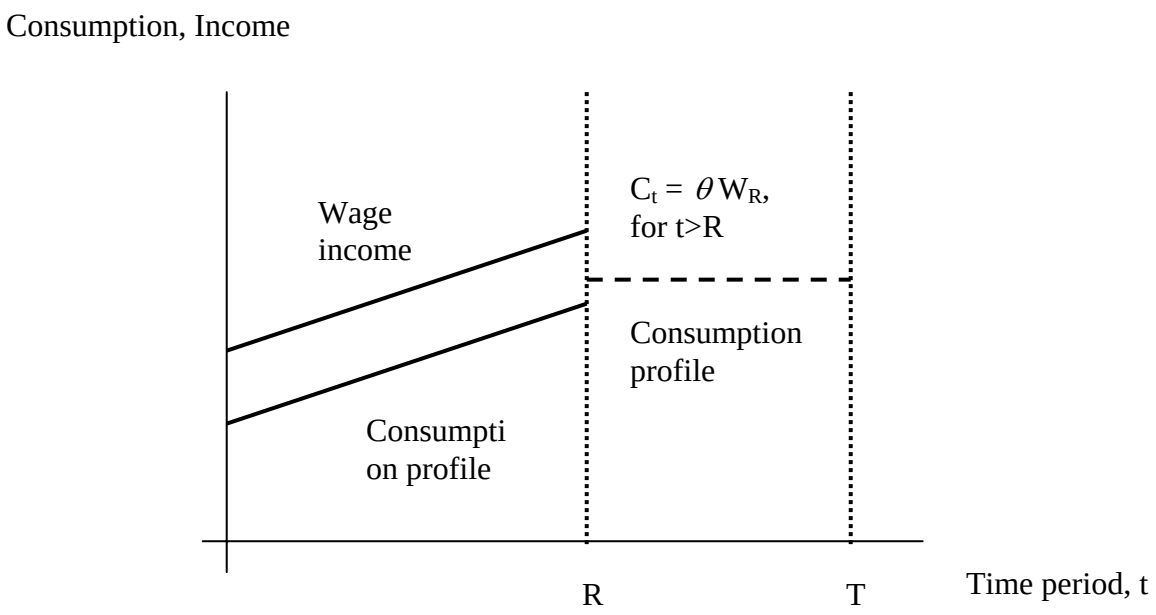

Figure 1. Wage and consumption profiles for an individual's lifetime

Table 1. Summary Statistics

Variable	Mean
Number of Respondents	633
Age	54.4
Female (percent)	53.5
Years of Service	15.3
Number of children	1.7
Education Attainment (percent)	
High School Degree	10.9
College Degree	25.3
Masters Degree	31.1
Doctoral Degree	26.5
Professional Degree	6.2
Annual Household Income (dollars)	102,677
Earnings from Primary Employer (dollars)[b]	63,823
Type of Investor (percent)[a]	
Conservative	6.7
Moderately Conservative	40.2
Moderately Aggressive	41.3
Aggressive	11.8
Retirement Age Goal	63.6
Likelihood of Achieving Retirement Age Goal (scale 1-10)	7.2
Retirement Income Goal (percent of final year's income)	79.7
Likelihood of Achieving Income Goal (scale 1-10)	6.3
Planning to Work after Retirement (percent)	52.0
First Financial Seminar Ever Attended (percent)	33.5
Number of Financial Seminars Previously Attended	3.4
Currently Working with Financial Advisor (percent)	25.7

Table 1. Summary Statistics (continued)

Variable	Mean
Basic Pension Plan	
Defined Contribution Pension (percent)	81.9
Account Balance (dollars)	358,411
Percent of Account Balance Allocated to Equities	64.1
Employee Contribution Rate	7.6
Employer Contribution Rate	8.6
Percent of New Contributions Allocated to Equities	60.1
Supplemental Pension Plans	
Currently Making Contribution (percent)	49.6
Account Balance (dollars)	109,330
Percent of Account Balance Allocated to Equities	67.3
Contribution as a Percent of Salary	9.1
Percent of New Contributions Allocated to Equities	65.3
Type of Employment (percent)	
Secretarial/Clerical	7.1
Teaching/Research	31.1
Administrative/Management	25.6
Maintenance/Service	2.6
Other Professional/Technical	19.5
Other	4.7
Retired	5.8
Not Currently Employed	3.5
Tenure Status of Teaching/ Research (percent)	
Tenured	62.0
Tenure-Track, non-tenured	12.7
Non-tenure Track	25.4
Rank of Teaching/ Research (percent)	
Instructor	18.1
Assistant Professor	11.0
Associate Professor	23.6
Professor	47.3

[a]Collected in Survey Two

[b]Respondents who are retired or not currently working are excluded

Source: TIAA-CREF Financial Education and Retirement Savings Study, Survey One unless otherwise noted.

Table 2. Estimates of Retirement Age Goals

Variable	Less than 60	60 - 64	65	Over 65	Significance Level
DB Plan	0.0133	0.0232	-0.0131	-0.0233	0.544
Age					
Age 44 or younger	0.0490	0.0854	-0.0485	-0.0859	0.041
Age 45 - 59					
Age 60 and over					
Female	0.0504	0.0880	-0.0499	-0.0885	0.005
Married	0.0481	0.0839	-0.0476	-0.0844	0.038
Children (yes/no)	-0.0459	-0.0801	0.0455	0.0806	0.022
Education					
High School Degree	0.0600	0.1047	-0.0594	-0.1054	0.075
College Degree	0.0583	0.1017	-0.0577	-0.1024	0.006
Graduate/Professional Degree					
Occupation					
Teaching/Research					
Professional/Technical, Other					
Administration/Management	0.0494	0.0861	-0.0488	-0.0866	0.949
Secretarial/Clerical	0.0022	0.0038	-0.0022	-0.0038	0.009
Maintenance/Service					
Years of Service with Employer	0.0014	0.0025	-0.0014	-0.0025	0.092
Household Income (% change)	0.0002	0.0003	-0.0002	-0.0003	0.339
Respondent Sole Income Earner	0.0227	0.0396	-0.0225	-0.0398	0.315
Works with a Financial Advisor	0.0362	0.0632	-0.0358	-0.0636	0.050
Number of Observations	50	170	122	94	
Percent of Sample	11.4	38.9	27.9	21.5	

Shown are the estimated marginal effects. The derivatives are evaluated at the sample means.

Table 3. Estimates of Retirement Income Goals

Variable	Less than 65	65-85	Over 85	Significance Level
DB Plan	0.0232	0.0123	-0.0356	0.521
Age				
Age 44 or younger	-0.0677	-0.0359	0.1036	0.082
Age 45 - 59				
Age 60 and over	0.0082	0.0043	-0.0125	0.793
Female	0.0341	0.0181	-0.0522	0.261
Married	0.0229	0.0122	-0.0351	0.528
Children (yes/no)	0.0689	0.0365	-0.1054	0.036
Years of Service with Employer	-0.0053	-0.0028	0.0081	0.000
Annual Earnings (% change)	0.0005	0.0003	-0.0008	0.047
Respondent Sole Income Earner	0.0884	0.0468	-0.1353	0.017
Number of Observations	82	204	151	
Percent of Sample	18.7	46.6	34.5	

Shown are the estimated marginal effects. The derivatives are evaluated at the sample means.

Table 4. Estimates of Changes in Retirement Age Goals

Variable	Lower Goal	No Change	Raise Goal	Significance Level
DB Plan	-0.0047	-0.0020	0.0066	0.788
Age				
Age 44 or younger	0.0366	0.0155	-0.0520	0.044
Age 45 - 59				
Age 60 and over				
Female	-0.0157	-0.0067	0.0224	0.230
Education				
High School Degree	-0.0524	-0.0222	0.0746	0.022
College Degree	-0.0301	-0.0128	0.0429	0.058
Graduate/Professional Degree				
Occupation				
Teaching/Research				
Professional/Technical, Other				
Administration/Management	0.0206	0.0087	-0.0294	0.157
Secretarial/Clerical	0.0506	0.0214	-0.0720	0.039
Maintenance/Service				
Household Income (% change)	-0.0001	0.0000	0.0001	0.622
Conservative/Moderate Investor	0.0246	0.0104	-0.0351	0.069
Focus of Savings				
Short Term				
Long Term				
Long Term/Short/Intermediate	-0.0182	-0.0077	0.0259	0.329
Number of Observations	19	345	26	
Percent of Sample	4.8	88.2	6.9	

Shown are the estimated marginal effects. The derivatives are evaluated at the sample means.

Table 5. Estimates of Changes in Retirement Income Goals

Variable	Lower Goal	No Change	Raise Goal	Significance Level
DB Plan	-0.0486	-0.0719	0.1205	0.013
Age				
Age 44 or younger	0.0237	0.0351	-0.0588	0.247
Age 45 - 59				
Age 60 and over				
Female	-0.0258	-0.0382	0.0640	0.099
Education				
High School Degree	-0.0297	-0.0439	0.0736	0.252
College Degree	-0.0154	-0.0228	0.0382	0.389
Graduate/Professional Degree				
Annual Earnings (% change)	-0.0003	-0.0004	0.0007	0.050
Respondent Sole Income Earner	0.0204	0.0302	-0.0506	0.245
Conservative/Moderate Investor	0.0305	0.0450	-0.0755	0.050
Works with Financial Advisor	0.0131	0.0193	-0.0324	0.426
Focus of Savings				
Short Term				
Long Term	0.0480	0.0710	-0.1191	0.006
Long Term/Short/Intermediate				
Number of Observations	29	272	79	
Percent of Sample	7.6	71.5	20.7	

Shown are the estimated marginal effects. The derivatives are evaluated at the sample means.

Table 6. Estimates of Changes in Retirement Savings Behavior

Variable	Plans to Establish Supplemental Plan	Plans to Increase Contributions to Supplemental Plan
DB Plan	0.2992 (0.024)	0.0451 (0.579)
Age		
Age 44 or younger	-0.0637 (0.541)	0.1731 (0.095)
Age 45 - 59		
Age 60 and over	-0.2065 (0.049)	-0.2936 (0.001)
Female	0.2219 (0.019)	0.1392 (0.053)
Married	0.2827 (0.014)	0.0497 (0.587)
Occupation		
Teaching/Research		
Professional/Technical, Other		
Administration/Management	0.0871 (0.330)	0.1470 (0.045)
Secretarial/Clerical	0.0465 (0.735)	0.2747 (0.033)
Maintenance/Service		
Annual Earnings (% change)	-0.0006 (0.466)	0.0005 (0.576)
Earnings % Household Income	0.0046 (0.050)	0.0013 (0.497)
Worked for Employer 5 Years or Less	0.2310 (0.033)	
Conservative/Moderate Investor	-0.0751 (0.396)	0.1404 (0.054)
Works with Financial Advisor	-0.0961 (0.269)	0.1281 (0.072)
Focus of Savings		
Short Term		
Long Term	0.2408 (0.031)	0.2012 (0.153)
Long Term/Short/Intermediate	0.3956 (0.010)	0.2510 (0.150)
Number of Observations	131	196

Shown are the estimated marginal effects. The derivatives are evaluated for each observation and averaged over the sample. Significance levels are in parentheses.

Table 7. Estimates of Changes in Investment Allocations

Variable	Plans to Change Investment Allocations	
	DC Plan	Supplemental Plan
DB Plan		-0.1404 (0.087)
Age		
Age 44 or younger	0.0022 (0.979)	-0.0574 (0.560)
Age 45 - 59		
Age 60 and over	-0.0425 (0.559)	0.0037 (0.963)
Female	0.0426 (0.516)	0.1610 (0.024)
Married	0.1557 (0.044)	0.1362 (0.082)
Children (yes/no)	-0.0551 (0.468)	
Occupation		
Teaching/Research		
Professional/Technical, Other		
Administration/Management	0.0553 (0.399)	-0.0086 (0.905)
Secretarial/Clerical	-0.2232 (0.044)	-0.1337 (0.247)
Maintenance/Service		
Household Income (percent change)	-0.0007 (0.349)	0.0000 (0.049)
Conservative/Moderate Investor	0.1414 (0.039)	0.0949 (0.204)
Works with a Financial Advisor	-0.1084 (0.088)	0.0437 (0.545)
Focus of Savings		
Short Term		
Long Term	-0.1216 (0.341)	0.0718 (0.603)
Long Term/Short/Intermediate	-0.1172 (0.379)	0.3016 (0.105)
First Financial Seminar Ever Attended	0.0857 (0.176)	0.1372 (0.067)
Current Account Balance ($1,000)	-0.0002 (0.057)	
Percent Allocated to Equities	0.0030 (0.030)	
Number of Observations	250	191

Shown are the estimated marginal effects. The derivatives are evaluated for each observation and averaged over the sa

Significance levels are in parentheses.

REFERENCES

Arnone, William. 2002. "Financial Planning for Employees Post-Enron," *Benefits Quarterly*, Fourth Quarter, pp. 35-41.

Bayer, Patrick, Douglas Bernheim, and Karl Scholz. 1996. "The Effects of Financial Education in the Workplace: Evidence from a Survey of Employers." Stanford University: unpublished paper.

Bernheim, Douglas. 1998. "Financial Illiteracy, Education, and Retirement Savings," in Olivia Mitchell and Sylvester Schieber (eds.), *Living with Defined Contribution Plans*. Philadelphia: University of Pennsylvania Press, pp. 38-68.

Bernheim, Douglas, Jonathan Skinner, and Steven Weinberg. 2001. "What Accounts for the Variation in Retirement Wealth Among U.S. Households?" *American Economic Review* 91 (4): 832-857.

Choi, James, David Laibson, Brigitte Madrian, and Andrew Metrick. 2003. "Defined Contribution Pension Plans: Plan Rule, Participant Decisions, and the Path of Least Resistance," Working Paper 2002-3, Pension Research Council, The Wharton School, University of Pennsylvania..

Clark, Robert and Madeleine d'Ambrosio. July 2002. "Saving for Retirement: The Role of Financial Education," TIAA-CREF Institute Working Paper 4-070102-A. Published on-line in *Retirement Implications of Demographic Family Change Symposium*, Society of Actuaries, **http://www.soa.org/library/monographs/retirement_systems/m-rs02-2_tableof contents.html**.

Clark, Robert, Madeleine d'Ambrosio, Ann McDermed, and Kshama Sawant. 2004 forthcoming. "Sex Differences, Financial Education, and Retirement Goals," in Olivia Mitchell and Stephen Utkus (eds.), *Pension Design and Structure*, Oxford University Press, pp. 185-206.

Clark, Robert and Sylvester Schieber. 1998. "Factors Affecting Participation Rates and Contribution Levels in 401(k) Plans," in Olivia Mitchell and Sylvester Schieber (eds.), Living with Defined Contribution Plans. Philadelphia: University of Pennsylvania Press, pp. 69-97.

Greenspan, Alan. 2002. "Prepared Statement." *Hearings on the State of Financial Literacy and Education in America.* U.S. Senate Committee on Banking, Housing, and Urban Affairs, February 6.

Lusardi, Annamaria. 2000. "Saving for Retirement: The Importance of Planning," *Research Dialogue*, No. 66. New York: TIAA-CREF Institute.

Madrian, Brigitte and Dennis Shea. 2001. "Preaching to the Converted and Converting those Taught: Financial Education in the Workplace." University of Chicago unpublished paper.

Madrian, Brigitte and Dennis Shea. 2001. "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior," *Quarterly Journal of Economics*, 116(4): 1149-1187.

Maki, Dean. 2004. "Financial Education and Private Pensions," in William Gale, John Shoven, and Mark Warshawsky (eds.), *Private Pensions and Public Policies*, Washington, DC: Brookings Institution Press, pp. 126-139.

ENDNOTES

[1] Arnone (2002) estimates that 40 percent of employers with more than 1,000 employees offer some type of educational program; however, he believes that only half of these companies provide a high quality educational program. He defines such a program as "an employer-paid program available throughout the year during working hours and including both education that is custom tailored to the employer's specific benefit plans and counseling that is individualized to each employee." It is his assessment that most of the 42 million participants in 401(k) plans are in effect "on their own" as they plan for retirement.

[2] Sponsorship of financial education seminars was associated with a 12 percentage point increase in the participation rate of nonhighly compensated workers and a six percentage point increase among highly compensated employees. Company-sponsored retirement seminars produced a one percentage point increase in the contribution rate of the nonhighly compensated and no significant increase among highly compensated employees. This increase in the contribution for nonhighly compensated employees is quite large given that the average contribution rate for these employees is only 3 percent.

[3] Providing written documents to workers about retirement savings increased the probability of participating in the 401(k) plan by 15 percentage points when only generic materials were provided. The use of documents specifically tailored to the company's plan and the worker's status raised the probability of participation by 21 percentage points. The effects are additive so if used together the total effect of written information is to increase the likelihood of plan participation by 36 percentage points. In addition, they find that the provision of information concerning the company's 401(k) plan increased the annual contribution rate by two percentage points while generic financial and economic information did not have any significant influence on the contribution rate.

[4] Assuming a fixed time of death is an analytical simplification. If individuals were uncertain about their life-span, then the model would have to account for conservation of wealth by risk-averse elderly people (as against dissaving out of remaining wealth) in order to ensure against negative consumption shocks due to a longer-than-expected life-span. A similar complexity would arise is individuals had a bequest motive to conserve wealth in later life. The model here does not address the bequest motive.

[5] Clark and d'Ambrosio (2002) provide a more detailed description of the seminars and the surveys.

[6] The third survey is sent to participants about three months after the seminar to determine what actions have actually been taken. Copies of the three surveys can be obtained from the authors upon request.

[7] In total, 2,157 people attended part or all of these seminars and 725 individuals completed some parts of the two surveys for a response rate of 34 percent. The sample included in the analysis contains 633 usable surveys in which participants completed both survey one and survey two. It is important to recognize that some individuals arrive after the seminar had begun and were not given either of the surveys. In addition, some participants who had completed Survey One left the seminar early and did not complete Survey Two.

[8] Clark, et al (2004 forthcoming) examine gender specific responses to financial education programs and consistently find that women are more likely to change their goals and savings behavior than men.