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**LIMITED UNDERSTANDING OF  
INDIVIDUAL  
RETIREMENT ACCOUNTS AMONG  
CHILEANS**

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# Limited Understanding of Individual Retirement Accounts among Chileans

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## Abstract

Chileans with more knowledge about the pension system more actively contribute to and manage their individual retirement accounts. This positive association between system knowledge and retirement saving remains even after controlling for differences in other relevant attributes, such as financial planning horizon, retirement plan, and risk preference. Furthermore, the members who have the most discretion with their accounts, such as the self-employed, are often the least knowledgeable about the pension system. In general, Chileans report a limited understanding of their retirement account system, and this lack of knowledge appears to impede active decision-making in the system.

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# 1 Introduction

Individual control over financial well-being in retirement is a central principle in Chile's system of personal accounts. Choices are balanced by government safeguards, which protect individuals from short-sightedness and adverse shocks. Nonetheless, the tight link between contributions while working and pension benefits in retirement, as well as options for voluntary savings and account management should encourage members to tailor their retirement saving to their particular circumstances and future plans.

Almost 25 years after its inception, we find evidence that limited knowledge about the personal account system impedes active participation. Knowledgeable members are more likely to use and benefit from choices in system, yet those with the most discretion, such as the self-employed, often have the least knowledge. Among the self-employed, we estimate that more pension knowledge could increase contributions to personal accounts and thus raise pension benefits. Similarly, knowledge is positively associated with other voluntary saving and account decisions facing all members. Without exogenous variation in system knowledge, we cannot, however, establish a causal relationship between knowledge and active participation in the system. Yet, our results concur with a growing literature of randomized experiments with saving decisions that establish the causal effect of information and psychological factors. Any reforms to the Chilean retirement account system need to carefully consider the role of knowledge and the best methods of disseminating information to members. Our paper demonstrates that knowledge of the system is quite limited. Only a randomized experiment would provide the exogenous variation in the supply of knowledge needed to clearly quantify its effects and determine the best ways to increase knowledge.

The pension system combines individual choice with government mandates, so our analysis of retirement saving must incorporate differences in members' circumstances and preferences. Limited information on members of the account system has previously impeded such micro-level studies.<sup>1</sup> The Social Security Survey, or *Encuesta de Protección*

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<sup>1</sup>A large literature does exist on the macroeconomic effects of the Chilean personal account system,

*Social*, with its nationally representative sample of over 13,500 individuals with personal retirement accounts allows us to carefully examine decisions across a diverse group of members (2002). This recent survey of pension system affiliates was conducted from May 24, 2002 to January 15, 2003.<sup>2</sup> We focus on members of the account system under the normal retirement age (60 for women and 65 for men). In particular, we utilize innovative survey measures of pension system knowledge, financial planning horizons, retirement plans and risk preferences to understand individuals' retirement saving.

The plan of the paper is as follows. Section 2 describes the interplay of individual choices and government safeguards in the Chilean personal account system. In Section 3, we document the limited knowledge of the retirement account system and discuss the potential demand for and supply of knowledge. Then Section 4 examines member attributes, which should also inform their retirement saving. In particular, we focus on members' planning horizons, retirement plans, and risk preferences. Section 5 finds that a relationship between pension knowledge and personal account choices remains even after controlling for members' attributes and saving preferences. In the final section, we offer our conclusions.

## 2 Individual Choices and Government Safeguards

While accumulating funds in their retirement accounts and later converting their balances to pension benefits, members can tailor their accounts to their particular needs and preferences, albeit with considerable government oversight of and safeguards on their choices. In this section, we summarize the main choices facing members of the retirement account system and use the survey responses to characterize the overall utilization of these options.

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its institutional details, and the transition from a pay-as-you-go pension system, for example, Diamond and Valdés-Prieto (?). The Chilean account system has undergone numerous reforms. For a detailed description of the system rules and outcomes through 2002, see (Ferreiro, ed 2003).

<sup>2</sup>The survey includes 17,000 pension affiliates of which 78.7% have retirement accounts (or had an account before retiring), 18.8% are still in the old system, 0.3% are members of the armed forces or police pensions, and 2.2% did not know their pension affiliation. In 2002, there were 6.3 million members in the account system representing 56% of the Chilean population over age 15.

Our analysis focuses on saving for retirement with personal accounts, since most members in the survey are still in accumulation phase. While the new pension system began in 1981, only 8% of members in 2002 are receiving an old-age or disability pension.<sup>3</sup> Nonetheless, the structure of expected pension benefits should influence current account decisions. In converting their retirement account balances to pension benefits, members will face several choices and may be eligible for certain government safeguards. After reaching normal retirement age, members can receive a pension from their accounts; however, there is no mandatory age at which an account must be converted to a pension and continued employment does not affect pension benefits. Early receipt of a pension is only possible for those members with sufficiently large account balances.<sup>4</sup> Members can purchase a real annuity with their account balance from an insurance company, establish a programmed withdrawal from their account with their fund manager, or utilize a combination of the two. These options mainly differ in terms of ownership and risk-bearing.

In addition to regulating the conversion of accounts balances to benefits, the government provides a pension safety-net. Members, who have contributed at least 20 years (or 240 months), are guaranteed a minimum pension level throughout their retirement. In December 2002, the minimum pension was 73,515 pesos for persons under age 70 and 80,383 pesos for those 70 and older, which is 45-50% of median monthly earnings. The level of the minimum pension is not inflation-indexed, so its legislated value can vary in real terms. For eligible members, the government provides the difference between the pension from their retirement accounts and the minimum level. Regardless of their contribution history, individuals may be eligible for a welfare pension of 36,308 pesos in 2002.<sup>5</sup> The minimum pension, in particular, provides a generous insurance benefit for low-income

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<sup>3</sup>This definition of pensioners excludes dependents receiving survivor or disability benefits, as well as those receiving a welfare pension. A portion of this 8% are receiving a pension from the old pay-as-you-go pension system and are members of the account system.

<sup>4</sup>To qualify for an early pension, the monthly pension benefit must be at least a 50% of the individual's average real income in the last 10 years and at least 100% higher than the minimum pension guarantee.

<sup>5</sup>Persons with income less than 50% of the minimum pension and over 65 years of age, disabled over age 18, or mentally handicapped are eligible for the welfare pension. The government caps the number of welfare pensions, so all eligible persons may not receive benefits. As with the minimum pension, the real value varies.

members, who have made regular contributions to their retirement accounts. Studies of the pension guarantee project that 10% to 50% of account members may receive some government funds from the minimum pension guarantee (Ferreiro, ed 2003).

## 2.1 Contributions to Retirement Accounts

Choices on contributions to retirement accounts partially depend on employment type. Employees in the formal sector with a contract make mandatory monthly contributions to their accounts. The basic tax-exempt contribution, 10% of monthly earnings up to 60UF, is transferred directly by employers to their employees' account managers.<sup>6</sup> When making basic contributions, members also pay 2-3% of their monthly earnings to their fund manager for fees plus disability and survivor insurance. For the self-employed, participation is voluntary. If they choose to make a contribution, they become members of the account system. Among members, the self-employed also have full discretion over the frequency and amount of their continued contributions. All working members of the system can also make additional voluntary contributions to their retirement accounts. Initially, members could contribute an additional 10% of monthly earnings tax-free and these funds could not be withdrawn from the accounts before retirement. By 2002, the cap on additional contributions is much higher and additional contributions (plus the interest earned) can be withdrawn early at a tax penalty.<sup>7</sup> While the government mandates a minimum saving rate for most workers, all members have options and incentives for further retirement saving. In general, the self-employed and those with sporadic employment face the most choice on their contributions.

The account decisions of the self-employed are important to the Chilean pension system. The self-employed represent a sizeable fraction of the Chilean workforce with 29%

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<sup>6</sup>The UF is an inflation-indexed quantity. In December 2002, the taxable maximum of 60UF was 1,004,747 pesos (1,431 US dollars) and over six times the median monthly earnings among working members of 160,000 pesos.

<sup>7</sup>For the vast majority of workers, the 50UF limit on additional contributions is more generous than the initial cap at 10% of wages.

of workers in the economy and 18% of workers in the account system.<sup>8</sup> In addition, their contribution behavior differs substantially from that of employees. As Table 1 shows, only 29% of self-employed members are currently contributing to their retirement accounts, in contrast to 98% of employees with contracts. Among the self-employed, employers are twice as likely to make contributions as independents. Only 23% of independent workers are currently contributing versus 57% of employers. Similar to independents, only a small fraction (24%) of employee members without a contract contribute. These differences in basic contributions by employment should translate into differences in pension benefits from retirement accounts in old-age. Furthermore, the contribution behavior of the self-employed and non-contract employees affects the government's financial liabilities in the pension system. Individuals, who do not join the account system or make sporadic contributions, are more likely to be eligible for either the welfare pension or minimum pension guarantee.

With additional contributions to their retirement accounts, members can compensate for irregular contribution histories, reduce their current tax burden, and increase their future pension benefits. Yet, Table 2 shows that only 5% of members have ever utilized this option. For those making additional contributions, the most common reason (58%) is to increase their pension benefit. Sizeable fractions also cite the good investment opportunity of the pension fund (21%) and the ability to retire early (11%). Yet, the majority of members claim no knowledge of this voluntary saving option. The other top reasons among non-contributors reveal limited desire and resources for additional retirement saving.

## 2.2 Voluntary Savings Accounts

Voluntary savings accounts introduced in 1987 offer another form of saving for retirement and other purposes. While individuals use the same the fund manager for their voluntary savings and retirement accounts, these accounts are separate. The self-employed can,

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<sup>8</sup>The former statistic is from the *Instituto Nacional de Estadísticas* (2005) and the latter is from authors' calculations of the Social Security Survey 2002.

however, make basic contributions to their retirement accounts with transfers from their voluntary savings account. At retirement, all members can use their voluntary accounts to increase the amount in their retirement accounts and obtain a larger pension. There are no tax benefits to contributions in voluntary savings accounts, but transfers to retirement accounts are not taxed. Other withdrawals from the voluntary accounts (a maximum of four times per year) are subject to income taxes. These accounts are often preferable to other savings vehicles, for example, bank deposits which earn low interest rates and mutual funds which have relatively high fees.

Table 3 reports that only 13% of members have a voluntary savings account. The most common reason (48%) among voluntary account holders is the good management of the funds. Convenience (28%) and increased pension benefits (14%) are also important factors. As with additional contributions to retirement accounts, most members are unaware of voluntary savings accounts. Other members, who do not have voluntary accounts, claim that the accounts are not necessary or they have too little income to save. Again, these accounts offer an option for increased saving, but few members choose to participate.

### **2.3 Pension Fund Administrator**

Members also face limited choice in the investment of their personal accounts. They can freely select their fund manager, an *Administradora de Fondos de Pensiones* (AFP), and change managers at no cost. The Chilean government regulates and closely supervises the investments and account management of the AFPs. In 2002, there are seven AFPs, which vary modestly in their fee structure, which includes both flat and variable (% of monthly earnings) commissions, and in their real returns. Each AFP determines its own fee structure; however, it must apply to all its account holders. These fees cover both administrative costs and the purchase of disability and survivor insurance for their members. Table 4 reports the monthly commissions across the seven AFPs and shows how the total fees, expressed as a percent of monthly earnings, vary across workers. For example, a worker earning the minimum wage of 111,200 pesos in 2002 would pay almost



1% more of his monthly earnings to Planvital than to Cuprum. As earnings rise, the differences across firms diminish.

Members may also select fund managers on their investment performance, yet government regulation limits the asset allocation of AFPs and diminishes the incentives to out-perform other AFPs. Specifically, the government requires that each member receives a minimum real return on their account, where this minimum is defined relative to the average real return across all AFPs.<sup>9</sup> While the return guarantee establishes a minimum and maximum return, which members receive on their accounts, returns can still vary moderately across AFPs. Nonetheless, Table 4 shows that AFPs, in fact, have had fairly similar investment performance. In each year, the standard deviation of real returns across the seven AFPs ranges is less than 20% of the average return across the AFPs. In addition to the minimum return guarantee, the government regulates the investments of AFPs. In March 2002, one-third of the AFP funds for non-pensioners was held in public debt, one-third in financial-sector securities, 19% in domestic corporate stocks and bonds and 13% in foreign stocks and bonds (Ferreiro, ed 2003).

Members pay no additional fees to switch AFPs, even though this involves administrative costs. The government uses free choice of AFPs to encourage competition among the fund managers. With moderate differences in fees and returns, AFPs have also used marketing and a large sales force to influence members' choices. Table 5 reports that almost half of members have changed AFPs at least once, though most have done so infrequently. The most common reason for switching AFPs at 23% was to help a sales person, and only 19% cited a higher return and 5% lower fees. These survey responses support the ongoing concern with the administrative costs of the fund managers. In exercising their choices in

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<sup>9</sup>There is a minimum return for each type of fund that AFPs manage. Before August 2002, AFPs managed two funds, one for pensioners and one for other members. Since then, AFPs offer five funds which differ in their allowed riskiness. For each fund, an AFP must insure that its members receive an annualized real return over the past 36 months above the lower of two thresholds: 1) 2 percentage points below the average real return for the same fund across all AFPs during the same period or 2) 50% below the average return. For example, if the average return is 10%, members must receive a 5% return, whereas the minimum return is 0% when the average return is 2%. Likewise, AFPs deposit returns in a reserve fund that exceed the higher of two thresholds: 1) 2 percentage points above the average or 2) 50% above the average. If an AFP cannot meet the minimum return payments with this reserve fund, the AFP is liquidated and the government provides the minimum return.

the account system, members may raise the total cost of the system without improving their economic well-being.

### **3 Knowledge of the Personal Account System**

To make well-informed decisions with their retirement accounts, members require some knowledge of the pension system. Yet, the value of such information and the costs of obtaining it likely differ across members. We begin by assessing the overall knowledge of personal accounts and find that most members reveal a very limited understanding of the system. We also show that more knowledgeable members are more active in the retirement account system. However, this association does not necessarily imply that knowledge increases active saving and management of accounts. At the end of the section, we discuss the challenges in identifying the direct impact of knowledge.

#### **3.1 Overall Knowledge**

To assess members' overall knowledge of the retirement account system, we utilize their survey responses in a module on knowledge and perceptions of the pension system. We focus initially on a subset of eight questions with verifiable answers. For each question, respondents may reply with a specific answer or "don't know." The responses, which we code as correct, follow each question in brackets. The first three questions pertain to the contribution phase:

1. What is the monthly contribution as a percent of earnings? [10%-13%]
2. How are the AFP funds invested? [mainly interest-bearing]
3. How much in variable fees does your AFP receive to manage your account?  
[2-3% of monthly wages]

The top panel of Table 6 displays the distribution of responses. With each of these contribution questions, a large portion of members do not even hazard a guess. While

a majority of members provide a specific contribution rate, less than 10% answer the commission question. Yet, both concepts directly affect workers' take-home pay and retirement savings.

Members are most knowledgeable about their monthly contribution rate with 28% providing the correct answer. One-quarter of the members were misinformed about their monthly contributions. Employers deposit their employees' contributions with the AFPs, so most members do not require any knowledge of this rate. This value would, however, be needed to assess the adequacy of these contributions for retirement savings goals. While 29% of members claim knowledge about the asset allocation of retirement funds, less than 10% correctly identify the low-risk investment strategy of the AFPs at the time of survey. This lack of knowledge could also impede accurate forecasts of account balances at retirement. Members can also freely choose the AFP, which manages their accounts. While AFPs compete on their combination of fixed and variable fees, only 2% of members know how much AFPs receive management fees as a percent of their monthly earnings.

The next five questions address pension benefits from retirement account system:

4. How are pensions from the AFP calculated? [account balance and other factors like retirement age]
5. What is the legal retirement age for men? [65] For women? [60]<sup>10</sup>
6. Fulfilling certain requirements, did you know early retirement is possible?<sup>11</sup>  
[Yes]
7. How much is minimum pension guaranteed by the state?<sup>12</sup> [70,000-85,000 pesos]
8. What are the conditions for the minimum pension? [contributions for 20 years or 240 months]

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<sup>10</sup>For this question, we combine responses from two related survey questions in a single item.

<sup>11</sup>For this question, the possible responses are "yes" and "did not know".

<sup>12</sup>As of December 2002, the minimum pension was 73,515 pesos for persons below age 70 and 80,383 pesos for those 70 or older. The range of answers we accept roughly corresponds to 5% below the lower value and 5% above the higher value.

Only 14% members understand the most basic principle of the pension system: their account balance determines their pension benefit. Furthermore, almost 80% claim no knowledge of the benefit calculation. While the system design tightly links contributions to benefits, there is little evidence that most members actually understand this connection. In the United States, Gustman and Steinmeier also find misinformation about pensions, for example, only 50% of persons with employer pensions correctly identify their plan as either defined-contribution or defined-benefit (?).

In sharp contrast to the benefit calculation, Chilean members are quite knowledgeable about the timing of retirement. Over 80% of members know the normal retirement ages and over 70% know that early retirement is possible. The final two questions cover the government pension guarantee. Again, the vast majority of members do not claim any knowledge about this safety net in the account system. Less than 5% know the value of the minimum pension and about 7% the required contribution history. In a study of Santiago workers, Barr and Packard suggest that some self-employed workers contribute to their accounts only to obtain the guarantee (2002). Such strategic contribution behavior is hard to reconcile with the general lack of knowledge about the pension guarantee. Self-employed members are not more knowledgeable about the value of or the requirements for the minimum pension than employees.

Members' answers across all eight questions reveal limited overall knowledge of the pension system. On average, members answer only 2.20 questions correctly and the median is two correct answers. Only 3% of members correctly answer more than half of the questions. For later analyzing account decisions, we construct a summary measure for pension knowledge. We denote the 37% members answering three or more questions correctly as "more knowledgeable."<sup>13</sup>

This low degree of overall knowledge could simply reflect its limited value to most members. With government mandates on employee contributions and on the management

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<sup>13</sup>We chose this knowledge measure for ease of interpretation. This cut point of three versus two or four correct questions does not qualitatively alter results. There are other relevant knowledge questions on the survey whose responses we cannot verify, such as the amount in the account balance.

of pension funds, most members, who are far from retirement, face few account decisions and may require minimal knowledge about the system. Yet, there are certain groups of members who have more discretion and could likely benefit from greater knowledge. While the self-employed and those with intermittent work histories face more choices, we find them to be actually less informed about the system. Only 33% of the self-employed and 28% of members not currently employed are more knowledgeable about the account system versus 43% of employees with contracts.

The cost of obtaining information about the system could also affect members' overall knowledge. The government has long recognized the need to inform members about their retirement accounts. AFPs are required to regularly send account statements to their members.<sup>14</sup> These statements include the members' current balance, contributions, fees, return on their account, and financial performance of their AFP. The statements also provide the return and commission structure for all AFPs. The statements do not, however, provide any projections of members' retirement benefits.<sup>15</sup> According to the survey responses, two-thirds of members regularly receive an account statement. In addition to their account statements, members can visit their local AFP office or use their websites to obtain information on their accounts; however, access to these other methods may differ across members based on their region of residence and income.

### **3.2 Account Behavior by Level of Knowledge**

More knowledge is associated with more active participation in the account system. The top panel of Table 7 documents the association between knowledge and each of the account behaviors. Among the self-employed, more knowledgeable members are 19% more likely

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<sup>14</sup>AFP's send a statement every four months to their members whose accounts have had some activity, for example, new contributions during the previous four months. All members receive at least one statement a year.

<sup>15</sup>Since July 2005, the AFP statement for middle-age members (women 20-49, men 30-54) provides pension projections under two scenarios: maintaining the current contribution level until the normal retirement age, and not contributing any more. For older members, it provides pension projections for two retirement ages. For members younger than 30 years, it provides information on the importance of the contributions between 20 and 30 years old.

to contribute to their account. This represents more than two-thirds of the 29% chance of contributions. Additional contributions and voluntary savings accounts are also more likely among the more knowledgeable members. While these effects are smaller at 3% and 8% respectively, they are statistically significant and sizeable fraction of the overall propensities. Finally, more knowledgeable members are 16% more likely to have switched AFPs. This represents a smaller share of the overall fraction of switching members than the other saving behaviors. In this case, knowledge may temper the propensity to change AFPs for non-economic reasons.

### 3.3 Identifying the Direct Effect of Knowledge

The statistical associations in the top panel of Table 7 do not necessarily identify the direct effect of knowledge on saving. Members with a high desire for retirement saving may seek out more information on the account system. Past participation in the system may also generate greater knowledge and encourage future participation. In both cases, other attributes actually drive account behavior as well as affect knowledge. The association between knowledge and account behavior mixes the direct effect of knowledge and the indirect effects of these other attributes.

To illustrate the issues consider the linear model:<sup>16</sup>

$$y = \beta_0 + \beta_1 Know + \beta_2 X + \epsilon \quad (1)$$

where  $y$  is an account behavior, such as voluntary contribution,  $Know$  is a categorical control for a "more knowledgeable" member, and  $X$  is a vector of other member attributes which affect account behavior. These attributes may or may not be observable in the data. The mean-zero disturbance term  $\epsilon$  is uncorrelated with the other controls. We are interested in the direct effect of knowledge on behavior  $\beta_1$ . If all the attributes in  $X$  were observed, we obtain a consistent estimate for the direct effect  $\beta_1$  by regressing  $y$  on

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<sup>16</sup>The regression estimates in Table 7 and elsewhere are from a logit (non-linear) model, but the same identification issues apply.

knowledge and  $X$ .

When we do not control for attributes in  $X$ , the coefficient estimate  $\widehat{b}_1$  from regressing behavior  $y$  on knowledge (and a constant) includes indirect effects of these other attributes:

$$\widehat{b}_1 \rightarrow_p \beta_1 + \beta_2 \frac{Cov(Know, X)}{Var(Know)} \quad (2)$$

Assume that the attributes in  $X$  are expressed, so they increase the account behavior ( $\beta_2 > 0$ ). Then the estimate  $\widehat{b}_1$  overstates the direct effect of knowledge when knowledge and the other attributes in  $X$  are positively correlated. Conversely, a negative association between knowledge and  $X$  would lead  $\widehat{b}_1$  to understate the direct effect of knowledge.

From the survey, we observe some attributes relevant to members' saving and account management decisions  $X_1 \subset X$ . Controlling for these attributes, we remove their indirect effects from the coefficient estimate on knowledge. In the bottom panel of Table 11, we regress each account behavior on knowledge as well as demographic, wealth, and employment characteristics. The presence of the other controls weakens the association between account behavior and knowledge.

Among the self-employed, the more knowledge, all else equal, are 14% more likely to contribute. This estimate is 5 percentage points lower than the initial estimate. We also find that the self-employed who employ other workers are 18% more likely to contribute than independents. Age, monthly wages, non-pension savings are also positively associated with contributions to retirement accounts.<sup>17</sup> Having less than a high school education or already being retired reduces the likelihood of contributing.

Additional contributions to retirement accounts and voluntary savings accounts follow a similar pattern. Knowledge is positively associated with saving, but the magnitudes are halved when controlling for other member attributes. More knowledgeable members are 9% more likely to switch AFPs after taking their other attributes into account.

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<sup>17</sup>The survey asks about twelve different forms of wealth, including bank accounts, investment in their children's education, stocks, and life insurance. Only one-third of members report any savings outside of the pension system.

Even after controlling for these basic member attributes  $X_1$ , there may be other factors in  $X$  which affect both behavior and knowledge. The survey also gathers information on members planning horizon, retirement plans, and risk preferences. These attributes should affect members' retirement saving and their demand for knowledge about the pension system.

## 4 Planning and Preferences: Other Determinants of Saving and Knowledge

In this section, we discuss members' planning horizons, retirement plans, and attitudes toward risk. While researchers in the United States have used comparable measures in examining retirement saving behavior, our analysis is the first for Chile. For each of the concepts, we present the distribution of responses across members. In general, we find that most members of the account system do not make long-term financial plans, have limited plans for retirement, and are quite risk averse. Most of these attributes strongly correlate with pension knowledge, thus our earlier estimates for knowledge's effect on account behavior likely contain the indirect effects of these attributes.

### 4.1 Planning Horizon

Length of financial planning horizon may be an important factor in saving for retirement. In fact, researchers in the United States have shown that long planning horizons are a strong predictor for participating in defined-contribution pension plans (Munnell, Sundén and Taylor 2000). The Chilean survey asks individuals:

“When you plan your savings and family expenses, which is the longest period you consider?”

The five choices range from “next few months” to “longer than 10 years”. Table 8 provides the distribution of the responses. Overall members of the retirement account system



report very short planning horizons. The financial plans for 70% of members cover only the next few months and another 15% the next year. Just 5% of members make financial plans for five years or longer. With most members several years from retirement, these short horizons may discourage active savings for retirement. Under one interpretation of this survey question, individuals with short planning horizons state a low value on future consumption relative to current consumption, that is a high discount rate. In fact, non-pension savings (a revealed preference for future consumption) is roughly increasing with the planning horizon. A connection between planning horizons and liquidity constraints would also be consistent with these patterns.

The bottom panel of Table 8 contrasts planning horizons from the 1992 Health and Retirement Study in the United States.<sup>18</sup> Longer horizons are far more common in the United States. For example, 37% in the U.S. report planning horizons of 5 years or more versus 5% in Chile. Furthermore, there is less variation in Chilean planning horizons. The most common horizon of the next few months covers 70% of Chilean members, whereas the most common horizon in the U.S. of the next few years covers only 19% of respondents.

Those with longer planning horizons should value information on their saving options. As expected, we find a positive correlation between knowledge of the pension system and planning horizon. We define a "longer horizon" as one spanning the next few years or more, thus 15% of members make plans over a longer horizon. Members with longer planning horizons are 6% more likely to be more knowledgeable about the pension system.

## 4.2 Retirement Plans

Current saving in retirement accounts supports financial well-being in retirement. A number of factors, including expected age of retirement, should affect the saving behavior of members during their careers. The survey asks members to characterize their current retirement plans. Table 9 reports the distribution of responses for those members not

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<sup>18</sup>The Health and Retirement Study in the U.S., a biennial panel study, began in 1992 with a representative sample of individuals ages 51-61 and their spouses.

already retired. Over one-third of members plan to never retire, that is, they will continue working as long as their health permits. Another 19% plan to partially withdraw from their career employment by either reducing work hours or becoming self-employed. Only 15% anticipate full retirement at (or after) the normal retirement age and less than 10% plan to retire early. Consistent with a short financial planning horizon, 19% of members have not formed any retirement plans.

Plans to fully exit the labor force at the normal retirement age are more common for older members and women. The normal retirement age for women is five years lower than men, but women have longer life expectancies. Men and younger workers are more likely to view partial retirement as a viable alternative. Non-pension savings is also positively associated with plans to retire either fully or partially.

Nearly 40% of members plan to never stop working which should influence the overall patterns of retirement saving in Chile. These individuals do not anticipate financing a period without labor income. Even without a planned withdrawal from the labor force, members can benefit from participation in the pension system. For example, access to disability benefits would be important in the case of a work-limiting health shock. In addition, the retirement account system does not penalize continued work while receiving benefits.

Finally almost one-fifth of members have not formed any plans for retirement. Unsurprisingly, the lack of a retirement plan is more common among younger members. Non-pension savings and a longer financial planning horizon are both less common among members with no retirement plans. Limited retirement plans could have important effects on voluntary retirement saving among Chileans. Among workers in the United States nearing retirement, Lusardi finds that those who thought less about their retirement accumulate less wealth and hold less sophisticated portfolios (?). Since a majority of Chilean members plan to never retire or have no retirement plans, we might similarly expect less active saving and account management.

Differences in retirement plans may also affect the usefulness of pension system knowl-

edge. Those planning to retire early may benefit from a better understanding of the account system, since early pension receipt requires a sufficiently large account balance. Yet, plans for early retire are associated with less pension knowledge. These members are 4% less likely to be more knowledgeable about the account system. In contrast, members who do not plan to retire or have not made any retirement plans may not value knowledge about their retirement accounts. As expected, members planning never to retire or having made no plans are 8% and 11% less likely to be knowledge about the account system.

### 4.3 Risk Preferences

Attitudes toward risk may also affect retirement savings behavior and participation in the pension system. For example, the insurance benefits and minimum pension guarantee may appeal to more risk averse members and encourage their continuous contributions to personal accounts. To measure risk preferences, the survey asks a battery of gambles over lifetime income. These questions are similar to those developed and first analyzed by Barsky et al. (1997) on the Health and Retirement Study. The questions in the Chilean survey begin with a hypothetical scenario:

Suppose you are the only source of income in the family, and have to change job. You have the possibility of choosing between two jobs that have the following characteristics. The first job guarantees you a fixed income level, and is safe for the rest of your life. The second job probably pays better, but the income is less certain.

The respondents then choose between five sets of certain and risky jobs. The risky job always has equal chances of doubling lifetime income or cutting lifetime income by a specific fraction. The downside risk varies across the questions from a 10% to 75% decline in income. Using responses to all five questions, we assign members to six risk categories.<sup>19</sup>

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<sup>19</sup> Almost 8% of members answering the income gambles provide inconsistent responses and are excluded from our analysis. For example, it is inconsistent to reject the risky job when the downside risk is 10% but then accept it when the downside risk increases to 75%. The questionnaire skip pattern in the HRS suppresses this form of response error.

The first row of Table 10 shows the distribution across these categories. Stated tolerance for risk increase from left-to-right. Over 72% of members reject all of the risky jobs in favor of the certain job. Less than 4% of members are in the most risk tolerant category and accept all of the risky jobs. Men, the more educated, high earners, and those with non-pension savings are more likely to be in the more risk tolerant categories.

In addition to these categorical controls, the question design allows us to estimate a cardinal proxy for a member's risk preference, the coefficient of relative risk tolerance. Responses to the income gambles imply boundaries on this underlying preference parameter. We follow the maximum-likelihood procedure from Barsky et al. (1997), which also addresses survey response error.<sup>20</sup> The third row of Table 10 presents the estimated risk tolerance for each category.

The last two rows provide responses to the same question on the Panel Study of Income Dynamics and the HRS. Chileans are much less risk tolerant than individuals in the United States. Whereas the majority of respondents in the United States choose at least one of the risky jobs, less than one-quarter of Chilean are willing to accept any job risk.

A low tolerance for risk may raise the value for information on the insurance benefits in the account system. In contrast, we find knowledge about the system is increasing in risk tolerance. The most risk tolerant members (risk tolerance of 0.333) are 14% more likely to be knowledgeable than the least risk tolerant (risk tolerance of 0.036).

#### 4.4 Correlation with Knowledge

The first three columns of Table 11 report the associations between knowledge and each of the planning and risk preference variables separately. Controlling for these variables jointly as well as basic member attributes weakens their association with knowledge. In

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<sup>20</sup>For additional details on the estimation procedure see Kimball et al. (2005). The correction for survey response error in the HRS relies on some respondents answering the income gamble question in two survey waves. With only one response from Chilean members, we calibrate the signal-to-noise ratio of the survey responses to the 0.35 estimate in the HRS.

fact, controlling for non-pension savings and other attributes greatly diminishes the role for planning horizons. The coefficient estimate on a longer planning horizon falls to 0.02 from 0.06 and is no longer statistically significant. Likewise, education substantially reduces the impact of risk tolerance on knowledge. There are still significant correlations between knowledge and retirement plans, though smaller in magnitude. These attributes should also affect account behavior, so the estimated effects of knowledge in Section 3 do not isolate the direct effect of knowledge on behavior. By including these controls, we can further improve our estimates for the relationship between knowledge and account behavior.

## **5 Retirement Savings and Knowledge**

More knowledgeable members are more active participants in the retirement account system. We investigate four choices facing members: basic contributions by the self-employed, additional contributions, having a voluntary savings account, and changing fund managers. Even after controlling for other attributes relevant to saving, such as planning horizons, expected retirement, and risk preferences, more pension knowledge is strongly associated with action. Under a counterfactual in which all members are knowledgeable, we estimate sizeable increases in the choice behaviors. While we cannot establish a clear causal link between more knowledge and more participation, our results suggest the potential importance of knowledge on current account decisions and future pension benefits.

### **5.1 Contributions to Retirement Accounts**

Self-employed members face a decision of whether or not to make monthly contributions to their retirement accounts. Their saving for retirement in personal accounts would likely reflect their preferences for future consumption, retirement plans, attitudes toward risk, non-pension savings, and other attributes. The results in the first column of Table 12 show that even after controlling for these attributes the positive association between knowledge

and contributions remains. In fact, the estimated marginal effect is unchanged from the bottom panel of Table 7. The self-employed who have above-average knowledge about the account system are 14% more likely to be currently making contributions. With only 29% of self-employed members contributing, the effect of knowledge is both statistically and economically significant.

None of the planning and preference variables exhibit a significant effect on contributions; however, the signs are in the expected direction. Older workers, employers, high earners, and those with non-pension savings are more likely to make contributions. Being a high school drop out or already retired significantly reduces the likelihood of contributions.

To quantify the potential impact of knowledge, we entertain a counterfactual in which all self-employed members are knowledgeable about the pension system. Using the coefficient estimates from the logit model, we predict the likelihood of each self-employed member contributing, assuming that he is "more knowledgeable" and his other attributes do not change. Common knowledge about the pension system raises the average probability of making a contribution to 36.8%. Of the 1,057 self-employed currently not contributing, 117 would need to make contributions to obtain this counterfactual prevalence. According to our estimates, the most likely to begin contributing are married men age 46 with monthly earnings of 300,000 pesos. If more knowledge leads to a one-time contribution, the effect on pension benefits would be small. A 10% contribution (of 30,000 pesos) in 2002 would raise their pension as a percent of current monthly earnings by less than 0.2 percentage points. If more knowledge translates into steady monthly contributions until retirement at age 65, the replacement rate of current earnings from the pension would rise by over 25 percentage points.<sup>21</sup> Under this scenario of increased knowledge, the self-employed with higher earnings are more likely to begin contributing. In this case, more knowledge and more contributions would have little effect on the government's financial

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<sup>21</sup>The calculations assume a 6% annual real return on account balances until age 65, a constant monthly wages until retirement of 300,000 pesos, a 4.6% real interest rate after retirement at age 65 in, a wife age 62, and a programmed withdrawal pension.

liabilities from providing welfare and minimum pensions.

All members can also make contributions to their retirement account beyond the 10% basic contribution. Individuals with intermittent contributions in the past, nearing their expected retirement age, or with high tax liabilities could benefit from these additional contributions. Yet, only 5% of members report using this saving option. As the second column of Table 12 shows, the more knowledgeable are 1% more likely to make voluntary contributions. Again controlling for planning horizon and risk preferences adds little additional information on the contribution decision. Only a plan to retire early significantly raises the likelihood of additional contributions. The rest of the estimates are similar to the results in Table 7. If all members were knowledgeable about the pension system, the average likelihood of making additional contributions rises to 5.9% from 5.2%. The relationship between the increase in additional contributions under common knowledge and the increase in pension benefits would depend on the level of the contributions.

## **5.2 Contributions to Voluntary Savings Accounts**

Voluntary savings accounts provide another vehicle for retirement savings. Though separate from retirement accounts, members can use their voluntary accounts to increase their retirement account balance and thus their pension benefit. About 14% of members with retirement accounts also have a voluntary savings account. After controlling for other relevant attributes, more knowledgeable members are 3% more likely to have a voluntary savings account. The point estimate on knowledge is only slightly lower than in Table 7 which excludes the planning and preference variables. The third column of Table 12 also shows that early retirement plans, higher education, and non-pension savings have large positive associations with voluntary savings. In contrast, the self-employed, those planning to never retire, or with no retirement plans are less likely to utilize this form of saving. Common knowledge about the pension system would increase the prevalence of voluntary savings accounts to 16% of members from the actual 14%.

### 5.3 Changing Pension Fund Administrators

Both contributions and asset returns affect members' account balance at retirement and their pension benefits. More knowledgeable members are more active in managing their accounts, that is, they are more likely to change their AFP. Overall 48% of members have switched their AFP at least once. In the last column of Table 12, more knowledge is associated with an 9% higher chance of switching. Relative to the overall prevalence, this is the smallest marginal effect from being more knowledgeable across the four choices. The effect of the other attributes on changing AFPs is qualitatively similar to the estimated effects on having a voluntary savings account. Under the counterfactual of common pension knowledge, the average probability of switching AFPs would increase to 53% from 48%. Whether this active management of the account improves financial well-being in retirement, depends on the AFP chosen as well as individual attributes.

### 5.4 Exogenous Variation in Knowledge

Our results suggest that improved knowledge about the account system could have a sizeable impact on active saving and account management. Yet, these results are suggestive rather than definitive. To identify the effect of knowledge, we control for knowledge and other observable attributes which affect account behavior. There may be other unobserved attributes in  $X$ , such as contribution history, which affect account behavior and pension knowledge. An alternate approach to identifying the direct effects of knowledge uses exogenous variation in knowledge, that is, a shift in some members' knowledge that does not directly affect their account behavior. The methods for disseminating system information may create random variation in the supply of knowledge, though we are unaware of any such policy instruments. A randomized field experiment would be even more informative. Providing additional system or account information to a randomly chosen subset of the survey participants and then following their subsequent account behavior would isolate the direct effects of knowledge. This could also identify the effects of specific information,



such as projected retirement benefits based on current account balance. While we find an important role for knowledge, unobserved differences may be driving this result. Rather than promoting a widespread information campaign to increase pension knowledge, our findings highlight a potential barrier to active participation and the need for further study.

There is a growing literature on the impact of psychology and knowledge on pension decisions. In the United States, default options are an important factor in pension plan participation (?). Information also has a sizable effect on participation and retirement saving. Duflo and Saez (2003) provide randomly selected employees in a subset of departments at a university with monetary incentives to attend to a benefits information fair. With this exogenous increase in attendance, they uncover sizable effects of information and social networks on the plan enrollment. Yet, the way in which information about saving options is conveyed also makes a difference. In another field experiment, individuals using a professional tax preparation service were randomly offered different match rates to their retirement account contributions. Duflo et al. (?) find that these higher match rates lead to higher contributions, even though an existing government program which effectively matches contributions (through lower taxes) has little effect. Our analysis shows that most Chileans do not understand the fundamental features of the account system. This related research suggests that information can raise retirement saving, but that the means of supplying knowledge are important. In addition, clearly explaining the current options for retirement savings, such as the tax deductions from additional savings, could increase saving.

Economic incentives and information are not the only determinants of saving (or borrowing) decisions. In the South African lending market, Bertrand et al (?) find that a marketing manipulation in an offer letter has the same effect as a one-half percentage point reduction in the monthly interest rate on loan applications. Our analysis of the Chilean survey responses suggests that similar marketing or psychological appeals may be influencing the decision to switch fund managers. Recall that the desire to help a sales person and gift were among the main reasons to switch managers. Frequent changes in

fund managers based on non-economic reasons result in higher administrative costs for the entire system without raising individuals' resources in retirement.

## 6 Conclusion

The personal account system in Chile combines individual choices and government safeguards to promote financial well-being in retirement. Our analysis of current members' behavior in the first Social Security Survey suggests that limited knowledge about the pension system may impede their full use of the system's options. Even in this relatively mature account system, few members understand their active role in financing their retirement benefits. Providing choices, even limited ones, in the retirement account system adds to its administrative cost. The benefits that individuals receive from tailoring accounts to their needs should balance these costs. Across a range of account decisions, we find that pension knowledge supports active participation in the account system even after controlling for demographics, planning horizons, risk tolerance, and retirement plans. More knowledgeable members are more likely to utilize the voluntary saving and account management options in the system, suggesting that more knowledge increases individuals' benefit from the personal accounts. Our results do not conclusively establish that more knowledge would produce more retirement saving; however, a basic understanding of the account system is arguably a prerequisite for sensibly managing one's retirement savings.

Over time the Chilean pension system has increased the discretion that members have in their retirement saving. Most recently, the Multifunds Law of 2002 provides members with asset allocation options for their retirement accounts. As with previous measures, there is considerable government regulation, with age-based investment caps on risky funds and sensible defaults for members not exercising their allocation choice. Yet, asset allocation raises even further the knowledge requirements for active members. Along with more choice, active involvement in the personal account system will require more knowledge. Without adequate knowledge, certain features of the system may have

unintended negative consequences. For example, the government mandates that members can switch their fund managers free of charge. This was designed to promote competition among managers and raise performance while keeping administrative costs low. Yet, if members switch for non-economic reasons or a lack of information, this measure may raise system costs.

As it matures the retirement account system in Chile is under increasing scrutiny. Low pensions paired with high administrative costs, large fund manager profits, and ongoing government subsidies have raised questions about the design of the system. Any reform discussion needs to consider the role of knowledge in system participation. Our results show there is substantial misunderstanding about the system, and that more knowledge is associated with more retirement saving. As demonstrated in other research, randomized field experiments provide a tool to quantify the impact of information and discern the best methods for delivering the necessary information to individuals.

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Table 1: Basic Contributions by Type of Employment

	All	Employees		Self-employed		
	Workers	Contract	No Contract	All	Employer	Independent
Respondents	9,302	6,404	1,159	1,684	316	1,368
% Contributing	76.1	98.0	24.4	29.3	56.6	22.9

Note: Tabulations include members of retirement account system under the normal retirement age (60 for women and 65 for men) who are currently working. All tabulations and regressions in the paper are unweighted. A small fraction (0.1-0.7%) of working members in each employment type do not know whether they are contributing.

Table 2: Additional Contributions to Retirement Accounts

	Response
Additional Contributors	658
% of Members	5.2
Reason Why	
(% of Additional Contributors)	
Obtain larger pension	57.6
Good investment	21.4
Retire early	10.8
Reduce taxes	5.5
Other	4.7
Reason Why Not	
(% of Additional Non-Contributors)	
Didn't know about option	61.3
Low income	17.5
Not interested	16.0
Other	4.4
Distrust system	0.9

Note: Tabulations include the 12,589 account members under the normal retirement age who respond to the additional contribution question.

Table 3: Voluntary Savings Accounts

	Response
Voluntary Savings Account	1,756
% of Members	13.3
Reason	
(% of Voluntary Account Holders)	
Good investment	47.9
Convenience	28.5
Obtain larger pension	14.2
Other	6.0
Retire early	3.4
Reason Why Not	
(% of Non-Account Holders)	
Didn't know about option	62.3
Not enough money	17.4
Not interested	14.5
Other	5.9

Note: Tabulations include the 12,565 account members under the normal retirement age who respond to the voluntary saving account question.

Table 4: AFP Annual Returns and Monthly Commissions

AFP	Annual Real Returns			Commission		Fees as % of Monthly Earnings		
	1990	1995	2002	Fixed (Pesos)	Variable (%)	112,000	160,000	260,000
Cuprum	18.2	-1.8	1.7	0	2.5	2.5	2.5	2.5
Habitat	15.9	-2.8	3.7	790	2.1	2.8	2.6	2.4
Magister	15.8	-3.3	3.1	690	2.6	3.2	3.0	2.8
Planvital	18.7	-2.6	3.2	1000	2.6	3.4	3.2	2.9
Provida	13.3	-2.5	3.0	390	2.3	2.6	2.5	2.4
Santa Maria	14.6	-3.3	2.9	695	2.3	2.9	2.7	2.6
Summa Bansander	18.1	-2.1	3.1	690	2.3	3.0	2.8	2.6

Note: The source for the returns and commissions is the Superintendency of AFP ([www.safp.cl](http://www.safp.cl)).



Table 5: Changes in Pension Fund Administrator

	Response
Ever Changed AFP	6,090
% of Members	47.6
Changes	
(% of Changers)	
One	46.9
Two	23.9
Three	16.1
Four or more	13.1
Reason	
(% of Changers)	
Help a sales person	23.5
Friend's recommendation	22.6
Obtain a higher return	19.2
Fund reputation	9.5
Employer required	7.6
Other	5.9
Gift	4.8
Lower fees	4.8

Note: Tabulations include the 12,797 account members under the normal retirement age who respond to the fund administrator questions.

Table 6: Knowledge of Retirement Accounts

Question	% of Answers		
	Correct	Incorrect	Don't Know
Contribution rate?	28.3	25.7	46.1
How funds invested?	9.8	19.0	71.2
Amount of variable fees?	2.0	4.8	93.3
How benefits calculated?	13.8	7.5	78.8
Normal retirement age?	80.4	15.6	4.0
Early retirement possible?	74.3	0.0	25.7
Value of minimum pension?	4.8	15.2	79.9
Condition for minimum pension?	6.6	15.7	77.7

Note: Tabulations include the 12,589 account members under the normal retirement age who respond to the pension knowledge questions. The mean number of correct responses is 2.2 and 36% of members answer 3 or more questions correctly.

Table 7: Personal Account Decisions, Knowledge, and Basic Member Attributes

	Marginal Effects by Decision			
	Basic Contributions	Additional Contributions	Voluntary Savings Account	Changed AFP
Controls				
More Knowledgeable	0.192 (0.026)**	0.026 (0.005)**	0.080 (0.007)**	0.162 (0.010)**
Log-likelihood	-867.0	-2269.4	-4450.8	-7647.7
Pseudo- $R^2$	0.032	0.008	0.015	0.018
More Knowledgeable	0.135 (0.028)**	0.011 (0.004)**	0.035 (0.005)**	0.089 (0.011)**
Age / 10	0.086 (0.013)**	0.009 (0.002)**	0.016 (0.003)**	0.074 (0.005)**
Male	0.009 (0.029)	0.012 (0.004)**	0.021 (0.006)**	0.101 (0.011)**
Married	0.004 (0.026)	0.008 (0.004)	0.029 (0.006)**	0.076 (0.011)**
Less than High School	-0.090 (0.029)**	-0.011 (0.005)*	-0.070 (0.007)**	-0.110 (0.013)**
Technical Degree	0.030 (0.041)	0.010 (0.006)	0.035 (0.010)**	0.082 (0.016)**
College Degree	0.017 (0.043)	0.006 (0.007)	0.025 (0.010)*	0.035 (0.019)
Currently Working		0.003 (0.006)	0.050 (0.007)**	0.118 (0.016)**
Employer	0.179 (0.038)**	0.002 (0.010)	-0.065 (0.010)**	-0.306 (0.024)**
Independent		0.003 (0.006)	-0.070 (0.007)**	-0.177 (0.016)**
Monthly Earnings / $10^6$	0.014 (0.005)**	0.003 (0.001)*	0.003 (0.001)**	0.031 (0.006)**
Retired	-0.138 (0.055)*	0.005 (0.010)	-0.020 (0.016)	-0.108 (0.026)**
Non-Pension Savings	0.121 (0.027)**	0.023 (0.005)**	0.040 (0.007)**	0.025 (0.011)*
Log-likelihood	-755.6	-2168.6	-4159.0	-7024.8
Pseudo- $R^2$	0.1563	0.05	0.08	0.10
Dependent Mean	0.290	0.052	0.139	0.482
Respondents	1,488	11,240	11,220	11,240

Note: The first column only includes self-employed members. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. Robust standard errors in parentheses. Statistical significance at 5%-level denoted \* and 1% \*\*.

Table 8: Financial Planning Horizon

	Planning Horizon				
	Next Few Months	Next Year	Next Few Years	Next 5 – 10 Years	Longer than 10 Years
Respondents	8,833	1,841	1,238	343	301
% of Members	70.3	14.7	9.9	2.7	2.4
% Male	56.2	57.9	54.3	59.5	57.5
Mean Age	38.0	38.1	37.8	39.1	39.1
Median Monthly Earnings	150,000	180,000	177,000	220,000	180,000
Mean Education	10.5	11.2	11.5	11.9	11.3
% Non-Pension Savings	30.6	40.5	42.8	49.9	39.5
Memo: U.S. Data					
% in HRS	18.8	10.8	33.0	28.5	8.9

Note: Tabulations of the 12,556 account members under the normal retirement age who respond to the planning horizon question. Median monthly earnings from primary job only include those with non-zero earnings. The U.S. data is from the 1992 Health and Retirement Study. The tabulations use a representative sample of persons ages 51 to 61.

Table 9: Retirement Plans

	Expected Retirement				No Plans
	Early	Normal	Partial	Never	
Respondents	1,136	1,809	2,301	4,501	2,264
% of Members	9.5	15.1	19.2	37.5	18.8
% Male	59.1	48.5	62.0	61.1	49.5
Mean Age	35.6	38.9	36.8	38.4	36.3
Median Monthly Earnings	180,000	180,000	180,000	150,000	150,000
Mean Education	11.5	11.6	11.7	10.2	10.5
% Non-Pension Savings	39.9	36.7	42.2	31.6	29.1

Note: Tabulations of 12,011 account members under the normal retirement age and not already retired who respond to the retirement plans question. Early retirement occurs before age 60 for women and before age 65 for men. Normal retirement is a plan to fully retire at age 60 or older for women and age 65 or older for men. Partial retirement includes reducing hours or moving to self-employment. Median monthly earnings from primary job only include those with non-zero earnings.

Table 10: Risk Tolerance

	Risk Category by Downside Risks					
	Reject All	Accept 1/10, Reject 1/5	Accept 1/5, Reject 1/3	Accept 1/3, Reject 1/2	Accept 1/2, Reject 3/4	Accept All
Respondents	8,346	1,043	1,068	475	137	406
% of Members	72.7	9.1	9.3	4.1	1.2	3.5
Risk Tolerance Proxy Value	0.036	0.088	0.111	0.140	0.190	0.333
% Male	53.9	55.1	63.1	67.2	70.1	71.2
Mean Age	38.5	37.3	36.3	36.0	36.3	36.1
Median Earnings	150,000	180,000	200,000	217,500	250,000	200,000
Mean Education	10.4	11.6	12.2	12.6	13.0	11.9
Non-Pension Savings	32.8	36.0	39.4	37.3	39.4	37.4
Memo: U.S. Data						
% in PSID	31.3	18.1	15.5	14.9	13.7	6.6
% in HRS	43.5	19.0	15.7	9.7	6.2	6.0

Note: Tabulations of 11,457 account members under the normal retirement age who provide consistent answers to the income gambles. 1,053 of members (8.1 % of the total) provide inconsistent responses to these questions and are not included in these tabulations. The proxy values correspond to the methods in Kimball et al. (2005) and assume a signal-to-noise ratio of 0.35 in the gamble responses. The U.S. data is from the 1996 Panel Study of Income Dynamics and the 2002 Health and Retirement Study.

Table 11: Pension Knowledge, Planning and Preferences

of Selected Controls	Marginal Effect on Overall Knowledge			
	Horizon Only	Retirement Plans Only	Risk Toler- ance Only	All + Basic Attributes
Longer Horizon	0.063 (0.013)**			0.021 (0.013)
Plan to Retire Early		-0.039 (0.016)*		-0.037 (0.017)*
Never Plan to Retire		-0.076 (0.011)**		-0.027 (0.011)*
No Retirement Plan		-0.110 (0.012)**		-0.060 (0.013)**
Risk Tolerance			0.457 (0.072)**	0.130 (0.076)
Log-Likelihood	-7342.3	-7303.4	-7334.2	-6829.0
Pseudo- $R^2$	0.002	0.007	0.003	0.072

Note: The estimation includes 11,240 members account members under the normal retirement age, as in columns 2 and 4 of Table 7. 36.2% of these members answered three or more questions correct about the pension system and are considered more knowledgeable. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. The second column also controls for already retired, so the omitted category is a normal retirement plan. In the fourth column, the controls include age, gender, marital status, education levels, low-income worker, self-employed, monthly earnings, any non-pension savings, and region. Robust standard errors in parentheses. Statistical significance at 5%-level denoted \* and 1% \*\*.

Table 12: Determinants of Personal Account Decisions

Controls	Marginal Effects by Decision			
	Basic Contributions	Additional Contributions	Voluntary Savings Account	Changed AFP
More Knowledgeable	0.135 (0.028)**	0.011 (0.004)**	0.034 (0.006)**	0.088 (0.011)**
Longer Horizon	0.0001 (0.036)	0.008 (0.005)	0.005 (0.008)	0.012 (0.015)
Plan to Retire Early	0.052 (0.058)	0.017 (0.008)*	0.028 (0.011)*	0.005 (0.019)
Never Plan to Retire	-0.028 (0.029)	0.003 (0.005)	-0.022 (0.007)**	-0.049 (0.012)**
No Retirement Plans	-0.038 (0.036)	-0.008 (0.005)	-0.025 (0.008)**	-0.055 (0.015)**
Risk Tolerance	-0.143 (0.178)	-0.005 (0.029)	0.076 (0.046)	0.046 (0.086)
Age / 10	0.087 (0.013)**	0.009 (0.002)**	0.017 (0.003)**	0.075 (0.006)**
Male	0.011 (0.029)	0.012 (0.004)**	0.020 (0.006)**	0.101 (0.011)**
Married	0.003 (0.026)	0.008 (0.004)	0.028 (0.006)**	0.075 (0.011)**
Less than High School	-0.090 (0.028)**	-0.011 (0.005)*	-0.068 (0.007)**	-0.107 (0.013)**
Technical Degree	0.028 (0.041)	0.010 (0.006)	0.032 (0.010)**	0.077 (0.016)**
College Degree	0.019 (0.044)	0.006 (0.007)	0.021 (0.010)*	0.028 (0.019)
Currently Working		0.002 (0.006)	0.048 (0.007)**	0.116 (0.016)**
Employer	0.178 (0.038)**	0.002 (0.010)	-0.064 (0.011)**	-0.304 (0.024)**
Independent		0.004 (0.006)	-0.067 (0.007)**	-0.173 (0.016)**
Monthly Earnings / 10 <sup>6</sup>	0.013 (0.005)**	0.002 (0.001)*	0.003 (0.001)*	0.030 (0.006)**
Retired	-0.148 (0.052)**	0.006 (0.011)	-0.029 (0.015)*	-0.138 (0.026)**
Non-Pension Savings	0.118 (0.027)**	0.022 (0.005)**	0.038 (0.007)**	0.022 (0.011)
Log-likelihood	-753.6	-2161.8	-4141.4	-7012.1
Pseudo- $R^2$	0.159	0.055	0.084	0.099
Dependent Mean	0.290	0.052	0.139	0.482
Respondents	1488	11240	11220	11240

Note: The first column only includes self-employed members. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. Robust standard errors in parentheses. Statistical significance at 5%-level denoted \* and 1% \*\*.