

# Knowledge and Retirement Saving with Personal Accounts in Chile

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## Abstract

Chileans with more knowledge about their pension system more actively contribute to and manage their personal retirement accounts. This positive association between knowledge and retirement saving remains even after controlling for other relevant attributes, such as financial planning horizons, retirement plans, and risk preferences. 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. This micro-level analysis of retirement saving suggests, that members require more pension knowledge to fully utilize their choices in Chile's personal account 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 accounts 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 would 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.

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 First Social Protection Survey (2002) with its nationally representative sample of over 13,500 individuals with personal accounts allows us to carefully examine decisions across a diverse group of members. This recent survey of pension system affiliates was conducted from May 24, 2002 to January 15, 2003.<sup>2</sup>

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<sup>1</sup>A large literature does exist on the macroeconomic effects of the Chilean personal account system, its institutional details, and the transition from a pay-as-you-go pension system, for example, Diamond and Valdés-Prieto (1994). 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

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. Then Section 3 examines member attributes, which should inform their retirement saving. In particular, we focus on members' planning horizons, retirement plans, and risk preferences. In Section 4, we document the limited knowledge of the retirement account system and discuss the potential demand for and supply of knowledge. Section 5 demonstrates the relationship between pension knowledge and personal account choices. 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.

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>

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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.

<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.

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 (60 for women and 65), 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 does 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 members, who have made regular contributions to their retirement accounts. Studies of

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<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.

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 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 their continued contributions. All working members of the system can also make additional voluntary contributions to their retirement accounts. Initially, members could only contribute an additional 10% of monthly earnings tax-free and these funds could not be withdrawn from the accounts before retirement; however, by 2002 the maximum is 50UF per month and additional contributions (plus the interest earned) can be withdrawn early at a tax penalty. The government mandates a minimum saving rate for most workers, yet there are 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% of workers in the economy and 18% of workers in the account system.<sup>7</sup> In addition, their

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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 of 160,000 pesos.

<sup>7</sup>The former statistic is from the *Instituto Nacional de Estadísticas* (2005) and the latter is from

contribution behavior differs substantially from that of employees. As Table 1 shows, only 30% of self-employed members are currently contributing to their retirement accounts, in contrast to 87% of employees.<sup>8</sup> 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. 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 affects the government's financial liabilities in the pension system. The self-employed, 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 (57%) 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 retirement

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authors' calculations of the First Social Protection Survey 2002.

<sup>8</sup>Contributions are mandatory for employees in the formal sector, which should lead to a 100% contribution rate. Among the 85% of employees with a contract (a requirement in the formal sector), 99% report contributions. There is also the potential for survey response error.

accounts and voluntary savings accounts, these accounts are separate. The self-employed can, 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 account holders is the good management of the funds. Convenience (29%) 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 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 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 administra-

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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 is 0% when the average is 2%. Likewise, AFPs deposit returns above the higher of two thresholds: 1) 2 percentage points above the average or 2) 50% above the average in a reserve fund. If an AFP cannot meet the minimum return payments with this reserve fund, the AFP is liquidated and the government provides the minimum return.

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

### **3 Planning and Preferences of Members**

Numerous individual and household characteristics may influence retirement saving behavior and active management of personal accounts. Any analysis of account decisions must recognize the impact of individual circumstances and preferences. The First Social Protection Survey provides detailed information on members of the retirement account system. Table 6 characterizes members of the retirement account system (excluding those already receiving an old-age or disability pension). At an average age of 38, most members are still in their prime earning years and have several years to contribute before retirement. The majority of members are men and married women are less likely to be members than single women. Three-quarters of members have a high school degree or less.

Among those working at the time of the survey, 82% are employees and 18% are self-employed. The vast majority of employees have a long-term contract and consider their positions permanent. The median monthly earnings of 160,000 pesos is about 40% above the legal minimum monthly wage (111,200 pesos), and there is considerable dispersion

in earnings. Average monthly earnings are twice the minimum wage, but almost 30% of workers report earnings below the minimum. Part-time workers and independents are more likely to be in this low income group. Less than 2% of workers have earnings above the taxable maximum of 1,004,747 pesos.

The last two rows of Table 6 describe household wealth outside of the pension system. Members can report 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. Interestingly, only 4% of members report wealth in the pension system, even though all members by definition have some savings in their personal accounts. This likely reflects a misunderstanding about the nature of the retirement accounts or the survey question. In contrast, home ownership is quite common covering 70% of members. With these basic measures of household wealth, we can examine the interaction between saving in the account system and in external assets.

In the rest of 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 saving behavior, our analysis is the first for Chile. For each of the concepts, we present the distribution of responses and use multivariate analysis to discern patterns 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. We also discuss how these attributes could affect retirement saving in personal accounts.

### 3.1 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 7 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 14% 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 7 contrasts planning horizons from the 1992 Health and Retirement Study in the United States. with a similar age-sample of Chilean members.<sup>10</sup> Among those nearing retirement, 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

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<sup>10</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.

6% in Chile. Furthermore, there is less variation in Chilean planning horizons. The most common horizon of the next few months covers 71% of Chilean members, whereas the most common horizon in the U.S. of the next few years covers only one-third of respondents.

Among members of the account system there are few predictors of financial planning horizons. We define a “longer horizon” as one spanning the next few years or more, thus 15% of members make plans over a longer horizon. Table 8 shows that controlling for other characteristics, members with college degrees, higher monthly earnings, and non-pension savings are more likely to have a longer horizon.<sup>11</sup> Having a college degree raises the likelihood by 6% and non-pension savings by 5%. Both are statistically significant and represent about one-third of the overall prevalence of longer horizons. Relative to employees, independents are 3% less likely to have a long planning horizon.

## 3.2 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. Over one-third of members plan to never retire, that is, they will continue working as long as their health permits. Another 18% 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. Parallel to the short financial planning horizon, 18% of members have not formed any retirement plans.

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<sup>11</sup>Unless otherwise noted, we estimate binary response models, such as longer planning horizon, with a logit model. The reported response probabilities, or marginal effects, are computed at the sample average of the controls.

Using multivariate analysis, we examine patterns across the various retirement plans. Table 10 reports the estimated marginal effects from logit models. Those who are younger, married, have higher monthly earnings, and have non-pension savings are more likely to expect an early retirement. Self-employed are less likely to anticipate an early withdrawal from the labor force. With pension level requirements for early retirement, we would predict a positive correlation between early retirement plans and income. The higher prevalence of early retirement plans among younger workers may; however, reflect limited knowledge about these rules.

From the second column of Table 10, plans to fully exit the labor force at the normal retirement age are more common for older members, women, and the more educated. The normal retirement age for women is five years lower than men, but women have longer life expectancies. Again, the self-employed are less likely to plan on full retirement. In the third column, men, younger workers, and the more educated are more likely to view partial retirement as a viable alternative. Interestingly, those with non-pension savings and higher earnings also expect a phased retirement.

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. As the fourth column of Table 10 shows, plans to never retire are more common among older members, men, the less educated, those currently working, and the self-employed. The effects of education and self-employment are particularly large in magnitude with high school drop outs being 7% more likely and independents being 10% more likely to not anticipate retirement. While this plan could reflect an preference for continued gainful employment, the results suggest an expected inability to finance retirement. In fact, those with higher monthly earnings, non-pension savings, and a spouse are less likely to anticipate no retirement. 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.

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 and those with discontinuous attachment to the work force (women and not currently employed). Having non-pension savings and a longer financial planning horizon both lower the chance of no retirement plans, though the latter effect is not statistically significant. 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 (2003). 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.

### **3.3 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>12</sup> The first row of Table 11 shows the distribution across these categories. Stated tolerance for risk increase from left-to-right. Over 70% of members reject all of the risky jobs in favor of the certain job. Less than 2% 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 longer planning horizons 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>13</sup> The third row of Table 11 presents the estimated risk tolerance for each category. Comparisons with the last two rows reveal that Chileans are much less risk tolerant than individuals in the United States. The estimates from the

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<sup>12</sup>Almost 9% 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.

<sup>13</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.

Panel Study of Income Dynamics cover a broad age sample, not unlike the Chilean survey and the Health and Retirement Study focuses on older individuals. Even compared to older Americans, relative risk tolerance of Chileans is only half as large.

The variation in risk tolerance across members does correspond with variation in several “risky” behaviors. Table 12 reports the coefficient estimate on the risk tolerance proxy in a series of regressions. In each case, the dependent variable is some risk-related behavior, such as smoking or holding stocks.<sup>14</sup> These multivariate regressions also control for age, gender, region, monthly earnings, education, and marital status. While not statistically significant, higher risk tolerance is associated with an increased likelihood of smoking and more cigarettes per week conditional on smoking. Risk tolerance exhibits a strong, positive association with being self-employed. A member accepting all risky jobs has a 12%  $((0.415 - 0.048) * 0.325)$  higher chance of being self-employed than a member rejecting all risky jobs. This effect is large in magnitude relative to the average prevalence of 18%. Higher risk tolerance also predicts more years of education as well as home-ownership. Purchasing life insurance is more common among the more risk averse though the effect is not statistically significant.

Higher risk tolerance should also increase the willingness of members to hold their non-pension savings in risky assets such as stocks. Yet, we find a negative association between stock ownership and risk tolerance. The most risk tolerant are actually 3% less likely to hold stocks than the least risk tolerant. In spite of their risk tolerance, high management fees (and fixed costs) associated with Chilean mutual funds may discourage small savers from holding stocks. Without a measure of wealth levels, we cannot directly test this hypothesis. Another survey question provides some evidence that higher risk

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<sup>14</sup>To estimate the relationship between risk tolerance and binary dependent variables, we use a linear regression model. This makes our results comparable to those in Barsky et al (1997). Estimated marginal effects from a logit model are qualitatively similar.

tolerance does increase the desire to hold risky assets. Under a hypothetical scenario, the survey asks members how they would allocate the AFP funds. Those who would place most or all of the funds in high-return, high risk assets tend to be more risk tolerant. The most risk tolerant are 20% more likely to favor the high-risk, high return strategy. Overall risky financial assets are not popular among members, which reflects the generally high aversion to risk. The risk tolerance proxy does capture important differences in risk attitudes across members.

## **4 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. Our analysis of pension knowledge incorporates the choices facing particular members and other relevant attributes, such as type of employment and retirement plans. We begin by assessing the overall knowledge of personal accounts and find that most members reveal a very limited understanding of the system. Members, who have greater discretion in the system and would particularly benefit from more knowledge, are often less familiar with the system. At the end of this section, we discuss the ways in which members can learn about the system.

### **4.1 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 nine 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 four questions pertain to the contribution phase:

1. What is the monthly contribution as a percent of earnings? [10%-13%]
2. What is the maximum taxable income for contributions? [60UF]
3. How are the AFP funds invested? [mainly interest-bearing]
4. Does your AFP receive variable commissions to manage your account? [Yes]

The top panel of Table 13 displays the distribution of responses. With each of these contribution questions, a large portion of members do not even hazard an answer. 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. In contrast, the taxable maximum at six times the median wage is binding for few members, so the 5% of members with correct answers is not surprising. While 30% of members claim knowledge about the asset allocation of retirement funds, less than 10% correctly identify the low-risk investment strategy of the AFPs. 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, less than 4% of members know that AFPs receive management fees as a percent of their monthly earnings.

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

5. How are pensions from the AFP calculated? [account balance and other factors like retirement age]
6. What is the legal retirement age for men? [65] For women? [60] <sup>15</sup>
7. Fulfilling certain requirements, can one retire early?<sup>16</sup> [Yes]
8. How much is minimum pension guaranteed by the state?<sup>17</sup> [70,000-85,000 pesos]
9. What are the conditions for the minimum pension? [contributions for 20 years or 240 months]

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 (2004).

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

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<sup>15</sup>For this question, we combine responses from two related survey questions in a single item.

<sup>16</sup>This question does not offer “don’t know” as a potential response.

<sup>17</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.

minimum pension and about 7% the required contribution history. In a study of Santiago workers, Barr and Packard suggest that some self-employed workers make contributions to their accounts just for the guarantee (2002). Such strategic contribution behavior is hard to reconcile with the general lack of knowledge about the pension guarantee.

Members' answers across all nine questions reveal limited overall knowledge of the pension system. On average, members answer only 2.25 questions correctly and the median is two correct answers. Only 5% 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".

## 4.2 Value of Knowledge

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

Employment status would likely affect the potential value of pension knowledge. For the self-employed, participation in the account system is voluntary. In deciding whether or not to contribute, knowledge of the contribution rates, their current balance, and benefit calculations would be useful. Yet, the results of the multivariate analysis in Table 14 show that the self-employed are actually less informed about the pension system. After controlling for other attributes, the self-employed are 8% less likely to be among the more knowledgeable members. They are 13% less likely to know the current balance

in their retirement account and do not possess significantly more knowledge about the benefit calculation or eligibility for the minimum pension. Likewise, those members with intermittent employment (proxied by not currently working) face a decision of whether or not to work and make further contributions. Across all the dimension of pension knowledge in Table 14, these intermittent workers do not possess significantly more knowledge on the benefit calculation nor in the minimum pension conditions.

Differences in retirement plans may also affect the usefulness of pension system knowledge. 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, in Table 14, early retirement plans are often associated with less knowledge, though the estimated effect is not statistically significant. While the ability to realize their plans depends foremost on their account balance, these members are only 1% more likely to know their balance. This effect is both statistically insignificant and small in magnitude relative to the 45% of members, who know their balance. 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, these two groups of members do appear less knowledgeable about the pension system.

Members with non-pension savings also have more discretion in the account system, since they have resources to make additional contributions to their retirement accounts or open a voluntary savings account. Depending on the level of their current income, they could also obtain tax benefits by saving in the account system rather than in external assets. Altogether we would expect these savers to have more knowledge about the account system. Table 14 reports that, controlling for other attributes, non-pension savers are 4% more likely to be among the more knowledgeable members and 6% more likely to know their account balance.

### 4.3 Supply of Knowledge

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>18</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.

According to the survey responses, only 60% of members regularly receive an account statement. Three-quarters of the recipients claim to read the statement. Among readers, 60% find the statement clear and comprehensible though only 18% use it to make account decisions. Overall less than 10% of members are actively using these account statements. The statements do have an impact on members' overall knowledge of the system. For example, 44% of members who receive a statement are knowledgeable about the system versus 28% of members who do not receive a statement. Unsurprisingly, receiving a statement also raises the likelihood that members know their account balance from 26% to 57%. 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.

Member attributes and behavior may also be important for translating account information into useful knowledge about the pension system. As the regressions in Table 14 show, there is a strong correlation between educational attainment and pension knowledge. After controlling for income, non-pension wealth and employment status, the more

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<sup>18</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.

educated do not face substantially higher benefits from more knowledge, however, they likely incur lower costs in gaining pension knowledge. We cannot rule out the possibility that active participation in the account system causes members to be more knowledgeable; however, the long lag between retirement saving and pension benefits weakens such learning-by-doing arguments. Furthermore, the conversion of account balances to pension benefits is a one-time event, which limits the knowledge members can gain from their own experiences.

## **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 15, show the expected associations between member attributes and basic contributions, though many are not statistically significant. Older workers, employers, high earners, and those with non-pension savings are more likely to make contributions. Above all else, being more knowledgeable about the pension system has the largest effect on contributions. The self-employed who have above-average knowledge about the account system are 14% more likely to be currently making contributions. With only 30% of self-employed members contributing, the effect of knowledge is both statistically and economically significant.

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 given his other attributes. Common knowledge about the pension system raises the average probability of making a contribution to 37.7% from the actual 29.6%. Of the 1,008 self-employed currently not contributing, 115 would need to make contributions to obtain this counterfactual prevalence. According to our estimates, the most likely to begin contributing are married men at age 47 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 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 would rise by over 25 percentage points.<sup>19</sup> Under this scenario of increased knowledge, the self-employed with higher earnings are more likely to begin contributing. In this case, more knowledge

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<sup>19</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.

and more contributions would have little effect on the government's financial 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 15 shows, the more knowledgeable are 1% more likely to make voluntary contributions. Only non-pension savings has a larger association with using this option. 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 given full 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 4% more likely to have a voluntary savings account. The third column of Table 15 also shows that early retirement plans, higher education, and non-pension savings have large positive associations with voluntary savings. In contrast, the self-employed are much 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 49% of members have switched their AFP at least once. In the last column of Table 15, more knowledge is associated with an 8% 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 54% from 49%. Whether this active management of the account improves financial well-being in retirement, depends on the AFP chosen; however, members' do not report their current or past AFPs.

## 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 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. 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.

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.

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Table 1: Basic Contributions by Type of Employment

	All Working		Self-employed		
	Members	Employees	All	Employers	Independents
Respondents	9,165	7,542	1,623	311	1,312
% Contributing	76.9	87.0	30.0	57.2	23.5

Note: Working members currently receiving an old-age or disability pension are excluded. All tabulations and regressions in the paper are unweighted. Percentages exclude item non-response.

Table 2: Additional Contributions to Retirement Accounts

	Response
Additional Contributors	708
% of Members	5.3
Reason Why	
(% of Additional Contributors)	
Obtain larger pension	57.9
Good investment	21.1
Retire early	10.7
Reduce taxes	5.8
Other	4.5
Reason Why Not	
(% of Additional Non-Contributors)	
Didn't know about option	61.6
Low income	17.4
Not necessary	15.9
Other	4.3
Distrust system	0.9

Note: Tabulations include 13,271 members responding.

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 necessary	17.4
Low income	14.5
Other	5.9

Note: Tabulations include 13,244 members responding.

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	6,321
% of Members	46.6
Changes (% of Changers)	
One	46.9
Two	24.0
Three	16.2
Four or more	12.9
Reason (% of Changers)	
Help a sales person	23.2
Friend's recommendation	22.6
Obtain a higher return	19.4
Fund reputation	9.6
Employer required	7.6

Note: Tabulations include 13,565 members responding. Percentages are adjusted for item non-response.

Table 6: Characteristics of Members

	Members
Mean Age	38.0
% Male	55.2
% Husbands	29.7
% Wives	19.8
Education	
Mean Years	10.7
% Less than High School	27.9
% High School	47.4
% Technical	12.4
% College	12.3
Current Workers	
% Employee	82.3
% Employees with Contract	84.7
% Self-employed	17.7
Median Monthly Earnings	160,000
Mean Monthly Earnings	232,779
% Below Minimum Wage	28.3
% Above Taxable Maximum	1.5
Mean Weekly Hours	47.7
% Firm Size 1-9	37.7
% Firm Size 10-499	42.5
% Firm Size 500+	19.8
% with Non-pension Savings	33.8
% Home Owner	69.3

Note: Tabulations of 12,537 members exclude those already receiving an old-age or disability pension. Statistics for monthly earnings in December 2002 pesos only include non-zero amounts from primary job. Underlying sample size also varies with employment status and item non-response.

Table 7: Financial Planning Horizon

	Planning Horizon				
	Next Few Months	Next Year	Next Few Years	Next 5 – 10 Years	Longer than 10 Years
Respondents	8,690	1,802	1,205	332	292
% of Members	70.5	14.4	9.8	2.7	2.4
% Male	54.6	56.3	52.8	58.7	56.2
Mean Age	37.9	37.8	37.4	38.6	38.8
Median Monthly Earnings	150,000	180,000	172,500	220,000	180,000
Mean Education	10.5	11.3	11.6	11.9	11.3
% Non-Pension Savings	30.5	40.5	43.0	50.0	39.4
Memo:					
% in U.S. ages 51-61	18.8	10.8	33.0	28.5	8.9
% in Chile ages 51-61	69.9	13.9	10.1	3.2	2.9

Note: Tabulations of 12,321 members responding to the planning horizon question exclude pensioners. Median monthly earnings from primary job only include those with non-zero earnings.

Table 8: Determinants of Longer Planning Horizon

Controls	Marginal Effects
Age/10	0.0004 (0.003)
Male	-0.003 (0.007)
Married	-0.008 (0.006)
Less than High School	-0.003 (0.008)
Technical	0.015 (0.010)
College	0.058 (0.012)**
Currently Working	0.0003 (0.008)
Employer	-0.002 (0.019)
Independent	-0.035 (0.009)**
Monthly Earnings / $10^6$	0.006 (0.001)**
Non-Pension Savings	0.048 (0.007)**
Dependent Mean	0.148
Log-likelihood	-4959.3
Pseudo- $R^2$	0.026

Note: The sample of 12,120 members excludes pensioners. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. The binary dependent variable takes value of 1 for members with planning horizons of next few years or longer. Estimated effects for the 13 regions of Chile not reported. Robust standard errors in parentheses and statistical significance at 1%-level denoted \*\* and 5%-level \*.

Table 9: Retirement Plans

	Expected Retirement				No Plans	Already Retired
	Early	Normal	Partial	Never		
Respondents	1,118	1,821	2,271	4,424	2,274	445
% of Members	9.1	14.7	18.4	35.8	18.4	3.6
% Male	58.5	47.8	61.5	60.0	49.0	19.8
Mean Age	35.3	39.1	36.6	38.3	36.6	48.9
Median Monthly Earnings	180,000	180,000	180,000	150,000	150,000	80,000
Mean Education	11.6	11.5	11.7	10.2	10.5	8.1
% Non-Pension Savings	40.0	36.5	42.2	31.6	28.8	14.6
% Longer Horizon	14.7	16.0	16.0	14.6	13.8	12.0

Note: Tabulations of 12,353 members responding to the retirement plans question exclude pensioners. 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: Determinants of Retirement Plans

Controls	Marginal Effects by Retirement Plan				
	Early	Normal	Partial	Never	No Plans
Age/10	-0.021 (0.002)**	0.026 (0.003)**	-0.014 (0.004)**	0.021 (0.005)**	-0.013 (0.004)**
Male	0.004 (0.005)	-0.045 (0.007)**	0.043 (0.007)**	0.045 (0.009)**	-0.040 (0.008)**
Married	0.018 (0.005)**	0.017 (0.007)*	0.011 (0.008)	-0.035 (0.009)**	-0.009 (0.007)
Less than High School	-0.011 (0.006)	-0.025 (0.008)**	-0.050 (0.009)**	0.071 (0.012)**	0.005 (0.009)
Technical	0.013 (0.008)	0.037 (0.011)**	0.027 (0.012)**	-0.042 (0.014)**	-0.035 (0.010)**
College	-0.008 (0.008)	0.074 (0.013)**	0.055 (0.013)**	-0.082 (0.016)**	-0.039 (0.012)**
Currently Working	0.018 (0.006)**	0.038 (0.007)**	-0.001 (0.009)	0.041 (0.013)**	-0.080 (0.011)**
Employer	-0.021 (0.014)	-0.077 (0.013)**	0.028 (0.024)	0.100 (0.032)**	0.011 (0.027)
Independent	-0.037 (0.007)**	-0.089 (0.008)**	0.021 (0.012)	0.102 (0.016)**	0.013 (0.013)
Monthly Earnings / 10 <sup>6</sup>	0.004 (0.001)*	-0.002 (0.001)	0.003 (0.001)*	-0.014 (0.004)	-0.001 (0.003)
Non-Pension Savings	0.011 (0.006)*	-0.001 (0.007)	0.044 (0.008)**	-0.019 (0.010)	-0.035 (0.008)**
Longer Horizon	-0.008 (0.007)	0.002 (0.009)	0.001 (0.01)	0.014 (0.013)	-0.008 (0.010)
Dependent Mean	0.094	0.154	0.191	0.371	0.190
Log-likelihood	-3526.8	-4836.4	-5546.9	-7481.5	-5506.1
Pseudo- $R^2$	0.029	0.036	0.027	0.029	0.032

Note: Sample of 11,683 members excludes pensioners and already retired. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. In a particular column, the binary dependent variable takes value of 1 for members with that retirement plan. Estimated effects for 13 regions of Chile not reported. Robust standard errors in parentheses and statistical significance at 1%-level denoted \*\* and 5%-level \*.

Table 11: 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	8,176	1,022	1,050	471	134	401
% of Members	72.6	9.1	9.3	4.2	1.2	3.6
Risk Tolerance Proxy Value	0.048	0.109	0.137	0.172	0.235	0.415
% Male	52.0	54.3	62.4	66.7	69.4	69.8
% Married	49.9	49.1	46.5	46.3	48.5	47.1
Mean Age	38.4	37.0	36.1	35.9	36.0	36.1
Median Earnings	150,000	180,000	200,000	220,000	250,000	200,000
Mean Education	10.4	11.6	12.2	12.6	13.0	11.9
% Longer Horizon	13.9	16.6	18.6	14.2	18.8	16.5
% Retire Early Plan	8.4	8.8	9.5	10.6	11.2	12.2
Memo:						
PSID Proxy	0.208	0.325	0.408	0.513	0.698	1.142
HRS Proxy	0.127	0.221	0.279	0.352	0.482	0.802

Note: Sample of 11,254 members providing consistent answers to the hypothetical income gambles excludes pensioners. 1,053 of members (8.6 % of all members) provide inconsistent responses to these questions and are not included in these tabulations. The PSID estimates are from a 1996 question with similar wording. The HRS estimates are from 1992 and 1994 survey responses. The Chilean and PSID proxy values both use the signal-to-noise ratio of 0.35 estimated on the HRS.

Table 12: Regressions of Selected Behaviors on Risk Tolerance

Dependent Variable	Mean Dependent Variable	Coefficient on Risk Tolerance	Responses	$R^2$
Currently smoke	0.41	0.099 (0.063)	11,061	0.042
Cigarettes per week (Smokers)	39.3	3.400 (7.418)	4,473	0.062
Self-employed (Currently employed)	0.18	0.325 (0.060)**	8,187	0.041
Years of education	10.8	4.627 (0.500)**	11,039	0.263
Home-owner	0.69	0.062 (0.058)	11,061	0.020
Life Insurance (Non-pension savers)	0.04	-0.035 (0.052)	3,764	0.051
Stockholder (Non-pension savers)	0.02	-0.090 (0.025)**	3,764	0.041
Would invest AFP funds in high-return, high risk assets	0.13	0.543 (0.065)**	7,958	0.051

Note: Basic sample of members excludes pensioners. Sub-samples in parentheses. Otherwise number of responses varies only with item non-response. To allow comparisons with the results in Barsky et al. (1997), we estimate the binary response models in this table with OLS. Estimated marginal effects from logit model are qualitatively similar. Other controls constant, age, gender, region dummies, monthly earnings, years of education, and married. Robust standard errors in parentheses. Statistical significance at 5%-level denoted \* and 1% \*\*.

Table 13: Knowledge of Retirement Accounts

Question	% of Answers		
	Correct	Incorrect	Don't Know
Contribution rate?	28.1	25.1	46.8
Maximum taxable income?	5.1	5.2	89.8
How funds invested?	9.7	18.6	71.7
Are there variable fees?	3.5	3.2	93.4
How benefits calculated?	13.6	7.1	79.3
Normal retirement age?	80.1	15.8	4.1
Early retirement possible?	73.4	26.6	0.0
Value of minimum pension?	4.8	15.1	80.1
Condition for minimum pension?	6.6	15.6	77.9

Note: Tabulations of 12,321 members responding to 9 questions about retirement account system exclude pensioners.

Table 14: Determinants of Pension Knowledge

Controls	Marginal Effects by Knowledge of			
	Overall System	Benefit Calculation	Account Balance	Minimum Pension Conditions
Longer Horizon	0.022 (0.014)	-0.003 (0.009)	-0.003 (0.015)	0.017 (0.007)**
Plan to Retire Early	-0.036 (0.018)*	-0.004 (0.011)	0.012 (0.019)	-0.004 (0.007)
Never Plan to Retire	-0.024 (0.012)*	-0.006 (0.007)	-0.048 (0.012)**	-0.002 (0.005)
No Retirement Plan	-0.061 (0.014)**	-0.036 (0.008)**	-0.084 (0.014)**	-0.020 (0.006)**
Risk Tolerance	0.150 (0.064)*	0.117 (0.036)**	0.074 (0.068)	0.023 (0.026)
Age/10	0.027 (0.005)**	0.011 (0.003)**	0.070 (0.005)**	0.012 (0.002)**
Male	0.053 (0.011)**	0.020 (0.007)**	0.121 (0.011)**	-0.002 (0.005)
Married	0.040 (0.010)**	0.009 (0.007)	0.058 (0.011)**	0.001 (0.004)
Less than High School	-0.151 (0.012)**	-0.040 (0.008)**	-0.109 (0.013)**	-0.040 (0.005)**
Technical Degree	0.141 (0.016)**	0.048 (0.011)**	0.060 (0.016)**	0.018 (0.007)**
College Degree	0.173 (0.019)**	0.072 (0.013)**	0.045 (0.018)**	0.015 (0.008)*
Currently Working	0.065 (0.019)**	0.001 (0.01)	0.116 (0.016)**	0.005 (0.007)
Low-Income Worker	-0.044 (0.014)**	-0.018 (0.008)**	-0.054 (0.013)**	-0.013 (0.005)*
Self-employed	-0.082 (0.014)**	-0.010 (0.009)	-0.131 (0.015)**	0.002 (0.007)
Monthly Earnings / 10 <sup>6</sup>	0.015 (0.005)**	0.003 (0.001)**	0.001 (0.003)	-0.001 (0.001)
Non-Pension Savings	0.039 (0.011)**	0.027 (0.007)**	0.064 (0.011)**	0.016 (0.005)**
Dependent Mean	0.377	0.136	0.455	0.066
Log-likelihood	-6454.0	-4046.8	-6804.9	-2487.6
Pseudo- $R^2$	0.085	0.042	0.072	0.041

Note: Sample of 10,641 members excludes pensioners and already retired. Marginal effects computed with coefficient estimates from a logit model and the sample averages of the control variables. Estimated effects for regions not reported. Robust standard errors in parentheses. Statistical significance at 5%-level denoted \* and 1% \*\*.

Table 15: Determinants of Personal Account Decisions

	Marginal Effects by Decision			
	Basic Contributions	Additional Contributions	Voluntary Savings Account	Changed AFP
Controls				
More Knowledgeable	0.144 (0.029)**	0.011 (0.004)**	0.039 (0.007)**	0.092 (0.011)**
Longer Horizon	0.004 (0.038)	0.008 (0.006)	0.002 (0.008)	0.015 (0.015)
Plan to Retire Early	0.027 (0.058)	0.014 (0.008)*	0.028 (0.011)**	-0.002 (0.019)
Never Plan to Retire	-0.031 (0.029)	0.003 (0.004)	-0.024 (0.007)**	-0.054 (0.012)**
No Retirement Plans	-0.047 (0.036)	-0.009 (0.005)	-0.025 (0.008)**	-0.059 (0.015)**
Risk Tolerance	-0.215 (0.150)	-0.001 (0.023)	0.067 (0.039)	0.045 (0.071)
Age / 10	0.098 (0.014)**	0.010 (0.002)**	0.016 (0.003)**	0.072 (0.006)**
Male	0.034 (0.029)	0.010 (0.004)*	0.019 (0.006)**	0.109 (0.011)**
Married	0.013 (0.027)	0.006 (0.004)	0.029 (0.007)**	0.081 (0.011)**
Less than High School	-0.097 (0.029)**	-0.012 (0.005)**	-0.069 (0.007)**	-0.107 (0.013)**
Technical Degree	0.046 (0.044)	0.009 (0.006)	0.029 (0.010)**	0.077 (0.016)**
College Degree	0.029 (0.046)	0.005 (0.007)	0.020 (0.010)**	0.034 (0.019)
Currently Working		0.004 (0.006)	0.051 (0.007)**	0.125 (0.016)**
Employer	0.170 (0.039)**	0.007 (0.011)	-0.065 (0.011)**	-0.319 (0.023)**
Independent		0.006 (0.006)	-0.064 (0.007)**	-0.170 (0.016)**
Monthly Earnings / 10 <sup>6</sup>	0.011 (0.004)**	0.002 (0.001)*	0.003 (0.001)**	0.029 (0.006)**
Non-Pension Savings	0.125 (0.028)**	0.020 (0.005)**	0.037 (0.007)**	0.023 (0.011)*
Dependent Mean	0.296	0.052	0.141	0.487
Log-likelihood	-723.8	-2052.4	-3951.0	-6622.8
Pseudo- <i>R</i> <sup>2</sup>	0.168	0.056	0.085	0.102
Respondents	1,432	10,641	10,624	10,641

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% \*\*.