

Voluntary Savings, Financial Gymnastics and Pension Finance Literacy:

Evidence from the Chilean Social Security Survey

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Abstract

Chileans with more knowledge about the pension system are more likely to have additional financial savings, but not within the voluntary pension saving plans offered by the pension system. This positive association between pension finance literacy and financial savings survives controls and an identification strategy that relies on instrumenting pension knowledge with the presence of a parent pensioner in the household, which we show is strongly correlated with pension literacy, has the desired exogeneity properties and is very likely to indicate exogenous access to more information on the system. We find that getting one additional answer right in the pension literacy survey (out of six) generates approximately a 50 % additional chance that the individual will save at least in one period, and a 25 % percent additional chance that the individual will save in both periods surveyed. We also test for evidence that pension literacy affects worker choices regarding their pension savings (what we call financial gymnastics). We find that more literate workers are more likely to engage in pension fund type switching and that independent workers are more likely to voluntarily enter the pension system as affiliates if they have pension knowledge. Getting one additional answer right in the pension literacy survey (out of six) increases in 20 % the probability of pension fund type switching and in 30 % the probability of voluntary affiliation to the pension system of self-employed workers.

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1. Introduction

Individual control over financial well-being in retirement is a central principle in Chile's system of personal pension accounts. Choices are balanced with 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 the options for voluntary savings and account management are supposed to encourage members to tailor their retirement savings to their particular circumstances, future plans, planning horizons and risk bearing profiles.

Mainstream economics predicts that some individuals treated to a compulsory saving system may be expected, theoretically, to adapt their non compulsory savings or debt to accommodate mandatory savings. This means that some agents may dissave as a response; others may reduce their voluntary private saving, and others, encouraged by the public safeguards may actually end up increasing total savings even to the point of not modifying too much their private savings. We should also expect them to accommodate their investment policy for non-compulsory savings so as to make them fit with the financial properties of the investment policies of the pension funds. In general, this global optimization of saving, debt levels and investment policies, in theory, should be sensitive to the different options within the system and particularly to the relative tax incentives that different savings systems are subject to.

Also mainstream microeconomics leads us to expect, at the very least, three sorts of endogenous responses by agents when treated to a Chilean style defined-contribution multi-fund personal account system vis-a-vis a defined benefit system:

First, this system is supposed to generate an incentive for individuals to use voluntary pension schemes (assuming they are financially attractive) since it creates a direct link between the pension saving effort and the pension obtained. Hence, individuals interested in saving should be at least more likely to make additional contributions within the system.

Second – and this is only true in more recent times within the Chilean system – it allows for agents to choose among different investment policies according to their risk return preferences and hence to globally optimize their savings strategy with options that are within the system.¹

Third, it should increase the sensitivity of agents (the frequency and likeliness of changes

¹The year 2002 the pension system was reformed creating the “multifun” system that allows contributors to choose among five investment policies that are ranked according to risk and return. There are also regulatory limits on the ages at which investing in the more riskier types of funds is allowed. We discuss this system in more detail below.

in their investment decisions) to changing financial circumstances , in particular to the performance of financial intermediaries.

All of these expected behaviors rely on a couple of assumptions, the most critical of which is unbounded rationality among the agents involved. Pension savers are supposed to maximize with a significant amount of information at their disposal, and, moreover, regulators make a continued effort of providing ever more information to them under the assumption that this will improve the use they make of the system and the efficiency of this market which is based on the possibility that individuals have of voting with their feet.

However, almost 25 years after its inception, a simple look at the Chilean Social Security Survey (known by its acronym EPS from Encuesta de Protección Social) shows us that there is evidence of very limited knowledge about the personal account system and even personal stakes in the system. For example only around 25 % know the contribution rate (that is deducted from wages every month by law) and barely 12 % knows how a pension is calculated. This shows that in Chile, even after many years of active operation of the system, the rationality and information assumptions that underly many of the expected results of the pension system are either not met or rationally irrelevant for most affiliates.

In the local public policy discussion the low level of knowledge is usually associated with the very limited success of voluntary pension savings schemes and, together with the ever increasing evidence of very low expected replacement rates, continuously fuels the agenda of providing more education and information to the public with the objective of increasing their voluntary savings (very simple calculations show anybody paying attention that the current compulsory saving rules lead to very low replacement rates). For example Ayala (2005) develops the technical argument behind a low replacement rate of a pension system like Chilean one; Gillion and Bonilla (1992) develop a simple exercise based on the Chilean pension scheme and shows how the compulsory savings characteristic affects negatively the replacement rate; and Arenas de Mesa and Mesa-Lago (2006) simulating replacement rates, based on same surveys we use in this study (2002 edition), shows that “based on differentiated ages, the replacement rates for all groups decrease between 16 and 27 percentage points”. Some of the pros and cons of Chilean pension reform (including its propensity to low replacement rates) are studied in Arenas de Mesa and Hernández (2001), while Arenas de Mesa and Bertranou (1997) studies the low replacement rate focusing in the gender inequality of the system. Moreover, one of the big selling points of the Chilean pension system has traditionally been that it would financially educate the population, a very optimistic objective it seems now that we know the very limited pension fund finance education that the system’s main users have. This argument is implicit in theoretical justifications of the system such as Vittas and Iglesias-Palau (1992) as well as in macroeconomic revisions of the effect of the introduction of a “Chilean style” pension system such as Schmidt-Hebbel (1997) and

Corbo and Schmidt-Hebbel (2003). Although it cannot be tested (due to lack of data) if the system indeed had this effect, the evidence we shall review in this article makes it very unlikely.

The issue of providing more information to pension system contributors has been at the heart of the Superintendency of Pension Fund Administrators (SAFP) for some time. Even the existence of the EPS which we use in this paper is a result of that concern and the need to understand what information individuals actually have about the system. Furthermore, in its short history the EPS (and some of the results that we explain in the body of this paper) has already motivated a regulatory change that ordainates the way that information was provided to contributors by private administrators.²

In this paper we investigate the causal link between pension finance knowledge (or literacy as we shall call it hereafter) and voluntary savings as well as financial gymnastics within the system. We will identify this effect using the presence of a parent pensioner in the household as an instrument for knowledge and understanding of the pension system. Our key identification assumption is that this event: having a pensioner in the household is an exogenous shock that could be credited with increasing pension finance knowledge

We find that pension finance literacy is positively correlated with the presence of pensioners in the households, but we do not find any evidence of the exogenously provided extra pension knowledge on voluntary pension savings within the system. However we do find evidence that pension system knowledge is correlated and does cause incremental savings in the financial system. We find that workers that have more pension literacy are more likely to engage in pension fund switching, but not pension fund administrator switching and are not more prone to pension fund originality (deviations from the automatic rules for pension fund type). We also find that self-employed workers are more likely to become voluntary affiliates of the system when they have greater levels of pension literacy.

The pension system combines individual choice with government mandates, so our analysis of retirement savings must incorporate differences in members' circumstances and preferences. Limited information on members of the account system has previously impeded such micro-level studies forcing analysts to infer conclusions from aggregated da-

²The new information policies, in fact, were a direct consequence of the implementation of the first wave of the EPS. In its 2002 wave the EPS had part of the questionnaire devoted to inquire about knowledge and perceptions of the pension system. The survey included questions designed to inquire on the levels of knowledge of: contribution rates, management fees, maximum income for contributions, balance of individual accounts, investment rules of pension fund administrators (AFPs), content of AFP reports sent every four months, different retirement plans... etc. The results of this survey made explicit the extremely low knowledge affiliates have about the system, considering management fees, individual account balances, how pensions are computed, etc. Therefore the Pension Superintendency made an effort to make information about management fees publicly available, and they also imposed a common structure on the information AFPs send every four months to their affiliates.

ta.³ The first EPS, 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. The first wave of this survey of the Chilean pension system affiliates was conducted from May 24, 2002 to January 15, 2003.⁴ The second wave is representative of both pension affiliates and non affiliates, and was conducted from November 2004 to March 2005; and the third wave was conducted between September 2006 and May 2007. The survey has a panel structure following affiliates found in the first wave. The questionnaire allows us to use innovative survey measures of pension system knowledge, financial planning horizons and retirement plans to understand individuals' saving because it has a module that asks the members about these issues.⁵

We believe that this the paper contributes to the bounded rationality and behavioral finance literature since it gives evidence of an exogenous information enhancing shock having significative effects on savings behavior, levels and choices. Second, we should also believe that this paper contributes to a related economic literature on financial literacy, since it actually tests determinants of and effects of a particular type of financial literacy which is the knowledge that individuals have on the functioning of the pension system. Third, we think that this paper should be interesting to those working on the pension reform literature since it actually measures an information effect in maybe the oldest privatized pension system in the world. Fourth, we think that the paper contributes to the case literature on the Chilean pension system since there has been so much discussion on the need to provide more and better information to make the system work better without any real measure of the impact that these policies could potentially have. This paper is the first microeconomic paper that actually attempts a measurement of these effects.

The paper is organized as follows. Section 2 briefly discusses the theory that justifies the estimations and identification strategies that we have in this paper. Section 3.1 describes the interplay of individual choices and government safeguards in the Chilean personal

³A 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) Edwards (1998), Corbo and Schmidt-Hebbel (2003), Holzmann (1997), Iglesias-Palau (2000), Acuña and Iglesias-Palau (2001), Arrau (1991), Cifuentes (1996), Cerda (2008) and Todd and Velez-Grajales (2008). The Chilean account system has undergone numerous reforms. For a detailed description of the system rules and outcomes see Bernstein, Larraín, Pino and Morón (2006), Arenas de Mesa, Bravo, Behrman, Mitchell and Todd (2006) and Palacios (2003) and for a revision of the last reform to the Chilean pension system see Arenas de Mesa, Benavides, Gonzalez y Castillo (2008), Arenas de Mesa (2010) and Valdés-Prieto (2009).

⁴The 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 (which have a separate defined benefit system), 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.

⁵For a comprehensive analysis of the EPS see Arenas de Mesa, Bravo, Behrman, Mitchell and Todd (2006)

account system; this is crucial to understand what are the actual options faced by the affiliates that provide a rationale for pension finance information use in globally optimizing a savings strategy. In Section 3.2, we document the limited knowledge of the retirement account system and discuss the potential demand for and supply of information and education on the system. Section 4 shows our attempt at estimating a causal effect of pension knowledge on voluntary savings and financial gymnastics. In the final section, we offer our conclusions.

2. A bit of verbal theory on the effect of information on savings and financial gymnastics

One of the problems in identifying the effect of information on the savings decision is the fact that we don't exactly know what type of information is being provided, even when we actually have a good instrument for identifying the effect. This is because the surveyed questions (that we discuss further below) are just indicators of pension literacy and are not in any way a comprehensive measure of the knowledge that individuals have on the system. The problem about not knowing what is the exact type of information that is being provided is that we cannot be sure of the transmission mechanism that converts that information into behavior: changes in savings levels or other choices that the individual faces when globally optimizing his savings strategy.

Information effects on financial behavior, of course, is a classical theme that is present in classical macrofinancial writing such as Keynes (1936), Kindleberger and Aliber (2005), Mishkin (1991), Shiller (2000) and Akerlof and Shiller (2009). This literature emphasizes the role of information on the amplification of economic cycles and the possibility of generating sudden stops, runs and financial crisis that can detonate severe macroeconomic crisis and even depressions. However the literature on the "steady state" effects of financial information deficits on the economy is slightly thinner and less notorious.

There is a growing literature on the effects of information and financial literacy on financial behavior and even on retirement plans. There are, by now, plenty of reports on the correlation between financial knowledge and literacy (although the distinction is not always made) and some sort of financial behavior.⁶ Identifying these effects is a slightly more tricky and usually involves expensive experiments or surveying. Some notorious papers are Lusardi and Tufano (2009) that try to use self-reported "financial experiences" as an instrument for information to find a demographically controlled effect on self-reported overindebtedness; Behrman, Mitchell, Soo and Bravo (2010) that use

⁶For the US see Hilgert and Hogarth (2003), Hilgert, Hogarth and Beverly (2003) and Barberis, Thaler, Constantinides, Harris and Slutz (2003).

the same survey we use for Chile to show separate the effects of general schooling and financial literacy on wealth accumulation; and the particularly notorious paper by Dufflo and Saez (2003) with a randomized experiment (an information fair) on voluntary retirement schemes within a college campus that seems to show some (although complicated) information effects affecting financial behavior. Usually the costs involved in these types of studies limit their representativeness.

The identification procedure we will use, and discuss extensively below, is based on an instrument that we believe identifies the provision of “more information”. However we do not know what information can be provided in each case. Moreover, it is very likely that the nature of the information is different in each case, and we will be driven to speculate on both the type of information and the transmission mechanism when we see the estimation results. To have some sort of framework to interpret the information effects it is important to discuss briefly the sorts of theoretical effects that information “could be having” in this market.

We believe that information could be having three sorts of effects:

- Information as a reducer of uncertainty or bias on the canonical savings decision.
- Information as a sorter of investment options within the available savings systems.
- Information as a reducer of noise within the available systems.

It is really quite trivial to imagine the mechanics of the first effect. An individual has to decide how much to save in a generical savings system that offers some risk and return profile considering the expectations and risks in his income profile. The individual optimizes and decides on the optimal amount of consumption and savings that he or she feels it must have. If this individual is treated to information it can make the individual update the stochastic properties of his income profile or of his savings opportunities. Three types of information updating that could increase his savings would be: an upward revision of the expected income profile while in the active sector, an upward revision of the risk surrounding his income profile expectations, and a downward revision of the risks involved in saving. On the other hand, a downward revision of the expected return of savings has an ambiguous theoretical effect but is more likely to be positive for low income and asset individuals. Another interesting possibility within this family of information updating is that the individual is helped to discover the relative peculiarity of his savings strategic needs and hence is riven to have a different savings strategy to similar individuals or to the savings strategy recommended by the designers of the pension savings system.

Now consider an individual that has decided how much to save globally, but has to decide how much to save within the system (in addition to the compulsory rates) and outside the system in the larger financial market. The information being provided by

the treatment could change both the expected returns of the two forms of savings and the variance covariance matrix that they share. In this case, information updates that could increase savings outside the system are: relative increases in the expected returns of saving outside the system, reductions in risk outside the system or a change in the covariances of returns within or outside the pension system like the forming of a conviction that the diversification opportunities outside the system are better. On the other hand, an information update that could increase savings within the system are the discovery of eligibility rules (for benefits and subsidies) that could in fact imply an increase in expected return in saving within the system or the possibility of diversifying against risks involved in private savings with participation in the system.

Finally, if information is a reducer of noise, and agents understand it so, it will increase their sensitivity to signals. Consider a Bayesian individual that must make choices within the whole scope of his savings strategy but has transactions costs involved in every step of the way. Bayesian theory tells us that individuals that are disentangling signals between noise and fundamentals will be more sensitive to “extreme signals”, since more common signals are less informative (or less likely to contain information). So, if we interpret “pension literacy” to be the reduction of noise within signals, then the optimal reactions to the same signals will increase. Hence their sensitivity to financial information that affects the relative performance of pension fund administrators or of fund types within the system could also increase. If we cannot actually test for this sensitivity we could actually attempt a measurement of the frequency with which they change. There is, in fact, a literature on the effects of information weight, strength and quality on financial behavior through “confidence” in laboratory experiments that seems to suggest that these effects are there, are quite strong and have a potential for biasing market prices. For a sample see the discussion between papers such as Griffin and Tversky (2001), Nelson, Bloomfield, Hales and Libby (2001) and Kraemer and Weber (2004)

3. The Pension System and Pension Literacy in Chile

3.1. Briefly on the Chilean Pension system

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 and safeguards on their choices. In this section, we summarize the main choices facing members of the Chilean retirement account system and use the survey responses to characterize the overall utilization of these options. In characterizing the real choices available to the members we want to assess the actual use that they can give to marginal pension finance literacy increases which is what we study empirically in this paper.

Our analysis focuses on voluntary saving for retirement with personal accounts and financial gymnastics. It is important to note that most affiliates in the survey are still in the accumulation phase. While the new pension system began in 1981, the demographics of the rules on which it was implemented imply that, for example, only 10 % of members are receiving an old-age or disability pension. Moreover, according to EPS 2009, there exist 9,229,009 affiliates to the pension system. 5.46 % of the total receives retirement pension, 3.03 % receives anticipated retirement pension and 2.26 % receives disability pension. Nonetheless, the structure of expected pension benefits should influence current savings decisions that we are able to observe thanks to the EPS. In converting their retirement account balances to pension benefits, members will face several choices and may be eligible for certain government safeguards so we need to carefully discuss these rules before attempting any identification of information or knowledge effects.

After reaching normal retirement age,⁷ 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 so potential retirees can delay the liquidation of their funds. Early receipt of a pension is only possible for those members with sufficiently large account balances.⁸ When retiring, members can use their pension funds to purchase a real annuity with their account balance from an insurance company, establish a programmed withdrawal flow from their account with their fund manager, or utilize a combination of these two options. Mitchell and Ruiz (2009) study how these options mainly differ in terms of the ownership of residual claims and individual risk-bearing and a modeling of these options is interesting in itself but exceeds the scope of this paper.

A profound pension reform was enacted in March 2008, changing the pension system structure and requirements particularly regarding the complementarity between the personal savings and the minimum pension guarantees. We will describe the regulations previous to the reforms, because it is what was faced by the survey respondents when making voluntary savings and financial gymnastics decisions. 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. Since December 2008, the minimum pension is 104,960 pesos per month (roughly US\$ 2,500 per year) for persons under age 70, CH\$ 114,766 per month (roughly US\$ 2,750 per year) for those between 70 and 75 and CH\$ 122,451 per month (roughly US\$ 2,900 per year) for those 75 and older, which is approximately 50 % of median monthly earnings. The level of the minimum pension

⁷In Chile this is 60 years for females and 65 years for males, although for some time there has been a discussion on elevating the retirement age for females to 65, so it could be conceivable to assume that there is some uncertainty on the female retirement age for current affiliates.

⁸To qualify for an early pension, the monthly pension benefit must be at least 50 % of the individual's average real income in the last 10 years and at least 100 % higher than the minimum pension guarantee

is inflation-indexed. For eligible members, the government provides the difference between the pension they can finance from their retirement accounts and the minimum level. Regardless of their contribution history, individuals may be eligible for a welfare pension (PASIS) of 122,451 pesos per month in December 2008 (roughly US\$ 2,900 per year).⁹ The minimum pension, in particular, provides a significant insurance benefit for low-income members, who have made regular contributions to their retirement accounts but have not accumulated sufficient funds.¹⁰ Studies elaborated for the pension reform of 2008 projected that 10 % to 50 % of account members may end up receiving some government funds from the minimum pension guarantee.¹¹

In the contribution phase individuals must make four critical decisions.

The first is whether to contribute or not. Employees in the formal sector with a contract make compulsory monthly contributions to their accounts. The basic tax-exempt contribution, 10 % of monthly earnings up to 60UF (roughly US\$ 30,000 per year), is transferred directly by employers to their employees account managers.¹² 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. Among members, the self-employed also have full discretion over the frequency and amount of their continued contributions.

The second decision is the choice of Pension Fund Administrator (AFP). Members can freely select their fund manager and change managers at no cost based on their fees¹³

⁹Persons 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 PASIS amount depends on the age: 48,000 for persons under 70, 51,169 for those between 70 and 75 and 55,949 for those 75 or older.

¹⁰One of the main stylized fact of the pension system issue in Chile is the significant amounts of individuals that do not have a prospect of accumulating a sufficiently large fund. This is due to many factors, but two are salient: the low participation rates, particularly among females, and the frequent rotation in and out of the labor force of many low income workers.

¹¹These figures were developed by Bernstein, Larraín, Pino and Morón (2006), Marcel (2006) and Melguizo, Muñoz, Tuesta and Vial (2009). For a review of this and other figures about the 2008 reform, see Kritzer (2008) and for a complete work about fiscal projections of the system, see Arenas de Mesa, Benavides, Gonzalez and Castillo (2008).

¹²The UF (Unidad de Fomento or Development Unit) is the Chilean official inflation index. In December 2007, the taxable maximum of 60UF was 1,173,046 pesos (US\$ 2,349) and over three times the median monthly earnings among contributing members.

¹³The Chilean government regulates and closely supervises the investments and account management of the AFPs. At present there are five AFPs (with one new entrant expected in the market), which vary modestly in their fee structure, which includes both flat and variable (% of monthly earnings) commissions, and 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.

and investment performance, yet government regulation limits the asset allocation of AFPs and diminishes the incentives to out-perform other AFPs, so differences are very slight and rankings variable.¹⁴ In addition to the minimum return guarantee, the government regulates the investments of AFPs. In August 2010, 56,1 % of the AFP funds was held in national instruments and 8,7 % of that in public debt. 28,5 % in other fixed rent contracts and 18,2 % in variable rent. Also, the percentage of the pensions that was held in foreign variable rent contracts was 27,9 % (Source: Superintendency of Pension Fund Administrators). Members pay no additional fees to switch AFPs, even though this involves administrative costs and time. Theoretically the system relies on free choice of AFPs to encourage competition among the fund managers, however the limitations of this mechanism have been well known for quite some time and have also been the subject of recent regulatory reform. Moreover, the 2008 pension reform created a new mechanism for the allocation of new members to AFPs by auctioning off portfolios of new affiliates. The individuals, however retain their right to choose individually their AFP manager and switch whenever they find it convenient to do so. With moderate differences in fees and returns, AFPs have frequently been involved in marketing wars that involved the hiring of large sales forces to influence members' choices. Survey data shows almost half of members have changed AFPs at least once, though most have done so quite infrequently.

The third decision is the type of fund into which the contributor will invest. The five types of fund available within the pension system vary in the limits to exposure in stocks and other variable yield instruments from the riskiest A fund (with maximum 80 % and minimum 40 % exposure) to the E fund (with only 5 % exposure)¹⁵ The choice of funds is completely voluntary up to the age of 55 and 50 for males and females respectively, from then onwards fund A is forbidden, and pensioners are also forbidden to invest in fund B. In the case of voluntary saving schemes within the system (that we explain in detail below) there are no restrictions on the fund choice. Contributors are allowed to distribute their funds into up to two different types of funds. If the affiliate does not choose a fund he will be invested in B funds if his age is ≤ 35 ; C funds if he is a male in the 36-55 range or a female in the 36-50 range; and D funds if he is a male older than

¹⁴Specifically, regulation 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. 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 risk profile. 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 % 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 are required to deposit returns in a reserve fund that must exceed the higher of two thresholds: 1) 2 % 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. This regulatory option, however, has never been used or required.

¹⁵Fund B has limits: 60 %-25 %, fund C has limits 40 %-15 %, fund D has limits 20 %-5 %.

56 or a female older than 51.

Finally, members can increase their retirement funds or to move forward the pension age with additional pension savings. There are two financial instruments for additional pension savings within the system: voluntary pension saving and voluntary savings account.

All working members of the system can 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. These are tax free contributions (capped at 50 UF monthly) that the affiliated can make to his/her account hold by and AFP or other authorized institution (banks, insurance companies, mutual fund administrators among others). Since 2002¹⁶, the cap on additional contributions is much higher and additional contributions (plus the interest earned) can be withdrawn early at a tax penalty.¹⁷ Theoretically 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 only 10 % of members have ever utilized this option.¹⁸ The question of estimating how many non credit constrained individuals have not used this option (which is the relevant one from a policy perspective) is open and interesting.

Voluntary savings accounts were introduced in 1987 to 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, 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 so the taxes are deferred to retirement (when it is probable that they will face lower marginal rates). Other withdrawals from the voluntary accounts (a maximum of four times per year) are subject to income taxes. These accounts are supposed to be preferable to other savings vehicles, for example, bank deposits which earn low interest rates and mutual funds which have relatively high fees. The EPS 2009 asks about voluntary savings accounts, inquiring if the affiliate has realized Voluntary Pension Savings (APV in spanish abbreviation) between January 2006 and the period of the survey. Just 3.7 % of affiliates have a voluntary savings account. The reason for this low number is the nature of the question, because some affiliates can have realized APV before 2006 and this fact isn't captured by the statistic. The most common reason (46.7 %) among voluntary account holders is that they wants an

¹⁶This mechanism was modified in March 2002.

¹⁷For the vast majority of workers, the 50 UF limit on additional contributions is far higher than the initial cap at 10 % of wages. It's a cap of over US\$ 25,000 per year.

¹⁸The exact figures are 9.78 % of members in 2004 and 10 % in 2006.

increased pension benefits; convenience (35,5 %) and it allows him to retire money (11 %) are also important factors. As with additional contributions to retirement accounts, most members are unaware of voluntary savings accounts and, again, the interesting and open empirical question (with policy implications) is how many non credit constrained individuals have not used this option. 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.

Part of the 2008 effort to reform the Chilean pension system included a reform to the Voluntary Pension Savings (APV). This reform included the possibility of establishing collective APV plans (APVC), consisting of a mechanism within companies and designed to supplement personal APV efforts by employees. Also a tax benefit for APV and APVC was implemented, consisting on the possibility of choosing of the tax treatment of contributions and retirement of funds. The idea of this reform was to stimulate an increase in personal voluntary saving, mainly, for middle classes. However, it is too soon to evaluate and is not possible within the time span of the last available EPS databases.

As we can see, there are a variety of voluntary savings alternatives available in the system as well as fund manager and fund type choices available to the affiliate that have the potential of being affected by pension finance literacy.

3.2. Stylized facts of pension finance literacy in Chile

To make well-informed decisions with their retirement accounts, and design optimal complementary savings policies, members require some knowledge of the pension system. Yet, the value of such information and the costs of obtaining it are very 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, which is worrying since some of the logic of the system is based on the market disciplining virtues of individual choice. We also show that more knowledgeable members are more active in the retirement account system, which is expected but of course impossible to disentangle in a statistical sense, and does not necessarily imply that knowledge increases active saving and management of accounts and could perfectly well indicate the other direction of causality. In section 4 we investigate the direction of causality of this relationship using our identification strategy.

To assess members' overall knowledge of the retirement account system, we use the EPS for years 2004 and 2006. We examine their survey answers in a module on knowledge and perceptions of the pension system. We focus initially on a subset of six questions with verifiable answers. For each question, respondents may reply with a specific answer or

Cuadro 1: Pension Literacy

	All Affiliates		Working		Dependant		Self Employed	
	Index	S.D.	Index	S.D.	Index	S.D.	Index	S.D.
Correct contribution percent	24.93	0.43	27.41	0.45	28.71	0.45	20.40	0.40
Claim to know account balance	51.72	0.50	54.05	0.50	55.04	0.50	48.72	0.50
Claim to know how funds are Invested	33.06	0.47	37.18	0.48	40.14	0.49	21.20	0.41
Know how pensions are calculated	11.78	0.32	12.58	0.33	12.66	0.33	12.14	0.33
Know retirement age	75.80	0.43	76.79	0.42	77.38	0.42	73.61	0.44
Know minimum pension guarantee requirement	8.63	0.28	8.64	0.28	8.79	0.28	7.83	0.27

Note: Tabulations include the 9,521 account members in the 2004 wave. Average percent of correct answers in 2004 and 2006 is 34 %. The correlation between both years is 0.45.

The percent of correct answers between Dependant and Selfemployed are statistically different for all questions, except for know minimum pension guarantee requirement.

“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. What is your account balance?
3. How are your funds invested?

The top panel of Table 1 displays the distribution of responses for AFP members in the 2004 wave. A minority of members (24.9 %) gives a correct answer for the contribution percent. 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. The value also directly affects workers’ take-home pay and other savings strategies.

Members are most knowledgeable about their account balance, with a 51.7 % claiming to know it. We do not have access to administrative data to investigate if the balanced declared is what members actually have in their individual balance account, so this figure is an upper bound on the knowledge of the account.

Finally, a 33.1 % claim to know how funds their pension funds are invested. Members have a choice between five funds types differentiated in their risk level. We do not have access to administrative data to check if the claimed fund type is the fund they have, then the 33.1 % is an upper bound on the knowledge of the level of risk the pension fund is bearing. Putting these figures together, at least half of the members do not know their balance and two-thirds do not know how their pension funds are invested. Both are critical figures to define the level of pension savings needed and the portfolio of them.

The next three 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] ¹⁹
6. What are the conditions for the minimum pension? [contributions for 20 years or 240 months]

Only 11.8% members understand the most basic principle of the pension system: their account balance determines their pension benefit. While the system design tightly links contributions to benefits, there is little evidence that most members actually understand this connection. Unfortunately, this is not particular to Chile, for example in the United States, Gustman and Steinmeier (1999) 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 75% of members know the normal retirement ages. The final question cover the government pension guarantee. Again, the vast majority of members do not claim any knowledge about this safety net in the account system: only 8.6% know the conditions for eligibility for the guaranteed minimum pension. In a study of Santiago workers, Barr and Packard (2002) suggest that some self-employed workers contribute to their accounts only to be eligible for the guarantee. Such strategic contribution behavior, which could be justified as rational is hard to reconcile with the general lack of knowledge about the pension guarantee.

There is some very robust pension literacy heterogeneity across different types of workers. Affiliates that are still working seem to be relatively more knowledgeable, dependant workers more so (only slightly but across all questions) and self-employed workers (for which adherence to the pensions system is not compulsory) seem to be much less literate on the system than the rest.

Members' answers across all six questions reveal limited overall knowledge of the pension system. On average, members answer only 2.06 questions correctly and the median is two correct answers (out of six). Only 14% of members correctly answer more than half of the questions. In the next section where we attempt to identify the effect of knowledge on behavior in the pension system, we will use this score (percent of correct answers) as an indicator of pension finance knowledge. We will call this percentage of correct answers *pension literacy*.

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 of

¹⁹For this question, we combine responses from two related survey questions in a single item.

Cuadro 2: Pension Literacy by Gender

	Women		Men	
	Index	S.D.	Index	S.D.
Correct contribution percent	25.79	0.44	28.34	0.45
Claim to know account balance	50.83	0.50	55.91	0.50
Claim to know how funds are Invested	38.55	0.49	36.38	0.48
Know how pensions are calculated	12.16	0.33	12.81	0.33
Know retirement age	78.99	0.41	75.52	0.43
Know minimum pension guarantee requirement	9.26	0.29	8.28	0.28

Note: Tabulations include the 7,260 account members working in the 2004 wave. The percent of correct answers for men and women are statistically different for all questions, except in know how pensions are calculated and know minimum pension guarantee requirement.

pension funds, most members, who are far from retirement could feel that they face few relevant 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 and actually have less. While the self-employed and those with intermittent work histories face more choices, we find them to be actually less informed about the system: the average number of correct answers for informal workers (self employed or working without a contract) is 1.78.

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.²⁰ 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 did not, (during most of the period for which we have data) however, provide any projections of members' retirement benefits. 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. On the other hand, Chile is a country with very low scores in internationally comparable tests measuring adult functional literacy and quantitative skills. There are no rigorous measures, just yet, of financial literacy, but everybody's prior is that they are very low. It is, at the very least, plausible that a significant portion of the pension system members that receive this information do not actually understand it or even read it.

To illustrate the difficulty in actually achieving through public policy an increase in pen-

²⁰ AFPs 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. Real time information is also available for any interested affiliate.

Cuadro 3: Pension Literacy by Age

	Less than age 30		Age 30 - 39		40 - 10 years before NRA		Within 10 years of NRA		At or above NRA	
	Index	S.D.	Index	S.D.	Index	S.D.	Index	S.D.	Index	S.D.
Correct contribution percent	28.21	0.45	27.56	0.45	23.67	0.43	22.73	0.42	15.43	0.36
Claim to know account balance	42.63	0.49	51.75	0.50	55.23	0.50	56.91	0.50	44.10	0.50
Claim to know how funds are Invested	32.08	0.47	37.52	0.48	33.34	0.47	31.08	0.46	17.24	0.38
Know how pensions are calculated	8.68	0.28	12.61	0.33	12.31	0.33	13.31	0.34	9.80	0.30
Know retirement age	66.42	0.47	73.91	0.44	77.53	0.42	83.24	0.37	83.48	0.37
Know minimum pension guarantee requirement	7.30	0.26	8.53	0.28	8.63	0.28	9.78	0.30	10.16	0.30

Note: Tabulations include the 9,521 account members in the 2004 wave.

sion literacy it is interesting to consider a policy innovation that is contained in the EPS surveyed period. In July 2005, the AFP statement requirement for middle-age members (women 20-49, men 30-54) must provide 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 made when between 20 and 30 years of age.

As we can see from Table 2 there are gender differences in pension literacy but they do not all go in the same direction. Women seem to be more knowledgeable on three of the questions, men know more on two of them and one is tied. Females know the retirement age more precisely (it is a public policy issue that is much discussed), they claim to know more about investment policies and know more about minimum guarantees (which would be expected since they are more likely to use them given high rotation in and out of the labor market). Men get the contribution rate right in a greater percentage and claim to know their account balance (we have no way of verifying this). From Table 3 we can see that pension literacy is not globally correlated with age, but within questions there are very striking age effects that actually make sense in intuitive terms. Older affiliates know more about their balance, about how pensions are calculated, about minimum pension requirements and about the retirement age. Younger affiliates, on the other hand, know more about the contribution percentage and how the funds are invested. From Table 4 we can see that pension literacy is clearly correlated with income levels, even in the case of questions that are most relevant to lower income affiliates (such as eligibility for minimum pensions).

There is some evidence that more pension literacy is correlated with more active participation in the account system. Martinez and Sahm (2009) document that more knowledgeable members also contribute more (among self-employed) and have additional pension savings. However these statistical associations do not necessarily identify the direct effect of knowledge on saving. Members with a high desire for retirement savings may seek out more information on the account system. Past participation in the system may

Cuadro 4: Pension Finance Knowledge by Wages

	Lowest Third		Middle Third		Highest Third	
	[\$0 - \$148,400]		[\$148,401 - \$264,953]		[More than \$264,953]	
	Index	S.D.	Index	S.D.	Index	S.D.
Correct contribution percent	21.04	0.41	26.23	0.44	26.44	0.44
Claim to know account balance	46.80	0.50	54.62	0.50	52.98	0.50
Claim to know how funds are Invested	19.95	0.40	37.40	0.48	38.14	0.49
Know how pensions are calculated	8.12	0.27	11.81	0.32	13.80	0.34
Know retirement age	70.26	0.46	75.65	0.43	78.94	0.41
Know minimum pension guarantee requirement	6.52	0.25	8.24	0.28	10.00	0.30

Note: Tabulations include the 9,521 account members in the 2004 wave.

also generate greater knowledge and encourage future participation. In both cases, other attributes actually drive account behavior and seem to affect knowledge as well. The association between knowledge and account behavior mixes the direct effect of knowledge and the indirect effects of these other attributes. One of the main objectives of this paper is to disentangle this causality using two identification strategies.

4. Pension Literacy and Savings Behavior

4.1. Voluntary Pension Savings

4.1.1. Correlations

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.

Martinez and Sahm (2009) document that more knowledgeable members are also more active participants in the retirement account system. They 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 literacy is strongly associated with action (contributions by the self-employed, additional contributions, having a voluntary savings account, and changing fund managers). However these correlations cannot establish a clear causal link between more knowledge and more participation.

In this paper we study the relationship between retirement saving and knowledge using as dependent variable the proportion of periods (out of two: 2004 and 2006) where the AFP member had some form of voluntary pension saving. We do not include 2002 data because the questionnaire changed after that year and variable construction required

Cuadro 5: Pension Literacy and Savings

Pension Literacy	Voluntary Savings in Pension System	Financial Savings
Lowest Third	8.7 %	33.6 %
Middle Third	14.5 %	37.7 %
Highest Third	24.9 %	50.6 %
All	16.0 %	40.9 %
N	1,749	4,459
Pearson chi2(2)	435.2	274.9
P-value of H0 no relationship	< .00	< .00

Note: All tabulations with 10,903 respondents who are AFP members and responded to the 2004 or 2006 EPS waves. Individuals are sorted according to their pension literacy index in three categories: lowest (33 %), middle(22-66 %) and highest(66 % and more).

many assumptions.²¹ It is important to notice that the dependent variable is not a dummy, because the AFP member could conceivably have voluntary pension savings only one year out of two. The mean of this variable is 0.11, and 16,04 % have had voluntary pension savings at least one period. Regarding the level of knowledge we also use the two period average of the pension literacy index described in previous section.

Table 5 shows the positive relationship between pension literacy and voluntary pension savings. Individuals are divided in three groups according to their pension literacy index (lowest 33 %, middle 33 % and top 33 %). Overall 16 % members have voluntary pension savings, and this proportion monotonically increases from 8.7 % to 24.9 % as their level of knowledge increases. The Table also shows that financial savings outside the pension system also seems to increase with pension literacy.

The first thing to do is to replicate Martinez and Sahm (2009) and run a simple regression to refine this correlation. So we run the following two:

$$\begin{aligned}
 D_{VS}^i &= c + \alpha I_{PL}^i + \epsilon^i \\
 D_{VS}^i &= c + \alpha I_{PL}^i + \beta_1 V_{DEM}^i + \beta_2 V_{LAB}^i + \beta_3 V_{INC}^i + \beta_4 V_{EDU}^i + \beta_5 V_{HOR}^i + \epsilon^i
 \end{aligned} \tag{1}$$

Where D_{VS}^i is the proportion of periods (out of two) that the individual is involved in voluntary savings; and V_x^i are a series of control vectors summarizing different sorts of variables (demographics, $x = DEM$; labor, $x = LAB$; income, $x = INC$; education, $x = EDU$; horizon, $x = EDU$).

²¹Regressions include one observation per household. If the 2006 data is available this is the data used for the covariates. A dummy for the year of the data is also included. We do not use the data panel structure because of the low correlation of the pension questions across waves.

Martinez and Sahm (2009) found a positive association between the pension literacy index and the probability of having voluntary pension savings. For comparability we report these replicated results in columns 1 and 2 of Table 11 show these refined estimations of the correlation between knowledge (pension literacy index) and the probability of voluntary pension saving. The first column shows the correlation without controls, whereas the third column documents the correlation when controls are included. Included controls are age dummies, gender, civil status, household size, dummies for informality and work status, wages, household income, education, household head and planning horizon.²²

A one standard deviation increase in the pension literacy index (0.18) increases the probability of having voluntary pension saving in 5.7 percentage points. This magnitude decreases to 3.9 percentage points when controls are included. If we were to believe the non identified effects of column 2 of Table 11 we would say that young individuals (less than 30 years old), less educated individuals (without a high-school degree) and those at or above the normal contribution rates are less likely to use this financial instrument. Higher wages and being the household head increase the probability of having voluntary savings, whereas having no retirement plan or not planning to retire decreases this probability. This, of course, makes sense but is not identified in any statistical sense.

These correlations suggest that improved knowledge about the account system could have a sizeable impact on voluntary pension saving. 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. However there may be other unobserved attributes in individual characteristics, such as contribution history, which affect account behavior and pension knowledge.

4.1.2. Causalities

In order to identify the causal effect of knowledge on voluntary pension saving we use an exogenous variation in knowledge that does not directly affect their saving behavior. Having an additional pensioner in the household exogenously increases knowledge of the pension system by generating an information spillover. Individuals will naturally be exposed to the consequences of pension behavior and understand better the pension system; information costs about the pension system will be reduced; and, moreover, having a pensioner in the household might increase member's interest and curiosity for the pension system which can lead to more knowledge.

²²Household income is computed as the sum of labor, pension, monetary subsidies and rent and interest. Missing values of labor income, pensions and rent and interest were imputed from OLS regressions with age, gender and married as controls.

Cuadro 6: Pension Literacy and Parent Pensioner in the Household

Years with a Parent Pensioner in the Household	Pension Literacy		
	Lowest Third	Middle Third	Highest Third
None (0)	43.26	18.94	37.79
Half (0.5)	39.10	18.64	42.26
All Years(1)	33.38	20.66	45.96
All	42.43	19.03	38.54
Pearson chi2(2)	30.14		
P-value of H0 no relationship	< .00		

Note: All tabulations with 10,903 respondants who are AFP members and responded to the 2004 or 2006 EPS waves. Individuals are sorted according to their pension literacy index in three categories: lowest (33 %), middle(22-66 %) and highest(66 % and more).

We only include in our measure of pensioners those parents that live with their children and have a pension. Pensions are normally below wages and therefore including for example the household head and his/her spouse in the definition could mix up the information given by the pensioner with an income shock caused by a new pensioner that could directly affect the amount of voluntary saving.²³

A very natural preoccupation is that the probability of having a pensioner in the household is correlated to income and hence not random. This could mean that it is not independent of the probability of voluntary savings which would bias our estimations. To discard this possibility we should test for a uniform distribution of the probability of having a pensioner on characteristics of the household, in particular those indicating income earning capabilities. We do this in Tables 8 and 9 available in the appendix where we test for uniform distribution across income and education levels. We find that the distributions seem to be very close to uniformity.

Table 6 shows that households with a parent pensioner have a higher percentage of individuals in the highest third of pension literacy, and the distribution is significantly different across categories. We therefore run the following two stage regression:

$$\begin{aligned}
 D_{VS}^i &= c + \alpha \hat{I}_{PL}^i + \epsilon^i \\
 D_{VS}^i &= c + \alpha \hat{I}_{PL}^i + \beta_1 V_{DEM}^i + \beta_2 V_{LAB}^i + \beta_3 V_{INC}^i + \beta_4 V_{EDU}^i + \beta_5 V_{HOR}^i + \epsilon^i
 \end{aligned} \tag{2}$$

with first stages:

$$\begin{aligned}
 I_{PL}^i &= c + \gamma D_{PIH}^i + \epsilon^i \\
 I_{PL}^i &= c + \gamma D_{PIH}^i + \nu_1 V_{DEM}^i + \nu_2 V_{LAB}^i + \nu_3 V_{INC}^i + \nu_4 V_{EDU}^i + \nu_5 V_{HOR}^i + \epsilon^i
 \end{aligned}$$

²³We exclude other pensioners in the household (siblings, other relatives) because of their low prevalence and concerns on its distribution across income.

where D_{PIH}^i is a dummy indicating if there is a pensioner in the household. Table 10 shows the first stage regression. The dependent variable is our measure of knowledge, and the independent variable is the presence of a parent pensioner in the household. Column 1 shows a strong relationship among these variables, with an associated F test of 29.7, and column 2 shows that the relationship is robust to our set of controls (with an associated F stat of 17.17).

Columns 3 and 4 of Table 11 shows results for the regression where knowledge is instrumented by the presence of a parent pensioner in the household. Column 3 shows that when no controls are included there is a significant effect of knowledge, but the relationship disappears once we add controls (column 4). Putting together the results of Tables 10 and 11 we can see that having a parent pensioner in the household increases its members knowledge of the pension system, but the induced increase in knowledge does not increase (nor decreases) voluntary pension saving for those whose knowledge of the system increased due to having a pensioner in the household.

Therefore the strong correlation between knowledge and voluntary pension savings found in the previous section is not a causal relationship from knowledge to savings. There are other unobservable affecting both variables at the same time.

An extreme interpretation of the previous result is that knowledge has no effect on pension savings. Two caveats must be considered: First, it is the induced variation in knowledge caused by the household composition (presence of a parent pensioner in the household) which appears having no effect on voluntary pension saving. In other words, variation in knowledge induced by other instruments might have an effect on voluntary pension savings. Secondly, individuals can save for retirement outside the pension system: they can have buy real state, have a small firms or save within the financial system but outside the pension system. Moreover, it could be that pension literate individuals actually decide to save less as we have argued in section 2. Finally it could be that voluntary saving within the system is not really that attractive or that since the dissaving option is not available within the system, the endogenous reaction occurs outside. Hence, people who get more information may decide to save or dissave outside in the financial market.

On the other hand the surviving effect of pension literacy on the probability of engaging in financial saving is quite considerable. Remember that the dependant variable has value 1 if the individual has saved in both the 2004 and 2006 surveys, value 0.5 if only in one period and 0 if never. This means that we must multiply by two the marginal effect of table 12 to calculate the true effect on savings of pension literacy (the probability that he has saved in the financial sector at least once). Given this rationale the table shows that a 1 % increase in the literacy index, increases in almost 3 % the probability of financial savings. To mentally calibrate this remember that our pension literacy index is

composed of six question, so getting one more answer right is an improvement of slightly less than 17 %, so a literacy enhancing shock that induces an additional correct answer generates approximately a 50 % additional chance that the individual will save at least in one period, and a 25 % percent additional chance that the individual will save in both periods. This is a large effect by any measure.

4.2. Voluntary Financial Savings

We focus in this section on the effect of pension knowledge on savings in the financial system²⁴, but outside the voluntary options of the pension system. Clearly not every savings in the financial system is intended for pensions. However financial savings caused by the presence of a parent pensioner in the household can increase savings outside the pension system. as we discussed in section 2 the information provided by the pensioner is not necessarily a reducer of uncertainty or bias on the canonical savings decision that would induce the individual to save more as information is revealed to him. We also argued in that section that information could be as a sorter of investment options within the available savings systems. The induced increase in pension system knowledge might be a manifestation of knowledge of all the financial system options. Table 5 shows a monotonically increasing relationship between pension literacy and the percentage of members with financial savings.

Table 12, shows regressions where the dependent variable is the (average over two periods) existence of any financial saving. As in Table 11, columns (1) and (3) are the OLS results and show a strong correlation between pension knowledge and financial saving. Interestingly, columns (2) and (4) show that when the pension knowledge index is instrumented by the presence of a parent pensioner in the household, there is positive and significant effect of pension knowledge on financial savings, even when controls are included. A one standard deviation of the pension knowledge index implies an increase of financial saving of 0.25-0.32 (without controls, with controls respectively).

From the combined results of section 4.1 and this section it seems then that the additional information and elevated finance literacy that is being provided by the pensioner in the household is in fact inducing additional savings by individuals. However it is not inducing them to save more within the pension system but rather outside of it.

²⁴Savings in the financial system are defined as housing savings account, voluntary pension saving, savings account, CDs, mutual fund investment, stocks, bonds, and other savings. Then our measure does not include loans and investments.

4.3. Financial Gymnastics

In section 2 we discussed how in a Bayesian model with noisy information on the relative expected performance of different pension fund managers and/or pension fund types, the provision of more knowledge should induce an increase in financial gymnastics. In practical terms the EPS provides us with three possible measures of financial gymnastics: voluntary affiliation, administrator switching, fund switching (risk-return type) and what we will call fund originality, that is, the propensity to deviate from the fund type that the law automatically gives you. In this section we will run the same regressions as the previous two (that is, the systems indicated in equations 1 to 3) but with four new dependent variables: a dummy indicating if the self-employed worker is voluntarily affiliated to the system (D_{VC}), a dummy indicating if the affiliate has ever switched fund administrator (D_{SFA}), a dummy indicating if the affiliate has ever switched fund type (D_{SFT}), a dummy indicating if the affiliate has ever had an “original” fund type (D_{OFT}), and dummy that summarizes the three later dummies (I_{GYM}) (the dummies that indicate pension gymnastics for dependant workers that are affiliates) by having value one if any of the component variables has a one and zero in the rest of the cases. What we attempt to do with this last measure is to capture as much “gymnastics” as we can.

Cuadro 7: Pension Literacy and Financial Gymnastic

Pension Literacy	Has switched fund administrator	Has switched fund type	Has originality	Financial Gymnastic	Voluntary Contributions
Lowest Third	5.3 %	8.8 %	59.3 %	14.1 %	37.6 %
Middle Third	6.8 %	22.3 %	63.2 %	31.2 %	46.8 %
Highest Third	13.9 %	58.3 %	62.7 %	69.0 %	65.9 %
All	8.9 %	30.4 %	62.5 %	38.5 %	47.7 %
N	967	3,319	1,982	4,197	655
Pearson chi2(2)	214.0	2600.0	1.0	2900.0	81.1
P-value of H0 no relationship	0.0	0.0	0.6	0.0	0.0

Note: All tabulations with 10,903 respondants who are AFP members and responded to the 2004 or 2006 EPS waves. Individuals are sorted according to their pension literacy index in three categories: lowest (33 %), middle(22-66 %) and highest(66 % and more).

Before running the regressions we briefly tabulate the correlations from which we are trying to disentangle causality. Table 7. What we see is that all measures of pension gymnastics monotonically increase with pension knowledge, with the exception of pension fund originality which increases from the lowest third of pension literacy to the second but not to the third. In any case, we believe that this is a sufficiently robust correlation that we may test it with our identification strategy. Also this Table illustrates why we construct this aggregated “gymnastics” measure. It is possible that there is some non monotonic effect of pension literacy on the originality variable, but at the very lowest levels, that is not sufficient for it to be a global effect, but can contribute to the testing of the global hypothesis we are addressing in this section.

Appendix tables 13 to 17 show the results of these regressions. As we can see most of the correlation we reported in Table 7 survive controls in the regressions of the second columns of all of these tables. Pension Fund type originality (Table 15) does not appear as significantly correlated, in the same way it did not in the Table above. Looking down the second column of all of these tables we can see that individual income levels seem to have a positive effect inducing gymnastics, it seems that being close to the retirement age also induces significantly less gymnastics, and that education induces more gymnastics.

The fourth column of each table shows us the effect of the identification strategy using the pensioner instrument. As in the previous section, in the third column of each table, we show the results of a regression with the identification strategy but no controls, so that the reader can see if it is the controls or the instrument that is driving the changes in results. A quick glance down the tables shows us that is clearly the instrument.

Pension fund administrator switching does not survive the identification strategy, but pension fund type switching does. However, when aggregated in an overall measure the significant effect survives. The measure is that an increase of 1 % in the correct answers, increases the probability of gymnastics by 1.2 %. To mentally calibrate this remember that our pension literacy index is composed of six question, so getting one more answer right is an improvement of slightly less than 17 %, so a literacy enhancing shock that induces an additional correct answer generates almost a 20 % increase in the probability of engaging in pension fund gymnastics.

Voluntary contributions by self employed workers also survive the identification strategy. Moreover, the marginal effect increases with the instrument which is a difference with the other surviving gymnastics measures that decrease slightly with the identification strategy. In this case, an increase of one correct answer by the self employed individual increases his probability of voluntary affiliation to the system by almost 30 % which is quite a relevant effect.

Interestingly, the instrumented regression also selects among the rest of the controls showing that different things seem to have an effect on different types of pension gymnastics. The distance of the retirement age continues to have a positive effect on gymnastics, some significance survives on the effect of education on the probability of pension fund administrator switching and employment status on fund switching (which makes sense), and individual income levels seem to increase the probability of having pension originality (which also makes sense). Finally it seems quite interesting that males seem less likely to involve themselves in gymnastics, although we do not have an intuition for it.

5. Conclusion

Chileans with more knowledge about the pension system are more likely to have additional financial savings, but not within the voluntary pension saving plans offered by the pension system. This positive association between pension finance literacy and financial savings survives controls and an identification strategy that relies on instrumenting pension knowledge with the presence of a parent pensioner in the household, which we show is strongly correlated with pension literacy, has the desired exogeneity properties and is very likely to indicate exogenous access to more information on the system. We find that getting one additional answer right in the pension literacy survey (out of six) generates approximately a 50 % additional chance that the individual will save at least in one period, and a 25 % percent additional chance that the individual will save in both periods surveyed. We also test for evidence that pension literacy affects worker choices regarding their pension savings (what we call financial gymnastics). We find that more literate workers are more likely to engage in pension fund type switching and that independent workers are more likely to voluntarily enter the pension system as affiliates if they have pension knowledge. Getting one additional answer right in the pension literacy survey (out of six) increases in 20 % the probability of pension fund type switching and in 30 % the probability of voluntary affiliation to the pension system of self-employed workers.

In our view these results show that information is having some potentially relevant effects on savings amounts as well as savings strategies. It is particularly important in increasing the probability of some types of pension finance gymnastics which we believe is associated with a noise reduction effect of the information provided that is increasing the sensitivity.

As we discussed in section 2 what we have in this database is a proxy of information and pension literacy. Even when we identify the effect by instrumenting with the pensioner in the household, we do not truly know what the transmission mechanism of information is nor what actual information is being transmitted. What we do know is that the information is correlated with our measure of pension literacy. Hence, the formulation of well designed “information policies” directed towards actual and potential affiliates of the pension system probably requires a more profound and directed inquiry into the actual content of the information that individuals actually consider as important in determining their savings strategy.

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Table Appendix

Cuadro 8: Years with a parent pensioner in the household by income level

Years	Lowest Third [\$0 - \$148,400]	Middle Third [\$148,401 - \$264,953]	Highest Third [More than \$264,953]	All
None (0)	2,489 25.8	2,339 24.3	4,806 49.9	9,634 100.0
Half (0.5)	153 25.5	159 26.5	289 48.1	601 100.0
All years (1)	161 24.1	175 26.2	332 49.7	668 100.0
All	2,803 25.7	2,673 24.5	5,427 49.8	10,903 100.0
Pearson chi2(4)	3.03			
P-value of H0 no relationship	0.55			

Cuadro 9: Years with a parent pensioner in the household by education level

Years	Dropout	Less than High School	Technical Degree	College Degree	All
None (0)	2,144 22.3	4,536 47.1	1,363 14.2	1,591 16.5	9,634 100.0
Half (0.5)	80 13.3	298 49.6	104 17.3	119 19.8	601 100.0
All years (1)	71 10.6	313 46.9	134 20.1	150 22.5	668 100.0
All	2,295 21.1	5,147 47.2	1,601 14.7	1,860 17.1	10,903 100.0
Pearson chi2(6)	92.5				
P-value of H0 no relationship	0.0				

Cuadro 10: First Stage: pensioner instrument

	Pension Literacy Index	
	[1]	[2]
Parent in Household Receives a Pension	0.038 [0.007]***	0.027 [0.007]***
Other Covariates	N	Y
F	29.7	128.25

Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5 % level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, $\ln(\text{wage})$, $\ln(\text{total household income})$, dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region.

* significant at 10 %; ** significant at 5 %; *** significant at 1 %.

Cuadro 11: Voluntary Pension Saving

		Marginal Effect on Voluntary Pension Saving (D_{VS}^i)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^i :	Pension Literacy Index	0.317 (0.014)***	0.217 (0.015)***	0.533 (0.264)**	0.488 (0.391)
V_{DEM}^i :	Less than age 30		-0.055 (0.008)***		-0.046 (0.016)***
	Age 30-39		-0.006 (0.006)		-0.005 (0.007)
	Within 10 years of NRA		-0.008 (0.008)		-0.011 (0.009)
	At or above NRA		-0.028 (0.012)**		-0.02 (0.016)
	Male		-0.005 (0.006)		-0.008 (0.007)
	Married		0.001 (0.006)		-0.002 (0.007)
	Household Size		0.002 (0.002)		0.002 (0.002)
	Household Head		0.013 (0.007)**		0.011 (0.007)
V_{LAB}^i :	Informal		-0.005 (0.007)		0.011 (0.024)
	Currently Working		0.038 (0.039)		0.044 (0.041)
V_{INC}^i :	Monthly Earnings		0.04 (0.006)***		0.028 (0.018)
	Household Income		0.006 (0.004)		0.002 (0.007)
V_{EDU}^i :	Less than High School		-0.027 (0.007)***		-0.007 (0.029)
	Technical Degree		0.002 (0.008)		-0.012 (0.022)
	College Degree		-0.009 (0.008)		-0.03 (0.031)
V_{HOR}^i :	Long Planning Horizon		0.01 (0.006)		0.007 (0.007)
	Plans to Never Retire		-0.036 (0.007)***		-0.033 (0.008)***
	No Retirement Plan		-0.037 (0.007)***		-0.025 (0.018)
R^2		0.048	0.077	0.026	0.050
F		544.18	34.86	4.08	26.46
Dependent Mean		0.11	0.11	0.11	0.11
Respondents		10903	10903	10903	10903

Note: Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5 % level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, $\ln(\text{wage})$, $\ln(\text{total household income})$, dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region. * significant at 10 %; ** significant at 5 %; *** significant at 1 %.

Cuadro 12: Voluntary Financial Saving

		Marginal Effect on Voluntary Financial Saving (D_{VS}^2)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^1 :	Pension Literacy Index	0.351 (0.019)***	0.21 (0.022)***	1.753 (0.454)***	1.487 (0.625)**
V_{DEM}^1 :	Less than age 30		0.125 (0.012)***		0.17 (0.026)***
	Age 30-39		0.086 (0.009)***		0.094 (0.011)***
	Within 10 years of NRA		-0.045 (0.011)***		-0.057 (0.014)***
	At or above NRA		-0.054 (0.017)***		-0.018 (0.026)
	Male		-0.036 (0.008)***		-0.049 (0.012)***
	Married		0.014 (0.008)*		0.001 (0.011)
	Household Size		-0.007 (0.002)**		-0.004 (0.003)
	Household Head		0.000 (0.009)		-0.01 (0.012)
V_{LAB}^2 :	Informal		-0.007 (0.009)		0.070 (0.039)*
	Currently Working		-0.022 (0.056)		0.008 (0.066)
V_{INC}^1 :	Monthly Earnings		0.036 (0.008)***		-0.021 (0.029)
	Household Income		0.041 (0.006)***		0.022 (0.011)*
V_{EDU}^1 :	Less than High School		-0.015 (0.010)		-0.076 (0.046)*
	Technical Degree		0.014 (0.011)		-0.052 (0.035)
	College Degree		0.021 (0.011)*		-0.0078 (0.050)
V_{HOR}^1 :	Long Planning Horizon		0.008 (0.008)		-0.007 (0.012)
	Plans to Never Retire		-0.026 (0.008)***		-0.009 (0.013)
	No Retirement Plan		-0.038 (0.010)***		0.017 (0.029)
R^2		0.029	0.86	-0.432	-0.207
F		544.18	34.86	4.08	26.46
Dependent Mean		0.29	0.29	0.29	0.29
Respondents		10903	10903	10903	10903

Note: Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5 % level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, $\ln(\text{wage})$, $\ln(\text{total household income})$, dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region. * significant at 10 %; ** significant at 5 %; *** significant at 1 %.

Cuadro 13: Pension Fund Administrator Switching

		Marginal Effect on Fund Administrator Switching (D_{SFA}^i)			
		[1] No identification	[2]	[3]	[4] Pensioner instrument
I_{PL}^i :	Pension Literacy Index	0.215 [0.013]***	0.079 [0.014]***	0.108 [0.269]	-0.206 [0.444]
V_{DEM}^i :	Less than age 30		0.005 [0.008]		-0.005 [0.018]
	Age 30-39		0.004 [0.006]		0.002 [0.007]
	Within 10 years of NRA		-0.012 [0.007]*		-0.012 [0.009]***
	At or above NRA		-0.041 [0.008]***		-0.069 [0.026]
	Male		-0.015 [0.006]**		-0.013 [0.007]*
	Married		0.001 [0.005]		0.004 [0.008]
	Household Size		0.001 [0.002]		0.001 [0.002]
	Household Head		0.006 [0.006]		0.009 [0.009]
V_{LAB}^i :	Informal		-0.046 [0.005]***		-0.081 [0.036]*
	Currently Working		0.021 [0.040]		0.019 [0.053]
V_{INC}^i :	Monthly Earnings		0.040 [0.006]***		0.058 [0.026]*
	Household Income		0.001 [0.004]		0.006 [0.008]
V_{EDU}^i :	Less than High School		0.003 [0.008]		-0.018 [0.033]
	Technical Degree		0.037 [0.009]***		0.053 [0.029]*
	College Degree		0.060 [0.010]***		0.080 [0.043]*
V_{HOR}^i :	Long Planning Horizon		-0.009 [0.005]*		-0.006 [0.008]
	Plans to Never Retire		-0.004 [0.005]		-0.009 [0.009]
	No Retirement Plan		-0.012 [0.006]		-0.027 [0.023]
Pseudo R^2		0.04	0.10		
Wald test of exogeneity				0.17	0.53
P-value of H0 there is no endogeneity				0.68	0.47
Dependent Mean		0.09	0.09	0.09	0.09
Respondents		10903	10903	10903	10903

Note: Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5% level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, ln(wage), ln(total household income), dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region * significant at 5%; ** significant at 1 %

Cuadro 14: Pension Fund Type Switching

		Marginal Effect on Fund Type Switching (D_{SET}^i)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^i :	Pension Literacy Index	1.356 [0.027]***	1.099 [0.029]***	1.400 [0.096]***	1.214*** [0.291]***
V_{DEM}^i :	Less than age 30		-0.007 [0.015]		0.010 [0.019]
	Age 30-39		0.015 [0.012]		0.013 [0.008]
	Within 10 years of NRA		-0.035 [0.014]***		-0.029 [0.011]**
	At or above NRA		-0.060 [0.021]***		-0.032 [0.026]
	Male		-0.002 [0.011]		-0.006 [0.009]
	Married		0.008 [0.010]		0.002 [0.009]
	Household Size		-0.004 [0.003]		-0.002 [0.003]
	Household Head		0.012 [0.012]		0.005 [0.010]
V_{LAB}^i :	Informal		-0.094 [0.011]***		-0.044 [0.037]
	Currently Working		0.132 [0.061]**		0.112 [0.053]**
V_{INC}^i :	Monthly Earnings		0.056 [0.011]***		0.019 [0.026]
	Household Income		0.015 [0.008]*		0.004 [0.010]
V_{EDU}^i :	Less than High School		-0.068 [0.013]***		-0.018 [0.039]
	Technical Degree		0.065 [0.014]***		0.021 [0.030]
	College Degree		0.114 [0.015]***		0.040 [0.045]
V_{HOR}^i :	Long Planning Horizon		0.012 [0.010]		0.003 [0.010]
	Plans to Never Retire		-0.025 [0.010]***		-0.012 [0.011]
	No Retirement Plan		-0.001 [0.013]		0.019 [0.020]
Pseudo R^2		0.22	0.27		
Wald test of exogeneity				3.20	0.89
P-value of H0 there is no endogeneity				0.07	0.35
Dependent Mean		0.30	0.30	0.30	0.30
Respondents		10903	10903	10903	10903

Note: Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5% level in all the first-stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, $\ln(\text{wage})$, $\ln(\text{total household income})$, dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region * significant at 5%; ** significant at 1%

Cuadro 15: Pension Fund Type Originality

		Marginal Effect on Fund Type Originality (D_{OET}^i)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^i :	Pension Literacy Index	0.091 [0.058]	0.009 [0.062]	-1.690 [0.841]**	-1.320 [1.633]
V_{DEM}^i :	Less than age 30		0.022 [0.029]		-0.029 [0.047]
	Age 30-39		0.051 [0.021]**		0.025 [0.054]
	Within 10 years of NRA		0.102 [0.026]***		0.090 [0.064]
	At or above NRA		0.147 [0.051]***		0.067 [0.183]
	Male		-0.043 [0.021]**		-0.022 [0.045]
	Married		0.004 [0.020]		0.001 [0.018]
	Household Size		0.001 [0.006]		0.001 [0.005]
	Household Head		-0.003 [0.023]		0.003 [0.021]
V_{LAB}^i :	Informal		0.041 [0.025]*		0.018 [0.050]
	Currently Working		0.179 [0.207]		-0.057 [0.383]
V_{INC}^i :	Monthly Earnings		0.044 [0.021]**		0.068 [0.022]***
	Household Income		0.025 [0.016]		0.025 [0.017]
V_{EDU}^i :	Less than High School		-0.000 [0.036]		-0.071 [0.092]
	Technical Degree		-0.005 [0.024]		0.026 [0.045]
	College Degree		0.021 [0.024]		0.065 [0.049]
V_{HOR}^i :	Long Planning Horizon		-0.024 [0.019]		0.007 [0.049]
	Plans to Never Retire		-0.018 [0.020]		-0.026 [0.017]
	No Retirement Plan		-0.028 [0.025]		-0.066 [0.043]
Pseudo R^2		0.00	0.02		
Wald test of exogeneity				0.38	0.28
P-value of H0 there is no endogeneity				0.54	0.60
Dependent Mean		0.63	0.63	0.63	0.63
Respondents		3169	3169	3169	3169

Note: Note: All regressions with 3,169 respondents who are AFP members and has an original fund type, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5% level in all the first-stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, $\ln(\text{wage})$, $\ln(\text{total household income})$, dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region * significant at 5%; ** significant at 1%

Cuadro 16: Financial Gymnastics

		Marginal Effect on Financial Gymnastics (I_{GYM}^i)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^i :	Pension Literacy Index	1.596 [0.031]***	1.336 [0.033]***	1.492 [0.079]***	1.219 [0.038]***
V_{DEM}^i :	Less than age 30		0.008 [0.017]		0.016 [0.020]
	Age 30-39		0.044 [0.013]***		0.032 [0.009]***
	Within 10 years of NRA		-0.017 [0.016]		-0.014 [0.012]
	At or above NRA		-0.090 [0.024]***		-0.056 [0.031]*
	Male		-0.021 [0.012]*		-0.018 [0.009]**
	Married		0.006 [0.012]		0.001 [0.010]
	Household Size		-0.002 [0.003]		-0.001 [0.003]
	Household Head		-0.124 [0.013]***		0.009 [0.011]
V_{LAB}^i :	Informal		0.016 [0.014]		-0.071 [0.045]
	Currently Working		0.158 [0.071]**		0.122 [0.056]**
V_{INC}^i :	Monthly Earnings		0.069 [0.012]***		0.034 [0.031]
	Household Income		0.015 [0.009]*		0.006 [0.011]
V_{EDU}^i :	Less than High School		-0.064 [0.015]***		-0.023 [0.043]
	Technical Degree		0.066 [0.016]***		0.029 [0.034]
	College Degree		0.111 [0.017]***		0.050 [0.051]
V_{HOR}^i :	Long Planning Horizon		-0.000 [0.012]		-0.004 [0.010]
	Plans to Never Retire		-0.030 [0.012]**		-0.016 [0.013]
	No Retirement Plan		-0.013 [0.015]		0.004 [0.025]
Pseudo R^2		0.22	0.27		
Wald test of exogeneity				0.27	0.33
P-value of H0 there is no endogeneity				0.09	0.57
Dependent Mean		0.38	0.38	0.38	0.38
Respondents		10903	10903	10903	10903

Note: Note: All regressions with 10,903 respondents who are AFP members, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5% level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, ln(wage), ln(total household income), dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region * significant at 5%; ** significant at 1%

Cuadro 17: Voluntary Contribution

		Marginal Effect on Voluntary Contribution (D_{vc}^i)			
		[1] No identification	[2]	[3] Pensioner instrument	[4]
I_{PL}^i :	Pension Literacy Index	0.783 [0.080]***	0.593 [0.089]***	1.629 [0.017]***	1.745 [0.034]***
V_{DEM}^i :	Less than age 30		0.011 [0.061]		0.023 [0.033]
	Age 30-39		-0.083 [0.036]**		-0.004 [0.029]
	Within 10 years of NRA		-0.059 [0.041]		0.008 [0.028]
	At or above NRA		-0.085 [0.066]		-0.018 [0.042]
	Male		-0.018 [0.041]		-0.018 [0.022]
	Married		-0.037 [0.034]		-0.025 [0.020]
	Household Size		0.005 [0.009]		0.001 [0.005]
	Household Head		0.019 [0.042]		-0.004 [0.023]
V_{INC}^i :	Monthly Earnings		0.163 [0.027]***		-0.010 [0.045]
	Household Income		-0.022 [0.027]		-0.023 [0.015]
V_{EDU}^i :	Less than High School		-0.002 [0.038]		0.096 [0.023]***
	Technical Degree		0.052 [0.046]		-0.044 [0.031]
	College Degree		0.086 [0.045]*		-0.128 [0.043]***
V_{HOR}^i :	Long Planning Horizon		0.045 [0.032]		-0.009 [0.021]
	Plans to Never Retire		-0.025 [0.032]		0.035 [0.020]*
	No Retirement Plan		0.050 [0.045]		0.076 [0.025]***
Pseudo R^2		0.05	0.11		
Wald test of exogeneity				3.10	2.32
P-value of H0 there is no endogeneity				0.08	0.13
Dependent Mean		0.48	0.48	0.48	0.48
Respondents		1374	1374	1374	1374

Note: Note: All regressions with 1,374 respondents who are AFP members and selfemployed, responded to the 2004 or 2006 EPS waves. The instrument for pension literacy (parent pensioner in the household averaged in 2004 and 2006) is statistically significant at 5 % level in all the first -stage regressions. Covariates are age, gender, married dummies, number of household members, work and informal dummies, ln(wage), ln(total household income), dummies for zero wage or household income, year 2006 dummy, education dummies (dropout, technical, college), dummy if long horizon, no retirement plan, plans to never retire, household head, region density and region * significant at 5 %; ** significant at 1 %