THE ROLE OF FINANCIAL LITERACY AND PENSIONS KNOWLEDGE ON THE INVESTMENT OF RETIREMENT SAVINGS

Carolina Felix[1]

Emory University

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Abstract

This paper investigates the role of financial literacy and pensions system knowledge on the retirement savings investment choice of workers using data from the 2006 and 2009 waves of the Chilean Social Protection Survey. Only 33 percent of Chilean workers have made an active investment decision with respect to their retirement savings. Besides, when deviating from the default option, workers tend to invest in riskier funds than the corresponding default fund for their age. Using logit, fixed-effects and multinomial logit models, I find that financial literacy and especially pensions knowledge present a statistically significant and positive effect on the probability of making an active investment decision, but do not have a statistically significant effect on the choice of investment fund. These results suggest that investing in financial education and pensions system education might be an important strategy for governments to motivate active investment choices and provide workers with tools for them to be able to make appropriate decisions in accordance with personal characteristics.

JEL Classification: G11; J26

Keywords: Financial literacy; pensions system knowledge; retirement savings; investment; active choice; pension funds; logit; fixed-effects; multinomial logit.

[1] Ph.D. student at the Economics Department. Contact information: ccfelix@emory.edu.

1 Introduction

Since 1981, when Chile replaced its defined benefit pensions system by a defined contribution scheme based on individual accounts, many countries (mainly in Latin America and Central and Eastern Europe) have followed its example[2]. A fundamental aspect of this type of pension scheme is that it places great responsibility on workers, since they are required to make choices on several important issues related to their savings for retirement. Among these, the way they choose to invest their retirement savings is most likely the most important, given the long accumulation phase in which interests are accrued in individual accounts. Therefore, the way savings are invested is a main determinant of workers' individual accounts accumulated balance to finance retirement, and is ultimately a fundamental determinant of future pension benefits. Choosing how to invest savings for retirement is not a simple task, though. It requires not only specific cognitive skills, such as mathematical and financial knowledge, but also some good understanding of how the pensions system works. This paper investigates whether and to what extent financial literacy and pensions system knowledge are related to active retirement savings investment decisions, and studies further whether these variables influence deviations from investment in default funds.

The extent of choice given to individuals varies among countries. Some countries, such as Sweden (Premium Pension System) and Australia (Superannuation System), give almost unlimited investment choices to workers (Tapia & Yermo, 2007). In Sweden, for instance, by the end of 2006, there were 776 available funds for workers to invest their retirement savings (Tapia

[2] Please see Tapia and Yermo (2007) for a description of all countries that adopted mandatory individual account pension systems.

& Yermo, 2007). This is also the case of the 401(k) in the US. Latin American countries and most Central and Eastern European countries offer much fewer choices. Chile has five different pension funds for workers to choose from, while Peru has three and Mexico only two[3]. In some countries workers are allowed to split their savings among two or more different funds. A common practice among countries is to offer a default fund for workers who do not actively choose how they would like to have their retirement savings invested.

Given the array of choices available to workers, making an active investment choice might be extremely beneficial if due to personal characteristics, such as age, income level and risk preference, another available investment fund would be a better fit than the default option. The default option is clearly not the optimal choice for everyone, since in this type of pension scheme there is no "one-size-fits-all" type of investment. Empirical evidence shows, however, that workers are not so likely to actively choose how to invest their retirement savings. Madrian and Shea (2001), for instance, point out that 71% of US workers choose the default investment alternative in their 401(k) and suggest that individuals tend to understand default options as advice. Engstrom and Westerberg (2003) show that in Sweden, 67% of individuals made an active investment decision when the Premium Pension System was launched in 2000, a result they call "reversed investment behavior", since it is very different from what US studies about 401(k) participation find[4]. Nevertheless, active participation in the rounds that followed for new

[3] Colombia is currently considering also implementing a multi-fund scheme.

[4] Weaver (2005) attributes this high participation of Swedish workers partly to the large amount of money that was to be placed in individual accounts (contributions accrued between 1995 and 1998) and to massive media campaign.

entrants in the labor market declined substantially, being less than 10% in the 3 rounds between 2003 and 2005 (Weaver, 2005)[5].

An individual will most likely make an active choice if the perceived expected benefits of doing so are higher than the costs of gathering enough information to be able to make an informed choose. This would suggest that individuals with higher levels of education, more knowledge about the pensions system and higher numerical ability might be more likely to make active investment choices, since their information costs are probably lower than the ones faced by less knowledgeable individuals. Along these lines, Engstrom and Westerberg (2003) find that previous experience with financial investment increases the probability of making an active decision in Sweden.

Of equal interest is the question of how "active investors" invest their retirement savings. In particular, it is interesting to observe whether they invest according to what a life cycle model would suggest – riskier investments early in the accumulation phase and more conservative investments as retirement approaches. Palme *et al.* (2005) study the investment choice of Swedish workers in the Premium Pension System and find that the relationship between income and risk is U-shaped: low and high-income earners take on more risk than their middle-income counterparts.

This paper contributes to the retirement savings investment choice literature in two ways. It uses a relatively new dataset, the Chilean Social Protection Survey, which mirrors the US Health and Retirement Survey, but includes workers of all ages. Contrary to US and Swedish workers,

[5] For a discussion of possible reasons for this decline, please see Weaver (2005).

Chilean workers do not count with a public component for their pension benefits[6], and rely entirely on their individual accounts to finance retirement. Moreover, this is the first study to examine the role of pensions system knowledge, as well as financial literacy, in the retirement savings investment decision.

2 Chilean Pensions System

Chile went through a major reform of its pensions system in 1981, when its pay-as-you-go system was replaced by an individual accounts scheme based on defined contributions. Individuals who were part of the old scheme could opt whether to change to the new system or not. However, every new worker had to comply with the new rules. The system was again reformed in 2008, but the recent changes were much less profound. The main objectives of the recent reform were to increase pensions' coverage and improve the access to pensions for the most economically disadvantaged groups.

The Chilean pensions system is based on three pillars: a Solidarity Pillar, a Contributive Pillar and a Voluntary Pillar. The Solidarity Pillar has the objective of reducing poverty by providing access to old age and disability pensions for people that did not participate in the pensions system or were not able to finance a minimum pension with the balance on their individual accounts. The Contributive (and main) pillar is the heart of the system. It mandates regular contributions to individual capitalization accounts for all dependent workers, to which they have

[6] Except for solidarity pensions, which are granted to individuals that belong to the 60% poorest population and are not able to finance a minimum pension with the balance on their individual accounts once they reach the legal retirement age.

access when they meet the eligibility criteria to retire[7]. Finally, the Voluntary Pillar provides an opportunity for individuals who want to increase their savings for retirement over the mandated amount to do so. Tax benefits are offered to encourage this decision.

Under the Contributive Pillar, each worker chooses a pension funds manager (known as *Administradoras de Fondos de Pension*, or AFP) and up to two types of fund where to invest their savings for retirement. In the case of a split of retirement savings between two funds, workers are free to choose the percentage to direct to each type of fund. The contribution rate is not a choice variable, though. Workers are required to contribute monthly 10% of their earnings to their individual accounts, and they also pay a monthly management fee to their pension fund manager[8], which includes the payment for a disability and survivorship insurance. At the time of retirement, workers use the accumulated balance on their individual accounts to finance their pensions. The latter can take the form of life annuities or programmed withdrawals, or a combination of the two.

There currently exist five different pension funds managers[9] and five different types of fund to choose from. The latter vary by the amount of stocks they are allowed to invest in. The types of fund are A (riskiest), B (risky), C (intermediate), D (conservative) and E (most conservative).

[7] The legal retirement age is sixty-five years of age for men and sixty for women. Early retirement is allowed when some conditions are met.

[8] Management fees vary among pension funds managers (Including the disability and survivorship insurance payment, fees vary between 2.63 and 3.85 percent as of April 2011). Together with the returns obtained for each one of the five available types of funds and the quality of the service provided, they constitute the competition tools of this industry.

[9] The number of pension funds managers in the market has decreased substantially in the last fifteen years. In the mid-nineties, there were over 20 managers in the market.

Fund A is the riskiest one, with up to 80% of its value invested in variable income, while fund E, the most conservative, is allowed to invest only up to 5% of its value in variable income. Funds B, C and D are allowed to invest up to 60%, 40% and 20% in stocks, respectively. The five types of fund reproduce a desirable life cycle investment: Younger workers, who have a longer time until retirement, can optimally choose to invest in the riskier funds (given that stocks are a long-term type of investment), while older workers approaching retirement should optimally invest in the more conservative funds, since they might not have enough time to recover from potential losses[10]. Workers that do not explicitly choose a type of fund where to invest their savings (do not make an "active choice") are assigned to one of the types of fund according to their age. Workers up to 35 years old are assigned to fund B, men between 36 and 55 and women between 36 and 50 years old are assigned to fund C. Older workers and pensioners are assigned to fund D. Furthermore, older workers are not allowed to invest in fund A, and retirees cannot invest in either of the riskier funds. Table 1 illustrates the investment options for workers in the Chilean Pensions System.

[10] An example is the recent world financial crisis, which hit the retirement accounts of many workers approaching retirement, who might end up delaying it.

Table 1. Investment options for women and men according to their ages

Men		35 or less	36 to 55	56 and older	Retirees
Women		35 or less	33 to 50	51 and older	Retirees
Investment Options	A Fund	O	O	X	X
	B Fund	O Default	O	O	X
	C Fund	O	O Default	O	O
	D Fund	O	O	O Default	O Default
	E Fund	O	O	O	O

X	Not available
O	Allowed to choose
O Default	Assigned automatically

Source: Chilean Superintendency of Pensions

The legal age to retire in Chile is 60 years old for women and 65 years old for men. Everyone that is affiliated to the AFP system (Contributive Pillar) has the right (not the obligation) to retire when reaching the legal age of retirement. However, by meeting certain eligibility requirements, it is possible to retire earlier.

3 Data

The data I use for this study comes from the third (2006) and fourth (2009) waves of the Chilean Social Protection Survey (SPS). The SPS is a nationally and regionally representative survey that contains extensive individual information about participation in the labor market and in the social protection system, as well as socioeconomic characteristics. It also contains a detailed set of questions that evaluate how well informed participants are about several aspects of the pensions system, as well as questions that measure the financial knowledge of respondents and their level of risk aversion. The SPS contains longitudinal data for 16,443 individuals in 2006

and 14,463 individuals in 2009. They were first interviewed in 2002, with follow-ups in 2004, 2006 and 2009.

I restrict the sample to individuals who are affiliated to the private pensions system, who are employed either full or part-time and report non-zero income, and who are not retired yet. I exclude individuals who present extreme values of income and/or missing values for the main variables of analysis. The sample size for 2009 after these restrictions is 4,064 individuals.

The questions I use to determine whether the participant has made an active investment choice in the 2009 survey are the following: "When you joined the system or when the multifunds were introduced in 2002, did you choose a type of fund for your retirement savings?"[11] If the answer is yes, I consider that the participant has made an active decision with regard to her retirement savings investment. If the answer is no, I then focus on the answer to the following question: "After this assignment or initial choice, have you changed the type of fund?"[12] If the participant answers positively, I consider she has made an active choice. In 2006, participants were asked a different question: "Have you chosen in which type of fund to put your retirement savings?"[13] Respondents who answer positively to this question are considered to have made an active investment choice. In both waves of the SPS, participants are also asked in which type of fund their retirement savings are. For the cases when participants have their savings split between two

[11] Author's translation from the original question in Spanish: "*Al afiliarse al sistema o cuando los multifondos fueron introducidos en 2002, eligio usted el tipo de fondo para sus ahorros previsionales*?"

[12] Author's translation from the original question in Spanish: "*Despues de esa asignacion o eleccion inicial, se ha cambiado usted de tipo de fondo*?"

[13] Author's translation from the original question in Spanish: "*Ha elegido en que tipo de fondo colocar sus ahorros previsionales*?"

funds (the maximum allowed by law), I only consider the riskier one for the purposes of this study.

I measure pensions knowledge through answers to ten different questions that assess general knowledge about the pensions system. For instance, one question asks whether the participant knows which percentage of her income is contributed monthly to her individual retirement account. Another question asks whether the participant knows who is responsible for paying the variable management fee to the pension funds manager (AFP). According to the number of correct answers to these questions, each participant is attributed a score that varies between 0 and 10. Figure 1 shows the distribution of pensions knowledge scores across individuals in the sample. I then divide workers into three different groups. I consider workers with a score between 0 and 3 as having a low level of pensions knowledge. In the same manner, workers with a score between 4 and 6 have an intermediate level of knowledge, and workers with a score higher than 6 have a high level of pensions knowledge. The exact questions I use to construct these variables are listed in Appendix A.

I use a similar approach to construct financial literacy variables. They are based on six math and finance questions, which require participants to calculate a percentage, do a division, use the notion of compound interest and show some familiarity with finance concepts. The distribution of financial knowledge scores among workers is shown in Figure 2. Just as in the case of pensions knowledge, I divide workers into three groups of knowledge. I consider workers have a low level of financial knowledge if their score is between 0 and 2. A score of 3 or 4 corresponds to an intermediate level of knowledge, while 5 or 6 corresponds to a high level of financial knowledge. The exact questions I use are also listed in Appendix A. Moreover, Appendix A

shows the question I use to determine whether the respondent is risk averse. I consider the respondent as risk averse if she chooses Alternative A in all three situations.

Table 1 shows the means of the variables of interest for all workers, as well as separately for the ones that have made an active investment decision and the ones that have not. The last column of Table 1 shows the p-value of a test of equality of means between both groups of workers. Thirty-three percent of workers in the 2009 sample actively chose how to invest their retirement savings. Workers that make an active decision have more knowledge about the pensions system and higher numerical ability on average. Moreover, workers who make an active investment choice have a higher level of education than the ones that do not. Forty-three percent of the workers who choose their retirement savings funds have a college degree, whereas only 19% of the ones that do not choose have this same level of education. Furthermore, workers who make an active investment decision earn on average 75% more than the ones that do not. They are, however, less wealthy, although this difference is not statistically significant. Women are less likely to make an active choice than men.

Work related variables also differ between the two groups. Workers who have not made an active decision are more likely to be blue collar and self-employed workers. On the other hand, workers who have made an active choice are more likely to work in a large company and to be unionized.

Among workers who made an active decision, 66% chose a riskier fund than the correspondent default for their age, while 14% chose a more conservative fund. Table 2 shows descriptive statistics for workers who chose either a riskier, the same, or a more conservative fund than the correspondent default option for their age. Workers with higher financial literacy, higher

pensions knowledge and a college degree tend to choose riskier funds. The same is true for workers with higher net wealth and monthly earnings. Women tend to be more conservative investors, and, surprisingly, workers who choose to deviate from the default option to a riskier fund are older on average.

4 Empirical Methodology

4.1 Active Investment Choice

In order to study the active investment decision of workers, I first use a logit model that estimates the following equation:

$$P(y_i = 1/X_i) = \beta_1 PK_i + \beta_2 FL_i + \beta_3 I_i + \beta_4 R_i + \beta_5 W_i + \beta_6 E_i \equiv X_i\beta \quad (1)$$

The dependent variable in (1) takes the value 1 if the worker has made an active investment decision and 0 otherwise. The independent variables include the pensions knowledge dummy variables (PK); the financial literacy dummy variables (FL); a dummy variable that takes value 1 if the worker has another type of financial investment and 0 otherwise (I); a dummy variable that takes value 1 if the worker is risk averse and 0 otherwise (R); a set of work related variables, such as being a blue collar worker, being unionized, working for a large company and being self-employed (W); and finally E represents a set of demographic controls, which include age, age squared, gender, dummies for educational level, marital status, number of children, monthly income, net wealth and whether the participant currently contributes to the system.

I then estimate fixed-effects models using data from both the 2006 and 2009 waves of the Chilean Social Protection Survey. The fixed-effects model has the advantage of accounting for

any time-invariant unobservable variables that might affect an active investment decision, such as individual ability and willpower. Table 4 shows summary statistics for individuals who participate in both rounds of the SPS. Between 2006 and 2009, workers' level of financial literacy among workers showed some improvement on average, but the same was not observed for pensions knowledge. The apparent worsen of workers' pensions knowledge might be a result of the pensions reform implemented in 2008[14], which possibly produced confusion among workers with respect to main aspects of the system.

4.2 Choice of Type of Pension Fund

For the sample of workers that made an active investment choice, I estimate a multinomial logit model that investigates how the knowledge variables affect the choice of type of fund. In particular, I study whether workers choose a riskier, more conservative or the same pension fund as the corresponding default option for their age. The multinomial logit model takes the following form:

$$P(y = j/X) = exp(X\beta_j)/\left[1 + \sum_{h=1}^{J} exp(X\beta_h)\right], \qquad \text{j=riskier, default, more conservative} \quad (2)$$

The dependent variable in (2) takes value 1 if the worker chooses a riskier fund than the corresponding default option for her age, 2 if the choice is the same as the default option for her age, and 3 if the chosen fund is more conservative than the corresponding default option for her age. The covariates I use in the estimation of equation (2) are exactly the same as the ones in equation (1).

[14] For more information about the 2008 Chilean Pensions Reform, please see Superintendence of Pensions (2009).

All models are estimated for all workers, as well as separately for men and women. This last distinction is important since it has been extensively reported in the literature that men and women present different investment behavior, with women usually found to be more conservative investors.

5 Empirical Results

5.1 Active Investment Choice

Table 3 presents the results of the logit models for an active investment decision for all workers, as well as for men and women separately. These results show that higher levels of financial literacy and pensions knowledge are strongly correlated with active retirement savings investment choices, even after controlling for education and income levels. High financial literacy is associated with a 4.8 percentage point higher probability of making an active choice (a 14.5% increase) as compared to a worker with low financial literacy, while a high level of pensions knowledge is associated with an increase in the probability of making an active choice of 30.6 percentage points with respect to a worker with low pensions knowledge, or a 92.7% increase in the probability of making an active decision.

The analysis by gender shows an interesting difference between men and women. Results suggest that although higher levels of pensions knowledge produce a positive effect for both men and women, it is stronger for men, while the contrary occurs with financial literacy. Moreover, the logit model also suggests that women are less likely to make an active investment choice.

The fixed-effects models, which identify the effect of the knowledge variables through within individual variation over time, also report statistically significant and positive associations of

higher levels of financial literacy and pensions knowledge with an active investment choice, with similar effects of financial literacy, but smaller effects of pensions knowledge. According to this model, a high level of financial literacy is associated with a 4 percentage point higher probability of making an active choice than a low level, while a high level of pensions knowledge is associated with a 10 percentage point higher probability when compared to a low level of knowledge. These smaller magnitudes are most likely a consequence of controlling for unobserved heterogeneity (or fixed effects) in this model, such as ability and willpower, which might be correlated with pensions knowledge and financial literacy.

The analysis by gender using fixed-effects models do not suggest a statistically significant effect of financial literacy for either men or women, but do suggest a positive and significant effect of pensions knowledge, which is greater for women.

These models also confirm the expected importance of education and income for this decision, both strongly associated with active choices. Also interesting to note are the strong positive effects of an increase in the worker's number of children and of being unionized on the probability of making an active choice.

5.2 Choice of Type of Pension Fund

Table 6 shows the results of the multinomial logit estimation for the choice of pension fund[15]. Results are relative to the correspondent default option according to the worker's age. Once again, results are presented for all workers, as well as for men and women separately.

The easiest way to interpret results from a multinomial logit model is using odds ratios. These give the change in the odds of choosing a riskier or more conservative pension fund relative to the default option (the omitted category) when there is a unit change in the covariate of interest.

Results suggest that knowledge variables don't have a statistically significant effect on a deviation from the default option, although they give some insight about the direction of the effects. Higher financial literacy, for instance, is associated with riskier investments for all workers, as well as for men and women. Higher pensions knowledge, on the other hand, are related to more conservative investments, even more so for women.

These results once again confirm the conservativeness of women as investors. They are strongly less likely to invest in a riskier fund than choosing the default fund when compared to men. Moreover, higher levels of education are strongly associated with deviations from the default option. Higher monthly earnings are also associated with higher odds of choosing riskier funds than the default fund.

With respect to age, results show that men and women present different behaviors. Although men are more likely to invest in riskier funds as they grow older (and wealthier), women are significantly less likely to deviate from the default choice. However, as they grow even older and

[15] A Hausman test for the Independence of Irrelevant Alternatives assumption suggests that the null hypothesis of independence cannot be rejected. Therefore, I proceed with the multinomial logit instead of a multinomial probit model.

approach retirement, men are less likely to invest in riskier funds, but women are more likely to deviate from the default fund appropriate for their age, mainly towards more conservative options.

6 Conclusion

This paper investigates the role of financial literacy and pensions system knowledge on the retirement savings investment decision of workers using data from the 2006 and 2009 waves of the Chilean Social Protection Survey. By 2009, only 33 percent of workers had made an active investment decision. This low active participation of Chilean workers is in accordance with previous findings for the US and Sweden (except for the first year of implementation of the Swedish Premium Pension System). Fixed-effects models, which control for the unobserved heterogeneity of workers, suggest a statistically significant and positive role of financial literacy and pensions knowledge on the probability of actively choosing a type of pensions fund. A higher level of financial literacy is associated with a 4 percentage point higher probability of actively choosing how to invest the retirement savings than a low level. The impact of a higher level of pensions knowledge is 2.5 times higher. Education and the level of monthly earnings are other important factors affecting the probability of actively choosing the type of retirement savings investment. When men and women are studied separately, pensions knowledge has a greater effect on an active investment choice, especially for women.

In accordance with previous results for the US (Papke, 1998), workers tend to choose riskier investments when they deviate from the default option. Among workers who made an active choice, 66% chose a riskier fund than the corresponding default option for their age, 20% chose the same as the default option for their age, and the remaining 14% chose a more conservative

fund. Higher financial literacy is associated with investment in riskier funds, while higher pensions knowledge is related to investment in more conservative funds, although these results are not statistically significant. Results also confirm the common knowledge of women being more conservative investors, since they are strongly less likely to invest in riskier funds.

Finally, results suggest that financial literacy and pensions system knowledge play a larger role in a possible active retirement savings investment choice than in the choice itself, where other variables, such as age, education and income seem to play a more important role. Investing in financial education and especially in pensions system education might be a good strategy for governments to motivate workers to make the important decision of how to invest their retirement savings, and would give them tools to better choose the appropriate option according to their individual characteristics.

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FIGURE 1

Distribution of Pensions Knowledge in 2009

FIGURE 2

Distribution of Financial Knowledge in 2009

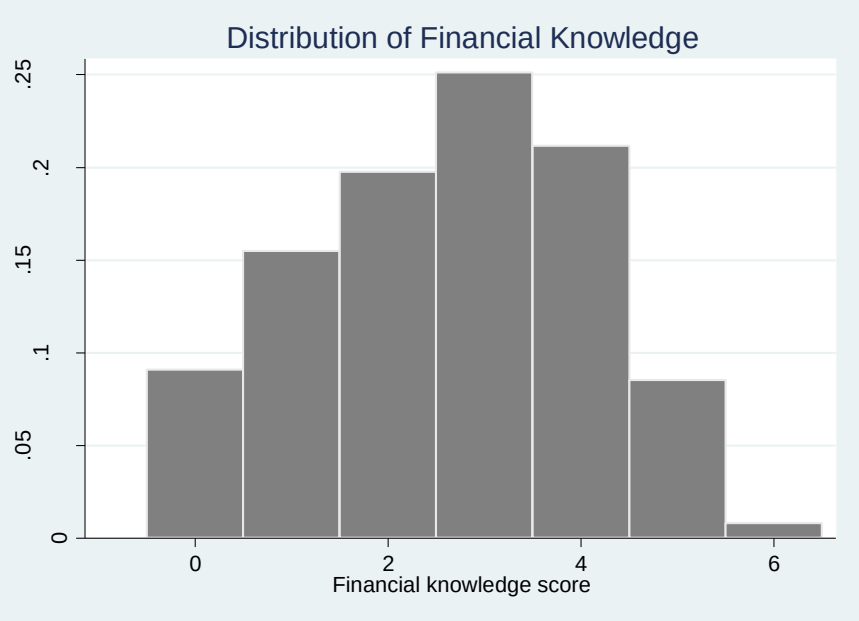

TABLE 1
Summary Statistics by Active Investment Decision (2009)

Variables	*All*	*No active choice*	*Active choice*	*P-value* [1]
Active choice	0.33	0.00	1.00	.
Low financial literacy	0.44	0.51	0.30	0.00
Intermediate financial literacy	0.46	0.42	0.55	0.00
High financial literacy	0.09	0.07	0.14	0.00
Low pensions knowledge	0.35	0.46	0.13	0.00
Intermediate pensions knowledge	0.48	0.44	0.55	0.00
High pensions knowledge	0.17	0.10	0.32	0.00
Other investment	0.34	0.30	0.41	0.00
Risk averse	0.67	0.68	0.66	0.15
High school dropout	0.21	0.26	0.09	0.00
High school degree	0.53	0.55	0.48	0.00
College degree	0.27	0.19	0.43	0.00
Female	0.39	0.40	0.37	0.03
Age	42.37	42.39	42.34	0.89
Married	0.63	0.62	0.65	0.02
Number of children	1.87	1.90	1.80	0.02
Net wealth (Millions CLP)	20.08	21.55	17.09	0.57
Contributes to pension	0.83	0.78	0.92	0.00
Monthly earnings (CLP)	356,219	285,459	500,064	0.00
Self-employed	0.15	0.18	0.09	0.00
Blue collar worker	0.49	0.57	0.33	0.00
Union member	0.22	0.17	0.32	0.00
Large firm	0.15	0.12	0.21	0.00
Number of observations	4,064	2,724	1,340	

[1] P-value of t-test of comparison of means for workers who have and have not made an active investment decision.

TABLE 2
Summary Statistics by Choice of Type of Fund (2009)

Variables	*All*	*Riskier than default*	*Default*	*More conservative than default*
Low financial literacy	0.28	0.24	0.34	0.39
Intermediate financial literacy	0.56	0.58	0.54	0.51
High financial literacy	0.15	0.18	0.12	0.09
Low pensions knowledge	0.11	0.10	0.12	0.11
Intermediate pensions knowledge	0.54	0.51	0.61	0.60
High pensions knowledge	0.35	0.39	0.27	0.28
Other investment	0.42	0.42	0.42	0.37
Risk averse	0.66	0.64	0.69	0.69
High school dropout	0.08	0.06	0.13	0.07
High school degree	0.48	0.45	0.51	0.57
College degree	0.45	0.49	0.36	0.36
Female	0.36	0.33	0.42	0.41
Age	42.21	43.31	39.53	40.96
Married	0.65	0.68	0.60	0.60
Number of children	1.78	1.86	1.58	1.73
Net wealth (Millions CLP)	16.36	18.26	10.60	15.76
Contributes to pension	0.94	0.94	0.93	0.92
Monthly earnings (CLP)	513,283	587,959	365,609	377,864
Self-employed	0.09	0.09	0.10	0.06
Blue collar worker	0.32	0.29	0.38	0.40
Union member	0.33	0.32	0.35	0.35
Large firm	0.22	0.23	0.18	0.21
Number of observations	1,199	787	243	169

TABLE 3
Logit Models for Active Investment Decision - Average Marginal Effects

	All		*Men*		*Women*	
Variables	***(1)***	***(2)***	***(1)***	***(2)***	***(1)***	***(2)***
Intermediate financial literacy	0.076***	0.040***	0.080***	0.038**	0.064***	0.038*
	(0.015)	(0.015)	(0.020)	(0.019)	(0.023)	(0.022)
High financial literacy	0.098***	0.048*	0.096***	0.032	0.096**	0.068*
	(0.026)	(0.025)	(0.033)	(0.033)	(0.041)	(0.039)
Intermediate pensions knowledge		0.173***		0.164***		0.175***
		(0.018)		(0.023)		(0.029)
High pensions knowledge		0.306***		0.328***		0.272***
		(0.024)		(0.031)		(0.038)
Other investment	0.052***	0.038***	0.071***	0.057***	0.024	0.011
	(0.015)	(0.014)	(0.019)	(0.019)	(0.021)	(0.020)
Risk averse	0.005	0.006	-0.022	-0.020	0.049**	0.047**
	(0.014)	(0.014)	(0.018)	(0.017)	(0.023)	(0.023)
High school degree	0.092***	0.057***	0.087***	0.053**	0.124***	0.086*
	(0.022)	(0.022)	(0.026)	(0.025)	(0.047)	(0.047)
College degree	0.165***	0.107***	0.161***	0.101***	0.209***	0.144**
	(0.032)	(0.029)	(0.039)	(0.037)	(0.062)	(0.058)
Female	-0.051***	-0.050***				
	(0.015)	(0.015)				
Age	0.008	0.005	0.004	-0.001	0.019**	0.019**
	(0.006)	(0.005)	(0.007)	(0.007)	(0.008)	(0.008)
Age squared	-0.000	-0.000	-0.000	0.000	-0.000**	-0.000**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Married	0.014	0.012	-0.004	-0.011	0.026	0.030
	(0.015)	(0.015)	(0.021)	(0.020)	(0.021)	(0.021)
Number of children	-0.005	-0.003	-0.001	0.003	-0.012	-0.013
	(0.006)	(0.006)	(0.008)	(0.008)	(0.010)	(0.010)
Net wealth	-0.000*	-0.000*	-0.000*	-0.000*	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Contributes to pension	0.098***	0.082***	0.127***	0.110***	0.045	0.035
	(0.026)	(0.026)	(0.034)	(0.033)	(0.039)	(0.038)
Log monthly earnings	0.123***	0.097***	0.120***	0.094***	0.117***	0.092***
	(0.013)	(0.013)	(0.016)	(0.015)	(0.022)	(0.021)
Self-employed	-0.058**	-0.038	-0.035	-0.008	-0.096***	-0.089**
	(0.023)	(0.023)	(0.029)	(0.029)	(0.037)	(0.037)
Blue collar worker	-0.085***	-0.070***	-0.079***	-0.064***	-0.110***	-0.092***
	(0.015)	(0.015)	(0.019)	(0.019)	(0.026)	(0.027)
Union member	0.096***	0.084***	0.139***	0.120***	0.038	0.037
	(0.018)	(0.017)	(0.024)	(0.023)	(0.025)	(0.024)
Large firm	0.021	0.008	0.002	-0.009	0.049	0.035
	(0.020)	(0.020)	(0.026)	(0.026)	(0.030)	(0.030)
Observations	4,064	4,064	2,475	2,475	1,589	1,589
Pseudo R-squared	0.152	0.189	0.155	0.193	0.162	0.197
Log Likelihood	-2184	-2090	-1344	-1283	-823.8	-789.2

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 4
Summary Statistics by Active Investment Decision

	2006				2009			
Variables	***All***	***No active choice***	***Active choice***	***P-value*** [1]	***All***	***No active choice***	***Active choice***	***P-value*** [1]
Low financial literacy	0.48	0.53	0.29	0.00	0.44	0.52	0.30	0.00
Intermediate financial literacy	0.41	0.39	0.50	0.00	0.47	0.42	0.55	0.00
High financial literacy	0.11	0.08	0.21	0.00	0.10	0.06	0.16	0.00
Low pensions knowledge	0.28	0.35	0.04	0.00	0.31	0.43	0.11	0.00
Intermediate pensions knowledge	0.53	0.53	0.52	0.82	0.50	0.46	0.56	0.00
High pensions knowledge	0.19	0.12	0.43	0.00	0.20	0.11	0.33	0.00
Other investment	0.37	0.34	0.48	0.00	0.36	0.32	0.42	0.00
Risk averse	0.66	0.67	0.62	0.02	0.68	0.69	0.67	0.18
High school dropout	0.22	0.26	0.06	0.00	0.18	0.26	0.07	0.00
High school degree	0.55	0.57	0.51	0.03	0.52	0.56	0.47	0.00
College degree	0.23	0.17	0.43	0.00	0.30	0.19	0.46	0.00
Female	0.37	0.36	0.41	0.03	0.37	0.36	0.38	0.23
Age	40.30	40.33	40.22	0.83	42.80	42.79	42.82	0.93
Married	0.65	0.64	0.69	0.07	0.65	0.64	0.67	0.22
Number of children	1.83	1.85	1.76	0.21	1.90	1.93	1.84	0.13
Net wealth (Millions CLP)	14.42	13.54	17.42	0.05	23.59	28.22	16.47	0.40
Contributes to pension	0.86	0.82	0.96	0.00	0.87	0.82	0.94	0.00
Monthly earnings (CLP)	345,952	287,284	546,681	0.00	385,706	305,326	509,376	0.00
Self-employed	0.15	0.17	0.07	0.00	0.13	0.16	0.09	0.00
Blue collar worker	0.46	0.53	0.23	0.00	0.47	0.57	0.32	0.00
Union member	0.21	0.17	0.33	0.00	0.25	0.18	0.34	0.00
Large firm	0.21	0.18	0.30	0.00	0.15	0.12	0.20	0.00
Number of observations	2,140	1,656	484		2,140	1,297	843	

TABLE 5
Fixed Effects Model for Active Investment Choice

	All		*Men*		*Women*	
Variables	***(1)***	***(2)***	***(1)***	***(2)***	***(1)***	***(2)***
Intermediate financial literacy	0.038***	0.033**	0.042**	0.037**	0.030	0.027
	(0.014)	(0.014)	(0.018)	(0.019)	(0.022)	(0.022)
High financial literacy	0.046**	0.040*	0.043	0.035	0.056	0.056
	(0.023)	(0.023)	(0.029)	(0.029)	(0.039)	(0.038)
Intermediate pensions knowledge		0.057***		0.040*		0.094***
		(0.016)		(0.020)		(0.027)
High pensions knowledge		0.100***		0.084***		0.136***
		(0.023)		(0.031)		(0.036)
Other investment	0.010	0.008	0.007	0.006	0.009	0.005
	(0.014)	(0.014)	(0.019)	(0.019)	(0.023)	(0.023)
Risk averse	-0.009	-0.009	-0.008	-0.009	-0.010	-0.009
	(0.014)	(0.014)	(0.017)	(0.017)	(0.023)	(0.023)
High school degree	0.168***	0.167***	0.169***	0.169***	0.152*	0.163*
	(0.045)	(0.045)	(0.054)	(0.054)	(0.087)	(0.086)
College degree	0.394***	0.400***	0.396***	0.402***	0.381***	0.404***
	(0.056)	(0.056)	(0.073)	(0.074)	(0.095)	(0.094)
Married	-0.036	-0.035	-0.041	-0.042	-0.032	-0.023
	(0.024)	(0.024)	(0.033)	(0.033)	(0.036)	(0.036)
Number of children	0.185***	0.186***	0.193***	0.193***	0.178***	0.180***
	(0.033)	(0.033)	(0.044)	(0.044)	(0.050)	(0.049)
Net wealth	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Contributes to pension	0.020	0.016	0.003	-0.000	0.061	0.059
	(0.026)	(0.026)	(0.032)	(0.032)	(0.044)	(0.043)
Log monthly earnings	0.069***	0.069***	0.079***	0.079***	0.054*	0.050*
	(0.018)	(0.018)	(0.023)	(0.023)	(0.028)	(0.028)
Self-employed	-0.019	-0.015	-0.004	-0.004	-0.057	-0.043
	(0.025)	(0.025)	(0.031)	(0.031)	(0.045)	(0.044)
Blue collar worker	0.011	0.010	0.016	0.015	-0.005	-0.009
	(0.024)	(0.024)	(0.028)	(0.028)	(0.048)	(0.048)
Union member	0.077***	0.075***	0.067**	0.064**	0.092***	0.093***
	(0.021)	(0.021)	(0.027)	(0.027)	(0.033)	(0.033)
Large firm	-0.056***	-0.059***	-0.085***	-0.088***	-0.004	-0.006
	(0.020)	(0.020)	(0.026)	(0.026)	(0.032)	(0.032)
Constant	-1.115***	-1.153***	-1.252***	-1.283***	-0.923**	-0.977***
	(0.226)	(0.226)	(0.293)	(0.293)	(0.360)	(0.357)
Observations	4,280	4,280	2,706	2,706	1,574	1,574
R-squared	0.071	0.080	0.069	0.074	0.085	0.103

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE 6
Multinomial Logit Model for Choice of Investment Funds
Base Outcome: Same as Default

	All		*Men*		*Women*	
Variables	***Riskier than default***	***More conservative than default***	***Riskier than default***	***More conservative than default***	***Riskier than default***	***More conservative than default***
Intermediate financial literacy	1.131	0.749	1.357	0.812	0.943	0.724
	(0.204)	(0.171)	(0.325)	(0.248)	(0.269)	(0.261)
High financial literacy	1.127	0.564	1.209	0.739	1.154	0.364
	(0.302)	(0.211)	(0.432)	(0.351)	(0.497)	(0.245)
Intermediate pensions knowledge	0.803	1.092	0.740	1.045	0.847	1.135
	(0.203)	(0.366)	(0.244)	(0.450)	(0.355)	(0.638)
High pensions knowledge	1.063	1.116	0.975	0.906	1.085	1.386
	(0.296)	(0.416)	(0.360)	(0.446)	(0.493)	(0.841)
Risk averse	0.873	0.954	0.912	0.752	0.773	1.550
	(0.149)	(0.216)	(0.196)	(0.209)	(0.231)	(0.667)
High school degree	2.155***	2.543**	1.953**	1.842		
	(0.627)	(1.022)	(0.646)	(0.803)		
College degree	2.184**	2.351*	1.843	1.902	1.292	0.841
	(0.741)	(1.092)	(0.769)	(1.034)	(0.369)	(0.322)
Female	0.688**	1.011				
	(0.128)	(0.250)				
Age	1.037	0.946	1.287***	1.125	0.764**	0.739**
	(0.071)	(0.082)	(0.112)	(0.127)	(0.095)	(0.114)
Age squared	1.000	1.001	0.998**	0.999	1.003**	1.004*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Net wealth	1.007**	1.008*	1.010	1.007	1.006	1.009*
	(0.004)	(0.004)	(0.007)	(0.009)	(0.004)	(0.005)
Log monthly earnings	1.917***	1.308	2.184***	1.208	1.747**	1.570
	(0.294)	(0.257)	(0.459)	(0.321)	(0.422)	(0.496)
Self-employed	0.675	0.423*	0.629	0.407*	0.752	0.385
	(0.201)	(0.188)	(0.223)	(0.215)	(0.465)	(0.344)
Union member	0.660**	0.855	0.604**	0.765	0.769	1.139
	(0.116)	(0.197)	(0.141)	(0.231)	(0.218)	(0.429)
Large firm	1.313	1.268	0.964	1.485	2.012*	0.835
	(0.298)	(0.371)	(0.291)	(0.559)	(0.726)	(0.425)
Constant	0.000***	0.035	0.000***	0.003	0.354	1.753
	(0.000)	(0.102)	(0.000)	(0.011)	(1.318)	(8.426)
Observations	1,199	1,199	768	768	431	431
Pseudo R-squared	0.0721	0.0721	0.0969	0.0969	0.0723	0.0723
Log Likelihood	-974.6	-974.6	-577.7	-577.7	-376.8	-376.8

seEform in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix A

Here I present the questions from the 2006 and 2009 waves of the Chilean Social Protection Survey I use to construct the Pensions Knowledge, Financial Knowledge and Risk Aversion variables.

Questions used for Pensions Knowledge variables

1. Do you know which percentage of your income is monthly discounted (was discounted or would be discounted) for the pensions system?
    a. Yes → Which percentage?
    b. No

2. According to the law, at which age can a man retire? What about a woman?

3. Do you know how pensions are calculated at the AFPs?
    a. According to the wage of the last years
    b. Considering the balance of the individual account, retirement age or other elements
    c. I don't know

4. Do you know or have heard about the Voluntary Savings for Retirement that operates since year 2002?
    a. Yes
    b. No

5. Do you know how much is accumulated in your individual account?
    a. Yes
    b. No

6. Who pays the variable fees?
    a. The participant with her wage
    b. The participant with her pension fund
    c. The employer

7. Do you know or have heard about the Multifunds?
    a. Yes
    b. No

8. Do you know how many types of fund exist?

a. Yes → How many?
b. No

9. Do you know which are the different types of payout of old age pensions?
    a. Yes
    b. No

10. Do you know that by fulfilling certain requisites, you can opt to retire early?
    a. Yes
    b. No

Questions used for Financial Knowledge variables

1. If the possibility of getting a disease is 10%, how many people out of 1,000 would get the disease?

2. If 5 people have the winner numbers of the lottery and the prize is 2 million pesos, how much would each one of them receive?

3. Suppose that you have $100 in a savings account, and the interest rate obtained for these savings is 2% per year. If you keep the money for 5 years in the account, how much will you have at the end of these 5 years?
    a. More than $102
    b. Exactly $102
    c. Less than $102
    d. Does not know/Does not answer

4. Let's say that you have $200 in a savings account. The account accumulates 10% of interests per year. How much will you have in the account after two years?

5. Suppose that you have $100 in a savings account, which has an interest of 1% annually. You also know that the inflation rate is of 2% annually. After 1 year, if you take the money out of the account, you will be able to buy:
    a. More than $100
    b. Exactly $100
    c. Less than $100
    d. Does not know/Does not answer

6. Is the following sentence true or false? “Buying one share of a company is less risky than buying with the same money various shares of different companies.”
    a. True
    b. False

Questions used for Risk Aversion variable

Suppose that you, as the only source of income of your household, need to choose between the following two jobs. Which alternative would you choose in these three situations?

First Situation:

Alternative A: A job with a fixed and stable earnings for the entire life.

Alternative B: A job where you have the same possibility of earning double or only ¼ of the earnings for the entire life.

Second Situation:

Alternative A: A job with a fixed and stable earnings for the entire life.

Alternative B: A job where you have the same possibility of earning double or only ½ of the earnings for the entire life.

Third Situation:

Alternative A: A job with a fixed and stable earnings for the entire life.

Alternative B: A job where you have the same possibility of earning double or only 3/4 of the earnings for the entire life.