

# RESEARCH DIALOGUE

Issue no. 100

FEBRUARY 2011

## FEES, FRAMING, AND FINANCIAL LITERACY IN THE CHOICE OF PENSION MANAGER

Justine Hastings

Yale University and NBER

Olivia S. Mitchell

Department of Insurance & Risk Management,  
The Wharton School, University of Pennsylvania

Eric Chyn

NBER and the Institution for Social Policy  
Studies (ISPS) at Yale

### ABSTRACT

A growing literature shows how consumers make mistakes in a variety of different settings pertinent to financial decision-making. Using data from a randomized experiment in Chile, we show how different ways of presenting pension management fees shape consumer choices, and how responses to pension fee information varies by level of financial literacy. Our results indicate that, in choosing pension funds, those with lower levels of education, income, and financial literacy rely more on employers, friends, and coworkers, than on fundamentals. We also find that such individuals are more responsive to information framing when interpreting the relative benefits of different investment choices.

This research is part of the NBER programs on Aging and Labor Economics, and it was supported by grants from the US Social Security Administration (SSA) to the Michigan Retirement Research Center (MRRC) and the TIAA-CREF Institute, as well as the Boettner Center/Pension Research Council at The Wharton School and Yale Institution for Social and Policy Studies. The authors also acknowledge support from and NIH/NIA grant AG023774-01, NIH/NIA Grant # P30 AG12836, and NIH/NICHHC Population Research Infrastructure Program R24 HD-044964, all at the University of Pennsylvania. The authors thank David Bravo, Fabian Duarte, Raissa Faibregas, Peter Frerichs, Daniela Fuentes, Carolina Orellana, Sandra Quijada, and Javiera Vasquez for helpful comments. Opinions and errors are solely those of the authors and not of the institutions providing funding for or with which the authors are affiliated. ©2010 Hasting, Mitchell, and Chyn. All rights reserved.



FINANCIAL SERVICES  
FOR THE GREATER GOOD®

The views and opinions in this paper are solely those of the authors and do not necessarily represent those of TIAA-CREF or the TIAA-CREF Institute.

“If households make investment mistakes, it may be possible for financial economists to offer remedies that reduce the incidence and welfare costs of these mistakes.” John Campbell, Presidential Address to the American Finance Association (2006)

Recent research and policy analysis has begun to explore the nexus between financial literacy and household saving for several reasons. First, financial literacy levels in the general population are remarkably low, both in the United States and elsewhere (Bernheim, Garrett and Maki 1997; Hastings and Tejada-Ashton 2008; Lusardi and Mitchell 2007a, b, c, 2009) which poses grave concern about whether consumers are capable of making sensible saving and investment decisions (Hilgert, Hogarth, and Beverley 2003; Lusardi and Mitchell 2010). Second, financial products are growing increasingly complex (e.g. “teaser rates” in credit cards and “no-income-no-down-payment mortgages”) which would seem to undermine the long-term trend toward asking individuals to assume greater control over their retirement accounts and other investments (Campbell 2006). Indeed, prior research finds that many people tend to be overly sensitive to framing of saving and investment decisions, chase past returns even in passively managed index funds, and take out too much debt (Ausubel 1991; Benartzi and Thaler 2001; Choi et al. 2007; Cronqvist and Thaler 2004; Lusardi and Tufano 2008; Ponce-Rodriguez 2008). Furthermore, those who prove to be least financially literate also tend to be among the most economically vulnerable, such as minorities, the least-educated, women, and low-earners (Lusardi and Mitchell 2006, 2008 and 2010). Consequently, those who most need financial skills and tools with which to make optimal financial decisions also prove to be the least well-equipped, rendering the already-disadvantaged even more vulnerable and potentially impairing the efficient functioning of financial markets.

The present study offers a unique opportunity to evaluate the relationship between financial literacy and economic outcomes, exploring how the presentation of fees and charges for financial services can help people make the most cost-effective saving decisions. Specifically, we evaluate the role of framing in shaping peoples’ awareness of fees and commissions associated with retirement saving. We ask whether people are more or less sensitive to pension fee information presented as gains versus losses, and we also evaluate whether less financially literate individuals are more or less sensitive to the way in which fees and commissions are presented.

The question of how people select pension fund managers and integrate fees into this decision process is particularly important in Chile, a nation that mandated private defined contribution pensions in 1981.<sup>1</sup> Yet even after almost 30 years of the AFP system (Asociación de Fondos de Pensiones), many participants appear to have only a rudimentary understanding of how these costs affect their pension accumulations (Arenas, Bravo, Behrman, Mitchell and Todd 2008). In the present paper, we draw on a new study that we conducted in cooperation with the Chilean Social Protection Survey (EPS or Encuesta de Protección Social) to examine the factors that influence worker selection of pension fund managers and to assess how framing of pension costs might further influence this retirement choice. Our particular focus is to assess the degree to which financial illiteracy can be overcome via different ways of presenting pension fund fees and charges. We find that individuals with lower levels of education, income, and financial literacy depend more on employers, friends, and coworkers, than on cost fundamentals when selecting a pension fund from a menu of possible offerings. We also find that these same types of individuals are more responsive to information framing when interpreting the relative benefits of different investment choices.

The discussion proceeds in three parts. First we offer a brief background on the Chilean pension system and our experimental design. Next we provide a descriptive analysis of selected characteristics of our sample population and the experimental results. A final section reviews the results and concludes with some thoughts on the implications of these results have on addressing issues of financial literacy and retirement planning.

## **SETTING, EXPERIMENTAL METHODOLOGY, AND DATA**

Chile’s national retirement system was privatized in 1981, and today pension accruals are substantial since contributions total 10 percent of wages for workers in the formal sector. Fund managers charge a front-end load fee on contributions and invest the assets following a defined contribution approach; these fees have a small but economically significant

impact on investment returns. Workers must select which pension manager they wish to hire to manage their retirement accumulations and only one manager can be selected at a time. Statistics on each fund manager's load and past return experience appear on the Chilean Government's Pension Superintendency website and are provided to participants in annual statements mailed to their residence. At present, the official government website reports monthly fees in pesos for each AFP relative to the cheapest AFP, while participant statements received annually present fees in annual percentage terms. Both of these approaches depict the data in terms of one-year results.

Despite the fact that the defined contribution pension system has been in place in Chile for several decades, there is evidence that many people still do not understand the system's contribution and benefit structures. For instance Arenas et al. (2008) report that many people do not know what contribution requirements are under the system, how much they pay in commissions, and how they have their funds invested. Mitchell et al. (2008) find that very few Chileans are aware of what commissions or fees are charged on their pension accruals. Moreover, this lack of understanding is concentrated among women, the lowest-paid, and the least-educated, the very groups most at risk of falling short of retirement saving.

For this reason, there is substantial interest in determining how to enhance participants' understanding and awareness of how fees and charges influence pension accumulations. One way to accomplish this is to determine whether people become more price-sensitive to fees when these are depicted in alternative formats. Specifically a pilot study in Mexico (Hastings and Tejada-Ashton 2008) suggested that giving workers information in pesos rather than annual percentage fees can alter how workers rank their pension fund options. That study did not, however, explore whether behavior is influenced more strongly when the *long-term* impact of gains or losses is illustrated.

In what follows, we report on a special experiment that we designed and implemented in the Chilean EPS (Encuesta de Proteccion Social) to determine whether showing workers different information on pension fund fees alters respondents' responses regarding their ranking of pension funds on a menu of possible choices. Specifically, in the 2009 EPS survey, we randomly presented two choices to interviewees, showing them hypothetical pension outcomes in terms of gains and losses in pesos over a 10-year period. For each of the five AFPs in the system at the time of the survey, we calculated the expected balance for each surveyed individual using the past returns and commissions of the AFPs and each individual's wage, balance, age and gender responses in the demographic section of the survey.<sup>2</sup> We hypothesize that individuals will be better able to understand the impact of higher AFP fees when these fees are reported as influencing the gains from contributing to a pension versus losses. To test this hypothesis, one set of respondents received a document showing how hypothetical AFP account balances would be anticipated to grow depending on each AFP's actual fees, where the results were projected over a 10-year period. The second group received a document showing the difference between the largest account that one might anticipate from selecting the lowest-cost AFP, versus the likely accumulation in the more expensive AFPs over the same period. After receiving a randomly assigned fee information sheet, each respondent was then asked to rank three AFPs to recommend to a hypothetical close friend who wished to figure out where to invest his pension money. This recommendation was recorded by the interviewer and the sheets were left with the respondents post-interview. Comparing these two groups will indicate whether the presentation of fund fees as gains or losses in peso terms is associated with the respondent selecting the lowest-cost pension fund manager.<sup>3</sup>

The nationally representative sample of individuals surveyed in the EPS also includes a rich set of information on individual-level characteristics which we use to determine which individuals are most influenced by how pension fund fees are presented. Beginning in 2002, and following up in 2004, 2006, and 2009, the University of Chile's Microdata Center has included in the EPS a wide range of questions similar to those used in the US Health and Retirement Study (NIA/NIH, nd.); this includes extensive information on schooling, labor market history, health, pension system participation, and investment behavior, as well as wealth.<sup>4</sup> The EPS also asks respondents to answer several questions measuring financial literacy and risk preferences (devised by Lusardi and Mitchell 2007a, b and used by Hastings and Tejada-Ashton 2008). Here, we focus on two sets of questions, with the first set being the "basic" financial literacy questions and the second the more "sophisticated" set:<sup>5</sup>

### **BASIC FINANCIAL LITERACY QUESTIONS**

- *Chance of Disease:* If the chance of catching an illness is 10 percent, how many people out of 1000 would get the illness?
- *Lottery:* If five people share winning lottery tickets and the total prize is two million Chilean pesos, how much would each receive?
- *Numeracy in Investment Context:* Assume that you have \$100 in a savings account and the interest rate you earn on this money is 2 percent a year. If you keep this money in the account for five years, how much would you have after five years? Choose one: more than \$102, exactly \$102 or less than \$102.

A second set of questions measures more sophisticated financial literacy concepts such as compound interest, inflation, and risk diversification; it has also been fielded in an HRS module (Lusardi and Mitchell, 2009).

### **SOPHISTICATED FINANCIAL LITERACY QUESTIONS**

- *Compound Interest:* Assume that you have \$200 in a savings account, and the interest rate that you earn on these savings is 10 percent a year. How much would you have in the account after 2 years?
- *Inflation:* Assume that you have \$100 in a savings account and the interest rate that you earn on these savings is 1 percent a year. Inflation is 2 percent a year. After one year, if you withdraw the money *from the* savings account you could buy more/less/the same?
- *Risk Diversification:* Buying shares in one company is less risky than buying shares from many different companies with the same money. True/False

Using these questions, we first evaluate individual differences in financial literacy, and second assess whether people with different attributes respond to the distinct formats for pension fees in terms of selecting the lowest-cost pension fund manager.

### **FINDINGS**

Table 1 reports summary statistics for the total number of financial literacy questions answered correctly arrayed by respondent characteristics including their age, sex, education, income, and whether the respondent had any form of saving. On average, younger individuals and men were more likely to give correct answers to more of the financial literacy questions. Similarly, financial literacy rises strongly with education levels, with those getting over half of the questions correct being more likely to have completed at least their secondary schooling. Average monthly income levels were also strongly positively correlated with financial literacy, as was the propensity to have some form of saving, and to be a member of an AFP plan.

**TABLE 1**  
**FINANCIAL LITERACY AND OTHER CHARACTERISTICS OF 2009 EPS INTERVIEWEES**

# CORRECT FINANCIAL LITERACY QUESTIONS (OF 6)	AGE (YRS)	MALE (%)	2NDRY+ EDUC. (%)	AVG. MO'LY INCOME (CP\$)*	ANY SAVINGS (%)**	AFP MEMBER (%)	OBS.
0	57	42	11	177,729.60	15	47	3,551
1	51	44	0	212,408.30	20	65	2,788
2	48	49	0	264,283.40	26	72	2,781
3	46	52	40	349,339.70	28	79	2,588
4	45	58	52	398,305.70	30	83	1,792
5	45	62	64	557,379.40	36	85	675
6	45	75	85	932,039.00	31	87	68
<i>Total</i>	50	49	29	287,731.00	24	68	14,243

Notes: \* Average monthly income calculation excludes those with zero income. \*\* This statistic is built from Question D27 in the EPS. Interviewees have savings if they respond that they have any of the following: (1) Savings for a Home (at a bank), (2) AVF Savings (Housing Fund Admin.), (3) Voluntary Pension Savings, (4) Account 2 AFP Savings, (5) Bank Savings Account, (6) Term Deposits, (7) Mutual Fund Investments, (8) Company Shares or Bonds, (9) Third Party Loans, (10) Other Savings (Cash, Dollars, "Polla", etc.).

Next we focus on AFP participants (as self-identified) and examine how respondents performed on specific financial literacy questions. Table 2 shows that those who answered each question correctly were more likely than those who did not know the correct answers to have higher monthly income, to have secondary education, and to have some form of saving. Of particular interest is the *Compound Interest* question which asked respondents to calculate the exact amount they would have in a saving account after two years if they started with \$200 and the account paid 10 percent interest annually. Very few – only 154 respondents out of more than 8,000 asked the question – answered it correctly giving a response of \$242. This handful of respondents was substantially wealthier and more educated than the sample as a whole.

**TABLE 2**  
**FINANCIAL LITERACY RESPONSES AND RESPONDENT CHARACTERISTICS OF AFP PARTICIPANTS**

FINANCIAL LITERACY QUESTION	AGE (YRS)	MALE (%)	2NDRY+ EDUC. (%)	AVG. MO'LY INCOME (CP\$)	ANY SAVING (%)*
Chance of disease	43	58	48	397,895	31
Lottery	44	58	48	403,792	30
Simple Interest	44	56	46	386,233	32
Compound Interest	43	79	84	750,137	39
Inflation	45	59	50	427,395	32
Risk Diversification	44	56	43	377,870	31

Notes: \* This statistic is built from Question D27 in the EPS. Interviewees have savings if they respond that they have any of the following: (1) Savings for a Home (at a bank), (2) AVF Savings (Housing Fund Admin.), (3) Voluntary Pension Savings, (4) Account 2 AFP Savings, (5) Bank Savings Account, (6) Term Deposits, (7) Mutual Fund Investments, (8) Company Shares or Bonds, (9) Third Party Loans, (10) Other Savings (Cash, Dollars, "Polla", etc.).

**Financial Literacy and Reasons for AFP Choice.** Prior literature has found that few Chileans are particularly aware of how the national retirement saving system works (Arenas et al. 2008). To explore this further, we added questions to the EPS that elicited the major factors influencing their fund choice, following Hastings and Tejada-Ashton (2008). Table 3

provides odds ratios from Logit analysis of respondents’ top reasons given for selecting their current AFP, relating these to control variables as well as respondent financial literacy scores (zero through six).<sup>6</sup> The first row gives the mean of the dependent variable; that is, the fraction of people who listed each factor as their top reason for selecting their current AFP. Overall, the most popular rationales for selecting their current AFPs include a friend’s recommendation, the AFP’s net returns (profitability), and an employer’s suggestion or recommendation. The rows provide insight into how the factors included influence fund manager selection. For instance, older respondents were significantly less likely to say that they depended on friends’ or employers’ recommendations when choosing an AFP, but they were more likely to select an AFP to ‘help a salesman’ or because of the institution’s perceived ‘financial stability.’ Respondents having above median income were substantially more likely to select an AFP based on the fund’s higher past returns; in fact, those with above median income have 63 percent higher odds of offering this reason. The higher income group was also much less likely to rely on employer advice when making an AFP selection and was more likely to seek perceived financial stability.

**TABLE 3**  
**LOGIT ANALYSIS OF REASONS FOR AFP CHOICE AND OTHER CONTROLS (ODDS RATIOS REPORTED)**

	FRIEND RECOMMENDED	PROFITABILITY	TO HELP SALESMAN	GOOD SERVICE	ADVERTISING	GIFT OFFERED	LOW-FIXED COMMISSION	LOW- VARIABLE COMMISSION	EMPLOYER
<i>Dependent Variable Mean</i>	0.17	0.18	0.06	0.04	0.05	0.01	0.03	0.00	0.32
Age	0.96** (0.02)	1.03 (0.02)	1.11** (0.04)	1.03 (0.03)	1.04 (0.03)	1.00 (0.07)	1.03 (0.05)	0.96 (0.10)	0.96** (0.01)
Age-Squared	1.00* (0.00)	1.00 (0.00)	1.00** (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00 (0.00)	1.00** (0.00)
Above Median Income (1/0)	1.08 (0.08)	1.62** (0.12)	1.32* (0.16)	1.04 (0.14)	0.88 (0.11)	1.33 (0.34)	1.02 (0.17)	2.55 (1.34)	0.58** (0.03)
Male (1/0)	0.88 (0.06)	1.21** (0.08)	0.81 (0.09)	1.21 (0.16)	0.94 (0.11)	1.04 (0.24)	0.78 (0.12)	1.89 (0.91)	1.03 (0.06)
Married (1/0)	0.89 (0.06)	1.02 (0.07)	0.93 (0.10)	1.22 (0.15)	1.04 (0.12)	1.18 (0.27)	1.04 (0.17)	2.09 (0.93)	0.92 (0.05)
> 2ndry+ Educ. (1/0)	1.04 (0.08)	1.37** (0.10)	1.49** (0.18)	1.08 (0.15)	1.24 (0.16)	1.46 (0.35)	0.94 (0.16)	1.35 (0.56)	0.61** (0.04)
# Financial Lit. Questions (0 - 6)	0.98 (0.02)	1.12** (0.03)	1.01 (0.04)	0.97 (0.04)	1.04 (0.04)	1.04 (0.08)	0.97 (0.05)	1.07 (0.14)	0.91** (0.02)
1+ Type of savings (1/0)†	1.04 (0.08)	0.95 (0.07)	1.19 (0.13)	1.19 (0.15)	0.78 (0.10)	0.91 (0.21)	1.34 (0.21)	1.06 (0.43)	0.93 (0.06)
Obs.††	6,884	6,884	6,884	6,884	6,884	6,884	6,884	6,884	6,884

Notes: Standard errors in parentheses. \* significant at 5%; \*\* significant at 1%. † Indicator is defined as previously described in Tables 1 and 2. †† Observations are only for individuals who have all demographic responses non-missing and are AFP members. Thus, sample is fewer than the 9,671 self-identified AFP holders.

Next we examine the links between financial literacy and education as influences on reasons given for AFP choice. Participants who had more than secondary-level education (technical training or university attendance) were more likely to say they elected their AFPs based on past returns, and less likely to say they depended on employer recommendations. The same holds for financial literacy: the odds of listing returns as important rose with the number of correct financial literacy answers, while the odds of relying on one’s employer fell for the more financially literate. To illustrate the relative magnitudes of the coefficients, we find that correctly answering four financial literacy questions has the same positive impact on the probability of choosing an AFP as having above median income.

**Financial Literacy and Sensitivity to Information Framing.** The fact that financially illiterate, less-educated, and lower-paid participants rely more on their employers when choosing an AFP, and less on fund return characteristics, suggests that such individuals may also be more sensitive to information and framing when making a pension choice decision.

To examine this further, our experimental framework offers a unique setting. We combine respondent reported income levels from the 2006 EPS with historical returns and fees data for each fund manager, in order to estimate an anticipated 10-year fund balance net of fees for each EPS respondent under all AFPs in the marketplace. These hypothetical account balance figures are then reported to respondents receiving the ‘gains’ version of the fee information worksheet used in the experiment. To construct the ‘losses’ version of worksheets, we compute the difference between the largest 10-year account balance for each individual and each of the other four AFPs in the menu. After fielding these experimental worksheets, we matched each respondent’s ‘top three AFPs they would recommend to a friend’ to our own ranking of the AFPs for that individual.<sup>7</sup>

Results appear in Table 4. Of the total of 8,614 participants who received this information, 10 percent more of the respondents who saw the gains sheet (53 percentage points) elected the lowest-cost AFP, versus 48 percentage points of those receiving the loss sheet. Evidently people seem more responsive to behavioral change when offered rewards, compared to losses. Table 4 also indicates that men, the better educated, and the higher-paid were more likely to elect the lowest-cost AFP, particularly when shown the ‘gains’ sheet.

**TABLE 4  
FACTORS ASSOCIATED WITH RESPONDENT RANKING THE LOWEST-COST AFP THE BEST (AFP PARTICIPANTS)**

<b>RANKED LOWEST-COST AFP BEST</b>	<b>SAW GAINS SHEET (%)</b>	<b>AGE (YRS)</b>	<b>MALE (%)</b>	<b>2NDRY+ EDUC. (%)</b>	<b>AVG. MO'LY INCOME (CP\$)*</b>	<b>ANY SAVINGS (%)**</b>	<b>OBS.***</b>
No	48	45	54	32	\$297,491	28	4,923
Yes	53	46	54	41	\$371,975	29	3,691
Total	50	45	54	36	\$329,873	28	8,614

Notes: \* Average monthly income calculation excludes those with zero income. \*\* This statistic is built from question D27 in the EPS. Interviewees have savings if they respond that they have any of the following: (1) Savings for a Home (at a bank), (2) AVF Savings (Housing Fund Admin.), (3) Voluntary Pension Savings, (4) Account 2 AFP Savings, (5) Bank Savings Account, (6) Term Deposits, (7) Mutual Fund Investments, (8) Company Shares or Bonds, (9) Third Party Loans, (10) Other Savings (Cash, Dollars, “Polla”, etc.). \*\*\* Total is less than 9,671 (all self-identified AFP holders) because some interviewees do not receive the experiment.

We further examine how information framing and other factors affect fund choice by testing for interaction effects of framing and literacy. This permits us to evaluate which population subgroups may be most sensitive to information framing. Table 5 reports Logit odds ratio results from analyses of whether respondents selected their lowest-cost AFPs, as a function of whether respondents received the gains or losses worksheet, and other factors. The first column presents odds ratio results pooling the experimental choices across respondents who were given AFP information as gains or losses. Receiving a gains sheet is very powerful, as this boosted the odds of choosing the most profitable AFP and increased the odds of selection by 26 percentage points. Quantitatively, showing participants the gains worksheet has a

measured impact as large as the impact of having a post-secondary education, and twice as large as the impact of having above-median income. The measured effect is slightly larger than the impact of a one unit increase in the financial literacy index.

**TABLE 5**  
**LOGIT ANALYSIS OF FACTORS ASSOCIATED WITH RESPONDENT RANKING THE LOWEST-COST AFP THE BEST**  
**(ODDS RATIOS REPORTED)**

<b>DEP. VAR: RESPONDENT RANKED LOWEST-COST AFP BEST</b>				
Saw Gains Sheet (1/0)	1.26**	1.57**	1.65**	1.66**
	(0.07)	(0.15)	(0.16)	(0.18)
Age	1.06**	1.06**	1.06**	1.06**
	(0.01)	(0.01)	(0.01)	(0.01)
Age-squared	1.00**	1.00**	1.00**	1.00**
	(0.00)	(0.00)	(0.00)	(0.00)
Above Median Income (1/0)	1.13*	1.13*	1.13*	1.15
	(0.07)	(0.07)	(0.07)	(0.10)
Male (1/0)	0.92	0.92	0.92	0.92
	(0.05)	(0.05)	(0.05)	(0.05)
Married (1/0)	0.98	0.98	0.98	0.98
	(0.06)	(0.06)	(0.06)	(0.06)
> 2ndry+ Educ. (1/0)	1.26**	1.26**	1.47**	1.47**
	(0.08)	(0.08)	(0.12)	(0.13)
# Correct Financial Lit. Questions * Saw Gains Sheet	1.22**	1.28**	1.26**	1.26**
	(0.02)	(0.03)	(0.03)	(0.03)
1+ Type of savings (1/0)†	0.92	0.92	0.92	0.92
	(0.05)	(0.05)	(0.05)	(0.05)
# Correct Financial Lit. Questions * Saw Gains Sheet		0.91**	0.94	0.94
		(0.03)	(0.03)	(0.04)
> 2ndry Schooling * Saw Gains Sheet			0.73**	0.74**
			(0.08)	(0.09)
> Median Income * Saw Gains Sheet				0.98
				(0.11)
Obs.††	6,132	6,132	6,132	6,132

Notes: Standard errors in parentheses. \* significant at 5%; \*\* significant at 1%. † This indicator is built from Question D27 in the EPS. Interviewees have savings if they respond that they have any of the following: (1) Savings for a Home (at a bank), (2) AVF Savings (Housing Fund Admin.), (3) Voluntary Pension Savings, (4) Account 2 AFP Savings, (5) Bank Savings Account, (6) Term Deposits, (7) Mutual Fund Investments, (8) Company Shares or Bonds, (9) Third Party Loans, (10) Other Savings (Cash, Dollars, "Polla", etc.). †† Observations are only for individuals who have all demographic responses non-missing and are AFP members that received the experiment. Thus, the sample is fewer than the 9,671 self-identified AFP holders.

Next we add an interaction between financial literacy and information framing in the second column, to assess whether financially literate respondents are more affected by information framing. Now the odds ratio is significant and less than one, implying that a one-unit increase in the financial literacy index reduces the impact of information framing by approximately 10 percentage points. It is also of interest to ask how framing interacts with both education and income. When we add an interaction for having received a gains sheet and having post-secondary education, the odds ratio is significantly less than one for the interaction, and the indicator with financial literacy becomes insignificant. Interestingly, the coefficient on the interaction between information framing and financial literacy is stable across the two specifications – only the significance changes – suggesting that financial literacy scores and educational attainment are sufficiently uncorrelated to effectively test their separate contributions to AFP choice. The results suggest that education rather than financial literacy is a stronger determinant of how sensitive respondents are to viewing information in gains rather than losses. Lastly, we add yet another interaction term testing for a joint effect of higher income and receiving a gains sheet; here, the new interaction term is not statistically significant and the reported odds ratio is near one.

## **CONCLUSIONS AND DISCUSSION**

We measure financial literacy as a person's ability to understand basic concepts like inflation, compounding, and investment returns. Using a new microeconomic dataset linked to experimental evidence, we have generated responses to framing of pension fund fees and we show that, when choosing pension funds, people with lower levels of education, income, and financial literacy rely far more heavily on employers, coworkers, and friends, than they do on cost fundamentals. These same types of individuals are also more responsive to fund fee framing when identifying the relative attractiveness of pension fund managers. Moreover, the impact of viewing information as gains is sizable, relative to the impact of various economic and demographic factors. Specifically, seeing investment choices as gains rather than losses is as important as the impact of having a post-secondary education, and twice as large as the impact of having above-median income. Those who do not understand these concepts make poor fund choices that can seriously prejudice their retirement security.

The policy implications of our findings are profound. Specifically, participant awareness of higher net-return funds can be greatly enhanced when information on fees is simplified in terms of likely gains from selecting higher net return funds. The impact of fund fee framing is largest for the least financially literate and the lowest-educated groups. By contrast, choices made by the financially well-informed tend to be less responsive to the information presentation, since those individuals tend to better understand the financial concepts necessary to translate annual percentage rates into costs and benefits.

Our results should interest policymakers in Chile as well as in other nations including the United States, who seek to determine how to better shape the environment in which workers make retirement saving choices. Our research is also relevant to the broader issue of whether consumers benefit from having more choice when it comes to products offered in financial markets. Recent research suggests that significant cognitive costs shape consumer decisions in a wide range of such markets from education (Hastings and Weinstein 2008) to credit cards (Ausubel 1991) to Medicare Part D (McFadden 2006, Kling et al. 2008, Abaluck and Gruber 2009) to savings and retirement investment choices (Ashraf, Karlan and Yin 2006; Madrian and Shea 2001; Choi et al. 2006, 2007; Hastings and Tajeda-Ashton 2008; Duarte and Hastings 2009), implying that market outcomes may be inefficient when greater choice and consumer autonomy is introduced. For example, decision-making costs might induce consumers to place more weight on brand names versus price in a world where product prices are not easy to understand. If such decision-making costs were negatively correlated with education, income, and wealth, such information could arouse adequacy and equity concerns.<sup>8</sup> As a consequence, increased choice could actually increase socioeconomic disparities compared to the traditional public provision model.

## REFERENCES

- Abaluck, Jason and Jonathan Gruber (2009). "Choice Inconsistencies Among the Elderly: Evidence from Plan Choice in the Medicare Part D Program." *NBER Working Papers 14759*.
- Arenas de Mesa, Alberto, David Bravo, Jere R. Behrman, Olivia S. Mitchell, and Petra E. Todd. (2008). "The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey." In Stephen Kay and Tapen Sinha. eds. *Lessons from Pension Reform in the Americas*, eds. Oxford: OUP 23-58.
- Ashraf, Nava, Dean Karlan and Wesley Yin (2006). "Tying Odysseus to the Mast; Evidence from a Commitment Savings Product in the Philippines." *The Quarterly Journal of Economics*. 121(2): 635-672.
- Ausubel, Lawrence M. (1991). "The Failure of Competition in the Credit Card Market." *American Economic Review*, 81(1): 50-81.
- Behrman, Jere, Olivia S. Mitchell, Cindy Soo, and David Bravo. *Forthcoming*. "Financial Literacy and Household Wealth Accumulation." Wharton Pension Research Council Working Paper.
- Benartzi, Shlomo, and Richard H. Thaler (2001). "Naïve Diversification Strategies in Defined Contribution Saving Plans." *American Economic Review*, 91(1): 79-98.
- Bernheim, Doug, Daniel Garrett, and D. Maki (2001). "Education and Saving: The Long-term Effects of High School Financial Curriculum Mandates." *Journal of Public Economics*, 85: 435-565.
- Bravo, David, Jere Behrman, Olivia S. Mitchell, and Petra Todd (2004). *Análisis y Principales Resultados: Primera Encuesta de Protección Social (Historia Laboral y Seguridad Social, 2002)*. <http://www.proteccionsocial.cl/english/docs/AnalisisPrincipalesResultadosPrimeraEncuestaProteccionSocial.pdf>
- Bravo, David, Jere Behrman, Olivia S. Mitchell, and Petra Todd (2006). *Encuesta de Protección Social 2004: Presentación General y Principales Resultados*. [http://www.proteccionsocial.cl/english/docs/Encuesta\\_Protección\\_Social%2020041.pdf](http://www.proteccionsocial.cl/english/docs/Encuesta_Protección_Social%2020041.pdf)
- Campbell, John (2006). "Household Finance." AFA Presidential Address. *Journal of Finance*, August. 61: 1553-1604.
- Choi, James J., David Laibson, Brigitte C. Madrian, and Andrew Metrick (2007). "Reinforcement Learning and Investor Behavior." *Yale University Working Paper*.
- Choi, James J., David Laibson and Brigitte C. Madrian (2007). "\$100 Bills on the Sidewalk: Suboptimal Investment in 401(k) Plans." *NBER Working Paper 11554*.
- Choi, James J., David Laibson and Brigitte C. Madrian (2006). "Why Does the Law of One Price Fail? An Experiment on Index Mutual Funds." *NBER Working Papers 12261*.
- Cronqvist, Henrik, and Richard H. Thaler (2004). "Design Choices in Privatized Social-Security Systems: Learning from the Swedish Experience." *American Economic Review (Papers and Proceedings)*, 94(2): 424-428.
- Duarte, Fabian and Justine Hastings (2009). "Fettered Consumers and Sophisticated Firms: Evidence from Mexico's Privatized Social Security System." Manuscript, Yale University Department of Economics.
- Hastings, Justine and Lydia Tejada-Ashton (2008). "Financial Literacy, Information and Demand Elasticity: Survey and Experimental Evidence from Mexico. *NBER Working Paper No. 14538*.
- Hastings, Justine S., and Jeffrey M. Weinstein (2008). "Information, School Choice and Academic Achievement: Evidence from Two Experiments," *Quarterly Journal of Economics*, 123(4): 915-937.
- Hilgert, Marianne A., Jeanne M. Hogarth, and Sondra G. Beverly (2003). "Household Financial Management: The Connection between Knowledge and Behavior." *Federal Reserve Bulletin*, 89: 309-322.
- Lusardi, Annamaria and Olivia S. Mitchell (2010). "How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness." *Journal of Consumer Affairs*, forthcoming.

- Lusardi, Annamaria and Olivia S. Mitchell. (2009). "Financial Literacy: Evidence and Implications for Financial Education." *Trends and Issues*. TIAA-CREF Institute, 2009
- Lusardi, Annamaria and Olivia S. Mitchell (2008). "Planning and Financial Literacy: How Do Women Fare?" *American Economic Review (Papers and Proceedings)*, 98(2): 413-417
- Lusardi, Annamaria and Olivia S. Mitchell (2007a). "Baby Boomer Retirement Security: The Roles of Planning, Financial Literacy, and Housing Wealth." *Journal of Monetary Economics* 54: 205-224.
- Lusardi, Annamaria and Olivia S. Mitchell (2007b). "Financial Literacy and Retirement Planning: New Evidence from the RAND American Life Panel." NBER Working Paper.
- Lusardi, Annamaria and Olivia S. Mitchell (2007c). "Financial Literacy and Retirement Preparedness: Evidence and Implications for Financial Education." *Business Economics* 42: 35-44.
- Lusardi, Annamaria and Olivia S. Mitchell (2006). "Financial Literacy and Planning: Implications for Retirement Wellbeing." Wharton School, Pension Research Council Working Paper.
- Lusardi, Annamaria and Peter Tufano (2008). "Debt Literacy, Financial Experience and Overindebtedness." *HBS Working Paper*.
- Kling, Jeffrey R., Sendhil Mullainathan, Eldar Shafir, Lee Vermeulen, and Marian V. Wrobel (2008). "Confusion and Choice in Medicare Drug Plan Selection." Unpublished Manuscript.
- Madrian, Brigitte and Dennis F. Shea (2001). "The Power of Suggestion: Inertia in 401(k) Participation and Savings Behavior." *The Quarterly Journal of Economics*, 116: 1149-1187.
- McFadden, Daniel. (2006). "Free Markets and Fettered Consumers (Presidential Address to the American Economic Association)." *American Economic Review*, 96(1), 5-29.
- Sirri, Erik and Peter Tufano. (1998). "Costly Search and Mutual Fund Flows." *Journal of Finance*, 53, 1589-1622.
- Mitchell, Olivia S., Petra Todd, and David Bravo (2008). "Learning from the Chilean Experience: The Determinants of Pension Switching." In Annamaria Lusardi, Ed. *Overcoming the Saving Slump: Making Financial Education and Saving Programs More Effective*. University of Chicago Press: 301-323.
- National Institute on Aging/National Institute of Health (NIA/NIH). N.d. *Growing Older in America: The Health and Retirement Study*. US Department of Health and Human Services. USGPO.
- OECD Directorate for Financial and Enterprise Affairs. Nd. "Financial Education." [http://www.oecd.org/department/0,3355,en\\_2649\\_15251491\\_1\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/department/0,3355,en_2649_15251491_1_1_1_1_1,00.html)
- President's Advisory Committee on Financial Literacy (PACFL) (2008). *Annual Report to the President: Executive Summary*. [http://www.ustreas.gov/offices/domestic-finance/financial-institution/fin-education/council/exec\\_sum.pdf](http://www.ustreas.gov/offices/domestic-finance/financial-institution/fin-education/council/exec_sum.pdf)
- Ponce-Rodriguez, Alejandro (2008). "Teaser Rate Offers in the Credit Card Market: Evidence from Mexico." Stanford University Working Paper. <http://faculty.fuqua.duke.edu/areas/finance/SG.seminars/Papers/20080201.PonceRodriguez.pdf>

## ENDNOTES

- 1 More than two dozen other Latin American countries have followed Chile's lead in adopting funded individual-account pensions; that nation's pension system has also drawn substantial attention in the United States and elsewhere.
- 2 We presented projected balances based on AFP-specific returns for two reasons. First, this calculation is very close to the official calculation the government uses. Second, we tested for persistence in AFP performance and found some evidence that some AFPs persistently outperform others, and that this persistent outperformance was present in all funds within the outperforming AFP.
- 3 In the future, using administrative linkages, it should be possible to determine whether participants provided with different formats for the fee tables differentially and systematically changed their own AFP portfolios.
- 4 The EPS also has linked respondent records to a wide range of historical administrative files on contribution patterns, benefit payments, and other program features (Bravo, Behrman, Mitchell and Todd, 2004, 2006) but we do not use these here.
- 5 In work currently underway (Behrman, Mitchell, Soo, and Bravo, forthcoming), we also evaluate questions on key aspects of the Chilean retirement system including the mandatory contribution rate, the legal retirement age for women (60) and men (65), how pension benefits are computed in the defined contribution system, whether people are aware of the welfare benefit available under the law, and whether people know they may contribute additional funds to the Voluntary Pension system.
- 6 Note that the sample here is restricted to only those members of the EPS who state that they participate in an AFP and have responses for all selected demographic variables.
- 7 Because some fund fees vary with contribution amounts, these valuations must be tailored to each respondent's own particulars.
- 8 Hastings and Tejeda-Ashton (2008) and Duarte and Hastings (2009) analyze this possibility in the context of Mexican pensions. Arenas et al. (2004; 2007a and b) evaluate these arguments in the Chilean context.