

Learning from the Chilean Experience: The Determinants of Pension Switching

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Introduction

Analysts have long debated the pros and cons of Chile's personal accounts pension system, which was launched in 1981 as a replacement of a number of bankrupt pay-as-you-go defined benefit schemes.¹ The new system of Administradoras de Fondos de Pensiones (AFPs) is a defined contribution (DC) personal account model, which today has assets equal to 60 percent of the national gross domestic product (GDP). Numerous other Latin American countries followed the Chilean model, and recent U.S. proposals for Social Security reform have also looked to Chile as a possible model for reform.²

Notwithstanding the system's success, politicians have recently proposed reforms in this decentralized, private structure, in response to relatively low coverage rates and commissions/fees that some say are excessive.³ Low coverage rates are attributed to the existence of a large informal sector within which workers are not required to contribute to the system and to low labor force participation rates among women (see Arenas de Mesa et al. 2007). Regarding commissions and fees, the designers of the privatized pension system had believed that competition among fund administrators and free entry into the market would ensure that fees and

commissions would be kept low.⁴ Yet it has been argued that low rates of financial literacy and regulations governing the pension industry have kept consumers from becoming informed about and selecting wisely among plans (see Rodriguez 1998).

This chapter examines consumer knowledge about the pension system to determine whether financial illiteracy might account for the persistence of market frictions in the pension marketplace. Our particular focus is on the marketing of the Chilean pension system: how it has changed over the years and how the changes have influenced pension fund switching behavior. Until the early 1990s, there was a proliferation of sales agents accompanied by increases in marketing expenditures and the number of AFP firms in operation. During that time, it was not uncommon practice for sales agents to offer gifts such as small appliances to encourage people to switch pension plans. The Chilean pension regulatory agency grew concerned about such practices, particularly since all AFPs held virtually identical asset allocations because of stringent portfolio allocation rules and mandatory guarantees (Bravo and Vásquez 2004). While some pension switching could of course enhance competition, it was widely believed that pension turnover was “expensive for the system and may also be damaging for members, if they are carried out without due information” (Superintendencia de Administradoras de Fondos de Pensiones [SAFP] 2003).⁵

Accordingly, in 1997, regulations were imposed that greatly changed marketing practices. First, licensing requirements for AFP sales agents were instituted and pension firms were required to hire only licensed sales agents. Second, AFP participants wanting to switch money management firms had to appear in person to submit copies of their identity cards, and they also had to bring along copies of their annual pension plan statements. As we show below, these regulatory changes did dramatically curtail switching across pension money managers. What is not yet known is whether the new rules limiting switching patterns affected pension participants equally or whether pension turnover declined more for particular socioeconomic groups. For instance, it could be hypothesized that those with low levels of education and who are least financially literate would reduce their pension turnover most, if the “protective” rule changes were targeted at this subset of participants. Alternatively, making switching harder might discourage turnover patterns more among better-educated, more highly paid workers, with the highest opportunity costs of time.

This chapter examines these questions empirically with a unique new data set known as the Encuesta de Protección Social (EPS), which was

gathered collaboratively among the University of Chile, the University of Pennsylvania, and the Subsecretaría de Previsión Social in Chile. The EPS links household demographic information gathered through a panel data survey with a longitudinal history of administrative pension records obtained from the pension regulatory agency. These data allow a detailed microeconomic analysis of how individuals make pension decisions, particularly exploring the key factors underlying workers' decisions to switch from one pension provider to another. To preview our findings, we show that participant pension switching patterns did change after the reform of the pension market in Chile. In particular, the decline in pension turnover was mainly concentrated among the better-educated participants, among whom prereform switching levels had been the highest.

The Chilean Pension Reform

Chile today is a relatively well-off nation compared with its Latin American sisters, with a per capita GDP of US\$12,700, a life expectancy of seventy-seven years, and a literacy rate of 96 percent.⁶ Yet some 11 percent of its 6.3 million employed population works in agriculture and 13.7 percent of the population lives in poverty, so there is still a substantial "informal" economy of self-employed microentrepreneurs (Tokman 2001; Mideplan 2007). Chile was a pioneer in social insurance schemes, establishing its first social security system in 1924. As explained in Arenas de Mesa et al. (2007), this system evolved from an occupationally based pension arrangement, to a national old-age pay-as-you-go system, to an unusual (for its time) funded DC plan launched in 1981, which was supplemented with a social safety net. At the time of the DC plan launch, the older system was facing collapse, with unfunded benefit promises eroding, erratic coverage, and interest-group politics impeding many from getting coverage.

The old system was replaced in 1981 with a new mandatory DC scheme wherein wage workers were required to pay 10 percent of their monthly earnings to one of the privately managed and licensed pension funds.⁷ In addition workers had to pay 2–3 percent more to cover survivor/disability insurance as well as management fees on the deposits.⁸ From the start, the government exerted strong control over the investment choices: initially workers' money could only be held in government bonds, but over time, the investment options have been expanded. Nevertheless, workers are still permitted to hold their money in only one AFP at a time, and they must

move all their pension accruals to a new AFP if they wish to switch money managers. This restriction was intended to help participants keep track of their money and avoid the growth of many small and potentially orphan accounts, a phenomenon observed in some other Latin nations. Other rules of special note include the fact that participants who contribute for twenty years are guaranteed a minimum pension if the need arises, which is financed from general revenue; the standard retirement age is 60 for women and 65 for men; and early retirement is permitted for those with sufficient wealth amassed in the pension. As with all DC plans, retirement income depends on the workers' lifelong contributions, investment earnings (net of commissions), retirement age, and life expectancy at the retirement age.

The requirement that each worker's assets be held with a single money manager has, some say, provided workers with the incentive to switch from one pension plan to another in rapid succession, producing "churning" across AFPs over time. This is not perceived to be an economically sensible strategy, as all AFPs have invested in virtually the same portfolios over time (Valdes Prieto 2005).

Initially, the Chilean system did not regulate fund-to-fund switching; after a short time, however, participants were restricted to four switches per year (SAFP 2003). Between 1982 and 1987, the rules were tightened slightly more, limiting affiliates to three switches per year; furthermore, participants seeking to move their money from one AFP to another had to appear in person at an AFP office to make the request rather than do it by mail. This in-person appearance requirement was lifted in 1987, and with this change came a substantial surge in the sales force associated with the AFP system. Sales forces grew by 23 percent per annum over the ensuing decade, and switching patterns began to take off. Indeed, by 1996, turnover reached 50 percent, the highest rate recorded in Chile (see figure 11.1), a result which some suggested could diminish pension accumulations by one-fifth (James et al. 1998). Eventually the pension regulatory agency, the AFP superintendency, grew concerned that there was "too much" switching, so in 1997 it required that any affiliate who wished to switch fund managers would have to appear in person at the AFP bearing not only a copy of his or her identification card but also a copy of his or her annual AFP statement. This 1997 change is believed to have had a substantially dampening effect on switching and on the size of the AFP sales agent force. In fact, sales agent employment fell from almost 17,500 in 1997 to just over 2,000 by 2005, and fund manager expenses due to sales force dropped quickly.

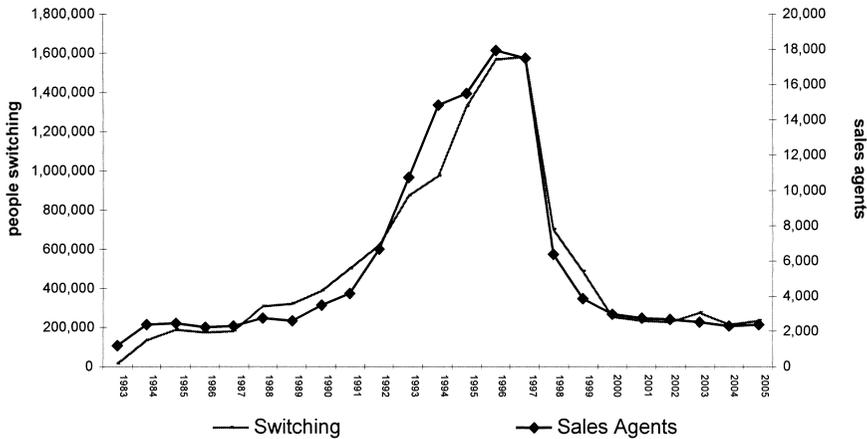


FIGURE 11.1 Participants in the Chilean pension system switching and number of sales agents by year, 1983–2005. (Source: Authors' calculations from data provided by the Chilean Superintendency of the AFP system.)

The Chilean pension system has also undergone other changes over time. For instance, the number of money managers peaked at twenty-one in 1994 but then fell steadily after that to its current all-time low of six managers.⁹ During the first sixteen years of the system's existence, there appeared to be a negligible relationship between the number of AFPs and various indexes measuring concentration among the largest AFPs. But after 1997, market concentration rose steadily as the number of AFPs fell. This change was associated with a subsequent more than doubling in profitability (measured as the net return on equity), although the 2001 market shock took its toll, from which the AFPs are only slowly recovering.

Prior Studies

Only a few empirical studies to date have examined the factors that influence workers to switch from one pension money manager to another in Chile, and all but one of these focuses exclusively on aggregate flows of affiliates across plans. For instance, Bernstein and Micco (2002) correlate net turnover patterns across AFPs to changes in the relative size of each firm's sales force, which the authors interpret as a measure of the probability of being contacted by a sales agent from that firm.¹⁰ The study concludes that AFPs with more sales agents attracted greater relative net inflows.

When they estimate the model separately in the pre- and post-1997 reform periods, they find that the effects of sales agents are attenuated, although the direct positive effect remains significant. Berstein and Micco also suggest that having more sales agents can reduce workers' sensitivity to poor return performance and higher fees and suggest that "welfare might be improved by imposing restrictions [on] switching." A follow-up study (Berstein and Ruiz 2004) again asks how net turnover flows by AFP vary with the number of sales agents over the period 1995–2002. The analysis does not test for structural changes in coefficient estimates, but the authors infer that having more sales agents had a small positive effect on net AFP inflows prior to the 1997 reform with no significant effect afterward. Accordingly they argue that the regulatory change decreased competition over fees and commissions. A study by Marinovic and Valdes-Prieto (2005) evaluates separately models for the pre- and post-1997 periods, but it does not test whether there are structural shifts over time. Cerda (2005) concludes that a larger sales force and higher marketing expenditures raised exit rates, but here too, the empirical work does not statistically test whether adding sales agents had a differential effect before versus after the 1997 reform.

To our knowledge, only Berstein and Cabrera (2007) have explored pension switching using worker-level data, drawing on a file of 24,662 pension system affiliates from a 2005 database owned by the superintendency of the AFP system and containing information on individuals' account-switching patterns.¹¹ The authors link workers' pension switches to AFP characteristics and compare results during the prereform phase (1988–96), the postreform phase (1998–2005), and the entire period (1988–2005). For our purposes, the most important finding is that the probability of switching is positively associated with the probability of being contacted by a sales agent. Berstein and Cabrera do not, however, test whether there was a significant structural shift in the model around 1997, the time of the regulatory reform. In addition, they do not test whether the reform engendered differential switching behaviors across participants of different types.

Our Methodology

In what follows, we use the EPS to explore whether workers' pension-switching patterns vary in Chile according to socioeconomic factors, whether switchers are more or less financially literate, and whether pension-switching

patterns changed after 1997 for workers of different types. The survey was first fielded by the Microdata Center of the Department of Economics of the Universidad de Chile in 2002; in 2004, a follow-up survey was administered to the same households as well as to a refresher sample. The data set includes information on respondent and household characteristics including educational status, marital status, and employment status, as well as some data on health, disability status, and utilization of medical services. Administrative data from the Chilean government have also been appended, permitting us to link worker-side with agency-side records on contributions, balances, switching patterns across AFPs, investment portfolios, and other important pension attributes.

Of substantial interest for the present analysis is the fact that the EPS incorporates several questions aimed at assessing respondents' financial literacy. In this chapter, we focus on 2004 survey affiliates age 18 to retirement (60 for women, 65 for men), where the wealth and literacy questions are particularly complete.¹² In particular, we test whether the 1997 regulatory reform had an effect on participant switching at all and, if so, whether the effect was more powerful for the more versus the less financially literate. One hypothesis is that workers who know little about their pension system will have only a weak interest in and willingness to contribute to their retirement accounts and will not be active traders. Studies from the U.S. labor marketplace suggest that many workers are woefully unaware of key aspects of their national and corporate defined benefit retirement plans (Mitchell 1988; Gustman and Steinmeier 1999; Gustman, Steinmeier and Tabatabai, this volume). As yet, however, less is known about whether similar problems arise for workers in DC plans,¹³ and no one has linked Chilean pension plan behavior with financial literacy patterns. This is of value since financial ignorance has been shown to translate into failure to plan and save for retirement in the U.S. context (Lusardi and Mitchell 2006, 2007), and it may also be a factor in the Latin American context. To this end, it is important to see how financial knowledge, or lack thereof, may be linked to important economic behaviors such as pension turnover.

In the Chilean case, we use several different indicators of financial literacy. First, we incorporate the respondent's schooling, on the grounds that more exposure to education could enhance financial literacy. Second, we use a measure of length of experience with the AFP system, which varies across individuals primarily because of variation in the timing of the first formal sector job. Third, we exploit several specific questions testing respondents' knowledge of the Chilean pension system. Our earlier

work demonstrated that questions about retirement system knowledge can be usefully grouped into the three phases of the pension lifecycle: contributions, investments/accumulations, and payouts (Arenas de Mesa et al. 2008).

Table 11.1 follows this natural grouping to summarize what 2004 EPS affiliates thought they knew about the Chilean pension system and how correct these answers proved to be. Overall, the findings suggest troublingly low levels of financial literacy. Panel A, for instance, shows that only 69 percent of the participants indicate that they receive an annual statement that summarizes past contributions and projects future benefit amounts, while, in fact, the documentation is sent out quarterly by each AFP. Fewer than half of the affiliates (46 percent) know how much they contribute to the AFP system—even though the contribution rate has been set at 10 percent of pay since the system's inception. Only one-third (34 percent) of the respondents state a contribution amount that matches at all closely (± 20 percent) with what is reported in their individual (administrative) records. Few affiliates know what commissions/fees are charged on their accounts. The fact that so many system participants are unaware of key attributes of their retirement program, despite the program having been in operation for over twenty-five years, is discouraging. It suggests a need for investor education, particularly if workers are to be encouraged to save more and more effectively for retirement.

Information on what workers have accumulated and invested in their pension appears in table 11.1B, where we see that only about half (53 percent) of those surveyed claim they know how much they have accumulated in their accounts; furthermore, only about one-fifth (22 percent) actually report amounts that are correct to within ± 20 percent of actual accruals (compared with administrative records). One-third (33 percent) of the respondents state that they know how their own money is invested, but only 16 percent are correct regarding which of the five funds they hold (compared with administrative records).¹⁴ Only one-third (38 percent) knows that fund A is the riskiest portfolio, of the five permitted by the government: funds B–E hold increasingly higher fractions of safer assets and a lower equity share. Table 11.1C focuses on retirement benefits, and it shows that around 80 percent know the legal retirement age but that fewer than 10 percent know how the AFPs actually compute benefits (in fact, a sizeable group believes that the system is a defined benefit structure, instead of a DC plan!). The current system also provides a minimum pension guarantee from the federal government if twenty-year contributors

TABLE 11.1 Knowledge of Chilean pension system attributes

Variable	%
A. Contributions	
Received AFP statement within twelve months	69.2
Claims to know AFP amount contributed	38.0
Correct on AFP contributions	30.9
Says knows fixed AFP commission	1.7
Says knows variable AFP commission	2.1
Says knows both commissions	0.5
B. Accumulations/investments	
Says knows AFP accumulation	52.7
Correct on AFP accumulation ($\pm 20\%$)	21.6
Knows about multifunds	47.4
Knows how many multifunds	32.8
Correct on number of multifunds	20.2
Says knows own investment mix	32.8
Correct on fund type	15.8
Knows riskiest fund	38.1
C. Payouts	
Knows female legal retirement age	76.5
Knows male legal retirement age	80.0
Knows how AFP calculates pensions	9.3
Says knows minimum pension requirements	31.1
Correct on minimum pension requirements	0.2
Knows minimum pension exists	44.9
Says knows minimum pension amount	32.8
Correct on minimum pension amount	3.4

Note: AFP = Administradoras de Fondos de Pensiones.

Source: Derived from Arenas de Mesa et al. (2008); sample includes AFP affiliates surveyed in 2004, ages 18–60.

had insufficient funds to reach the promised threshold as of retirement. But here too participant information is meager: fewer than half (45 percent) are even aware of the guaranteed minimum benefit. Interestingly, of the one-third (33 percent) who claims to know the minimum benefit level, only a miniscule minority—3 percent—can accurately report this minimum benefit. It is worth noting that AFP participants in Chile seem similar to the majority of their U.S. counterparts covered by company pensions (Gustman, Steinmeier, and Tabatabai in this volume).

To more compactly summarize the responses to these three sets of pension knowledge questions, we implement a summary index or scoring system that was developed by Brockett et al. (2002) known as PRIDIT. This approach evaluates each respondent's answer to a financial literacy

question by weighting a correct response more heavily when other respondents mostly get it wrong and less heavily if most others provide a correct answer. As an example, correctly answering a question that only 10 percent of respondents answer correctly is rewarded more than correctly answering a question that everyone gets right, but getting it wrong is not associated with much of a penalty if no one knows the answer. In this way, the PRIDIT score is sensitive to others' performance. The scoring is centered at zero, which refers to the mean score of all who respond to a given question. We then sum these scores across questions to generate a respondent's literacy index score by cluster of pension knowledge.¹⁵ An advantage of this process is that the weights take into account what others know across questions. For instance, if two people tend to get two questions right, their answers on both will be less informative compared with the questions that distinguish between people. The PRIDIT weights for clusters A–C in table 11.1, referring to pension contributions, pension accumulations/investments, and pension outflows, respectively, appear at the top of table 11.2. Here we see that average scores are relatively higher on the accumulation than on the pay-in/pay-out questions, and those who switched pension managers have even higher pension literacy than the full sample.

Turning next to switching patterns, table 11.2 also indicates the number of times a worker switched from one AFP to another over the period 1981–2004. In particular, we seek to determine how often Chilean AFP members switch fund managers and whether switchers are similar to nonswitchers. In the U.S. 401(k) context, we have found that DC plan participants are fairly inactive on average, trading in their pension plan only about once every two years. Nevertheless, there is an important segment of active 401(k) plan traders, namely, more highly paid men. This has been interpreted as an “overconfidence” effect, in that active trading tends to reduce, rather than enhance, plan performance (Mitchell et al. 2006a, 2006b). Accordingly, one hypothesis we seek to test is whether pension switchers are among the least educated and least financially literate. An initial insight into this behavior in the Chilean context is facilitated by table 11.2, which shows that the mean number of pension switches per year, 0.2, was quite low in the population as a whole; only 15 percent ever switched over their work life. In other words, most people switch zero or one times, but some switch pension managers as many as eight times in a single year. It is important to note that a small but important fraction of people changed pension managers owing to cor-

TABLE 11.2 Descriptive statistics for analysis sample

Variable	All respondents	Respondents who switched Administradoras de Fondos de Pensiones at least once during the year
Pridit A: contributions score	10.7 (111.6)	19.07 (124.06)
Pridit B: accumulations score	20.5 (103.9)	43.32 (104.06)
Pridit C: payouts score	11.5 (99.0)	20.93 (98.94)
Mean number of voluntary switches	0.20 (0.52)	1.31 (0.57)
Proportion of people switching voluntarily	0.15 (0.36)	1.0 (0.0)
Mean number of merger-related switches	0.01 (0.11)	0.07 (0.27)
Average age	35.71 (10.12)	34.70 (9.24)
% With highest degree elementary	0.16 (0.37)	0.09 (0.29)
% With highest degree high school	0.60 (0.49)	0.56 (0.50)
% With highest degree college	0.24 (0.43)	0.34 (0.47)
% Married	0.70 (0.46)	0.72 (0.45)
% Divorced, widowed, or separated	0.11 (0.31)	0.11 (0.32)
% Male	0.64 (0.48)	0.64 (0.48)
Average monthly remuneration (in 1,000 pesos)	171.82 (186.24)	228.44 (214.00)
Years of participation in the AFP system	7.67 (6.05)	7.87 (5.30)
Number of sales agents	6,331 (5543)	
Sales agents/affiliates	0.001 (0.001)	
Number of AFP firms	11.8 (4.3)	
Number of affiliates	4,985,673 (1,648,032)	

Note: Data are mean (standard deviation). Observations represent an individual in a given year. There are 8,641 observations in all; 12,886 observations that switched Administradoras de Fondos de Pensiones firms at least once during the year.

Source: Authors' computations are from the 2004 Encuesta de Protección Social sample of affiliates and administration pension fund data.

porate mergers, and in what follows we subtract these from the voluntary switch analysis.¹⁶

Other sample statistics are also summarized, with one salient difference being that active switchers tend to be more highly paid and better educated than those who never alter their pension holdings over time. About one-third (34 percent) of switchers have a college degree, in comparison with 24 percent for the whole AFP affiliate sample. There is no discernible difference by sex, with the same proportion male (64 percent) in both the more and less frequent switcher groups. There is a big difference in the level of contributions, with more frequent switchers making almost double the amount of contributions. They also have much higher financial literacy scores, by all three PRIDIT literacy measures (A, B, and C). The average age of the sample is 35.4, with the higher proportion of males reflecting the fact that the male labor supply is higher in Chile and that males are more likely to be in formal sector employment. With regard to education, 16 percent of the sample has six or fewer years of education

(elementary), 60 percent has seven to twelve years (high school), and 24 percent has more than a high school degree. The majority of the sample (70 percent) is married. Chilean workers are required to pay 10 percent of their wages to their pension fund up to a maximum threshold. The average monthly remuneration is 171,000 pesos, or roughly \$285 dollars. The last five lines of the table refer to average characteristics of the AFP industry over the 1981–2004 time period, including the average number of sales agents, the average number of total AFP affiliates, and the number of AFP firms in operation.

Results

Next we test whether switching patterns were significantly reduced after the regulatory reform that made switching more onerous and, if so, for whom. We also seek to determine whether making switching more difficult was more of a deterrent to switching among the low-paid, uneducated workers or among the more affluent and better educated. In the former case, making switching more difficult could be interpreted as enhancing consumer protection for the financially vulnerable, if sales agents use tactics that induce less-educated consumers to sign up for higher cost funds. On the other hand, since the regulatory change mainly increased the time costs of switching, the change may have increased transaction costs most for the well-to-do. The net effect of the regulatory change is ambiguous and must be determined empirically.

Our analysis of switching patterns and financial literacy uses 84,641 person-years of EPS data. We estimate a series of multivariate models linking the annual number of voluntary switches made by each individual to different sets of control variables. First, we include indicator variables for whether the person-year observation occurred before or after the 1997 reform, along with mandatory contribution levels. The estimates in table 11.3, column (1), indicate that the average number of switches declined after 1997 by 0.12 per annum. Column (2) adds a time trend for control for general changes over time in switching behavior, perhaps attributable to technological advances that facilitated switching, and also adds as a regressor the number of AFP firms in operation, as the latter could be expected to offer more opportunity for switching. The addition of these control variables only slightly lowers the estimated effect of the 1997 reform from 0.12 to 0.11 switches per year. Next, column (3) includes sociodemographic

controls that will take into account possible differences in characteristics of pension affiliates over time. We find that higher numbers of switches are associated with being better educated, having higher mandatory contribution levels (and therefore higher wages), and being married. We also find that individuals with a longer experience with the AFP pension system (controlling for age) switch more. Switching patterns appear to be highly similar for men and women after controlling for the levels of contributions and other factors, a finding that differs from U.S. studies reporting that men switch funds more than women. To allow for flexibility, age is entered as a quadratic (we use age and age squared) and is found to have a positive but decreasing effect on switching up to age 44, after which it has a negative effect. Older people tend to have more accumulated in their pension funds, so switching would generally have greater implications for them in terms of potential cost savings.

People who are not working do more switching, which may be a reflection of the fact that the AFP fee structures may make it optimal to switch when an employed person becomes unemployed. That is, AFPs charge both a fixed fee and a variable fee that depends on the mandatory contribution amount, and different AFPs generally charge different combinations of fixed and variable fees. The fee structures have changed over time. Because of the fee structure, when people become unemployed, it might be optimal for them to choose a different AFP.¹⁷ Interestingly, the socioeconomic factors prove to be useful controls in that they are statistically different from zero, but their inclusion does not materially alter our estimates of the 1997 reform effect. In other words, the estimated impact of the regulatory reform is robust to the inclusion of these socioeconomic factors as controls.

To examine which groups are most affected by the reform, additional models in columns (4) and (5) permit the 1997 regulatory reform to have a different impact depending on the respondent's education level. The results indicate that the number of switches is curtailed most among the better educated, who were also the most frequent switchers prior to the reform. Switching also dropped for the least educated, but by only half as much. In this sense, the reform may have had a greater impact on the better off—and more financially literate—rather than on the lesser informed, as might have been hoped. Controlling for the number of AFP firms in operation also shows that people switched more when there were many AFP firms from which to choose. Nevertheless, even given the number of firms in the market, it is clear that the 1997 reform is associated

TABLE II.3 Estimates of multivariate model for number of voluntary switches

Covariates	(1)	(2)	(3)	(4)	(5)
Constant term	0.12 (0.003)	-0.07 (0.01)	-0.13 (0.03)	-0.17 (0.028)	-0.22 (0.03)
Age	...	...	0.005 (0.001)	0.006 (0.001)	0.008 (0.001)
Age squared	...	...	-0.0001 (0.00001)	-0.0001 (0.00002)	-0.0001 (0.00002)
Male	...	...	-0.003 (0.004)	-0.002 (0.004)	-0.002 (0.004)
High school	...	...	0.04 (0.005)	0.06 (0.006)	0.07 (0.007)
College	...	...	0.09 (0.006)	0.11 (0.007)	0.10 (0.009)
Married	...	...	0.02 (0.005)	0.02 (0.005)	0.02 (0.005)
Divorced/widowed/separated	...	...	0.06 (0.007)	0.06 (0.007)	0.07 (0.007)
Working	...	...	-0.05 (0.01)	-0.05 (0.01)	-0.04 (0.01)
Mandatory contribution	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)
Mandatory contribution squared	-9.61E-7 (3.47E-8)	-7.91E-7 (3.77E-8)	-7.32E-7 (3.83E-8)	-7.34E-7 (3.85E-8)	-7.38E-7 (4.06E-8)
Years experience in the AFP system	...	...	0.002 (0.0005)	0.001 (0.0005)	0.001 (0.0005)
Post-1997	-0.20 (0.004)	...	-0.11 (0.009)	...	...
Post-1997 × elementary school	...	...	...	-0.04 (0.01)	-0.04 (0.01)
Post-1997 × high school	...	...	...	-0.12 (0.005)	-0.13 (0.01)
Post-1997 × college	...	...	...	-0.11 (0.008)	-0.12 (0.01)
Time trend	...	0.001 (0.0005)	0.002 (0.0006)	0.002 (0.0006)	0.003 (0.0006)
Number of AFPs	...	0.013 (0.0007)	0.013 (0.0007)	0.01 (0.0007)	0.01 (0.0007)
PRIDIT A: contributions score	...	...	...	...	0.000004 (0.00002)
PRIDIT B: accumulations score	...	...	...	...	0.0002 (0.00002)
PRIDIT C: payouts score	...	...	...	...	0.00004 (0.00002)
Number of observations, person-years	84,640	84,640	84,640	84,640	76,972
Adjusted R ²	0.0470	0.0512	0.0602	0.0560	0.0623

Note: Standard errors are in parentheses. AFP = Administradoras de Fondos de Pensiones.

Source: Authors' computations are from the 2004 Encuesta de Protección Social sample of affiliates and administration pension fund data.

with fewer pension plan switches. Column (5) augments the equation to include the three PRIDIT variables that we propose as measures of financial literacy as we have described. Only the PRIDIT B score proves to be positively and statistically associated with higher pension switching rates. In other words, those workers with more knowledge about their pension accumulations and investment patterns are also those who tend to switch more often.

We have also estimated all of the specifications separately for men and women, but results are not reported in detail for the sake of brevity. Most critically, all of the estimated patterns noted previously are consistent with the new results. The magnitudes of estimated coefficients are similar, with the exception of the coefficients on the pay, which are of the same sign but differ in magnitude for men and women. For both groups, the average number of switches declines by about 0.10 after the 1997 reform in specifications similar to columns (2)–(5), with the more educated exhibiting a greater decrease. Again, only the PRIDIT B variable is statistically significant: greater financial literacy according to this measure boosts the average number of switches by the same amount for men and women.

Table 11.4 presents estimates analogous to those in table 11.3, except that the specification includes individual-level fixed effects, which allow for any individual-level unobserved determinants of switching. Because we have repeated observations for each individual, we can account for individual-specific differences among individuals. In the fixed-effect specifications, the coefficients associated with regressors that are fixed over time or that vary in a deterministic way with age within individuals cannot be identified. For example, within individuals, the time trend and the exposure to the AFP system are collinear with age and therefore are not separately identified. Also, the PRIDIT variables cannot be included because they are measured only at a single point in time. The estimated coefficient associated with the 1997 reform is virtually unchanged by the inclusion of fixed effects; specifically, the average number of switches is 0.10 lower after the regulatory reform. Also, the switching pattern by work status and level of remuneration remains the same as in table 11.3. *F*-tests of the joint significance of the individual fixed effects reject the hypothesis of no fixed effects at conventional significance levels.¹⁸

For exploratory analysis, we also consider the relationship between the pension knowledge (PRIDIT) variables and individual characteristics in table 11.5. Here we see that education is highly statistically positive and significant for all of the financial knowledge measures. The coefficient on

male is positive and statistically significant for the PRIDIT A measure, statistically insignificantly different from zero for the PRIDIT B measure, and negative and statistically significant for the PRIDIT C measure. This suggests that men are more knowledgeable than women about contributions but less knowledgeable on rules governing payouts and minimum pensions, which might be related to the fact that women can expect to receive their pension about three years earlier on average because the mandatory retirement age is lower for women. Workers who have higher contribution levels are more knowledgeable about their pension contribution amounts and about investments, but they are not differentially knowledgeable about payments and minimum pension rules. A longer experience with the AFP system is associated with a higher level of financial literacy according to all three measures. It is noticeable that the R^2

TABLE 11.4 Estimates of multivariate fixed-effect model for number of voluntary switches

Covariates	(1)	(2)	(3)	(4)
Constant term	0.12 (0.003)	-0.04 (0.01)	-0.24 (0.04)	-0.28 (0.04)
Age	...	...	0.012 (0.002)	0.015 (0.002)
Age squared	...	...	-0.0001 (0.00002)	-0.0001 (0.00002)
Working	...	...	-0.04 (0.01)	-0.04 (0.01)
Mandatory contribution	0.001 (0.00003)	0.0008 (0.00004)	0.0008 (0.00003)	0.0008 (0.00003)
Mandatory contribution squared	-8.45E-7 (3.84E-8)	-6.28E-07 (4.3E-08)	-6.13E-7 (4.37E-8)	-6.14E-7 (4.40E-8)
Post-1997	-0.19 (0.005)	-0.10 (0.009)	-0.10 (0.009)	...
Post-1997 × elementary school	...	...	...	-0.03 (0.01)
Post-1997 × high school	...	...	...	-0.12 (0.01)
Post-1997 × college	...	...	...	-0.10 (0.01)
Time trend	...	0.002 (0.0006)	...	...
Number of Administradoras de Fondos de Pensiones	...	0.01 (0.0007)	0.01 (0.0007)	0.01 (0.0007)
Number of observations, person-years	84,641	84,641	84,640	84,640
<i>p</i> -value from <i>F</i> -test of fixed effects equal to 0	< 0.0001	< 0.0001	< 0.0001	< 0.0001
Adjusted R^2	0.0457	0.0494	0.0602	0.0560

Note: Standard errors are in parentheses.

Source: Authors' computations are from the 2004 Encuesta de Protección Social sample of affiliates and administration pension fund data.

TABLE 11.5 **Estimated relationship between financial literacy and demographics**

Covariates	PRIDIT A	PRIDIT B	PRIDIT C
Constant term	-26.16 (24.31)	-56.83 (23.05)	-111.42 (23.43)
Age	-0.87 (1.22)	-0.37 (1.16)	2.00 (1.18)
Age squared	0.01 (0.01)	-0.004 (0.01)	-0.01 (0.01)
Male	8.68 (3.13)	-1.08 (2.97)	-12.70 (3.02)
High school	21.37 (4.93)	41.30 (4.67)	27.38 (4.75)
College	39.80 (5.71)	92.03 (5.41)	45.56 (5.50)
Married	1.52 (3.56)	-1.65 (3.38)	-3.17 (3.43)
Divorced/widowed/separated	-0.52 (5.70)	-18.87 (5.41)	-12.47 (5.50)
Working	-0.22 (10.70)	-15.77 (10.15)	8.95 (10.32)
Mandatory contribution	0.07 (0.03)	0.21 (0.02)	0.03 (0.02)
Mandatory contribution squared	-0.00006 (0.00003)	-0.0001 (0.00002)	0.000002 (0.00003)
Years of experience with the Administradoras de Fondos de Pensiones system	0.46 (0.32)	1.73 (0.30)	1.18 (0.30)
Adjusted R^2	0.02	0.15	0.06

Note: The number of observations, person-years (year 2004 only), is 4,928. Standard errors are in parentheses.

Source: Authors' computations are from the 2004 Encuesta de Protección Social sample of affiliates and administration pension fund data.

is much higher for the PRIDIT B measure than for the other measures, indicating that socioeconomic factors are a better predictor of knowledge about accumulations and investments. This is plausible, given that these demographic and economic factors are important predictors of earnings, which in large part determine investment levels through the minimum contribution rules.

Conclusions and Implications

Recent studies of financial decision making suggest that financially illiterate consumers tend to make poor financial decisions—saving inadequately, managing their money inefficiently, and even retiring too soon. This analysis of the Chilean pension system is the first to link education

and financial literacy with an interesting retirement saving outcome—switching between pension money managers who are basically investing in identical portfolios. We also test whether the least educated and financially literate appear to be most affected by regulation restricting such pension turnover.

We show that the change in regulatory rules on the marketing of AFPs substantially suppressed the overall number of participant switches. Nonetheless, although the number of voluntary switches declined, the drop was concentrated mainly among a particular group—the better educated. Our evidence implies that the policy did little to target those who might be thought to be most in need of consumer protection; rather, it influenced the switching behavior of the better educated and the most highly paid who had previously been most likely to switch pension fund managers.

This analysis has implications for other countries contemplating pension reform. An oft-noted critique of those seeking to implement an individual account-style pension system is that consumers may be poorly informed and therefore incapable of making sensible economic decisions about their own retirement saving. While this is surely true, the Chilean experience shows that regulations intended to reduce pension turnover affected mainly those who were doing the most switching in the first place—the better educated and higher earning members. To the extent that lowering turnover reduces overall administrative expenses, overall system performance can be enhanced. Whether it has a differential effect on investment returns for different types of workers is the subject of future research.

Notes

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1. Many have written on the Chilean pension system (for example, Cheyre 1988; Iglesias and Acuña 1991; Baeza and Margozzini 1995; and SAFP 2003). Some of the literature is summarized by Arenas de Mesa et al. (2008).

2. Other Latin American countries that reformed their pension systems along similar lines include Peru (1993), Colombia (1994), Argentina (1994), Uruguay (1996), Bolivia (1997), Mexico (1997), El Salvador (1998), Costa Rica (2001), the Dominican Republic (2003), Nicaragua (2004), and Ecuador (2004). Cogan and Mitchell (2003) discuss prospects for funded individual defined contribution account pensions in the United States.

3. A recent critique citing the problem of low coverage rates is Holzmann et al. (2005). Chilean president Michele Bachelet has proposed several changes in the AFP system; for details, see Consejo Asesor Presidencial para la Reforma Previsional (2006) and Gobierno de Chile (2006).

4. The Chilean pension reform was implemented by General Pinochet's military government, which was advised by a team of University of Chicago economists.

5. Others arguing that pension switching in Chile has been costly include Berstein and Cabrera (2006); Berstein and Ruiz (2004); Cerda (2005); James, Smalhout, and Vittas (2001) and Valdes Prieto (1999, 2005); for additional citations, see Consejo Asesor Presidencial para la Reforma Previsional (2006).

6. For more detail, see <http://www.cia.gov/cia/publications/factbook/print/ci.html>.

7. In addition to the funded defined contribution accounts, the Chilean old-age system includes a welfare benefit for the destitutes, a minimum pension guarantee for long-time contributors, and the opportunity to make additional voluntary contributions. These other elements are not the central focus of this chapter; for more detail, see SAFP (2003).

8. Mandatory system contributions are capped at a ceiling earnings level of approximately US \$2,200 a month; fewer than 8 percent of AFP contributors earn over that ceiling.

9. Barrientos and Boussofiene (2005) find that more efficient providers survived better than less efficient ones.

10. Their model also controls for AFP-specific changes in advertising expenditures, information technology expenditures, fund returns, and fund commissions and fees, all expressed in relative terms.

11. The authors note that the actual AFP identification codes had to be imputed, in some cases, as they found that old AFP codes had been overwritten when a new firm merged with or bought an old one. To correct this, the authors used published data on AFP-specific fixed commissions to reverse-engineer the codes for the actual AFPs covering the sample over time.

12. The sampling frame of the 2002 *Historia Laboral and Seguridad Social* survey consists of individuals enrolled in the social security system for at least one month during the 1981–2001 time period. The sample included individuals who

in 2002 were working, unemployed, out of the labor force, receiving pensions, or deceased (in this case, the information was collected from surviving relatives). The sample was drawn from a sampling frame of approximately 8.1 million current and former affiliates of the social security system that was compiled from official databases (obtained from the secretary of labor and social security). This sample covers around 75 percent of the population aged 15 and older in 2001. The sampling frame in 2004 was augmented to include a subsample of individuals not affiliated with the social security system, so that the sample is representative of the entire Chilean population over the age of 15. The proportion of individuals in the population who are affiliated or not affiliated with the social security system is known, so weights can be used to adjust for the choice-based sampling data design.

13. There is some very recent research on 401(k) plan switching patterns by Mitchell et al. (2006a, 2006b).

14. During the first twenty years, Chilean AFP affiliates could decide only which AFP they wanted to invest with but were not permitted to diversify their holdings across AFPs, nor could they choose asset allocations. In 2000, the government permitted the AFPs to open a more conservative account for retirees or those within ten years of legal retirement. In 2002, each fund administrator was permitted to expand the number of investment offerings from two to five in order to allow participants to diversify their asset allocations. Under this new “multifund” structure, each AFP must offer a so-called fund A, which invests 80 percent of the portfolio in equities; fund E, which holds 100 percent fixed income; and funds B–D, which hold intermediate fractions of equities. Workers may elect to hold up to two funds in a single AFP at a time (see Arenas de Mesa et al. 2008).

15. In practice, Skog (2006) notes that the PRIDIT model first measures what proportion of the population has an identifying trait, such as answering a question correctly. The difference of an individual’s score from the mean is then calculated. These scores are then normalized, and the principle component of a group of questions is computed and used to calculate the final PRIDIT score. Skog (2006) uses these literacy scores as dependent variables and reports that older, healthier, more highly paid, and more educated men are more pension literate across the board. He also contends that people appear more likely to inform themselves as knowledge becomes more relevant, implying that they may respond to incentives when investing in self-education.

16. We measure switching using the administrative data, which provide monthly information on each affiliate’s AFP. This information is merged with the socioeconomic and financial literacy information from the Encuesta de Protección Social, and the analysis uses the subset with data from both sources. It should be mentioned that we inferred that a person’s *reported* AFP was incorrect in a case in which this AFP was not in existence during a given year. When this AFP had recently merged with another AFP, we imputed the new AFP value to the individual. In a few cases, less than 5 percent, the AFP could not be confirmed and the

observation was dropped. Similar data checks were conducted by Berstein and Cabrita (2006), who assisted this project in providing guidance on the AFP imputation algorithm.

17. We plan to examine this potential reason for nonworking individuals to switch in future work.

18. We also estimate random-effects models, which are not reported here for brevity; the results are quite similar to those reported in the text.

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