

# **Learning from the Chilean Experience: The Determinants of Pension Switching**

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October 2007

**PRC WP2007-31**

**Pension Research Council Working Paper  
Pension Research Council**

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The authors acknowledge research support from NIA grant AG023774-01, and funding from the Mellon Foundation to the Population Studies Center on Latin American demographic issues. The research was also supported by an award from the Population Aging Research Center (PARC) at the University of Pennsylvania Population Studies Center and the Boettner Center for Pensions and Retirement Security and Pension Research Council at the University of Pennsylvania. Helpful research assistance was provided by José Luis Ruiz, Jeremy Skog, and Javiera Vásquez. Useful suggestions from Solange Berstein, Gary Engelhardt, and Annamaria Lusardi are gratefully acknowledged. Opinions and errors are solely those of the authors and do not reflect views of the institutions supporting the research nor with whom the authors are affiliated. This paper will appear in the volume edited by Annamaria Lusardi, Ed. *Overcoming the Saving Slump: Making Financial Education and Saving Programs More Effective*. University of Chicago Press (*forthcoming*). © 2007 Mitchell, Todd, and Bravo. All findings, interpretations, and conclusions of this paper represent the views of the author(s) and not those of the Wharton School or the Pension Research Council. © 2007 Pension Research Council of the Wharton School of the University of Pennsylvania. All rights reserved.

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## Abstract

Competition across money managers, along with market entry, in theory could ensure that capital market remains competitive. But in Chile, which has had a privatized pension system for 25 years, high rates of switching between the funds and little downward movement on fees, have been interpreted as evidence of market inefficiency. This chapter uses a change in the regulatory rules governing the marketing of AFP pensions (*Administradoras de Fondos de Pensiones*) in Chile to investigate the empirical basis for sources of market frictions. We find that switching patterns are on a par with trading in US 401(k) accounts, and further, that switchers tend to be highly educated and relatively more highly paid. Switching is also more common among those with higher levels of financial literacy. The 1997 regulatory change appears to have reduced switching, particularly among the better educated.

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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.<sup>1</sup> The new system of *Administradoras de Fondos de Pensiones* (AFPs) is a defined contribution personal account model, which today has assets equal to 60 percent of national GDP. Numerous other Latin American countries followed the Chilean model, and recent US proposals for Social Security reform have also looked to Chile as a possible model for reform.<sup>2</sup>

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 some say are excessive.<sup>3</sup> Low coverage rates are attributed to the existence of a large informal sector where workers are not required to contribute to the system, and to low labor force participation rates among women.<sup>4</sup> 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.<sup>5</sup> Yet it has been argued that low rates of financial literacy and regulations governing the pension industry have inhibited consumers from becoming informed about and selecting wisely among plans.<sup>6</sup>

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 1990's, 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 due to 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" (SAFP 2003).<sup>7</sup>

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 only to hire 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 a copy 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 education and least financially literate would reduce their pension turnover most, if the "protective" rule changes were targeted on 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 paper examines these questions empirically with a unique new dataset known as the *Encuesta de Protección Social* (EPS), gathered in collaboration between 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, in particular exploration of 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, where pre-reform switching levels were the highest.

### **The Chilean Pension Reform**

Chile today is a relatively well-off nation compared to its Latin American sisters, with a per capita GDP of US\$12,700, a life expectancy of 77 years, and a literacy rate of 96%.<sup>8</sup> Yet some 11% of its 6.3 million employed work in agriculture and 13.7 % of the population lives in poverty, so there is still a substantial “informal” economy of self employed micro-entrepreneurs (Tokman 2001, Mideplan 2007). Chile was a pioneer in social insurance schemes, establishing its first social security system in 1924. As explained in Arenas 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 defined contribution (DC) plan launched in 1981, 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 defined contribution scheme wherein wage workers were required to pay 10 percent of their monthly earnings to one of the privately-managed and licensed pension funds.<sup>9</sup> In addition workers had to pay 2-3 percent more to cover survivor/disability insurance as well as management fees on the deposits.<sup>10</sup> From the start, the government exerted strong control over the investment choices: initially workers' money could only be held in government bonds, and 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 20 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 defined contribution plans, retirement income depends on the workers' lifelong contributions, investment earnings (net of commissions) , and 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; shortly thereafter, 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 doing it by mail. This in-person appearance requirement was then 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% per annum over the ensuing decade, and switching patterns began to take off. Indeed, by 1996, turnover reached 50%, the highest rates recorded in Chile (see Figure 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 identification card but also a copy of his 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 1 here*

The Chilean pension system has also undergone other changes over time. For instance, the number of money managers peaked at 21 in 1994, but then fell steadily after that to its current all-time low of 6 managers.<sup>11</sup> During the first 16 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), though 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, Berstein and Micco (2002) correlate net turnover patterns across AFPs to changes in the relative size of each firm's salesforce, which the authors interpret as a measure of the probability of being contacted by a sales agent from that firm.<sup>12</sup> 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 the effects of sales agents is attenuated though the direct positive effect remains significant. The authors 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 (2005) evaluates separately models for the pre-and post-1997 periods but it also 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 Cabrita (2006) 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 containing information on individuals' account switch patterns.<sup>13</sup> The authors link workers' pension switches to AFP characteristics and compare results during the pre-reform phase (1988-1996), the post-reform 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. They do not, however, test whether there was a significant structural shift in the model around 1997, the time of the regulatory reform. Also 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 (*Encuesta de Protección Social*) 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 dataset includes

information on respondent and household characteristics including educational status, marital status, and employment status, as well 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.<sup>14</sup> In particular, we will 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 US labor market 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 Tabathai, this volume). As yet, however, little is known about whether similar problems arise for workers in *defined contribution* plans,<sup>15</sup> 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 US context (Lusardi and Mitchell 2006; Lusardi and Mitchell 2007), and it may also be a factor in the Latin American context. To this end, it is of importance to see how financial knowledge, or lack thereof, may be linked to important economic behaviors like 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 due to 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 et al. forthcoming).

Table 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 summarizing past contributions and projecting future benefit amounts. (In point of fact, the documentation is sent out quarterly by each AFP) Fewer than half of the affiliates (46%) know how much they contribute to the AFP system – even though the contribution rate has been set at 10% of pay since the system's inception. Only one third (34%) of the respondents state a contribution amount that matches at all closely (+/-20%) 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 over 25 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.

*Table 1 here*

Information on what workers have accumulated and invested in their pension appears in Panel B, where we see that only about half (53%) claim they know how much they have accumulated in their accounts; furthermore, only about one-fifth (22%) are actually report amounts that are correct to within +/-20% of actual accruals (compared to administrative records). One-third (33%) of the respondents state that they know how their own money is invested, but only 16% are correct regarding which of the five funds they hold (compared to administrative records).<sup>16</sup> Only one-third (38%) knows that Fund A is the riskiest portfolio, of the five permitted by the government: Funds B-C hold increasingly higher fractions of safer assets and a lower equity share. Panel C of Table 1 focuses on retirement benefits, and it shows that around 80% know the legal retirement age, but fewer than 10% 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 20-year contributors had insufficient funds to reach the promised threshold as of retirement. But here too, participant information is meager: fewer than half (45%) are even aware of the guaranteed minimum benefit. Interestingly, of the one-third (33%) which claims to know the minimum benefit level, only a miniscule minority -- 3% -- can accurately report this minimum benefit. It is worth noting that AFP participants in Chile see similar to the majority of US counterparts covered by company pensions. For instance, Gustman, Steinmeier, and Thabathai (this volume) show that US workers consistently understate their defined-contribution assets, by about 30 per cent at the median compared to administrative records (and by half in the middle and upper tiers). Furthermore, the low fraction of those who can offer accumulation estimates suggests that many workers are not well apprised of this crucial retirement asset in the developing as well as the developed economy contexts.

To more compactly summarize the responses to these three sets of pension knowledge questions, we implement a summary index or scoring system 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 a correct response is weighed less heavily if others mostly provide a correct answer. As an example, answering a question correctly on which only 10 percent of respondents score correctly is rewarded more than answering a question correctly 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; the score centers on zero which is the score of the mean person given a set of questions.<sup>17</sup> 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 than on questions which distinguish between people. The PRIDIT weights for clusters A-C in Table 1, referring to pension contributions, pension accumulations/investments, and pension outflows respectively, appear at the top of Table 2. Here we see that average scores are relatively higher on the accumulation than on the payin/payout questions, and those who switched pension managers have even higher pension literacy than the full sample.

*Table 2 here*

Turning next to switching patterns, Table 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 US 401(k) context, we have found that defined contribution 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 and b). Accordingly, one hypothesis we seek to test is whether pension switchers are among the least-educated, least financially literate. An initial insight into this behavior in the Chilean context is facilitated by Table 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% ever switched over the worklife. In other words, most people switch zero or one times, but some switch pension managers as many as 8 times in a single year. It is important to note that a small but important fraction of people changed pension managers due to corporate mergers, and in what follows, we subtract these from the voluntary switch analysis.<sup>18</sup>

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%) of switchers has a college degree, in comparison to 24% for the whole AFP affiliate sample. There is no discernible difference by sex, with the same proportion male (64%) 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 Prudit literacy measures (A, B and C). The average age of the sample is 35.4, with the higher proportion males reflecting the fact that male labor supply is higher in Chile and

males are more likely to be in formal sector employment. With regard to education, 5% of the sample has 6 or fewer years of education (elementary), 24% has seven to 12 years (high school), and 10% has more than 12 years (college). The majority of the sample (70%) is married. Chilean workers are required to pay 10% 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 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 3, column (1), indicate that average number of switches declined after 1997 by 0.12 per annum. Model (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, model (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 US studies reporting that men switch funds more than women. To allow for flexibility, age is entered as a quadratic 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.

*Table 3 here*

People who are not working do more switching, which may reflect 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 changed over time. Because of the fee structure, when people

become unemployed, it might be optimal for them to choose a different AFP.<sup>19</sup> 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 (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 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 with fewer pension plan switches. Model (5) augments the equation to include the three PRIDIT variables that we propose as measures of financial literacy, as described above. Only the PRIDIT B score proves to be positively and statistically associated with higher pension switching rates. In other words, those having more knowledge about their pension accumulations and investment patterns are also those tending 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 models (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 4 presents regression results analogous to those in Table 3, except that the specification includes individual-level fixed effects, which allow for any individual-level unobserved determinants of switching. 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 3. F-tests of the joint significance of the individual fixed effects reject the hypothesis of no fixed effects at conventional significance levels.<sup>20</sup>

*Table 4 here*

For exploratory analysis, we also explore the relationship between the pension knowledge (PRIDIT) variables and individual characteristics in Table 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 on investments, but they are not differentially knowledgeable about payments and minimum pension rules. A longer experience with the AFP pension system is associated with a higher level of financial literacy according to all three measures. It is noticeable that the R-squared 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.

*Table 5 here*

## **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 marketing of AFPs substantially suppressed the overall number of participant switches. Nonetheless, though 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 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 switching most in the first place – the better educated and higher earning members. To the extent that lowering turnover reduces overall administrative expenses, this can enhance overall system performance. Whether it has a differential effect on investment returns for different types of workers is the subject of future research.

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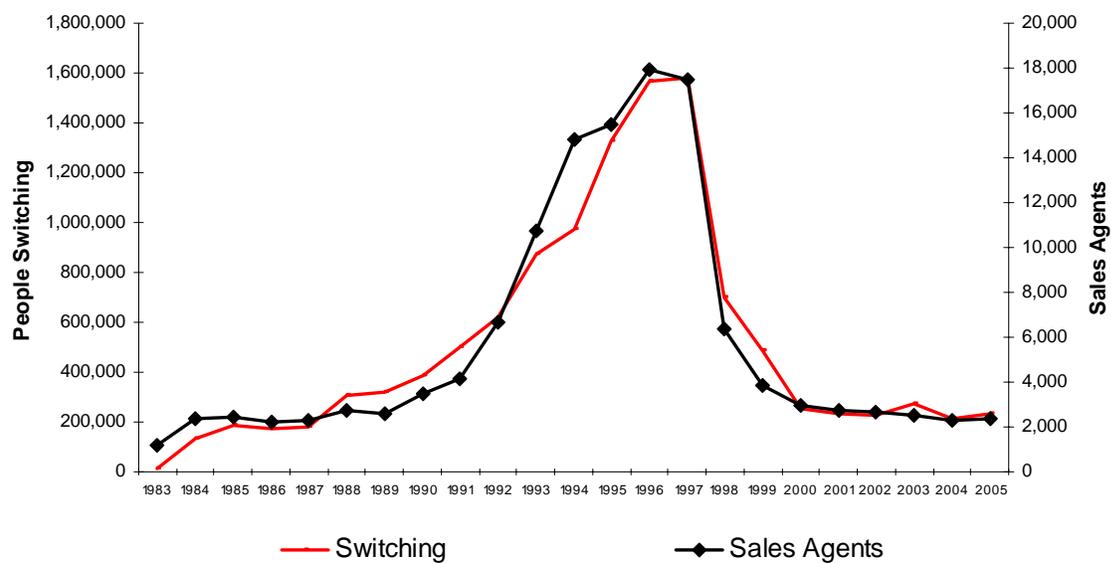
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**Figure 1. Participants in the Chilean Pension System Switching and Number of Sales Agents by Year: 1983-2005**



Source: Authors' calculations from data provided by the Chilean Superintendency of the AFP system.

**Table 1. Knowledge of Chilean Pension System Attributes**

<i>Variable</i>	<i>%</i>
<b><i>A. Contributions</i></b>	
Got AFP statement w/in 12 mos	69.2
Claims knows AFP amt contributed	38.0
Correct on AFP contributions	30.9
Says knows Fixed AFP commission	1.7
Says knows Var AFP commission	2.1
Says knows both commissions	0.5
<b><i>B. Accumulations/Investments</i></b>	
Says knows AFP accumumulation	52.7
Correct on AFP accum (+-20%)	21.6
Knows about multifunds	47.4
Knows how many multifunds	32.8
Correct on N multifunds	20.2
Says knows own investment mix	32.8
Correct on fund type	15.8
Knows riskiest fund	38.1
<b><i>C. Payouts</i></b>	
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 req's	31.1
Correct on Minimum Pen req's	0.2
Knows Minimum pension exists	44.9
Says knows Minimum pension amt	32.8
Correct on Miniimum pension amt	3.4

Source: Derived from Arenas et al. (forthcoming); sample includes AFP affiliates surveyed in 2004 age 18-60.

**Table 2. Descriptive Statistics for Analysis Sample: Mean** (st dev in parenthesis)

<i>Variable</i>	<i>All respondents</i>	<i>Respondents who switched AFPs at least once during the year</i>
Predit A Contributions score	10.7 (111.6)	19.07 (124.06)
Predit B Accumulations score	20.5 (103.9)	43.32 (104.06)
Predit 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)
N Sales Agents	6,331 (5543)	
Sales Agents/Affiliates	0.001 ( 0.001)	
N AFP firms	11.8 (4.3)	
Number of Affiliates	4,985,673 (1,648,032)	

Note: Observations represent an individual in a given year. There are 8641 observations in all; 12,886 observations that switched AFP firms at least once during the year.

Source: Authors' computations from the 2004 EPS sample of affiliates and administration pension fund data.

**Table 3: Estimates of Multivariate Model for Number of Voluntary Switches**  
(Standard errors in parentheses)

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/Wid/Sep	...	...	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)
Mand contr	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)	0.001 (0.00003)
Mand contr 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*elem	...	...	...	-0.04 (0.01)	-0.04 (0.01)
Post 1997 * highschool	...	...	...	-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)
# Observations (person-year)	84640	84640	84640	84640	76972
Adjusted R-squared	0.0470	0.0512	0.0602	0.0560	0.0623

Source: Authors' computations from the 2004 EPS sample of affiliates and administration pension fund data.

**Table 4: Estimates of Multivariate Fixed Effect Model for Number of Voluntary Switches**  
(Standard errors in parentheses)

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)
Mand contr	0.001 (0.00003)	0.0008 (0.00004)	0.0008 (0.00003)	0.0008 (0.00003)
Mand contr 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*elem	...	...	...	-0.03 (0.01)
Post 1997 * highschool	...	...	...	-0.12 (0.01)
Post 1997 * college	...	...	...	-0.10 (0.01)
Time trend	...	0.002 (0.0006)	...	...
Number of AFPs	...	0.01 (0.0007)	0.01 (0.0007)	0.01 (0.0007)
# Observations (person-year)	84641	84641	84640	84640
p-value from F test of fixed effects equal to 0	<0.0001	<0.0001	<0.0001	<0.0001
Adjusted R-squared	0.0457	0.0494	0.0602	0.0560

Source: Authors' computations from the 2004 EPS sample of affiliates and administration pension fund data.

**Table 5: Estimated Relationship between Financial Literacy and Demographics**  
(Standard errors in parentheses)

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)
Mand contr	0.07 (0.03)	0.21 (0.02)	0.03 (0.02)
Mand contr squared	-0.00006 (0.00003)	-0.0001 (0.00002)	0.000002 (0.00003)
Years of Experience with the AFP pension system	0.46 (0.32)	1.73 (0.30)	1.18 (0.30)
# Observations (person-year) Year 2004 only	4928	4928	4928
Adjusted R-squared	0.02	0.15	0.06

Source: Authors' computations from the 2004 EPS sample of affiliates and administration pension fund data.

## Endnotes

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<sup>1</sup> Many have written on Chilean pensions system (e.g. Cheyre, 1988; Iglesias and Acuña, 1991; Baeza and Margozzini, 1995 and SAFP, 2003). Some of the literature is summarized in Arenas de Mesa, Bravo, Behrman, Mitchell, and Todd (2006).

<sup>2</sup> Other Latin American countries who 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.

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

<sup>4</sup> See Arenas de Mesa, Bravo, Behrman, Mitchell, and Todd (2006).

<sup>5</sup> The Chilean pension reform was implemented by General Pinochet's the military government, advised by a team of University of Chicago economists.

<sup>6</sup> See Rodriguez (1998).

<sup>7</sup> Others arguing that pension switching in Chile has been costly include Berstein and Cabrera (2006); Berstein and Ruiz (2004); Cerda (2005); James et al (2001) and Valdes Prieto (1999, 2005); for additional citations see Consejo Asesor Presidencial para la Reforma Previsional (2006).

<sup>8</sup> For more detail see [www.cia.gov/cia/publications/factbook/print/ci.html](http://www.cia.gov/cia/publications/factbook/print/ci.html) (2006 est)

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<sup>9</sup> In addition to the funded DC accounts, the Chilean old-age system includes a welfare benefit for the destitute, 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 paper; for more detail see SAFP (2003).

<sup>10</sup> Mandatory system contributions are capped at a ceiling earnings level of approximately US\$2,200 a month; fewer than 8 per cent of AFP contributors earn over that ceiling.

<sup>11</sup> Barrientos and Boussofiane (2005) find that more efficient providers survived better than less efficient ones.

<sup>12</sup> Their model also controls for AFP specific changes in advertising expenditures, IT expenditures, fund returns, and fund commissions and fees, all expressed in relative terms.

<sup>13</sup> 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.

<sup>14</sup> The sampling frame of the 2002 HLSS 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% 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

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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.

<sup>15</sup> There is some very recent research on 401(k) plan switching patterns by Mitchell et al. (2006a and b).

<sup>16</sup> During the first 20 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 per cent of the portfolio in equities; Fund E, which holds 100 per cent 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 et al. forthcoming).

<sup>17</sup> 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 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.

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<sup>18</sup> We measure switching using the administrative data which provides monthly information on each affiliate's AFP. This information is merged with the socioeconomic and financial literacy information from the EPS and analysis below uses the subset with data from both sources. It should be mentioned that we inferred that a person's *reported* AFP was incorrect, in view of the fact that 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%, 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.

<sup>19</sup> We plan to examine this potential reason for nonworking individuals to switch in future work.

<sup>20</sup> We also estimate random effect models, not reported here for brevity; the results are quite similar to those reported in the text.