Ca' Foscari University of Venice

Department of Economics

Working Paper

Piera Bello
Marius Cziriak
Mario Padula

Fee-ling Stuck? Provider Choice in a Mandatory Defined Contribution Pension System

ISSN: 1827-3580
No. 26/WP/2025

Working Papers
Department of Economics
Ca' Foscari University of Venice
No. 26/WP/2025
ISSN 1827-3580

Fee-ling Stuck? Provider Choice in a Mandatory Defined Contribution Pension System

Piera Bello
Bergamo University

Marius Cziriak
ZEW – Leibniz Centre for European Economic Research

Mario Padula
Ca' Foscari University of Venice

Abstract
Fees play a critical role in shaping the pension benefits provided by defined contribution (DC) pension funds. Even small differences in fees, when compounded over a long contribution period, can lead to substantial disparities in retirement income. In this study, we focus on Chile — a country with a large, mandatory DC pension system — to examine how individuals choose among pension fund administrators. Despite a regulated fee structure that ensures transparency and the absence of switching costs, we observe significant fee dispersion across providers and low switching rates among participants. Our findings reveal that individuals with higher financial literacy and a better understanding of the institutional framework are significantly more likely to switch providers, thereby minimizing fees.

Keywords
Fees, defined contribution pension funds, investment mistakes, investor sophistication

JEL Codes
D14, G53, H55, J32

Address for correspondence:
Mario Padula
Department of Economics
Ca' Foscari University of Venice
Cannaregio 873, Fondamenta S.Giobbe
30121 Venezia - Italy
e-mail: mpadula@unive.it

The Working Paper Series
is available only on line
(https://www.unive.it/dec-workingpapers)
For editorial correspondence, please contact:
wp.dse@unive.it

Department of Economics
Ca' Foscari University of Venice
Cannaregio 873, Fondamenta San Giobbe
30121 Venice Italy
Fax: ++39 041 2349210

Fee-ling Stuck? Provider Choice in a Mandatory Defined Contribution Pension System*

Piera Bello[1], Marius Cziriak[2], and Mario Padula[3]

[1]Bergamo University

[2]ZEW – Leibniz Centre for European Economic Research

[3]Ca' Foscari University of Venice

December 2025

Fees play a critical role in shaping the pension benefits provided by defined contribution (DC) pension funds. Even small differences in fees, when compounded over a long contribution period, can lead to substantial disparities in retirement income. In this study, we focus on Chile — a country with a large, mandatory DC pension system — to examine how individuals choose among pension fund administrators. Despite a regulated fee structure that ensures transparency and the absence of switching costs, we observe significant fee dispersion across providers and low switching rates among participants. Our findings reveal that individuals with higher financial literacy and a better understanding of the institutional framework are significantly more likely to switch providers, thereby minimizing fees.

Keywords: Fees, defined contribution pension funds, investment mistakes, investor sophistication.

JEL-Classification: D14, G53, H55, J32.

*Bello: piera.bello@unibg.it. Cziriak: marius.cziriak@zew.de. Padula: mpadula@unive.it. This study was co-funded by the European Union - Next Generation EU, Mission 4 Component 2, within the NRRP (National Recovery and Resilience Plan) project "Age-It - Ageing well in an ageing society" (PE0000015 - CUP H73C22000900006). The opinions expressed are only those of the authors and do not necessarily reflect those of the European Union or the European Commission. Neither the European Union nor the European Commission can be held responsible for them.

1 — Introduction

In many countries, retirement systems have shifted towards market-based arrangements for the provision of pension products. These systems are intended to offer greater choice and efficiency compared to traditional ones. The effectiveness of such arrangements, however, depends on the extent to which individuals are able to navigate the available options. While standard economic theory predicts that individuals will select the alternative that maximizes their utility, evidence shows that actual choices are often influenced by systematic biases, heuristics, and behavioral frictions. A key inefficiency arises from inertia: individuals often remain with their initial choices even when economic conditions evolve. In this paper, we analyze inertia in retirement investment decisions, measured by low switching rates across pension fund providers, and assess the extent to which financial sophistication can improve this behavior. We develop a measure of investment mistakes and study its relationship with financial sophistication, considering both general financial literacy and specific knowledge of the pension system. We analyze a setting where switching costs are absent, which allows us to isolate the role of sophistication in shaping retirement investment behavior.

We focus on Chile, where the pension system is structured around individual capitalization accounts funded through defined contribution schemes. All formally employed individuals are required to allocate a fixed proportion of their monthly taxable income to these accounts. They can choose from a limited set of pension fund managers (Administradoras de Fondos de Pensiones, AFPs), which offer five legally mandated products with varying risk and return profiles. Individuals are charged a variable commission by their AFPs, calculated as a percentage of monthly taxable income. This is the only fee in the system and is directly comparable across providers. Switching between providers is free of charge. Members who do not actively select an investment portfolio are automatically enrolled in the default fund corresponding to their age and gender.

To study the financial decisions in the Chilean DC pension system, we combine large-scale longitudinal survey data with administrative information on monthly contributions and account balances of a representative sample of individuals affiliated with the Chilean mandatory DC pension over a period of more than 13 years (2008-2021). To this, we add information on the returns of the funds offered by the providers in the market, the fees associated with contributions to the system, and the portfolio allocation for every fund offered by the providers.

Despite the system's straightforward design features, we find that switching rates among pension fund providers remain low, and fee dispersion across providers is substantial. Specifically, switching rate represent only 0.4% of our sample— regardless of existing price differences. Financially sophisticated individuals are significantly more likely to switch providers – they switch between 10-25% more often, compared to less sophisticated members. They also exhibit stronger responsiveness to variation in commission fees, with switching rates rising during periods of greater dispersion in fees. Finally, among those who switch, financially sophisticated members achieve larger reductions in their monthly fees compared to less sophisticated members.

Our paper is related to three strands of the literature. First, we complement existing evidence on switching rates and fee dispersion in pension systems, as well as in other financial markets (Hastings, Madrian, and Skimmyhorn 2013; Luco 2019; Illanes 2017), by studying the role of cognitive costs and financial sophistication in shaping switching behavior. Acquiring and processing financial information is costly, and such costs can hinder optimal decision-making (Hastings, Madrian, and Skimmyhorn 2013; Haliassos and Bertaut 1995; Christelis, Jappelli, and Padula 2010; Agarwal and Mazumder 2013). Knowledge of pension system rules and a solid understanding of basic financial principles can help individuals make more informed and effective choices (Lusardi and Mitchell 2007; Hastings, Mitchell, and Chyn 2011). Differently from previous studies on Chile (Luco 2019; Mitchell, Todd, and Bravo 2009; Berstein and Cabrita 2007; Arenas de Mesa et al. 2007; Illanes 2017; Gutierrez Cortez, Ivashina, and Salomao 2025), we focus on the post-2008 reform period, when the abolition of fixed commissions left only variable fees, making costs directly comparable across providers, and examine heterogeneity in switching behavior across levels of financial sophistication.

Second, we contribute to the literature documenting the relationship between financial sophistication and investment mistakes (Calvet, Campbell, and Sodini 2009a, 2009b) by proposing a novel measure of investment mistakes in pension fund choices, based on lower switching rates and differences in fees relative to the cheapest available option. Our findings indicate that individuals with greater financial sophistication are more likely to switch providers and exhibit higher sensitivity to fee increases.

Third, we enrich the current body of literature examining the role of financial literacy in shaping economic decisions—such as retirement planning (Lusardi and Mitchell 2011; Rooij, Lusardi, and Alessie 2012), wealth accumulation (Lusardi and Mitchell 2014), portfolio

diversification (Jappelli and Padula 2014), and investment in higher-return assets (Rooij, Lusardi, and Alessie 2011).[1] We advance this literature by emphasizing the additional role of pension literacy—that is, knowledge of the rules governing the pension system—which can, in certain cases, be even more influential than general financial knowledge in impacting retirement-related choices.

2 — Institutional setting

In 1981, Chile reformed its pay-as-you-go (PAYGO) system and introduced a mandatory defined contribution pension system. Employees who entered the labor force after December 31, 1982 contribute 10% of their monthly covered earnings to individual retirement accounts, plus an additional administrative fee.[2] The accounts are managed by private companies, the *Administradoras de fondos de pensiones* (AFPs). The contributions are invested on the capital market, with AFPs competing for members with their administrative fees. Since 2002, AFPs are required to offer four products with varying risk profiles and investment strategies and can offer an additional, riskier product.[3] The optional 'fund A' carries the highest risk due to its significant equity exposure, the most conservative 'fund E' focuses primarily on safe bonds. Funds B, C, and D offer intermediate and decreasing risk levels. The minimum share of equity and fixed income assets is mandated by law for each of the five products. We illustrate the investment limits in figure 1. Over the period of interest, all AFPs allocate their investments close to the upper bound of the equity limit allowed for each fund type.[4]

The decision space for Chilean mandatory account holders is limited. They can choose a provider that manages their mandatory DC account and how to allocate their funds across the five products available. Before September 2010, they were free in choosing their provider when joining the system. Since then, new members must affiliate with the cheapest AFP that won the

1. Similar evidence exists for Chile, showing that the Chilean pension system is marked by inertia, myopia, and low financial literacy has been provided in (Berstein, Fuentes, and Villatoro 2013). While more literate individuals are more likely to plan for retirement (Garabato Moure 2015; Diaz, Ruiz, and Tapia 2021), contribute voluntarily (Landerretche and Martínez 2013), or opt out of default portfolios (Kristianpoller and Olson 2015), active investors often underperform on average (Villatoro et al. 2024) and frequently rely on financial advisors recommending costly portfolio reallocations (Da et al. 2018; Cuevas, Bernhardt, and Sanclemente 2023).

2. Contributions are mandatory for formally employed workers. Similar to other Latin American countries, the informal sector is sizable, with one third of workers being informally self-employed or lacking permanent contracts (Henriquez 2019).

3. All AFPs offered the five pension fund types during the observed period (2008-2021).

4. Figure A1 in appendix A illustrates the investment allocation for all funds between September 2008 and December 2021, which highlights negligible changes in fund investment allocation over time.

latest tender process. The tender process is conducted as a hidden price auction in which AFPs bid on the right to serve all individuals joining the system for 24 months. The AFP offering the lowest price wins the auction and has to offer the price for all new and existing affiliates. Hence, since September 2010, new members must enroll with the winner of the auction for 24 months, unless the winning company does not offer the lowest variable commission for two consecutive months, falls below minimum return requirements, or a competing provider achieves more favorable returns net of commissions.[5] After that period, they can switch up to four times a year at no charge using a standardized form, which is also available online, and transfer their accounts within a few business days at no cost.

The second choice of mandatory account holders is how to allocate their contributions. They are free to choose up to two of the five available products until ten years before their statutory eligibility age (which is 65 for men and 60 for women), when investments in the riskiest fund A are not permitted anymore. If members do not make an active decision regarding their fund distribution, the law mandates their contributions to be allocated following a default investment strategy with decreasing equity exposure over the life-cycle. The fund allocation differs by age and gender. Contributions of both men and women are initially fully allocated to fund B, transitioning gradually to fund C by transferring 20% of the account balances per year between the ages of 36 to 40. Ten years before the statutory eligibility age, account balances are transferred to fund D. This corresponds to a transition period between 56 and 60 for men and a transition period between 51 and 55 for women.[6] Similar to the provider choice, AFPs are mandated to let fund members switch their fund allocation free of charge during the accumulation phase.

AFPs have to inform account holders at least three times per year about the status of their savings, pension projections, commissions paid, transfers of funds and gains or losses for the previous four months. Account holders that did not actively make a decision regarding their fund allocation are informed about the available options and the fact that their funds are to be transferred. They receive letters on this twelve months before the first transfer of resources and twelve months after the last transfer.[7]

For a given fund, returns are highly correlated across providers. The similarities can be

5. For a detailed description of the process and an analysis of the effect of auctions on fees, mark-ups, demand price elasticity, returns and risk premiums, see Harrison, Parada-Contzen, and Villena (2023).

6. For details about the default allocation of funds, see Superintendencia de Pensiones (2025b).

7. For details about the content and timing of the pension letters, see Superintendencia de Pensiones (2025a).

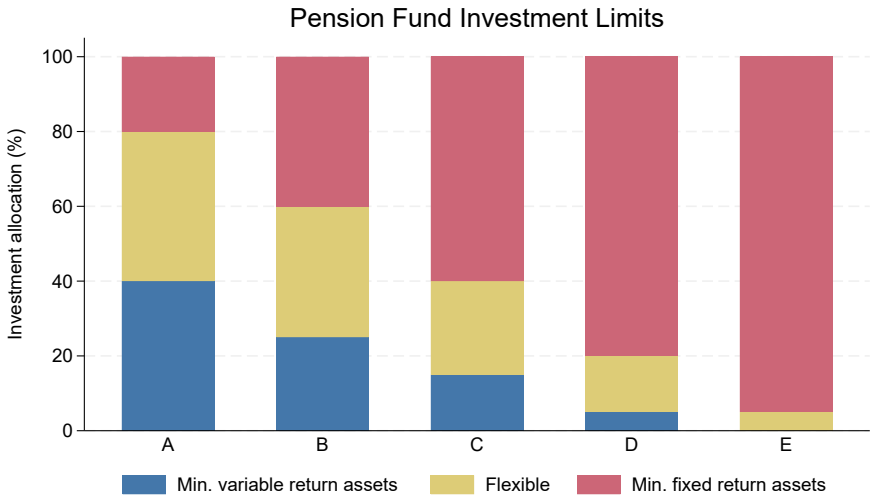


Figure 1 — Equity investment limits by fund

attributed to the regulation of pension funds in Chile. AFPs are subject to minimum and maximum investment limits for broadly defined asset classes ("renta fija" and "renta variable," which refers to equity and fixed income assets), exposure to foreign assets, currency hedging and other diversification rules. Furthermore, AFPs are mandated to provide a minimum yield for the mandatory accounts, which depends on the performance of the pension fund market in Chile overall. Specifically, the Pension Supervision Authority which oversees the market requires the annualized monthly average real return for the last 36 months to be higher than the minimum of either (1) industry's asset-weighted average annualized return for the last 36 months, minus 4 percentage points for funds A and B and minus 2 percentage points for funds C, D and E; or the (2) industry's asset-weighted average monthly return for the last 36 months, minus 50 percent of the return's absolute value (Olivares 2008; Illanes 2017). If an AFP falls short of the minimum return requirements, it has to top-up from its mandatory capital buffer. In cases where the buffer is insufficient to cover the difference between the returns and the minimum requirement, the state temporarily complements the payments and the AFP is liquidated.

Given the strong incentives created by this regulation, there is evidence for herding behavior in investment decisions, which results in highly correlated and very similar returns overall (Olivares 2008; Raddatz and Schmukler 2012; Fernandez 2013; López and Walker 2020). Because returns are generated from the performance of the funds, which are largely similar across providers, the most relevant characteristic for acquiring pension wealth should be the administrative fees charged by the providers.

3 — Data

We combine administrative pension data with large-scale longitudinal survey data from the Encuesta Previsional Social (EPS). We further add administrative information from the Chilean Pension Supervision authority to receive insights into the products available to the fund members.

3.1. Information on individual pension histories

Our primary source of information on the members' savings behavior comes from the administrative pension records (Historia Previsional de Afiliados Activos, pensionados y fallecidos, HPA) provided by the Chilean Pension Supervision Authority. The HPA provides detailed monthly data on the pension portfolios, contributions, and commission fees for a representative sample of Chilean AFP participants. We use the mandatory pension account information based on monthly account balances in each pension fund (i.e., funds A to E) over the period 2008 to 2021. We add information on monthly contributions to the defined contribution account, which corresponds to 10% of the taxable monthly income.

The monthly account balances also allow us to identify whether respondents make active investment decisions or stick to the default allocation. We identify the default behavior by comparing the fund allocation on a monthly level with the mandated defaults laid out in Decree Law 3.500. When members are assigned to a fund and do not subsequently express a preference, the legislation mandates the schedule of transfers and the shares to be transferred to less risky funds over the life-cycle.

We identify default investment portfolios using the monthly account balances in a multi-step procedure, leveraging the panel dimension of our data. In a first step, we identify non-default portfolios as those including the most- and least risky funds A and E that are never part of the default allocation or with allocations that do not align with the mandated transfer schedule. Due to the rounding of monthly account balances in the data, we only account for exact transfer schedules for total account balances above CLP 500.000 (about USD 500). For values below CLP 500.000, we consider whether the account contains only funds prescribed for the individual's age and gender, but do not consider the exact proportional transfers around the month of the member's birthday.[8]

8. Note that the mean (median) balance of the pension accounts over our sample period is around CLP 9.06 m. (CLP 2.98m.).

The HPA data includes information on all incomes associated with contributions to the individual mandatory accounts. Accordingly, incomes are censored below the minimum wage and above the tax ceiling, which caps the contributions to the mandatory accounts. Both the minimum wage and the tax ceiling are adjusted regularly. At the beginning of our observational period in 2008, the minimum wage was CLP 144,000 per month (about USD 275), and the tax ceiling was around CLP 1,184,000 (about USD 2,470). At the end of our observational period in December 2021, the minimum wage was CLP 337,000 (about USD 444), and the cap for taxable incomes was at CLP 2,529,000 (about USD 2,968). Most individuals report only one source of income per period, accounting for approximately 87% of the full sample. However, a non-negligible proportion receive multiple incomes per month, with 10.25% reporting two incomes and 2.25% reporting three or more incomes per month.

3.2. Administrative data on AFPs

We merge the administrative pension records with administrative information on the values of pension fund units *(cuotas)* provided by the Chilean Pension Supervision Authority (Superintendencia de Pensiones). The data include daily information for all funds offered by all AFPs. Based on this, we calculate monthly and annualized returns.[9] We calculate portfolio returns as the monthly returns weighted by the individuals' fund allocation.[10] To quantify the equity share of pension savings, we rely on monthly information on the pension fund investments per fund and AFP, available from September 2008 to December 2021. Following the investment restrictions described in section 2, funds differ substantially with respect to the share of equity investments.

3.3. Survey data from the Chilean Social Protection Survey (EPS)

We merge responses from the Chilean Social Protection Survey (EPS) with the administrative data. The EPS is an extensive, nationally representative longitudinal household survey modeled after the U.S. Health and Retirement Study (HRS). We use six waves (2004, 2006, 2009, 2012, 2015, 2019/20), offering rich insights into respondents' wealth outside the mandatory DC pension system, financial sophistication, and other socioeconomic and demographic characteristics,

9. AFP Capital acquired AFP Santa Maria in March 2008 and merged with AFP Bansander in April 2008. We combine observations of these AFPs for brevity.

10. If, for instance, an individual affiliated with AFP Uno in December 2019 holds 30% of their pension wealth in fund A and 70% in fund E, we calculate the return as $0.3 \times (-3.64) + 0.7 \times 2.48 = 0.644$, where -3.64 and 2.48 are the returns in fund A and E, respectively.

including age, gender, educational background, and marital status.

Using data from the EPS survey, we construct indicators for real and financial asset ownership outside the mandatory defined contribution (DC) pension system. Specifically, we define a binary variable indicating whether respondents own the dwelling in which they currently reside. To assess financial asset holdings beyond the pension system, we develop an indicator based on reported household financial assets. These include savings for housing held with a bank, deposits with a Housing Fund Administrator (AFV), voluntary pension savings (APV), contributions to a secondary voluntary AFP account (commonly referred to as "Cuenta 2"), other bank savings accounts, term deposits, investments in mutual funds, stocks or corporate bonds, loans extended to third parties, and miscellaneous savings. The latter category encompasses cash holdings, savings in U.S. dollars, and "polla."[11]

Notably, the EPS allows us to gain insights into the financial sophistication of AFP affiliates by including questions on financial literacy and on the institutional setting of the AFP system.

Our primary measure of financial literacy comes from a series of questions related to basic principles of household finance. The questions closely follow the module on planning and financial literacy of the 2004 HRS by Lusardi and Mitchell (2011, 2007). The questions cover basic numeracy (chance of catching a disease, dividing a lottery win equally), and basic financial concepts (compound interest, inflation, risk diversification). We discuss these questions to greater detail in section 4.[12]

To assess members' understanding of Chile's mandatory defined contribution (DC) pension system, we define a pension literacy measure that utilizes six survey questions, each with a clearly defined correct answer. These questions focus on the "multifunds" component of the DC pensions introduced in 2002, which allowed members to diversify their investments across up to five funds with different risk-return profiles. All respondents who reported to be affiliated with the AFP system receive questions on the most important characteristics of the institutional setting, including the mandatory monthly contribution rate, the number of funds available, how to diversify the investments, who has to pay for commissions, which of the available fund is the riskiest and which one has the highest expected returns in the medium term (10 years).[13]

We merge all available information from the EPS surveys with the monthly administrative

11. "Polla" refers to low- or zero-interest loans distributed through rotating savings and credit associations.
12. See also appendix C.
13. See appendix C for detailed information on the question wording and routing across survey waves.

pension data. To obtain a measure consistent with the format of the monthly account balances, we assume knowledge to be constant between EPS observations. That is, we impute missing observations using forward and backward imputation, filling existing gaps by carrying backward and forward in time the available values for an individual. This method leverages on the results of Angrisani et al. (2020), who show financial literacy to be relatively stable even over extended periods of time.

In our main analyses, we use an aggregate measure of financial literacy and an aggregate measure of knowledge about the pension system, both counting the number of correct answers to each of the six questions, respectively.

4 — Descriptives

4.1. Fund returns and administrative fees

Both the performance of underlying assets and the fees paid for administration of the fees influence the returns generated from members' contributions. Better performances are associated with higher nominal returns. In contrast, higher fees imply larger foregone earnings for given returns.

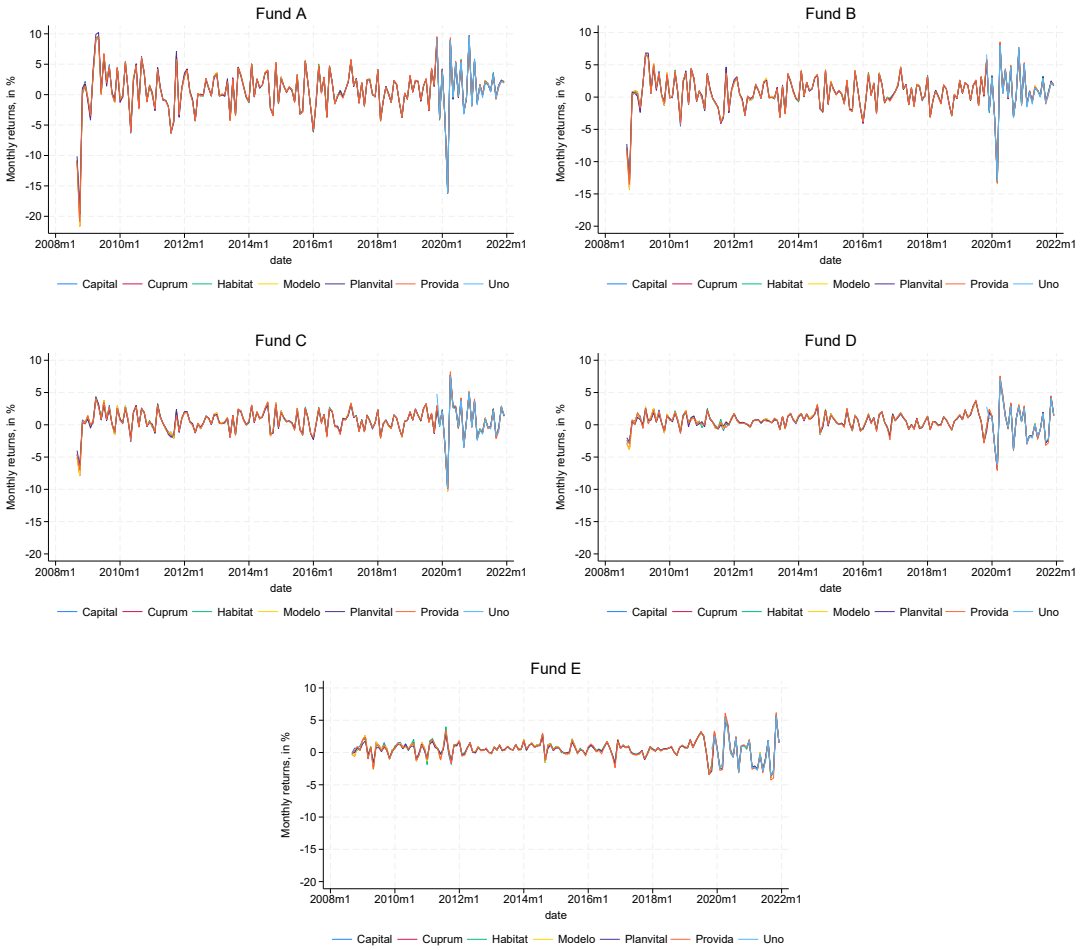
We provide the distribution of nominal returns for the five funds (A to E) in the mandatory defined contribution system across all AFPs in the market during our period of observation in figure 2.[14] Funds with a higher share of equity are substantially more volatile than those consisting predominantly of fixed income assets (i.e., $A > B > C > D > E$). Moreover, the funds with higher equity exposure also suffer substantial negative returns during the Global Financial Crisis and subsequent recession in Chile (2008/09) and during the first months of the COVID-19 Pandemic in March 2020. However, while there are substantial variations over time and across funds, the returns across AFPs do not differ substantially or systematically for any fund.[15]

We follow Illanes (2017, appendix B) and test for correlation between variable commissions and nominal monthly returns using linear regressions. Specifically, we regress each AFP's monthly nominal return for fund f on the AFP's variable commission in that period $(p_{i,t})$ and

14. Note that two funds started their operations during our period of observation, with Modelo providing its services since September 2010 and AFP Uno since September 2019.

15. Our additional results in appendix B show that there are also no substantial differences in monthly or annualized real returns across providers.

Figure 2 — Monthly nominal returns across AFPs, by fund



Notes. This figure shows the monthly returns for each product (funds A-E) offered by each AFP in the market during our period of observation (2008-2021).

the monthly nominal return in the previous month ($r_{i,f,t-1}$). In all regressions, we include year-month fixed effects. Hence, we estimate the following regression for our period of observation (September 2008 to December 2021):

$$r_{i,f,t} = \alpha_0 + \alpha_1 p_{i,t} + \alpha_2 r_{i,f,t-1} + \delta_t + \gamma_f + \varepsilon_{i,f,t} \tag{1}$$

We present the results of these regressions in table 1. We find no significant correlation between variable commissions and nominal returns in the regression, pooling all funds in column 1. When considering funds A-E separately in columns 2-6, we find a significantly positive association between commissions and nominal returns only for the riskiest fund A. For funds B and C, we do not find a significant association between variable commission rates and nominal returns, and for funds D and E, the correlation is negative though insignificant. Notably, the significantly positive association we find for fund A is relatively small: a one percentage point higher commission fee corresponds to a 3.5 basis points higher monthly return for the riskiest fund.

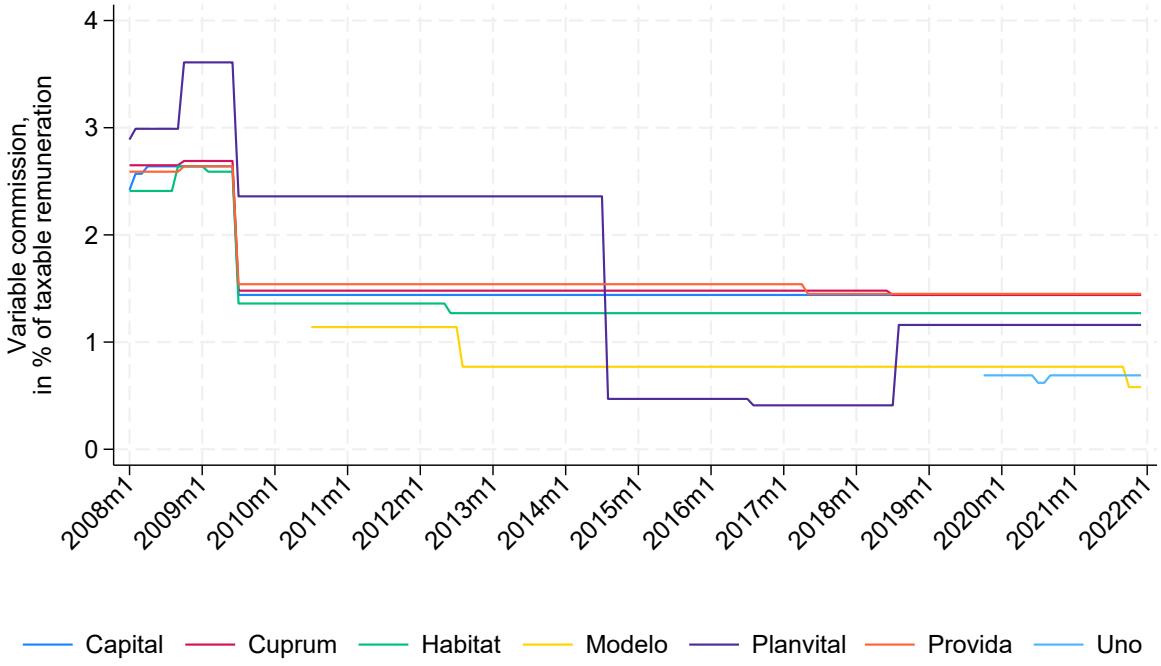
Table 1 — Correlation between funds, commission fees and lagged returns (09/2008 – 12/2021)

	(1) All funds	(2) Fund A	(3) Fund B	(4) Fund C	(5) Fund D	(6) Fund E
Variable commission	0.0157	0.0350*	0.0227	0.0213	-0.00335	-0.00299
	(0.0547)	(0.0151)	(0.0126)	(0.0132)	(0.0141)	(0.0182)
Lagged monthly returns	0.0241	0.0785*	0.0979**	0.0561	-0.0347	0.00192
	(0.0146)	(0.0354)	(0.0345)	(0.0327)	(0.0299)	(0.0322)
Constant	0.561***	0.617***	0.564***	0.536***	0.548***	0.485***
	(0.0795)	(0.0315)	(0.0277)	(0.0264)	(0.0260)	(0.0308)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Fund FE	Yes	No	No	No	No	No
Observations	4795	959	959	959	959	959
Adj. R2	0.672	0.998	0.997	0.994	0.989	0.978
Adj. Within R2	0.000179	0.0116	0.0125	0.00481	-0.000765	-0.00247

Notes. We report the results of OLS regressions on monthly nominal returns on (one month) lagged nominal returns and variable commission fees. Column 1 reports the results of a pooled regression with all funds and providers, columns 2-6 present the results separately by funds. We include year-month fixed effects in all regressions and add fund-dummies in column 1. Heteroscedasticity-robust standard errors in parentheses, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

In contrast to the very similar returns across AFPs for each fund, the commission fees differ substantially across AFPs and over time. Figure 3 presents insights into the distribution of variable commissions across providers over our observational period. The figure highlights the substantial heterogeneity in fees across the observational period and an overall decrease in the fees over time.

Figure 3 — Variable commission fees across AFPs (2008-2021)



Notes. This figure shows the variable commissions across AFPs between 2008 and 2021 for AFPs in the market. Members pay variable commissions for each contribution they make to their mandatory accounts, which is a share of their monthly covered earnings, expressed as a percentage.

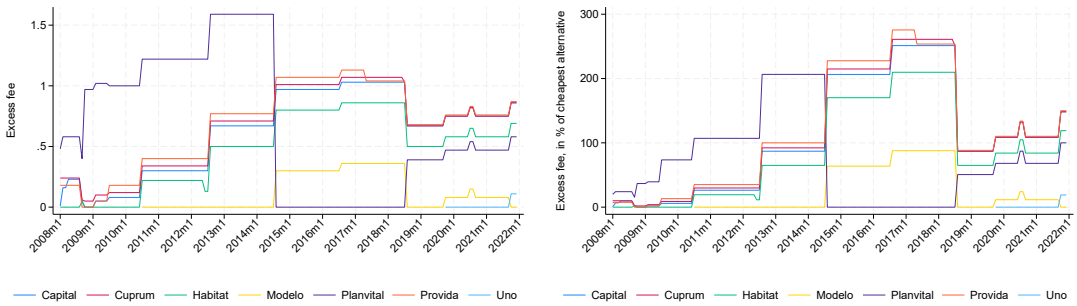
However, while fees decrease in absolute terms over our observational period, the spread in prices increases over the same period. To provide an insight into this, we define "excess fees" as the difference between an AFP's fee and the cheapest alternative available. Hence, the cheapest AFP has zero excess fees, and positive values correspond to higher costs relative to the cheapest option.

In figure 4, we show the absolute difference in terms of percentage points of commission fees (i.e., percentage points of monthly covered earnings) and in relative terms (i.e., how much each AFP costs in percent of the cheapest option available). The left panel of 4 shows that the excess fees of the most expensive option increased from around 0.5 to more than 1.5 percent of monthly covered earnings in 2012 and decreased to around 1.1 percentage points between 2014 and 2018, and around 0.6 to 0.8 percentage points between 2018 and 2021. In the right

panel, we show the same results in relative terms, that is, commission fees as a percentage of the cheapest option available. Our results highlight that differences in price reductions and the entry of cheap providers increased the spread in prices for many providers.

Figure 4 — Increase in the spread of variable commissions, 2008-21

(a) Absolute spread: difference in percentage points of total covered earnings **(b) Relative spread: fees in percent of cheapest option available**



Notes. This figure shows the development of the excess commission, which we define as the difference in the monthly variable fee (as share of monthly covered earnings) between the cheapest alternative and each other alternative.

4.2. Summary statistics of fund members in our sample

Overall, our sample of matched administrative data and survey information includes about 3 million observations for almost 22,000 individuals, followed for 11.3 years on average. Table 2 presents summary statistics of our data. We include the mean across observations and highlight the standard deviation between and within individuals to give an insight into differences across individuals and over time.

Based on the information available in the administrative data, our sample includes 47% women and 31% are married individuals.[16] Just over one in four individuals (27.8%) have completed higher education, which includes qualifications from professional institutes (Instituto Profesional) as well as bachelor's and postgraduate programs (Universitaria de Postgrado).[17] The average age is 37.3 years, and the average time to reach the statutory eligibility age for retirement (60 for women and 65 for men) is 25.4 years.

Based on information on real and financial assets outside the mandatory defined contribution pension system based on survey responses, we find 61.4% of our sample to own their

16. In 86 cases, the gender reported in the survey differs from the information on the individuals' gender included in the administrative data. We assume that the administrative data reflects the gender relevant for the statutory eligibility ages and use this information accordingly.

17. This classification corresponds to levels 6 and 7 of the International Standard Classification of Education (2011). See also Organisation For Economic Co-Operation and Development (OECD) and International Bank Reconstruction and Development/The World Bank (2009).

home. Regarding financial assets outside the mandatory DC accounts, we find that about 77.9% of the observations in our sample do not hold any financial assets outside their mandatory DC pension savings.

The average total monthly covered earnings reported in administrative data is CLP 338,536, with a higher variation between individuals (SD between CLP 352,602) than within individuals (SD within CLP 289,707).

The administrative data also includes information on the AFP that collects the contributions to the mandatory accounts. Overall, we observe AFP switches in 0.4% of the total individual-month observations. Over the 168 months of our observational window, we observe 13,235 AFP switches of 6,185 individuals in our data. Hence, about 28.5% of the individuals changed their AFP at least once.

Using the information on the monthly account balances and the strategy to identify the default investments outlined in section 3.1, we identify default portfolios in 60.4% of observations in our sample. Most of the variation in default portfolio holdings is across individuals (between individual SD of 0.453), and fewer individuals opt out of or into the default portfolio (within individual SD of 0.175). In our administrative data, the average pension wealth in mandatory defined contribution accounts amounts to 320 Unidad de Fomento (UF, the Chilean inflation-adjusted unit of account), which corresponds to CLP 8,079,585 (or USD 10,356 by the end of 2021). In addition to the overall pension wealth, we add information on the distribution of pension wealth across funds. Most pension wealth is invested in fund B (42.4%) or C (30.9%), which are the two funds corresponding to the default at the sample's mean age (37.3), and to a lesser degree in the conservative fund D (8.3%). Nevertheless, we observe a substantial share of pension wealth in the riskiest fund A (13.0%) and the most conservative fund E (5.4%), both of which are non-default investments.

Lastly, we show the monthly and annualized real returns of the portfolios we observe in the administrative data. We calculate the monthly real returns using the asset-weighted average of the returns of funds in the member's portfolio. The average monthly real returns are at 0.35%. The average annualized real returns, which we calculate as the rolling sum of the portfolio returns of the members' previous twelve months, were around 3.87%.

Table 2 — Summary statistics

	mean	sd	min	max	$SD_{between}$	SD_{within}
Female	0.470	0.499	0.000	1.000	0.500	0.000
Married	0.309	0.462	0.000	1.000	0.442	0.125
Attended tertiary education	0.278	0.448	0.000	1.000	0.440	0.111
Age	37.298	12.588	16.000	65.000	12.882	3.621
Time to retirement	25.352	12.695	0.000	49.000	12.997	3.621
Home ownership	0.614	0.487	0.000	1.000	0.454	0.182
No fin. assets outside mandatory DC account	0.779	0.415	0.000	1.000	0.370	0.192
Total covered earnings (tsd. CLP)	338.536	461.733	0.000	13466.000	352.602	289.707
Changed AFP	0.004	0.062	0.000	1.000	0.010	0.061
Holds default portfolio	0.604	0.489	0.000	1.000	0.453	0.175
DC account balance (tsd. CLP)	8079.637	14785.587	10.000	285750.000	13657.711	5862.465
DC account balance (in UF)	319.587	576.309	0.323	11746.950	565.800	173.491
...share in fund A	0.130	0.333	0.000	1.000	0.279	0.163
...share in fund B	0.424	0.484	0.000	1.000	0.440	0.221
...share in fund C	0.309	0.442	0.000	1.000	0.370	0.232
...share in fund D	0.083	0.259	0.000	1.000	0.255	0.151
...share in fund E	0.054	0.222	0.000	1.000	0.152	0.163
Monthly real return	0.351	2.609	-22.439	10.232	0.116	2.607
Annualized real returns (rolling)	3.873	9.258	-45.842	57.339	1.384	9.204
Observations	2953726					
Individuals	21709					
Av. months observed	136.060					

Notes. We show the key summary statistics of our sample of AFP affiliates between 2008-2021 based on survey information (education, marital status, home ownership, financial assets) and administrative information. The mean and standard deviation (SD) refer to overall sample statistics across all individuals and time periods. $SD_{between}$ is the standard deviation over the 21709 individuals in the data, and SD_{within} refers to the standard deviation within individuals over time.

4.3. Financial sophistication

Table 3 provides the summary statistics of respondents' financial literacy and knowledge of the Chilean mandatory defined contribution pension system.

Our results highlight a low level of financial literacy among the Chilean AFP members. We observe 2.2 correct answers across the six financial literacy questions on average. Comparing the standard deviation between and within individuals highlights a persistence over time and heterogeneity across individuals. Across the "Big-3" financial literacy questions, which include questions on compound interest, inflation, and risk diversification, respondents answered only 1.1 questions correctly.

Considering the individual items of the financial literacy measures shows notable heterogeneity across the specific domains of knowledge included. The first three questions of the financial literacy module are related to basic numerical skills. The question on the chance of

catching an illness requires an understanding of percentages, and the majority of respondents (63.4%) can correctly calculate 10% of 1000. The question on lottery prizes requires a simple division of CLP 2m in five equal parts, and only 45.3% answered this question correctly. We observe fewer correct answers to the compound interest question (41.7%), where respondents have to indicate whether the annual interest of 2% on CLP 100 is more, less, or equal to 110 after five years. The most challenging question was the open question on the exact value of compounding interest. Only 2.5% of respondents were able to correctly answer that CLP 200 invested with an interest rate of 10% will compound to CLP 242 after two years. The remaining two questions did not have any numerical content but covered key concepts in finance, namely inflation and risk diversification. Of the respondents in our sample, 20.0% correctly identified that they will be able to buy less after one year at an interest rate of 1% and an annual inflation rate of 2%, and 47.0% correctly identified that buying one share of stock in one company is riskier than buying several shares in different companies.

Regarding the knowledge of the institutional setting, respondents in our sample are not aware of fundamental concepts characterizing the mandatory defined contribution system in Chile. Of the six questions we consider in our data, we observe about 1.5 correct responses on average.

We observe substantial heterogeneity in the number of correct responses regarding the specific topics included in the pension literacy measure. Regarding the share of income to be contributed to the mandatory DC system, in a minority of about 20.1% of cases, respondents correctly indicate that 10% of their income is deducted for mandatory DC contributions. Similarly, in only 20.7% of cases, we observe the correct response that there are five different funds to choose from in the mandatory DC system. The most challenging of the pension literacy questions is the question of the possibility of diversifying investments in the pension system. Only 4.8% of the responses contain the correct answer that up to two of the available funds can be held at the same time. Notably, many members correctly indicate that commission fees are paid from the saver's income and not from the pension account balances or by the employer (44.2%). The question concerning which of the funds available in the multifunds system bears the highest risk, we observe the correct response that Fund A carries the highest risk in 36.6% of the cases. Lastly, in about one in four (24.4%) of observations, members correctly expect that the fund with the highest share of equity is to generate the highest returns in the medium term (ten years).

Table 3 — Financial sophistication indicators: summary statistics

	mean	sd	min	max	$SD_{between}$	SD_{within}
Financial Literacy:						
Financial Literacy	2.200	1.399	0.000	6.000	1.318	0.502
Correct answers in Big-3	1.088	0.888	0.000	3.000	0.824	0.341
Chance of disease	0.634	0.482	0.000	1.000	0.452	0.180
Lottery division	0.453	0.498	0.000	1.000	0.464	0.183
Compound interest (simple)	0.417	0.493	0.000	1.000	0.454	0.197
Compound interest (exact)	0.025	0.157	0.000	1.000	0.144	0.057
Inflation	0.200	0.400	0.000	1.000	0.368	0.156
Risk diversification	0.470	0.499	0.000	1.000	0.462	0.194
Observations	2155716					
Individuals	15143					
Av. months observed	142.357					
	mean	sd	min	max	sd_b	sd_w
Pension Literacy:						
Pension Literacy	1.508	1.427	0.000	6.000	1.344	0.461
Contributions	0.201	0.401	0.000	1.000	0.343	0.200
Fund types	0.207	0.405	0.000	1.000	0.356	0.193
Diversification	0.048	0.213	0.000	1.000	0.180	0.113
Commission payment	0.442	0.497	0.000	1.000	0.422	0.271
Fund risk	0.366	0.482	0.000	1.000	0.472	0.091
Fund returns	0.244	0.430	0.000	1.000	0.417	0.090
Observations	2073626					
Individuals	14305					
Av. months observed	144.958					

Notes. We show the key summary statistics of our sample of AFP affiliates between 2008 and 2021. The mean and standard deviation (SD) refer to overall sample statistics across all individuals and time periods. $SD_{between}$ is the standard deviation over individuals in the data, SD_{within} refers to the standard deviation within individuals over time. For details on how we extend the information from the EPS waves to the monthly administrative data, differences across survey waves, and translations of the survey items, see appendix C.

Both dimensions of financial sophistication are positively, but not perfectly correlated ($\rho = 0.2866, p = 0.0000$), suggesting that both variables measure distinct aspects of skills and knowledge.[18] To better understand the correlation between our two measures of financial

18. The *components* of both financial sophistication measures (providing the correct response to any of the questions) are also positively correlated. However, pairwise correlation varies substantially, as the results in table

sophistication, we use OLS regressions to highlight the correlation between socioeconomic and demographic variables and financial literacy and knowledge about the AFP system, respectively. We present our results in table 4.

In column 1, we report the correlation between the number of correct responses to the financial literacy questions and socioeconomic and demographic variables based on responses to the EPS survey. We find that women answer fewer financial literacy questions correctly, compared to men, and that financial literacy is positively correlated with educational attainment and being married. Time to retirement is positively correlated with the number of correct answers to the financial literacy questionnaire, which implies that younger respondents answer more questions correctly, though the effect levels off, as the negative correlation of the squared term indicates. Respondents who do not hold any financial assets outside the mandatory DC pension accounts are less financially literate, ceteris paribus, and we do not find an insignificantly negative association between financial literacy and home ownership.

In columns 2 and 3, we add information on covered earnings (in logs) and the mandatory DC account's balance (in logs), respectively. While we find both measures to be significantly correlated with financial literacy, controlling for account balances renders the coefficient of earnings insignificant, as both measures are highly correlated. Lastly, we add the indicator for holding the default portfolio allocation, which we find to be negatively associated with financial literacy.

In columns 5-8, we report correlations between socioeconomic and demographic characteristics and our pension literacy measure. Overall, the results are comparable with the results on our financial literacy measure: we find a positive correlation with tertiary education, being married, time to retirement, covered earnings, mandatory account balances, and holding the default portfolio. Two notable differences are the insignificant correlation between gender and pension literacy once we control for account balances. Hence, men and women with the same account balances answer the same number of pension literacy questions correctly. Notably, this is a specific subset of the population, given the large gender pension gap in Chile.[19] Lastly, we find a significantly positive correlation between homeownership and pension literacy — this suggests that while homeowners are similarly financially literate as renters, they know

C1 in appendix C.2 show.

19. On average, female pension beneficiaries aged 65 and over received only about 30 percent of their male counterparts in 2022 (OECD 2021), which is is related to the substantially higher share of women in part-time, temporary or informal jobs, and shorter contribution histories, among other aspects (International Monetary Fund 2024).

more about the pension system, ceteris paribus.

Our findings are consistent with earlier contributions to the literature, including Fonseca et al. (e.g. 2012) and Bucher-Koenen et al. (2016) who document the gender gap in financial literacy, and Lusardi and Mitchell (2014) who extensively discuss the positive correlation with education, income, and wealth. Similarly, the negative correlation between financial literacy and default portfolios is in line with the results of Bianchi (2018), who finds that financially literate individuals are more active in rebalancing their portfolios.

Table 4 — Financial sophistication: analysis of variance

	(1) Fin. lit.	(2) Fin. lit.	(3) Fin. lit.	(4) Fin. lit.	(5) Pen. lit.	(6) Pen. lit.	(7) Pen. lit.	(8) Pen. lit.
Female	-0.249***	-0.222***	-0.0991***	-0.106***	-0.352***	-0.277***	0.000451	-0.0237
	(0.0216)	(0.0217)	(0.0233)	(0.0233)	(0.0220)	(0.0216)	(0.0228)	(0.0225)
Attended tertiary education	0.825***	0.797***	0.753***	0.735***	0.974***	0.888***	0.757***	0.701***
	(0.0249)	(0.0250)	(0.0251)	(0.0252)	(0.0279)	(0.0274)	(0.0270)	(0.0269)
Married	0.166***	0.165***	0.149***	0.148***	0.147***	0.145***	0.110***	0.107***
	(0.0235)	(0.0234)	(0.0232)	(0.0232)	(0.0236)	(0.0229)	(0.0223)	(0.0220)
Time to retirement	0.0201***	0.0180***	0.0121***	0.0113***	0.0318***	0.0271***	0.0154***	0.0129***
	(0.00273)	(0.00273)	(0.00276)	(0.00275)	(0.00278)	(0.00271)	(0.00265)	(0.00262)
Time to retirement (sq.)	-0.000385***	-0.000336***	-0.00000515	0.0000143	-0.00103***	-0.000924***	-0.000204***	-0.000154**
	(0.0000591)	(0.0000592)	(0.0000632)	(0.0000631)	(0.0000608)	(0.0000593)	(0.0000609)	(0.0000604)
Home ownership	-0.0195	-0.0228	-0.0283	-0.0289	0.0789***	0.0662***	0.0486**	0.0466**
	(0.0209)	(0.0208)	(0.0208)	(0.0207)	(0.0212)	(0.0207)	(0.0201)	(0.0200)
No fin. assets outside mandatory DC account	-0.184***	-0.169***	-0.143***	-0.138***	-0.353***	-0.314***	-0.258***	-0.245***
	(0.0235)	(0.0235)	(0.0234)	(0.0234)	(0.0250)	(0.0244)	(0.0237)	(0.0235)
Log covered earnings		0.0139***	0.000543	-0.000526		0.0396***	0.0112***	0.00824***
		(0.00122)	(0.00120)	(0.00119)		(0.00119)	(0.00115)	(0.00113)
Log mandatory DC account balance			0.121***	0.114***			0.284***	0.258***
			(0.00723)	(0.00735)			(0.00731)	(0.00728)
Holds default portfolio				-0.128***				-0.375***
				(0.0209)				(0.0204)
Constant	2.020***	1.913***	0.0677	0.269**	1.552***	1.239***	-3.115***	-2.463***
	(0.0426)	(0.0433)	(0.120)	(0.125)	(0.0429)	(0.0426)	(0.121)	(0.122)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean fin. sophistication	2.200	2.200	2.200	2.200	1.508	1.508	1.508	1.508
Observations	2155716	2155716	2155716	2155716	2073626	2073626	2073626	2073626
Individuals	15143	15143	15143	15143	14305	14305	14305	14305
Adj. R2	0.0776	0.0814	0.0923	0.0941	0.128	0.158	0.208	0.223
Adj. Within R2	0.0773	0.0812	0.0921	0.0939	0.127	0.157	0.207	0.222

Notes. This table reports the results of OLS regressions on our two measures of financial sophistication, including year-month fixed effects. Standard errors are clustered at the individual level and in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

4.4. Bivariate patterns in fee developments and switching behavior

In the following, we consider the variable commission fees paid by individuals in our sample and their provider switches in greater detail. Overall, most fund members are not affiliated with the lowest-cost option on the market — only 12.75% of the sample hold their mandatory DC account with providers offering the lowest variable commission fees. Among those cases, the average (median) fee paid in excess of the cheapest option amounts to 0.62% (0.67%) of the fund member's monthly covered earnings.

As members can save more in periods where the spread between commissions across providers is larger, we consider the dynamics of AFP switches and excess fees in figure 5.

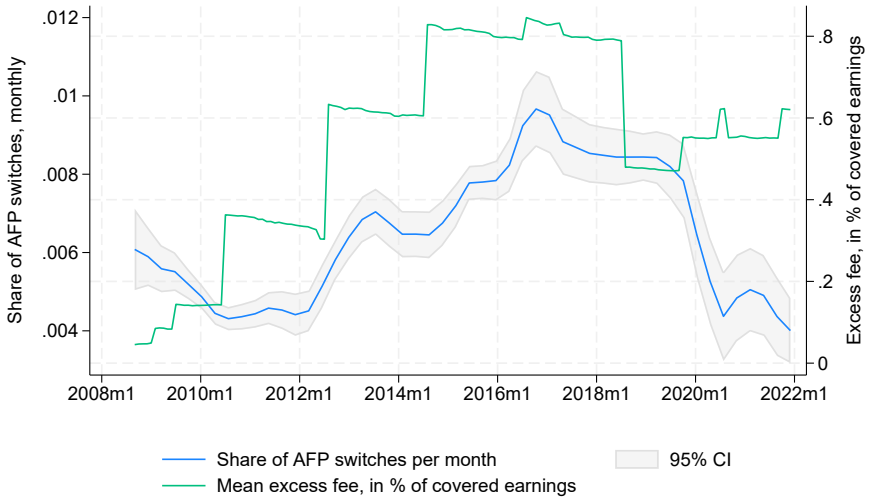
Our results highlight that the average commissions paid in excess of the cheapest option closely mirror the overall pattern highlighted on the market level in figure 4, which is not surprising, considering the high level of inertia and correspondingly low number of provider changes overall. We consider the development of provider changes by presenting the share of contributing affiliates that change their AFP in each month. After a decrease in provider changes from 0.4% to about 0.3% between late 2008 and the beginning of 2012, the share of contributing affiliates changing providers rises to 0.6% between 2012 and 2017. After a period of higher switching activity between 2017 and 2020, the number of provider switches drops to about 0.25% until the end of our observational period in 2021. Hence, we find that a higher share of contributing affiliates switch their AFP in periods in which the spread in prices is higher.

To get a better understanding of the subgroups of individuals that change their fund providers, we consider the average number of annual switches and present the results in figures 6 and 7. The results presented in figure 6 indicate that individuals who do not hold the default portfolio are also more likely to change their AFP, which holds across all age groups below the statutory eligibility age.

In figure 7 we plot the average number of AFP switches per year and across the number of correct answers to the financial literacy (left) or pension literacy questions (right). Our results highlight that individuals with higher financial sophistication (i.e., a higher number of correct responses to either set of questions) tend to switch their provider more often than those with lower levels of financial sophistication, which holds across all age groups.

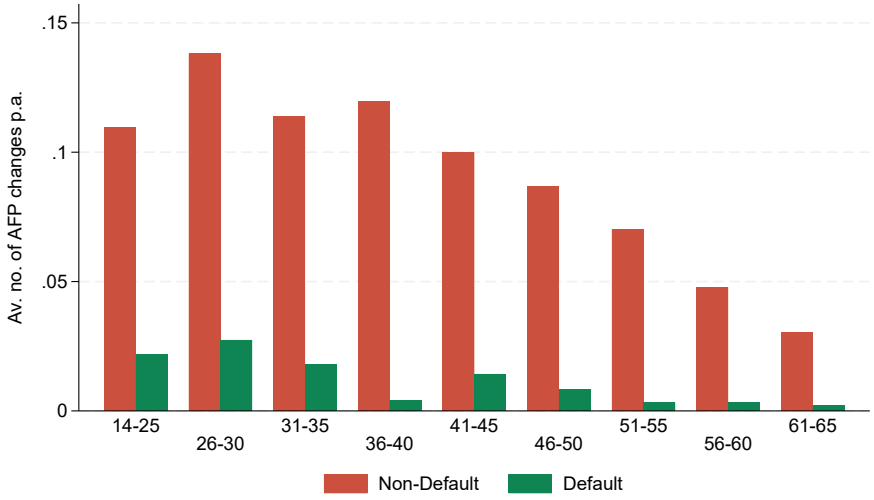
To quantify in monetary terms the savings that members forego by not selecting the lowest-fee provider available, we calculate the monetary value of what members could save by

Figure 5 — Excess commissions and AFP switching, 2008-21



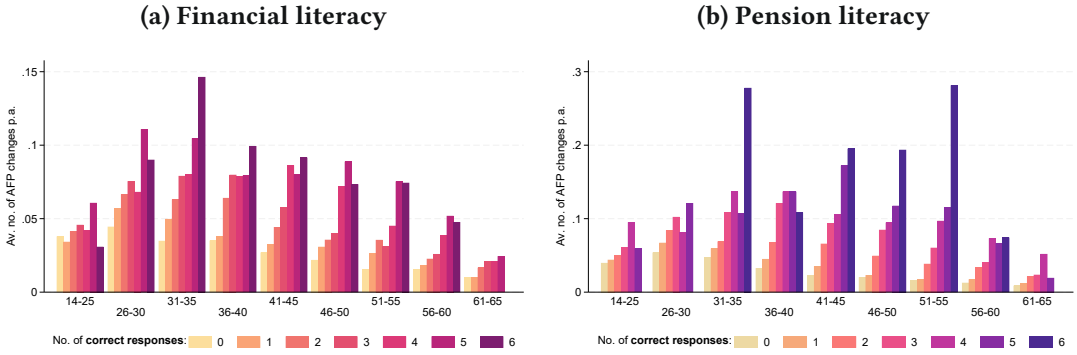
Notes. This figure shows the development of the relative excess commission, which we define as the difference in the monthly variable fee (as a share of the monthly covered earnings) between the chosen option and the cheapest option available. The share of AFP switches represents the share of contributing individuals per month who changed their AFP. The kernel-weighted local polynomial smooth plots are based on an Epanechikov kernel function to calculate the weighted local polynomial estimate with a rule-of-thumb bandwidth estimator.

Figure 6 — Changes of AFPs across default portfolio choice



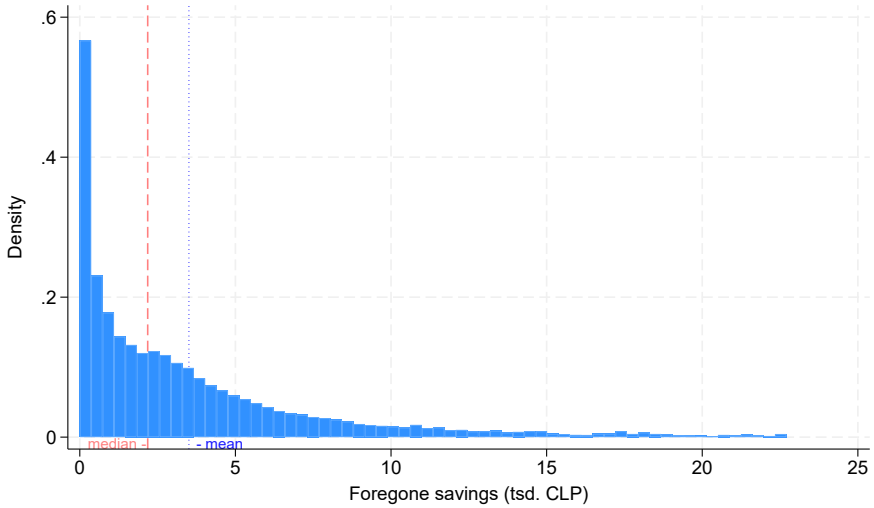
Notes. This figure plots the average number of AFP changes across age groups for individuals holding the default portfolio allocation compared to those that do not.

Figure 7 — Changes of AFPs across financial sophistication



Notes. This figure plots the average number of AFP changes across age groups and levels of financial literacy (left) and pension literacy (right).

Figure 8 — Foregone savings: fees paid in excess for the cheapest option per month



Notes. We define foregone savings as the monthly costs paid in excess of the cheapest option available and compute this by multiplying the member's total covered earnings by the difference between the member's current AFP and the cheapest alternative.

switching to the cheapest provider in the respective period. The resulting measure equals zero for periods with affiliation with the cheapest provider, and higher positive values for larger potential savings in thousands of CLP.

The histogram in figure 8 shows that the average (median) foregone savings is CLP 3,505 (CLP 2,182) per month. Considering this in Chile's inflation-indexed currency for long-term contracts (Unidad Fomento, UF), we find that the average (median) foregone saving of contributing members was at UF 0.135 (UF 0.087) per month, which corresponds to USD 4.95 (USD 3.19) in December 2021.

5 — Results

In the following section, we investigate the price sensitivity of pension fund members. We first use a conditional logit model to study differences in the overall price sensitivity of fund members across their level of financial sophistication. Subsequently, we use linear probability models to consider differences in the propensity to switch pension fund providers, and consider how members react to prices. Subsequently, we restrict our sample to those fund members who switch providers and consider differences in the fees around the switching dates. Lastly, we relate how the differences in provider choices across financial sophistication translate into foregone savings.

5.1. Conditional Logits

As our data includes both choice-specific attributes and individual-specific characteristics, we first use a conditional logit model following McFadden (1974) to model choices across alternative pension fund providers. The probability of choosing a pension fund provider relates to alternative-specific and individual-specific regressors. We index our set of unordered alternatives j=1,2,...,J, with J being up to seven alternatives when AFP Uno entered the market in 2019. Let y_{ijt} be an indicator variable for the chosen alternative of individual i at time t. That is, $y_{ijt} = 1$ if individual i chose alternative j, and $y_{ijt} = 0$ otherwise.

Alternative-specific regressors reflect the variation across providers and over time and include fees and fund returns. Individual-specific regressors are the socioeconomic and demographic characteristics of fund members, such as gender, educational attainment, marital status, time to retirement, home ownership, financial assets outside the mandatory DC pension account, monthly incomes, total account balances, and default asset allocation. Individual-specific regressors only vary across individuals, not across alternatives.

We then estimate the following regression:

$$
\begin{aligned}
\eta_{it} &= \mathbf{X_{it}}\beta + (\mathbf{z_{it}}\mathbf{A_t})' \\
&= \mathbf{X_{it}}\beta + (\mathbf{z_{it}} \otimes I_{jt})vec(A') \\
&= (\mathbf{X_{it}}, \mathbf{z_{it}} \otimes \mathbf{I_{Jt}}) \begin{Bmatrix} \beta \\ vec(\mathbf{A}') \end{Bmatrix} \\
&= \mathbf{X^*_{it}}\beta
\end{aligned}
$$

Here, β represents our vector of alternative specific regression coefficients, and $\mathbf{A} = (\alpha_1, \alpha_J)$ refers to the matrix of individual-specific regression coefficients. We normalize the location using one alternative, which then provides us with the case specific regression coefficients, relative to the normalized alternative.

To highlight the role financial sophistication plays in the choice of fund providers, we allow the price sensitivity to vary across the levels of financial sophistication. Specifically, we consider how the propensity to choose providers differs across the median level of correct responses to both measures of financial sophistication. In the specifications shown in table 5, we control for the asset-weighted medium-run real returns of the providers in the market and include case-specific controls. For brevity, we do not include the alternative-specific estimates.[20]

Across both specifications, we find negative coefficients for variable commissions, both for high- and low-financial sophistication individuals. The negative coefficients imply that members are less likely to choose providers with higher fees, relative to providers with lower fees. Furthermore, the consistently positive coefficient of asset-weighted medium-run real returns (over the previous 36 months) suggests that pension fund members are more likely to switch to providers with higher returns and less likely to switch to providers with lower returns.

Moreover, we find larger coefficients (in absolute terms) among members with higher levels of sophistication, compared to less sophisticated members. However, the difference is only significant for the split across pension literacy, which suggests a higher price sensitivity of

20. We include the full results, including case-specific regression coefficients, in table D1 (including the financial literacy interaction) and table D2 (including the pension literacy interaction) in appendix D.1.

Table 5 — Heterogeneity in provider choices in conditional logits (McFadden choice model) across financial literacy

	(1) AFP chosen	(2) AFP chosen
Alternatives		
Low financial literacy × Variable commission fee	-0.118***	
	(0.0225)	
High financial literacy × Variable commission fee	-0.184***	
	(0.0291)	
Low pension literacy × Variable commission fee		-0.0967***
		(0.0230)
High pension literacy × Variable commission fee		-0.215***
		(0.0289)
Asset-weighted medium-run real returns (-36m;-1m)	0.0563***	0.0548***
	(0.00109)	(0.00118)
Case-specific controls	Yes	Yes
Observations	13036502	12449312
Clusters	15222	14333
Log Likelihood	-3107172.1	-2969920.7
Wald-test of difference across fin. sophistication (p-val)	0.109	0.00390

Notes. This table reports the results of conditional logits (McFadden choice models) with case-specific controls (including gender, education, marital status, time to retirement (linear and squared), home ownership, holding financial assets outside the mandatory pension account, total covered earnings, account balance, and a dummy for default fund allocation). For the full set of alternative-specific results, see appendix D.1. We classify respondents with low (high) financial literacy as those answering less than three (three or more) of the six financial literacy questions correctly, and classify respondents with low (high) pension literacy as those answering less than two (two or more) of the six questions on the pension system correctly. Standard errors are clustered at the individual level and in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.

sophisticated members.[21]

21. Our results are robust to employing full sample splits across both financial sophistication measures, with highly financially sophisticated members being more sensitive towards fees than less sophisticated members, as our results in table D3 in appendix D.2 show.

5.2. Provider switches

In the following, we consider the provider switches using linear regressions. Compared to the conditional logit results, the linear probability models allow for a more straightforward interpretation of the resulting coefficients and allow for the employment of various levels of fixed effects. Similar to the conditional logit models, we explore the decisions of mandatory pension fund members to change their AFP in a given month. Accordingly, the dependent variable equals one if the individual changed their affiliation in the respective month, and zero if they are affiliated with the same AFP as in the previous period. In all regressions, we cluster standard errors at the individual level and use year-month fixed effects.

Table 6 presents our results. In column 1, we include only the lagged fees and monthly real returns. We find that higher fees in the previous period are associated with a higher propensity to switch providers, and higher real returns are associated with a lower propensity to switch. Thus, contributors facing higher excess fees by being affiliated with more expensive providers are more likely to switch, compared to respondents affiliated with cheaper providers. A one percentage point increase in excess fees is associated with an increase of 0.175 percentage points in the probability of switching providers, which is substantial considering the average AFP switching rate of about 0.4 percent per month. The significantly negative association with provider switches suggests that respondents earning higher returns on their portfolio in the previous month switch significantly less often, compared to those with lower returns, all else equal. The negative association suggests that fund members may consider returns in their decision to switch providers. However, note that the effect is minimal: A one percentage point higher monthly real return is associated with a 1.37 basis points decrease in the probability of switching their AFP.

We confirm these correlations when adding socioeconomic and demographic characteristics in column 2. We find women to switch significantly less compared to men. Our results further indicate an insignificant association of marital status, but a significantly positive association of the propensity to switch providers with education. Time to retirement is significantly positively associated with switches, which suggests that younger individuals switch more often, though this association tapers off, as the negative squared term indicates. Adding measures for real and financial assets outside the pension system hardly changes our results, but we find that individuals without financial assets outside the pension system switch providers significantly less.

We add controls for covered earnings and accounts balances in the mandatory account in column 4, both of which are significantly positively associated with provider changes. As higher covered earnings are associated with higher fees in absolute terms, the positive correlation suggests that contributing individuals switch more often when they can save more in real terms. Notably, among individuals with similar incomes and pension wealth, women tend to switch providers significantly more often than men.

In column 5, we add a control variable for members' fund allocation status — specifically, whether they maintain the default portfolio allocation. While our results do not highlight a consistent pattern regarding mandatory account balances anymore, we find the default portfolio allocation to be consistently negatively associated with the propensity to switch providers. This suggests that individuals who do not actively select their investment portfolio are also less inclined to engage in provider choice. It is perhaps unsurprising that members who refrain from making active fund decisions similarly exhibit limited attention to selecting their pension fund provider.

To analyze the implications of financial sophistication for switching behavior, we include both measures of financial sophistication and their interaction with excess fees as explanatory variables and present our results in table 7. Our results in columns 1 and 4 show the association between provider switches and financial literacy or pension literacy, respectively. We control for demographic characteristics in all specifications, including gender, time to retirement (linear and squared), marital status, and education.

We find both measures of financial sophistication to be significantly positively associated with the propensity to switch providers. In our specifications in columns 1 and 4, where we only control for demographic characteristics, we find additional correct responses to the financial literacy (pension literacy) questions to be associated with a 0.0412 (0.104) percentage points higher propensity to switch providers in a given month. While this effect appears small, it is sizable given the average propensity to switch providers of 0.373 percent – i.e., an additional correct answer increases the propensity by about 11.0-27.9%.

In columns 2 and 4, we add additional controls for the respondents' financial situation, including whether they hold financial assets outside the mandatory pension accounts, home ownership, log covered earnings, log balance of mandatory DC account, and whether they hold the default portfolio allocation. We further include the lagged fees and lagged monthly real returns. Adding these controls substantially reduces the size of the financial sophistication

Table 6 — Linear probability model on AFP switches

	(1) Changed AFP	(2) Changed AFP	(3) Changed AFP	(4) Changed AFP	(5) Changed AFP
L.Excess fee over cheapest alternative	0.00175***	0.00281***	0.00280***	0.00263***	0.00232***
	(0.000175)	(0.000192)	(0.000192)	(0.000189)	(0.000187)
L.Monthly real return	-0.000137***	-0.000164***	-0.000163***	-0.000155***	-0.000142***
	(0.0000423)	(0.0000422)	(0.0000422)	(0.0000422)	(0.0000422)
Female		-0.000447***	-0.000482***	0.000809***	0.000667***
		(0.000146)	(0.000147)	(0.000149)	(0.000147)
Attended tertiary education		0.00373***	0.00365***	0.00280***	0.00246***
		(0.000199)	(0.000200)	(0.000187)	(0.000181)
Married		0.000108	0.0000887	0.0000200	0.00000936
		(0.000165)	(0.000165)	(0.000160)	(0.000157)
Time to retirement		0.000288***	0.000279***	0.000172***	0.000154***
		(0.0000201)	(0.0000200)	(0.0000191)	(0.0000186)
Time to retirement (sq.)		-0.00000511***	-0.00000492***	-0.00000200***	-0.00000156***
		(0.000000439)	(0.000000436)	(0.000000419)	(0.000000409)
Home ownership			0.0000244	-0.000105	-0.000106
			(0.000138)	(0.000134)	(0.000132)
No fin. assets outside mandatory DC account			-0.00101***	-0.000380**	-0.000318*
			(0.000173)	(0.000168)	(0.000166)
Log covered earnings				0.000493***	0.000472***
				(0.00000850)	(0.00000822)
Log mandatory DC account balance				0.000246***	0.0000569
				(0.0000432)	(0.0000410)
Holds default portfolio					-0.00299***
					(0.000127)
Constant	0.00298***	-0.00163***	-0.000744**	-0.00837***	-0.00326***
	(0.0000971)	(0.000246)	(0.000303)	(0.000741)	(0.000691)
Time FE	Yes	Yes	Yes	Yes	Yes
Mean AFP switching	0.00388	0.00388	0.00388	0.00388	0.00388
Observations	2928676	2928676	2928676	2928676	2928676
Individuals	21709	21709	21709	21709	21709
Adj. R2	0.000389	0.00139	0.00144	0.00420	0.00468
Within R2	0.0000709	0.00108	0.00112	0.00388	0.00437
Adj. Within R2	0.0000702	0.00107	0.00112	0.00388	0.00436

Notes. This table reports the results of OLS regressions, including year-month fixed effects. Standard errors are clustered at the individual level and in parentheses, * $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$.

coefficients. Given the high correlation between financial sophistication and these financial behaviors, the coefficients of both financial sophistication measures are diminished substantially, by 56.6% for financial literacy and 59.5% for pension literacy. Hence, our results suggest that an additional correct response to the financial literacy (pension literacy) questions is associated with a higher switching probability of 0.0179 (0.0421) percentage points, conditional on their financial situation, previous fees and returns, and demographic characteristics.

In columns 3 and 6, we analyze how financial sophistication moderates the association between lagged fees and provider switches. Notably, the insignificant coefficients of both financial sophistication measures imply an insignificantly different propensity to switch providers across financial sophistication for members already affiliated with the cheapest option, i.e., those with zero excess fees. Furthermore, the significantly positive coefficients of lagged excess fees suggest that higher fees are associated with more provider switches, even for respondents at the lowest levels of financial sophistication. Lastly and most importantly, the significantly positive interaction terms suggest that higher fees increase the propensity to switch more for individuals with higher levels of sophistication.

To get an insight into which of the two measures matters more for the provider choice, we present models including both financial sophistication indicators in columns 7 and 9. Our results in column 7 show that both financial literacy and pension literacy capture distinct aspects of financial sophistication and are relevant for explaining the respondents' propensity to switch providers, ceteris paribus. Conditional on the level of financial literacy, an additional correct response to the pension literacy questions is associated with a 0.0375 percentage point higher propensity to switch providers in a given month. Financial literacy, on the other hand, is associated with a 0.0121 percentage point higher propensity to switch in a given month, conditional on pension literacy. Including interactions of both aspects of financial sophistication with the excess returns in the previous month in column 8 shows that only pension literacy moderates the effect of fee differences on the propensity to switch providers, holding financial literacy constant.

Table 7 — Linear probability model on AFP switches: heterogeneity across financial sophistication

	(1) Changed AFP	(2) Changed AFP	(3) Changed AFP	(4) Changed AFP	(5) Changed AFP	(6) Changed AFP	(7) Changed AFP	(8) Changed AFP
Financial Literacy	0.000412***	0.000179***	0.00000930				0.000121**	0.0000854
	(0.0000573)	(0.0000538)	(0.0000713)				(0.0000566)	(0.0000758)
Pension Literacy				0.00104***	0.000421***	0.0000151	0.000375***	-0.0000247
				(0.0000736)	(0.0000699)	(0.0000859)	(0.0000710)	(0.0000872)
L.Excess fee over cheapest alternative		0.00233***	0.00168***		0.00266***	0.00169***	0.00258***	0.00147***
		(0.000233)	(0.000298)		(0.000254)	(0.000265)	(0.000257)	(0.000337)
Financial Literacy × L.Excess fee over cheapest alternative			0.000303***					0.0000742
			(0.000108)					(0.000112)
Pension Literacy × L.Excess fee over cheapest alternative						0.000712***		0.000702***
						(0.000135)		(0.000136)
L.Monthly real return		-0.000142***	-0.000143***	-0.000147***	-0.000134***	-0.000137***	-0.000151***	-0.000154***
		(0.0000497)	(0.0000497)	(0.0000518)	(0.0000517)	(0.0000517)	(0.0000527)	(0.0000527)
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls for financial situation	No	Yes	Yes	No	Yes	Yes	Yes	Yes
Mean AFP switching	0.00373	0.00373	0.00373	0.00387	0.00387	0.00387	0.00382	0.00382
Observations	2155716	2138880	2138880	2057908	2057908	2057908	1959094	1959094
Individuals	15143	15143	15143	14305	14305	14305	13674	13674
Adj. R2	0.00156	0.00475	0.00475	0.00215	0.00484	0.00488	0.00480	0.00483
Within R2	0.00129	0.00448	0.00448	0.00189	0.00458	0.00462	0.00453	0.00457
Adj. Within R2	0.00128	0.00447	0.00448	0.00188	0.00458	0.00461	0.00453	0.00456

Notes. This table reports the results of OLS regressions, including year-month fixed effects. Standard errors are clustered at the individual level and in parentheses, * $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$.

Notably, our results are robust to the inclusion of provider-fixed effects and using the within-individual variation in financial sophistication by using individual-fixed effects. We provide details on this exercise and the results of this robustness-check in appendix C.3.

5.3. Fees around provider switches

So far, our results suggest that financially sophisticated members are more likely to switch providers and react more strongly to fees, compared to less sophisticated members. As a next step, we consider how fees change around the time of the provider switch. That is, are more sophisticated fund members more likely to choose lower-fee services when they change?

To investigate this, we consider the mean fees paid around the date of the provider switches. We focus only on respondents who changed their provider and consider a period of 9 months before and after the switch. We split the sample across the median number of correct responses to both sets of financial sophistication questions and compare differences in excess fees paid around the switching dates. In the following, we focus on the fund members' first provider switches, but provide our results considering all switches in appendix D.3.

In figure 9, we show the mean fees paid around the date of their first switch for members with low and high financial sophistication. Specifically, we split the sample across the median number of correct answers to the financial literacy (upper panel) or pension literacy questions (lower panel). The figure offers several notable insights.

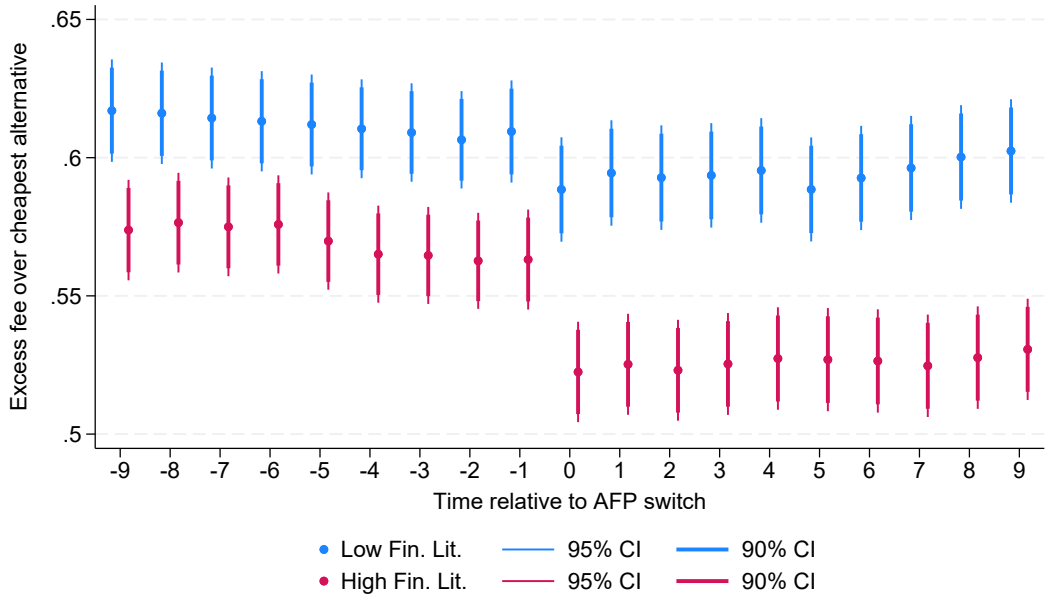
First, our results in the upper panel show that individuals with higher levels of financial literacy pay lower excess fees even before they switch providers. In the nine months before the switch, they pay around 0.05 percentage points less of their monthly covered earnings in fees, compared to the low financial literacy group.

Second, while the mean level of fees paid after the switch is lower for both groups, the decrease in the mean excess fees is more pronounced for the high financial literacy group, which reduces their mean fees by 0.04 percentage points of monthly covered earnings, compared to the reduction of 0.02 percentage points for the low financial literacy group.

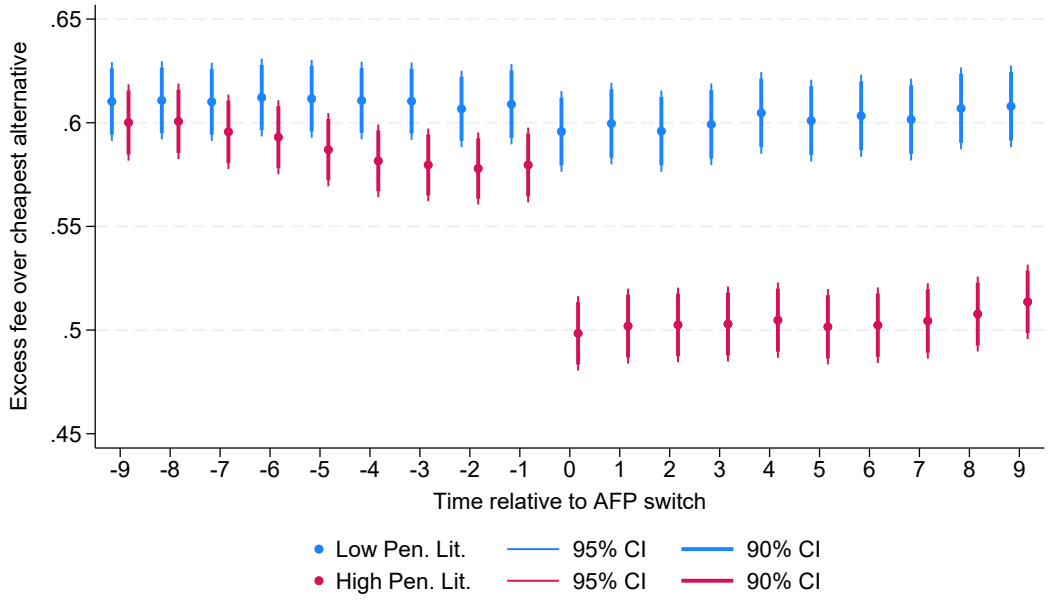
Third, even for the high financial literacy group, respondents still pay considerable fees in excess of the cheapest option (around 0.58 percent of monthly income for the low financial literacy group and about 0.51 percent for the high financial literacy group). Put differently, even among the high financial literacy group, not every individual switches to the cheapest option available.

Figure 9 — Mean excess fees paid around time of switch across financial literacy and knowledge of the pension system

(a) Fees around the first provider switch across financial literacy



(b) Fees around the first provider switch across pension literacy



Notes. We center the data around the month of the first AFP switch and show the mean excess fees paid up to nine months before and after the switch. We split the sample across the median number of correct responses to the financial literacy or pension literacy questions, using the most recent information for each respondent. We include the estimated mean excess commissions around the switches and 95% confidence intervals.

Lastly, the difference in excess fees paid across levels of financial literacy is larger after the switch, increasing from 0.05 to 0.07 percentage points of monthly covered earnings.

Considering the results regarding pension literacy shown in the lower panel of figure 9,

we find no considerable difference regarding the mean excess fees paid in the nine months prior to the switch. However, while the mean excess fees are similar around the switch for respondents with lower levels of pension literacy, respondents with high literacy reduce their excess fees substantially (-0.07 percentage points of monthly covered incomes).

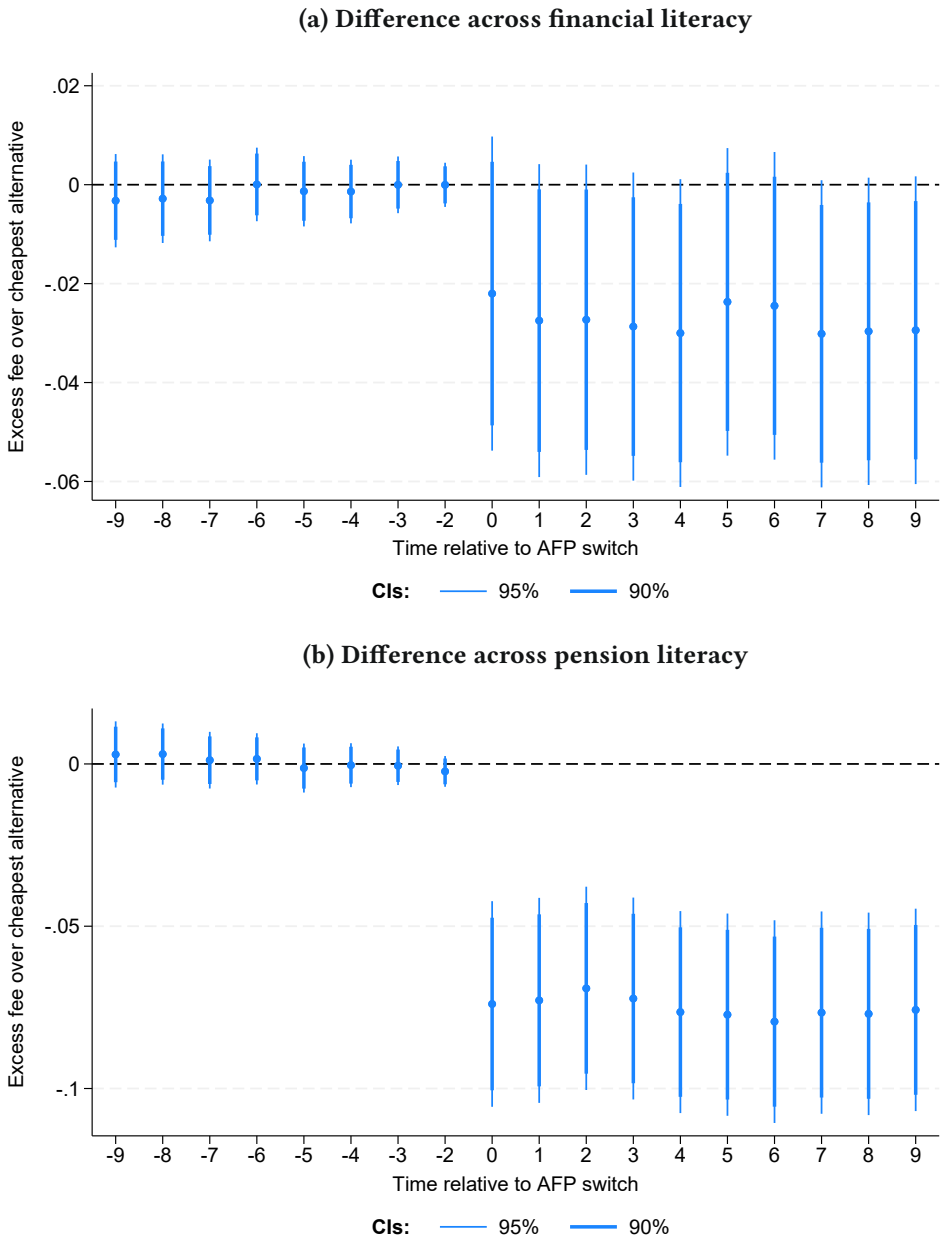
We further test the differences in the mean excess fees around the switching date across the median split of our two financial sophistication measures using the following specification:

$$\Delta\phi_{it} = \sum_{k} \beta_k \times FS_{it}^{k} + FS_{it} + \Gamma' X_{it} + \lambda_t + \varepsilon_{it} \tag{2}$$

We consider the excess fees ($\Delta\phi_{it}$, difference between fees the members paid and the cheapest alternative) and include all fund members that switched and use the month before the switch as a reference period (i.e. $k = -1$) and consider differences across the level of financial sophistication (FS_i^k), controlling for socioeconomic and demographic characteristics X_{it}, including gender, education, time to retirement (linear and squared), home ownership, holding financial assets outside the pension system, log covered earnings and account balance, and holding the default portfolio composition. We further include year-month fixed effects and control for overall financial sophistication. We present the coefficients of the interaction terms β_k in figure 10, including the results both for the median split in financial literacy (upper panel) and pension literacy (lower panel).

Overall, the graphical insights in figure 10 show that across both measures of financial sophistication, members with higher levels of financial literacy or pension literacy reduce their fees more, compared to less literate members. While the difference is substantially smaller at around 0.02 percentage points of monthly covered earnings when splitting the sample across financial literacy, and mostly significant only at a 10 percent level, the drop is considerable at -0.075 percentage points for individuals with a better understanding of the pension system.

Figure 10 — Difference in excess fees paid around the period of the AFP switch across levels of financial sophistication



Notes. We center the data around the month of the first AFP switch and show the mean excess fees paid up to nine months before and after the switch. We split the sample across the median number of correct responses to financial literacy and pension literacy questions, using the most recent information for each respondent. We include the estimated mean excess commissions around the switches and 90% and 95% confidence intervals. The regressions include year-month fixed effects and controls for individual socioeconomic and demographic characteristics, including gender, educational attainment, time to retirement (linear and squared), home ownership, holding financial assets outside the pension system, total covered earnings in CLP, account balances in CLP, and being in the default option. We cluster standard errors at the individual level.

5.4. Investment mistakes: foregone savings

To assess the quality of financial decisions in pension fund selection, we focus on the foregone savings incurred by members who do not enroll in the cheapest available pension fund. This measure captures the economic cost of suboptimal choices and serves as a proxy for investment mistakes. We define excess commissions as the difference between the fees actually paid and those charged by the lowest-cost pension scheme. This concept is particularly relevant because even small differences in fees, when compounded over a working life, can translate into substantial reductions in retirement wealth. By quantifying these foregone savings, we provide a clear metric of inefficiency in pension fund choice and a basis for evaluating the role of financial sophistication, market transparency, and behavioral frictions in shaping individual outcomes.

To this end, we regress excess commissions on observable characteristics of pension fund members and perform two sample splits: one based on financial literacy, distinguishing individuals below and above the median score, and another based on pension literacy, using the same median-based threshold.

The results are presented in Table 8. Columns (1) and (2) correspond to the sample split based on financial literacy, while columns (3) and (4) correspond to the split based on pension literacy. Within each pair, odd-numbered columns report estimates for individuals below the median score, and even-numbered columns for those above the median.

Several patterns emerge from the estimates. Gender and education are highly correlated with excess commissions: women pay significantly lower excess commissions than men across all groups (coefficients range from -0.033 to -0.035), and tertiary education reduces excess commissions by up to -0.043. Regardless of financial or pension literacy levels, women consistently incur smaller excess commission payments than men. Women appear less prone to selecting high-cost pension schemes, which may reflect greater caution, different decision-making strategies compared to men, higher propensity to seek advice more frequently, reducing the likelihood of costly mistakes, and, to a limited extent, lower risk taking. Education appears to play a significant mitigating role in reducing investment mistakes, suggesting that higher human capital is associated with more informed and cost-efficient pension choices. Individuals with higher educational attainment are less likely to pay excess commissions, likely because education enhances financial decision-making skills, information processing, and confidence in navigating complex pension products. It reinforces the idea that human capital not only

improves earning potential but also reduces behavioral inefficiencies in long-term financial planning.

Financial characteristics also matter. Pension wealth is positively associated with excess commissions for individuals below the median literacy level, but this effect disappears for those above the median, indicating that less sophisticated individuals with higher wealth may be more vulnerable to costly fund choices. Holding the default portfolio significantly reduces excess commissions for low-literacy groups (-0.013 to -0.017), reinforcing its role as a protective mechanism. Finally, the age profile is non-linear: the positive coefficient on time to retirement and the negative coefficient on its square imply that excess commissions increase as individuals approach retirement but at a decreasing rate. This pattern is robust across all specifications. Overall, Table 8 highlights significant heterogeneity in investment mistakes across observable individual characteristics, indicating that demographic, financial, and behavioral factors play a key role in shaping excess commission payments. In addition, the results show heterogeneity in behavior across literacy levels. A Chow test confirms this by rejecting the null hypothesis that the coefficients in columns (1) and (2) are equal, as well as the null that the regressions in columns (3) and (4) coincide. This indicates that financial and pension literacy significantly moderate the relationship between individual characteristics and excess commission payments.

We use the coefficients reported in Table 8 to predict the age profile of excess commissions paid, holding all other observable individual characteristics at their sample averages. This age profile allows us to quantify the savings foregone by not enrolling in the cheapest pension fund. Our approach is as follows. Pension fund fees are a fixed proportion of covered earnings, expressed as

$$\phi_t \times y_t$$

where $\phi_t \in (0, 1)$ and y_t covered earnings in month t.

Assuming a constant monthly interest rate r, fees paid in month t reduce pension wealth at retirement by:

$$\phi_t \times y_t \times (1 + r)^{N-t}$$

where N is the retirement date. Summing over the entire working life, the total reduction in pension wealth due to fees is:

$$\sum_{t=0}^{N-1} \phi_t y_t (1 + r)^{N-t}$$

Consider two pension schemes, Scheme H and Scheme L, identical in all respects except that

$\phi_t^H > \phi_t^L$ for all t. The pension wealth foregone by choosing Scheme H instead of Scheme L is:

$$\sum_{t=0}^{N-1}(\phi_t^H - \phi_t^L) \times y_t \times (1+r)^{N-t}$$

If covered earnings grow at a constant monthly rate g, then the foregone pension wealth becomes:

$$y_0 \sum_{t=0}^{N-1}(\phi_t^H - \phi_t^L) \times (1+g)^t \times (1+r)^{N-t}$$

where y_0 is initial covered earnings. Expressed as a fraction of y_0, the foregone wealth is:

$$\sum_{t=0}^{N-1}(\phi_t^H - \phi_t^L) \times (1+g)^t \times (1+r)^{N-t}. \tag{3}$$

To compute (3), we replace $(\phi_t^H - \phi_t^L)$ with the predicted age profile of excess commissions, using year and month as predictors and setting all other controls from Table 8 to their sample averages for each of the four groups considered.

The logic behind this calculation is straightforward: every extra fee paid today not only reduces current savings but also eliminates the opportunity for that amount to earn compound interest until retirement. For example, a small excess commission early in life grows into a much larger amount by retirement because it could have been invested and accumulated returns over decades. Conversely, excess fees paid closer to retirement have a smaller impact because they compound for fewer periods. This compounding effect explains why even modest differences in commission rates can translate into substantial differences in pension wealth over a full working life. In short, paying higher fees is costly not only because of the direct expense but because of the lost growth potential of those funds.

The results for this calculation are show in Figure 11, which displays, in the top panel, the time series of (3) for pension fund members with financial literacy scores below and above the median, and in the bottom panel, the corresponding time series for members with pension literacy scores below and above the median.

The figure reveals several noteworthy patterns in the evolution of foregone pension wealth. First, across both sample splits, its trajectory closely mirrors the pattern of excess commissions shown in Figure 5. Foregone wealth is relatively low at the beginning and end of the sample period, with a pronounced peak during the intermediate years, reflecting the surge in excess fees between late 2014 and early 2018. Second, this peak underscores the compounding effect

of higher commissions during that interval, which significantly amplified the long-term cost of suboptimal fund choices. Third, differences across levels of financial sophistication appear modest overall, with the notable exception of the period between early 2010 and late 2011, where the gap is more pronounced for the pension literacy split. This divergence likely reflects transitional dynamics in the pension system—such as regulatory adjustments or changes in fee structures—that required more active decision-making. Individuals with higher pension literacy were better equipped to respond to these changes, while less informed members tended to remain in costlier schemes, widening the gap in foregone wealth during that period.

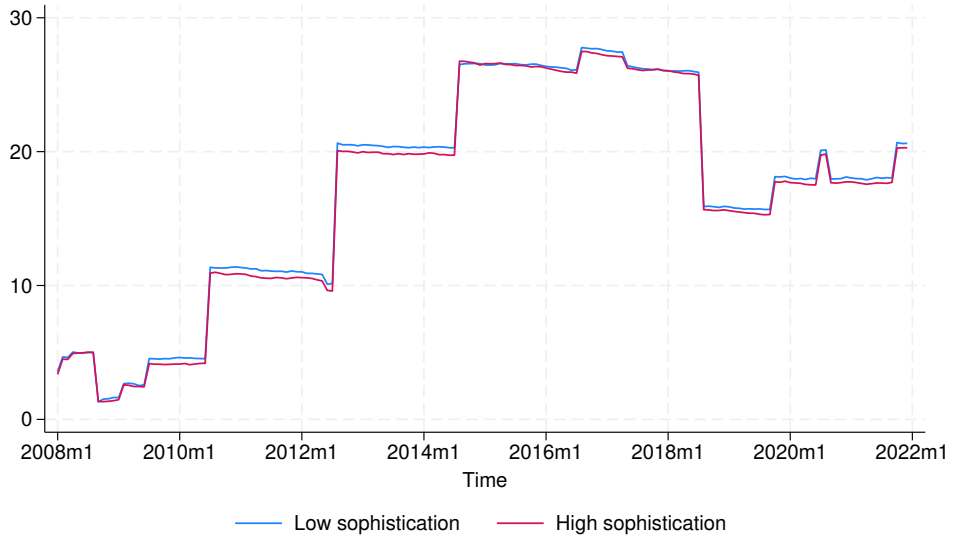
Table 8 — Financial sophistication and investment mistakes

	(1) low FL	(2) high FL	(3) low PL	(4) high PL
Female	-0.033***	-0.032***	-0.035***	-0.025***
	(0.005)	(0.005)	(0.004)	(0.006)
Attended tertiary education	-0.043***	-0.032***	-0.038***	-0.020***
	(0.006)	(0.005)	(0.005)	(0.005)
Married	-0.003	-0.001	-0.004	0.006
	(0.004)	(0.004)	(0.004)	(0.005)
Home ownership	0.005	0.003	0.006*	-0.001
	(0.004)	(0.005)	(0.004)	(0.005)
No fin. assets outside mandatory DC account	-0.006	-0.006	-0.006	-0.000
	(0.005)	(0.005)	(0.004)	(0.005)
Log of covered income	-0.006***	-0.006***	-0.004**	-0.003
	(0.002)	(0.002)	(0.002)	(0.003)
Log of pension wealth	0.010***	0.007***	0.008***	-0.003
	(0.002)	(0.002)	(0.002)	(0.003)
Holds default portfolio	-0.013***	-0.014***	-0.017***	0.003
	(0.004)	(0.004)	(0.003)	(0.005)
Time to retirement in months	0.024***	0.033***	0.028***	0.015**
	(0.005)	(0.005)	(0.004)	(0.006)
Time to retirement squared in months	-0.010***	-0.012***	-0.011***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)
R-squared	0.543	0.565	0.545	0.648

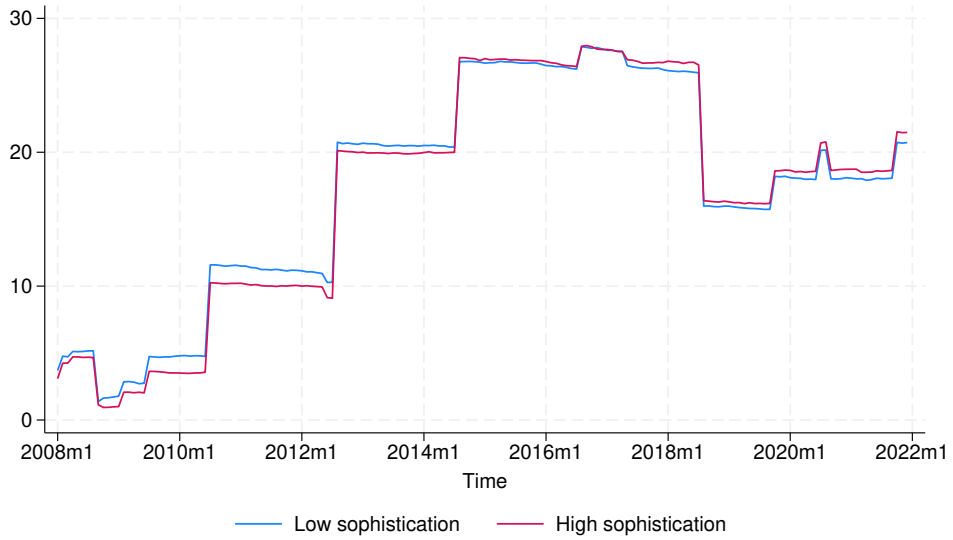
Notes. This table reports the results of OLS regressions, including year-month fixed effects. Standard errors are clustered at the individual level and in parentheses, * $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$. Time to retirement is divided by 100.

Figure 11 — Foregone pension wealth as a fraction of y_0 across levels of financial sophistication

(a) Difference across financial literacy



(b) Difference across pension literacy



Notes. The figures display, in the top panel, the time series of (3) for pension fund members with financial literacy scores below and above the median, and in the bottom panel, the corresponding time series for members with pension literacy scores below and above the median. In both panels, (3) is computed under the assumptions of a constant monthly interest rate of 0.005 and a monthly growth rate of covered earnings of 0.0025. The duration of working life is assumed to be equal to 480 months.

6 — Conclusions

In this paper, we adopt a broader perspective on financial sophistication by integrating conventional measures of financial literacy with indicators of individuals' understanding of the pension system.

We provide robust evidence that financial literacy as well as the knowledge of the pension system plays a critical role in shaping pension fund choices within Chile's mandatory DC system. Despite a simplified and transparent fee structure, many members fail to select the lowest-cost provider, resulting in substantial foregone savings. Our analysis shows that individuals with higher financial literacy and deeper knowledge of the pension system are significantly more likely to switch providers, incur lower fees, and thereby enhance their retirement savings (and incomes).

By combining administrative data with longitudinal survey responses, we quantify investment inefficiencies and demonstrate that these inefficiencies are systematically related to individual characteristics. Specifically, women, university graduates, and homeowners tend to make more cost-effective choices, while those with longer time horizons to retirement or lower financial sophistication are more prone to suboptimal decisions.

Importantly, our findings highlight that even in a market designed to facilitate informed decision-making, behavioral inertia and informational frictions persist. The evidence suggests that targeted interventions — such as personalized disclosures and financial education — could meaningfully improve consumer outcomes. Moreover, the observed heterogeneity in price sensitivity underscores the need for policy designs that account for varying levels of financial capability among contributors.

Improving financial sophistication is not merely a matter of individual empowerment — it is a lever for enhancing the efficiency and equity of pension systems. Future reforms should further consider mechanisms that reduce cognitive barriers and promote active, informed engagement with pension choices.

References

Agarwal, Sumit, and Bhashkar Mazumder. 2013. "Cognitive Abilities and Household Financial Decision Making." *American Economic Journal: Applied Economics* 5, no. 1 (January): 193–207. https://doi.org/10.1257/app.5.1.193. https://www.aeaweb.org/articles?id=10.1257/app.5.1.193. (Cited on page 3).

Angrisani, Marco, Jeremy Burke, Annamaria Lusardi, and Gary Mottola. 2020. *The Stability and Predictive Power of Financial Literacy: Evidence from Longitudinal Data.* NBER Working Paper 28125. National Bureau of Economic Research, November. https://doi.org/10.3386/w28125. (Cited on page 10).

Arenas de Mesa, Alberto, David Bravo, Jere R. Behrman, Olivia S. Mitchell, Petra E. Todd, Andres Otero, Jeremy Skog, Javiera Vasquez, and Viviana Velez-Grajales. 2007. "The Chilean Pension Reform Turns 25: Lessons from the Social Protection Survey." Chap. 2 in *Lessons from Pension Reform in the Americas,* edited by Stephen J Kay and Tapen Sinha, 23–58. Oxford University PressOxford, November. ISBN: 9780191710285. https://doi.org/10.1093/acprof:oso/9780199226801.003.0003. (Cited on page 3).

Berstein, Solange, and Carolina Cabrita. 2007. *Los Determinantes de la Elección de AFP en Chile: Nueva Evidencia a Partir de Datos Individuales.* Working Paper 19. Superintendencia de Pensiones. (Cited on page 3).

Berstein, Solange, Olga Fuentes, and Félix Villatoro. 2013. "Default investment strategies in a defined contribution pension system: a pension risk model application for the chilean case." *Journal of Pension Economics and Finance* 12, no. 4 (June): 379–414. ISSN: 1475-3022. https://doi.org/10.1017/s1474747213000073. (Cited on page 4).

Bianchi, Milo. 2018. "Financial Literacy and Portfolio Dynamics." *The Journal of Finance* 73, no. 2 (January): 831–859. ISSN: 1540-6261. https://doi.org/10.1111/jofi.12605. (Cited on page 20).

Bucher-Koenen, Tabea, Annamaria Lusardi, Rob Alessie, and Maarten van Rooij. 2016. "How Financially Literate Are Women? An Overview and New Insights." *Journal of Consumer Affairs* 51 (2): 255–283. ISSN: 1745-6606. https://doi.org/10.1111/joca.12121. (Cited on page 20).

Calvet, Laurent E, John Y Campbell, and Paolo Sodini. 2009a. "Measuring the Financial Sophistication of Households." *American Economic Review* 99, no. 2 (April): 393–398. ISSN: 0002-8282. https://doi.org/10.1257/aer.99.2.393. (Cited on page 3).

———. 2009b. "Fight Or Flight? Portfolio Rebalancing by Individual Investors*." *Quarterly Journal of Economics* 124, no. 1 (February): 301–348. ISSN: 1531-4650. https://doi.org/10.1162/qjec.2009.124.1.301. (Cited on page 3).

Christelis, Dimitris, Tullio Jappelli, and Mario Padula. 2010. "Cognitive abilities and portfolio choice." *European Economic Review* 54 (1): 18–38. ISSN: 0014-2921. https://doi.org/https://doi.org/10.1016/j.euroecorev.2009.04.001. https://www.sciencedirect.com/science/article/pii/S0014292109000579. (Cited on page 3).

Cuevas, Conrado, Dan Bernhardt, and Mario Sanclemente. 2023. "Followers of the pied piper of pensioners." *Canadian Journal of Economics/Revue canadienne d'économique* 56, no. 4 (September): 1517–1550. ISSN: 1540-5982. https://doi.org/10.1111/caje.12684. (Cited on page 4).

Da, Zhi, Borja Larrain, Clemens Sialm, and José Tessada. 2018. "Destabilizing Financial Advice: Evidence from Pension Fund Reallocations." *The Review of Financial Studies* 31, no. 10 (February): 3720–3755. ISSN: 1465-7368. https://doi.org/10.1093/rfs/hhy011. (Cited on page 4).

Diaz, David, José L. Ruiz, and Pablo Tapia. 2021. "The role of pension knowledge in voluntary pension and banking savings in Chile." *Academia Revista Latinoamericana de Administración* 34, no. 4 (October): 545–560. ISSN: 1012-8255. https://doi.org/10.1108/arla-12-2020-0264. (Cited on page 4).

Fernandez, Viviana. 2013. "Profitability of Chile's Defined-Contribution-Based Pension System During the Multifund Era." *Emerging Markets Finance and Trade* 49, no. 5 (September): 4–25. ISSN: 1558-0938. https://doi.org/10.2753/ree1540-496x490501. (Cited on page 6).

Fonseca, Raquel, Kathleen J. Mullen, Gema Zamarro, and Julie Zissimopoulos. 2012. "What Explains the Gender Gap in Financial Literacy? The Role of Household Decision Making." *Journal of Consumer Affairs* 46, no. 1 (January): 90–106. ISSN: 1745-6606. https://doi.org/10.1111/j.1745-6606.2011.01221.x. (Cited on page 20).

Garabato Moure, Natalia. 2015. "Financial literacy and retirement planning in chile." *Journal of Pension Economics and Finance* 15, no. 2 (March): 203–223. ISSN: 1475-3022. https://doi.org/10.1017/s1474747215000049. (Cited on page 4).

Gutierrez Cortez, Bryan, Victoria Ivashina, and Juliana Salomao. 2025. *Performance Capital Flows in DC Pensions.* NBER Working Paper w33693. National Bureau of Economic Research (NBER), April. https://doi.org/10.3386/w33693. (Cited on page 3).

Haliassos, Michael, and Carol C. Bertaut. 1995. "Why do so Few Hold Stocks?" *The Economic Journal* 105, no. 432 (September): 1110. ISSN: 0013-0133. https://doi.org/10.2307/2235407. (Cited on page 3).

Harrison, Rodrigo, Marcela Parada-Contzen, and Marcelo Villena. 2023. "Can auctions increase competition in the pension funds market? The Chilean experience." *Journal of Policy Modeling* 45, no. 5 (September): 975–993. ISSN: 0161-8938. https://doi.org/10.1016/j.jpolmod.2023.07.002. (Cited on page 5).

Hastings, Justine, Ali Hortaçsu, and Chad Syverson. 2017. "Sales Force and Competition in Financial Product Markets: The Case of Mexico's Social Security Privatization." *Econometrica* 85 (6): 1723–1761. ISSN: 0012-9682. https://doi.org/10.3982/ecta12302. (Cited on page 58).

Hastings, Justine, Olivia S Mitchell, and Eric Chyn. 2011. "Fees, framing, and financial literacy in the choice of pension manager." In *Financial literacy: Implications for retirement security and the financial marketplace,* edited by Olivia S Mitchell and Annamaria Lusardi, 17–39. Oxford University Press. (Cited on page 3).

Hastings, Justine S., Brigitte C. Madrian, and William L. Skimmyhorn. 2013. "Financial Literacy, Financial Education, and Economic Outcomes." *Annual Review of Economics* 5, no. 1 (August): 347–373. ISSN: 1941-1391. https://doi.org/10.1146/annurev-economics-082312-125807. (Cited on page 3).

Henriquez, Lysette. 2019. *Formalization: The Case of Chile.* Publication by the Enterprises Department. International Labor Organization (ILO). (Cited on page 4).

Illanes, Gaston. 2017. *Switching Costs in Pension Plan Choice.* Working Paper. (Cited on pages 3, 6, 10).

International Monetary Fund. 2024. *Chile: Selected Issues.* IMF Report. International Monetary Fund. (Cited on page 19).

Jappelli, Tullio, and Mario Padula. 2014. "Investment in financial literacy, social security, and portfolio choice." *Journal of Pension Economics and Finance* 14, no. 4 (December): 369–411. ISSN: 1475-3022. https://doi.org/10.1017/s1474747214000377. (Cited on page 4).

Kristianpoller, Werner D., and Josephine E. Olson. 2015. "The effect of financial knowledge and demographic variables on passive and active investment in Chile's pension plan." *Journal of Pension Economics and Finance* 14 (3): 293–314. ISSN: 1475-3022. https://doi.org/10.1017/S1474747214000213. (Cited on page 4).

Landerretche, Oscar M, and Claudia Martínez. 2013. "Voluntary savings, financial behavior, and pension finance literacy: evidence from Chile." *Journal of Pension Economics and Finance* 12, no. 3 (February): 251–297. ISSN: 1475-3022. https://doi.org/10.1017/s1474747212000340. (Cited on page 4).

López, Fernando, and Eduardo Walker. 2020. "Investment performance, regulation and incentives: the case of Chilean pension funds." *Journal of Pension Economics and Finance* 20, no. 1 (January): 125–150. ISSN: 1475-3022. https://doi.org/10.1017/s1474747219000350. (Cited on page 6).

Luco, Fernando. 2019. "Switching Costs and Competition in Retirement Investment." *American Economic Journal: Microeconomics* 11, no. 2 (May): 26–54. ISSN: 1945-7685. https://doi.org/10.1257/mic.20160332. (Cited on page 3).

Lusardi, Annamaria, and Olivia S. Mitchell. 2007. "Baby Boomer retirement security: The roles of planning, financial literacy, and housing wealth." *Journal of Monetary Economics* 54, no. 1 (January): 205–224. ISSN: 0304-3932. https://doi.org/10.1016/j.jmoneco.2006.12.001. (Cited on pages 3, 9, 54).

Lusardi, Annamaria, and Olivia S. Mitchell. 2011. "Financial literacy and retirement planning in the United States." *Journal of Pension Economics and Finance* 10, no. 4 (October): 509–525. ISSN: 1475-3022. https://doi.org/10.1017/s147474721100045x. (Cited on pages 3, 9, 54).

———. 2014. "The Economic Importance of Financial Literacy: Theory and Evidence." *Journal of Economic Literature* 52, no. 1 (March): 5–44. ISSN: 0022-0515. https://doi.org/10.1257/jel.52.1.5. (Cited on pages 3, 20).

McFadden, Daniel M. 1974. "Conditional logit analysis of qualitative choice behavior." Chap. 4 in *Frontiers in Econometrics,* edited by Paul Zarembka, 105–142. Academic Press. (Cited on page 25).

Mitchell, Olivia S., Petra E. Todd, and David Bravo. 2009. "Learning from the Chilean Experience: The Determinants of Pension Switching." In *Overcoming the Saving Slump,* 301–323. University of Chicago Press. ISBN: 9780226497105. https://doi.org/10.7208/chicago/9780226497105.003.0012. (Cited on page 3).

OECD. 2021. *Towards Improved Retirement Savings Outcomes for Women.* OECD, March. ISBN: 9789264374560. https://doi.org/10.1787/f7b48808-en. (Cited on page 19).

Olivares, José A. 2008. "Rear-view-mirror driving in defined contribution systems: the strange formula of the Chilean pension funds." *Applied Economics* 40, no. 15 (August): 2009–2019. ISSN: 1466-4283. https://doi.org/10.1080/00036840600936345. (Cited on page 6).

Organisation For Economic Co-Operation and Development (OECD), and International Bank Reconstruction and Development/The World Bank. 2009. *Reviews of National Policies for Education: Tertiary Education in Chile.* ISBN: 978-9-264-05138-6. (Cited on page 14).

Raddatz, Claudio, and Sergio L. Schmukler. 2012. "Deconstructing Herding: Evidence from Pension Fund Investment Behavior." *Journal of Financial Services Research* 43, no. 1 (December): 99–126. ISSN: 1573-0735. https://doi.org/10.1007/s10693-012-0155-x. (Cited on page 6).

Rooij, Maarten van, Annamaria Lusardi, and Rob Alessie. 2011. "Financial literacy and stock market participation." *Journal of Financial Economics* 101, no. 2 (August): 449–472. ISSN: 0304-405X. https://doi.org/10.1016/j.jfineco.2011.03.006. (Cited on page 4).

Rooij, Maarten C. J. van, Annamaria Lusardi, and Rob J. M. Alessie. 2012. "Financial Literacy, Retirement Planning and Household Wealth." *The Economic Journal* 122, no. 560 (April): 449–478. ISSN: 1468-0297. https://doi.org/10.1111/j.1468-0297.2012.02501.x. (Cited on page 3).

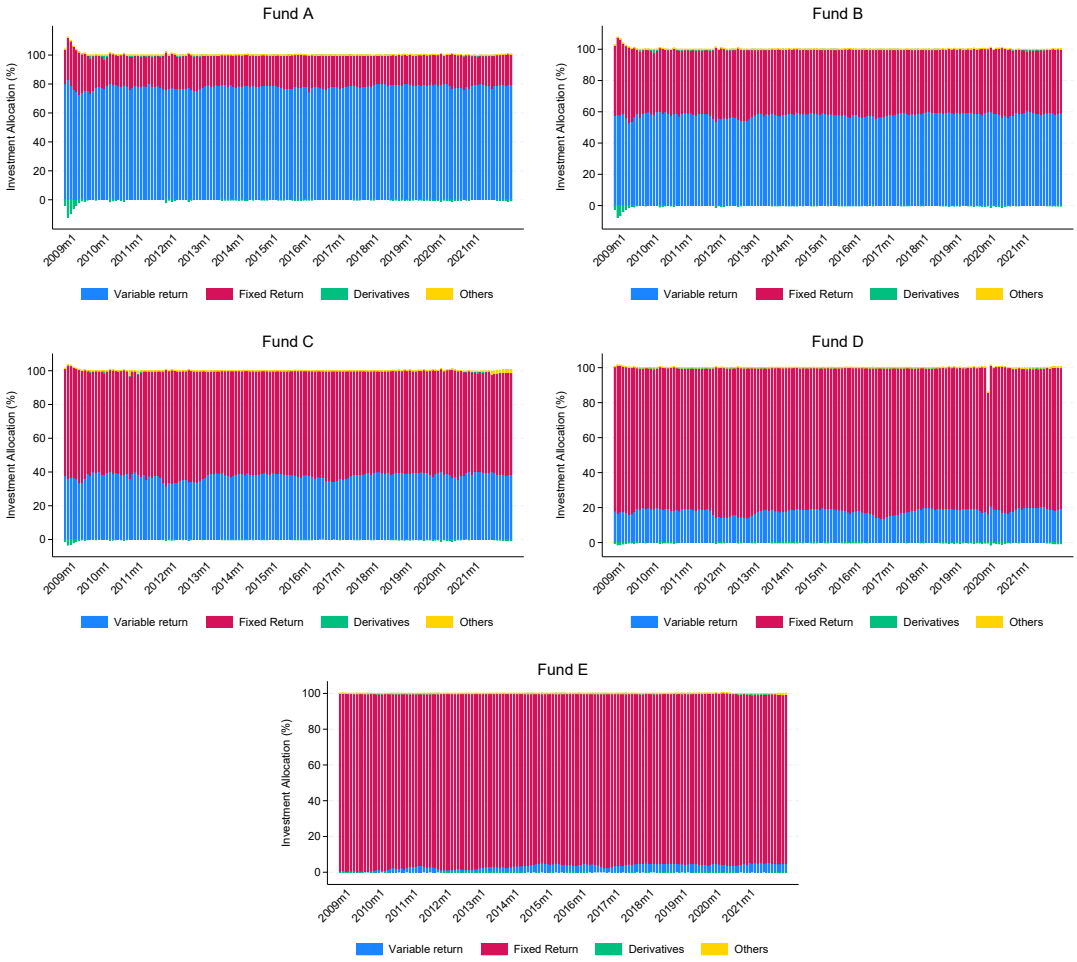
Superintendencia de Pensiones. 2025a. "Compendium of Pension Regulations: Chapter III Pension letters (Capítulo III Carolas)," April 29, 2025. https://www.spensiones.cl/portal/institucional/594/w3-article-7854.html. (Cited on page 5).

———. 2025b. "Compendium of Pension Regulations: Chapter XI – Fund Switching and Assignment (Capítulo XI – Cambio y Asignación de Fondos).," April 29, 2025. https://www.spensiones.cl/portal/compendio/596/w3-propertyvalue-3623.html. (Cited on page 5).

Villatoro, Félix, Olga Fuentes, Julio Riutort, and Pamela Searle. 2024. "Mislearning and (poor) performance of individual investors." *Journal of Pension Economics and Finance* 23 (1): 30–52. https://doi.org/10.1017/S147474722200018X. (Cited on page 4).

A — Investment allocation over time

Figure A1 — Investment allocation of funds across broadly defined asset categories, across all AFPs (09/2008 - 12/2021)



Notes. This figure shows the average share of broadly defined investment instruments across all AFPs for the period 09/2008 to 12/2021, following the classification of investment instruments provided by the Chilean Superintendency of Pensions.

B — Additional insights into fund returns

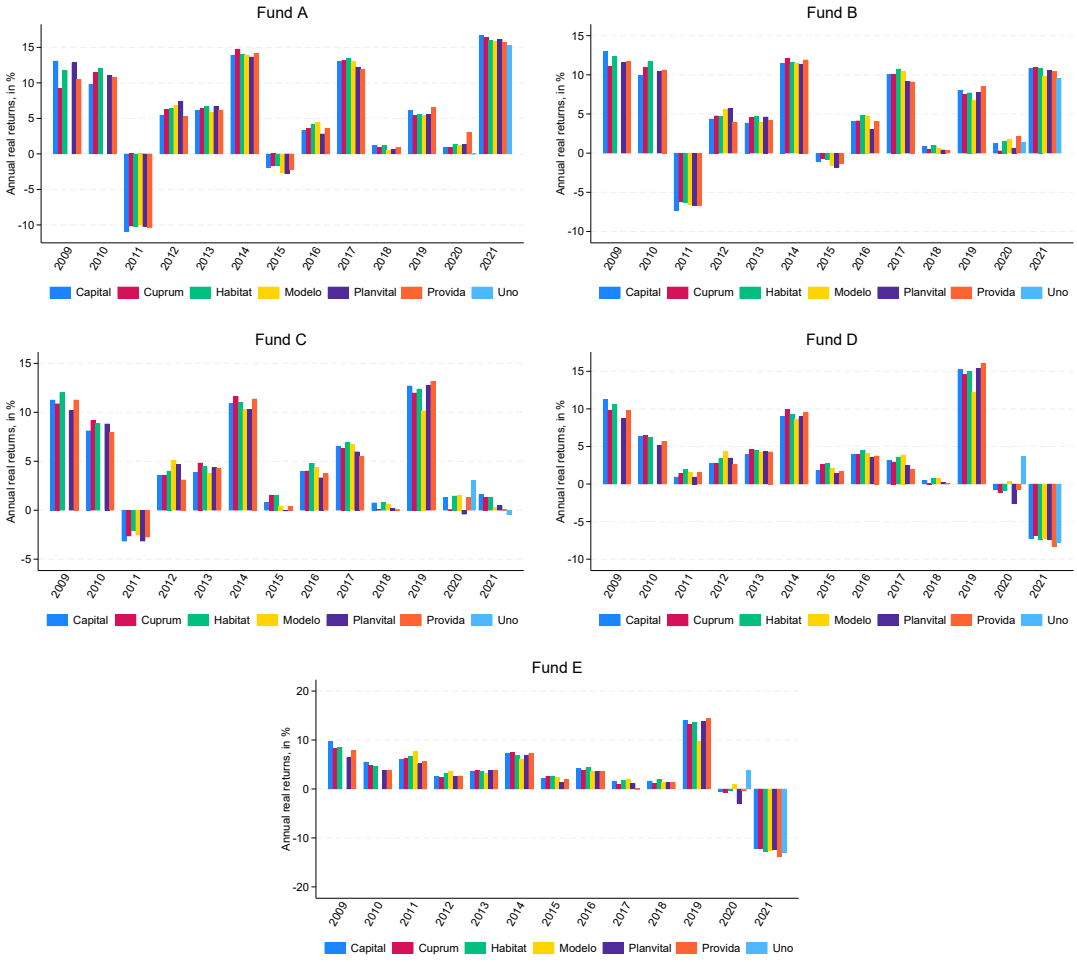
Table B1 — Distribution of fund returns over observational period (01/2008 – 12/2021)

	Mean	SD	p10	p50	p90	Obs.
Monthly nominal returns						
A	0.656	3.886	-3.543	0.767	5.027	1001
B	0.616	2.889	-2.374	0.619	3.936	1001
C	0.578	2.054	-1.559	0.583	2.846	1001
D	0.525	1.598	-1.028	0.589	2.140	1001
E	0.497	1.409	-1.187	0.608	1.839	1001
Monthly real returns						
A	0.381	3.926	-3.988	0.438	4.709	1001
B	0.341	2.937	-2.886	0.383	3.556	1001
C	0.303	2.107	-1.953	0.327	2.614	1001
D	0.249	1.647	-1.505	0.362	2.002	1001
E	0.221	1.429	-1.449	0.342	1.605	1001
Annual nominal returns						
A	8.229	15.304	-7.148	8.614	20.707	85
B	7.576	11.065	-3.522	6.983	17.669	85
C	6.997	7.095	0.218	6.652	17.448	85
D	6.325	5.172	-1.998	6.391	13.912	85
E	6.002	4.810	2.423	6.869	11.720	85
Annual real returns						
A	5.019	16.331	-10.640	6.154	17.144	85
B	4.328	12.297	-7.151	4.587	14.576	85
C	3.713	8.570	-3.723	4.279	14.360	85
D	3.022	6.573	-9.548	3.482	12.641	85
E	2.662	5.445	-1.297	3.682	7.341	85

Notes. We report the distribution of monthly and annual fund returns for all AFPs during our observational period (01/2008 - 12/2021) using administrative data from the Chilean Superintendency of Pensions. The real returns are calculated using information on the values of the Unidad de Fomento (UF) from the Central Bank of Chile.

Furthermore, we present the pairwise correlations in monthly nominal returns for all AFPs during our period of observation and find very highly correlated returns for all AFPs and all funds.

Figure B1 — Annual returns across AFPs and funds



Notes. This figure shows the annual real returns (in September of each year) across funds A-E, offered by each AFP in the market during our period of observation (Sep. 2008-2021). Two AFPs entered the market at later points, with AFP Modelo joining in September, 2010 and AFP UNO in September, 2019.

Table B2 — Bivariate correlations in monthly nominal returns, by fund (08/2008 - 12/2021)

	Capital	Cuprum	Habitat	Modelo	Planvital	Provida	Uno
				Fund A			
Capital	1						
Cuprum	0.998***	1					
Habitat	0.998***	0.998***	1				
Modelo	0.997***	0.997***	0.997***	1			
Planvital	0.998***	0.997***	0.998***	0.997***	1		
Provida	0.998***	0.999***	0.999***	0.997***	0.998***	1	
Uno	0.999***	0.999***	0.998***	0.999***	0.999***	0.999***	1
				Fund B			
Capital	1						
Cuprum	0.997***	1					
Habitat	0.998***	0.998***	1				
Modelo	0.997***	0.997***	0.997***	1			
Planvital	0.997***	0.996***	0.997***	0.997***	1		
Provida	0.998***	0.998***	0.998***	0.997***	0.997***	1	
Uno	0.998***	0.998***	0.998***	0.998***	0.998***	0.998***	1
				Fund C			
Capital	1						
Cuprum	0.996***	1					
Habitat	0.997***	0.996***	1				
Modelo	0.992***	0.990***	0.990***	1			
Planvital	0.996***	0.993***	0.995***	0.993***	1		
Provida	0.997***	0.995***	0.996***	0.990***	0.995***	1	
Uno	0.990***	0.992***	0.992***	0.994***	0.989***	0.991***	1
				Fund D			
Capital	1						
Cuprum	0.995***	1					
Habitat	0.994***	0.993***	1				
Modelo	0.989***	0.988***	0.985***	1			
Planvital	0.992***	0.990***	0.990***	0.988***	1		
Provida	0.995***	0.992***	0.993***	0.985***	0.992***	1	
Uno	0.973***	0.971***	0.975***	0.980***	0.964***	0.971***	1
				Fund E			
Capital	1						
Cuprum	0.987***	1					
Habitat	0.988***	0.987***	1				
Modelo	0.966***	0.963***	0.952***	1			
Planvital	0.987***	0.983***	0.981***	0.970***	1		
Provida	0.991***	0.988***	0.986***	0.965***	0.988***	1	
Uno	0.974***	0.974***	0.979***	0.986***	0.962***	0.975***	1

Notes. P-values are Bonferroni adjusted, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

C — Further information on the financial sophistication measures

C.1. Details on the EPS questionnaires

In our main analyses, we built on two sets of questions related to basic principles of household finance and the main characteristics of the institutional setting of the multifunds system introduced in 2002 in the Chilean mandatory defined contribution pension system. Our measure of financial literacy comes from a series of questions introduced in the module on planning and financial literacy of the 2004 Health and Retirement Study by Lusardi and Mitchell (2011, 2007). These questions are included in the surveys of 2006, 2009 and 2012. The questions are as follows, with correct answers in italics:

1. **Chance of Disease:** If the chance of catching an illness is 10 percent, how many people out of 1000 would get the illness? [open question, *correct: 100*]
2. **Lottery Division:** If five people share winning lottery tickets and the total prize is two million Chilean pesos, how much would each receive? [open question, *correct: 400.000*]
3. **Compound interest:** Assume that you have $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow – *more than $102*, exactly $102, or less than $102?
4. **Compound interest (exact):** Assume that you have $100 in a savings account and the interest rate you earn on this money is 2 percent a year. If you keep this money in the account for 5 years, how much would you have after 5 years? [open question, *correct: 110.41*]
5. **Inflation:** Suppose you have $100 in a savings account, which earns interest at 1% per year. You know that the inflation rate is 2% per year. After one year, will you be able to buy [more than today, exactly the same as today, or *less than today*] with the money in your account?
6. **Risk diversification:** Do you think the following statement is true or false: "Buying a single company stock is less risky than buying several shares in different companies with the same money." [true, *false*]

To capture the contributors' understanding of the Chilean defined contribution pension system, we also consider responses to six additional questions with a similar structure as the financial literacy questions described above. Only respondents that were ever affiliated with the AFP system receive the questions. These pension literacy questions are as follows, with

correct answers in italics:

1. **Contributions:** Do you know what percentage of income is / has been /would be deducted monthly for pension system contributions? [*Yes* / No] with Follow-up: What percentage? [open, *correct: 10%*]
2. **Fund types:** Do you know how many types of funds exist? [open question, [*Yes* / No] with Follow-up: How many? *correct: 5*]
3. **Diversification:** Do you know how many of these funds you can decide to put your savings in? [open question, [*Yes* / No] with Follow-up: How many? *correct: 2*]
4. **Commission payment:** Who pays the variable commissions? [*The member with their salary* / the member with their accumulated funds / the employer]
5. **Fund risk:** Of the five funds available, which one is the riskiest? [*A* / B / C / D / E]
6. **Fund returns:** Of the five fund types available, which one should have the highest return in the medium term, i.e. the next 10 years? [*A* / B / C / D / E]

Note that there are some survey-wave specific deviations that are worth describing to greater detail. Most importantly, the routing differs across waves. In waves 2015 and 2020, only respondents that indicate that they do know the number of funds receive the follow-up question on how much funds one can decide to put savings in. Hence, we treat respondents that reported to not know the number of funds available as also not knowing the number of funds one can invest in at the same time in both EPS 2015 and EPS 2020. The question on which of the five funds bears the highest risk is available for all AFP affiliates of EPS waves 2004, 2006 and 2009. In EPS 2012 and 2015, only new respondents receive this question. For panel participants that answered this questions in previous waves, we use their earlier responses to calculate the number of correct responses for the follow-up waves. The question on the fund with the highest return in the medium term is similarly included for all AFP affiliates only in EPS waves 2004, 2006, and 2009. In EPS 2012, only new respondents received this question. We similarly use panel participants' earlier responses to this question to calculate the number of correct responses for this survey wave.

The question on variable commissions consists of two parts. In the first part, the survey asks AFP affiliates about whether they know their AFP's variable commission for managing their funds. Respondents can indicate Yes/No/No charge (which would imply that their AFP does not collect any variable commission, which was not the case for any AFP). Respondents that answer "Yes" or "No" receive a follow-up question about how much their AFP charges,

which they can answer directly or select values from a showcard, respectively. Subsequently, both groups receive the question on who has to pay the variable commissions. Respondents that indicated that their AFP does not charge any commission do not receive the question on who has to pay the variable commission. We treat respondents in this group as answering incorrectly. Note that in EPS surveys 2004 and 2006, the variable commission questions were asked after the same sequence of questions on the fixed commissions, which were abolished with the pension reform of 2008. Using both the fixed commission and variable commission question gives similar as the ones reported in the paper, the results are available upon request.

Importantly, when we merge the administrative information (on a monthly level) to the responses from the irregularly scheduled EPS surveys, we first merge on the scheduled survey year level. Subsequently, we impute the information before and between survey waves under the assumption that respondents hold a latent and constant level of financial literacy and understanding of the institutional setting across survey waves.

C.2. Bivariate correlations across financial literacy and knowledge about the institutional setting

Table C1 presents the pairwise correlation coefficients between correct responses to our financial sophistication questions. Our results show a significantly positive correlation across all but one pair, with correct responses to the commission payment question being negatively correlated with the compound interest question, though the coefficient is rather small (-0.0140).

Table C1—Pairwise correlation across items of financial sophistication measures

	Financial literacy						Pension literacy					
	Chance of disease	Lottery division	Numeracy in invest. context	Compound interest	Inflation	Risk diversification	Contributions	Fund types	Diversification	Commission payment	Fund risk	Fund returns
Financial literacy:												
Chance of disease	1											
Lottery division	0.370***	1										
Numeracy in invest. context	0.164***	0.200***	1									
Compound interest	0.112***	0.134***	0.129***	1								
Inflation	0.130***	0.131***	0.0847***	0.0837***	1							
Risk diversification	0.148***	0.150***	0.0796***	0.0152***	0.159***	1						
Pension literacy:												
Contributions	0.125***	0.121***	0.0773***	0.0602***	0.0687***	0.0706***	1					
Fund types	0.154***	0.164***	0.147***	0.0966***	0.0894***	0.0942***	0.203***	1				
Diversification	0.0718***	0.0855***	0.0868***	0.0382***	0.0459***	0.0592***	0.0998***	0.328***	1			
Commission payment	0.0193***	0.0492***	0.0659***	-0.0140***	0.0287***	0.0283***	0.0531***	0.0916***	0.0485***	1		
Fund risk	0.167***	0.149***	0.148***	0.0635***	0.114***	0.118***	0.197***	0.408***	0.210***	0.103***	1	
Fund returns	0.116***	0.107***	0.122***	0.0610***	0.0875***	0.0766***	0.140***	0.307***	0.178***	0.0767***	0.620***	1

Notes. We handle missing values by pairwise deletion (i.e. using all available observations). P-values are Bonferroni adjusted, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Note that the scale reliability coefficients for items of both scales is low in our panel data set, with Cronbach's $\alpha = 0.4936$ for the financial literacy measure and Cronbach's $\alpha = 0.5886$ for the pension literacy measure. The Rasch-type one parameter item response theory model uncovers item difficulties for components of the financial literacy measure ranging from -0.6177 (easy, question on chance of disease), 0.1535 (risk diversification), 0.2380 (lottery division), 0.4084 (simple compound interest), 1.6029(inflation), to 3.9807 (very difficult, exact compound interest question), with a common discrimination of about 1.0489. This indicates that the scale covers a wide ability range, though one item primarily targets the extreme upper end of financial literacy. Similarly, we find a common discrimination of about 1.2950 for the measure on pension literacy, with two easier questions with item difficulties of 0.3296 (question on diversification) and 0.5670 (question on commission payment), several items of medium difficulty (1.1968 for fund returns, 1.4663 for fund types, 1.4907 for contributions), and one rather difficult item at 2.9981 (on fund types).

C.3. Within-individual changes in financial sophistication

A rather unique feature of the Chilean EPS is that it includes questions on financial sophistication in several waves of the survey. In line with analyses based on other countries, the number of correct answers to either set of financial sophistication questions does not differ substantially, with the majority of members in our sample holding the same level of financial literacy over time (72.01% of individuals, representing 70.71% of observations) and the same level of pension literacy (59.96% of individuals, representing 57.30% of observations). Nevertheless, using the within-individual variation in an individual-fixed effects specification allows us to see how *changes* in financial sophistication are correlated with provider switches, while controlling for unobserved individual-level confounders. Therefore, as we keep year-month fixed effects used in earlier estimations, the two-way fixed effects model shows the association of variation within individual and within time-periods — that is, we use the variation left relative to what we would expect given that individual, and given that time period.

Another concern regarding our main effects is unobserved provider-level confounders. For instance, some providers may provide a consistently higher level of service or spend more on advertising.[22] To account for time-invariant provider-level differences in the propensity

22. The advertisement channel appears to be a plausible channel, considering the contribution of Hastings, Hortaçsu, and Syverson (2017), which finds spending on advertisements to impede competition in the Mexican DC pension system significantly.

to switch providers, we employ provider fixed effects in our estimates. Hence, the results of these regressions provide information about the association of within-individual variation in financial sophistication with the propensity to switch providers, accounting for unobserved factors affecting all members similarly at a given point in time, and accounting for unobserved differences across providers that are constant over time.

We show the results of these regressions in table C2. The models in columns 1 and 4 show the association of the propensity to switch providers and within-individual changes in financial sophistication, including only potentially time-varying demographic controls (time to retirement (linear and squared), educational attainment, and marital status). Our results indicate an insignificant association between the within-individual changes in financial sophistication and the propensity to switch. However, when including the interaction of within-individual changes in financial sophistication and lagged fees, we find that an increase in financial literacy or pension literacy is associated with a lower propensity to switch providers for individuals affiliated with the cheapest provider, for whom excess fees are zero. The propensity to switch is higher for members affiliated with more expensive providers, even at the lowest level of financial sophistication. Importantly, the propensity to switch from expensive providers increases with larger within-individual changes in financial sophistication, as the positive interaction terms highlight.

Our results in columns 4 and 6 further include provider fixed effects. The coefficients are very similar to those including only time- and individual fixed effects, which suggests that time-invariant differences across fund providers do not drive our results.

Table C2 — Linear probability model on AFP switches using within-individual variation in financial sophistication

	(1) Changed AFP	(2) Changed AFP	(3) Changed AFP	(4) Changed AFP	(5) Changed AFP	(6) Changed AFP
Financial Literacy	-0.000110	-0.000340***	-0.000393***			
	(0.0000848)	(0.000104)	(0.000106)			
Financial Literacy × L.Excess fee over cheapest alternative		0.000482***	0.000609***			
		(0.000131)	(0.000137)			
L.Excess fee over cheapest alternative		0.00218***	0.00428***		0.00241***	0.00516***
		(0.000430)	(0.000557)		(0.000408)	(0.000552)
Pension Literacy				0.0000415	-0.000438***	-0.000494***
				(0.000118)	(0.000144)	(0.000145)
Pension Literacy × L.Excess fee over cheapest alternative					0.000719***	0.000793***
					(0.000143)	(0.000149)
L.Monthly real return		-0.000111**	-0.000105**		-0.000103**	-0.0000998*
		(0.0000495)	(0.0000495)		(0.0000516)	(0.0000515)
Socioeconomic controls	Yes	Yes	Yes	Yes	Yes	Yes
Controls for financial situation	No	Yes	Yes	No	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual FE	Yes	Yes	Yes	Yes	Yes	Yes
Provider FE	No	No	Yes	No	No	Yes
Observations	2155716	2138875	2138875	2073626	2057903	2057903
Individuals	15143	15138	15138	14305	14300	14300
Adj. R2	0.0198	0.0214	0.0230	0.0210	0.0225	0.0242
Adj. Within R2	0.0000538	0.00160	0.00174	0.0000426	0.00151	0.00171

Notes. This table reports the results of OLS regressions, including individual-, year-month-, and provider fixed effects. Standard errors are clustered at the individual level and in parentheses, * $p < 0.10$, ** $p < 0.5$, *** $p < 0.01$.

D — Robustness checks

D.1. Full conditional logits (McFadden choice models) with case-specific equations

This section includes the full results of the McFadden Choice models with case-specific variables. In the following tables we show the results for the alternative-specific variables (commission fees and returns) and case-specific variables (socioeconomic and demographic characteristics).

Table D1 — Heterogeneity in provider choices in conditional logits (McFadden choice model) with financial literacy interaction

	Alternatives	CUPRUM	HABITAT	MODELO	PLANVITAL	PROVIDA	UNO
Low financial literacy × Variable commission fee	-0.118***						
	(0.0225)						
High financial literacy × Variable commission fee	-0.184***						
	(0.0291)						
Asset-weighted medium-run real returns (-36m;-1m)	0.0563***						
	(0.00109)						
Female		0.155*	0.140***	0.982***	-0.184**	-0.161***	-0.500*
		(0.0865)	(0.0509)	(0.0688)	(0.0826)	(0.0456)	(0.299)
Attended tertiary education		0.685***	0.149***	0.239***	-0.548***	-0.515***	0.480*
		(0.0810)	(0.0525)	(0.0656)	(0.0925)	(0.0510)	(0.246)
Married		0.199**	0.0180	-0.466***	-0.0163	0.0464	0.117
		(0.0782)	(0.0505)	(0.0915)	(0.0820)	(0.0456)	(0.315)
Time to retirement		0.0260**	0.0229***	-0.0317***	0.0364***	0.0130**	0.0631
		(0.0105)	(0.00622)	(0.0100)	(0.0102)	(0.00541)	(0.0585)
Time to retirement (sq.)		-0.000101	-0.000358**	0.00276***	-0.00129***	-0.000341***	-0.000852
		(0.000265)	(0.000142)	(0.000198)	(0.000238)	(0.000123)	(0.00136)
Home ownership		0.0784	-0.0710	-0.112*	-0.0214	0.0285	-0.240
		(0.0734)	(0.0448)	(0.0600)	(0.0725)	(0.0406)	(0.253)
No fin. assets outside mandatory DC account		-0.102	-0.0484	0.288***	0.0926	0.0521	-0.0506
		(0.0724)	(0.0485)	(0.0775)	(0.0781)	(0.0443)	(0.295)
Log covered earnings		0.0000704	0.00227	0.0194***	-0.0117**	-0.00349	0.160***
		(0.00509)	(0.00278)	(0.00323)	(0.00469)	(0.00255)	(0.0293)
Log mandatory DC account balance		0.622***	0.0688***	-0.0383***	-0.0388***	-0.000210	-0.135***
		(0.0484)	(0.0120)	(0.0127)	(0.0112)	(0.00852)	(0.0327)
Holds default portfolio		-0.204**	0.176***	0.223***	-0.850***	0.170***	-1.966***
		(0.0812)	(0.0480)	(0.0603)	(0.0819)	(0.0438)	(0.459)
Constant		-11.86***	-1.452***	-2.755***	-0.314	0.548***	-3.546***
		(0.846)	(0.215)	(0.270)	(0.236)	(0.159)	(1.045)
Observations	13036502						
Clusters	15222						
Log Likelihood	-3107172.1						
Wald-test diff. fin. sophistication (p-val)	0.109						

Notes. This table reports the results of conditional logits (McFadden choice models) with case-specific controls (including gender, education, marital status, time to retirement (linear and squared), home ownership, holding financial assets outside the mandatory pension account, total covered earnings, account balance, and a dummy for default fund allocation). We classify respondents with low (high) financial literacy as those answering less than three (three or more) of the six financial literacy questions correctly, and classify respondents with low (high) institutional knowledge as those answering less than two (two or more) of the six questions on the pension system correctly. Standard errors are clustered at the individual level and in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.

Table D2 — Heterogeneity in provider choices in conditional logits (McFadden choice model) with pension literacy interaction

	Alternatives	CUPRUM	HABITAT	MODELO	PLANVITAL	PROVIDA	UNO
Low pension literacy × Variable commission fee	-0.0967***						
	(0.0230)						
High pension literacy × Variable commission fee	-0.215***						
	(0.0289)						
Asset-weighted medium-run real returns (-36m;-1m)	0.0548***						
	(0.00118)						
Female		0.258***	0.199***	1.019***	-0.129	-0.125***	-0.540*
		(0.0853)	(0.0524)	(0.0764)	(0.0839)	(0.0469)	(0.315)
Attended tertiary education		0.660***	0.154***	0.275***	-0.536***	-0.490***	0.475*
		(0.0806)	(0.0540)	(0.0725)	(0.0950)	(0.0525)	(0.261)
Married		0.175**	0.0241	-0.482***	-0.00706	0.0133	0.119
		(0.0765)	(0.0505)	(0.0948)	(0.0823)	(0.0457)	(0.312)
Time to retirement		0.0254**	0.0212***	-0.0320***	0.0345***	0.0144***	0.0886
		(0.0103)	(0.00635)	(0.0106)	(0.0105)	(0.00555)	(0.0619)
Time to retirement (sq.)		0.0000830	-0.000277*	0.00283***	-0.00119***	-0.000355***	-0.00158
		(0.000261)	(0.000149)	(0.000215)	(0.000246)	(0.000128)	(0.00144)
Home ownership		0.113	-0.0720	-0.115*	-0.0545	0.0156	-0.366
		(0.0733)	(0.0458)	(0.0657)	(0.0735)	(0.0416)	(0.263)
No fin. assets outside mandatory DC account		-0.0603	-0.0699	0.252***	0.0888	0.0367	0.00179
		(0.0716)	(0.0487)	(0.0825)	(0.0784)	(0.0445)	(0.309)
Log covered earnings		-0.00135	0.00336	0.0187***	-0.00814*	-0.00231	0.157***
		(0.00502)	(0.00285)	(0.00346)	(0.00470)	(0.00260)	(0.0313)
Log mandatory DC account balance		0.684***	0.0729***	-0.0250	-0.0679***	-0.00374	-0.148***
		(0.0501)	(0.0150)	(0.0165)	(0.0124)	(0.0103)	(0.0378)
Holds default portfolio		-0.200**	0.168***	0.121*	-0.878***	0.189***	-2.103***
		(0.0809)	(0.0491)	(0.0643)	(0.0841)	(0.0447)	(0.545)
Constant		-12.98***	-1.537***	-3.013***	0.0836	0.576***	-3.424***
		(0.881)	(0.263)	(0.323)	(0.257)	(0.188)	(1.194)
Observations	12449312						
Clusters	14333						
Log Likelihood	-2969920.7						
Wald-test diff. fin. sophistication (p-val)	0.00390						

Notes. This table reports the results of conditional logits (McFadden choice models) with case-specific controls (including gender, education, marital status, time to retirement (linear and squared), home ownership, holding financial assets outside the mandatory pension account, total covered earnings, account balance, and a dummy for default fund allocation). We classify respondents with low (high) pension literacy as those answering less than two (two or more) of the six questions on the pension system correctly. Standard errors are clustered at the individual level and in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.

D.2. Conditional logits (McFadden choice models) on split samples across financial sophistication

Instead of interacting the variable commission fees with the indicators for high- or low financial sophistication, the results in table D3 are calculated for the subsample of members with low or high financial literacy (columns 1 and 2) and low or high pension literacy (columns 3 and 4), respectively. The results are overall comparable to those presented in table 5 in the main body of the article.

Table D3 — Conditional logits (McFadden choice model) on provider choice: Sample splits across financial sophistication

	(1) Low FL	(2) High FL	(3) Low PL	(4) High PL
Alternatives				
Variable commission fee	-0.128***	-0.174***	-0.128***	-0.174***
	(0.0197)	(0.0272)	(0.0204)	(0.0289)
Asset-weighted medium-run real returns (-36m;-1m)	0.0598***	0.0517***	0.0548***	0.0541***
	(0.00151)	(0.00160)	(0.00145)	(0.00218)
Case-specific controls	Yes	Yes	Yes	Yes
Observations	7530487	5506015	7399047	5050265
Clusters	10008	7462	9651	6730
Log Likelihood	-1764979.1	-1338126.1	-1691534.2	-1260931.2
Chi-2	3828.1	2927.5	3799.2	2029.8

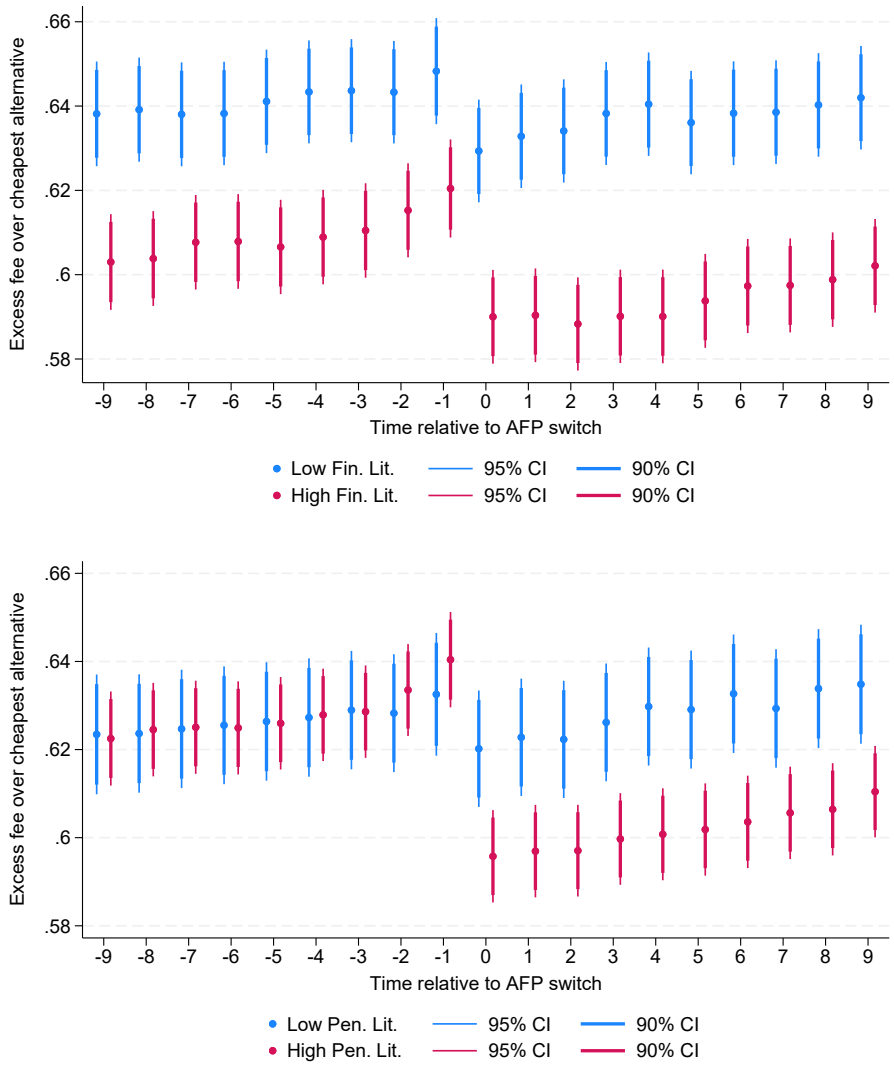
Notes. This table reports the results of conditional logits (McFadden choice models) with case-specific controls (including gender, education, marital status, time to retirement (linear and squared), home ownership, holding financial assets outside the mandatory pension account, total covered earnings, account balance, and a dummy for default fund allocation). We classify respondents with low (high) pension literacy as those answering less than two (two or more) of the six questions on the pension system correctly. Standard errors are clustered at the individual level and in parentheses, * $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$.

D.3. Fees around all provider switches

In contrast to the results shown in subsection 5.3, we do not center the data around the first provider switch only, but include all provider switches instead. Hence, we include all switches of those individuals that changed their providers multiple times, center around the switching date and show the mean fees paid 9 months before and after the switch in figure D1.

To consider differences in the fees paid around all switches for respondents across both high and low levels of financial sophistication, we estimate a similar regression to the one described in equation 2 in subsection 5.3, but include additional controls for the number of switches s per individual:

Figure D1 — Mean excess commissions paid around time of switch across financial literacy and pension literacy



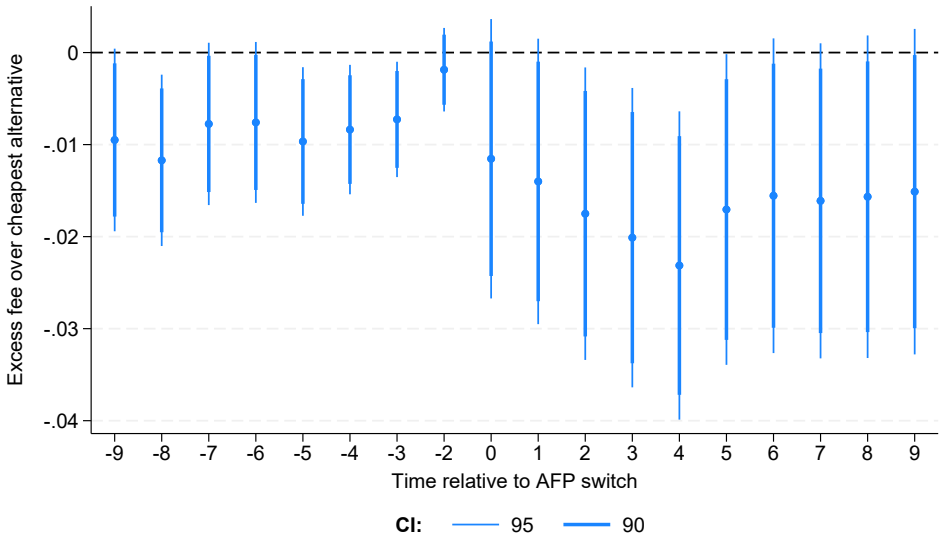
Notes. We center the data around the month of the AFP switches and show the mean excess fees paid up to nine months before and after the switch. We split the sample across the median number of correct responses to the financial literacy and pension literacy questions closest to the switching date. We include the estimated mean excess commissions around the switches and 95% confidence intervals.

$$Excessfee_{its} = \sum_{k} \beta_k \times FS_{is}^{k} + FS_{is} + \mu_s + \lambda_t + X_{its} + \varepsilon_{its} \tag{D.1}$$

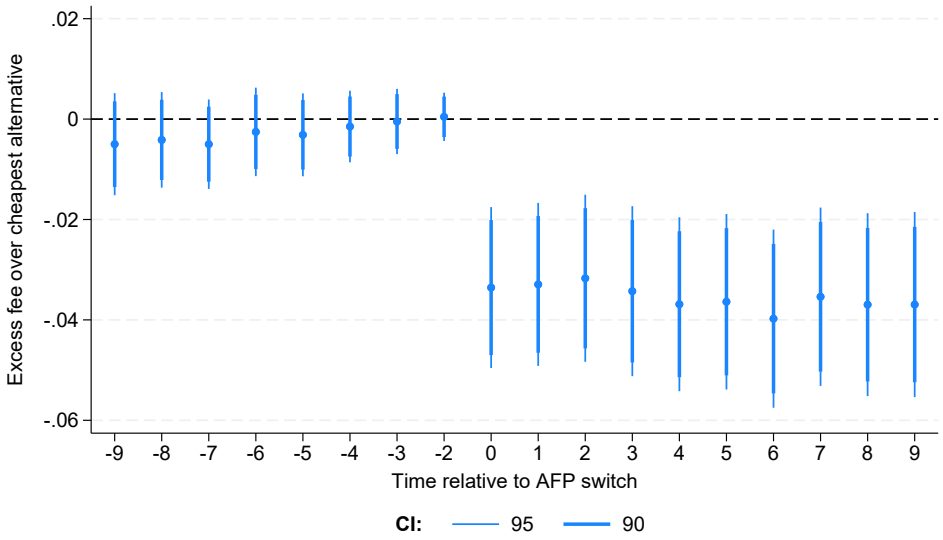
In figure D2 we show the coefficients of the interaction between either measure of financial sophistication and the relative distance to the switching date, relative to the period before the switch ($k = -1$). We cluster the standard errors at the individual level.

Figure D2 — Difference in excess fees paid around period of AFP switches across levels of financial sophistication

(a) Difference across financial literacy



(b) Difference across pension literacy



Notes. We center the data around all AFP switches of fund members in our data and show the mean excess fees paid up to nine months before and after each switch. We split the sample across the median number of correct responses to financial literacy and pension literacy questions, using the most recent information for each respondent. We show the coefficient of the interaction terms between the respective measure of financial sophistication and the distance to each switch. The regressions includes year-month fixed effects and controls for individual socioeconomic and demographic characteristics, including gender, educational attainment, time to retirement (linear and squared), home ownership, holding financial assets outside the pension system, log total covered earnings and account balances, and being in the default option. Standard errors are clustered at the individual level.