THE CHILEAN *MULTIFONDOS*: A CRITICAL ASSESSMENT AFTER TWENTY-THREE YEARS OF EXISTENCE

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ABSTRACT

The Chilean pension system has relied since 2002 on five funds (A through E) spanning different risk profiles—the so-called multifondos—,a scheme that is now coming to an end. Using 23 years of monthly returns, we examine two questions: (i) whether asset managers (AFPs) deliver statistically different risk-adjusted performance despite regulatory constraints that push them toward holding similar portfolios, and (ii) whether management fees bear any relationship to that performance. We measure performance using cumulative return (CumR) over Conditional-Value-at-Risk, a metric we denote as RAR. We find that AFPs are not interchangeable: Habitat outperforms rivals in 18 of 20 pairwise comparisons, while Provida fails to outperform any competitor. The fee-performance relationship is more nuanced: in Fund A, which is dominated by equities, fees and RAR show no discernible relationship; in Funds B through E, an inverse relationship emerges and strengthens as portfolios shift toward fixed income. Rather than regressing fees against returns, as is standard in the literature, we treat fees and performance as two rankings to be compared—an approach that, to our knowledge, is novel in this literature. We interpret the resulting pattern as suggestive of execution quality, rather than asset-allocation skill, driving performance differences.

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I. BACKROUND

The Chilean pension system is a privately managed, defined-contribution (DC) system established in 1981 during the Pinochet regime and designed by Jose Pinera, then Secretary of Labor. It is based on individual capitalization accounts managed by private asset managers known as AFPs (*Administradoras de Fondos de Pensiones*). Workers are required to make mandatory monthly contributions equal to 10% of their gross salary, up to a ceiling of approximately USD 3,900 per month as of early 2026. Initially, the system relied on a single investment fund, but a 2002 reform introduced the so-called *multifondos* scheme: five funds—known as A, B, C, D, and E—designed to offer different investment alternatives, ranging from Fund A (riskiest) to Fund E (most conservative). The underlying idea is that younger workers should gravitate toward Fund A, gradually shifting toward Fund E as they approach retirement. There are currently seven AFPs operating in Chile. Enrollment is compulsory for salaried workers upon entering the labor market; workers may choose their AFP freely (subject to some restrictions when they join the system) but eventually can select the fund that best suits their age and risk tolerance preferences. Upon reaching retirement age (65 for men and 60 for women), workers may draw down their funds either through periodic withdrawals managed by the AFP and recalculated annually (*retiro programado*); or by purchasing an inflation-adjusting annuity from an insurance company (*renta vitalicia*).

The Chilean model attracted considerable international attention, in part because of its conceptual appeal to free-market advocates: linking the size of one's pension directly to the savings accumulated over a working life carried an intuitive logic that traditional collective schemes lacked. At the same time, many pay-as-you-go (PAYG) systems in developed countries were coming under growing stress, driven by changing demographics—ageing populations combined with declining fertility rates—that were steadily eroding the ratio of active contributors to retirees. Considering this situation, the Chilean alternative offered what seemed an attractive solution: by shifting financial responsibility for retirement from the state to the individual, it promised to relieve government budgets of an increasingly burdensome long-term liability. Not surprisingly, many countries emulated at least partially the Chilean architecture. In Latin America, for example, Colombia, Mexico, Bolivia, and El Salvador all adopted variations of the Chilean model—as did a handful of nations elsewhere, including Hungary, Poland, Latvia, Bulgaria, and Estonia in Central and Eastern Europe, as well as Nigeria in Africa, and Kazakhstan in Central Asia.

Two salient features of the Chilean regulatory framework are worth noting. First, rather than employing portfolio-level risk metrics to monitor the risk exposures of the five *multifondos*, the regulation relies on strict upper and lower limits by asset class. Second, it enforces a penalty mechanism based on deviations from the industry average return: any AFP whose fund underperforms its peers by a sufficient margin must compensate its affiliates out of its own capital reserves (Superintendencia de Pensiones, 2020). Taken together, these two features have produced what the popular press and parts of the academic literature have described as herd behavior—a tendency for AFPs to hold similar portfolios, since tracking the market average is the dominant risk-minimizing strategy under such a regime (Fintualist, 2024).

If all AFPs hold similar portfolios, it is not unreasonable to assume—at least in principle, and in the absence of contrary empirical evidence—that they also deliver broadly equivalent returns, and that meaningful competition between them is limited. Under these assumptions, price becomes the only differentiating factor. It was arguably this diagnosis that led the regulator, in 2010, to introduce the *licitaciones* mechanism: a public auction mechanism in which new entrants to the system are automatically assigned to the AFP offering the lowest management fee, with a mandatory stay of 24 months before they may freely transfer to another provider (Superintendencia de Pensiones, n.d.). The logic implicit in this design is quite revealing—it tacitly conveys that all AFPs are sufficiently similar in terms of their returns that the management fee is the only variable worth considering when deciding which AFP to enroll in.

In recent years the Chilean pension system has come under growing criticism, as the pensions it began to deliver proved inadequate. Replacement rates of around 60–

70% are generally considered acceptable; the OECD average for mandatory pension schemes is approximately 63% (OECD, 2025). In Chile, by contrast, the median replacement rate for workers retiring between 2015 and 2022 was just 17% overall: 27% for men and 11% for women (Superintendencia de Pensiones & DIPRES, 2024).

In fairness, these disappointing outcomes cannot be attributed to a conceptual flaw in the system itself. Rather, they reflect three structural factors largely external to its design. First, Chilean workers contribute only 10% of their salary to their pension accounts, whereas most studies suggest that a minimum contribution of around 15–16% is necessary to achieve an adequate replacement rate (International Monetary Fund, 2021). Second, labor market informality remains widespread: contribution density—the fraction of a worker's active life during which contributions are actually made—stands at approximately 58% for men and 50% for women (Superintendencia de Pensiones, 2024). And third, life expectancy at retirement is notably high—approximately 86 years for men and 90 years for women (World Bank, 2021). Thus, women must finance a significantly longer retirement than men, a situation aggravated their contribution density is lower.

That said, in January 2025 the Chilean Congress approved a major pension reform that scrapped the *multifondos* system, and sought to replace it with a mixed architecture combining individual accounts with a defined-benefit component (Lockton, 2025; Caputo, 2026). Going forward, retirement savings will be allocated across ten target-date (generational) funds, with workers automatically enrolled in the fund corresponding to their age group, regardless of any other consideration (e.g., risk tolerance, existence of additional savings). The merits of this reform, or, more broadly, those of mixed pension systems and target-date funds, are clearly beyond the scope of this paper.

The *multifondos* are coming to a close after more than two decades of operation. With that as background, we seek to exploit this rich dataset—23 years of monthly returns across all AFPs and all fund types—to explore two questions: (1) whether there were any significant differences in performance among the AFPs; and (2) whether there was any relationship between fees and performance.

These are not rhetorical questions. Their answers will shed light on which features of the *multifondos* scheme worked well—and which did not—offering practical guidance to regulators and legislators in other countries with similar pension frameworks. Beyond that, addressing these questions may either validate or challenge the core assumptions underlying the *licitaciones* mechanism—an issue that is particularly relevant given that the new reform incorporates a *licitaciones* mechanism of its own.

The following section reviews the relevant literature, after which we describe our data and discuss our analyses and results. The conclusions are presented in the final section.

II. LITERATURE REVIEW

The Chilean pension reform of 1981, as mentioned before, represented the first country-wide effort to replace a traditional PAYG system with an individual capitalization scheme. Not surprisingly, since it served as a blueprint for reforms implemented in a number of other countries, it has been the focus of a number of studies.

Diamond and Valdes (1993) provided the first assessment of Chile's 1981 pension reform, focusing on two key points: the shift to a fully funded system and the privatization of the fund management function via personal accounts. They highlighted the critical role of the fiscal surplus built prior to the reform in financing the transition deficit, while noting that administrative costs under the new system would likely exceed those of the old PAYG structure. They concluded that although privatization successfully insulated pensions from short-run political pressures, the Chilean model would be difficult to replicate elsewhere without comparable prior fiscal consolidation.

Edwards (1996) provided a comprehensive account of the origins (and the rationale) of the Chilean reform. In short, the PAYG system of the time was heading for insolvency, and thus, the reform was a clear necessity to ease the financial strain of a country that was already in a difficult economic situation. He also pointed out that a by-product of the pension reform was that it contributed to accelerating the development of the domestic capital markets—something which, ironically, had not been considered as a potential benefit. Edwards also identified two weaknesses of the new system: first, that self-employed workers were not required to contribute to their pensions; and second, that the existence of a government-guaranteed minimum pension created a moral hazard problem, as low-income self-employed workers would have little incentive to make regular contributions. Finally, he argued that the minimum return requirement embedded in the regulation would foster herd behavior among AFPs.

We should emphasize that the investment regime of the *multifondos* relies on strict upper and lower limits by asset class and makes no use of any risk metric, either at the portfolio level or by individual asset class. The implications of this regulatory framework have attracted some attention. Berstein and Chumacero (2003) argued that, in the absence of these limits, portfolio returns would have been higher, since these constraints forced the AFPs to settle on sub-optimal portfolios. Schlechter et al. (2019) compared the performance of Mexican pension funds with those of the Chilean *multifondos* system. The comparison is illuminating because the Mexican regulatory framework mirrors the structure of the *multifondos*, with one important caveat: in addition to limits by asset class, the Mexican regulation incorporates a Value-at-Risk (VaR) constraint at the portfolio level. The authors found that while the Mexican funds were consistently ranked in agreement with their intended risk-return profiles, the Chilean *multifondos* exhibited erratic patterns—a result that they attributed to the absence of a portfolio-level risk metric in the regulation. More recently, Pagnoncelli et al. (2023) not only corroborated the erratic behavior of the Chilean *multifondos* documented by Schlechter et al. (2019), but also demonstrated that investors in the riskier *multifondos* had not been adequately compensated for the additional risk they had taken, when compared to the more conservative funds.

The herding behavior of Chilean AFP managers, a problem that Edwards (1996) had hinted could occur, is another topic that has been explored in the academic literature. Olivares (2008) was among the first to identify this pattern, which he attributed to the regulatory requirement to achieve a minimum return benchmarked against the industry average—an incentive that discouraged any deviation from peers' portfolios. Fernandez (2013) extended this analysis and confirmed that returns across AFPs were highly correlated. Later, Lopez and Walker (2021) further corroborated these findings, estimating pairwise return correlations between funds as high as 0.99 and portfolio overlaps between 80 and 90 percent. However, despite the pervasive herding, these authors identified statistically significant return differences across some AFP pairs.

Few authors have examined the relationship between management fees (*comisiones*) and fund returns in the AFP system, and the evidence has consistently pointed to the absence of a link between the two. Medina et al. (2013), using OLS regressions and Pearson correlations over the period 2002–2010, found, at best, a weak positive association for Funds A and B, and no statistically significant relationship for Funds C, D, and E. Sandoval and Germany (2018), based on the 2010–2016 period, also found no relationship between fees and performance, though they did note that two AFPs—Modelo and Habitat—had delivered returns above the industry average, which, in turn, they attributed to their lower fees. Leitch et al. (2022), applying both pooled OLS and panel methods to quarterly data over 2002–2022, likewise found no significant fee-performance relationship. Taken together, however, these studies share several important shortcomings: the time windows considered are relatively short given the two-decade lifespan of the *multifondos* system; the explanatory power of their regression models is strikingly low; and, perhaps more importantly, they based their analyses on average returns and not cumulative (geometric) returns over several years, which is really what determines the value of a pension.

In summary, notwithstanding the merits of the above-mentioned studies, two important gaps remain in the literature in relation to the *multifondos* system in Chile. First, although herding behavior has been documented in numerous studies (in relation to the similarity of their portfolios), the question of whether the AFPs have delivered statistically different cumulative risk-adjusted returns still remains unanswered. And second, while the relationship between fees and performance has been examined by several studies, the evidence remains inconclusive. This study attempts to contribute to the literature by filling the above-mentioned gaps.

III. THE DATA

The data for this study consists of monthly returns (in inflation-adjusted pesos, or UF) and management fees (*comisiones*) as reported by the *Superintendencia de Pensiones*. The dataset spans the full life of the *multifondos* system, from its creation in October 2002 through September 2025. Five AFPs have operated without interruption throughout this period: Capital, Cuprum, Habitat, PlanVital, and Provida. Those 23 years are long enough to be representative and eventful enough to be instructive—they include the subprime crisis (2007–2008), the Chilean social unrest of 2019, and the COVID-19 shock (2020–2022). Where two AFPs merged, we averaged their returns and fees before combining the series. PlanVital's pre-March 2004 figures, for instance, blend PlanVital S.A. and Magister S.A.; Capital's pre-April 2008 figures blend Santa Maria S.A. and Bansander S.A. Modelo and Uno, created in 2010 and 2019 respectively, are not included in the dataset: their shorter histories—notably missing the 2007/2008 subprime crisis—would make comparisons with the incumbent AFPs uneven.

IV. ANALYSES AND RESULTS

Basic Assumptions

Before proceeding, some important clarifications are needed. First, pensions, when all is said and done, are ultimately determined by the cumulative return over the relevant time horizon, not the arithmetic average of periodic returns (e.g., monthly returns) over that same window. In short, what matters is the ending balance in the retirement account—how one gets there is irrelevant. Hence, performance comparisons between two pension funds should be based on geometric returns, not arithmetic averages. In fact, the more volatile the returns, the more arithmetic averages "inflate" them, offering a misleading view of what a pension fund can actually deliver. The American Academy of Actuaries makes this point directly: “historical performance is conventionally measured with geometric averages, not arithmetic” (American Academy of Actuaries, 2019).

Second, this raises the following question: what is an appropriate time window for evaluating the geometric return in this context? The Chilean pension system, as already mentioned, is structured around five *multifondos*, and workers are expected to move gradually from the riskiest fund (Fund A) to the most conservative (Fund E). Given an average working life of thirty-five years—typical for the Chilean labor market—it is reasonable to assume that a worker spends, on average, seven years in each fund. This provides a natural, context-specific rationale for performing the analyses based on 7-year time windows. This choice is also broadly consistent with the horizon embedded in the CFA Institute's Global Investment Performance Standards recommendations, which require an initial track record of at least five years, extended annually to a minimum of ten (CFA Institute, 2019/2020). Seven years falls comfortably within that span.

Third, although most future pensioners will likely monitor only the balance in their accounts—which is driven by absolute cumulative return—a proper comparison of two funds' performance must rest on risk-adjusted returns. To this end, we rely on the Conditional-Value-at-Risk (CVaR) to measure risk, which is a superior metric to the standard deviation (volatility) of returns. The standard deviation does not measure risk; it measures dispersion, mixing favorable and unfavorable scenarios together (Sortino and van der Meer, 1991). The CVaR, by contrast, focuses solely on downside scenarios (losses), which is what investors care about most (Rockafellar and Uryasev, 2000). We therefore measure risk-adjusted returns as the ratio of cumulative return to CVaR, a calculation we discuss more fully in the next section.

Finally, the fee structure of the Chilean pension system deserves a special comment. Most investment vehicles charge a fee based on assets under management (AUM), which allows one to subtract the management fee from the gross return and obtain a clear, net-of-fees return for comparison purposes. Unfortunately, in the Chilean case this straightforward calculation is not possible.

Chilean workers make, in essence, two separate monthly payments: a pension contribution (10% of their salary), which goes into their individual retirement account, and a management fee (*comision*), based on a percentage of their current salary, which goes directly to the AFP. Thus, the management fee has no direct impact on fund returns; it simply reduces the worker's take-home pay. In other words, there is no straightforward way to incorporate the effect of management fees into a performance comparison; such comparisons must instead be based on gross returns, which is the approach taken by previous authors (e.g., Fernandez, 2013; Lopez and Walker, 2021). Fernandez (2013) has made the point forcefully: "Given that the relationship between gross and net returns is complex due to the way the latter are computed, the following analysis is based on the former." Therefore, in what follows, our analysis is based on returns without any adjustment for management fees.

Data Description

The data allow for seventeen overlapping 7-year windows (from October 2002–September 2009 until October 2018–September 2025), rolling one year at a time. All the analyses are based on this time-window structure.

Table 1 provides an overview of the *comisiones* charged by each AFP, based on the seventeen 7-year windows. A first observation is that fees vary considerably, both within and across AFPs. A second comment (not directly observable from this table, but worth reporting) is that fees have tended to decrease over time: the maximum values reported correspond to the early years of the pension system, while the minimum values correspond to more recent years.

Table 1: Fees charged by AFPs based on seventeen overlapping 7-year windows (2002-2025).		
AFP	**Management Fee**	
Capital	Mean	1.67%
	Min	1.44%
	Max	2.40%
Cuprum	Mean	1.71%
	Min	1.44%
	Max	2.49%
Habitat	Mean	1.52%
	Min	1.27%
	Max	2.22%
PlanVital	Mean	1.73%
	Min	0.77%
	Max	2.72%
Provida	Mean	1.71%
	Min	1.45%
	Max	2.34%

Note: The average management fee for each AFP is computed first for each of the seventeen 7-year windows. The table reports the mean, minimum, and maximum of these seventeen window-level values.

Table 2 complements this picture by describing the main performance attributes of each AFP and fund type. CumR refers to the cumulative return observed over a 7-year window and is expressed as a monthly return. CVaR is the Conditiona-Value-at-Risk, estimated with a 90% confidence level, based on the 84 monthly returns corresponding to a 7-year window. In short, it is the average of the lowest eight returns, and for convenience it is expressed as a positive number, although it reflects losses. The 90% confidence level used in the CVaR calculation is a common choice among practitioners (e.g., Ceren and Köksalan, 2014; Suhaimi and Rusyn, 2024; Krokhmal et al., 2002). Moreover, given that our samples consist of 84 monthly observations, a 90% confidence level is a natural choice: it implies a tail of approximately 8.4—rounded to 8—observations, which is large enough to yield a reasonably stable average. A 95% confidence level, by contrast, would leave only about 4 observations in the tail, too few to support a reliable and stable estimate of average worst-case losses. Finally, RAR refers to the risk-adjusted return, which we define as CumR / CVaR. This definition is in line with—or, more precisely, consistent with—the Stable Tail Adjusted Return Ratio (STARR) proposed by Martin et al. (2003); the key difference being that we use cumulative return (CumR) in the numerator rather than excess return over a risk-free rate. We should also mention that the Sharpe ratio, a metric sometimes used to assess risk-adjusted performance, is based on the standard deviation, which, as indicated before, captures dispersion rather than downside risk. Another issue with the Sharpe ratio is the lack of consensus on how to estimate the relevant risk-free rate (Gremm, 2016); the CVaR does not require this input, and therefore does not suffer from a similar ambiguity.

Table 2: Key metrics (averages) by AFP and fund type based on seventeen overlapping 7-year windows (2002-2025).

AFP		**Fund Type**				
		A	**B**	**C**	**D**	**E**
Capital	CumR	0.0034	0.0033	0.0031	0.0029	0.0028
	CVaR	0.0674	0.0500	0.0351	0.0257	0.0210
	RAR	0.0554	0.0710	0.1016	0.1458	0.1833
Cuprum	CumR	0.0034	0.0033	0.0033	0.0029	0.0027
	CVaR	0.0680	0.0500	0.0348	0.0256	0.0218
	RAR	0.0557	0.0721	0.1070	0.1531	0.1613
Habitat	CumR	0.0036	0.0036	0.0035	0.0032	0.0029
	CVaR	0.0670	0.0489	0.0341	0.0250	0.0211
	RAR	0.0591	0.0788	0.1164	0.1680	0.1854
PlanVital	CumR	0.0034	0.0033	0.0031	0.0027	0.0023
	CVaR	0.0673	0.0495	0.0341	0.0252	0.0198
	RAR	0.0551	0.0701	0.1018	0.1441	0.1743
Provida	CumR	0.0034	0.0032	0.0030	0.0027	0.0024
	CVaR	0.0678	0.0500	0.0350	0.0262	0.0224
	RAR	0.0549	0.0690	0.0976	0.1403	0.1546

Notes: (1) CumR refers to the cumulative return, over a 7-year window, expressed as a monthly return; (2) CVaR is the Conditional-Value-at-Risk (90%) based on monthly returns over a 7-year period (i.e., average of the lowest eight returns); (3) The CVaR is reported as a positive number although it reflects losses; (4) The RAR represents the risk-adjusted return, that is, CumR divided by CVaR; (5) The figures reported in the table correspond to the average of these metrics based on the seventeen overlapping 7-year windows permitted by the data (October 2002-September 2025).

Several patterns emerge from Table 2. First, cumulative returns, for all AFPs, follow a descending order from Fund A to Fund E, which is consistent with the expected risk-return relationship: riskier funds in the long term deliver higher returns than more conservative ones. Second, the CVaR decreases monotonically from Fund A to Fund E, confirming that risk does indeed decline as one moves toward more conservative funds. The third and most striking finding, however, concerns the RAR. If fund participants were being adequately compensated for risk, one would expect RAR to be broadly similar across fund types. Instead, the RAR increases when moving from Fund A to Fund E, in the case of all AFPs, suggesting that participants in riskier funds were not adequately compensated for the additional risk they took, while affiliates in more conservative funds were overcompensated relative to the risk actually assumed—a finding that Pagnoncelli et al. (2023) had already documented, albeit over a shorter time period and using different metrics.

Performance Comparison

To assess differences in RAR across AFPs for each fund type (A through E), we conduct pairwise comparisons using a paired Newey-West (NW) corrected t-test based on the corresponding seventeen matched differences. The paired design is appropriate because AFP portfolios are highly similar, so treating returns across AFPs as independent samples would be inadequate. Additionally, because the seventeen windows overlap—each one sharing up to six years of return data with its neighbors—the paired differences are serially correlated; we accordingly apply Newey-West standard errors with six lags. For each of the five fund types, all possible AFP pairs are evaluated, yielding four comparisons per AFP. Only pairs for which the NW-corrected test reaches statistical significance ($p < 0.05$) are reported. Note: the choice of six lags might appear somewhat arbitrary; however, it can be justified on the grounds that beyond six lags, the paired differences no longer share any underlying return data, so there is no reason for them to remain correlated. In any case, the results are robust to the choice of lag length—we obtain qualitatively similar findings using 2, 4, 6, and 8 lags, the four options explored.

Table 3 reports three statistics for each significant paired comparison: δ, the extent to which the superior AFP's RAR exceeds that of the inferior AFP; the corresponding p-value; and dominance, the percentage of the seventeen 7-year windows in which the superior AFP's RAR exceeded that of the inferior one.

Table 4 summarizes the main findings of Table 3. It reports the total number of wins for each AFP by adding up the wins across all five fund types. Habitat clearly emerges as the overall winner, appearing as the superior AFP in 18 of the 20 pairwise comparisons in which it participates across all fund types (90% of wins). Provida, by contrast, occupies the bottom position: it failed to outperform its counterparts in any of the 20 comparisons in which it participates. The remaining three AFPs fall somewhere in between.

Notwithstanding the argument made above regarding the need to base comparisons on risk-adjusted returns rather than absolute returns, a comparison based on the CumR can still be informative, and can serve as an informal robustness check. Would the patterns reported in Table 4 change if the CumR, rather than the RAR, were the chosen metric? Table 5 presents these results. Again, Habitat appears as the clear winner, with Cuprum and Capital sharing a distant second place, while Provida and PlanVital remain at the bottom. In summary, this admittedly loose check confirms that the patterns shown in Table 4 are not an artifact of the choice of metric.

It is worth noting that, despite holding highly similar portfolios—a consequence of the *multifondos* regulatory framework, which constrains each fund type's asset allocation within fairly narrow bounds and penalizes performance deviations from the market average—AFPs do not achieve similar returns. This suggests that execution-level differences across AFPs may play an important role in separating winners from losers. Exploring this topic, however interesting, lies beyond the scope of this study.

Table 3: Pairwise comparisons based on RAR (risk-adjusted returns) by AFP and fund type (2002-2025).

Fund	AFP Pair	δ	p-value	Dominance (%)
A	Habitat — Cuprum	1.060	0.000	100.0
A	Habitat — Capital	1.067	0.032	76.5
A	Habitat — PlanVital	1.071	0.016	88.2
A	Habitat — Provida	1.075	0.020	76.5
B	Habitat — Cuprum	1.094	0.000	100.0
B	Habitat — Capital	1.111	0.000	94.1
B	Capital — Provida	1.029	0.009	70.6
B	Habitat — PlanVital	1.124	0.002	88.2
B	Habitat — Provida	1.142	0.000	100.0
C	Habitat — Cuprum	1.087	0.000	94.1
C	Cuprum — Provida	1.097	0.000	94.1
C	Habitat — Capital	1.146	0.002	88.2
C	Habitat — PlanVital	1.143	0.000	100.0
C	Habitat — Provida	1.193	0.000	100.0
D	Habitat — Cuprum	1.097	0.001	100.0
D	Cuprum — PlanVital	1.062	0.048	70.6
D	Cuprum — Provida	1.091	0.031	70.6
D	Habitat — Capital	1.152	0.003	94.1
D	Habitat — PlanVital	1.166	0.000	100.0
D	Habitat — Provida	1.198	0.000	100.0
D	PlanVital — Provida	1.027	0.029	64.7
E	Capital — Cuprum	1.136	0.000	100.0
E	Habitat — Cuprum	1.149	0.000	100.0
E	Cuprum — Provida	1.044	0.007	76.5
E	Capital — Provida	1.185	0.000	100.0
E	Habitat — Provida	1.200	0.000	100.0
E	PlanVital — Provida	1.128	0.016	82.4

Notes: (1) *δ is the ratio of the average RAR of the superior AFP (listed first) to that of the inferior AFP (listed second), across the seventeen windows; (2) Dominance records the fraction of the seventeen windows in which the superior AFP's RAR exceeds that of the inferior AFP. Only comparisons significant at a 5% level are reported; (3) Of the 27 pairwise comparisons significant at the 5% level, 19 remain significant after applying the Benjamini-Yekutieli correction for multiple comparisons (family = 10 comparisons per fund type), and 18 remain significant under the more conservative Bonferroni correction. All comparisons involving Habitat in Fund B through Fund E remain statistically significant under both corrections without exception; the exceptions are concentrated in Fund A, where three of Habitat's four pairwise comparisons lose significance under correction, and among the more closely-ranked AFPs (Cuprum, Capital, and Planvital) in the other fund types. Provida's result — never showing the higher mean RAR in any of its 20 pairwise comparisons — is unaffected by any correction, as it does not depend on statistical significance.*

Table 4: Number of pairwise wins by AFP and fund type, based on statistically significant RAR differences ($p < 0.05$) reported in Table 3.					
	Number of wins				
Fund	**Habitat**	**Cuprum**	**PlanVital**	**Provida**	**Capital**
A	4	0	0	0	0
B	4	0	0	0	1
C	4	1	0	0	0
D	4	2	1	0	0
E	2	1	1	0	2
Total Wins	18	4	2	0	3
Total Comparisons	20	20	20	20	20
% of Wins	90.0%	20.0%	10.0%	0.0%	15.0%

Note: See notes to Table 3 for results under corrections for multiple comparisons (Benjamini-Yekutieli and Bonferroni). Habitat's win count and Provida's directional result are robust to both corrections; see Table 3 notes for the fund-type-level detail.

Table 5: Number of pairwise wins by AFP and fund type, based on statistically significant CumR differences ($p < 0.05$).					
	Number of wins				
Fund	**Habitat**	**Cuprum**	**PlanVital**	**Provida**	**Capital**
A	4	0	0	0	0
B	4	0	0	0	1
C	4	2	0	0	0
D	4	2	0	0	2
E	4	2	0	1	3
Total Wins	20	6	0	1	6
Total Comparisons	20	20	20	20	20
% of Wins	100.0%	30.0%	0.0%	5.0%	30.0%

Note: Of the 33 pairwise comparisons significant at the 5% level, 26 remain significant after applying the Benjamini-Yekutieli correction for multiple comparisons (family = 10 comparisons per fund type), and 26 remain significant under the Bonferroni correction. All of Habitat's significant wins in Fund B through Fund E survive both corrections, with one exception (Habitat vs. Capital in Fund E); the exceptions are otherwise concentrated in Fund A, where none of the four raw-significant comparisons survive under Benjamini-Yekutieli. Provida's single win (against PlanVital in Fund E) survives the Benjamini-Yekutieli correction but not the Bonferroni correction.

Fee and Performance

It might be tempting to look at the potential relationship between management fees and performance using linear regressions. Yet regressions capture covariation in levels rather than agreement in ordering, which is the feature we actually care about: do the AFPs with higher fees also rank best in performance? A regression may suggest a strong fit even when the rank ordering is poor, simply because the numerical magnitudes happen to co-move. In short, regression answers a different question from the one we are asking. A more appropriate approach, therefore, is to treat fees and performance as two rankings of the same five AFPs and compare them directly using rank-order metrics. To this end, we rely on three metrics, each capturing a different aspect of the consistency between two rankings: (i) the Hamming distance; (ii) Spearman's footrule; and (iii) Kendall's Tau rank distance. These metrics have been widely employed in the social sciences—for instance, to assess consistency in the rankings produced by different judges or referees, and in voting theory to compare preference orderings across voters. They have also been used in information retrieval to compare rankings produced by different search algorithms.

In brief, the idea is to rank the five AFPs by their management fee (from highest to lowest) and check whether they rank identically in terms of performance (highest to lowest RAR). This exercise is repeated for each of the five *multifondos* (A, …, E).

More specifically, and in reference to the three metrics:

(i) **Hamming distance**: This metric simply counts how many AFPs are in the wrong position when ranked by RAR relative to their position when ranked by fees. A value of 0 for a given AFP indicates that it is in the right position, and 1 otherwise. With five AFPs, the highest possible score is 5, meaning every AFP is in the wrong position. For example, the sequence (1, 2, 3, 4, 5) yields a value of 0. On the other hand, the sequences (5, 3, 4, 2, 1) and (3, 4, 1, 5, 2) both yield a value of 5, meaning all AFPs are in the wrong position. The sequence (1, 2, 3, 5, 4) yields a value of 2, since only the last two AFPs are swapped. The main limitation of this metric is that it registers only whether an AFP is misplaced, but not by how much (Hamming, 1950).

(ii) **Spearman's footrule**: Rather than just counting misplaced AFPs, this metric measures how far each AFP is from its correct position (i.e., its position when ranked by fees). For example, the sequence (3, 4, 1, 5, 2) yields $|3-1| + |4-2| +$

|1−3| + |5−4| + |2−5| = 10. The worst possible case is the fully reversed sequence (5, 4, 3, 2, 1), which produces the maximum value of 12. Compared to the Hamming distance, this metric is more informative: the penalty it assigns is proportional to the magnitude of the deviation with respect to the correct position (Diaconis and Graham, 1977).

(iii) **Kendall's Tau rank distance**: This metric takes a different approach. Instead of looking at each AFP individually, it counts the number of pairwise discrepancies between the two rankings. With five AFPs there are ten possible pairs, so the maximum score is 10. For example, consider the sequence (3, 4, 1, 2, 5). Compared to the correct order (1, 2, 3, 4, 5), four pairs are out of order: (3,1), (3,2), (4,1), and (4,2), so the Kendall's Tau distance is 4 (Kendall, 1938, 1955).

In short, higher values of these metrics are associated with higher levels of discrepancy in the rank order. To facilitate comparisons, we normalize all metrics by their maximum value. A value of 0 then reflects a perfect rank order, while values closer to 1 indicate maximum discrepancy from it. An additional benchmark against which to judge these rank-order metrics is a purely random scenario—that is, the average value each metric takes across all 5! = 120 possible permutations. This yields 0.80 for Hamming distance, 0.67 for Spearman's footrule, and 0.50 for Kendall's Tau.

Kendall's Tau is arguably the most reliable of the three metrics. The Hamming distance is quite rough: it treats any mismatch the same way, regardless of how far apart the two items actually are in the ranking. Spearman's footrule sits in between: it does account for the magnitude of displacement, summing how far each item is from its position in the reference ranking, but it lacks a direct interpretation in terms of concordant and discordant pairs. Kendall's Tau, by contrast, is based on the number of pairwise inversions between two rankings, capturing the full ordinal structure of the discrepancy. Kendall's Tau also has a well-established asymptotic distribution under the null hypothesis of independence, which provides the associated significance test with a firmer statistical foundation.

Table 6 reports the average value of the three metrics across the seventeen 7-year windows, by fund type. The table also shows the gap between the observed average distance and the benchmark (the value expected under total randomness). A paired-difference NW test assesses whether this departure from randomness is statistically significant.

Table 6: Fee–Performance Rank Agreement and Comparison Against a Random-Rank Benchmark, by Fund Type (A–E).

Fund	Metric	Benchmark	Observed Mean	Gap	NW t-stat	p-value	Sig. (5%)
A	Hamming	0.8000	0.7529	−0.0471	−1.16	0.2476	No
	Footrule	0.6667	0.6863	+0.0196	0.41	0.6846	No
	Kendall	**0.5000**	**0.5529**	**+0.0529**	**1.20**	**0.2304**	**No**
B	Hamming	0.8000	0.8000	+0.0000	0.00	1.0000	No
	Footrule	0.6667	0.7353	+0.0686	2.57	0.0102	Yes
	Kendall	**0.5000**	**0.5824**	**+0.0824**	**2.90**	**0.0037**	**Yes**
C	Hamming	0.8000	0.8353	+0.0353	0.92	0.3593	No
	Footrule	0.6667	0.7647	+0.0980	2.36	0.0182	Yes
	Kendall	**0.5000**	**0.6000**	**+0.1000**	**3.32**	**0.0009**	**Yes**
D	Hamming	0.8000	0.8235	+0.0235	0.45	0.6506	No
	Footrule	0.6667	0.7745	+0.1078	3.51	0.0005	Yes
	Kendall	**0.5000**	**0.6588**	**+0.1588**	**13.66**	**<0.0001**	**Yes**
E	Hamming	0.8000	0.9176	+0.1176	6.51	<0.0001	Yes
	Footrule	0.6667	0.8137	+0.1470	10.35	<0.0001	Yes
	Kendall	**0.5000**	**0.6294**	**+0.1294**	**5.12**	**<0.0001**	**Yes**

Notes: (1) Rank agreement between fee rankings (most to least expensive AFP) and risk-adjusted return rankings (from highest to lowest) is measured using Hamming, Footrule, and Kendall rank agreement metrics; (2) Benchmark values are the expected mean under random permutation (Hamming = 0.8000, Footrule = 0.6667, Kendall = 0.5000); (3) Gap = Observed Mean – Benchmark; (4) NW t-stat and p-value are based on Newey-West (6-lag) corrected standard errors across the seventeen overlapping 7-year windows; (5) Sig. (5%) indicates whether the NW p-value is below 0.05. Kendall's Tau rows (bolded) are treated as the primary metric.

In reference to Fund A, none of the three metrics differs significantly from its random benchmark (all $p > 0.20$). Hence, we find no evidence of a relationship between fees and risk-adjusted performance (RAR) for this fund type.

A potential, but speculative, explanation for the absence of a fee–RAR relationship in Fund A relates to the efficiency of equity markets, particularly foreign developed-market equities, which make up a substantial share of the holdings in this type of fund (the limit set by the regulator is 80% for equities). In efficient markets, security selection and market timing yield little persistent advantage, since available information is already reflected in prices. Hence, there is limited scope for AFPs to genuinely differentiate their returns through skill, that is, asset selection. As a result, fee levels—however they are set—have no consistent channel to correlate with returns, which are for all practical purposes random, so no systematic relationship with RAR should be expected in either direction.

In terms of Funds B through E, all three metrics point in the same direction—away from the random benchmark and toward the pattern expected under an inverse fee–performance relationship (cheaper AFPs performing better on a risk-adjusted basis), albeit by small deviations. The strength of this evidence is not uniform: it is modest for Funds B and C, and considerably stronger for Funds D and E. We interpret this as suggestive of a weak-to-moderate inverse relationship between fees and performance that strengthens as fund type moves from the highest-risk, equity-oriented fund (A) toward progressively more conservative portfolios, where fixed-income securities play a more important role. This tendency is consistent with the information in Table 1: Habitat—by far the best-performing AFP, as discussed above—charges the lowest average fee (1.52%). More tellingly, Provida and PlanVital, which occupy the bottom positions in Table 4, charge the highest fees (1.71% and 1.73%, respectively). This constitutes an informal validation of what Table 6 suggests regarding the fee–RAR relationship.

While causality cannot be established with the data at hand, we offer the following as a plausible, speculative account of the inverse fee–RAR relationship. Since AFPs charge the same fee across all five fund types, the fee is best understood not as a fund-specific price but as a fixed characteristic of the AFP—plausibly correlated with its overall operating efficiency—whose relevance to performance depends on the asset class in question. As the share of fixed-income holdings rises from Fund B to Fund E—with Fund E being most heavily concentrated in Chilean bonds, which have historically traded with wider bid-ask spreads and lower liquidity than equities—execution quality becomes considerably more relevant for realized returns. Consequently, a less efficient AFP is more likely to incur higher trading costs in these segments, which translates into poorer execution and lower RAR. Ordinarily, competitive pressure would force a less efficient AFP to lower its fee in order to retain affiliates; however, because affiliates rarely switch AFPs regardless of performance, this discipline is largely absent, allowing a comparatively high, fund-invariant fee to persist alongside weak execution and lower returns. Since this dynamic is concentrated in the more conservative, bond-heavy fund types, it may help explain the inverse fee–RAR relationship documented in Table 6. By the same logic, its absence in Fund A—where execution quality matters far less since this fund is dominated by equities, a more liquid market segment—is consistent with this interpretation. This account, of course, is a conjecture rather than a definitive explanation.

CONCLUSIONS

This study exploits an unusually long dataset—23 years of monthly returns and fees for all five AFPs that operated continuously since the creation of the *multifondos* system in October 2002—to revisit two questions that the existing literature had left only partially answered: (1) whether the *multifondos* deliver statistically distinguishable risk-adjusted performance; and (2) whether management fees bear any relationship to that performance. Two methodological choices distinguish our approach from prior work. First, we base our analysis on cumulative (geometric) returns rather than the arithmetic average returns used in earlier studies, since it is the cumulative return over time that ultimately determines the value of a worker's pension. And second, we measure risk-adjusted performance using the RAR—cumulative return over CVaR—rather than the Sharpe ratio. Unlike the Sharpe ratio, which relies on the standard deviation and thus treats gains and losses symmetrically, the CVaR focuses specifically on losses—what actually matters to a worker relying on these savings for retirement—while also avoiding the ambiguity of choosing the appropriate risk-free rate. Taken together, these choices allow us to address both questions more directly than the existing literature has been able to.

The central empirical finding is that AFPs do not deliver equivalent performance, notwithstanding the fact that the *multifondos* regulatory framework—through asset-class limits and a penalty for deviating from the industry average—pushes AFPs, fund type by fund type, toward holding very similar portfolios. Comparing AFPs within each of the five fund types and then aggregating across them, Habitat emerges as an unambiguous winner, prevailing in 18 of the 20 pairwise comparisons in which it participates, while Provida and PlanVital occupy the opposite end, with Provida failing to outperform any rival in any of its 20 comparisons. These findings hold whether performance is measured by RAR or by cumulative return alone, which rules out the possibility that this conclusion is an artifact of the choice of metric.

In reference to fees, we find that the fee-performance (RAR) relationship is more nuanced: it depends on the type of fund. In Fund A—whose holdings are predominantly equities, and therefore the closest to an efficient-market setting among the five—fees and RAR show no discernible relationship, which is consistent with the idea that security selection offers little persistent advantage in this segment. In Funds B through E, by contrast, all three rank-order metrics point toward the same pattern: a weak-to-moderate inverse relationship between fees and RAR that strengthens as the fund composition shifts toward fixed income. This tendency is informally corroborated by the fee and performance data taken together: Habitat, the best performer, also charges the lowest average fee, while Provida and PlanVital, the weakest performers, charge the highest.

We interpret, tentatively, the combination of these two findings—persistent AFP-level performance differences despite near-identical portfolios, together with an inverse fee-RAR relationship concentrated in the more conservative, bond-heavy funds—as potential evidence that execution quality, rather than asset-allocation skill, is what separates winners from losers among Chilean AFPs. Since regulation leaves little room for differentiation through portfolio composition, differences in trading costs, liquidity management, and operational efficiency emerge as the more plausible explanation, particularly in the less liquid, bond-heavy segments (Funds D and E) where execution quality matters more than in equity-dominated segments such as Fund A.

A further, related finding concerns the risk-adjusted return itself: for every AFP, the RAR rises monotonically from Fund A to Fund E, indicating that affiliates in the riskier funds were not adequately compensated for the additional risk they assumed, while affiliates in the more conservative funds were, if anything, overcompensated. This pattern, consistent with what Pagnoncelli et al. (2023) had documented over a shorter period, suggests that the risk-return trade-off embedded in the *multifondos* design did not operate as intended.

These results bear directly on the *licitaciones* mechanism, which rests on the premise that AFPs are sufficiently alike that fee is the only variable worth optimizing for. Our findings offer a mixed verdict on that premise—and the mix matters more than it might first appear, given who *licitaciones* actually affects. New entrants are, typically, young workers, who gravitate toward Fund A (and, to a lesser extent, Fund B) rather than the more conservative funds. Yet it is precisely in Fund A that fee is uninformative about performance, and only in Fund B that the inverse fee-RAR relationship is at its weakest. The segment of the market where cheaper AFPs do perform better—Funds D and E—is largely irrelevant to the population the *licitaciones* is designed to steer. Beyond this mismatch, the sheer magnitude of the Habitat-Provida performance gap suggests that AFPs are far from interchangeable to begin with—a premise the auction design does not accommodate, regardless of fund type. Given that the pension reform approved in 2025 retains a *licitaciones*-type mechanism within its new architecture, these findings carry a practical relevance that extends beyond the *multifondos* system itself—if anything, they suggest the mechanism's fee-based logic is weakest exactly where it is applied.

On methodological grounds, we would emphasize that treating fees and performance as two rankings to be compared—rather than as variables to be regressed against one another—proved more informative for the question at hand, since what ultimately matters for a regulator designing a mechanism like *licitaciones* is whether cheaper AFPs also rank better, not merely whether fee and return levels co-move.

Finally, it is worth noting that this dataset closes a chapter that cannot be reopened in its current form: with the 2025 reform replacing the *multifondos* with generational target-date funds, this study offers what is likely the last comprehensive assessment of the *multifondos* system as it operated for 23 years. We should stress, however, that our account of the inverse fee-RAR relationship remains speculative. What can be said with more confidence is that AFPs differ meaningfully in performance, and that fees are not simply noise, particularly for the more conservative fund types. The extent to which performance differences among AFPs can be attributed to execution efficiency combined with trading volumes remains an open question. Disentangling these potential structural drivers presents a compelling avenue for future research efforts.

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