Does organization design affect delegated investment performance?

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ABSTRACT

Using data on Italian occupational pension funds, we investigate the impact on investment performance of (*i*) the specialization of tasks assigned to each asset manager and (*ii*) the choice of hiring more than one asset manager to perform similar tasks to diversify management risk and/or foster competition (managerial diversification). We also evaluate the effect of the sponsor's inclination to redistribute financial resources among managers. We report two main results. First, task specialization increases active risk, but a corresponding increase in active return occurs only when plan sponsors are inclined to redistribute resources among mandates possibly to exploit market timing opportunities. Second, we do not detect any impact of managerial diversification on active risk and on active return unless the plan sponsors are prone to reallocate resources among managers. In this case, we document decreased active risk and active return.

JEL Classification: G11; G20; G23.

Keywords: Institutional investors, Return dispersion, Active management, Pension Funds.

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1. Introduction

In their seminal 1986 article titled 'Determinants of Portfolio Performance', Brinson, Hood, and Beebower describe the framework still used to attribute the production of returns to the different types of tasks performed by asset managers. According to the authors, a portfolio return originates from three activities. The first is the strategic (or long-term) asset allocation, i.e., the definition of the portfolio's objectives and the optimal asset class mix designed to meet them, usually summarized by a portfolio benchmark. The second, tactical asset allocation (or market timing), is the temporary under- or over-weighting of an asset class relative to its weight in the benchmark, as to exploit short-term imbalances in equilibrium values among different asset classes. The third, security picking, is the selection of investments within an asset class. Xiong et al. (2010) consider also the role of management costs and define 'active portfolio management return' the return due to timing, security selection, and fees.

In a delegated investment management scheme, like a pension plan, this picture is more complicated as two subjects perform the previous activities: the plan sponsor[1] – delegated by the investors participating in the scheme to manage their investments, and the asset managers[2] – appointed by the sponsor to exploit their supposedly superior ability at investing.[3] Here, the complexity stems from two issues: (*1*) the fact that a division of labor and responsibilities between sponsor and asset managers has to be defined; and (*2*) the circumstance that the sponsor has a duty to oversee the delegated asset managers' activities and to set the right incentives for them to deliver.

[1] Hereinafter, we use the term 'sponsor' to refer to what Stewart and Yermo (2008) define as "governing body or board', i.e. "the ultimate decision-maker, having overall responsibility for strategic decisions such as setting the investment policy, choosing the investment manager(s) and other service providers, and reviewing the fund's performance". However, it is worth mentioning that, especially in some countries and/or for certain types of delegated management schemes, the governing body does not coincide with the entity that sponsored the creation of the fund.

[2] Albeit we refer to "asset managers," our unit of analysis throughout the paper is the investment management firm rather than the individuals working in such firms.

[3] Pension funds can either carry on asset management activity in-house or outsource it to external firms. Even though the funds revert to different organizational arrangements, most of them do both, bringing in external asset managers to profit from skills that are expensive to build internally (Ambachtsheer 2016). Only the largest pension funds (e.g. CalPERS in the United States, PGGM in the Netherlands, Ontario Teachers' Pension Plan in Canada, AustralianSuper in Australia, and USS in the United Kingdom) have sufficient size to justify the build-up of an internal asset management structure. However, even these large funds employ third-party managers in some areas, particularly in less mainstream asset classes, where the potential allocation size is too small to justify the cost of building an internal team.

The above issues are particularly hard to address because an agency conflict intervenes between the sponsor (principal) and the asset managers (agents). The investment management process takes place in a framework where the asset managers (*i*) are better informed than the sponsor about their own ability and (*ii*) might be able to acquire superior information through an unobservable (by the sponsor) costly effort after their appointment, thus being in a position of delivering better results than the sponsor acting by herself. Furthermore, the outcome of the asset managers' activity does not depend only on their effort but also on external factors that are beyond their control. A contract that best helps the sponsor to attract asset managers of highest quality and have the selected ones behave properly afterwards is therefore difficult to design[4].

The contract between the sponsor and the asset managers is called the 'investment mandate' (hereinafter: the mandate). The mandate specifies asset managers' delegated tasks and their compensation, i.e. it defines all the terms of the asset managers' assignment. Each asset manager signs her own contract and is assigned a specific pool of assets. In a simplified setting – like the one we analyze in this paper, where the sponsor forgoes the possibility of in-house management of the plan assets but is responsible for the scheme strategic asset allocation - the sponsor may decide to employ only one manager to oversee the entire asset pool or she can hire multiple managers. If more than one manager is in charge of investing the fund's assets, the mandates can have different degrees of specialization. At one end of the spectrum, there are schemes portioned in sub-pools whose financial resources are invested in securities belonging to very specific asset classes (i.e. Japanese equities or European corporate bonds). At the other end, there are schemes whose asset managers can pick securities among a wider investment universe comprising various asset classes (i.e. a global or a European balanced brief).

[4] See, among others, Bhattacharya and Pfleiderer (1985), Starks (1987), Heinkel and Stoughton (1994), Admati and Pfeiderer (1997), Ou-Yang (2003) and Dybvig et al. (2010).

In such a framework, we contend that the analysis of the asset management process and of its outcomes should go beyond the contractual specifications of single mandates to include some relevant features of the way the process itself is organized. These features define what we call the *organization design* of the delegated investment management activity. Such organization design relies on both the formal organization structure of the sponsor - asset managers relationship and the width of the sponsor's managerial role.

As for the formal organizational structure of the asset management process, we are particularly interested in two dimensions:

(i) the degree of specialization of the mandates given to asset managers, a concept that Williams (1980) calls the 'diversification of style', and that we name *mandate specialization*, and

(ii) the choice of hiring more than one manager to perform the same task, a concept that Williams (1980) calls 'pure diversification' and that we name *managerial diversification*.

We refer to the above characteristics as the *investment management structure.*

As for the sponsors' role, we are mainly interested in her tendency to redistribute resources among asset managers and at the extreme fire and hire them – a trait that we call *sponsor involvement*.

We believe that organization design contributes to specify the labor division and responsibility attribution between the plan sponsor and the delegated asset managers. It also helps the sponsor build an appropriate incentive structure for the delegated asset managers.

Regarding the labor division, in our framework the plan sponsor is responsible for the long-term asset allocation, summarized by an investment benchmark. Albeit market timing and security selection activities are usually delegated to the asset managers, sometimes the sponsor plays an important role also in these portfolio management tasks. We claim that the formal organization structure of the process contributes, together with the contractual provisions stated in the mandate, to the specification of the sponsor's tasks and, consequently, the asset managers' as well. In particular, when asset managers are

assigned highly specialized mandates, their role in market timing becomes relatively less important because the number of asset classes they can invest in is narrow. In this case, the sponsor can perform some market timing activity as she reallocates financial resources across the mandates. In this case, sponsor involvement materializes potential profits that asset managers are not able to reap due to the specialized nature of their tasks. On the other hand, if the sponsor is not prone to act, the contribution of the market timing activity to value creation is limited to what asset managers are able to perform – which is restricted by their mandate constraints. [5]

As said above, organization design can be useful also for creating the right incentives for asset managers to behave properly. Sponsors have various tools at their disposal to perform the above duty. The obvious one is compensation schemes: performance fees can be helpful in this respect. Another tool is firing misbehaving managers. Firing decisions are usually expensive last resort methods though, because they require handling the transition between the fired manager and the one in charge of managing the freed assets. As an alternative to outright layoffs, sponsors can employ discretionary power in the allocation of the pension scheme resources among asset managers to stimulate proper behavior.[6] In this respect, having more than one asset manager with the same investment objectives can be a useful way to spur competition. Indeed, the comparative evaluation of managers becomes easier because the asset managers under scrutiny share the same objectives and the same investment constraints. Additionally, the threat of reducing the resources given to – and at the extreme the threat of firing – the poorly performing asset manager becomes more credible when the mandate is shared. Resource redistribution and outright asset transfers from one manager to the others are cheaper when the sponsor has at hand an already hired asset manager performing the same tasks of the manager that she wants to punish. A similar story holds when an asset manager's good work is to be rewarded by allocating increasing resources.

[6] Resource reallocation is a way to link results to asset managers' compensation because their management fee is calculated as a percentage of the value of the pool of assets they manage.

In this paper, we first investigate whether the scheme's investment management structure influences results from a risk/return point of view. Then, we examine if the sponsor involvement has an impact on risk and return and if this impact differs depending on the scheme's investment structure features.

As we are specifically interested in exploring the influence of the organization design of the investment scheme on the relationship between the sponsor and the asset managers, in our analysis we only consider the results coming from this interaction. This means that, rather than looking at the absolute risk-return profile (which largely depends on the strategic asset allocation decisions, pertaining solely to the sponsor), we focus on the risk-return dimensions explained by the relative or excess returns, i.e., the difference between the pension schemes' actual returns and those of their self-stated benchmarks. As they are based on the returns coming from the sole active asset management activity, consistent with Fischer and Wermers (2013), we call these dimensions *active risk* and *active return*, respectively.

To answer our research questions, we select a sample of Italian pension funds and examine their characteristics and results over the period from 1999 to 2015. The schemes included in our analysis are industry-wide second pillar defined contribution (DC) funds, whose aim is to allow participants to accumulate the highest possible balance in a way that is compatible with their tolerance for risk.

The Italian occupational pension funds investigated in this paper provide us with an ideal setup to test for the relevance of the investment management structure for several reasons.

First and foremost, the Italian pension fund sponsors act as principals in a delegated investment scheme, with external professional investment firms (asset managers hereafter) acting as agents. Even if asset management activity is outsourced to external firms, the pension fund's sponsor keeps the responsibility for the strategic asset allocation, summarized in a benchmark, whereas delegated asset managers are responsible for the investment strategy execution. Delegated managers in our sample are required to either replicate the benchmark's performance (passive investing) or try to outperform it (active investing). Different from the sample analyzed in Blake et al. (2013), due to regulatory

constraints, Italian plan sponsors do not have in house management teams at their disposal and therefore all delegated asset managers operate at arm's length. This simplifies the analysis of asset managers' incentives, as we avoid complications arising from them having heterogeneous relationships with the plan sponsor while competing for the same pool of resources.

Second, most of the existing literature has focused either focused on defined benefit (DB) schemes[7], mainly due to the longer time span that available information on them allows to exploit, or has analyzed schemes featuring heterogeneous characteristics in terms of sponsors' interests and goals.[8] The pension funds we are considering here are instead DC plans, which are not required to guarantee any performance to their participants (we discarded the observation when that was the case). Therefore, in our sample, sponsors' behavior is not influenced by the need to secure a certain benefit level to the scheme participants.[9]

Third, Italian law forbids asset managers to supply services other than investing: we can discard inefficiencies arising from favoritism due to the dual role of administering the plan while managing its assets, such as those documented by Pool et al. (2016).

Finally, the Italian pension funds have adopted very different management structures, mirroring the diversity in organizational arrangements found elsewhere, providing support for the generalizability of our results.

Due to the features that we described above, and even if the resulting sample size is relatively small, we think that the specificities of the Italian legal framework guarantee the homogeneity of many relevant

[7] Defined benefit schemes are also analyzed by Blake et al. (2013) and Rossi et al. (2018).
[8] For example, Del Guerio and Tkac (2002) include all tax-exempt clients of asset managers as plan sponsors, and Goyal and Wahal (2008) include both pension and nonprofit institutions sponsors.
[9] As Lakonishok et al. (1992) highlight, when DB schemes are considered, underfunding is an important issue, because the shortfall becomes the most senior claim on the sponsor. Moreover, the demographic characteristics of the participants' scheme could influence the fund trustees when establishing mandates guidelines and hiring/firing asset managers. For example, the progressive closing of UK corporate DB plans to new members and the consequent aging of their participants increased the pressure to have liabilities covered with the results of scheme investment activity. As documented by the Investment Management Association (2014), this demographic trend induced most UK corporate DB plans to adopt liability-driven investment strategies, partially shifting away from specialized managers. Since our study considers only DC plans, we can safely ignore these issues.

facets that might bias our analysis, allowing our investigation to focus on specific research questions without worrying that relevant elements have been left out.

Our analysis shows that higher mandate specialization, proxied by the number of mandates, is linked to greater active risk and to higher aggregate active return, consistent with Blake et al. (2013) findings. However, a more accurate investigation shows that it is fund sponsors' inclination to perform reallocation activity that drives the increase in active return. Therefore, net of cost, we find no proof of any superior ability of specialized asset managers, which could be due to asset managers being able to reap, on average, most of the benefits they generate through the fees they collectively obtain from the fund.

On the other hand, we find that having a higher number of managers competing for the same pool of money is detrimental to performance, since it reduces both active risk and active return. The reallocation activity carried out by the sponsor is again relevant: when sponsor involvement is low, managerial diversification has no effect on either active return or active risk.

In our investigation, we control for the presence of passive mandates. The increasing popularity of passively managed portfolios has led some sponsors to appoint both passive and active managers. When passive mandates are assigned to some managers, the sponsor implicitly restricts those managers from security picking. The extra value coming from this activity is therefore lost. A sponsor that makes such a decision reckons that the reduced fees paid to passive asset managers compensate for it. As expected, we find that the higher the percentage of resources delegated to passive mandates the lower the active risk. However, in our sample we do not find any significant impact on the active return. If we deemed using a risk-adjusted measure of excess return appropriate to gauge overall performance, the above results would suggest that passive mandates are a more efficient solution than hiring several active managers to execute the same task.

Finally, our data allow us to control for the presence of incentives linked to the fee structure. The relation between the presence of incentive fees and performance that we find is puzzling at first. While

it does not have any impact on active return, the presence of incentive fees reduces active risk. However, we also find that, in our sample, when incentive fees are present, the percentage paid as a flat management fee is lower. This result suggests that the incentive partly replaces the flat portion of the asset managers' compensation. However, the attainment of performance fees is uncertain. This could have an undesired result: to avoid any reduction in asset under management value and the consequent contraction in the management fee, risk averse asset managers in part rewarded with an incentive fee might tend to be more conservative than asset managers that are paid a (higher) flat fee only.

In conclusion, we argue that our paper makes at least two new contributions. First, we add to the literature on the relation between organizational arrangements and pension funds results. More specifically, our results – found in a different market – endorse those of Blake et al. (2013) and Rossi et al (2018) who have examined the relation between mandate-type and pension fund performance in the UK pension fund industry. However, unlike Blake et al. (2013), while we cannot observe directly the performance at the single asset manager level, we are able to measure the fund aggregate performance net of fees – which, in the end, is the relevant one for investors – and to perform checks on the fee structure.

Second and more important, we analyze the role of the plan sponsor under different organizational arrangements. Blake et al. (2013) do not account for such role and the existing literature on sponsors' behavior has failed to consider how the organizational arrangements might explain it,[10] implicitly assuming that the sponsor's role is limited to managerial oversight. In this literature, the resource redistribution decisions taken by the plan sponsors are a reward/punishment tool they employ to create the right incentives, while the market timing activity is delegated to the asset managers. Conversely, we show that, under certain investment management structures, the resource redistribution activity serves

[10] For example, see. Goyal and Wahal (2008), Del Guercio and Tkac (2002), Sialm et al. (2015); Pool et al. (2016), Christoffersen and Simutin (2017).

tactical asset allocation purposes as well. In such a case, the plan sponsor's actions can create value through market timing.

This paper proceeds as follows. Section 2 reviews the literature. Section 3 illustrates the various mechanisms through which the organization design of a delegated investment portfolio might affect its performance. Section 4 describes our empirical strategy. Section 5 discusses the data sources and describes the sample. Section 6 presents the empirical results and their economic interpretation. Section 7 concludes the paper.

2. Literature review

Our analysis builds on the literature, both theoretical and empirical, on delegated investment, which so far has examined various aspects of the topic.

Theoretical literature

The practice of delegating investment activity to more than one asset manager has been examined from a theoretical point of view by Sharpe (1981), Barry and Starks (1984), Shleifer (1985), Scharfstein and Stein (1990), and van Binsbergen et al. (2008). Their analysis aims at finding the appropriate way to benchmark managers' results to avoid coordination problems and closet indexing.

Sharpe (1981) claims that the hiring of multiple managers for managing a single portfolio is reasonable if it allows to exploit asset managers' specialized skills at investing in specific asset classes and/or to diversify away the mismanagement risk. Barry and Starks (1995) build on Sharpe (1981) to show that hiring multiple managers can also be a useful way to align investors' and asset managers' risk preferences.

Shleifer (1985) shows how competition among agents helps addressing the shirking problem by allowing sponsors to compare asset managers' observed behavior, a concept called 'yardstick

competition'. A potential limitation of this approach is the possibility that agents act in a similar way to reduce competition and mitigate rivalry. As Lieberman and Shigaru (2006) underline, imitation is a natural response to environmental uncertainty as it reduces risk. When competitors take similar actions, there is less chance that any firm will succeed or fail relative to others. Thus, imitation helps to preserve the *status quo* among them. Scharfstein and Stein (1990) examine the motivations behind the tendency to herd and suggest mechanisms to reduce it. Under certain circumstances, management firms ignore substantive private information due to concerns about their reputation, which could be compromised by negatives results, and decide to stick to their benchmark. Short-term incentive contracts can shift managers' focus from reputation to profits, making them more prone to make contrarian bets if their private information encourages them to do so. A compensation system based on a relative comparison can also force managers to avoid herding behavior: if top-ranked managers earn a disproportionately high fee, mimicking other managers will destroy the possibility of climbing the rankings to access higher compensation. This 'superstar effect' reduces herding tendencies (Rosen 1981).

Finally, Van Binsbergen et al. (2008) highlight how an ineffective coordination of the delegated managers' actions can result in misalignments of incentives and significant utility losses when the investment management structure consists of several specialized asset managers. They then specify how the adoption of a benchmarking procedure design can help to curtail such coordination costs.

Empirical literature

Empirically, the behavior of competing asset managers has been extensively analyzed by relating both fee structure and benchmarking to herding behavior. A vast literature on this topic exists, but it largely deals with retail mutual funds. Below, we limit our review to papers that examine pension funds' investment activity.

Blake and Timmermann (2002) link herding incentives to the fact that institutional investors often revert to peer benchmarking and find the distribution of UK pension fund managers' returns in the 1986-1994 period concentrated around the median fund manager, whose gross performance is close to that of a passive index matcher. Herding behavior has been observed not only at the manager but also at the fund level by Blake et al. (2017). They claim that such herding behavior directly stems from the institutional structure of the pension fund industry, as well as the incentives pension funds have to watch closely their peer group.

An investment bias induced by benchmarking has been documented by Christoffersen and Simutin (2017). In their work they find that, if pressured by strict oversight, asset managers strategically increase beta exposure to the benchmark while maintaining and even reducing tracking error volatility.

Del Guercio and Tkac (2002) analyze the relation between asset managers' performance and fund resource redistribution by the scheme sponsors. They find a concave flow-performance relation: a disproportionately higher return does not imply a proportionate reward in terms of new resources, but assets are withdrawn in case of poor short-term performance. Pension fund sponsors also appear to discourage active risk taking and tend to fire managers who substantially deviate from their stated investment policies.

By examining sponsors' hiring and firing decisions, Goyal and Wahal (2008) find that plan sponsors hire investment managers after superior performance and fire investment managers for many reasons, including underperformance, and show that this return-chasing behavior does not deliver positive excess returns thereafter. A possible explanation of such active role of plans sponsors is job preservation: 'if plan sponsors did not hire and fire, their *raison d'être* would be non-existent' (p. 1809).

As mentioned, the papers that are closer to our investigation are those authored by Blake et al. (2013) and by Rossi et al (2018). The former investigates he impact of specialization on performance and the latter the importance of asset managers' networks. The two contributions document a significant role of

these characteristics of asset managers. In particular, Blake et al. (2013) observe that many UK DB pension funds shifted to a multiple-manager setting during the 1980s and 1990s. They argue that this shift is consistent with the need to avoid costs coming to diseconomies of scale. The Sharpe ratio of plans managed by more than one asset manager is comparable to the Sharpe ratio of plans managed by one manager only, even if coordinating various asset managers is costly, as Sharpe (1981) explains, possibly because of the superior skills deployed by asset managers assigned specialized mandates. They also document that when funds convert to a multiple-manager environment by adding new managers to an incumbent, the improvement in overall performance is driven by the increased returns fetched by the incumbent. Other than this, they find a weak effect of competition on returns while observing a reduction in risk levels.

3. The impact of delegated investment management organization design on performance: competing explanations

Investigating the impact of the organization design of the delegated investment management activity on its performance is desirable and relevant because the way each dimension (namely: mandate specialization, managerial diversification, and sponsor involvement) can affect the performance is far from easy to predict.

As far as the mandate specialization dimension, its effect on active risk and active return is seemingly straightforward. The adoption of specialist mandates should enable the fund sponsor to access the superior expertise of dedicated managers whose core business is a specific niche of the investment universe. We should therefore expect in this case higher active risk and return at the manager level.

Regarding managerial diversification, if a plan sponsor hires more than one investment firm with the same mandate and Shleifer's (1985) yardstick competition argument prevails, direct competition will

push managers to exert more effort and pay more attention to performance. This is because the evaluation of the results will take place not only against a benchmark, but also against one or more competing players, which should more easily reveal variability in ability. In this case, we should observe an increase in active risk when the number of asset managers with the same mandate increases. The effect on active return is less obvious: on the one hand, competition is expected to intensify managers' effort and enhance the output (hence increasing active returns). On the other hand, investment management structures based on managerial diversification can lead to inefficient hiring and firing decisions, as Goyal and Wahal (2008) show, thus lowering the returns. However, if the sponsor's attempt to foster competition through managerial diversification results instead in unintended herding behavior, asset managers might prefer to keep their bets to a minimum and stick close to their benchmark, thus decreasing both active risk and active return. The impact of managerial diversification on active risk and return is therefore uncertain. Such ambiguity is even more pronounced if returns can be affected by the sponsor's reallocation interventions.

The impact of the investment management structure on the fund's active performance is even more ambiguous if the observed returns are at the fund level, as in our analysis, rather than at the manager level. Returns at the fund level depend also on the sponsor's resource reallocation activity that could mitigate or enhance managers' deviation from the benchmark. Therefore, sponsor activity cannot be ignored. The effect of sponsor involvement on fund returns is also far from straightforward because the objectives of resource reallocation can be different and attributable to at least two main reasons.

The first is linked to the sponsor's role in market timing: the logic for moving money from one mandate to another could be the desire to profit from market opportunities that can be seized by deviating from benchmark weights. This will occur primarily in investment structures where the sponsor is responsible for market timing, a situation that is consistent with a high degree of mandate specialization.

Here, the sponsor's resource reallocation should trigger an even higher active management risk and active return.

The second reason for reallocating resources is to enhance asset managers' incentives. Activism intended to generate more value implies greater risk taking, which might not be conducive to better returns because results also depend on out-of-control factors. Unless appropriate incentives are in place, asset managers find passive investing preferable in an asymmetric information context. Compensation schemes can help in creating the right incentives. However, effective incentives are difficult to design and implement. When negotiating the fee structure, for example, the sponsor could reduce the fixed management fee while introducing a performance fee. If the manager is not sure that a more active risk investment strategy will pay off – or if the participation rate is not adequately high – she could be tempted to forgo the expensive tasks implied by the active management. The incentive system linked to a predefined compensation scheme could be strengthened and enhanced by a reallocation of financial resources based on the managers' observed behavior. Since their compensation is in the first place a percentage of the value of the assets they manage, asset managers may exert more effort if they fear a reduction of their asset under management due to a resource reallocation operated by the sponsor to penalize unsatisfactory results. However, unless driven by a scrupulous performance attribution process, a resource reallocation mechanism could end up with perverse results. A reduction in managers' compensation due to a resource reduction could induce managers to stick to the benchmark instead of attempting to deviate from it to improve their relative performance, as results shown in Del Guercio and Tkac (2002) suggest. Therefore, resource reallocation among competing managers influences results through its impact on managers' incentives to behave and its impact is not predictable.

4. Research methodology

4.1. Empirical specification

To determine whether the organization design of a pension fund affects its financial performance, we estimate the following panel regression model, with robust standard errors clustered at the sub-fund level:

$$\begin{aligned} performance_{i,t} = \alpha + \boldsymbol{\beta}\ investment\ structure_{i,t\text{-}1} + \theta\ \text{FLOW\_REALL}_{i,t\text{-}1} + \boldsymbol{\gamma}\ sub\text{-}fund \\ characteristics_{i,t\text{-}1} + \\ + \delta\ active\ risk_{i,t\text{-}1} + \lambda\ \text{STDEV\_BENCH}_{i,t} + \boldsymbol{\tau}\ year_t + \eta_{i,j} + \varepsilon_{i,t} \end{aligned} \quad (1)$$

where

- $performance_{i,t}$ is the observed performance for the *i*th sub-fund in year *t*;
- $investment\ structure_{i,t\text{-}1}$ is the vector of investment structure variables, as observed at year *t*-1;
- $\text{FLOW\_REALL}_{i,t\text{-}1}$ is a dummy variable that signals the propensity of the sponsor to intervene in the allocation of pension fund assets as observed in year *t*-1;
- $sub\text{-}fund\ characteristics_{i,t\text{-}1}$ is a vector of control variables;
- $active\ risk_{i,t\text{-}1}$ is a measure of investment management activeness measured in year *t*-1;
- $\text{STDEV\_BENCH}_{i,t}$ is the standard deviation of the monthly returns of the sub-fund benchmark observed in year *t*;
- $year_t$ is a vector of time-specific dummy variables;
- α, $\boldsymbol{\beta}$, θ, $\boldsymbol{\gamma}$, δ, λ, and $\boldsymbol{\tau}$ are the regression coefficients;[11] η is the sub-fund fixed effect, and $\varepsilon_{i,t}$ is the disturbance term.

[11] The vectors $\boldsymbol{\beta}$, $\boldsymbol{\gamma}$, and $\boldsymbol{\tau}$ are comprised of the regression coefficients for the investment structure variables, the sub-fund characteristics variables, and the year dummy variables, respectively.

Our analysis is performed at the sub-fund level, because this is the minimum level at which financial performances can be observed. In fact, we do not have accurate information on single managers' returns, since these data are not disclosed by Italian pension funds and a database comparable to UK Combined Actuarial Performance Services (CAPS) does not exist for Italy. On the other side, we do not look at the overall pension fund level because most ~~of~~ Italian funds are established as 'umbrella funds'. They provide several (from two to six) distinct sub-funds to meet the different risk–return preferences of the scheme participants (hence, different returns can be observed in a given period, for a given pension fund). In this case, the plan sponsor manages the investment process design and its activity separately for each sub-fund, thus justifying the level of analysis adopted in this paper. More details on this issue can be found in Appendix A. Sub-fund returns are net of fees returns, as they have been computed from the monthly net asset value figures.

4.2. Performance measures

We refer to two types of performance dimensions, the *active risk* and the *active return*. Active return is calculated as the average of the difference between the *i*th sub-fund's monthly returns and its benchmark index return in year *t*, multiplied by 100: This measure is also called 'tracking error gain' i.e., TEG (Fischer and Wermers 2013).

$$\mathrm{TEG}_{i,t} = \mathrm{mean}(Return_{sub\text{-}fund} - Return_{benchmark}) \times 100 \quad (2)$$

We use two proxies for capturing active risk. The first proxy, TEV, is the sub-fund's 'tracking error volatility', [12] which is the usual way to proxy for investment management activeness. The tracking error represents the time series standard deviation of the difference between the sub-fund's monthly returns and its benchmark index return in year *t* (Ammann and Zimmermann 2001):

$$\text{TEV}_{i,t} = \text{stdev}(Return_{sub\text{-}fund} - Return_{benchmark}) \quad (3)$$

The tracking error volatility measures the dispersion of the portfolio's return that exceeds the one due to the portfolio's benchmark index return. We use the benchmark index self-reported by the pension fund for each sub-fund. If we employed a 'standard benchmark', as most of the literature does, we could not be completely sure that detected activeness is simply due to asset managers having been assigned a different reference point than the one used for measurement purposes.

Following Amihud and Goyenko (2013), we use an alternative measure of the activeness of the investment management based on the sub-fund's $R^2_{i,j,t}$ value, estimated by regressing the *i*th sub-fund's monthly returns on the returns of its benchmark for each year *t*, where R^2 is the proportion of the sub-fund's return variance that is explained by variation in the benchmark return. Consequently, the lower R^2, the greater the deviation of portfolio returns from benchmark returns and, therefore, the more active the asset management activity performed.[13]

To have a measure that, consistently with the tracking error measure, increases with investment activeness, we adopt the transformation 1 - R^2, which Amihud and Goyenko (2013) define as selectivity. Selectivity is measured as

[12] In this paper, in order to better distinguish it from the 'tracking error gain' measure, we follow Fisher and Wermers (2013) and prefer using use the expression 'tracking error volatility' instead of the more common 'tracking error'.

[13] As argued by Amihud and Goyenko (2013), mutual funds with R^2 values close to one are effectively 'closet index' funds, while extremely low values could be the result of estimation error. Our main results are qualitatively the same whether we winsorize or keep the outliers.

$$1 - R^2 = \frac{RMSE^2}{Return\ variance} \quad (4)$$

where *RMSE* is idiosyncratic volatility, that is, the volatility of the residual from the regression of the fund returns on the benchmark returns. However, R^2 and $1 - R^2$ can only range between zero and one, which could lead to biased estimation results. We avoid misspecifications in the empirical estimation by using a logistic transform of $1 - R^2$ that leads to our second dependent variable, $\text{ACTIVER2}_{i,t}$, calculated as

$$\text{ACTIVER2}_{i,t} = \ln\left(\frac{(1\text{-}R^2_{i,t})}{1-(1\text{-}R^2_{i,t})}\right) \quad (5)$$

As Petajisto (2013) points out, despite proxying for a similar phenomenon, TE should be preferred to ACTIVER2 as a measure of active risk. For example, if the asset manager is timing a market by temporarily holding a large amount of cash, the active risk generated by this strategy would be captured by the TE measure but not by the ACTIVER2 one, which is based on the regression residuals. [14]

4.3. Organization design variables

As mentioned, we define organization design the formal organization structure that features a pension fund (i.e. its investment management structure) and the sponsor behavioral traits that influence the structure workings (i.e. the scheme sponsor involvement).

[14] Unfortunately, we do not have information on our sample schemes' holdings. Therefore, we are not able to profit from measures that need holdings as inputs to proxy for managerial activism such as the Active Share of Cremers and Petajisto (2009), the active weight measure of Doshi et al. (2015) and the holding horizon measure of Lan et al. (2018).

We evaluate the investment management structure of a pension fund along two different dimensions (measured at *t*-1 to mitigate endogeneity concerns).[15] First, we look at the degree of *specialization* of the investment mandates, proxied by the number of mandates, $MNDTS_{i,t-1}$, assigned by the fund sponsor to the *i*th sub-fund at year-end *t*-1. A more specialized investment structure would require a larger number of mandates (for each of the asset classes in which the portfolio is portioned) and, in most cases, of asset managers.[16]

We also consider the intensity of *managerial diversification,* proxying it with the Herfindahl–Hirschman index (HHI) of the asset managers' assets under management, $HHI\_MGRS_{i,t-1}$, for the *i*th sub-fund in year *t*-1.[17] The HHI has the advantage of capturing not only the number of asset managers in a sub-fund, but also the way resources are allocated among them. Then, to make the empirical results' interpretation straightforward, we transform the variable so that its value increases with the level of diversification. We thus measure *managerial diversification* with the transform $1\text{-}HHI\_MGRS_{i,t-1}$.

Finally, we claim that an important variable that influences the results of the investment management activity is the propensity of the sponsor to intervene in the allocation of pension fund assets. Sponsors might retain the right to modify the resource and flow allocations, deviating from the original allotment in the mandate, and might or might not take advantage of this right. We call this attitude *sponsor involvement*. We consider a sponsor to be involved in the investment activity either if the sponsor declares to be ready to perform a resource redistribution activity if needed or if she actually does it. The information available in the pension funds' annual reports makes it possible to classify pension funds in two categories: those who retain the right to modify the resource and flow allocations and those who do

[15] It is worth mentioning that the investment management structure variables and other fund-specific variables are all evaluated at year-end. Consequently, *t*-1 denotes the investment management structure or other fund characteristics at the beginning of year *t.*

[16] If a specialization structure aims to exploit asset managers' specific skills, we should expect the managers to specialize on different asset classes; hence, different mandates are assigned to different managers.

[17] As an example, if the resources of a sub-fund are assigned to a single manager (i.e. there is no competition), the HHI is one; if the resources are assigned to four managers (i.e. there is significant competition), the HHI is 0.25 (provided that each manager is allocated the same amount of resources), and so forth.

not. If a sponsor is engaged in the resource reallocation we assign the value of one to the dummy variable $FLOW\_REALL_{i,t}$. We describe in detail the way we built this variable in Appendix B.

It is worth mentioning that the asset reallocation performed by the sponsor can occur in different ways. For example, the sponsor could decide to distribute the financial flows coming from new contributions according to an allocation rule that differs from the initial one. The sponsor can also reduce the assets under management originally allotted to an incumbent manager (who, in the extreme, the sponsor could fire) and reallocate the freed assets among other retained or newly hired managers. When reallocation implies the transfer of assets from one manager to another – which typically happens when bad results are punished by either firing or reducing the poorly performing manager's responsibilities – the process could entail a transition cost. The manager assigned the assets might not be as free to redeploy them as the manager would have been had he or she been given money. Sometimes sponsors hire 'transition managers' who are in charge of smoothly managing the changeover.

Moreover, the sponsor could reallocate the fund assets across either the existing mandates or the asset managers. In the first case, the sponsor deviates from the initial allocation of resources across mandates (and asset classes), allotting the resources originally destined to a manager performing a certain task to another manager with a different assignment (a concept we call *redistribution across mandates*). In the second case, the sponsor redistributes resources among managers assigned to similar jobs (a concept we call *redistribution among managers*). The decision to redistribute resources to managers performing different tasks could be the result of market timing strategy: the sponsor could intend to deviate from the initial strategic asset allocation to achieve short-term overperformance. On the other hand, a reason for redistributing resources among other managers performing a similar task, keeping the same asset allocation, could be the will to sanction poorly performing managers and/or to enforce the managers' incentives with a (credible) punishment threat. Unfortunately, while the information available in pension funds' financial reports allows us to identify sponsor involvement, it is often difficult to establish whether

reallocation activities take place among managers, across mandates, or both. This occurs, for example, when the same manager has been assigned different mandates: public information that part of the manager's resources is given to other managers is available, but we may not have details on the mandates towards which this money was originally intended to be channeled.

Therefore, we interact our measure of sponsor involvement in the investment activity with the number of mandates and the HHI measure to check if the propensity to be active has a different effect, if any, depending on the investment management structure features. For example, multiple specialized mandates could imply market timing activity performed by the sponsor, whereas, if the sub-fund has assigned only a single mandate to multiple managers, the fund sponsor being active could imply higher credibility of punishment in case of bad performance.

4.4. Other variables

We include a number of additional control variables (also measured at *t*-1 to mitigate endogeneity concerns) to control for sub-fund–specific characteristics. First, investment mandates' terms and provisions influence managers' behavior. While we do not have detailed data on the compensation structure of all mandates, the information retrieved from pension funds' annual reports and investors' filings allows us to identify the sub-funds that adopted incentive fee structures: Italian law specifically requires sponsors to warn participants about potential increases in costs due to the need to pay incentive fees to the asset managers. We denote these with $\text{INCENT\_FEES}_{i,t\text{-}1}$, a dummy variable that equals one if the sub-fund's managers are remunerated with an incentive fee on top of a management fee and zero otherwise.

Following the literature, we include the variables $\text{SIZE}_{i,t\text{-}1}$ and $\text{AGE}_{i,t\text{-}1}$, the natural logarithm of assets under management and the number of operating years of the *i*th sub-fund in year *t*-1, respectively. Other variables include $\text{TURNOVER}_{i,t\text{-}1}$, the minimum between the amount of securities bought and securities

sold by the sub-fund, divided by assets under management, and $PASSIVE\_SHARE_{i,t-1}$, the percentage of the sub-fund's assets under management allotted to passive investment mandates. We also control for the level of active risk in the previous period by adding either $TEV_{i,t-1}$ or $ACTIVER2_{i,t-1}$. Finally, to control for time-specific effects, we include a set of year dummy variables. We also include the variable $STDEV\_BENCH_{i,t}$, the standard deviation of the monthly benchmark's returns, to account for specific financial market conditions. All the variables are defined in Appendix C.

5. Data sources and sample characteristics

We use a hand-collected data set of Italian occupational pension funds for which accounting, benchmark, financial performance, and financial management structure information is available. Most of the information is retrieved from the funds' websites, while benchmark returns are collected from Bloomberg and Datastream.

We want to select sub-funds whose asset managers perform comparable activities. Sponsors' result evaluations should also follow a comparable process. We therefore want asset managers' performances to be benchmarked to an index that is a real reference point. We thus exclude from our data set minimum guaranteed return sub-funds, since the aim of the delegated manager is to reach the minimum guaranteed return. For such sub-funds, the risk of not reaching the minimum threshold is very often shifted to the asset manager, who is paid a distinct fee to cover that risk. Furthermore, in this case, the disclosed benchmark is merely suggestive and is not the main factor used to evaluate the asset manager's performance.

For the same reason, we also exclude sub-funds whose resources are allotted even partially to total return mandates and sub-funds whose organizational arrangements deviate from a homogeneous benchmark-based evaluation of investing activity, for example, because a single manager is in charge of hedging exchange rate risk, tail risk, and so on. We thus end up with an unbalanced data set consisting

of 58 sub-funds from 26 pension funds, from 2000 to 2016, for a total of 554 sub-fund–year observations.[18]

As mentioned, the pension funds in our data set exhibit different levels of sophistication regarding the investment solutions offered to their participants. They are typically established as 'umbrella funds' and provide distinct sub-funds to meet the different risk–return preferences of their customers.

More important for our analysis, sub-funds can exhibit different investment management structures. The management of financial resources can be delegated to one asset manager via a single mandate as well as to various managers while resources can be managed along one or more mandates. Similarly, some cases show clear evidence of sponsor involvement, which is absent in other sub-funds. Examples of investment management structures are reported in Appendix D.

6. Empirical results

6.1. Descriptive and bivariate analysis

Table 1 reports sample descriptive statistics for the financial performance of the sub-funds and their benchmarks (Panel *A*), our investment management structure variables (Panel *B*), and the main characteristics of the funds and sub-funds (Panel *C*). As far as the investment management structure variables, the average sub-fund comprises two mandates and employs almost three (2.86) asset managers. Interestingly, around 60% of the sub-funds have a single mandate and about one-third (31.5%) employ a single manager. A total of 31.6% of sub-funds exhibit sponsor involvement. As far as the other characteristics, the average value of a sub-fund's assets under management is 311 million euros (while the average value of assets under management for pension funds in the sample is 776 million euros) and

[18] As in our main multivariate analysis, we evaluate sub-fund financial performance against lagged sub-fund characteristics. We present descriptive statistics on the sample of sub-fund–year observations that enter all the multivariate analyses, which total 471. For the same reason, the sub-funds' performances refer to the period from 2001 to 2016, whereas the sub-funds' investment structure and other characteristics refer to the period from 2000 to 2015.

the average age is 4.7 years for sub-funds and 5.9 years for their funds. Interestingly, only 7%, on average, of pension fund assets are managed according to a purely passive benchmark-replicating strategy, while incentive fees are applied to about half of the sample sub-funds.

Insert Table 1 approximately here

The correlations among the main variables are shown in Table 2. Table 3 shows the results of *t*-tests for the equality of our variables' means. In column 1 of Table 3, we compare sub-funds with a high degree of investment management specialization, that is, sub-funds with more than two mandates (identified with the dummy variable MORE_THAN_2_MNDTS = 1), with sub-funds featuring low investment management specialization (with MORE_THAN_2_MNDTS = 0). We also contrast, in column 2, sub-funds with high and low degrees of managerial diversification, that is, sub-funds with more than three managers (identified with the dummy variable MORE_THAN_3_MGRS = 1), versus those with fewer than three managers (dummy variable MORE_THAN_3_MGRS = 0). Lastly, in column 3, we compare sub-funds whose sponsors we consider active (i.e. dummy variable FLOW_REALL = 1) with sub-funds whose sponsors did not undertake any activity aimed at reallocating resources (i.e. dummy variable FLOW_REALL = 0). As expected, we find that specialization and managerial diversification are correlated and are more common in large sub-funds. In addition, consistent with Myners' (2001) evidence, resources are reallocated more frequently in pension funds employing more concurrent managers and more mandates.

The results in both Tables 2 and 3 display a strong correlation between the number of mandates (MNDTS) and the number of asset managers (the variable MGRS) or the HHI-based measure (1-HHI_MGRS). This result is not surprising: as the number of mandates increases, sponsors tend to hire more managers. Including both variables in a regression could raise multicollinearity issues. To minimize

these, we employ the term 1-HHI_MGRS instead of MGRS as our proxy for the managerial diversification dimension, because it exhibits a lower correlation with the MNDTS variable.[19]

As far as our main research question is concerned, at this level of our analysis, we do not find that different investment structures are associated with different levels of financial performance, albeit – quite surprisingly – the average tracking error volatility is significantly smaller in sub-funds whose organization design either relies on more mandates or envisages the employment of multiple managers. However, sub-funds run by active sponsors exhibit higher levels of active risk.

Insert Table 2 and Table 3 approximately here

6.2. Multivariate analysis

The intrinsic weakness of the above bivariate analysis is that it does not contemporaneously take into account relevant features that differentiate sub-funds beyond their investment management structures' features. We want to include in our analysis variables such as the average sub-fund size, its age, and the percentage of resources allotted to passive mandates. To complete our examination, we estimate a panel regression model whose dependent variable is either a measure of the sub-fund's active return (tracking error gain – TEG) or a measure of the sub-fund's active risk (tracking error volatility – TEV, or R^2). The explanatory variables included in the analysis are the following:

i. Our investment management structure proxies (the number of mandates that proxy for specialization and the HHI-based measure that proxies for managerial diversification),

ii. A dummy that captures sponsor involvement, and

[19] To better address multicollinearity concerns, in a robustness test, we orthogonalize the MGRS variable with respect to MNDTS and we use this orthogonalized variable in place of MGRS. The results of such a specification, not tabulated here, are qualitatively similar to those reported.

iii. Relevant controls (including one that checks for the influence of passive mandates on our performance measures).

Table 4 reports the results of the multivariate regressions based on Equation (1) above. We start by estimating the impact of the two dimensions of our sample sub-funds' investment management structure on their financial performance, that is, TEG (see columns 1 and 2); the logit transformation of Amihud and Goyenko's (2013) selectivity measure, ACTIVER2 (see column 3); and the tracking error volatility of the sub-fund's performance, TEV (see column 4).

Our findings show that the number of mandates increases both the active return and the active risk, whereas managerial diversification has a negative impact on all our performance measures. A more specialized investment management structure is therefore consistent with both greater activeness and higher tracking error gain. Conversely, the result that a larger number of managers is linked to lower active risk could be explained with either a diversification effect – which could well be the aim of hiring multiple managers – or a herding effect induced by more intense competition among managers. If the latter is the case, managers' fears of underperforming the benchmark and their peers could lead them to adopt a safer passive investment strategy instead of the active one they are supposed to.

At this stage, our empirical results suggest that the adoption of a more specialized investment management structure is compatible with greater managerial activeness. On the other hand, the increase in active return that we ascertain could be reconciled with superior abilities that highly specialized asset managers deploy when performing their activities in the niche businesses they operate, as Blake et al. (2013) find in the UK DB pension fund case. On the other hand, an investment structure that allots resources among many managers performing similar tasks is conducive to lower active risk and lower active return.

The above results are not enough to prove a causal nexus. In particular, a confounding story could be that more specialized investment management structures are characterized by investment mandates that

either give managers more freedom (e.g. through wider tracking error volatility constraints) or stronger incentives to beat their benchmarks (e.g. through incentive fees). Similarly, investment management structures designed to achieve greater managerial diversification could feature mandates with stricter investment limits. Should this be the case, our results would then be due to differences in the investment mandates rather than in the investment management structures. Although we cannot directly control for all the features of the investment mandates in our sample, we address this issue with two arguments.

First, at least on a qualitative basis, we can exclude greater managerial activeness being due to looser tracking error volatility constraints in the mandate. Our evidence – which does not cover the entire sample but a sizable portion of it – suggests that tracking error volatility limits stated in mandates assigned to active asset managers were always above the conventional thresholds that separate passive and enhanced passive investments, from active investments.[20] The debate between asset managers and plan sponsors documented in public sources also backs this idea. Annual surveys conducted by the Italian pension fund trade organization, Mefop, report pension fund trustees' criticism of asset managers for a generic lack of initiative (for example, see Mefop 2011). Complaints about asset managers' lethargy also echo in annual reports.

For example, the Gomma Plastica fund's 2008 annual report states,

> With the partial exception of asset manager Unipol/JP Morgan, we observe that managers find it hard to obtain performances that significantly differ from their benchmarks. This phenomenon (is independent of benchmarks' volatility because it) also holds when volatility is extremely high.[21]

[20] According to the Bank for International Settlements (BIS 2003), these thresholds correspond to tracking error volatilities of around 2% for equity funds and 0.25% for fixed income portfolios.
[21] Translated from Gomma Plastica's 2018 management report, page 13.

On the other hand, asset managers justify their stance with the pressure to deliver short-term results and never mention the lack of room for *manoeuvre* due to mandate limits (Mefop 2011).

Second, we can identify sub-funds that adopted incentive fees and we therefore include the INCENT_FEES dummy variable among the explicative variables of Equation (1) to control for the influence of the contractual incentive structure on asset managers' behavior. Previous literature – mostly concerning mutual funds, however (e.g. Elton et al. 2003) – predicts a positive impact of incentive fees on investment managers' activeness. For example, according to Scharfstein and Stein (1990), incentive fees should decrease herding, because they create a more intense incentive to pursue profitable opportunities, even if higher risks are entailed. However, contrary to what we would expect, the sign of the coefficient of INCENT_FEES is always negative, independent of the activeness measure we adopt as the dependent variable.

Our interpretation of the above result refers to three different arguments. First, INCENT_FEES indicates the presence of incentive fees in the sub-funds' mandates but does not quantify the amount of the fees or the strength of the incentive. Low values of these fees (compared to management fees) could make the incentive weak and ineffective. The average participation rate of the sub-funds belonging to our sample that apply incentive fees and disclose their value is around 5%, which is quite low also, considering that, in the Italian mutual fund industry, incentive fees rates range from 10% to 25% (Drago et al. 2008, 2010).

Second, we find that the presence of an incentive fee is, on average, coupled with a lower flat management fee, pointing to a partial substitution effect between the fixed rate portion of managers' compensation and their bonus.[22] Such a substitution could induce caution among asset managers, whose

[22] A *t*-test for the equality of the means of the management fees of sub-funds with and without incentive fees shows that they are significantly lower (at the 5% level) when INCENT_FEE equals 1 (0.00116 vs. 0.00125). The untabulated results of multivariate analysis based on a panel regression model where the dependent variable is a measure of the sub-fund's management fee and the explanatory variables include INCENT_FEE confirm that the presence of incentive fees is associated with a reduction in management fees.

strategies could become more conservative than they would be otherwise. Massa and Patgiri (2009) find a similar effect for mutual funds with concave management fees. This explanation is also compatible with the negative coefficient when active return is our dependent variable: the savings obtained by funds that compensate their managers with an incentive fee in addition to a lower management fee could explain why lower active risk is not conducive to a lower tracking error gain.

Finally, the incentive fees could signal the more effective monitoring activity of fund trustees over asset managers, which seems plausible, given the agency problems documented by Del Guercio and Tkac (2002). Now, since more intense monitoring activity could imply stronger pressure to herd because of reputational concerns, the presence of incentive fees might end up having the undesired effect of increasing the tendency towards passive investing.

Insert Table 4 approximately here

In Table 5, we report the regression estimates of a more complete version of Equation (1), since we also include the explanatory variable capturing sponsor involvement (FLOW_REALL). The previous results are confirmed and sponsor involvement does not affect a sub-fund's active return or its active risk, except when this is proxied with the tracking error volatility. In this case, the possibility of the sponsor reallocating financial assets across managers and/or mandates increases the tracking error volatility. We observe investment performance at the sub-fund level, however, which means that we are unable to discriminate between two competing explanations. On the one hand, the higher tracking error volatility could be the result of the increased activeness of sub-fund asset managers, induced by the threat of reducing the assets under management in case their performance turns out to be unsatisfactory. On the other hand, the larger tracking error volatility could be the result of the sponsor's investment decisions, since the reallocation of resources affects the financial performance of the sub-fund *per se*.

Insert Table 5 approximately here

As mentioned before, our dummy variable FLOW_REALL taking the value of one implies that the sub-fund sponsor is prone to perform two different resource reallocation activities, with different implications: a reallocation of resources among managers and a reallocation across mandates. Albeit we cannot clearly distinguish between these two, we try to disentangle one from the other through the interaction of FLOW_REALL with both MNDTS and 1-HHI_MGRS.

Thanks to the inclusion of such interactions, the estimation results of our regression model, presented in Table 6, provide now a more accurate picture of the relations between the investment structure variables and sub-fund performance. Indeed, the coefficients of some variables turn out to have a slightly different interpretation. The coefficients of MNDTS and 1-HHI_MGRS denote the impact on the scheme performance of an investment structure depending on its degree of specialization and on its level of asset manager diversification respectively, when the sub-fund's sponsor is not prone to interfere in the investment process with reallocation decisions. Conversely, the impact on the scheme performance of investment structure specialization for a sub-fund whose sponsor is active is measured by the sum of the coefficients of MNDTS and FLOW_REALL×MNDTS. The impact on performance of an investment structure featuring managerial diversification and a sponsor prone to act is measured by the sum of 1-HHI_MGRS and FLOW_REALL×1-HHI_MGRS.

This in-depth analysis shows that the only relation between the investment structure dimension and sub-fund performance that is documented, irrespective of sponsor involvement, is the positive relation between the specialization of asset managers' activity and active risk. The coefficients of MNDTS and the sum of the coefficients of MNDTS and FLOW_REALL×MNDTS are positive and significantly different from zero in the regression on the tracking error volatility. We cannot obtain a similar

conclusion if we consider the impact on active return, since the coefficient of MNDTS in regressions (1) and (2) are not significant. An increase in the number of mandates (hence, the adoption of a more specialized investment structure) increases active risk but has no impact on the active return. A positive impact on the sub-fund's tracking error gain occurs only when the more specialized investment management structure is managed by an active sponsor; the sum of the coefficients of MNDTS and FLOW_REALL×MNDTS is positive and significantly different from zero in regressions (1) and (2). This result is consistent with the idea that the sponsor reallocates the fund's financial resources across mandates, possibly as a temporary adjustment of long-term asset allocation. In other words, the observed increase in active return would result from the sponsor's market timing decisions rather than from asset managers' superior skills or greater efforts.

The inclusion of the interaction effect in our analysis reveals that managerial diversification affects sub-fund financial performance only when the sponsor is active in reallocating resources. In such a case, both active returns and active risk decrease. Our explanation for the decrease in active risk is as follows: a larger number of managers, possibly under the same mandate, does not foster competition *per se*, as the yardstick competition argument proposed by Shleifer (1985) would suggest. However, when the sponsor is more prone towards sanctioning underperforming managers (via firing decisions or a reduction of their resources), a herding effect *à la* Scharfstein and Stein (1990) could prevail: managers prefer to stick to their benchmark to avoid underperformance and consequent intervention by the sponsor.

We can also explain the negative effect on the scheme's active return by considering that the reallocation of resources entails a cost, which is especially relevant when assets are transferred from one manager to another, consequent to firing decisions, which usually predate a reallocation among managers but not across mandates.

Finally, we observe that, while showing a strong negative correlation with active risk, as expected, passive mandates show a statistically insignificant influence on excess return, possibly due to their

convenience with respect to active management. Therefore, given our overall results, if evaluated on a risk-adjusted basis, passive mandates might be preferable to managerial diversification strategies, especially if these are coupled with intense reallocation activity among managers carried out by the plan sponsor.

Insert Table 6 approximately here

7. Conclusions

This paper examines if the organization design of the delegated investment management activity influences the performance of managed portfolios. Empirical evidence from a sample of Italian DC occupational pension funds suggests a positive answer. In particular, we find that a higher degree of mandate specialization increases active risk, consistent with plan sponsors' aim of exploiting specialized asset managers' superior skills. Moreover, the positive effect of specialization on active risk is associated with a significant impact on active return.

Our findings also support the evidence of a significant relation between managerial diversification and the performance of the delegated portfolios. Increased managerial diversification decreases both active risk and active return. This result suggests that, if the aim of hiring multiple managers is to diversify away potential mistakes, managerial diversification works. On the other hand, if the aim of hiring multiple managers is to obtain better results through increased effort due to more intense competitive pressure, this tool does not seem to be conducive to the intended goal.

If we include in our analysis plan sponsors' involvement though, the picture becomes more nuanced.

First, the specialization of asset management activity is significantly linked to the portfolio's active return only if sponsors are prone to act. Therefore, we suspect that the better relative return that we find when sponsors actively reallocate resources across mandates is due to the market timing activity that they

performed. However, as we can only observe performance at the level of sub-fund level and not at the level of individual asset managers, we cannot exclude that more intense monitoring activity by the sponsor increases managers' efforts and performance.

Second, higher managerial diversification results in lower active risk and lower active return only if it is coupled with more intense sponsor involvement: we do not find any significant link if the sponsor is not prone to act. Once again, sponsors' involvement in the resource redistribution process is crucial in explaining performance. A reduction in active return in this setting can be reconciled with the transition costs that redistributing resources among managers entail. However, transition costs do not explain the reduction in active risk, which could be the consequence of a change in managers' behavior and incentives triggered by the sponsor's threat to sanction poor performance.

Even if we do not have conclusive evidence that allows us to disentangle the effects of sponsors' reallocation decisions from those due to changes in managers' behavior, we exploit the fact that reallocation decisions have a specific meaning in different investment management structures to interpret the observed outcomes. The transfer of resources from one manager to another manager who is performing the same task implies sanctioning the behavior of the former and rewarding the behavior of the latter. On the other hand, redistributing resources across mandates could simply be due to the sponsor undertaking market timing activity that the sponsor has kept to ~~himself or~~ herself when choosing a specialized investment management structure. Thus, we propose the following interpretation of our results: on the one hand, a credible threat of acting in case of unsatisfactory results indeed has unintended negative consequences on managers' behavior. On the other hand, through market timing, the scheme sponsor is potentially able to create value that single asset managers cannot generate because they perform a highly specialized activity.

We also find that the presence of incentive fees is conducive to lower levels of active risk. Albeit this result seems surprising, the use of incentive fees in Italian pension funds has some distinctive features

that explain it. In particular, anecdotal evidence suggests that the amount of incentive fees is too small to justify active risk taking. More in general, a remuneration system that adopts incentive fees emphasizes both over- and underperformance. It could also be a way for plan sponsors to signal to plan participants their efficiency at policing asset managers' behavior. If that is the case, obtaining a mandate renewal following underperformance, even though the overall results of the asset management firm are positive, could be more difficult because sponsors are worried their position could suffer. Such conditions can make managers stick to their benchmarks to avoid risks.

Lastly, our evidence suggests that an increase in the percentage of assets managed through passive mandates decreases active risk, as expected, without a significant decrease in active returns. This result suggests that sponsors should attentively consider the adoption of passive delegated management, especially if it leads to significant cost savings compared to active management investment solutions.

We acknowledge that additional research efforts are needed to shed further light on the topic we analyzed in this paper and that our results suffer from some limitations. As mentioned, we do not have information on single managers' performances, and therefore are not able to identify any compensation effect among asset managers' results. However, as we focus on the performance component that ultimately affects investors' benefits, we think that sub-fund relative performance is the most important metric to look at. Moreover, our analysis implicitly assumes that asset managers' selection process is not correlated with the investment management structure chosen by the sponsor, as in Blake et al. (2013). We also assume that the specific characteristics of the mandates do not correlate with the scheme's investment management structure. However, even if we cannot observe all the characteristics of the investment mandates as public information on some of their features is incomplete, we think that the inclusion of the INCENT_FEE dummy variable in the analysis allows us to (at least partially) address the issue of existing differences between investment mandates. Moreover, strong anecdotal evidence

suggests that the TEV constraints in the investment mandates of Italian pension funds have never limited active managers. We think that both elements curtail concerns about the robustness of our results.

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Appendix A. Italian occupational pension funds: Institutional details

Italian occupational funds are established via collective agreements between workers' and firms' representatives or by unions or regional and other administrative authorities. Workers can join the scheme – membership is voluntary – only if they meet specific requirements established in the fund bylaws. Even though the establishment of DB plans is possible, in Italy, at present, only defined contribution plans have been created.

The fund charter initially sets a membership rate target to be achieved within a defined time. If the target is met, the Italian Supervisory Authority allows the fund to start operations, provided that certain requirements are fulfilled. Once authorized, the fund collects its members' contributions. When the pool reaches a minimum amount, the money is invested by one or more financial intermediaries (asset managers hereafter) in charge of managing its resources. According to Italian law, banks, insurance companies, investment firms, and companies managing Undertakings for Collective Investment in Transferable Securities (UCITS), harmonized under the legislation of the European Union, with a legal head office in the European Union, as well as UCITS incorporated in Italy, can manage the resources of pension funds. With few exceptions (e.g. real estate), Italian law requires pension fund investing activity to be mandatorily delegated to external managers, with the board of trustees in charge of their hiring and firing. Administration, trading, and custody are also outsourced. To avoid conflicts of interest, the outsourced activities cannot be jointly performed by either the same firm or firms belonging to the same group.

Depending on the design of investment options, Italian pension funds offer two or more 'investment lines' designed to meet the needs of different risk tolerance levels. Under an umbrella fund, each investment line has a specific investment policy, as if it were a different pool, and is therefore called a

compartment or sub-fund.[1] Unlike US 401(k) plans or most UK corporate defined contribution schemes, Italian pension funds do not offer a 'self-select' option that enables members to choose from a menu of funds and construct their own asset allocation. In Italy, members are instead given a choice between different balanced allocations along the risk–return spectrum. It is worth pointing out that, unlike in the United Kingdom or the United States, even the most aggressive profiles of Italian pension funds have a sizable bond weighting. In fact, a 60% equities-40% bonds profile would be considered very aggressive in Italy, while it would lie in the middle of the risk spectrum in the United States.

With the help of consultants, the board of trustees delineates the goals of the plan and the strategic asset allocation, defining the mix of asset classes in which the plan participants' money is going to be invested for each balanced profile. The strategic asset allocation is expressed in terms of a benchmark and the most appropriate investment structure is chosen to achieve the plan goals.

After a process that selects the most suitable asset managers consistent with the investment structure established, pension plan trustees negotiate the contractual service terms with a restricted set of potential winners and choose from among them. Asset manager activity is bounded by a contractual agreement (the investment management mandate, or, hereafter, just the mandate). The mandate specifies asset managers' goals and defines a benchmark. Limitations on the risks that managers can run are typically set as tracking error volatility limits and constraints on portfolio weights.

The information that asset managers must provide to the trustees and the method by which fees are calculated are also included in the mandate. Since more than one manager can be delegated within the

[1] Originally, the scheme participants were not allowed to split their contributions among different sub-funds and, consequently, most sub-funds invest in a variable mix of both stock and bonds. Moreover, in 2007, an automatic enrolment clause for private employees meant to foster pension plans funding was enacted. The law mandates employers to vest a pension fund with the annual severance pay share of the worker unless the employee explicitly opts out. In this case, unless employers and employees agree on a different destination for contributions, an occupational fund collects it. For a scheme to be deemed suitable for the above kind of intake, however, the plan must offer a viable investment alternative to the worker's severance pay. The law establishes that contributions to the fund due to the automatic enrolment clause are to be invested in a way that mimics periodic increases of the annual severance pay share in addition to a minimum warranted return. To tap into that source of money, all Italian pension funds have established suitable investment lines, called minimum guaranteed return sub-funds.

same mandate, a reference to the managers' peer group's relative performance could be specified, because, in this case, the mandate also defines the way new resources are to be allocated among competing managers and the fund trustees can retain some degree of discretion over the pool's redistribution. If that is the case, for example, the worst-performing manager could be temporarily denied access to future cash inflows from participants' contributions. Transferring some of that manager's resources to other managers, while retaining the manager, is also possible.

While consultants and trustees do not interfere with the day-to-day decisions taken by asset managers, they will monitor their managers' investment performance, typically quarterly. Underperforming managers are asked to explain their investment strategy and the rationale behind it. If underperformance continues, the fund trustees may decide to fire the manager, even before the mandate term. Moreover, Italian law explicitly calls for negotiating changes in the asset class weight limits included in the mandate, especially when financial market volatility is high. This occurred during the financial crisis, for example, when restrictions on managers' cash holdings were relaxed to limit exposure.

The duration of the mandate typically varies from three to five years. Upon its conclusion, the pension plan can either renew it or start the selection process anew. Mandates might not be renewed, either, because of unsatisfactory performance or because the plan trustees intend to modify the portfolio's strategic asset allocation and want to involve new managers with different skills. However, since asset manager substitution can be costly and the assets are often transferred to newly hired managers by a transition organization whose goal is to minimize losses due to the shift, changes in strategic asset allocation tend to be managed by retaining at least some of the managers who were selected in the past.

Appendix B. FLOW_REALL$_{it}$ variable building process

In the annual report, the plan sponsor is requested by law to provide the reader with a detailed description of the features of the mandates assigned to the asset managers and the breakdown of the value of the scheme assets pertaining to each mandate at the end of the year. While the details about how asset managers' compensations are calculated vary depending on the scheme, the report always depicts the mandates' benchmark and its weight in the overall sub-fund benchmark, the names of the asset managers in charge of each mandate and the resources allotted to each of them at the start of their activity. We often learn about the active/passive nature of the mandate from this source as well.[2]

For some of plans, the accounting information provided in the financial statements also includes the amount of resources allotted to each asset manager during the year. When asset managers' individual performance is reported as well, we are able to directly gauge if the resource allotment performed by the sponsor is due to a mere rebalancing activity. Sometimes, in the management report the sponsor explicitly states that the resources allotment performed during the year deviated from the original intentions, thus allowing us to detect the sponsor's reallocation activity. For example, Priamo fund's 2008 annual report states,

> The resources coming from plan participants' contributions allotted to the asset managers every month has taken place in 2008 according to the following plan: 21.25% to Allianz Global Investors, Eurizon Capital, Assicurazioni Generali, Pioneer Investment Management and 15% to Pioneer investment management. However, from January 2009, Allianz Global investors obtains 42.5% while Eurizon Capital is excluded from any new intake.[3]

Unfortunately, in most cases these aspects are not set forth with such a precision. In the management report section of the document though, sponsors are required to justify any change in the features of the

[2] We were able to fill the gaps when this was not the case, because we collected the sponsors' initial calls for bids at the start of the selection process. At that stage the active or passive nature of the mandate is explicitly stated.
[3] Translated from Priamo annual report 2008 page 9.

mandates they assigned to the asset managers if the change occurred before the term of the mandate. Sponsors must also detail hiring and firing decisions and state if the firing is due to regulatory reasons. For example, Fopen fund's 2013 annual report states,

> Considering the fact that Amundi's performances were inadequate, the fund exercised its right of withdrawal from the contract. Its resources were redistributed to Dexia for the balanced sub-fund and to Axa for the equity sub-fund.[4]

In Capi and Quadri Fiat fund's 2007 annual report we find the following sentences,

> Asset manager Epsilon SGR informed us that at the end of December its controlling shareholder was acquired by Intesa SanPaolo and that Epsilon will be merged with Eurizon Capital in 2008, becoming part of the Intesa SanPaolo group. Being Intesa SanPaolo bank our depository institution, the ensuing conflict of interest made us exercise out right of withdrawal from the contract with Epsilon.[5]

We classify a sponsor as involved in reallocating resources every time we can gauge it because we have direct evidence of it. We also consider active sponsors those who impose a change in the features of the mandate that imply a revision in the way the asset management activity is performed. This is due to a change in the weights of the individual mandates' benchmarks within the sub-fund's one, to the fact that a new manager is added to the existing set and to the fact that an asset manager is fired for reasons other than regulatory ones.

Moreover, we consider sponsors as involved in resource redistribution every time they explicitly state their right to do so even if no redistribution activity has taken place during the year. We consider these explicit statements as a signal of the sponsor's leaning towards acting whenever she deems it necessary.

[4] Translated from Fopen's 2013 annual report, page 10.
[5] Adapted from Capi e Quadri Fiat's 2007 annual report, page 18.

For example, Astri pension fund's 2015 annual report states,

> New resources conveyed to the sub-fund by members during the year have been distributed to both asset managers on a fifty-fifty basis even if the sponsor retains the right to modify this allotment by attributing more money to the asset manager that performs significantly better than the other [6].

Once we either observed an actual reallocation or found a statement that affirms that a reallocation can take place if the sponsor so decides, the variable $FLOW\_REALL_{it}$ for that year takes a value of 1. The variable takes a value of 1 in the following years as well, until the term of the contractual agreements among the sponsor and the asset managers expires. We reckon that the sponsor's leaning towards being actively involved in the reallocation process shapes the relationship among her and the assets managers from the moment the asset managers receive a signal of it, because the sponsor shows its tendency either by performing a reallocation or through a statement to the external observers.

Data constraints do not allow us to exploit full information on flows. On the other hand, flows would not allow us to identify sponsors that are willing to take advantage of their power to modify resources allotment among managers but did not profit from it because they did not deem this activity fruitful during the specific timeframe we analyze.

To check for the accuracy of our reading of the financial statements, we run a text search algorithm in order to make sure that we did not miss anything. If the annual report contains the terms "allocation", "flow", "resource", "allot", "competit", "market tim", "withdraw" and "assist",[7] we manually inspect the paragraph containing the expression to ascertain if it either includes a description of any kind of reallocation activity or a statement about the willingness to do so whenever the sponsor would find it suitable.

[6] Translated from Astri's 2015 annual report, page 10.
[7] "Allocazione", "risorse", "distribuzione", "compet", "market tim", "recesso", "affiancare" in Italian.

Appendix C. Variable description.

VARIABLE	Definition
NUMBER_OF_SUBF	Number of different active subfunds in the pension fund.
AUM_F	Assets under management of the pension fund, thousands €.
AUM	Assets under management of the sub-fund, thousands €.
AGE_F	Number of operating years of the pension fund.
AGE	Number of operating years of the sub-fund.
TURNOVER	The minimum between the amount of securities bought and securities sold by the sub-fund and its assets under management.
INCENT_FEES	Dummy variable which equals 1 if at least one of the managers of the sub-fund is compensated with incentive fees, 0 otherwise.
FLOW_REALL	Dummy variable which equals 1 if the sponsor has modified the pre-established allocation of the financial resources among managers and/or mandates, 0 otherwise.
MNDTS_F	Number of different investment mandates adopted for all the sub-funds of the pension fund.
MNDTS	Number of different investment mandates adopted in the sub-fund.
MGRS_F	Number of different asset managers hired for all the sub-funds of the pension fund.
MGRS	Number of different asset managers hired for the sub-fund.
1-HHI_MGRS	1-Herfindahl-Hirschman index (HHI) of the assets managers' assets under management.
PASSIVE_SHARE	Percentage of the sub-fund's asset under management allocated to passive investment mandates.
TEG	Average monthly excess return (over the benchmark's net return), multiplied by 100.
TEV	Standard deviation of the monthly excess returns (over the benchmark's net returns).
R2	Coefficient of determination resulting estimated by regressing the sub-fund's returns on the returns of its benchmark.
ACTIVER2	Logistic transformation of the variable $(1 - R^2)$.
RET_BENCH	Mean of the monthly benchmark's returns.
STDEV_BENCH	Standard deviation of the monthly benchmark's returns.

Appendix D. Examples of investment management structures.

This table reports the sub-funds, their assigned investment mandates and hired asset managers and the values of the variables MNDTS, MGRS, 1-HHI_MGRS, and FLOW_REALL for some representative pension fund-years in our sample. Variable definitions are in Appendix C.

Year	Fund	Sub-fund	Manager	Mandate	MNDTS	MGRS	1-HHI_MGRS	FLOW_REALL
2006	Fopen	Bilanciato obbligazionario	Pictet San Paolo IMI Duemme Société Générale Rotschild Allianz	Government Bond EUR Corporate Bond EUR US Equity Europe Equity Japan Equity	5	6	0.79140	1
2006	Fopen	Bilanciato	Duemme	Balanced - 1	1	1	0	1
2006	Fopen	Azionario	Duemme	Balanced - 2	1	1	0	1
2007	Telemaco	Conservativo	Fineco Fineco Axa San Paolo IMI Ras Pioneer	Government Bond Euro US Equity - Passive Corporate Bond European Equity - Passive European Equity - Active US Equity - Active	6	5	0.4216	1
2007	Telemaco	Prudente	Fineco Fineco Axa San Paolo IMI Ras Pioneer Fineco	Government Bond Euro US Equity - Passive Corporate Bond European Equity - Passive European Equity - Active US Equity - Active Japan Equity - Passive	7	5	0.4898	1
2007	Telemaco	Bilanciato	Fineco Fineco Axa San Paolo IMI Ras Pioneer Fineco	Government Bond Euro US Equity - Passive Corporate Bond European Equity - Passive European Equity - Active US Equity - Active Japan Equity - Passive	7	5	0.6567	1
2007	Telemaco	Crescita	Fineco Fineco Axa San Paolo IMI Ras Pioneer Fineco	Government Bond Euro US Equity - Passive Corporate Bond European Equity - Passive European Equity - Active US Equity - Active Japan Equity - Passive	7	5	0.7101	1
2011	Cometa	Reddito	Allianz Amundi State Street Halbis State Street UBS	Balanced - Active 1 Bond - Active Balanced - Passive 1 Bond - Passive	4	5	0.6945	0
2013	Fonchim	Stabilità	Groupama Natixis Eurizon Generali BlackRock Axa Pioneer Credit Suisse State Street	Short term Government Bond All maturities Government Bond Corporate Bond Balanced - Active Equity - Passive	5	9	0.86830	1
2013	Fonchim	Crescita	AnimaSGR Dexia	Balanced Growth - Active Balanced Growth - Passive	2	2	0.5000	0

Table 1. Sample descriptive statistics.

This table contains descriptive statistics for the different pension funds and their sub-funds in our sample. Reported are mean and standard deviation values for the financial performance of the sub-funds and their benhmarks (Panel *A*), the investment management structure of the sub-funds (Panel *B*), and the main characteristics of the funds (denoted with _F) and sub-funds (Panel *C*).
Variable definitions are in Appendix C.
The sub-fund management structures and their characteristics refer to *t* -1.

Panel *A* . Financial performances

Variable	*Obs*	*Mean*	*Std. Dev.*
TEG(*t*) *	471	0.071	0.151
TEV(*t*)	471	0.004	0.003
R2(*t*)	471	0.907	0.085
ACTIVER2(*t*)	471	-2.724	1.112
RET_BENCH(*t*)	471	0.004	0.006
STDEV_BENCH(*t*)	471	0.015	0.008

Panel *B* . Investment management structure

Variable **	*Obs*	*Mean*	*Std. Dev.*
MNDTS_F(*t*-1)	471	4.811	2.671
MNDTS(*t*-1)	471	2.002	1.529
MGRS_F(*t*-1)	471	5.270	2.253
MGRS(*t*-1)	471	2.866	1.803
1-HHI_MGRS(*t*-1)	471	0.447	0.324
FLOW_REALL(*t*-1)	471	0.316	0.466

Panel *C* . Sub-fund main characteristics

Variable ***	*Obs*	*Mean*	*Std. Dev.*
NUMBER_OF_SUBF(*t*-1)	471	3.289	1.147
AUM_F(*t*-1)	471	776,000	1,050,000
AUM(*t*-1)	471	311,000	653,000
AGE_F(*t*-1)	471	5.900	
AGE(*t*-1)	471	4.673	3.278
TURNOVER(*t*-1)	471	1.028	3.252
PASSIVE_SHARE(*t*-1)	471	0.072	0.193
INCENT_FEES(*t*-1)	471	0.503	0.501

* TEG is the average monthly excess return (over the benchmark's net return), multiplied by 100.

** The number of mandates (MNDTS_F) and the number of managers (MGRS_F) at the fund level include the guaranteed sub-funds.

*** The number of sub-funds (NUMBER_OF_SUBF), the asset under management (AUM_F), and the age (AGE_F) at the fund level include the guaranteed sub-funds. AUM and AUM_F are in thousands of euros.

Table 2. Correlation between sub-fund financial performances, main characteristics, and management structure variables.

The table reports pairwise correlations between sub-fund financial performances, main characteristics, and management structure variables of sub-funds. Variable definitions are in Appendix C.
The sub-fund characteristics, their management structure and their mandate characteristics refer to t-1.
***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

	TEG (t)	TEV (t)	R2 (t)	ACTIVER2 (t)	RET_BENCH (t)	STDEV_BENCH (t)	INCENT_FEES (t-1)	SIZE (t-1)	AGE (t-1)	TURNOVER (t-1)	PASSIVE_SHARE (t-1)	MNDTS (t-1)	MGRS (t-1)	1-HHI_MGRS (t-1)
TEV(t)	0.2898*** (0.0000)	1												
R2(t)	0.0639 (0.1665)	-0.4571*** (0.0000)	1											
ACTIVER2(t)	-0.0766* (0.0968)	0.4718*** (0.0000)	-0.9022*** (0.0000)	1										
RET_BENCH(t)	-0.4320*** (0.0000)	-0.1619*** (0.004)	0.0171 (0.7109)	-0.0247 (0.5935)	1									
STDEV_BENCH(t)	0.4143*** (0.0000)	0.7250*** (0.0000)	0.1269*** (0.0058)	-0.1521*** (0.0009)	-0.1869*** (0.0003)	1								
INCENT_FEES(t-1)	0.0092 (0.8423)	-0.1454*** (0.0016)	0.1865*** (0.0000)	-0.2276*** (0.0000)	0.0028 (0.9514)	-0.0083 (0.8574)	1							
SIZE(t-1)	-0.0488 (0.2907)	-0.2645*** (0.0000)	0.1202*** (0.0090)	-0.1531*** (0.0009)	-0.0342 (0.4590)	-0.2242*** (0.0000)	0.1520*** (0.0009)	1						
AGE(t-1)	0.0215 (0.6417)	-0.1662*** (0.0003)	0.1844*** (0.0001)	-0.2668*** (0.0000)	0.1292*** (0.0050)	0.0024 (0.9580)	0.3067*** (0.0000)	0.5438*** (0.0000)	1					
TURNOVER(t-1)	-0.0640 (0.1653)	0.0845* (0.0670)	-0.1118** (0.0152)	0.0713 (0.1224)	0.0188 (0.6844)	0.0369 (0.4242)	0.0548 (0.2356)	-0.0505 (0.2738)	-0.0366 (0.4276)	1				
PASSIVE_SHARE(t-1)	-0.03 (0.5156)	-0.0247 (0.5933)	0.1332*** (0.0038)	-0.1456*** (0.0015)	0.0085 (0.8540)	0.0236 (0.6098)	-0.0752 (0.1032)	0.1526*** (0.0009)	0.1911*** (0.0000)	0.0228 (0.6220)	1			
MNDTS(t-1)	-0.0221 (0.6318)	-0.0908** (0.0490)	0.0191 (0.6798)	-0.0719 (0.1194)	-0.0543 (0.2395)	-0.1081** (0.0189)	0.0236 (0.6091)	0.4101*** (0.0000)	0.2281*** (0.0000)	0.005 (0.9139)	0.6508*** (0.0000)	1		
MGRS(t-1)	-0.0783* (0.0897)	-0.2375*** (0.0000)	0.1168** (0.0112)	-0.1625*** (0.0004)	-0.0312 (0.5000)	-0.2357*** (0.0000)	0.0488 (0.2906)	0.6797*** (0.0000)	0.3014*** (0.0000)	-0.0148 (0.7483)	0.3675*** (0.0000)	0.7416*** (0.0000)	1	
1-HHI_MGRS(t-1)	-0.1021** (0.0268)	-0.2493*** (0.0000)	0.1200*** (0.0092)	-0.1325*** (0.0040)	-0.017 (0.7129)	-0.2622*** (0.0000)	-0.0848* (0.0659)	0.6312*** (0.0000)	0.1816*** (0.0001)	-0.0445 (0.3384)	0.2550*** (0.0000)	0.5392*** (0.0000)	0.8522*** (0.0000)	1
FLOW_REALL(t-1)	0.0468 (0.3112)	0.1342*** (0.0035)	-0.0707 (0.1257)	0.1238*** (0.0071)	0.0245 (0.5952)	0.0308 (0.5047)	-0.1185** (0.0101)	0.2663*** (0.0000)	0.1362*** (0.0030)	-0.0171 (0.7108)	0.2757*** (0.0000)	0.2860*** (0.0000)	0.3419*** (0.0000)	0.3143*** (0.0000)

Table 3. Bivariate comparison of sub-fund financial performances, main characteristics, and management structure variables.

Reported are mean values of sub-fund financial performances, main characteristics, management structure, and mandate variables of sub-funds with specialized investment management and not (MORE_THAN_2_MNDTS=1 and MORE_THAN_2_MNDTS=0, in column 1), sub-funds with few and many managers (MORE_THAN_3_MGRS=0 and MORE_THAN_3_MGRS=1, in column 2), and sub-funds with and without flow reallocation mechanisms (FLOW_REALL=1 and FLOW_REALL=0, in column 3). The value in parentheses is the *t*-statistic for testing the equality of variable means. Variable definitions are in Appendix C.

The sub-fund characteristics, their management structure and their mandate characteristics refer to *t*-1.

***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

	(1)		(2)		(3)	
	MORE_THAN_2_MNDTS (*t*-1)		**MORE_THAN_3_MGRS (*t*-1)**		**FLOW_REALL (*t*-1)**	
	= 0 *N*=346	= 1 *N*=125	= 0 *N*=228	= 1 *N*=243	= 0 *N*=322	= 1 *N*=149
TEG(*t*)	0.058 (1.327)	0.038	0.059 (0.952)	0.047	0.048 (-1.013)	0.063
TEV(*t*)	0.004 (2.016)*	0.004	0.005 (4.191)**	0.004	0.004 (-2.933)***	0.005
R2(t)	0.906 (-0.279)	0.909	0.902 (-1.227)	0.912	0.911 -1.533	0.898
ACTIVER2(*t*)	-2.682 (1.346)	-2.839	-2.649 (1.426)	-2.795	-2.818 (-2.703)***	-2.522
RET_BENCH(*t*)	0.004 (0.832)	0.004	0.004 (1.050)	0.004	0.004 (-0.532)	0.004
STDEV_BENCH(*t*)	0.015 (2.595)***	0.013	0.017 (5.358)***	0.013	0.015 (-0.667)	0.015
INCENT_FEES(*t*-1)	0.480 (-1.692)*	0.568	0.526 (0.971)	0.481	0.543 (2.583)**	0.416
SIZE(*t*-1)	17.778 (-9.643)***	19.413	17.199 (-14.382)***	19.163	17.891 (-5.984)***	18.907
AGE(*t*-1)	4.344 (-3.673)***	5.584	4.364 (-1.988)**	4.963	4.370 (-2.978)***	5.329
TURNOVER(*t*-1)	1.012 (-0.181)	1.073	1.114 (0.555)	0.947	1.066 (0.371)	0.946
PASSIVE_SHARE(*t*-1)	0.015 (-12.095)***	0.228	0.023 (5.443)***	0.117	0.036 (-6.212)***	0.150
MNDTS(*t*-1)	1.179 (-43.775)***	4.280	1.127 (-14.442)***	2.823	1.705 (-6.463)***	2.644
MGRS(*t*-1)	2.090 (-22.292)***	5.016	1.338 (-31.243)***	4.300	2.447 (-7.881)***	3.772
1-HHI_MGRS(*t*-1)	0.345 (-13.409)***	0.730	0.167 (-33.295)***	0.710	0.378 (-7.169)***	0.597
FLOW_REALL(*t*-1)	0.246 (-5.660)***	0.512	0.171 (-6.876)***	0.453	-	-

Table 4. The effect of investment management structure on financial performances.

This table reports the fixed-effect coefficient estimates and robust standard errors (in parentheses) clustered at the sub-fund level of a test for the impact of the investment management structure on sub-fund financial performances. The dependent variables are: (*i*) TEG, i.e., the sub-fund's excess return multiplied by 100 (columns 1 and 2); (*ii*) ACTIVER2, i.e., the logit transformation of 1 - the sub-fund's R2 (column 3); and (*iii*) TEV, i.e., the sub-fund's tracking error volatility (column 4). The explanatory variables are: MNDTS, the number of different investment mandates adopted in the sub-fund; 1-HHI_MGRS, 1-Herfindahl-Hirschman index (HHI) of the assets managers' assets under management; INCENT_FEES, a dummy variable that equals one if the mandate(s) comprise(s) (an) incentive fee(s), and zero otherwise; SIZE, the natural logarithm of the sub-fund's assets under management; AGE, the sub-fund's number of operating years; TURNOVER, the minimum between the amount of securities bought and securities sold by the sub-fund and its assets under management; PASSIVE_SHARE, the percentage of the sub-fund's asset under management allocated to passive investment mandates; TOTAL_FEES, the ratio of the total fees paid to the asset managers of the sub-fund and its assets under management; STDEV_BENCH, the standard deviation of the benchmark adopted by the sub-fund's SHARES_PCT, the percentage of stocks in the sub-fund's benchmark. All estimations include an intercept (coefficient not reported).

***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	TEG(t)		ACTIVER2(t)	TEV(t)
MNDTS(t-1)	0.022**	0.020*	0.167***	0.000***
	(0.010)	(0.010)	(0.060)	(0.000)
1-HHI_MGRS(t-1)	-0.191***	-0.179***	-1.025***	-0.001**
	(0.049)	(0.046)	(0.293)	(0.001)
INCENT_FEES(t-1)	-0.022	-0.018	-0.627***	-0.001***
	(0.023)	(0.024)	(0.165)	(0.000)
SIZE(t-1)	0.023	0.017	0.077	-0.000
	(0.016)	(0.017)	(0.152)	(0.000)
AGE(t-1)	-0.121***	-0.019	1.334***	0.002***
	(0.030)	(0.034)	(0.292)	(0.001)
TURNOVER(t-1)	-0.003***	-0.003***	-0.001	-0.000
	(0.001)	(0.001)	(0.004)	(0.000)
PASSIVE_SHARE(t-1)	-0.077	-0.073	-1.243***	-0.002***
	(0.062)	(0.058)	(0.272)	(0.001)
ACTIVER2(t-1)	-0.032***	-	0.205***	-
	(0.008)		(0.059)	
TEV(t-1)	-	-14.990***	-	0.196***
		(4.343)		(0.033)
STDEV_BENCH(t)	7.401***	9.780***	-12.793	0.263***
	(1.746)	(1.982)	(13.795)	(0.042)
Year dummies	Yes	Yes	Yes	Yes
Observations	471	471	471	471
Number of sub-funds	58	58	58	58
Adj. R^2	0.372	0.382	0.375	0.619

Table 5. The effect of the fund reallocation by the sub-fund's sponsor on financial performances.

This table reports the fixed-effect coefficient estimates and robust standard errors (in parentheses) clustered at the sub-fund level of a test for the impact of the investment management structure and the sponsor's decision of reallocation of financial flows on sub-fund financial performances. The dependent variables are: (*i*) TEG, i.e., the sub-fund's excess return multiplied by 100 (columns 1 and 2); (*ii*) ACTIVER2, i.e., the logit transformation of 1- the sub-fund's R2 (column 3); and (*iii*) TEV, i.e., the sub-fund's tracking error volatility (column 4). The explanatory variables are: MNDTS, the number of different investment mandates adopted in the sub-fund; 1-HHI_MGRS, 1-Herfindahl-Hirschman index (HHI) of the assets managers' assets under management; FLOW_REALL, a dummy variable that equals 1 if the sponsor has modified the pre-established allocation of the financial resources among managers and/or mandates, and zero otherwise; INCENT_FEES, a dummy variable that equals one if the mandate(s) comprise(s) (an) incentive fee(s), and zero otherwise; SIZE, the natural logarithm of the sub-fund's assets under management; AGE, the sub-fund's number of operating years; TURNOVER, the minimum between the amount of securities bought and securities sold by the sub-fund and its assets under management; PASSIVE_SHARE, the percentage of the sub-fund's asset under management allocated to passive investment mandates; TOTAL_FEES, the ratio of the total fees paid to the asset managers of the sub-fund and its assets under management; STDEV_BENCH, the standard deviation of the benchmark adopted by the sub-fund. All estimations include an intercept (coefficient not reported).

***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	TEG(t)		ACTIVER2(t)	TEV(t)
MNDTS(t-1)	0.023**	0.021**	0.174***	0.000***
	(0.010)	(0.010)	(0.060)	(0.000)
1-HHI_MGRS(t-1)	-0.182***	-0.172***	-0.986***	-0.001*
	(0.050)	(0.047)	(0.305)	(0.001)
FLOW_REALL(t-1)	0.032	0.026	0.137	0.001**
	(0.020)	(0.020)	(0.159)	(0.000)
INCENT_FEES(t-1)	-0.015	-0.012	-0.598***	-0.001**
	(0.023)	(0.024)	(0.164)	(0.000)
SIZE(t-1)	0.021	0.016	0.071	-0.000
	(0.016)	(0.018)	(0.150)	(0.000)
AGE(t-1)	-0.127***	-0.022	1.308***	0.002***
	(0.029)	(0.034)	(0.289)	(0.001)
TURNOVER(t-1)	-0.003***	-0.003***	-0.000	-0.000
	(0.001)	(0.001)	(0.003)	(0.000)
PASSIVE_SHARE(t-1)	-0.072	-0.068	-1.222***	-0.002**
	(0.061)	(0.059)	(0.279)	(0.001)
ACTIVER2(t-1)	-0.033***	-	0.199***	-
	(0.008)		(0.060)	
TEV(t-1)	-	-15.126***	-	0.193***
		(4.350)		(0.032)
STDEV_BENCH(t)	7.194***	9.645***	-13.671	0.260***
	(1.703)	(1.952)	(13.689)	(0.041)
Year dummies	Yes	Yes	Yes	Yes
Observations	471	471	471	471
Number of sub-funds	58	58	58	58
Adj. R^2	0.375	0.383	0.375	0.623

Table 6. The effect of the different forms of fund reallocation by the sub-fund's sponsor on financial performances.

This table reports the fixed-effect coefficient estimates and robust standard errors (in parentheses) clustered at the sub-fund level of a test for the impact of the investment management structure and the sponsor's decision of reallocation of financial flows on sub-fund financial performances. The dependent variables are: (*i*) TEG, i.e., the sub-fund's excess return multiplied by 100 (columns 1 and 2); (*ii*) ACTIVER2, i.e., the logit transformation of 1 - the sub-fund's R2 (column 3); and (*iii*) TEV, i.e., the sub-fund's tracking error volatility (column 4). The main explanatory variables are: MNDTS, the number of different investment mandates adopted in the sub-fund; 1-HHI_MGRS, 1-Herfindahl-Hirschman index (HHI) of the assets managers' assets under management; FLOW_REALL, a dummy variable that equals 1 if the sponsor has modified the pre-established allocation of the financial resources among managers and/or mandates, and zero otherwise; INCENT_FEES, a dummy variable that equals one if the mandate(s) comprise(s) (an) incentive fee(s), and zero otherwise; SIZE, the natural logarithm of the sub-fund's assets under management; AGE, the sub-fund's number of operating years; TURNOVER, the minimum between the amount of securities bought and securities sold by the sub-fund and its assets under management; PASSIVE_SHARE, the percentage of the sub-fund's asset under management allocated to passive investment mandates; TOTAL_FEES, the ratio of the total fees paid to the asset managers of the sub-fund and its assets under management; STDEV_BENCH, the standard deviation of the benchmark adopted by the sub-fund. *F*-test (MNDTS) is the *F*-statistic of a test on the sum of the coefficients of the MNDTS and the FLOW_REALL×MNDTS variables; *F*-test (1-HHI_MGRS) is the *F*-statistic of a test on the sum of the coefficients of the 1-HHI_MGRS and the FLOW_REALL×1-HHI_MGRS variables. All estimations include an intercept (coefficient not reported).

***, **, and * indicate statistical significance at the 1%, 5%, and 10%, respectively.

	(1)	(2)	(3)	(4)
	TEG(t)		ACTIVER2(t)	TEV(t)
MNDTS(t-1)	0.012	0.011	0.160**	0.000***
	(0.008)	(0.008)	(0.068)	(0.000)
1-HHI_MGRS(t-1)	-0.120	-0.115	-0.593	0.000
	(0.072)	(0.078)	(0.470)	(0.001)
FLOW_REALL(t-1)	0.022	0.015	0.576**	0.002***
	(0.053)	(0.058)	(0.247)	(0.000)
FLOW_REALL(t-1) × MNDTS(t-1)	0.031**	0.029**	0.004	0.000
	(0.012)	(0.011)	(0.125)	(0.000)
FLOW_REALL(t-1) × [1-HHI_MGRS(t-1)]	-0.099	-0.092	-0.712	-0.002**
	(0.070)	(0.080)	(0.510)	(0.001)
INCENT_FEES(t-1)	-0.016	-0.013	-0.577***	-0.000**
	(0.024)	(0.025)	(0.161)	(0.000)
SIZE(t-1)	0.021	0.016	0.065	-0.000
	(0.016)	(0.017)	(0.150)	(0.000)
AGE(t-1)	-0.127***	-0.023	1.306***	0.002***
	(0.030)	(0.034)	(0.289)	(0.001)
TURNOVER(t-1)	-0.003***	-0.003***	-0.000	-0.000
	(0.001)	(0.001)	(0.004)	(0.000)
PASSIVE_SHARE(t-1)	-0.107*	-0.101	-1.237***	-0.002***
	(0.062)	(0.061)	(0.336)	(0.001)
ACTIVER2(t-1)	-0.033***	-	0.197***	-
	(0.008)		(0.060)	
TEV(t-1)	-	-14.909***	-	0.192***
		(4.246)		(0.031)
STDEV_BENCH(t)	7.255***	9.673***	-13.877	0.260***
	(1.678)	(1.902)	(13.414)	(0.040)
Year dummies	Yes	Yes	Yes	Yes
Observations	471	471	471	471
Number of sub-funds	58	58	58	58
Adj. R^2	0.381	0.388	0.375	0.625
F-test (MNDTS)	10.27***	10.91***	2.35	8.11***
F-test (1-HHI_MGRS)	28.37***	29.76***	11.00***	10.41***