Does Firm Organization Matter? Evidence from Centralized and Decentralized Mutual Funds

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Abstract

We examine the impact of centralization of investment decisions by a fund's family on its funds' performance and show that funds from decentralized families have higher performance than their centralized counterparts. We exploit a quasi-experiment involving failed mergers to generate exogenous variation in acquisition outcomes of target funds. A difference-in-differences estimation reveals that, relative to failed funds, those acquired in a merger by centralized (decentralized) fund family produce lower (higher) performance. These differences in performance are driven by more discretion in managerial decision making in decentralized fund families. We confirm these findings by tracing the response of centralized and decentralized funds to exogenous changes in their information environment. Though funds in centralized families have lower performance than their decentralized counterparts, we show that these families allow for better coordination in trading and brokerage decisions and better diversification across funds in the family.

I Introduction

In his seminal paper, "The Nature of the Firm", Ronald Coase [1937] raised a fundamental question: Does firm organization affect the allocation of resources? Although this question has spawned a large body of theoretical research (e.g., Williamson [1975; 1985], Aghion and Tirole [1997], Stein [2002]), testing these theories empirically has been challenging due to absence of data that could plausibly relate internal firm organization to its decisions. We exploit data on internal organization structure of mutual funds and examine the role of internal decision making on their investment behavior and performance. In particular, we provide an empirical connection between the type of decision making inside the mutual fund family and performance of its constituent mutual funds. In doing so, we provide evidence that sheds light on the connection between decision making inside the firm boundary and the very nature of its activities.

Mutual funds form a large sector of financial intermediaries with about $12 trillion invested with such entities in the U.S as of end of 2009. The academic literature on mutual funds has examined the performance of mutual funds primarily from the perspective of managerial ability and information, compensation structure, and trading costs. We propose to depart from the literature and examine how the internal organizational structure adopted by the management company—in particular the decision-making process about investments—affects its strategies and performance.

To understand the notion of internal firm organization, consider two contrasting examples. *Baron Capital Management* fund family uses a centralized decision making as is summarized by their investment process in Nelson's Directory of Investment Managers:

> *"The [investment] ideas are presented to the committee until all of the committee members concerns are addressed".*

On the other hand, *Franklin Templeton* fund family follows a decentralized investment process as summarized in Nelson's Directory of Investment Managers:

> *"...portfolio managers have full and final discretion on buy and sell decisions."*

The goal of this paper is to examine the impact of differences in decision-making process across mutual fund families on performance and investment strategies of their constituent funds.

The trade-offs that emerge from the two types of decision-making process follow from a large literature on organizational economics (see Stein [2003]). A centralized decision making reduces the discretion of the manager, thereby lowering her incentives to generate private information. Other forms of incentive compensation may not be able to fully solve this problem since a large part of this information may be information that may be difficult to transfer (soft information) to committees or other decision-making bodies (Stein [2002]) or may be non-contractible (Aghion and Tirole [1997]). In contrast, the downside of a decentralized decision-making organization is the lack of coordination in decisions across the agents in the firm.

These economic trade-offs generate several testable predictions. First, we expect decentralized mutual funds to perform better than their centralized counterparts. This should be largely on account of decentralized funds using more private information in their investment decisions. Second, since the manager talent pool is not homogeneous, we expect higher ability managers to get attracted to decentralized funds—where the decision making allows for better use of the more valuable information they can produce. The first part of the paper uses panel data on nearly 3000 actively managed U.S. equity funds to test these predictions and finds strong support.

The caveat with the empirical approach in the first part of the paper is that omitted factors could impact both fund family decision to follow a certain decision making and their investment and performance. We exploit a quasi-experiment that helps circumvent this challenge. The empirical design uses failed mergers of funds to generate exogenous variation in acquisition outcomes of target funds. In particular, we construct a group of target firms whose mergers failed to go through for reasons that are unrelated to investment skill of the target ('control group'). We then assemble a 'treatment group' comprising of funds taken over in a merger. The two groups then comprise a sample where we claim that the assignment of a firm into a fund family is orthogonal to investment performance (or its expectation) at the time of merger. Under this assumption, we can difference out any selection bias by comparing the investment performance of the funds in the treatment group pre and post-merger with those of the control group.

A difference-in-differences-in-differences estimation reveals that, relative to failed funds, those acquired in a merger by centralized fund family produce lower performance relative to funds in the control group. Strikingly, funds involved in a merger where the acquirer has a decentralized structure see an improvement in their performance. This experiment lends support to the notion that differences in organizational decision making are responsible for generating differences in fund performance.

We next investigate the mechanism that helps generate the differences in performance. We start by showing that there are large differences in the extent of private information that is generated by the two fund structures – with more private information being produced in decentralized fund families. We find this inference holds in the quasi-experiment involving failed mergers as well in the overall pooled sample. We also confirm these findings by tracing the response of the two fund structures to exogenous variation in information quality about investment opportunities faced by them. We find that an exogenous reduction in quality of public information about investment opportunities leads to a differential increase in performance of decentralized mutual funds relative to centralized ones. This evidence is also consistent with centralized funds producing less private information—and as a result suffering more relative to decentralized funds when the precision of public information falls after the shock.

We further extend our analysis by providing direct evidence on the mechanism that drives differences in performance across two structures. In particular, we show that decentralized funds offer greater discretion to their managers, measured by the number of funds per manager. Moreover, they also provide higher-powered incentives, in that fund managers in those families are more likely to be promoted (demoted) based on their superior (inferior) performance.

Overall, we provide strong evidence that decentralized fund families perform significantly better and are likely to produce more private information. In equilibrium, such a result would be hard to justify as it appears that decentralized funds offer greater benefits to their investors. We argue that the downside of a decentralized decision-making organization is the lack of coordination in decisions across the agents in the firm.

Empirically, we demonstrate this to be case. Funds in centralized families allow for better coordination in trading and brokerage decisions across funds in the family. In particular, centralized families are less likely to cannibalize each others' trades in that they are less likely to trade in the opposite directions at the same time. Moreover, funds in centralized families are more likely to use similar execution brokers which is likely to lower their execution costs.

We also provide evidence that centralized fund structures provide better diversification opportunity for their investors. The reason for this, again, involves better coordination of investment decisions that results in smaller "diversification loss" (see, Sharpe [1981]). In summary, there is some evidence that centralized fund structures allow for better coordination of investment decisions across funds in the family.

The empirical literature on the impact of organization design on investment decisions is small. For instance, Mullainathan and Scharfstein [2001], Baker and Hubbard [2004], and Ciliberto [2006] investigate the implications of organizational form on various investment decisions. Similarly, Beshears [2010] and Seru [2010] assess if organizational form impacts firm's productivity. However, most of these studies are indirect since they do not directly observe inputs and outputs of agents undertaking decisions. In contrast, our study extends this literature by providing us a setting where we can observe *both* the impact on inputs (information) and output (portfolio choice, performance and tracking error) of fund managers in response to different decision making inside organizations. Consequently, we are able to provide a more direct evidence and mechanism of whether and how investment decisions are impacted by organizational form.

Our paper also connects to the literature that empirically tests the implications of theories on organizational design (e.g., Aghion and Tirole [1997] and Stein [2002]). The evidence on both the quality of managers and the internal incentives suggests that firms design organizational structure taking into account the effects a given decision making process will have on the inputs of agents impacted by these decisions. By doing so, we contribute to the relatively nascent empirical literature in economics that tests the theories of organizations (Bloom et al. [2010]).

Finally, the paper is related to the literature on mutual fund performance in which the research is divided into studies that document that fund managers have skills (e.g., see Cohen, Coval, and Pástor [2005], Kacperczyk, Sialm, and Zheng, [2005, 2008], Kacperczyk and Seru [2007],) or those which claim managers do not have any skills (see Jensen [1968], Gruber [1996], Fama and French [2008]). By arguing that firm internal organization impacts investment behavior and performance, we connect the literature on mutual fund performance with that on boundaries of the firm—thereby providing a new insight into the nature of a mutual fund's activities.

II Theoretical Considerations

A large theoretical literature argues that organization design may impact the nature of investment decisions (Williamson [1975]). The situation involves incentivizing agents to produce economically valuable information which may be difficult to transfer to committees or other decision-making bodies. Consequently, it may be hard to incentivize agents directly on information that is inherently non-contractible (Stein [2002]). Appropriate organizational design can, in many such situations, be used to provide such incentives. In particular, a decentralized decision-making environment provides discretion to the agent and provides her incentives to produce private information (Aghion and Tirole [1997]). We use this insight in the context of mutual fund families to examine the connection between the investment decision-making process inside the organization and their inner workings.

The investment decision process within a fund family may be centralized or decentralized depending on how much discretion a manager of a constituent fund is given with respect to investment decisions in that fund. To illustrate the basic notion of discretion we have in mind, consider the following piece of information coming from one of the largest mutual fund families in the world, Fidelity Investment Management. In its official statement to shareholders, Fidelity states:

> *"At Fidelity, individual portfolio managers are ultimately responsible for investment decisions. Since our founding, we have believed that individual responsibility and accountability for investment decisions is much more effective than decisions made by committee."*

This would constitute a decentralized decision making fund family. In contrast, T.Rowe Price could constitute a centralized decision making fund family since it manages portfolios using a team approach where members across funds work closely together on the investment strategy, asset allocation, portfolio construction, and security selection.[1] Given the theoretical literature discussed above, we expect mutual fund managers who are allowed more flexibility in deciding on their investment strategies to produce more valuable information. The testable prediction that emerges from this discussion is that, ceteris paribus, funds that are part of decentralized investment management companies should produce more private information in their investment decisions and as a result outperform their centralized counterparts.

The downside of a decentralized organization, however, is the lack of coordination in decisions across the agents in the firm. In other words, we expect better coordination across funds in the family which has centralized decision making in the family. This idea is exemplified in the following report from Barclays Global Management:

> *"Barclays Global Investors offers performance management through quantitative, structured and index management techniques. This focus eliminates the traditional active management decision process and provides maximum cost control."*

The testable prediction that emerges from this discussion is that, ceteris paribus, centralized investment management companies should exhibit better coordination across investment decisions in their funds. In our analysis, we focus on two measurable dimensions. First, we examine the proportion of trades in opposing directions across funds in a given family during a time period. In a similar vein, we also investigate the number of brokers handling the trades across funds in a family during a time period.

Second, we also assess if centralized investment management companies may allow for better diversification of risk across its funds for investors. There could be several reasons for

[1] It is instructive to note that both structures seem to manage significant amounts of assets on behalf of their clients. In 2009, in a $12-trillion mutual fund industry, about 40% of fund families had centralized structures while the remaining had 60% decentralized structure.

diversification loss in decentralized fund family. First, in a decentralized fund family, investment decision in each fund is likely to have more influence of individual fund manager. As a result, there may be manager-specific risks which are introduced across funds in a decentralized fund family that are not as easily diversified. Second, it is also possible that multiple individual managers in a decentralized fund may not account for the correlation of their own portfolio returns with the returns of other managers in the fund family. This diversification loss in decentralized fund family is similar to the notion discussed in Sharpe [1981] and later advanced by Elton and Gruber [2004] and van Binsbergen, Brandt, and Koijen [2008].[2]

We end this section by noting that the differences in type of incentives offered in the two organizational forms may induce managerial sorting if managers are relatively informed about their ability. Specifically, if higher-ability managers prefer discretion in their investment decision making, they might sort into a decentralized fund family. In the empirical analysis, any differences in performance across different organizational structures could be driven by differences in managerial quality. To the extent that this heterogeneity in managerial quality is induced by differences in discretion across organizations, this self-selection does not pose threat to our empirical analysis. However, there may be other reasons for heterogeneity in managerial quality across the two organizational forms. Therefore, our empirical identification is devoted to providing evidence for the causal link between organizational form and fund performance after conditioning for managerial quality.

III Data Description

Our main data set is the Center for Research on Security Prices (CRSP) survivorship bias-free mutual fund database. Our full sample covers the period 1980-2005. Given the nature of our tests and data availability, we focus on actively managed open-end U.S. equity mutual funds. However, for our measure of diversification and some tests we utilize the data of all fund families covered by CRSP. We further merge the CRSP data with fund holdings data from Thomson Financial. The total number of funds in our merged sample is 3477.

We also use the CRSP/Compustat stock-level database, which is a source of information on individual stock returns, market capitalizations, book-to-market ratios, momentum, and standardized unexpected earnings (SUE). In addition, for some of our exercises, we map funds to the names of their managers using information from CRSP, Morningstar, Nelson' Directory of Investment Managers, Zoominfo, and Zabasearch. This mapping results in a sample with

[2]The diversification loss results from the standard portfolio optimization result that the unconstrained solution to the mean-variance optimization problem for the entire portfolio (fund family) as a whole is usually different from the optimal linear combination of mean-variance efficient portfolios (individual funds).

4267 managers.

Our main dependent variable measures performance at the fund level. We use three performance measures: Characteristic Selectivity (*CS*), *3-Factor* α, and *4-Factor* α. *CS* is a measure of stock-picking skill and is calculated following the methodology in Daniel, Grinblatt, Titman, and Wermers [1997]. Alphas are obtained from estimating 12-month rolling-window regressions of fund-level excess returns on excess market returns, SMB, and HML factors for the three-factor alpha, and additionally on UMD (momentum) factor for the four-factor alpha.

The main explanatory variable in our tests is *Central*, an indicator variable equal to one if the fund family is organized as a centralized structure, and zero if it is organized as a decentralized structure. The information on the organizational type comes from annual reports in Nelson's Directory of Investment Managers. The Directory is a lead publication and comprehensive source of information on investment managers available to business professionals for over 30 years. The Directory, mostly accessible in hard copies, provides extensive information on various family-level attributes. Among others, the Directory classifies the decision making inside the fund family as either being centralized or decentralized depending on the process of investment decisions made inside the family. Apart from giving a label to each fund family (as central or decentral), the Directory also provides descriptive information on the decision making inside each family. We read through these directories to ensure consistency between the label and the actual process. Most descriptions indeed closely reflect the label given by Nelson's. Note that there are changes in organization for several fund families during our sample period. Therefore, we read Nelson directories across years in our sample period to capture such information.

In our performance-based tests, we use the following fund-specific control variables: The fund size (natural logarithm of total net assets under management in millions of dollars, *Log(Assets)*), the fund age (natural logarithm of age in years since inception, *Log(Age)*), the turnover rate (in percent per year, *Turnover*), the average fund expense ratio (in percent per year, *Expense*), and the fund load (the sum of front-end and back-end loads, additional fees charged to the customers to cover marketing and other expenses, *Load*). Also included are the fund style characteristics along the size, value, and momentum dimensions.[3] To mitigate the impact of outliers on our estimates, we winsorize *Turnover* at the 1% level.

[3] The size style of a fund is the value-weighted score of its stock holdings' percentile scores calculated with respect to their market capitalizations (1 denotes the smallest size percentile; 100 denotes the largest size percentile). The value style is the value-weighted score of its stock holdings' percentile scores calculated with respect to their book-to-market ratios (1 denotes the smallest B/M percentile; 100 denotes the largest B/M percentile). The momentum style is the value-weighted score of a fund's stock holdings' percentile scores calculated with respect to their past twelve-month returns (1 denotes the smallest return percentile; 100 denotes the largest return percentile). These style measures are similar in spirit to those defined in Kacperczyk, Sialm, and Zheng [2005].

The summary statistics of the data for the performance regressions (time-series averages of cross-sectional means, medians, and standard deviations) are reported in Table I. In a sample of over $190,000$ fund-time observations 32.6% are represented by funds in centralized organization structures. The standard deviation of *Central* is 46.8%. The annualized average fund return in a sample equals 7.74%. An average fund in our sample exhibits positive stock-picking ability as evidenced by CS value of 0.79% per year; at the same time, consistent with prior literature, an average fund underperforms relative to its passive benchmark, both using 3-factor and 4-factor abnormal returns, with respective values of -0.04% and -0.17% per year.

Our tests involving coordination across investment decisions across funds in a family will include the following family-specific control variables: The family size (natural logarithm of total net assets under management in million of dollars obtained as a sum of all funds inside the family, *Log(Famsize)*), the family age (natural logarithm of family age in years since inception, *Log(Famage)*), the family return (value-weighted return of all funds inside the family, *Famreturn*), number of funds inside the family (natural logarithm of the number, *Log(Funds)*), and percentage value of equity funds inside the family (*% Equity*).

IV Preliminary Evidence

We begin our analysis by assessing differences in performance of funds that belong to decentralized fund families relative to those that belong to centralized ones. To do so, we estimate a regression model of the following form:

$$\text{Performance}_{it+1} = \alpha + \beta Central_{it} + \gamma' X_{it} + \mu_t + \mu_i + \epsilon_{it+1}, \tag{1}$$

where *Performance* is a generic variable for four different performance measures: *Return*, *CS*, *3-Factor* α, and, *4-Factor* α. The right-hand side includes lagged value of *Central* as an explanatory variable with β measuring the impact of organization's decision making on performance. We saturate the empirical specification with a plethora of explanatory variables that might be important in explaining the variation in fund performance. In particular, in vector X, we include *Log(Assets)*, *Log(Age)*, *Turnover*, *Expense*, *Load*, and style attributes (*Size*), value (*Value*), and momentum (*Momentum*). We additionally include fund and time fixed effects, denoted by μ.[4] Since *Central* varies at the family level, we cluster standard errors at the fund family groupings.

[4]Note that, in the specifications that use fund fixed effects, the identification on the coefficient of *Central* in this section is coming from changes in decision making faced by some funds in the data. Over the sample period, we have 140 changes where the investment decision making of a fund changes. This is largely on account of fund mergers changing the decision making associated with its family.

The regression results are presented in Table II. We first present results for specifications without time fixed effects (columns (1)-(3)). In column (1), we present results for *CS*. The coefficient of *Central* equals -0.88%, a drop of 4% of a standard deviation, and is statistically significant at the 1% level. In column (2), for *3-factor* α, the coefficient of *Central* is -0.74%, a drop of 10% of a standard deviation, and is statistically significant at the 5% level. For *4-factor* α, in column (3), the effect is 0.56% reduction, an equivalent of 7% of standard deviation, and is statistically significant at the 10% level. We include time-fixed effects in columns (4)-(6) and find that the results are quantitatively very similar. These results provide evidence that is consistent with the notion that funds in centralized structures have lower performance relative to those in decentralized structures.

V Identification

The evidence from panel data suggests that organizational structure plays an important role in performance differences across funds. However, such evidence is difficult to interpret as causal, especially since the context of our analysis makes it subject to potential endogeneity concerns. We start by describing a selection consideration in this spirit—managerial sorting—which may make such inferences difficult. We provide evidence for such selection and offer a simple solution to deal with this concern. We then discuss results from a quasi-experiment that more generally accounts for selection bias due to omitted variables (including managerial sorting).

V.A Differences in Managerial Quality

The simplest concern with interpreting our performance results causally is that these differences could arise from several other factors. Not all such factors are necessarily inconsistent with our arguments on differences in organization of the the two fund structures being responsible for differences in performance. However, the presence of these factors makes it hard to isolate the effect of fund organization on performance, *all else equal*. The simplest example concerns the heterogeneity in managerial quality in the two structures. Why might we expect quality of managers to vary depending on the fund structure? Under our interpretation, decentralized structures provide managers with more flexibility to execute their ideas. As a result, we expect managers with better investment skills sort into these type of organizations. There could be other factors too. But regardless of the source of this sorting, its presence makes interpreting the results from Table II difficult.

We first conduct analysis to assess if there are differences in managerial quality across the two structures. To get at a measure of ex-ante ability we use a hand-collected data on managerial education. Empirically, Chevalier and Ellison [1999] have shown that managers with better education seem to generate better investment returns, which confirms the premise of our test. In particular, we construct three skill measures: $GRAD$ is an indicator variable equal to one if the manager has a graduate diploma (MBA, MA or PhD) and zero, otherwise; IVY is an indicator variable equal to one if the manager has any degree from the Ivy League academic institution; $IVY \times GRAD$ assigns a value equal to one to managers who have a graduate diploma from the Ivy League School. Subsequently, we evaluate whether different organizational structures employ managers with different skills by looking at the regression model in which *Central* is a function of *Skill*, where *Skill* is a generic name for our skill measures defined above. In this regression, we cluster standard errors at the fund manager level.

The results, presented in Panel A of Table III, indicate strong relationship between organizational structure and skill: Managers in decentralized structures, on average, exhibit better skills than managers employed by centralized structures. The results are particularly strong for $GRAD$ and $GRAD \times IVY$, though even for IVY we find a negative relationship.

An alternative way in which we can also assess the differences in managerial quality in the two structures is by assessing outside career outcomes of managers from the two structures. These outcomes could serve as a signal for quality under the assumption that, on average, managers with higher quality are more likely to have favorable external career outcomes. We measure external career outcomes in three ways: By observing if a manager moves to another fund outside the fund family that is larger in size than the fund she was managing before, *External Promotion*; or if a manager moves to a hedge fund, *Hedge Fund*. Both outcomes can be regarded as signs of superior investment skills. Likewise, we could also look at demotions—career movements from a larger to smaller size, in which case managers with less skill would be more likely to be demoted, *External Demotion*. In terms of our hypothesis, one should then expect that managers in decentralized structures should be more likely promoted, move to a hedge fund, or be less likely demoted. Formally, we test this hypothesis using the following regression model:

$$CareerOutcome_{it+1} = \alpha + \beta Central_{it} + \gamma' X_{it} + \epsilon_{it+1}, \tag{2}$$

where *Career Outcome* is a generic variable for *External Promotion*, *External Demotion*, and *Hedge Fund*. To control for any other effect that may be correlated with the organizational structure and career outcome itself we include a vector of control variables, X, which includes all the same controls we used in regression (9). In addition, to control for any differences in performance among fund managers not observed to the econometrician, but conditioned upon by outside labor market, we use return gap – the measure of unobserved actions introduced in Kacperczyk, Sialm, and Zheng [2008], *Return Gap*. We additionally include fund and time fixed effects. Standard errors are clustered at family groupings. The coefficient of interest is β, which measures the relative importance of the structure for the subsequent career outcomes.

We report the results in Panel B of Table III. In column (1), we consider *External Promotion* and find that managers employed by centralized structures are less likely to be promoted to a larger fund outside her own family. The effect is statistically significant at the 10% level of significance. Similarly, in column (3) we show that such managers are less likely to land a job in a hedge fund industry. This effect is statistically significant at the 1% level. At the same time, while we find, in column (2), that managers in a centralized structure are more likely to be demoted to a smaller fund outside their own families, this effect is statistically insignificant. Overall, this evidence suggests that managers of higher quality sort into decentralized fund families.

V.A.1 Simple solution

The results in Section V.A indicate a significant heterogeneity in managerial ability, possibly induced by differences between the two organization structures. These results, while consistent with our hypothesis, also pose an important challenge on how to interpret our findings. Could the results on differences in performance be driven by differences in managerial ability—with higher quality managers matched to decentralized funds for unobservable reasons other than our hypothesis? To the extent that the differences in performance in the two structures are not driven by time-invariant manager characteristics, introducing manager-fixed effects in our previous specifications should isolate the effect of organization structure.[5] In this section, we consider this possibility.

In our analysis, we present the results from panel data—but rather than estimating the performance regression at the fund level, we reorient our data to the manager level to facilitate the use of manager-fixed effects. In columns (1)-(3) of Table IV, we present the results with fund and time-fixed effects, but without manager-fixed effects. We obtain similar results to those we obtained in our fund-level specification, in Table II. Subsequently, in columns (4)-(6), we estimate the same model adding manager-fixed effects to the specification. Including manager-fixed effects retains the economic and statistical significance of our findings. Note that these specifications are more stringent and exploit the within manager-fund variation. In

[5] Introducing fixed effects accounts for time-invariant but not time-varying managerial attributes. However, the essence of our empirical context indicates that the former variation is likely to be more important in this setting.

other words, the identification here comes from tracking the performance of the *same* manager across a centralized and decentralized fund structures over time. These results indicate that differences in structure itself maybe an important driver of our findings.

Overall, the results suggest that while differences in managerial ability may be driving some of the magnitudes, a large part of our findings are also influenced by differences in organization structure. While it could still be the case that we may not have accounted for some omitted factor which affects both differences in manager ability and the performance across the two structures, these specifications provide comfort that the time invariant component of such a factor is unlikely driving our findings on performance.

V.B Evidence from a quasi-experiment on failed fund mergers

In this section, we exploit a quasi-experiment using failed fund mergers to handle selection concerns more generally. Before proceeding with the analysis it is worth clarifying the nature of selection issue more formally. The goal of empirical tests so far has been to isolate the causal effect of centralized activity on manager investment behavior. Let us represent this average treatment effect as $ATE = E[y_i(C=1) - y_i(C=0)]$, where $y_i(C=j)$ is the investment performance of a fund i when it is (not) a part of centralized family $j = 1$ ($j = 0$). To illustrate the complications in making causal inferences, let us focus on regressions in Table II where we observed $E[y_i(1)|C=1] - E[y_i(0)|C=0]$, i.e., the difference in average performance of centralized firms relative to decentralized ones. It is useful to note that:

$$\begin{aligned} E[y_i(1)|C=1] - E[y_i(0)|C=0] &= (E[y_i(1)|C=1] - E[y_i(0)|C=1]) \\ &+ \underbrace{(E[y_i(0)|C=1] - E[y_i(0)|C=0])} \end{aligned}$$

The bracketed term is the 'selection bias' that plagues the estimates. Put simply, it says that there might be a bias in the estimates since investment performance of mutual funds that are a part of the centralized firm might differ from those that are decentralized—both on observables and unobservables. If one could randomly assign funds with similar investment skill into centralized and decentralized funds, one could remove this bias (since with random assignment $E[y_i(0)|C=1] = E[y_i(0)|C=0]$).[6] Following this, the empirical design in this part of the paper is geared towards discussing a quasi-experiment that tries to get as close as possible towards generating this random assignment.

[6]It is easy to show using iterated expectations that the term that survives after the selection bias is removed is equal to ATE.

V.B.1 Empirical Design

The empirical analysis involves a quasi-experiment involving failed mergers of funds that helps generate exogenous variation in acquisition outcomes of target funds. In particular, we construct a group of target firms whose mergers failed to go through for reasons that are unrelated to investment skill of the target ('control group'). We then assemble a 'treatment group' comprising of funds taken over in a merger. The two groups then comprise a sample where we claim that the assignment of a firm into an fund-family is orthogonal to investment performance (or its expectation) at the time of merger. Under this assumption, we can difference out any selection bias by comparing the investment performance of the funds in the treatment group pre and post-merger with those of the control group.

This design allows for two tests. The identification of the main estimate comes from the unsuccessful targets that were going to be a part of centralized fund family acting as a counterfactual for how the successful targets would have performed investment *after* the merger, had they not been acquired by centralized fund families. In addition, the research design allows us to conduct additional tests to assess the behavior of funds which become a part of decentralized fund family. Under our hypothesis, we should observe that target funds in such mergers should suffer less from the dilution of incentives to engage in information production.

The basic sub-sample used for this test comes from the SDC Platinum Database. We start by considering all the potential merger events involving financial institutions in this database over our sample period. We then hand match the names of the acquirer and the target fund to funds in our sample. This allows us to link the fund characteristics of target funds before and after the merger event date.

We then construct two groups based on the final sample. The control group consists of mergers that failed to go through for reasons that are unrelated to investment activity of the target. To construct this sample, we verify that the failure of the merger did not occur due investment activity of the target based on news items from Lexis-Nexis and Factiva. The second group, the treatment sample, consists of cases where the target fund was acquired in a merger.

To make inferences about subsequent changes in investment of the control and treatment groups after the intended merger date (*event date*), we need to show that the assumption about sample construction of the control group is valid. The quasi-experiment assumes that, conditional on observables, the investment performance of targets in the control and treatment groups is similar before the event. In unreported tests we confirm that the descriptive statistics on different characteristics for firms in the two groups before the merger event. The two groups are very similar in terms of different measures of performance.

In the unreported test we pooled all target firms and examine whether the investment performance of the targets at any time $t-1$ can predict the deal's success at time t. We take all the years till the year in which the deal either succeeds or fails (inclusive). More concretely, the specification is:

$$Prob\,(\text{Success}_{it}=1)=\Phi\left(\alpha+\ \gamma X_{it-1}+\beta_1\text{Performance}_{it-1}+\mu_t\ \right), \tag{3}$$

where Φ denotes the logit distribution function and X are control variables. The dependent variable *Success* takes a value 1 for the treatment group in the event year and 0 otherwise. The coefficient of interest is β_1, the coefficient of performance of the target fund prior to the merger event.

In this regression, we find that β_1 is insignificant across specifications. This evidence suggests that, conditional on other observables, the pre-merger characteristics of the control and the treatment sample are quite similar on the dimension of performance—and as a result, measures of investment are not able to predict which deal will subsequently succeed. This analysis validates the methodology that was used to construct the control sample.

V.B.2 Main Result

In our main tests, we estimate a difference-in-differences-in-differences (DDD) specification that compares the investment performance of targets *within* the treatment and control groups before and after the event dates and then compares the difference *across* the two groups for mergers involving centralized acquirers versus decentralized ones. Specifically, the specification that is estimated in Table V is:

$$Performance_{it}=\left\{\ \alpha+\gamma_1\text{After}_{it}+\gamma_2\text{After}_{it}*T_i+\gamma_3\text{After}_{it}*T_i*Central_i+\delta\mathbf{Z}_{it}+\mu_t+\mu_i\ \right\}, \tag{4}$$

where, *After* is an indicator variable that takes a value 1 for all the years after the event date and 0 otherwise and T is an indicator variable that takes a value 1 for targets in the treatment group and 0 for targets in the control group. And, *Central* is an indicator variable that takes a value 1 for mergers that involve centralized acquirers and is 0 for mergers where the acquirer is decentralized. All the regressions are estimated with time (μ_t) and fund (μ_i) fixed effects.

Note that, this specification allows us to assess the change in performance of funds in the treatment group when the mergers are ones where acquirers have decentralized headquarters relative to the funds in the control group (γ_2). In addition, it also helps to infer the change in performance in instances when the funds in the treatment group are acquired by centralized fund family, relative to the funds in the control group (γ_3). The net effect of acquiring targets in a centralized structure would therefore be given by $\gamma_2 + \gamma_3$.

In Panel A, we consider the three-factor alpha as a measure of performance. As can be observed across specifications, $\gamma_2 > 0$, suggesting that funds that are acquired by decentralized families tend to improve their performance after the merger, relative to similar funds in the control sample. This implies that the funds that are acquired by families that are decentralized are able to leverage on better environment for private information generation (including appropriate incentives and resources)—thereby outperforming funds that do not successfully merge.

Strikingly, we observe an opposite pattern for funds that are acquired by centralized fund families, relative to similar funds in the control sample ($\gamma_3 < 0$). This suggests, consistent with our hypothesis, that such fund organizations are not conducive to producing private information that helps in superior performance. Moreover, the net effect of such mergers, given by $\gamma_2 + \gamma_3$ is negative. This suggests that, overall, mergers where the decision-making for acquired fund becomes centralized see a drop in their performance after the merger event. The results described here remain similar across specifications that iteratively adds more controls as well as clusters standard errors at time dimension.

In Panel B, we present the results with alternative measures of performance. The results in the first two columns use four-factor alpha and confirm the inferences made in Panel A. Interestingly, we find no action on the dimension of holdings-based measures. We present results using *CT* measure, but the nature of the results are similar for other holdings-based measures as well. Overall, the findings from this section confirms that differences in fund organization has a direct effect on the performance of the funds.

VI Economic Mechanism

Our analysis suggests that that decentralized structures produce better performance than their centralized counterparts. In this section, we provide evidence that drills down on the mechanism that drives our findings. In Section VI.A, we provide evidence that managers in decentralized structures outperform their counterparts in centralized structures because they produce more private information. In addition, we also provide evidence that suggests that decentralized structures provide fund managers with more discretion and incentives to produce private information for their investment activities in Section VI.B.

VI.A Differences in Information Production

One of the consequences of providing better incentives to managers in decentralized structures for investment decisions is that such fund managers should have greater incentives to produce useful private information. We explore this conjecture in two ways: Directly, by looking at fund managers' reliance on various information sources, and indirectly, by looking at the response of fund families in terms of having personnel associated with collecting private information on investment opportunities.

In our first test, we assess how fund managers' reliance on private information varies across fund structures. In line with our hypothesis, managers in decentralized structures should rely more on private information in their investment decisions. We construct two different measures of reliance on private information, which are conceptually similar to the reliance on public information (*RPI*) measure previously introduced by Kacperczyk and Seru [2007]. The basic idea behind these measures is to evaluate the strength of a response of fund managers' portfolio holdings to future information shocks which are supposed to proxy for private information since they are not publicly available at the time of making decision. This strength is expressed in terms of the sensitivity regression's R-squared.

Specifically, we use two measures to capture the reliance on private information by managers: *RPI(SUE)* is the R-squared from the regression of changes in portfolio weights from time t to t+1 on Standardized Unexpected Earnings (SUE) at time t+1 and *RPI(SYST)* is the R-squared from the regression of changes in portfolio weights from time t to t+1 on the systematic risk from the market model at time t+1.[7] With these measures in hand, we estimate the following regression:

$$RPI_{it} = \alpha + \beta Central_{it} + \gamma' X_{it} + \mu_t + \epsilon, \tag{5}$$

where *RPI* is a generic name for the two different *reliance* measures. All the right-hand side variables mirror those specified in regression model (1). Standard errors are clustered at the family groupings. Our coefficient of interest, β, measures a differential response of fund managers' information production to differences in the organizational structure. We expect the coefficient to be negative, that is, managers in centralized structures rely less on private information. Panel A of Table VI presents the results. Estimates in columns (1) to (4) are negative and significant, confirming that managers employed by centralized structures indeed rely less on private information.

[7] Similar measures have been recently used in Kacperczyk, Van Nieuwerburgh, and Veldkamp [2010] to study cyclical patterns in attention allocation.

We also test for this effect directly in the quasi-experiment discussed earlier. In particular, we follow the same specification as (4) but use *RPI* as the dependent variable. We present the results in Panel B of Table V. As is shown in Columns (5) and (6), the results suggest that there is a dramatic drop in reliance on private information subsequent to the merger for cases when the fund is acquired by centralized organization ($\gamma_3 < 0$). No such effect is evident when the merger involves a decentralized organization. This result confirms that the mechanism driving differences in performance across the two fund structures is related to to the amount of private information being produced in these organizations.

We also conduct additional tests that confirm this mechanism. In particular, we directly study the resources for information production employed by the fund organizations. To the extent that fund managers of decentralized structures would like to produce more information internally (instead of relying on public sources), the organizations employing them would likely facilitate such process and supply the private information to their trading desks. As a result, we expect more personnel associated with collecting private information on investment opportunities to be present in decentralized structures. This personnel could include buy-side security analysts, security traders, and other fund managers, among others. We gather information on these variables from Nelsons' Directories. In addition, we use family size, *Famsize*, as an indirect proxy for the ability of the fund family to provide useful information following the intuition that large companies, such as Fidelity, are more likely to be better equipped to provide useful information to their managers.

Formally, we estimate the following regression model:

$$\text{InfoProduction}_{it} = \alpha + \beta Central_{it} + \gamma' X_{it} + \epsilon, \tag{6}$$

where *InfoProduction* is a generic variable for any measure of the internal information production sources. In our regression model, we alternately use the number of analysts, *Analysts*, the number of managers, *Managers*, and the number of security traders employed by the family, *Traders*. The last specification includes the natural logarithm of family assets, *Log(Famsize)*. Our main variables of interest is *Central*. We also include a vector of control variables, *Log(Famage)*, *Famreturn*, and *Expenses*. We cluster standard errors at the family groupings. Our coefficient of interest is β, which measures the differential response of the two organizational structures in terms of their information production. Panel B of Table VI presents the results.

In columns (1) and (2), we respectively consider the univariate and multivariate specifications for *Analysts*. Consistent with our prediction, we find a strong negative effect of a centralized structure on the number of analysts employed. The coefficient of *Central* is statistically significant at the 1% level of significance; it is also economically significant: Moving from centralized to decentralized structure amounts to an increase of about 9 analysts. In columns (3) and (4), we examine the effect of structure on *Managers*. Like in the previous case, we again find a strong and negative effect of a centralized structure on the number of employed managers. The coefficient of *Central* is statistically significant at the 1% level of significance. Moving from a centralized to decentralized structure leads to an increase of about 13 managers, an economically significant result. Finally, in columns (5)-(6), we look at the effect on *Traders* and find a similarly strong effect: Moving from away from centralized structure amounts to an increase of about 2.5-3 security traders. Taken together, these results indicate that decentralized funds have more information-gathering resources which is consistent with funds in these structures producing more private information.

VI.A.1 Evidence from information environment shock

We now provide additional evidence that supports the notion that decentralized fund structures produce superior performance on account of more private information. In particular, we exploit changes in information environment about investment opportunities faced by different fund structures and trace responses of fund performance to these shocks. Specifically, our empirical design builds on the notion that fund managers weigh public and private information in their investment decisions. Consequently, if managers in decentralized structures generate more precise private information about their investment opportunities, an exogenous change in the precision of public signal about investments should impact the reliance on public information and the investment performance of decentralized funds to a lesser degree.[8]

Our experiment requires an exogenous shock to precision of public information of investments across various funds. For that purpose, we build on Hong and Kacperczyk [2010] (HK) and use mergers between large brokerage houses. The sample construction is discussed in Appendix. HK show that such mergers result in the firing of analysts because of redundancy (e.g., one of the two analysts covering the same stock is let go) and other reasons such as culture clash – and this reduction impacts analyst forecast bias. We verify in Appendix that reduction of analysts following mergers of brokerage houses also leads to an increase in analyst

[8]This follows from an idea that was exploited before in Kacperczyk and Seru [2007]. In a setting similar to Grossman and Stiglitz [1980] they show that managers who produce more private information put smaller weight on the public signal. More formally, suppose all participants observe a normally distributed public signal about the asset fundamental value with mean $\bar{u}$ and precision ρ_{pu}. Moreover, suppose informed managers observe a private signal, θ, about the asset fundamental value, u, with $\theta = u + \epsilon$, where ϵ is distributed $N(0, \rho_\epsilon)$. Then any informed manager calculates the expected value and precision of the asset mean as, $E[u \mid \theta] = \frac{\rho_\epsilon}{\rho_\epsilon + \rho_{pu}}\theta + \frac{\rho_{pu}}{\rho_\epsilon + \rho_{pu}}\bar{u}$, with $\rho[u \mid \theta] = \rho_\epsilon + \rho_{pu}$. Thus if the precision of private signal (ρ_ϵ) is tied to skill (see Kacperczyk and Seru [2007]), we would expect that any exogenous change in the precision of the public signal should impact the holdings, and the investment performance of decentralized funds to a lesser degree.

forecast errors of stocks that are covered by both merging houses (treated stocks). Under the assumption that information in public domain is affected by the quality of information produced by sell-side analysts, an increase in analyst forecast error implies a decrease in precision of public information for the treated stocks. To the extent that the pre-merger exposure of a given mutual fund to stocks that are affected by the merger of brokerage houses is exogenous, we can trace the performance and investment behavior of the two organizational structures in response to the merger event

To examine how the shock to precision of public information to some stocks propagates through the two organizations, we start by focusing on performance. In particular, we estimate the following specification:

$$\text{Performance}_{it+1} = \left\{ \begin{array}{l} \alpha + \beta_1 Central_{it} + \beta_2 Central_{it} \times After_t \\ +\beta_3 Central_{it} \times After_t \times Intensity_{it} + \gamma' X + \mu_i + \mu_t + \epsilon_{it+1} \end{array} \right\}, \quad (7)$$

where *Performance* is a generic variable for our performance variables. *Central* is an indicator variable equal to one if the fund belongs to a centralized structure and zero, otherwise. *After* is an indicator variable equal to zero when the observation is in the pre-merger window and one if the observation is in the post-merger window. *Intensity* measures the exposure of each fund to the treated stocks in the merger. It is defined as a value-weighted fraction of treated stocks that are held by the fund. To ensure that we adequately account for other differences across funds that may affect performance we condition on *Log(Assets)*, *Log(Age)*, *Turnover*, *Expense*, *Load*, and style attributes (*Size*), value (*Value*), and momentum (*Momentum*). This specification is estimated with fund-fixed effects (μ_i) to account for fund-specific unobservables and time-fixed effects (μ_t). Standard errors are clustered at the family level.

This specification is equivalent to a difference-in-differences-in-differences approach (DDD). More specifically, we compare the change in outcome variable around the merger event across funds in decentralized and centralized fund families and across funds with different exposure to stocks affected by the merger event. The coefficient of interest is β_3, and in line with our prediction, we expect this coefficient to be negative – the adverse shock to precision of public information should negatively impact the performance of exposed centralized funds to a larger degree.

We present the results from the estimation in Table VII, columns (1)-(3), iteratively employing *CS*, *3-factor* α, and *4-factor* α. Consistent with our prediction the coefficient β_3 is negative and statistically significant in all the specifications. This suggests that, relative to their decentralized counterparts, centralized funds suffer a lower performance in response to an exogenous decrease in precision of stocks in its portfolio.

The results across all performance variables are also economically strong: The standard deviation of *Intensity* in our sample is 0.17, which implies that the effect of the shock is the reduction in *CS* of the centralized structure of 1.36% per year relative to a decentralized structure. Similar numbers for the other two measures of performance are 0.66% and 0.62% per year. In summary, we find strong support for our prediction that the performance in centralized structures is more adversely affected by the exogenous shock to the quality of public information.

In columns (4)-(6), we use an alternative measure to capture the exposure of each fund to treated stocks. Specifically, we define *Intensity* in these columns as an indicator variable that takes a value 1 if the continuous measure of intensity is greater than the sample intensity median, and zero, otherwise. Consistent with our earlier findings, the findings in these columns suggest that the estimate β_3 is driven by subsample with above-median exposure to treated stocks.

We also assess whether there is also a change in reliance on private information in response to the merger event as would be predicted by our hypothesis. Accordingly, we employ an exactly same DDD specification as (7) iteratively for *RPI(SUE)* and *RPI(SYST)*. Similarly, we include the same set of control variables and cluster standard errors at the family groupings. In unreported tests we find that the merger event leads to a relative decrease in reliance on private information for centralized funds compared to their decentralized counterparts. This is consistent with our hypothesis which argues that centralized funds produce less private information, and as a result are more sensitive to shocks in information environment in the public domain.

We further conduct several tests to provide additional evidence that is supportive. First, we assess if the effects we document weaken over time. The expectation is that organizations would adjust to the shock in a reasonable period of time and the effects we find would dampen as one moves further away from the merger event date. In particular, we examine how the effects of performance and tracking error change 12-months ahead and 18-months ahead after the event. We find that the effects indeed diminish the longer time period we consider after the event. Second, since the differences in behavior of different organizational forms are on account of human capital that produces the private information about various investments, it might be reasonable to expect stronger effects in periods when it might be harder for organizations to 'adjust' on this margin. Consistent with this conjecture, we find the effects we documented earlier are stronger when labor market conditions are tighter.[9] Finally, we conduct a placebo

[9] Specifically, we split the sample into periods with tight and loose labor market conditions based on the Chicago Federal Reserve National Activity Index (*CFNAI*). We define the period to be loose whenever the value of *CFNAI* in this period is greater than the median value of *CFNAI* and the period to be tight when the

test in which we randomly pick a merger event date and repeat the estimation of the regression models as in equation (7). Since the placebo event date is unrelated to a shock in the precision of public information we expect no differential effect between two family structures, i.e., β_3 should be insignificant. We conduct this test for several permutations of the event date (from 2 years before to 2 years after the factual event) but in each of these permutations we find no effect on β_3.

Overall, by tracing the response of fund families to exogenous changes in their information environment we are able to confirm that funds in decentralized structures produce more private information and hence generate higher returns.

VI.B Differences in Managerial Incentives

In this section we assess if incentives inside decentralized structures slant managers towards producing more private information relative to the centralized counterparts. Our first test examines whether there are differences in discretion provided to managers between funds in the two structures. Formally, we estimate the following regression model:

$$Discretion_{it} = \alpha + \beta Central_{it} + \gamma' X_{it} + \mu_t + \epsilon, \tag{8}$$

where *Discretion* is a generic variable of managerial discretion, and X is a vector of control variables including *Log(Famage)*, *Expense*, and *Famreturn*. We additionally include time-fixed effects and cluster standard errors at the fund family groupings. Our coefficient of interest is β. Our mechanism predicts $\beta < 0$, that is, centralized fund families offer less discretion to their managers.

We use two measures of *Discretion*: the number of funds managed by a manager, *Funds/Manager*, and the value of assets managed on average by a manager, *Assets/Manager*. We argue that a higher value of both of these measures represents more discretion to the manager in her decision making. Therefore, as per our hypothesis, we expect both these measures to be negatively related to *Central*.

Panel A of Table VIII presents the results. In column (1), we present results for the univariate regression of *Funds/Manager* on *Central*. The coefficient of *Central* is negative and statistically significant. The result is robust to an inclusion of other control variables, as evidenced in column (2). Finally, in columns (3)-(4), we show results for our third measure, *Assets/Manager*, and find a similar negative effect of *Central*. In sum, we find strong evidence

current *CFNAI* value is below the median value of *CNAI*. Subsequently, we estimate the regression model in (7) for *Performance* and *IdioVol* separately for high and low *CFNAI* and find that the effects on these variables are stronger when the labor conditions are tighter.

that centralized structures on average offer less discretion to their managers, consistent with our proposed mechanism.

We next examine differences in the two organizations on another dimension of internal incentive provision. Since performance tracks the effort of the managers more closely in funds belonging in decentralized structures, we expect funds belonging to these structures to have higher powered incentives relative to their centralized counterparts. As a gauge of degree of internal incentives, we examine the sensitivity of internal career outcomes, such as promotion to a larger fund inside the fund family or demotion to a smaller fund inside the fund family, to performance of the manager. To this end, we construct two measures of internal career outcomes: *Internal Promotion* is an indicator variable equal to one if a manager moves internally to a fund with more assets under management and zero, otherwise; *Internal Demotion* is an indicator variable equal to one if a manager moves internally to a fund with fewer assets under management and zero, otherwise.

We test our conjecture by estimating the following regression model:

$$InternalCareer_{it+1} = \alpha + \beta_1 Central_{it} + \beta_2 Central_{it} \times Return_{it} + \gamma' X_{it} + \epsilon_{it+1}, \qquad (9)$$

where *Internal Career* is a generic name for the two variables of career outcomes; *Return* is a return of a manager in the fund; X is a vector of control variables including an indicator variable equal to one if a manager is a male and zero, if she is a female, *Gender*; the natural logarithm of a manager's age, *Log(Manage)*; fund-level idiosyncratic risk, *Idio Vol*; beta, *Beta*; and flows into a fund, *Flow.* In addition, we include all the other variables we previously used in regression (1). We consider specifications with and without time fixed effects. Our coefficient of interest is β_2, which measures the sensitivity of internal career outcome to performance conditional on the organizational structure.

In columns (1) and (2) of Panel B of Table VIII, we present the results for promotion. In both specifications, we find that the effect of return on subsequent internal promotion is stronger for decentralized structures. The coefficient β_2 is statistically significant at the 1% level of significance. Likewise, in columns (3) and (4), we show that incentives have also more power in the case of demotions. In this case the coefficient β_2 is positive and statistically significant at the 1% level of statistical significance. These results suggest that, relative to centralized fund families, decentralized fund families have a higher-powered incentive provision for managers.

Overall, both the results on discretion and incentives inside internal labor market suggest that, compared to centralized structures, decentralized structures provide stronger incentives to exert effort to gather useful private information.

VII Why does centralized structure exist?

Our analysis so far suggests that decentralized fund families perform significantly better. However, in equilibrium, one observes centralized structures too. We argue that the downside of a decentralized decision-making organization is the lack of coordination in decisions across agents in the firm. In particular, centralized investment management companies should show higher coordination across trading and brokerage decisions in their funds. On a similar vein, we will also assess if centralized investment management companies allow for better diversification of risk across its funds for investors – since multiple individual managers in a decentralized fund may not account for the correlation of their own portfolio returns with the returns of other managers in the fund family.

We formally evaluate if centralized fund families differ from their decentralized counterparts on how coordinated investment decisions are using the following regression model:

$$Coordination_{it+1} = \alpha + \beta Central_{it} + \gamma' X_{it} + \mu_t + \epsilon_{it+1}, \tag{10}$$

where *Coordination* is a generic name for three different measures of coordination: *Trades Coordination*, *Brokerage Coordination*, and *IdioVol*. To obtain *Trades Coordination*, we first calculate the number of positive (#*pos.*) and negative (#*neg.*) changes in holdings (from period to period) stock by stock for a given family and time. Next, for the same time and family we calculate the number of funds inside the family ($\#funds$). Then, for each stock/family/time, we define the following measure of coordination: $C = (\#pos./\#funds)^2 + (\#neg/\#funds)^2$. Finally, we aggregate C across stocks inside the same family and time. In general, a higher value of this variable implies a greater degree of coordination. Next, to obtain *Brokerage Coordination*, we first calculate the number of funds inside the family ($\#funds$). For each family, we obtain the list of brokers that are responsible for trades in each individual fund. For each broker, we then calculate the number of funds inside the family that the broker does business with (#*broker*). Then, we calculate the fraction of funds in which each broker offers service. The final measure is calculated as the average fraction of participation across all brokers inside a given family. Similar as before, a higher value of this variable implies a greater degree of coordination. Finally, *IdioVol* is a measure of family-level idiosyncratic risk, obtained obtained from 12-month rolling-window linear projection of value-weighted family-level excess returns on a set of comprehensive risk factors that capture the exposure of a fund family to systematic risk: equity style (SMB, HML, and UMD), global equity markets, and fixed income risk (default and term spreads). The idiosyncratic risk is the standard deviation of the residuals obtained from such a 6-factor model.

In this regression, we also include lagged values of *Central* and a set of previously defined control variables, X, which include *Log(Famsize)*, *Log(Famage)*, *Famreturn*, *Log(Funds)*, and *% Equity*. In all specifications, we additionally include time-fixed effects, denoted by μ. We cluster standard errors at the fund family groupings. In this specification, β would measure the impact of organization's decision making on the level of coordination inside fund family. Our prediction suggests that $\beta > 0$ for the first two variables and $\beta < 0$ for the last variable.

Table IX presents results from the regression estimation. In column (1), we present results for coordination of trades. The coefficient of *Central* equals 0.050 and is statistically significant at the 5% level of significance. In column (2), we consider coordination of brokerage execution. The coefficient of *Central* equals 0.066 and is again statistically significant at the 5% level of significance. Finally, in column (3), we report the results for idiosyncratic volatility. The coefficient of *Central* equals -0.001, again statistically significant at the 5% level of significance. Overall, though funds in centralized families have lower performance than their decentralized counterparts, we show that these families allow better coordination in trading and brokerage decisions and better diversification across funds in the family.

VIII Conclusion

The goal of this paper is to examine the impact of differences in decision-making process across mutual fund families on investment strategies and performance of their constituent funds. We provide empirical evidence that suggests that decentralized mutual funds have higher performance than their centralized counterparts. This evidence is consistent with the notion that fund families where major investment decisions are decentralized allow its fund managers to run his or her own assets without substantial interference—and this discretion translates into higher performance. However, since decision making is done individually by managers in decentralized structure, there is lack of coordination in portfolio decisions across funds within investment management company. In particular, we show that families where major investment decisions are centralized allow better coordination in trading and brokerage decisions and better diversification across funds in the family.

Our findings speak to the issue raised in Coase [1937] and suggest that internal organization structure has an impact on its investment behavior and performance. Thus, there is a tight connection between decision making inside the firm boundary and the very nature of its activities. Our findings also highlight the trade-offs inherent in the two organizational forms and suggest reasons why one observes different organizational forms in equilibrium. More generally, if trade-offs pertaining to coordination and discretion alter the nature of activities conducted inside a firm's boundary, a natural question arises: what prompts firms to choose one form over the other? Examining what these factors may be remains a fruitful area of empirical inquiry.

Appendix

Sample Construction for Analysis on Changes in Information Environment

Our sample for this test exactly follows HK. In particular, we identify mergers among brokerage houses by relying on information from the SDC Mergers and Acquisition database. We start with the sample of 32,600 mergers of financial institutions. Next, we choose all the mergers in which the target company belongs to the four-digit SIC code 6211 ("Investment Commodity Firms, Dealers, and Exchanges"). This screen reduces our sample to 696 mergers. Subsequently, we manually match all the mergers with IBES data. This match identifies 43 mergers with both bidder and target being covered by IBES. Finally, we select only those mergers where both merging houses analyze at least two same stocks otherwise, there is little scope for our instrumental variables approach below. With this constraint, our search produces 15 mergers, which we break down to parties involved: bidder and target. HK provide more details on these mergers.[10]

Table A.1 lists the names of the merging brokerage houses in our sample, the date of the merger, and the number of stocks covered by either brokerage house or both of them prior to the merger. We observe a significant variation in the number of stocks covered by the bidder and target individually and the overlap in the coverage. For instance, in the merger involving Paine Webber and Kidder Peabody, Paine Webber covered 659 stocks and Kidder covered 545 stocks. There was a 234 stock overlap in terms of their coverage. Overall, 1656 stock-merger observations in our sample are part of the treatment group (with 948 different treatment stocks).

Mergers led to changes in quality of public information

We verify that the merger event is indeed a shock to a precision of public information of the affected stocks. To this end, we employ a difference-in-differences (DID) specification and

[10] Of the 15 mergers, six are particularly big in the sense that the merging houses tend to both be big firms and had coverage pre merger on a large number of similar stocks. The first of these big mergers is Merrill Lynch acquiring in 9/10/1984 a troubled Becker Paribas that was having problems with its own earlier merger to another firm. The second is Paine Webber acquiring Kidder Peabody on 12/31/1994. Kidder was in trouble and had fired a good part of its workforce before the merger and in the aftermath of a major trading scandal involving its government bond trader, Joseph Jett. The third is Morgan Stanley acquiring Dean Witter Reynolds on 05/31/1997. Morgan Stanley was portrayed as wanting to get in on the more down-market retail brokerage operations of Dean Witter. The fourth is Smith Barney (Travelers) acquiring Salomon Brothers on 11/28/1997. This is viewed as a synergy play led by Sandy Weill. The fifth and sixth mergers involved Swiss banks trying to geographically diversify their lines of business into the American market. These mergers happened within a few months of each other. Credit Suisse First Boston acquired Donaldson Lufkin and Jenrette on 10/15/2000. A few months later on 12/10/2000, UBS acquired Paine 14 Webber.

examine changes in forecast error between treated (affected by merger) and control (unaffected by merger) stocks around the merger event window. The DID estimator is a standard way to account for any macro trends which might lead to change in forecast error for all the stocks. For each merger, we consider a one-year window prior to merger (pre-event window) and a one-year window after the merger (post-event window). The treatment group are all stocks that are covered by both merging houses, while the control sample are all other stocks. To measure the differential effect of mergers on forecast error, we estimate the following regression model:[11]

$$FERROR_{it} = \alpha + \beta_1 After_{it} + \beta_2 After_{it} \times Treated_i + \gamma' X + \mu_m + \mu_j, \tag{11}$$

where consensus forecast error (*FERROR*) is calculated as a mean or median forecast error among all analysts covering a particular stock. The forecast error, at the analyst level, is measured as the absolute difference between the forecast of an analyst j at time t and the actual EPS, expressed as a percentage of the previous year's stock price. *After* is an indicator variable equal to one for the post-event period and zero for the pre-event period. For each merger window, we assign an indicator variable *Treated* equal to one for each stock covered by both merging brokerage houses, and zero otherwise.

Vector X represents other variables that have been shown (e.g., Hong and Kubik [2003]) to affect the forecast error. Those are constructed using CRSP and Compustat database. By including the controls we account for any systematic differences in stocks, which may affect the partial effect to change due to merger. In particular, *Ln(Size)* is a natural logarithm of the market cap of the stock; *Sigma* the variance of daily (simple, raw) returns of stock i during year t; *Retann* the annual return on the stock; *Ln(BM)*, the natural logarithm of the book to market ratio; *Coverage*, the number of analysts tracking the stock; *ROE*, firm i's return on equity in year t measured as the ratio of earnings in year t over the book value of equity and the volatility of *ROE*; *Profit* the profitability of company i at the end of year t, defined as operating income over book value of assets and *SP500* an indicator variable equal to one if a stock is included in the S&P500 index. These regressions also include three-digit SIC industry and merger fixed effects. Finally, the standard errors are clustered at the merger groupings.

Table A.II presents the results. In columns (1) and (2), we report the results for mean forecast error, while in columns (3) and (4) the results for median forecast error. The coefficient of interest is β_2, which measures the differential effect of the treatment on forecast error. Across all specifications, we find a positive and statistically significant effect on the forecast error.

[11] Alternatively, one could employ the nonparametric method in which matching is done on a stock-by-stock basis along important observables, such as stock size, book-to-market ratio, and past returns. This alternative method produces quantitatively similar result.

The results are also economically meaningful: Treated stocks experience an increase of about 0.25% over their mean forecast error before the merger event, which is equivalent to a 15% of a standard deviation of the forecast error. Overall, this evidence confirms that the merger event does indeed reduce precision of public information associated with treated stocks.[12]

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Table I. Summary Statistics: Panel Data

We report time-series averages of cross-sectional means, medians, and standard deviations. *CS* is a characteristic selectivity measure of stock-picking skills, defined in Daniel et al. [1997]; 3-factor, and 4-factor abnormal returns (*3-Factor/4-Factor α*) are based on 12-month rolling-window regression models. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized as a centralized structure, and zero if the family is organized as a decentralized structure. *Log(Assets)* is a natural logarithm of fund assets under management. *Log(Age)* is a natural logarithm of a fund age. *Turnover* is a fund portfolio turnover. *Expense* is the fund total expense ratio. *Load* is the total distribution fee. *Size, Value, and Momentum* are fund portfolios' style attributes along size, value, and momentum dimensions. The sample is monthly and spans the period of 1980-2005.

Variables	Observations	Mean	Median	Standard Dev.
Return	200,213	7.740	7.408	27.565
CS	196,241	0.790	0.422	21.660
3-factor α	196,421	-0.036	-0.181	7.681
4-factor α	196,421	-0.174	-0.327	7.785
Central	200,213	0.326	0.000	0.468
Log(Assets)	199,675	5.002	4.961	1.641
Log(Age)	200,100	2.401	2.390	0.907
Turnover	190,345	0.819	0.630	0.713
Expense	197,353	0.012	0.011	0.005
Load	200,203	0.026	0.006	0.029
Size	199,846	4.014	4.367	0.913
Value	199,846	2.641	2.644	0.538
Momentum	199,846	3.290	3.258	0.551

Table II. Centralization and Performance: OLS Regressions

The dependent variable is monthly characteristic selectivity (*CS*), 3-factor, and 4-factor abnormal returns (*3-Factor/4-Factor α*). Abnormal returns are based on 12-month rolling-window regression models. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized as a centralized structure, and zero if the family is organized as a decentralized structure. *Log(Assets)* is a natural logarithm of fund assets under management. *Log(Age)* is a natural logarithm of a fund age. *Turnover* is a fund portfolio turnover. *Expense* is the fund total expense ratio. *Load* is the total distribution fee. *Size, Value, and Momentum* are fund portfolios' style attributes along size, value, and momentum dimensions. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	(1) CS	(2) 3-Factor α	(3) 4-Factor α	(4) CS	(5) 3-Factor α	(6) 4-Factor α
Central	-0.880***	-0.736**	-0.564*	-0.809***	-0.674**	-0.597*
	(0.336)	(0.321)	(0.320)	(0.349)	(0.344)	(0.341)
Log(Assets)	-1.429***	-0.517***	-0.480***	-1.641***	-0.655***	-0.749***
	(0.120)	(0.105)	(0.101)	(0.114)	(0.104)	(0.103)
Log(Age)	1.225***	-1.268***	-1.121***	0.724**	-1.519***	-1.298***
	(0.214)	(0.234)	(0.232)	(0.292)	(0.286)	(0.265)
Turnover	0.322*	-0.434**	-0.174	0.207	-0.561***	-0.435***
	(0.177)	(0.193)	(0.192)	(0.170)	(0.178)	(0.167)
Expense	41.724	-39.748	-37.293	44.233	1.739	-0.768
	(36.174)	(34.839)	(37.224)	(38.715)	(34.775)	(36.374)
Load	1.545	2.017	-7.125	5.757	0.027	-1.410
	(6.635)	(5.836)	(6.245)	(6.329)	(5.093)	(5.456)
Size	0.479*	0.441	1.154***	-0.517*	-0.367	-0.123
	(0.258)	(0.268)	(0.271)	(0.278)	(0.267)	(0.262)
Value	-0.339	-1.162***	-0.537*	0.358	-0.431	0.406
	(0.276)	(0.272)	(0.274)	(0.282)	(0.271)	(0.267)
Momentum	1.948***	3.510***	3.501***	0.383*	2.354***	1.897***
	(0.206)	(0.187)	(0.203)	(0.213)	(0.173)	(0.180)
Constant	-2.502	-4.149***	-9.132***	5.536**	1.429	0.471
	(1.629)	(1.420)	(1.473)	(2.292)	(1.638)	(1.582)
Time-Fixed Effects	No	No	No	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	182,563	184,574	184,574	182,563	184,574	184,574

Table III. Centralization and Manager Sorting

In Panel A, the dependent variable is *Central*. *GRAD* is an indicator variable equal to one if the manager has a graduate diploma (MBA, MA or PhD) and zero, otherwise; *IVY* is an indicator variable equal to one if the manager has any degree from the Ivy League academic institution; *IVY × GRAD* assigns a value equal to one to managers who have a graduate diploma from the Ivy League School. **In Panel B,** *External Promotion* is an indicator variable equal to one if the manager moves to a fund with larger size in a different family, and zero, otherwise; *External Demotion* is an indicator variable equal to one if the manager moves to a fund with a smaller size in a different family, and zero, otherwise; *Hedge Fund* is an indicator variable equal to one if the manager moves to a hedge fund, and zero, otherwise. *Gender* is an indicator variable equal to one if a manager is a male and zero, if she is a female, *Log(Manage)* is the natural logarithm of a manager's age, *Return Gap* is the measure of unobserved actions introduced in Kacperczyk, Sialm, and Zheng [2008], *Idio Vol* is the fund-level idiosyncratic risk, *Beta* is a fund beta; and *Flow* measures net flows into a fund. In addition, we include all the other variables we previously used in Table II. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

Panel A: Quality Inference Based on Education

	Central		
GRAD	-0.027**		
	(0.013)		
IVY		-0.019	
		(0.017)	
IVY*GRAD			-0.035**
			(0.015)
Observations	3022	3022	3022

Panel B: Quality Inference from External Career Moves

	External Promotion	External Demotion	Hedge Fund
Central	-0.090*	0.0004	-0.037***
	(0.055)	(0.0004)	(0.014)
Gender	-0.122	0.000	-0.016
	(0.124)	(0.001)	(0.046)
Log(Manage)	-1.972***	-0.001*	-0.169***
	(0.223)	(0.001)	(0.062)
Return Gap	-1.077	0.009	0.184
	(1.821)	(0.009)	(0.671)
Idio Vol	-8.571*	-0.028	3.881
	(4.383)	(0.025)	(2.923)
Beta	0.142	-0.000	0.006
	(0.089)	(0.001)	(0.042)
Log(Age)	0.081*	0.000	-0.000
	(0.044)	(0.000)	(0.015)
Turnover	0.079*	0.000	0.029
	(0.043)	(0.000)	(0.019)
Flow	-0.023	0.002	0.057
	(0.612)	(0.003)	(0.199)
Other Controls	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes
Observations	86,199	86,199	86,199

Table IV. Centralization and Performance: Accounting for Manager-Fixed Effects

In this table the dependent variables are: *CS* is a characteristic selectivity measure of stock-picking skills, defined in Daniel et al. [1997]; *3-Factor/4-Factor α*, based on 12-month rolling-window regression models. *Log(Assets)* is a natural logarithm of fund assets under management. *Log(Age)* is a natural logarithm of a fund age. *Turnover* is a fund portfolio turnover. *Expense* is the fund total expense ratio. *Load* is the total distribution fee. *Size, Value, and Momentum* are fund portfolios' style attributes along size, value, and momentum dimensions. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	CS	3-Factor α	4-Factor α	CS	3-Factor α	4-Factor α
Central	-0.827*	-0.600**	-0.624**	-0.839**	-0.628*	-0.738**
	(0.452)	(0.299)	(0.305)	(0.428)	(0.357)	(0.355)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Manager-Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	255,782	259,063	259,063	255,782	259,063	259,063

Table V. Centralization and Performance: Evidence from Quasi-Experiment of Failed Mergers

In this table the dependent variables are: *CT* is a characteristic timing measure of stock-picking skills, defined in Daniel et al. [1997]; *3-Factor/4-Factor α*, based on 12-month rolling-window regression models. *Log(Assets)* is a natural logarithm of fund assets under management. *Log(Age)* is a natural logarithm of a fund age. *Turnover* is a fund portfolio turnover. *Expense* is the fund total expense ratio. *Load* is the total distribution fee. *Size, Value, and Momentum* are fund portfolios' style attributes along size, value, and momentum dimensions. *T* is the treatment sample consistent of targets that were successfully acquired in a merger. *Central* is dummy variable that takes a value 1 if the acquirer in the merger has centralized structure and 0 if the acquirer has decentralized structure. *After* is an indicator that takes a value 1 for periods after the merger date and 0 otherwise. *RPI(SYST)* is the R-squared from the regression of changes in portfolio weights from time *t* to *t+1* on the residual from the AR(1) model of industrial production growth. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

Panel A: 3-Factor *α*

	3-Factor α			
T*After	0.0014***	0.0012***	0.0010***	0.0010***
	(0.0003)	(0.0003)	(0.0003)	(0.0003)
T*After*Central	-0.0025***	-0.0026***	-0.0022***	-0.0022***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Other Controls	No	Yes	Yes	Yes
Fund style Controls	No	No	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Clustering (Time)	No	No	No	Yes
Observations	32,849	31,497	31,494	32,849

Panel B: Other Measures of Performance

	4-Factor α		CT		*RPI(SYST)*	
T*After	0.0015***	0.0015***	0.0001	0.0001	0.9118	0.9118
	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.598)	(0.628)
T*After*Central	-0.0019***	-0.0019***	-0.0013	-0.0013	-3.547**	-3.547**
	(0.0007)	(0.0007)	(0.0014)	(0.0015)	(1.602)	(1.568)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund style Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustering (Time)	No	Yes	No	Yes	No	Yes
Observations	31,947	31,497	29,478	29,478	31,610	31,610

Table VI. Information Production across Organizations

RPI(SUE) is the R-squared from the regression of changes in portfolio weights from time *t* to *t+1* on Standardized Unexpected Earnings (*SUE*) at time *t*. *RPI(SYST)* is the R-squared from the regression of changes in portfolio weights from time *t* to *t+1* on the residual from the AR(1) model of industrial production growth. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized as a centralized structure, and zero if the family is organized as a decentralized structure. **In Panel A**, *Other Controls* includes the following variables: Log*(Assets)* is a natural logarithm of fund assets under management. *Log(Age)* is a natural logarithm of a fund age. *Turnover* is a fund portfolio turnover. *Expense* is the fund total expense ratio. *Load* is the total distribution fee. *Size, Value, and Momentum* are fund portfolios' style attributes along size, value, and momentum dimensions. **In Panel B**, *Analysts* is the number of analysts, *Managers* is the number of managers, and *Traders* the number of security traders employed by the family. *Other Controls* include *Log(Famage)*, *Famreturn*, and *Expense*. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

Panel A: Panel Data

	(1) RPI (SUE)	(2) RPI (SYST)	(3) RPI (SUE)	(4) RPI (SYST)
Central	-0.208**	-0.078*	-0.219**	-0.082**
	(0.106)	(0.042)	(0.095)	(0.040)
Other Controls	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	No	No	Yes	Yes
Observations	183,509	185,009	183,509	185,009

Panel B: Resources for Information Production

	Analysts		Managers		Traders	
Central	-9.441***	-7.904***	-13.759***	-12.727***	-3.071***	-2.531***
	(2.699)	(2.571)	(4.097)	(4.195)	(0.922)	(0.921)
Other Controls	No	Yes	No	Yes	No	Yes
Observations	389	358	388	357	378	347

Table VII. Response of Centralized and Decentralized Funds to Shocks in the Information Environment of Investments

The dependent variable is Characteristic Selectivity (CS), 3-factor *α*, and 4-factor *α*. Abnormal returns (*α)* are based on 12-month rolling-window regression models. The experiment here involves using mergers of brokerage houses as in HK to generate shocks to information environment of investments faced by the two fund structures. *After* is an indicator variable equal to zero for the period prior to merger (pre-event window) and one for the period after the merger. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized as a centralized structure, and zero if the family is organized as a decentralized structure. In columns (1)-(3), *Intensity* is defined as a percentage of the fund dollar portfolio value that is affected by the merger event. In columns (4)-(6), *Intensity* is an indicator variable equal to one if the continuous measure of intensity is greater than the sample intensity median, and zero, otherwise. *Grad* is an indicator variable equal to one if the manager has a graduate diploma (MBA, MA or PhD) and zero, otherwise. *Gender* is an indicator variable equal to one if a manager is a male and zero, if she is a female. As measures of ability, we use an indicator variable equal to one if the manager has a graduate diploma and an indicator variable equal to one if a manager has a diploma from Ivy League School. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	Parametric			Nonparametric		
	(1)	(2)	(3)	(4)	(5)	(6)
	CS	3-Factor α	4-Factor α	CS	3-Factor α	4-Factor α
After	-23.594***	-8.849**	-8.009**	-21.524**	-8.466**	-7.861**
	(7.374)	(3.043)	(2.886)	(7.631)	(3.221)	(2.912)
Central	-1.380	-0.820	-0.947**	-0.869	-0.819	-0.900*
	(2.445)	(0.670)	(0.379)	(2.367)	(0.685)	(0.421)
After*Central	2.674	0.807	0.624	-4.213	-1.188	-0.217
	(1.864)	(0.922)	(0.498)	(5.868)	(1.198)	(0.854)
After*Central*Intensity	-7.989*	-3.882**	-3.672***	-1.750*	-1.611**	-1.495***
	(4.227)	(1.974)	(1.142)	(0.891)	(0.635)	(0.314)
Intensity	-24.651	-4.324	-3.334	1.769	0.760	0.576
	(18.409)	(3.656)	(3.601)	(1.701)	(0.867)	(0.428)
After*Intensity	40.981**	9.377***	6.457**	10.262*	2.900**	1.715
	(15.784)	(2.777)	(2.791)	(5.250)	(1.075)	(1.028)
Central*Intensity	3.366	1.715	1.365	0.407	0.724*	0.493
	(6.293)	(1.253)	(0.970)	(1.861)	(0.377)	(0.308)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	14,643	14,017	14,017	14,643	14,017	14,017

Panel B: Conditioning on Manager-Fixed Effects

	CS	3-Factor α	4-Factor α	CS	3-Factor α	4-Factor α
After	-22.212**	-8.962**	-7.823**	-21.959**	-8.751**	-7.882**
	(8.284)	(3.041)	(2.910)	(8.494)	(3.182)	(3.003)
Central	-1.824	-0.720	-0.615*	-0.475	-0.489	-0.419
	(1.709)	(0.469)	(0.299)	(1.801)	(0.671)	(0.306)
Intensity	-27.542	-6.359	-6.287	-26.429	-6.054	-5.107
	(23.417)	(5.615)	(5.770)	(22.231)	(3.692)	(3.600)
After *Central*Intensity	-7.238**	-4.118*	-4.008***	-6.651**	-5.000**	-4.744***
	(2.700)	(1.942)	(1.059)	(3.014)	(2.180)	(1.104)
After *Central	3.302	1.177	0.824*	3.317	1.428	1.068**
	(2.128)	(0.934)	(0.412)	(2.285)	(1.059)	(0.414)
After *Intensity	35.359*	10.090***	6.895**	36.668	9.716***	6.678**
	(18.353)	(3.297)	(2.993)	(21.126)	(2.934)	(2.868)
Central*Intensity	5.492	2.468**	2.520**	3.784	2.641**	2.409***
	(3.954)	(1.062)	(0.868)	(4.990)	(1.133)	(0.702)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Manager-Fixed Effects	No	No	No	Yes	Yes	Yes
Observations	22,055	21,323	21,323	22,055	21,323	21,323

Panel C: Conditioning on Observable Managerial Skill

	Ability = GRAD degree			Ability = GRAD from Ivy League School		
	CS	3-Factor	4-Factor	CS	3-Factor	4-Factor
After	-22.208**	-9.236**	-8.076**	-22.759**	-8.810**	-7.554**
	(8.168)	(3.088)	(2.935)	(9.059)	(3.137)	(3.010)
Central	-1.825	-0.718	-0.613*	-2.270	-1.315**	-1.202**
	(1.708)	(0.468)	(0.298)	(1.995)	(0.525)	(0.524)
Intensity	-26.244	-6.224	-6.430	-30.294	-7.606	-7.309
	(23.695)	(5.621)	(5.804)	(22.635)	(5.849)	(6.171)
After *Central*Intensity	-7.232**	-4.086**	-3.980***	-11.593**	-4.374*	-4.249**
	(2.703)	(1.946)	(1.057)	(5.476)	(2.316)	(1.748)
After *Central	3.300	1.172	0.819*	4.783	1.036	0.696
	(2.130)	(0.938)	(0.415)	(3.098)	(1.001)	(0.669)
After *Intensity	34.198*	10.356**	7.343**	39.881**	10.457***	6.862*
	(18.679)	(3.482)	(3.030)	(17.584)	(3.435)	(3.344)
Central*Intensity	5.499	2.466**	2.517**	5.143	4.552***	4.154**
	(3.961)	(1.060)	(0.862)	(3.822)	(1.326)	(1.611)
Other Controls	Yes	Yes	Yes	Yes	Yes	Yes
Ability Interactions	Yes	Yes	Yes	Yes	Yes	Yes
Fund-Fixed Effects	No	No	No	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	22,055	21,323	21,323	11,135	10,793	10,793

Table VIII. Internal Incentive Provision across Organizations

In Panel A, the dependent variables are: *Funds/Manager* – a number of funds managed by a manager, *Assets/Manager* – the value of assets managed on average by a manager. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized as a centralized structure, and zero if the family is organized as a decentralized structure. *Log(Famage)* is a natural logarithm of a family age. *Famreturn* is the family monthly return. *Expense* is the fund total expense ratio. **In Panel B,** *Internal Promotion* is an indicator variable equal to one if the manager moves to a fund with larger size within the same family, and zero, otherwise; *Internal Demotion* is an indicator variable equal to one if the manager moves to a fund with a smaller size within the same family, and zero, otherwise, *Return* is a return of a manager in the fund, *Gender* is an indicator variable equal to one if a manager is a male and zero, if she is a female, *Log(Manage)* is the natural logarithm of a manager's age, *Return Gap* is the measure of unobserved actions introduced in Kacperczyk, Sialm, and Zheng [2008], *Idio Vol* is the fund-level idiosyncratic risk, *Beta* is a fund beta; and *Flow* measures net flows into a fund. In addition, we include all the other variables we previously used in Table II. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

Panel A: Discretion

	Funds/Manager		Assets/Manager	
Central	-0.345*	-0.340*	-96.900*	-101.398**
	(0.203)	(0.203)	(53.197)	(52.840)
Log(Famage)		-0.061		-6.592
		(0.087)		(22.848)
Famreturn		-3.241***		-574.218***
		(0.555)		(137.966)
Expense		42.779**		-9,962.464**
		(19.980)		(4,704.597)
Fund-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	Yes	Yes	Yes	Yes
Observations	54,974	54,119	54,974	54,119

Panel B: Promotion and Demotion

	Internal Promotion		Internal Demotion	
Central	0.002***	0.002***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Return	-0.053***	-0.040***	-0.044**	-0.065***
	(0.015)	(0.015)	(0.019)	(0.019)
Return*Central	-0.135***	-0.135***	0.093***	0.095***
	(0.045)	(0.046)	(0.029)	(0.029)
Gender	0.002***	0.002***	0.002***	0.002***
	(0.000)	(0.000)	(0.000)	(0.000)
Log(Manage)	-0.002***	-0.001*	0.005***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
Idio Vol	0.041	0.095**	0.009	-0.061**
	(0.041)	(0.046)	(0.022)	(0.026)
Beta	0.001	-0.000	-0.003***	-0.002***
	(0.001)	(0.001)	(0.000)	(0.001)
Other Controls	Yes	Yes	Yes	Yes
Fund-Fixed Effects	Yes	Yes	Yes	Yes
Time-Fixed Effects	No	Yes	No	Yes
Observations	93,001	93,001	93,001	93,001

Table IX. When Do Centralized Structures Perform Better?

To obtain *Trades Coordination*, we first calculate the number of positive (#pos.) and negative (#neg.) changes in holdings (from period to period) stock by stock for a given family and time. Next, for the same time and family we calculate the number of funds inside the family (#funds). Then, for each stock/family/time, we define the following measure of coordination: $C = (\#pos./\#funds)^2 + (\#neg/\#funds)^2$. Finally, we aggregate *C* across stocks inside the same family and time. To obtain *Brokerage Coordination*, we first calculate the number of funds inside the family (#funds). For each family, we obtain the list of brokers that are responsible for trades in each individual fund. For each broker, we then calculate the number of funds inside the family that the broker does business with (#broker). Then, we calculate the fraction of funds in which each broker offers service. The final measure is calculated as the average fraction of participation across all brokers inside a given family. *Idio Vol* is the residual from the regression model of family excess returns on the following factors: size, value, momentum, global market equity, default spread, and term spread. Size, value, and momentum are based on U.S. equity data. *Central* is an indicator variable equal to one if the fund belongs to a family that is organized in a centralized structure, and zero if it belongs to decentralized family. *Famsize* is total family assets under management. *Famreturn* is the family monthly return. *Traders* is the number of traders inside the family. *Famflow* is the percentage flow of money into the family. *% Equity* is the percentage of the value of family invested in equity. *Funds* is the number of funds within the family. The sample spans the period 1980-2005. Standard errors (in parentheses) are clustered at the family groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	(1) Trades Coordination	(2) Brokerage Coordination	(3) Idiosyncratic Volatility
Central	0.050**	0.066**	-0.001**
	(0.028)	(0.037)	(0.001)
Famsize	-0.000***	-0.000	-0.000***
	(0.000)	(0.000)	(0.000)
Famreturn	0.373***	-0.235	-0.015**
	(0.133)	(0.143)	(0.007)
Traders	-0.061***	-0.046***	-0.001
	(0.013)	(0.017)	(0.000)
Famflow	0.220***	-0.046	-0.001
	(0.053)	(0.057)	(0.001)
% Equity	0.083**	0.099**	0.012***
	(0.041)	(0.048)	(0.001)
Funds	-0.000**	-0.000	-0.000
	(0.000)	(0.000)	(0.000)
Constant	0.527***	0.587***	0.010***
	(0.033)	(0.044)	(0.001)
Time-Fixed Effects	Yes	Yes	Yes
Observations	34,893	21,283	34,026
R-squared	0.213	0.223	0.391

Table A1. Descriptive Statistics for Mergers

The table includes the names of brokerage houses involved in mergers, the date of the merger, and the number of stocks covered by either brokerage house or both of them prior to the merger. We restrict our sample of stocks to those which were covered by bother the bidder and the target house.

Brokerage House	Merger number	Merger Date	# Stocks (Bidder)	# Stocks (Target)	# Stocks (Bidder and Target)
Merrill Lynch	1	9/10/1984	762		173
Becker Paribas				288	
Paine Webber	2	12/31/1994	659		234
Kidder Peabody				545	
Morgan Stanley	3	05/31/1997	739		251
Dean Witter Reynolds				470	
Smith Barney (Travelers)	4	11/28/1997	914		327
Salomon Brothers				721	
Credit Suisse First Boston	5	10/15/2000	856		307
Donaldson Lufkin and Jenrette				595	
UBS Warburg Dillon Read	6	12/10/2000	596		213
Paine Webber				487	
Chase Manhattan	7	12/31/2000	487		80
JP Morgan				415	
Wheat First Securities	8	10/31/1988	178		8
Butcher & Co				66	
EVEREN Capital	9	1/9/1998	178		17
Principal Financial Securities				142	
DA Davidson & Co	10	2/17/1998	76		8
Jensen Securities				53	
Dain Rauscher	11	4/6/1998	360		26
Wessels Arnold & Henderson				135	
First Union	12	10/1/1999	274		21
EVEREN Capital				204	
Paine Webber	13	6/12/2000	516		28
JC Bradford				182	
Fahnestock	14	9/18/2001	117		5
Josephthal Lyon & Ross				91	
Janney Montgomery Scott	15	3/22/2005	116		10
Parker/Hunter				54	

Table A.2. Change in Forecast Error

The dependent variable is analyst forecast error (*FERROR*) measured as the absolute difference between the forecast analyst *j* at time *t* and the actual *EPS*, expressed as a percentage of the previous year's stock price. The consensus error is calculated as a mean or median forecast error among all analysts covering a particular stock. For each merger, we consider a one-year window prior to merger (pre-event window) and a one-year window after the merger (post-event window). *After* is an indicator variable equal to one for the post-event period and zero for the pre-event period. For each merger window, we assign an indicator variable (*Treated*) equal to one for each stock covered by both merging brokerage houses, and zero otherwise. *Ln(Size)* is a natural logarithm of the market cap of the stock; $Sigma_{it}$ is the variance of daily (simple, raw) returns of stock *i* during year *t*; *Retann* is annual return on the stock; *Ln(BM)* is a natural logarithm of the book to market ratio; *Coverage* is the number of analysts tracking the stock. To measure the volatility of *ROE* (*VolROE*), we estimate an AR(1) model for each stock's *ROE* using a 10-year series of the company's valid annual *ROE*s. ROE_{it} is firm *i*'s return on equity in year *t*. *ROE* is the ratio of earnings in year *t* over the book value of equity. *VolROE* is the variance of the residuals from this regression. $Profit_{it}$ is the profitability of company *i* at the end of year *t*, defined as operating income over book value of assets. *SP500* is an indicator variable equal to one if a stock is included in the S&P500 index. We include three-digit SIC industry and merger fixed effects. Our sample excludes observations with stock prices lower than $5 and those for which the absolute difference between forecast value and the true earnings exceeds $10. Standard errors (in parentheses) are clustered at the merger groupings. ***, **, * denotes 1%, 5%, and 10% statistical significance.

	Mean FERROR		Median FERROR	
After	0.0016*	0.0008	0.0016*	0.0009
	(0.0008)	(0.0010)	(0.0008)	(0.0009)
Treated	-0.0072***	0.0011	-0.0070***	0.0016
	(0.0010)	(0.0012)	(0.0010)	(0.0012)
After*Treated	0.0021**	0.0028**	0.0019**	0.0025**
	(0.0009)	(0.0010)	(0.0009)	(0.0010)
Ln(Size)		-0.0012**		-0.0012**
		(0.0005)		(0.0005)
Sigma		-0.0022		-0.0032
		(0.0038)		(0.0038)
Retann		-0.0146		-0.0061
		(0.0090)		(0.0094)
Ln(BM)		0.0071***		0.0069***
		(0.0007)		(0.0007)
Coverage		-0.0002***		-0.0002***
		(0.0000)		(0.0000)
VolROE		0.0097***		0.0094***
		(0.0011)		(0.0011)
Profit		-0.0180**		-0.0182**
		(0.0081)		(0.0082)
SP500		-0.0057***		-0.0052***
		(0.0017)		(0.0017)
Merger-Fixed Effects	Yes	Yes	Yes	Yes
Industry-Fixed Effects	Yes	Yes	Yes	Yes
Observations	57,005	57,005	57,005	57,005