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What Determines the Allocation of Managerial Ownership within Firms? Evidence from Investment Management Firms

Stephen G. Dimmock, William C. Gerken, and Jennifer Marietta-Westberg*

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Abstract

We show that the allocation of managerial ownership to individuals within firms varies depending upon the joint distribution of decision control and decision management rights. Using a unique dataset of institutional investment management firms, we show that ownership is higher for managers: with both executive and operational responsibilities; when benefits of cooperation are higher; and with large contributions to firm value. Consistent with career concerns, we find increases in a manager's ownership are associated with increases in unsystematic risk. Ownership dispersion within the firm is associated with the allocation of monitoring and operational roles and the potential benefits of cooperation.

JEL Classifications: G32, G3, G2, G23

Keywords: Manager Ownership, Managerial Ownership, Employee Ownership, Agency, Incentives, Institutional Investment Managers

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*Dimmock (dimmock@ntu.edu.sg) is at Nanyang Technological University, Gerken (will.gerken@uky.edu) is at University of Kentucky, and Marietta-Westberg (westbergj@sec.gov) is at the Securities and Exchange Commission. Gerken is the corresponding author and can be reached at (859) 257-2774. The Securities and Exchange Commission disclaims responsibility for any private publication or statement by any of its employees. This study expresses the authors' views and does not necessarily reflect those of the Commission, the Commissioners or other members of the staff. We thank Chris Adkerson, George Benson, and Brian Duddy for helpful discussions and assistance obtaining the data. We are grateful to: Francesco Bova, Craig Brown, Ranadeb Chaudhuri, Long Chen, Zsuzsanna Fluck, Charlie Hadlock, Brian Henderson, Jiekun Huang, Bill Johnson, Byoung-Hyoun Hwang, Steven M. Levitt, Stefan Reunzi, Lei Wedge, Scott Weisbenner, Lei Zhang, and seminar participants at University of Kentucky, National University of Singapore, Auburn University, Financial Management Association Annual Meeting, and International Association for the Economics of Participation Conference for comments. Gerken is grateful for funding from the J. Robert Beyster Fellowship for Research in Employee Ownership. Joyce Liao and Shan Yan provided excellent research assistance.

I. Introduction

Since the work of Berle and Means (1933) many studies have explored the agency conflict arising from the separation of ownership and control between external and internal owners. Typically these studies aggregate internal (managerial) ownership, and effectively treat managers as if they are a single entrepreneur. This approach ignores, however, the dispersion of ownership across managers within a single firm. Agency issues caused by the separation of ownership and control can still emerge in firms without any external owners. Within a single firm some managers are owners and others are not; two firms with identical levels of aggregate internal ownership often have vastly different distributions of ownership across managers within the firm. What factors determine the allocation of ownership to specific managers within a firm? Why does the concentration of managerial ownership vary across competing firms?

We address these questions using a unique panel dataset containing individual managers' ownership positions in their firms. Our sample consists of institutional investment management firms, which provide long-only, delegated portfolio management services to accredited investors such as pension funds and high net worth individuals.[1] We focus on this industry because detailed information on individual managers' ownership positions is available through mandatory SEC filings, and because we can observe all executives and portfolio managers within firms regardless of their ownership status.[2] The sample includes a wide range of ownership structures: firms wholly owned by a single manager, partnerships, public and private corporations, and wholly and partially owned subsidiaries. In total, our sample includes 1,365 institutional investment management firms that, in aggregate, manage more than \$13.7 trillion across all asset classes.[3]

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[1] For detailed studies of this industry see Berzins and Trzcinka (2005), Busse, Goyal, and Wahal (2010), and Lakonishok, Shleifer, and Vishny (1992).

[2] We are also able to observe indirect managerial ownership through holding companies and trusts.

We begin by examining the determinants of individual manager's ownership positions in the equity of the firm for which they work (Note, we examine ownership of the investment management *firm* and *not co-investment in the portfolios* managed by the firm). Of course, a manager's ownership is jointly determined along with many other factors and is affected by potentially unobservable characteristics of both the firm and the manager. Our identification strategy is based on exploiting the panel nature of the data, which allows us to include fixed effects to control for potentially confounding omitted variables. We use two specifications when estimating the determinants of individual managers' ownership positions. First, we include person-firm fixed effects, to remove individual specific characteristics such as ability. Second, we include firm-year fixed effects, to eliminate firm specific factors such as firm value.

Our empirical analysis is motivated by Fama and Jensen (1983), who analyze management ownership in terms of two concepts: decision control and decision management. Decision control involves ratifying decisions and monitoring others actions (i.e. the tasks of firm level executives). Decision management involves the initiation of new projects and the implementation of ratified decisions (i.e. operational tasks, such as portfolio management). Fama and Jensen (1983) argue that within firms, managers should also be owners if they hold both decision control rights and decision management rights. Consistent with this conjecture we find that within a firm the allocation of ownership to specific managers is strongly related to the allocation of decision control and decision management rights. Even after controlling for unobserved individual characteristics we find that changes in ownership are strongly associated with changes in decision control rights.

As expected, we find a strong positive relation between a manager's rank within a firm and her ownership. More so, we show that this relation varies with firm and individual characteristics. Firm executives who are also portfolio managers have substantially higher ownership than executives without decision management roles. This result is highly significant, even after including person-firm fixed effects to control for individual characteristics such as ability.

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[3] Asset values measured as of December 2005.

One of the benefits of ownership, relative to other incentives, is that it rewards cooperation within the firm. Kempf and Ruenzi (2008) extends the fund tournament model in Taylor (2003) to show that, even within a single firm, competition between portfolio managers distorts risk taking, and this effect is particularly strong among funds with similar investment styles. As Baker (1992) points out in such an environment, the difficulty in contracting over multiple tasks will result in allocation of effort towards those activities that they are directly compensated and away from uncompensated activities. In a tournament environment, this multitasking problem may even discourage information sharing. Pomorski (2009) shows that information sharing in mutual fund families positively affects performance and is concentrated among funds with similar styles. Consistent with the idea that ownership provides an incentive for cooperation, we find higher ownership by portfolio managers whose investment style is similar to other portfolios managed within the same firm.

While managerial ownership can substitute for external monitoring, the value of ownership is determined by the effort of all employees. For a manager whose effort has only a small effect on firm value the incentive from ownership is diluted, which may result in free riding. We find evidence that this moral hazard problem affects the allocation of managerial ownership. Individuals who manage a relatively high proportion of their firms' portfolios have significantly higher ownership, consistent with ownership having higher incentive efficiency for individuals who have a large impact on firm value. This result holds even after controlling for both person and firm specific characteristics using fixed effects.

While monitoring can partially substitute for managerial ownership, it is not a perfect substitute because decision managers cannot always credibly communicate their private information to decision controllers. As a result, decision managers may be penalized for an unlucky outcome of a good ex ante decision. Scharfstein and Stein (1990) and Zwiebel (1995) show that the separation of decision control and decision management can result in herding: decision managers may ignore private information because of career concerns. Chevalier and Ellison (1999) show that mutual fund managers with greater career risk herd, by holding less unsystematic risk in their portfolios.

We find evidence consistent with agency concerns leading to herding. Higher portfolio manager ownership is associated with significantly higher idiosyncratic risk. This result is robust to including both portfolio manager-fund fixed effects and investment style-year fixed effects to remove the potentially confounding effects of individual specific investment behavior. The combination of these fixed effects means that, relative to their own past risk levels, portfolio managers change their risk choices following changes in managerial ownership. Portfolio managers whose ownership increases partially offset the increases in their portfolios' idiosyncratic risk by reducing systematic risk (beta).

Next, we move from the determinants of individual manager's ownership to the concentration of managerial ownership within firms. Consistent with the Fama and Jensen (1983) suggestion that managerial ownership is necessary when the same individual holds decision control and decision management roles, we find a strong relation between the distributions of ownership and authority. When numerous managers have moderate ownership positions the hierarchy is flat; when a single manager has a controlling interest in the firm the hierarchy is steep. Obviously the allocation of ownership and authority are jointly determined, and this result does not imply causality. But the strong relation between the distributions of managerial ownership and decision control does provide supporting evidence for our results at the individual manager level, and shows how managerial ownership is used to solve agency problems within firms, even in firms that are wholly owned by their employees.

There have been many prior empirical studies of managerial ownership. The largest body of this literature seeks to explain the aggregate level of managerial ownership based on the agency conflict between managers (with homogeneous interests) and external shareholders. Higher managerial ownership reduces agency costs, but may prevent the firm from exploiting economies of scale and results in inefficient risk sharing because managers must hold undiversified portfolios. Numerous studies explore the factors that affect this tradeoff and whether the level of aggregate managerial ownership is optimal.[4] While the primary focus of those papers is whether managerial ownership is optimally allocated, this question is unanswerable unless the true determinants of optimal ownership are known.

Much of the prior literature generally treats managerial ownership as homogeneous and effectively assumes there is only a single manager-owner.[5] This approach ignores the fact that both managerial ownership and responsibilities vary widely within firms. Our approach is to examine the allocation of managerial ownership within firms rather than at the aggregate level. This approach allows us to test aspects of managerial ownership that are untestable at the aggregate level. For example, we show that managerial ownership has a significant relation with the joint allocation of decision control and decision management roles and with the benefits of cooperation within the firm. A cost of our approach, however, is that we are unable to address whether the allocation of managerial ownership within firms is optimal. Because many of the firms in our sample are private we cannot observe their market value, which precludes us from testing the relation between the allocation of managerial ownership and value.

While we are unable to test whether managerial ownership is optimally allocated, a key advantage of our approach is that we are able to use novel fixed effects strategies to control for omitted variable bias. By examining individuals within firms, we are able to use firm-year fixed effects and thus our identification comes from cross-sectional variation across managers within a firm at a single point in time. In our person-firm fixed effects our identification comes from time-series variation in an individual's ownership while employed at a single firm. However, while our approach allows us to control for many potential biases due to omitted variables using fixed effects, ultimately the variation in managerial ownership is endogenously determined. Thus while we are able to rule out specific categories of omitted variable bias, such as those based on time-invariant individual characteristics, we cannot rule out all alternative interpretations.

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[4] McConnell and Servaes (1990) and Morck, Shleifer, and Vishny (1988) argue that aggregate managerial ownership of publicly traded corporations is not optimally allocated and has an observable effect on firm value. Demsetz (1983), Demsetz and Lehn (1985), and Himmelberg, Hubbard, and Palia (1999) argue that competitive pressure forces firms to optimally allocate ownership, and any observed relation between aggregate manager ownership and firm value is caused by an omitted variable bias.

[5] A recent study by Bauguess, Moeller, Schlingemann, and Zutter (2009) separates inside ownership into managerial and non-managing director ownership and find differences in target returns in mergers based on the levels of these two types of aggregated inside ownership.

The absence of studies examining the allocation of managerial ownership within firms is particularly surprising in light of recent studies showing that the characteristics and composition of external shareholders are strongly associated with firms' policies and actions (e.g. Becker, Cronqvist, and Fahlenbrach (2011), Cronqvist and Fahlenbrach (2009), and Laeven and Levine (2008)). Similarly, by looking within firms we show that the aggregate level of managerial ownership masks substantial variation; two firms with identical aggregate managerial ownership can have vastly different allocations of ownership across managers. Further, this within firm variation is systematically associated with important differences in firm structure and managerial behavior.

Chen, Goldstein, and Jiang (2008), and Cremers, Driessen, Maenhout, and Weinbaum (2009) consider the case of mutual fund directors' ownership of units of the mutual funds they supervise. Their focus is on the role of co-investment in reducing agency problems between investors and mutual funds. Khorana, Servaes, and Wedge (2007) consider the role of mutual fund portfolio managers' ownership of units in the mutual funds they control. While loosely related to our work, these papers focus on how co-investment reduces problems between firms and their clients, rather than how managerial ownership reduces agency problems between firms and managers.

In addition to the managerial ownership literature, this paper is also related to studies of managerial incentives within firms. Aggarwal and Samwick (2003), Bushman, Indjejikian, and Smith (1995), and Wulf (2007) test the determinants of managerial incentives within multidivision publicly traded companies. They show there is substantial variation in both the level and type of managerial compensation within firms, i.e. managers' compensation is more sensitive to firm performance when divisional performance is more variable and for managers with firm level responsibilities. Our paper differs from these studies in several ways. First, we consider the joint relation between the distribution of ownership and authority within the firm. Second, we consider how changes in ownership affect changes in managerial risk taking. Third, these studies are concerned with how incentives are used to align managers' interests with external shareholders, while our sample includes many private firms without any external ownership, where the agency problems are entirely between insiders.

The paper is organized as follows. The next section describes the institutional investment management industry and summarizes the data used in the analysis. Section III examines the determinants of individual manager's ownership. Section IV provides analysis of the effects of ownership on risk taking by managers in our sample. Section V examines firm-level patterns of ownership, and Section VI concludes.

II. Institutional Investment Management Industry

Our sample includes firms in the institutional investment management industry. These firms provide long only, delegated portfolio management services to their clients, but differ from mutual funds in several important ways. For the purposes of this study, the most important difference is that many of the firms in our sample are exempt from the Investment Company Act of 1940 because their clients are accredited investors, such as pension funds and wealthy individuals. This exemption substantially reduces regulatory costs, and the fixed costs of entering the industry are low. As a result, there is great dispersion in firm size and ownership structure.

Figure 1 shows the basic structure of a typical institutional investment management firm, River Road Asset Management, which offers portfolio management services through several distinct portfolios such as River Road Small Cap Portfolio. In 2006, the firm was owned by a professional services company called River Road Partners and the Dutch bank ABN AMRO. River Road Partners was owned by two managers of River Road Asset Management: James Shircliff and R. Andrew Beck. Our main focus is on how managerial ownership, such as that of James Shircliff and R. Andrew Beck, is determined. Note that this is different from managerial investment in their firms' portfolios, which we do not consider. River Road also employees an additional seven executives, whose titles include: Chief Operating Officer, Chief Compliance Officer, and Executive Vice-President.

[Insert Figure 1 here]

Institutional investment management firms are the largest investor class in the U.S. equity market, managing over \$5.8 trillion as of December 2005. Despite the massive amount of wealth controlled by these firms they have attracted surprisingly little academic research. Berzins and Trzcinka (2005), Busse, Goyal, and Wahal (2010), and Lakonishok, Shleifer, and Vishny (1992) find there is no evidence of return predictability for portfolios managed by institutional investment management firms. Del Guercio and Tkac (2002) finds a linear, rather than convex, fund flow-performance relation. Lakonishok, Shleifer, and Vishny (1992) explore the institutional structure of firms in this industry, focusing primarily on the agency conflicts related to fund selection by clients. To our knowledge, this is the first paper to use institutional investment management firms to explore issues that are not directly related to portfolio management.

A. Data Sources

Our data come from two sources. First, we use a panel of SEC Form ADV data.[6] The SEC mandates filings this form for all institutional investment management firms with at least $25 million in assets under management and 15 or more U.S. based clients. Firms must file this form annually or in the event of material changes, including changes to ownership. Because Form ADV is legally required, this panel should be comprehensive and survival bias free. The Form ADV data we utilize from the time period September 2001 through May 2006 are available from the SEC under the Freedom of Information Act (FOIA) and include filings of defunct firms. Second, we use the PSN database produced by Informa Investment Solutions.[7] This database is designed to help institutional investors identify potential asset managers. It contains information on firms, portfolio managers, and portfolios. The intersection of these two databases contains 1,365 firms.

B. Managerial Ownership

Schedule A of Form ADV requires firms to list all directors, executive officers, and owners of 5% or more of the firm.[8] Each individual must list their ownership position and job title. Schedule B identifies indirect ownership through trusts and holding companies. Both schedules report ownership by categories rather than exact percentages, and so we impute ownership using an algorithm described in the appendix.

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[6] Active institutional investment management firms' most recent Form ADV filings are available at: `http://www.adviserinfo.sec.gov/IAPD/Content/Search/iapd_OrgSearch.aspx`.

[7] Since our focus is on managerial ownership rather than performance persistence we are not overly concerned with survival bias in the PSN database. However, we have compared the voluntary PSN filings with the mandatory Form ADV filings. We do not find any evidence of a survival bias that could alter our results. See also Busse, Goyal, and Wahal (2010).

[8] The formal definition of required Form ADV individuals is: officers, partners, directors, or similar positions exercising executive responsibility; those with the right to receive 25% or more of the firm's capital upon dissolution; controls 25% or more of a voting share class; an elected manager of a company; a trustee or managing agent of a trust meeting any of the previous criteria. While we do not observe non-executive ownership of less than 5%, we observe all managerial ownership that represents meaningful control rights over firms' operations.

Table 1 shows that only 26.7% of firms have no reported managerial ownership. This table also reports summary statistics for three measures of aggregate managerial ownership: the single largest position, the sum of the three largest positions, and total employee ownership. Conditional on non-zero ownership, the average largest position is 55.9%, the average sum of the top three positions is 79.0%, and average total managerial ownership is 83.3%. Table 1 also summarizes the concentration of managerial ownership: 10.6% of firms have some managerial ownership but more than 50% of the firm is owned by an external shareholder; 16.9% of firms have a partnership structure in which manager owners collectively own more than half the firm, but no single individual has a majority position;[9] and 45.8% of firms has concentrated managerial ownership, in which a single manager has an ownership position greater than 50%.

Although our sample is comprised of investment management firms, the levels of aggregate managerial ownership are generally consistent with other studies of non-investment firms. In Appendix Table 3, we report the "Total Manager Ownership" split by quintile of assets under management. The largest quintile of firms in our sample have levels of aggregate ownership comparable to studies based on large public firms listed in Compustat (e.g. Himmelberg, Hubbard, and Palia (1999) and Holderness (2009)). The smallest firms in our sample have ownership levels consistent with the levels found for private, non-financial firms (see Ang, Cole, and Lin (2000)). Therefore, we believe the overall levels of ownership we observe are roughly comparable to the available evidence on similar sized non-financial firms.

[Insert Table 1 here]

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[9] Note that we use the term partnership to refer to the economic substance of the ownership structure and not the legal sense of the word. Firms we term partnerships may be corporations.

Table 2 shows summary statistics of all persons identified by name in either Form ADV or the PSN database.[10] Of these people 29.5% are manager-owners, and conditional on non-zero ownership, the average individual ownership position is 28.7%. Of Portfolio Managers 22.4% are owners, and conditional on non-zero ownership, the average position is 46.2%.

[Insert Table 2 here]

C. Hierarchy and Job Titles

Given the wide range of organizational structures in our sample and the flexibility in reporting, job titles are not standard, and there is wide variation across firms: firms may have a CEO, a president, both, or neither. To make cross-firm comparisons we need to create standardized measures of managers' ranks within their firms.[11] We begin by identifying the job title for each of the 14,825 individuals in our sample. These job titles are summarized in Table 2. Using these job titles we assign each individual a rank based on his position within his firm's hierarchy. Within each firm, we rank all managers. The top manager (e.g. CEO) receives a score of one. The lowest ranked manager (e.g. Portfolio Manager) receives a score of zero. Managers with intermediate ranks receive scores ranging from zero to one, with higher scores indicating a higher rank within the firm. See the appendix for further details.

We then use the individual manager rank variable to construct a firm level variable measuring the steepness of each firm's hierarchy. Steepness of Hierarchy, summarized in

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[10] We use last name to match between the full legal name given in Form ADV Schedules A and B, and the manager name given by PSN. We then compare the first and last name using the SPEDIS function in SAS and keep matches with a score below 50. In the event when we have multiple matches based on first and last name (typically when father and son work for the same firm) we use the lowest SPEDIS score on the full name string including suffix to select the best match.

[11] Some directors in our sample likely exclusively play a traditional monitoring role for executives and would not be typically considered a manager of the firm. All of our results are robust to excluding individuals reported only as "director" from the sample.

Table 1, is the within-firm standard deviation of managers' ranks. This variable is low for firms in which many executives have similar ranks and high for firms with steeper hierarchies. We also create an indicator variable for the top ranked executive(s) within each firm. Of all executives and portfolio managers, 18.7% have the highest job title held at their firm and 11.4% are unique top executives. At the firm level, 83.5% of firms have a single top executive, and the remaining 16.5% have multiple executives sharing the top position.

D. Firm and Manager Characteristics

Table 1 shows that firms in our sample, on average, employ 6.4 executives, 2.8 portfolio managers, and offer their clients 5.5 distinct portfolios. Some of these firms also provide other financial services. From the Form ADV data we see that 17.3% of firms have multiple business segments, i.e. they conduct operations in at least one of the following areas: broker-dealer, registered representative of a broker dealer, commodity trading, real estate, insurance, banking, or other financial services.

The average firm manages \$9.9 billion, but this figure is highly skewed as the median firm manages only \$783 million.[12] We measure each firm's asset class focus with the variable Asset Class Concentration. This variable is the Herfindahl index of the firm's assets under management in different asset classes: equity, fixed income, and balanced. The average value in our sample is 0.87, indicating that most firm in our sample are narrowly focused on a single asset class. We measure each firm's equity style focus with the variable Equity Style Concentration, which is the Herfindahl index of the firm's equity investments across equity styles. We use 12 equity style categories based on four size categories: all, large, mid and small, and three style categories: value, growth, and core. The average Equity Style Concentration is 0.51.[13]

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[12] For some firms this figure includes assets under management in mutual funds, hedge funds, or other non-institutional funds.

As seen in Table 2, the sample includes 3,956 distinct portfolio managers. Many of the portfolio managers are also executives, and 17.5% of the portfolio managers are also the highest ranked individual in their firms. We include two variables to measure each portfolio manager's relative contribution to her firm. Proportion of Portfolios Managed shows that the average portfolio manager is responsible for 31.8% of the portfolios offered by her firm. Style Complement is the percentage of the firm's assets under management in the same equity style as the portfolio manager's products. For example, if a portfolio manager controls a single small cap value portfolio, and 38% of the firm's assets under management is invested in small cap value portfolios, then PM Style Complement is 0.38. For portfolio managers with multiple portfolios, we take a value weighted average. Note that we do not have information on individuals total compensation, or the means of compensation, aside from their ownership in their firm.

E. Portfolio Data

Table 3 summarizes information on the portfolios managed by the firms in our sample. There are 4,721 distinct portfolios in our sample: 3,182 equity; 1,270 fixed income; and 369 balanced portfolios.[14] We do not use the balanced portfolios in our analysis. All of the portfolio values reported to PSN are value weighted aggregates of clients' portfolios within a specific investment style (see Busse, Goyal, and Wahal (2010) for more details). The average portfolio is slightly over $1.6 billion. The size of the average equity portfolio, at $1.2 billion, is smaller than the $2.3 billion average for fixed income portfolio.

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[13] We assign a value of zero if the firm does not manage any equity portfolios.

[14] This figure includes only portfolios that report all of the variables used in our subsequent analysis. Thus it is lower than the number of portfolios used to calculate the variable Number of Portfolios reported in Table 1.

[Insert Table 3 here]

We calculate the tracking error of each portfolio as the root mean square of the differences between the portfolio's returns and its benchmark's returns over a 24 month period. Higher tracking errors indicate greater divergence from the benchmark. For the equity portfolios we use 12 style benchmarks based on each fund's stated style benchmark. These benchmarks are listed in the appendix. For the fixed income portfolios we use the Lehman Brothers Aggregate Bond Index. The average equity portfolio has an annualized tracking error of 6.7%, while the average fixed income portfolio has an annualized tracking error of 2.9%. The standard deviation of returns is also higher for equity portfolios than for fixed income portfolios, 15.1% versus 4.1% per year. We also estimate the market betas of the equity portfolios in our sample using the Carhart (1997) model. The average beta is 0.96, and there is considerable cross sectional variation. We also estimate the market betas of the fixed income portfolios in our sample using the Gutierrez, Jr., Maxwell, and Xu (2008) model.

III. Which Managers are Owners?

In equilibrium, the allocation of ownership within firms should be determined by the tradeoff between the benefits of reduced agency problems versus the costs. Managerial ownership is costly because it requires individuals to hold undiversified portfolios and forgo the benefits of risk sharing. In our sample, with many wholly manager-owned firms, there is a second cost to managerial ownership: any increase in one manager's ownership position dilutes the ownership of the other manager-owners and weakens their incentives. Only when the reduction in agency cost outweighs the costs of ownership should a firm allocate ownership to a specific manager. The tests in this section show what factors affect this tradeoff and when managerial ownership is most beneficial.

A. The Allocation of Managerial Ownership

For each year in our sample we measure the ownership positions of all executives and all portfolio managers for each firm. We then estimate regressions to explain each individual's ownership. Of course, ownership is partially determined by many individual and firm specific characteristics. To control for these confounding effects in our regressions we use two fixed effects specifications.

In our first specification we include person-firm fixed effects. In these regressions, our identification comes from the time-series variation in individuals' characteristics and their ownership, while they are employed by a specific firm. While this eliminates variation across individuals,[15] these tests are very powerful as we control for time-invariant person-firm characteristics, such as individual ability. This approach greatly reduces the likelihood that our results are biased due to omitted variables. We do not assume that our explanatory variables change exogenously; rather our operating assumption is that that changes in ownership and individual managers' characteristics are jointly determined. The purpose of the person-firm fixed effects is to control for the possibility that both ownership and observable manager characteristics are jointly caused by some unobserved factor (as this would cause us to mistakenly fail to attribute the joint change of ownership and manager characteristics to this unobserved characteristic).

In our second specification, we include firm-year fixed effects. In these regressions, our identification comes from the variation in managerial ownership across individuals within the same firm at a given point in time.[16] These fixed effects control for firm level characteristics such as the aggregate level of managerial ownership. By including separate fixed effects for each firm-year, we control not just for time-invariant firm characteristics, but also for time varying firm characteristics such as changes in firm value and the composition of external owners.[17] Petersen (2009) shows that fixed effects estimation works best when the effect is genuinely constant. By including firm-year, rather than firm, fixed effects, we ensure that the effects truly are constant and avoid any biases from time-series changes in unobserved firm characteristics.

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[15] Less than one third of individuals experience a change in ownership level during the sample period.

[16] The results are similar if we include firm fixed effects rather than firm-year fixed effects.

In Panel A of Table 4 the main independent variable of interest is managers' rank within their firms, as well as interactions between this variable and managers' characteristics. In Panel B of Table 4 we include an indicator variable equal to one for the top ranked executive(s) within each firm. In both panels, columns one and two include person-firm fixed effects as well as year fixed effects. Columns three and four include firm-year fixed effects.

For all specifications in Panel A of Table 4, managerial ownership increases with rank. Very likely, individual characteristics, such as ability, affect both rank and managerial ownership. Indeed, a Hausman test shows that the coefficients change significantly between the person-firm and firm-year fixed effects specifications, which strongly suggests that a large component of both rank and managerial ownership is determined by individual specific characteristics. However, the relation between rank and managerial ownership is highly significant even after controlling for person-firm fixed effects, tenure, and year effects. The person-firm fixed effects remove the time-invariant component of personal ability, while the combination of tenure and year effects remove the average increase in ability through experience over time. It is possible that positive changes in both ownership and rank reflect individuals whose ability has increased over time at an above average rate. In unreported results, however, we find that decreases in rank are significantly associated with decreases in ownership, which suggests the relation between rank and managerial ownership cannot be explained solely by changes in ability. Our results are consistent with theoretical models of managerial compensation, which find that firm level incentives are increasingly efficient as an individual's contribution to overall firm performance increases e.g. Bushman, Indjejikian, and Smith (1995).

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[17] Although the fixed effects control for potential level effects of external ownership, we split the sample into firms with 100% employee ownership (and therefore no external blockholders) to examine whether the presence of a blockholder affects the sensitivity of the relations. In Appendix Table 4, we show the results are consistent across subsamples.

[Insert Table 4 here]

The results in column one imply that, fixing an individual's time-invariant characteristics and conditioning out the effect of job tenure, moving from the lowest rank in a firm to the highest is associated with an increase in ownership of 2.83 percentage points (33.3% increase relative to the mean). The results in column three imply that, within a firm, the ownership of the managers with the highest rank is 17.6 percentage points higher than the ownership of the managers with the lowest rank.

The results for Top Executive in Panel B of Table 4 are similar to the results for Rank in Panel A. Even with person-firm fixed effects included, ownership increases when a manager becomes the top executive in her firm's hierarchy, and this effect is especially strong for a manager who becomes the unique top executive (sole possessors of her firm's top rank). The results in both Panels A and B show that managerial ownership is significantly related to both Rank and Unique Top Executive, even when both variables are included in the regression. Any increase in responsibility is associated with an increase in managerial ownership, but this relation is non-linear. An increase in rank to the top position within a firm is associated with a larger increase in managerial ownership than changes in rank at lower levels of the firm's hierarchy. Presumably monitoring costs for the top manager in a firm are considerably greater than for other managers; while the top executive in a firm is responsible for monitoring all other managers, only individuals outside the firm can discipline the top executive. It seems reasonable to assume that external monitoring costs are greater than internal monitoring costs, implying that the optimal level of managerial ownership is substantially higher for the top ranked executive.

An alternative explanation for this finding is the possibility that a manager's effect on overall firm value increases non-linearly as she rises through the firm's hierarchy. While ownership aligns managers' incentives with the firm, the value of ownership depends on the actions of all employees. If a manager's actions have only a small effect on overall firm value, ownership is a weak incentive and provides little incentive for effort. This moral hazard problem implies that managerial ownership should only be allocated to managers with substantial contributions to firm value. This argument implies that not only the amount of managerial ownership, but also the proportion of total incentives that are linked to ownership, should increase with a manager's contributions to firm value. One disadvantage of our sample is that, because it contains many private firms, we do not observe total manager compensation, and as a result, we cannot address changes in the composition of incentives. So while we show that the level of managerial ownership changes when Rank changes, we cannot rule out the possibility that all other forms of compensation simultaneously change, leaving the proportional composition of incentives unchanged. This limits our ability to show that changes in Rank are associated with greater changes in the incentive efficiency of managerial ownership *relative to alternative incentives.*

In Panels A and B of Table 4 we also include interaction terms between an indicator variable for portfolio managers and a measure of managers' status within their firms (Rank in Panel A and Top Executive in Panel B). Individuals who are both executives and portfolio managers have multiple roles within the firm. In the terminology of Fama and Jensen (1983), these managers hold both decision control and decision management rights. Because the allocation of effort between roles depends on the managers' private, non-verifiable information, external monitoring is difficult, and incentives other than ownership may encourage sub-optimal allocation of effort between roles (e.g. see Baker, Gibbons, and Murphy (1994) for a discussion of a similar problem in the context of bonuses and incentive pay as opposed to managerial ownership).

The interaction of portfolio manager with rank is highly significant in all specifications. Of course, individuals with both executive and portfolio manager roles likely have particularly high ability, and ability is likely correlated with managerial ownership. However, this result is highly significant even after controlling for tenure and person-firm fixed effects, which remove the most obvious sources of omitted variable bias. The significance in the firm-year fixed effects regressions shows the result is not driven by firm level correlations (i.e. the fact that executives are more likely to also be portfolio managers at manager owned firms. Taken together, these results provide strong support for the argument of Fama and Jensen (1983), that managerial ownership is most efficient for individuals with both decision control and decision management responsibilities.

We also include interaction terms between an indicator variable for multisegment firms with Rank (Panel A) and Top Executive (Panel B). In addition to portfolio management services, multisegment firms also provide at least one additional financial service such as: commodity trading, broker-dealer, real estate, or banking. Multisegment firms are more complex than single segment firms, and the necessary knowledge for decision making is diffused across managers in separate segments. As argued by Fama and Jensen (1983), because the knowledge needed to make decisions is diffused across managers, decision management rights must also be diffused across managers. To control the agency problems associated with diffuse decision management rights, decision control is separated from decision management, resulting in lower benefits from managerial ownership.

The interactions of multisegment with Rank (Panel A) and Top Executive (Panel B) are both significantly negative in the firm-year fixed effects specifications. While the firm-year fixed effects remove each individual firm's aggregate level of managerial ownership, the slope coefficients are constant across all firms. The significant negative coefficients indicate that the relation of managerial ownership with Rank or Top Executive is significantly weaker in multisegment firms. Managerial ownership is less valuable in complex firms, thus rank has a weaker effect on ownership in these firms. The coefficients are not significant in the person-firm fixed effects regressions. After including person-firm fixed effects there is very little time variation in the multisegment indicator variable, and so these regressions have low power with respect to this variable.

We include an indicator variable for portfolio managers. All of the other job titles included in our measure of rank denote firm level executive responsibility. Portfolio Manager, by contrast, involves only operational responsibilities. The significant negative relation between Portfolio Manager and ownership indicates that the effect of rank is non-linear. Moving from some executive responsibility, to none at all, is more meaningful than changes in the level of executive responsibility.

The final variable in Panels A and B of Table 4 is tenure. There are two reasons to expect managerial ownership to increase with tenure. First, tenure is closely related to age. Holmstrom (1982b) shows that the incentive effect of career concerns decreases as a manager approaches retirement, and Chevalier and Ellison (1999) find empirical evidence that career concerns affect portfolio managers' behavior. Because ownership can be sold after retirement, it continues to provide a strong incentive for aging managers. Second, in privately held firms, managerial ownership creates a strong tie between manager and firm. Although it is risky for a firm to bind themselves to a manager whose ability is unknown, the uncertainty regarding a manager's ability decreases with tenure and so ownership increases.

While we cannot distinguish between uncertainty about managers' ability and diminishing incentives from career concerns, including this variable controls for an omitted variable bias from either possibility. Across all specifications we find significant positive coefficients on tenure, even when controlling for person-firm fixed effects, which shows that managerial ownership increases with tenure.

B. Portfolio Manager Ownership

In this subsection, we test the determinants of portfolio managers' ownership positions. We restrict the sample to portfolio managers because we can use information about their portfolios to clearly measure their actions and contributions to the firm. In Table 5 we use two fixed effects specifications combined with four different sets of variables measuring portfolio managers' positions in their firms' hierarchies. As the results are similar across all four sets of variables, we focus our discussion on the results in the first two columns. The first column includes person-firm fixed effects and the second column includes firm-year fixed effects.

[Insert Table 5 here]

The first variable, Rank, ranges between zero and one, with zero indicating portfolio managers without executive responsibilities, and one indicating that the portfolio manager is the highest ranked executive in his firm. We include this variable to capture two concepts. First, portfolio managers with executive responsibilities have multiple distinct roles within the firm, and incentives other than ownership may distort the allocation of effort between roles. Second, portfolio managers who are also executives are more important to overall firm profitability, and thus the incentive effect of managerial ownership is less diluted for these individuals.

In both columns one and two the relation between rank and ownership is positive and highly significant. The results in the remaining columns show that this relation is robust to alternative definitions of executive responsibility. As in the previous subsection, managers with decision control rights (executive role) and decision management rights (portfolio manager role) have higher ownership. The coefficient on Rank is highly significant even after controlling for person-firm fixed effects, which suggests this result is not driven by a time-invariant omitted variable such as individual ability.

The second variable is the proportion of the firm's portfolios[18] managed by the individual. We include this variable to measure the portfolio manager's relative contribution to overall firm profitability. A manager who controls a high proportion of his firm's portfolios has a large contribution to overall firm value, and as a result ownership is an efficient incentive; the incentive dilution and moral hazard problems associated with a team incentive such as ownership are lower for managers with a large contribution to firm value.

The results in column two of Table 5 show that managers who control a large proportion of their firms' portfolios have higher ownership, and the inclusion of firm-year fixed effects show this result is not driven by firm size (i.e. manager owned firms offer fewer distinct portfolios). The insignificance of this variable in the person-firm fixed effects regressions, however, means that we cannot rule out the possibility that this relation is driven by some unobserved characteristic such as ability.

The third variable is Style Complement. This variable measures the similarity between a portfolio manager's investment style and that of her coworkers. Low values indicate little overlap between a portfolio manager's style and other individuals in the firm. High values indicate the portfolio manager's style is very similar to his colleagues. We include this variable to measure the interdependencies between portfolio managers. Bushman, Indjejikian, and Smith (1995) argue that firm level incentives are more effective relative to individual level incentives when within firm interdependence is higher. The incentive dilution that occurs from using an incentive based on the effort of all employees is offset by the value of encouraging cooperation and reducing conflict among employees. Based on the results of Pomorski (2009), we assume that there are greater benefits to sharing information, investment technology, and centralized research when multiple portfolio managers follow the same style.

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[18] We have also estimated results using the proportion of total assets under management controlled by the portfolio manager. The results are qualitatively the same for the firm-year fixed effects regressions. With person-firm fixed effects, most of the year-to-year variation in the proportion of assets under management is driven by asset price fluctuations. By contrast, year-to-year changes in the proportion of portfolios managed represent conscious managerial changes by the firm.

The relation between Style Complement and managerial ownership is significant in the firm-year fixed effects regression. Portfolio managers whose investment style is relatively similar to their peers have higher ownership. The firm-year fixed effects remove the most obvious sources of bias in interpreting this result, such as the aggregate level of managerial ownership or the relation between ownership, firm size, and firm focus. This result is consistent with the idea that ownership is relatively more efficient as interdependencies increase, and benefits of cooperation offset the moral hazard and shirking that result from using a team incentive such as ownership. After including person-firm fixed effects the relation between managerial ownership and Style Complement is not significant. Given that Style Complement is very stable over time this specification has very low power with respect to this variable.

We also include tenure and the logarithm of firm assets as controls. Tenure controls for the fact that individual manager's ownership tends to increase over time. The logarithm of firm assets controls for the possibility that both the aggregate level of managerial ownership and the range of portfolios offered change as firm size changes.

IV. Managerial Ownership and Risk Taking

In the previous section we test whether the allocation of managerial ownership is determined by the joint allocation of decision control and decision management rights. In this section, we test if managers change their behavior following changes in ownership, and whether these changes in behavior are consistent with our interpretation of the results in the previous section. Specifically, we test if portfolio managers alter their risk taking behavior following changes in ownership.

Fama and Jensen (1983b) argue that the benefits of allocating decision control and decision management rights to a single individual are highest when the information needed for decision making is costly to transfer among agents. Scharfstein and Stein (1990) and Zwiebel (1995) show that the inability to credibly communicate ex ante information distorts manager's incentives and leads to herding: because of career concerns, managers underweight their own private information when making decisions. Chevalier and Ellison (1999) examine the behavior of mutual fund managers and find empirical evidence consistent with this argument. Portfolio managers with greater career concerns track the index more closely. Managerial ownership reduces the ability of the firm to terminate a portfolio manager, and because ownership substitutes for monitoring it eliminates the need for a manager to credibly communicate her information to a superior.

Several prior papers test whether managerial ownership alters risk taking. Coles, Daniel, and Naveen (2006), Coles, Lemmon, and Meschke (2012), and Rajgopal and Shevlin (2002) estimate structural models of compensation and risk taking, and find that higher equity compensation results in higher risk taking. Low (2009) uses changes to takeover protection laws in Delaware as a natural experiment and finds a positive relation between managerial ownership and discretionary risk taking.

Our work differs from these prior studies in several ways. First, these papers focus on the direct pecuniary incentives from ownership. Our tests focus on how the separation of ownership and control distorts managerial decision making because of the difficulty in credibly communicating information. We consider not just the level of risk, but also *risk taking relative to peers*, to test whether managerial ownership reduces the herding problem discussed in Scharfstein and Stein (1990) and Zwiebel (1995). Second, we look within firms and examine the portfolio manager risk choices and portfolio manager ownership, rather than examining firm level risk.

The advantages of examining portfolio risk are that we can compare portfolio managers within the same firm while controlling for all firm level characteristics and there are clear benchmarks for portfolio risk that are common to all portfolio managers in a given investment style. Note that we are testing the relation between ownership and portfolio risk, and we do not measure firm level risk. Because fees are based on assets under management and Del Guercio and Tkac (2002) shows that fund flows are linearly related to performance[19] there is a close relation between portfolio performance and firm performance. However, while portfolio risk and firm risk are related they are not identical, and our tests should be interpreted in this light.

A. Portfolio Manager Ownership and Portfolio Risk

We test the relation between portfolio manager ownership and risk taking using the equity and fixed income portfolios in our data. We measure equity portfolio risk in three ways. The first risk measure is the tracking error of each portfolio's returns relative to its style benchmark. This measures unsystematic risk and reflects the portfolio manager's decision to alter his portfolio relative to other portfolio managers in the same style. The second risk measure is the portfolio's beta estimated using the Carhart (1997) model, which captures the portfolio manager's decision regarding the level of systematic risk. The final risk measure is the portfolio's standard deviation of returns. All three risk variables are measured over the 24 months subsequent to the measurement of our independent variables. For fixed income portfolios we measure portfolio risk as tracking error and standard deviation. We also estimate the relation between portfolio manager ownership and alpha for both equity and fixed income portfolios.

The regressions in Table 6 are estimated at the portfolio level, and not the portfolio manager level as in Table 5. As a result, a single portfolio manager may be associated with multiple portfolios. Because of the need for standard benchmarks, we limit the sample to U.S. domestic equity and fixed income portfolios. Because the dependent variables are estimated over two years, and we are using annual observations, we cluster the standard errors at the portfolio level to avoid overstating significance.

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[19] The linear performance-flow relation for institutional investment management funds shown by Del Guercio and Tkac (2002) eliminates many of the incentives for strategic risk taking by mutual fund managers discussed in Brown, Harlow, and Starks (1996) and Chevalier and Ellison (1997).

[Insert Table 6 here]

To control for omitted variables we use two fixed effects specifications. First, we include person-portfolio fixed effects. These fixed effects remove any time-invariant component of a portfolio manager's risk choices for a specific portfolio. Second, we include firm-year fixed effects to remove firm specific effects.

We also include several control variables to reduce the possibility that changes in portfolio manager ownership and portfolio risk are both systematically driven by some other factor. The logarithm of the number of products managed by a portfolio manager controls for the possibility that portfolio managers alter their risk taking in response to competing demands on their time and attention. We also include the logarithm of firm total assets under management and the logarithm of portfolio assets. These variables control for the possibility that the level of assets under management affects risk taking: for example, perhaps a larger portfolio must follow the index more closely because of higher price impact for trades. Finally, based on the finding of Chevalier and Ellison (1999) that changes in career concerns over the life cycle are related to portfolio risk taking, we include portfolio managers' tenure at their current firm.[20]

All of the regressions reported in Panel A of Table 6 include style-year fixed effects. We define nine equity investment styles based on the intersection of growth, core, and value with small, mid, and large cap. These style fixed effects are estimated separately for each year in the sample to control for time variation in the risk of different styles. Including these fixed effects means that each portfolio manager's risk choices are evaluated relative to other portfolios with the same style during the same period.

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[20] We cannot observe portfolio manager age in our sample and so we use tenure as the best available proxy.

The first column in Panel A of Table 6 show that after controlling for portfolio managers' overall level of risk taking using fixed effects, higher managerial ownership is associated with significantly greater deviations from the established benchmarks. This result is consistent with the arguments of Scharfstein and Stein (1990) and Zwiebel (1995), who argue that the career concerns resulting from the separation of decision management and decision control roles can induce managers to ignore their private information and herd. A portfolio manager with private information must consider the career risk of acting on that information. Because an external monitor cannot differentiate between a bad decision and a good ex ante decision with a bad outcome, acting on private information increases the risk a portfolio manager will be terminated. Managerial ownership substitutes for external monitoring and eliminates the career risk associated with acting on private information, which results in less herding.

While there are explanations other than herding, the use of fixed effects and control variables reduces their feasibility. The person-portfolio fixed effects eliminate all time-invariant components of an individual portfolio manager's investment style or preferences. Thus any competing explanation must explain a simultaneous change in ownership and tracking error for a specific portfolio manager-portfolio pair, and that is not controlled for by including the number of portfolios managed, portfolio size, and tenure.

The most plausible alternative explanation is that ownership changes following an individual specific change in ability. As a result of this change in ability, the portfolio manager chooses to increase his deviations from the benchmark. However, if we exclude all observations in which a portfolio manager's ownership increases we find similar results to those presented in the table. Thus any story based on changes in managerial ability must explain decreases in ability occurring simultaneously with decreases in managerial ownership.

The results in the first two columns of Panel B of Table 6 provide supporting evidence.

We find a significant positive relation between fixed income portfolio tracking error and portfolio manager ownership, just as we did for equity portfolios. Overall, these results support the argument that the allocation of managerial ownership is closely linked to the joint allocation of decision control and decision management rights. Manager-owners act on their private information to a greater extent than non-owners.

Columns three and four in Panel A of Table 6 show regression results where the dependent variable is portfolio beta. With person-portfolio fixed effects, we find a significant negative relation between portfolio manager ownership and betas. This pattern of results suggests that portfolio managers alter the level of systematic risk in their portfolio to offset some of the change in unsystematic risk that occurs when managerial ownership changes.

Columns five and six in Panel A of Table 6 show regression results where the dependent variable is the overall portfolio standard deviations. In both specifications, there is a significant positive relation between managerial ownership and portfolio standard deviation. Reduced career concerns from higher managerial ownership result in portfolio managers taking greater unsystematic risk. In Panel B of Table 6, however, we fail to find a significant relation between portfolio manager ownership and the standard deviations of fixed income portfolios, while controlling for portfolio manager fixed effects.

In the last two columns in Panel A of Table 6 we test the relation between portfolio manager ownership and alpha. The dependent variable in these regressions is each portfolio's alpha over the subsequent 24 months, estimated using the Carhart 4-factor model. In both specifications the relation between portfolio manager ownership and alpha is insignificant. This result does not imply that the increased risk taking by portfolio managers whose ownership has increased is unrewarded however. If investors react rationally to observable measures of portfolio managers' ability, Berk and Green (2004) show that the quantity of assets under management, should adjust but there will not be any observable effect on risk adjusted performance.

V. The Concentration of Managerial Ownership

Closely connected to the question of which managers are allocated ownership, is the question of why there is so much variation in the concentration of managerial ownership within firms. Some firms are wholly owned by a single manager, while others are jointly owned by many managers with minority positions. In a study of 300 large U.S. firms, Rajan and Wulf (2006) note a trend towards flatter organizations with less differential in pay and more long term incentives like stock ownership. Understanding what determines the variation in the concentration of managerial ownership helps us to understand what drives the separation of ownership and control within firms.

The empirical tests in this section are conducted at the firm level rather than the individual manager level, and the independent variables include firm characteristics with little time-series variation. Because the variation is primarily cross-sectional, rather than within firms, we are unable to use firm fixed effects to control for omitted variable bias. Many of the independent variables in this section are determined jointly with managerial ownership and so the results in this section should be interpreted as descriptive. In addition to providing a description of the correlation structure between managerial ownership and other organizational features, these tests also provide a useful validation check of our earlier results. Our interpretations of the individual manager results have implications regarding the firm level distribution of managerial ownership, and in this section we show that the firm level distribution of ownership is generally consistent with our interpretation of the determinants of individual manager's ownership.

A. Empirical Results

We begin by dividing firms into four categories based on the concentration of their managerial ownership: no managerial ownership; minority structure (aggregate managerial ownership is less than 50%); partnership structure (aggregate managerial ownership is greater than 50% but no single individual owns 50% or more); and concentrated structure (a single manager owns more than 50%). These categories capture the most important aspects of the variation in managerial ownership concentration. In minority structure firms, managerial ownership aligns incentives with external owners, but the final arbiter of authority is the external owner(s). In partnership structure firms, both incentives and authority are held within the firm, but are dispersed across managers who must cooperate and reach consensuses. In concentrated structure firms, one manager directly controls the firm.

Table 7 shows the relation between the concentration of managerial ownership and firms' characteristics. Using the four categories of managerial ownership defined above, we estimate a multinomial logit model of ownership structure with standard errors clustered by firm. The excluded category is firms with no managerial ownership. To measure the distribution of authority within firms we use the variable Steepness of Hierarchy, which ranges from zero (completely flat hierarchy) to one (very steep hierarchy). We have also estimated a similar model using Unique Top instead of Steepness of Hierarchy, with similar results.

[Insert Table 7 here]

In addition to the multinomial logit model, Table 8 shows the results of a random effects panel Tobit model of firm level managerial ownership. In the first two columns, the dependent variable is the sum of all managerial ownership positions. In the third and fourth column, the dependent variable is the sum of the three largest managerial ownership positions. And in the last two columns, the dependent variable is the size of the single largest managerial ownership position. We include all three measures of managerial ownership, as our primary interest is not in the aggregate level of managerial ownership but rather in understanding the variation in ownership concentration.

[Insert Table 8 here]

The multinomial logit results in Table 7 show a clear difference between partnership structures and other managerial ownership structures. The coefficient estimate for Steepness of Hierarchy is significantly negative in the partnership structure equation, and is significantly different from the coefficient in the concentrated ownership structure equation. This shows that partnership structures have flatter hierarchies and authority is more widely diffused. This result is consistent with Fama and Jensen (1983), who argue that managerial ownership allows firms to avoid a strict hierarchy and the associated monitoring costs. Because the compensation of all partners is determined by the group's performance there is mutual monitoring and less need for centralized authority to solve conflicts between individuals. The significant difference between partnership and concentrated ownership structures highlights that it is not just the separation of ownership and control between managers and external owners that matters. Even among firms controlled by management, when most managers are not owners the distribution of authority is similar to externally owned firms.

In the Tobit model regressions the coefficient estimate on Steepness of Hierarchy is significant only when the dependent variable is the single largest managerial ownership position. This result highlights the fact that firms with concentrated managerial ownership structures are even more hierarchical than externally owned firms. Only firms with dispersed managerial ownership have flatter hierarchies and dispersed decision making.

The second variable we consider is the proportion of the firms' executives who are also portfolio managers. Fama and Jensen (1983) argue that managerial ownership is necessary when both decision control (executive roles) and decision management (portfolio management) rights are held by the same person. Consistent with this intuition, we find that managerial ownership is strongly associated with a high proportion of executives also having portfolio management roles. This result is consistent with our findings and interpretations at the individual manager level.

The logarithm of the number of portfolio managers has a strong negative relation with partnership and concentrated ownership structures. Manager controlled firms have significantly fewer portfolio managers. As the number of employees grows, ownership becomes an increasingly inefficient incentive because each manager's individual contribution to firm value is lower, resulting in free riding and low effort.

We include the average number of portfolios managed per portfolio manager because, as shown by Holmstrom and Milgrom (1991), as the number of distinct tasks performed by an agent increases the greater the likelihood that formulaic incentive compensation will distort the agent's allocation of effort across tasks. We include the variable Multisegment to measure the complexity of the firm. However, these two variables are not significant.

Asset Class Concentration and Equity Style Concentration measure the similarity of the portfolios the firm offers to its clients. Because ownership rewards the combined actions of all employees, it creates an incentive for cooperation, which is most valuable when there is greater scope for spillovers between portfolio managers (e.g. Pomorski (2009)). We find that firms with partnership structures are significantly more likely to focus on a single asset class. This suggests that the benefits of cooperation are much greater between portfolio managers in the same asset class, and as a result managerial ownership is distributed across many managers within the firm. Both partnership and concentrated structure firms have significantly higher Equity Style Concentration than non-manager owned firms, but the differences between firms with different classifications of managerial ownership concentration are not significant. The lack of significant differences suggests this result is driven by the incentive effect of ownership, rather than the separation of ownership and control.

We also include the logarithm of total assets under management (AUM) to control for the fact that the incentive efficiency of managerial ownership decreases with firm size. Each manager has less effect on overall firm value, which results in free riding. Also, managerial ownership limits the amount of capital available to a firm. As expected, the coefficients for this variable are significant and negative.

The overall pattern of results in this section provides supporting evidence for the earlier results examining the allocation of managerial ownership within firms. The joint allocation of decision management and decision control, the moral hazard issues arising from the use of a general incentive such as ownership, and the benefits of encouraging cooperation within firms all affect the allocation of managerial ownership. The results at the firm level are generally consistent with the aggregate implications and interpretations of our individual manager level results. Our findings also complement the results in Rajan and Wulf (2006), who examine the compensation structures in a broader cross-industry sample of over 300 large U.S. firms and find employees in flatter organizations seem to have more stock ownership.

VI. Conclusion

What factors determine the allocation of ownership to specific managers within a firm? We address this question using a unique sample of institutional investment management firms, for which we have the ownership positions of all individual managers. Our sample includes many privately held firms with no external ownership. Controlling for person-firm fixed effects and firm-year fixed effects, we find strong evidence that managerial ownership is allocated to individuals who hold both executive level monitoring roles and operational responsibilities. We also find that ownership of the firm is higher for individuals when the benefits of cooperation between managers are high and with relatively large contributions to overall firm value.

We also show that changes in managerial ownership are associated with changes in risk taking behavior. Controlling for individual characteristics, portfolio managers who experience an increase in managerial ownership subsequently increase the level of unsystematic risk in their portfolios but decrease the level of systematic risk. Similarly, portfolio managers who experience a decrease in managerial ownership decrease unsystematic risk and increase systematic risk. We interpret this as evidence that career concerns, arising from the separation of monitoring and operational decision making, reduce managerial risk taking.

Why does the concentration of managerial ownership vary across competing firms? Examining this question in investment firms, we find a strong relation between the dispersion of ownership and the dispersion of authority. High external ownership and concentrated managerial ownership are both associated with steep hierarchies, while dispersed managerial ownership is associated with flat hierarchies. We also find that managerial ownership is more dispersed when the benefits of cooperation within the firm are greater.

Collectively, our results provide empirical evidence that the separation of ownership and control within firms is important. By looking within firms, rather than at aggregate managerial ownership, we are able to use fixed effects to control for the endogeneity that plagues studies of managerial ownership and to test the role of managerial ownership in novel ways. We believe this is a promising direction for future research on the role of managerial ownership in other industries.

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Table 1

Firm Level Summary Statistics

This table shows summary statistics of firm level characteristics for institutional investment management firms that both file a Form ADV and report to the PSN database for the years 2001 through 2006. The sample consists of 6,600 firm-year observations. Steepness of Hierarchy is the standard deviation of the scaled rank of all employees listed on Form ADV. Unique Top Executive equals one if a single employee holds the highest position within the firm. Number of Executives is the count of all executives listed on Form ADV. Number of Portfolio Managers is the number of portfolio managers that work for the firm. Proportion of Executives also PM is the proportion of executives that also act as portfolio managers. Average Portfolios per PM is the average number of portfolios managed per portfolio manager. Multisegment equals one if the firm operates non-investment management business segments. Asset Class Concentration is the Herfindahl index of firm assets across asset classes. Equity Style Concentration is the Herfindahl index of equity assets across styles. Firm Assets is the total assets managed by the firm in $ millions. Minority Structure denotes that total managerial ownership is less than 50% but greater than zero. Partnership Structure denotes that total managerial ownership is greater than 50% but no single individual owns 50% or more. Concentrated Structure denotes that one individual manager owns more than 50%.

	Mean	SD	25th	Median	75th
Unique Firms	1,365				
Steepness of Hierarchy	0.29	0.07	0.28	0.30	0.32
Unique Top Executive	83.5%				
Number of Executives	6.4	5.1	3.0	5.0	8.0
Number of Portfolio Managers (PM)	2.8	4.6	1.0	1.0	3.0
Proportion Executive also PM	13.2%				
Number of Portfolios	5.5	9.5	1.0	3.0	6.0
Average Portfolios per PM	1.1	1.1	0.5	1.0	1.5
Multisegment	17.3%				
Asset Class Concentration	0.87	0.24	0.83	1.00	1.00
Equity Style Concentration	0.51	0.46	0.00	0.55	1.00
Firm Assets	9,872	39,029	221	783	3,723
Firms with No Manager Ownership	26.7%				
Minority Structure	10.6%				
Partnership Structure	16.9%				
Concentrated Structure	45.8%				
Total Manager Ownership	61.1%	44.1	0.0	87.5	100.0
Largest Manager-Owner Positions (if > 0)	55.9%	29.5	32.5	50.0	82.5
Largest Three Manager-Owner Positions (if > 0)	79.0%	28.5	66.7	92.5	100.0
Total Manager Ownership (if > 0)	83.3%	28.3	76.9	100.0	100.0

Table 2

Manager Summary Statistics

This table shows summary statistics for the 53,120 individual-year observations of managers employed at firms in our sample. Rank is the manager's scaled rank relative to other managers within the same firm, and ranges from zero (lowest) to one (highest). Top Executive equals one when the employee holds the highest position within a firm. Unique Top Executive equals one when a single manager holds the top position in the firm. Tenure is the number of years that the employee has been with the firm. CEO, Chairman, President, Other Chief Executive, Director, Partner/Principal/Member, Vice President, Manager, and Secretary indicate the employee's highest ranked title. CCO equals one when the employee's only title is chief compliance officer. Proportion of Portfolios Managed is the fraction of the firm's total portfolios managed by the portfolio manager. Style Complement is the fraction of the firm's equity assets managed in the same style as the portfolio manager. Columns All and PM contain statistics for all managers and portfolio managers, respectively.

	All	PM
Unique People	14,825	3,956
Ownership	8.5%	10.5
Percent of Managers with Ownership Positions	29.5%	22.7
Ownership (if > 0)	28.7%	46.2
Rank	0.60	0.48
Top Executive	18.7%	17.5
Unique Top Executive	11.4%	13.3
Tenure	6.7	9.2
CEO	5.1%	4.5
Chairman	3.4%	2.3
President	7.7%	8.8
Other Chief Executive	3.2%	0.4
Director	17.9%	4.7
Partner/Principal/Member	10.4%	6.0
Vice President	17.4%	5.8
Manager	2.2%	0.8
Secretary	1.6%	0.1
CCO	3.5%	0.1
Other	3.3%	0.5
Portfolio Manager	30.1%	100.0
Number of Portfolios Managed		2.0
Proportion of Portfolios Managed		0.32
Style Complement		0.39

Table 3

Portfolio Summary Statistics

This table shows summary statistics for the 14,495 portfolio-year observations in our sample. Portfolio Assets is the total assets managed in each portfolio in $ millions. Panel A summarizes the characteristics of the portfolios managed by firms in our sample. Tracking error and standard deviation are calculated from monthly returns over the 24 months subsequent to measuring managerial ownership and are annualized. Panel B summarizes the characteristics of the equity portfolios managed by firms in our sample. The parameters beta and alpha are estimated with monthly return data over the 24 months subsequent to measuring managerial ownership using the Carhart (1997) model. Alphas are annualized. Panel C summarizes the characteristics of the fixed income portfolios managed by firms in our sample. The fixed income alpha is estimated with monthly return data over the 24 months subsequent to measuring managerial ownership using the Gutierrez, Jr., Maxwell, and Xu (2008) model and then annualized.

Panel A: All Portfolios					
	Mean	SD	25th	Median	75th
Portfolios	4,721				
Portfolio Assets	1,558	5,810	69	296	1,100
Tracking Error	5.5%	4.1	2.6	4.6	7.4
Standard Deviation	11.6%	6.8	5.5	11.1	16.8
Panel B: Equity Portfolios					
Portfolios	3,182				
Portfolio Assets	1,228	4,188	52	260	959
Tracking Error	6.7%	4.1	3.7	5.7	8.6
Standard Deviation	15.1%	5.4	10.7	15.1	18.6
β	0.96%	0.28	0.87	0.98	1.08
$\alpha_{Carhart}$	0.4%	5.6	-2.4	0.1	3.0
Panel C: Fixed Income Portfolios					
Portfolios	1,270				
Portfolio Assets	2,307	7,062	121	452	1,773
Tracking Error	2.9%	2.7	1.0	2.0	4.0
Standard Deviation	4.1%	2.6	2.4	3.8	4.9
α_{GMX}	0.9%	2.6	-0.1	0.4	1.4

Table 4

Determinants of Individual Managers' Ownership

This table reports the results of fixed-effect panel regressions using the sample of 53,120 manager-year observations. The dependent variable is each individual manager's level of ownership. Columns one and two show the results from person-firm fixed effects panel regressions. Columns three and four show the results from firm-year fixed effects panel regressions. PM is equal to one if the individual is a portfolio manager. Multisegment is equal to one if the firm has more than one business segment. Panel A reports Rank interactions with characteristics. Panel B reports Top Executive interactions with characteristics. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

Panel A: Rank Interactions				
Rank	2.83**	1.33**	17.60**	2.82**
	[10.17]	[4.02]	[45.96]	[6.21]
Rank × PM	3.61**	2.80**	21.36**	22.66**
	[6.39]	[4.96]	[35.40]	[39.09]
Rank × Multisegment	0.24	0.29	-7.38**	-4.98**
	[1.10]	[1.36]	[12.54]	[8.82]
Top Executive		0.27		3.86**
		[1.31]		[8.54]
Unique Top Executive		3.53**		14.41**
		[16.33]		[30.86]
PM	-3.95**	-3.29**	-4.73**	-8.75**
	[7.74]	[6.45]	[12.20]	[23.12]
Tenure	0.33**	0.33**	0.52**	0.43**
	[21.55]	[21.21]	[42.63]	[36.28]
Person-Firm Fixed Effects	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	No	No
Firm-Year Fixed Effects	No	No	Yes	Yes
Within R^2	0.020	0.030	0.208	0.274
Observations	53,120	53,120	53,120	53,120

Panel B: Top Executive Interactions				
Top Executive	0.47*	-0.20	5.38**	1.99**
	[2.42]	[0.89]	[12.26]	[4.24]
Unique Top Executive	3.43**	3.52**	13.22**	13.54**
	[15.84]	[16.23]	[28.14]	[28.93]
Top Executive × PM	1.79**	1.85**	19.63**	17.37**
	[6.36]	[6.60]	[45.58]	[39.21]
Top Executive × Multisegment	0.49	0.50*	-5.93**	-5.84**
	[1.96]	[1.98]	[12.05]	[11.93]
Rank		1.87**		7.45**
		[5.91]		[20.26]
PM	-1.92**	-1.95**	-1.97**	0.16
	[7.51]	[7.65]	[10.75]	[0.77]
Tenure	0.33**	0.33**	0.40**	0.41**
	[21.09]	[21.25]	[34.23]	[34.51]
Person-Firm Fixed Effects	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	No	No
Firm-Year Fixed Effects	No	No	Yes	Yes
Within R^2	0.029	0.030	0.270	0.276
Observations	53,120	53,120	53,120	53,120

Table 5

Determinants of Portfolio Managers' Ownership

This table reports the results of fixed-effect panel regression using the sample of 15,964 portfolio manager-year observations. The dependent variable is each portfolio manager's level of ownership. Columns one, three, five, and seven show the results from manager-firm fixed effect panel regression. Columns two, four, six, and eight show the results from firm-year fixed effect panel regression. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

Rank	10.08**	25.30**						
	[13.35]	[54.23]						
Executive			8.69**	14.69**				
			[14.08]	[46.44]				
Top Executive					6.28**	26.02**	3.29**	14.13**
					[16.63]	[63.67]	[6.86]	[17.98]
Unique Top Executive							5.47**	16.04**
							[10.05]	[17.63]
Proportion of Portfolios Managed	2.18	3.13**	1.05	4.70**	2.24	3.41**	2.53	3.21**
	[1.40]	[4.08]	[0.68]	[5.97]	[1.44]	[4.66]	[1.64]	[4.44]
Style Complement	-0.33	2.47**	-0.34	3.13**	-0.33	2.04**	-0.34	1.99**
	[1.10]	[7.06]	[1.12]	[8.67]	[1.09]	[6.05]	[1.13]	[5.98]
Tenure	0.49**	0.23**	0.47**	0.25**	0.49**	0.13**	0.47**	0.11**
	[14.09]	[14.44]	[13.64]	[14.95]	[14.33]	[8.32]	[13.76]	[7.07]
log(Firm assets)	-0.38**		-0.40**		-0.42**		-0.40**	
	[3.95]		[4.18]		[4.36]		[4.20]	
Person-Firm Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Year Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Firm-Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Within R^2	0.034	0.245	0.035	0.198	0.042	0.303	0.050	0.323
Observations	15,964	15,964	15,964	15,964	15,964	15,964	15,964	15,964

Table 6

Risk Taking by Portfolio Managers

This table reports fixed-effect panel regression using a sample of equity and fixed income portfolios. In Panel A, the dependent variable in columns one and two is the tracking error of the portfolio. The dependent variable in columns three and four is the beta of the portfolio. The dependent variable in columns five and six is the standard deviation of the portfolio returns. The dependent variable in columns seven and eight is the equity alpha of the portfolio returns. In Panel B, the dependent variable in columns one and two is the tracking error of the portfolio. The dependent variable in columns three and four is the standard deviation of the portfolio returns. The dependent variable in columns five and six is the fixed income alpha of the portfolio returns. Columns one, three, five, and seven include Portfolio Manager-Portfolio fixed effects. Columns two, four, six, and eight include Firm-Year fixed effects. All dependent variables are calculated for the 24 months after the independent variables are observed. All columns include Style-Year fixed effects. PM Ownership is the percentage of the firm owned by the portfolio manager. A constant is include, but not reported. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

Panel A: Equity Portfolios

	Tracking Error		Beta		Standard Deviation		Alpha	
PM Ownership	0.02**	-0.004	-0.001**	0.0004	0.06**	0.01	-0.01	-0.005
	[4.42]	[0.06]	[3.31]	[0.92]	[4.05]	[1.89]	[0.74]	[0.50]
log(Number of Portfolios)	-0.35	-1.59**	-0.01	0.03*	-1.06*	-0.12	0.89	-0.70**
	[1.15]	[7.79]	[0.43]	[2.24]	[2.01]	[0.72]	[1.39]	[3.17]
log(Firm Assets)	0.03		0.006		0.26**		-0.46**	
	[0.72]		[0.55]		[3.09]		[4.16]	
log(Product Assets)	-0.22**	-0.35**	0.03**	0.01**	-0.45**	-0.06	-0.94**	-0.35**
	[4.09]	[10.02]	[7.99]	[4.39]	[3.71]	[1.74]	[8.74]	[9.47]
Tenure	-0.65**	0.003	0.01**	-0.001	-2.00**	-0.02	0.52**	-0.004
	[9.82]	[0.28]	[5.50]	[1.45]	[10.44]	[1.71]	[6.90]	[0.32]
PM-Portfolio Fixed Effects	Yes	No	Yes	No	Yes	No	Yes	No
Firm-Year Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Style-Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Within R^2	0.270	0.067	0.059	0.013	0.478	0.021	0.062	0.034
Observations	9,696	9,696	9,696	9,696	9,696	9,696	9,696	9,696

Panel B: Fixed Income Portfolios

	Tracking Error		Standard Deviation		Alpha	
PM Ownership	0.01*	0.02*	0.004	0.02	0.005	-0.03
	[2.33]	[2.31]	[0.93]	[1.86]	[0.60]	[1.84]
log(Number of Portfolios)	-0.19	-1.51**	-0.04	-0.82**	0.41	-0.62**
	[0.86]	[5.02]	[0.16]	[3.58]	[1.16]	[3.01]
log(Firm Assets)	-0.07		-0.13**		-0.08	
	[1.27]		[2.66]		[1.04]	
log(Product Assets)	-0.24**	-0.28**	-0.20**	-0.24**	-0.76**	-0.24**
	[3.43]	[4.92]	[3.23]	[4.05]	[6.66]	[4.39]
Tenure	-0.31**	-0.02	-0.36**	0.01	-0.21**	0.004
	[6.70]	[1.18]	[7.03]	[0.33]	[5.96]	[0.28]
PM-Portfolio Fixed Effects	Yes	No	Yes	No	Yes	No
Firm-Year Fixed Effects	No	Yes	No	Yes	No	Yes
Within R^2	0.188	0.098	0.214	0.043	0.094	0.041
Observations	4,014	4,014	4,014	4,014	4,014	4,014

Table 7

Determinants of Managerial Ownership Concentration

This table reports results of multivariate logit regressions using a sample of 6,660 firm-year observations. The dependent variable is the classification of managerial ownership structure. We divide firms into four categories: no managerial ownership; Minority (total managerial ownership is less than 50%); partnership (total managerial ownership is greater than 50% but no single individual owns 50% or more); and Concentrated (one individual manager owns more than 50%). No managerial ownership is the omitted category. Columns one through three report the coefficients for each structure. Columns four through six report the p-value for the significance of the difference between the different ownership structures. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

Panel A: Steepness of Hierarchy

	(1) Minority	(2) Partnership	(3) Concentrated	(1)-(2)	(1)-(3)	(2)-(3)
Steepness of Hierarchy	-1.10	-2.98**	0.16	0.171	0.354	0.000
	[0.82]	[3.33]	[0.18]			
Proportion Exec. also PM	3.58**	3.70**	5.21**	0.865	0.010	0.002
	[4.87]	[5.21]	[7.82]			
log(Number of PM)	-0.22	-1.02**	-1.11**	0.000	0.000	0.557
	[1.50]	[7.12]	[8.21]			
Average Portfolios per PM	-0.09	0.04	0.09	0.232	0.090	0.500
	[0.95]	[0.52]	[1.13]			
Multisegment	0.35	-0.09	-0.11	0.080	0.034	0.913
	[1.62]	[0.37]	[0.56]			
Asset Class Concentration	-0.10	0.63**	0.30	0.002	0.064	0.065
	[0.46]	[3.06]	[1.64]			
Equity Style Concentration	0.33	0.50*	0.46**	0.468	0.541	0.819
	[1.49]	[2.45]	[2.59]			
log(Firm Assets)	-0.12*	-0.31**	-0.42**	0.001	0.000	0.004
	[2.47]	[6.44]	[9.54]			
Year Fixed Effects	Yes	Yes	Yes			
Overall p-value	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R^2	0.124					
Observations	6,660					

Panel B: Unique Top						
	(1) Minority	(2) Partnership	(3) Concentrated	(1)-(2)	(1)-(3)	(2)-(3)
Unique Top	-0.29	-0.64**	0.21	0.107	0.012	0.000
	[1.51]	[3.45]	[1.27]			
Proportion Exec. also PM	3.58**	3.77**	5.21**	0.776	0.010	0.002
	[4.84]	[5.30]	[7.79]			
log(Number of PM)	-0.22	-1.05**	-1.09**	0.000	0.000	0.741
	[1.45]	[7.16]	[8.19]			
Average Portfolios per PM	-0.10	0.03	0.09	0.244	0.081	0.414
	[0.99]	[0.41]	[1.14]			
Multisegment	0.35	-0.08	-0.11	0.087	0.033	0.879
	[1.64]	[0.32]	[0.56]			
Asset Class Concentration	-0.12	0.58**	0.32	0.003	0.049	0.137
	[0.51]	[2.81]	[1.73]			
Equity Style Concentration	0.33	0.52*	0.44*	0.427	0.595	0.679
	[1.52]	[2.54]	[2.52]			
log(Firm Assets)	-0.12*	-0.29**	-0.42**	0.001	0.000	0.001
	[2.41]	[6.25]	[9.57]			
Year Fixed Effects	Yes	Yes	Yes			
Overall p-value	0.000	0.000	0.000	0.000	0.000	0.000
Pseudo R^2	0.127					
Observations	6,660					

Table 8

Determinants of Firm Level Managerial Ownership

This table reports marginal effects of random effect Tobit regressions using a sample of 6,660 firm-year observations. The dependent variable in columns one and two is aggregate managerial ownership for the firm. The dependent variable in columns three and four is the sum of the three largest manager owners' positions. The dependent variable in columns five and six is the size of the largest single managerial ownership position in the firm. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

	All		Largest Three		Largest	
Steepness of Hierarchy	-2.42		4.50		11.46**	
	[0.71]		[1.34]		[2.73]	
Unique Top		-0.97		-0.61		2.70**
		[1.54]		[1.06]		[3.29]
Proportion Exec. also PM	9.20**	9.10**	12.21**	10.88**	13.92**	15.88**
	[5.13]	[4.94]	[5.72]	[5.80]	[5.22]	[4.91]
log(Number of PM)	-0.20	-0.56	-1.24*	-0.86	-1.16	-2.99**
	[0.45]	[1.20]	[2.51]	[1.84]	[1.52]	[4.62]
Average Portfolios per PM	-0.90**	-0.68*	-0.30	-0.39	-0.59*	-0.58
	[3.41]	[2.56]	[1.12]	[1.49]	[1.98]	[1.63]
Multisegment	1.23	1.24*	0.89	1.30*	1.56	-0.04
	[1.95]	[1.97]	[1.27]	[2.04]	[1.43]	[0.05]
Asset Class Concentration	1.00	1.00	1.46*	1.43*	-0.69	-1.07
	[1.34]	[1.33]	[2.00]	[2.13]	[0.76]	[1.31]
Equity Style Concentration	0.30	0.44	0.26	0.36	1.10	3.07**
	[0.43]	[0.63]	[0.38]	[0.55]	[1.28]	[3.69]
log(Firm Assets)	-1.21**	-1.16**	-1.39**	-1.35**	-2.56**	-3.21**
	[7.95]	[7.47]	[8.13]	[8.74]	[10.20]	[12.20]
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.209	0.227	0.266	0.255	0.189	0.208
Observations	6,660	6,660	6,660	6,660	6,660	6,660

Appendix

We use data from two primary sources: a panel of the SEC's Form ADV filings for the years 2001 through 2006 and Informa Investment Solutions's Plan Sponsor Network database as of 2006.

Form ADV

The Investment Advisors Act of 1940 requires investment advisors with more than $25 million in assets under management and 15 or more U.S. clients to register with the SEC. The Act defines investment advisers as any entity which receives compensation for managing portfolios of securities for clients or provides advice regarding individual securities. To register with the SEC, an investment advisor files the Form ADV. The main section of Form ADV has data on name, location, and firm characteristics, such as firm total assets under management and additional business segments.

Form ADV also has schedules. Schedule A lists all direct owners and executives, while Schedule B list indirect owners of the ownership positions described on Schedule A. The complete list of required entities include: officers, partners, directors, or similar positions exercising executive responsibility; those with the right to receive 25% or more of the firm's capital upon dissolution; controls 25% or more of a voting share class; an elected manager of a company; a trustee or managing agent of a trust meeting any of the previous criteria. While we do not observe non-executive ownership of less than 5%, we observe all ownership that represents meaningful control rights over firms' operations. Schedule A also lists job titles and length of tenure with the firm in the current position.

Calculation of Ownership Positions

Schedule A records all direct ownership positions. Schedule B records all indirect owners that have a 25% interest in any entity listed in Schedule A. Using Schedule B we find the true controlling owner of each entity listed in Schedule A.

On Schedule A ownership is classified into 6 groups: “NA - Less than 5%”, “A - 5% but less than 10%”, “B - 10% but less than 25%”, “C - 25% but less than 50%”, “D - 50% but less than 75%”, “E - 75% or more”. For portfolio managers from PSN that do not match to Form ADV, we assign 0% ownership. To construct a single value for each ownership stake, we apply the following algorithm. We sum the number in each ownership group. Starting at “E - 75% or more”, we build an upper and lower constraint based on the sum of each of the other groups except “E - 75% or more” multiplied by the maximum and minimum possible value for each of the other groups. We then take the midpoint of the maximum and minimum possible value as the value for any entity classified as “E - 75% or more”. We then construct the constraints for “D - 50% but less than 75%” as above, except now omitting “D - 50% but less than 75%” and use the value for “E - 75% or more” as both the minimum and maximum constraint for “E - 75% or more”. Again, we take the midpoint of the constraints as the value for “D - 50% but less than 75%”. We proceed recursively until we obtain values for each group.

We verify the validity of the results of the algorithm by ensuring that each calculated group value falls within the prescribed range and that the values of all the stakes in a single firm sum to 100%. For the small number that do not, we correct these entries by hand (e.g. there are reporting errors where a single individual with “E - 75% or more” ownership stake is listed multiple times for multiple positions: CEO, CCO).

Plan Sponsor Network (PSN)

Plan Sponsor Network is a commercially available investment manager search and evaluation database. In 2006, Informa Investment Solutions integrated Mobius and PSN databases and launched the enhanced investment manager database. We use this merged PSN dataset and obtain the entire database as of 10/28/2006. The new PSN database is the largest separately managed account database available and contains data on 1,851 investment management firms and 9,959 investment portfolios (as of our 2006 version).

Firms self-report to PSN. This raises two possible concerns: self-selection bias and validity of the data. Management firms do not pay to be included in the database, and firms have an incentive to report as it allows them to attract flows and also is a requirement for industry awards such as Top Gun or Bull & Bear Market lists. Firms also have an incentive to be accurate as clients can cross-check the data with alternative sources, such as Nelson's and Pensions & Investments. Furthermore, the SEC can and does bring fraud charges for lying about investment returns to potential investors.

Prior studies have used parts of this dataset. Del Guercio and Tkac (2002) use the June 1995 M-Search Database compiled and distributed by Mobius, Inc. Del Guercio and Tkac (2002) compared a subsample of the Mobuis data to the Nelson's directory and found 90% of the subsample either matched exactly or were within 10% of the values reported in Nelson's. Using a 2004 (pre-merger) version of PSN, Busse, Goyal, and Wahal (2010) cross-check the number of firms with data contained in the Mercer Performance Analytic database and publications such as the Money Market Directory of Investment Advisors and find that coverage in PSN is slightly better. For our study, we use PSN data on returns, portfolio size, portfolio manager name and tenure, and portfolio investment style.

We examine the stated benchmark for all portfolios and choose the most commonly stated benchmark in each style category: Large Core (S&P 500), Large Value (Russell 1000 Value), Large Growth (Russell 1000 Growth), Midcap Core (Russell Midcap Core), Midcap Value

(Russell Midcap Value), Midcap Growth (Russell Midcap Growth), Small Core (Russell 2000 Core), Small Value (Russell 2000 Value), Small Growth (Russell 2000 Growth), Allcap Core (Russell 3000 Core), Small Value (Russell 3000 Value), and Small Growth (Russell 3000 Growth). For all bond portfolios, we use the most common benchmark, the Lehman Aggregate Bond Index.

The vast majority of portfolios, 93%, have a single identifed manager. Less than 7% are nominally "team-managed" or some other non-individual named designation. Sixty-four portfolios have named co-managers.

Form ADV - PSN matching

We hand-match by name to match between the PSN and Form ADV firm names. As both data contains location and asset under management, we use those fields to verify the name matches. As Form ADV is compulsory, we find that we can match 99.7% of AUM in PSN to Form ADV. PSN has 1,851 unique firms. We can match 1,632 to Form ADV. Twenty of the firms we don't match are foreign. Only twenty-four firms have reported assets of over $25 million and cannot be matched to Form ADV. These unmatched firms have less than half the average number of products of the matched sample. The average size PSN-ADV matched firm is six time larger than a PSN-no ADV match firm.

At the individual-level, we use last name to match between the legal name given in Form ADV Schedule A and manager name given by PSN. We then compare the first and last name using the SPEDIS function in SAS and keep matches with a score below 50. When we have multiple matches based on first and last name we use the lowest SPEDIS score on the full name string to select the best match.

Job titles

We obtain job titles of persons listed on Form ADV from the field "Title or Status". We identify common categories of responsibility and create a hierarchy that follows the logic in Aggarwal and Samwick (2003). The Appendix Table 1 lists the frequency of job titles of all individuals in our combined dataset. Note, the percentages do not sum to 100% as portfolio managers may not have executive level responsibility. Also, an individual may have multiple titles. In these cases, we assign the individual the highest ranking title.

Appendix Table 1

Job Titles

Rank	Title	Frequency
1	CEO	5.3%
2	Chairman	3.5%
3	President	7.7%
4	Other Chief Officer (except Chief Compliance Officer)	9.0%
5	Director	18.0%
6	Partner, Principal, or Member	10.9%
7	Vice President	17.5%
8	Manager	2.3%
9	Secretary	1.6%
10	CCO	3.9%
11	Other required Form ADV Filer	3.4%

Of the remaining 2,103 manager titles in "Other"; 317 are "TREASURER"; 195 are "GENERAL COUNSEL"; 87 are "ASSOCIATE PERSON; and 65 are "CONTROLLER". We rank portfolio managers without any executive responsible below "Other".

We determine the variables Rank and Top Executive based on the relative ranking of individuals within the firm. To verify that our results are not driven by our choice of order, we repeat the analysis contained in Table 4 using job titles. In Appendix Table 2, we find that the results are consistent with rank and unique top results. Job titles that reflect firm level responsibility have a higher coefficient on both the title and the PM interaction term.

Appendix Table 2

Job Title Ownership Regressions

This table reports the results of fixed-effect panel regressions on the sample of 53,120 manager-year observations. The dependent variable is each individual manager's level of ownership. Column one shows the results from person-firm fixed effects panel regressions. Column two shows the results from firm-year fixed effects panel regressions. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

CEO	2.14**	11.76**
	[5.18]	[25.64]
CHM	2.66**	8.97**
	[5.85]	[17.56]
President	4.92**	16.57**
	[12.53]	[37.51]
Other Chief Executive	0.25	-0.64
	[0.59]	[1.33]
Director	-0.75*	-0.13
	[2.11]	[0.36]
Partner/Principal/Member	0.74	10.10**
	[1.89]	[22.60]
Vice President	-0.97**	-1.86**
	[2.74]	[5.06]
Manager	-1.41**	-3.36**
	[2.64]	[5.52]
Secretary	0.004	-2.85**
	[0.01]	[4.62]
CCO	0.31	-2.94**
	[0.64]	[6.18]
Other	-0.71	5.00**
	[1.51]	[9.93]
PM	-3.26**	-3.65
	[5.99]	[10.31]
CEO × PM	6.35**	23.52**
	[9.67]	[29.97]
CHM × PM	2.02**	26.22**
	[2.65]	[26.09]
President × PM	1.97**	21.38**
	[3.23]	[32.22]

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Other Chief Executive × PM	3.33**	4.72*
	[2.59]	[2.23]
Director × PM	-0.09	7.94**
	[0.13]	[11.56]
Partner/Principal/Member × PM	4.34**	11.00**
	[6.65]	[16.45]
Vice President × PM	0.98	5.64**
	[1.54]	[8.82]
Manager × PM	-0.07	5.03**
	[0.07]	[3.28]
Secretary × PM	9.51**	5.24
	[4.14]	[1.48]
CCO × PM	5.62*	1.67
	[1.98]	[0.48]
Other × PM	-4.88**	3.00
	[4.05]	[1.52]
Tenure	0.34**	0.42**
	[21.73]	[35.71]
Person-Firm Fixed Effects	Yes	No
Year Fixed Effects	Yes	No
Firm-Year Fixed Effects	No	Yes
Within R^2	0.037	0.286

Appendix Table 3

Firm Managerial Ownership by AUM Quintile

This table shows total managerial ownership for institutional investment management firms in the sample. We sort firms into quintiles based on their reported assets under management. The sample consists of 6,600 firm-year observations.

	Mean	SD	25th	Median	75th
Smallest Quintile	73.6	41.0	50.0	100.0	100.0
2nd Quintile	75.3	38.6	62.5	100.0	100.0
3rd Quintile	68.5	41.6	25.0	100.0	100.0
4th Quintile	53.5	44.7	0.0	66.7	100.0
Largest Quintile	27.2	39.7	0.0	0.0	60.0

Appendix Table 4

Determinants of Individual Managers' Ownership - Split by Aggregate Ownership

This table reports the results of fixed-effect panel regressions using the subsamples of the 53,120 manager-year observations based on aggregate firm ownership. In columns one through four, the sample consists of firms with less than 100% employee ownership. In columns five through eight, the sample consists of firms with 100% employee ownership. The dependent variable is each individual manager's proportion of ownership. Columns one, two, five, and six show the results from person-firm fixed effects panel regressions. Columns three, four, seven and eight show the results from firm-year fixed effects panel regressions. PM is equal to one if the individual is a portfolio manager. Multisegment is equal to one if the firm has more than one business segment. Panel A reports Rank interactions with characteristics. Panel B reports Top Executive interactions with characteristics. The symbols * and ** denote significance at the 5% and 1% levels, respectively.

Panel A: Rank Interactions

	Total Ownership < 100%				Total Ownership = 100%			
Rank	4.06**	1.26	23.02**	8.26**	5.89**	1.68*	36.02**	3.66**
	[5.50]	[1.30]	[22.44]	[6.58]	[10.19]	[2.36]	[35.42]	[2.96]
Rank × PM	7.30**	5.12**	32.65**	35.10**	4.41**	3.06**	32.67**	32.56**
	[5.18]	[3.66]	[20.65]	[22.57]	[4.37]	[3.05]	[20.61]	[22.03]
Rank × Multisegment	-0.66	-0.61	-6.42**	-3.32*	0.2	0.24	-3.17	-0.47
	[1.06]	[0.99]	[4.34]	[2.29]	[0.47]	[0.55]	[1.60]	[0.26]
Top Executive		0.44		0.76		1.94**		13.56**
		[0.85]		[0.65]		[4.27]		[10.90]
Unique Top Executive		7.81**		18.19**		5.01**		19.80**
		[13.05]		[15.05]		[11.58]		[16.35]
PM	-5.40**	-3.68**	-10.06**	-14.33**	-4.35**	-3.20**	-11.21**	-17.18**
	[4.26]	[2.91]	[9.81]	[14.00]	[4.68]	[3.46]	[10.01]	[16.33]
Tenure	-0.12*	-0.12*	0.58**	0.51**	0.20**	0.21**	1.02**	0.83**
	[2.52]	[2.55]	[18.24]	[16.18]	[7.33]	[7.51]	[29.74]	[25.70]
Person-Firm Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Firm-Year Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Within R^2	0.011	0.32	0.193	0.230	0.018	0.039	0.351	0.437
Observations	36,570	36,570	36,570	36,570	16,550	16,550	16,550	16,550

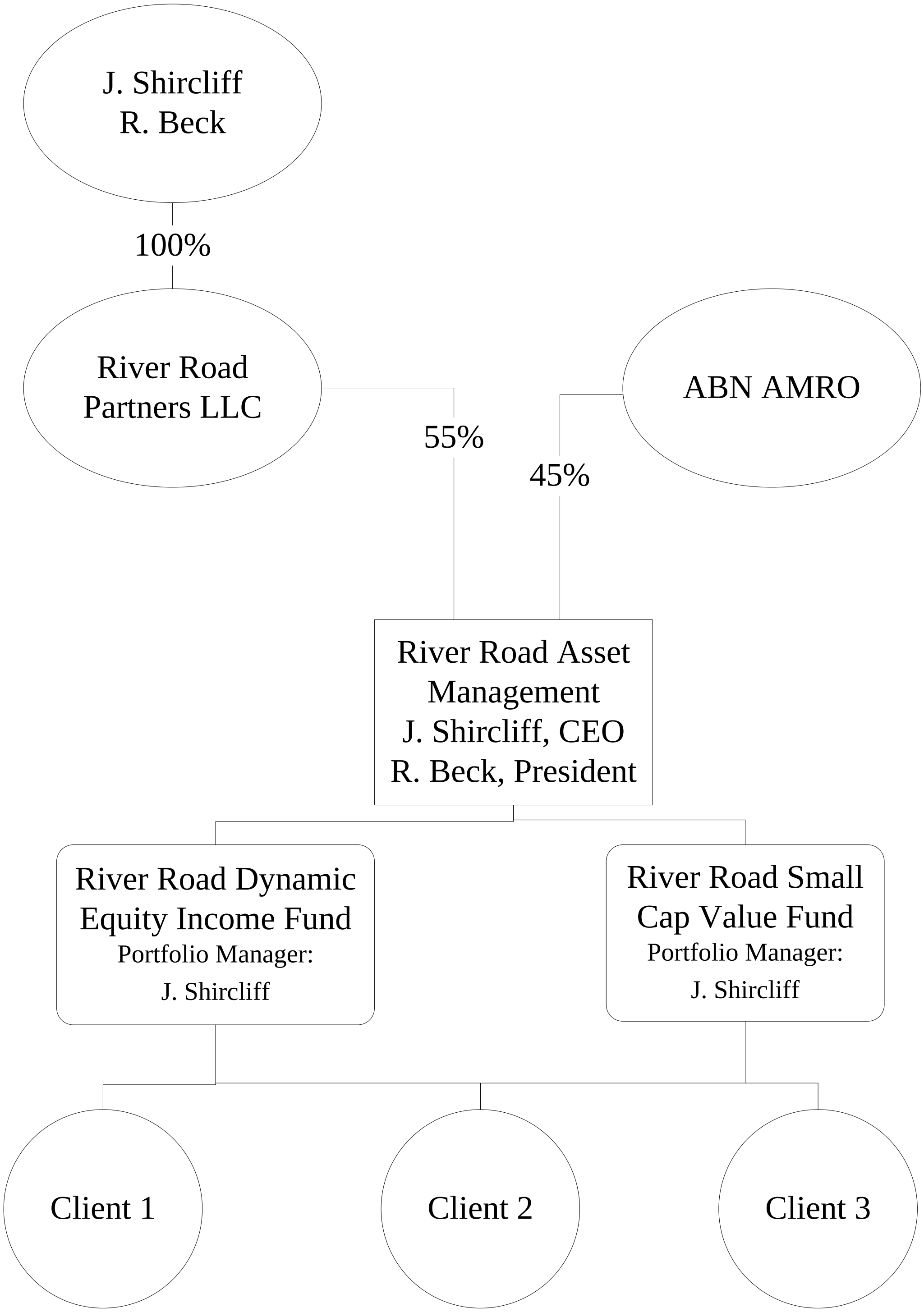
Panel B: Top Executive Interactions

	Total Ownership < 100%				Total Ownership = 100%			
Top Executive	1.11*	0.25	7.47**	2.62*	2.56**	1.70**	16.54**	9.50**
	[2.44]	[0.44]	[6.34]	[2.08]	[6.55]	[3.58]	[14.26]	[7.45]
Unique Top Executive	7.37**	7.49**	16.64**	18.06**	4.87**	4.97**	18.50**	19.53**
	[12.28]	[12.44]	[13.29]	[14.62]	[11.25]	[11.46]	[15.09]	[15.99]
Top Executive × PM	3.52**	3.58**	18.54**	13.11**	0.88	0.99*	20.07**	17.37**
	[4.96]	[5.05]	[15.60]	[10.92]	[1.86]	[2.08]	[19.71]	[16.80]
Top Executive × Multisegment	-1.73**	-1.69**	-2.85*	-2.48*	0.72	0.71	-1.39	-1.32
	[2.78]	[2.73]	[2.26]	[1.99]	[1.40]	[1.39]	[1.01]	[0.96]
Rank		2.23*		20.52**		2.23**		13.74**
		[2.41]		[20.39]		[3.20]		[12.94]
PM	-1.33	-1.40*	-2.22**	3.03**	-1.11*	-1.17**	-5.00**	-2.37**
	[1.91]	[2.00]	[4.36]	[5.37]	[2.56]	[2.69]	[8.95]	[4.02]
Tenure	-0.11*	-0.11*	0.47**	0.46**	0.20**	0.21**	0.83**	0.80**
	[2.49]	[2.36]	[14.48]	[14.63]	[7.38]	[7.47]	[25.36]	[24.58]
Person-Firm Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	No	No	Yes	Yes	No	No
Firm-Year Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Within R^2	0.033	0.033	0.183	0.208	0.038	0.039	0.422	0.429
Observations	36,570	36,570	36,570	36,570	16,550	16,550	16,550	16,550

Figure 1

Organization Structure of a Typical Institutional Investment Management Firm

Figure 1 shows the basic structure of a typical institutional investment management firm, River Road Asset Management , as of January 1, 2006.


J. Shircliff
R. Beck
100%
River Road Partners LLC
55%
ABN AMRO
45%
River Road Asset Management
J. Shircliff, CEO
R. Beck, President
River Road Dynamic Equity Income Fund
Portfolio Manager:
J. Shircliff
River Road Small Cap Value Fund
Portfolio Manager:
J. Shircliff
Client 1
Client 2
Client 3