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ESSAYS ON MUTUAL FUND PERFORMANCE AND ORGANIZATION

By

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ABSTRACT

ESSAYS ON MUTUAL FUND PERFORMANCE AND ORGANIZATION

By

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This dissertation examines how the management team structure, management team characteristics and individual manager characteristics of mutual fund portfolio management teams relate to performance, risk taking and other characteristics of mutual fund portfolios. We utilize a unique data set on over 1,200 mutual fund managers and management teams of more than 2,000 distinct open-end mutual fund portfolios over the 1997 to 2004 period.

In the first essay we first analyze differences in performance and risk taking between sole-managed and team-managed mutual funds. We find that teams under-perform single managers in terms of risk-adjusted returns in the bear market period 2001-2004. This underperformance is more evident among growth-oriented funs. Further, we focus on team-managed funds and examine how team-level characteristics such as team size, age and diversity relate to performance. We find that teams having diverse levels of managerial experience exhibit superior performance. However, when one of more of the fund's manager(s) works for multiple funds, performance deteriorates. Overall, our results suggest that, in contrast to what conventional wisdom suggests, more heads are not better than one when it comes to managing a mutual fund.

In the second essay we focus on the manager characteristics of sole-managed funds. The findings suggest that, consistent with Chevalier and Ellison (1999), managers who attend high SAT-score institutions outperform other managers; however, the

significance of the SAT score decreases after controlling for the quality of the manager's MBA degree. Managers who attend highly ranked business schools perform much better than other managers. We fail to find evidence that managing many mutual fund portfolios affects mutual fund performance negatively.

Finally, the third essay examines the determinants and consequences of team management by focusing on 503 mutual funds that have switched their management team structure during the period 1997-2004. We find that team-managed funds switch to sole-managed after poor performance while sole-managed funds switch to team-managed after significant over-performance. When a fund becomes sole-managed performance improves significantly (184 basis points in terms of 4-factor alphas) while a switch to team management leads to deteriorating performance. Sole-managed funds that add more managers exhibit a decline in performance of 190 basis points. Sole-managed funds that switch to team-managed experience above normal increases in size (total net assets) the year before the change. Weak evidence suggests that risk taking considerations also relate to the decision to change a fund's management team structure. In general, our findings confirm evidence from the first essay that team-managed funds do not offer superior risk-adjusted performance.

DEDICATION

To my parents Georgios and Anastasia

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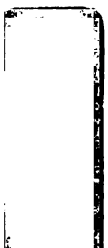


ESSAY 1. Portfolio Management Team Structure and Mutual Fund Performance

1.1 Introduction

Although historically it was common for a fund to have only one person as the portfolio manager, things have changed dramatically in recent years. For instance, according to Morningstar's database of domestic equity funds, in 1997 only 32.5% of all funds and 20% of total mutual fund assets were managed by a team of managers rather than a single individual, whereas in 2005 the corresponding percentages were 58.5% and 60%, respectively. In terms of dollar amounts, teams managed more than $1.2 trillion in 2005 compared to only $250 billion in 1997, while single managers managed $888 billion in 2005 compared to $686 billion in 1997. [1]Further, many mutual funds advertise their team-managed approach to portfolio management as an "edge" and investors seem to prefer team managed funds.[2]

In spite of the increasingly important role of management teams in the portfolio management industry there is little empirical evidence on the differences in performance and trading practices of sole-managed and team-managed mutual fund portfolios. Moreover, to the best of our knowledge, there is no study that investigates the importance

[1] An alternative view is that this is just a change in reporting by mutual fund companies. If this is true, we should not see any differences in trading practices or performance. We document the opposite. Even in the case where the increase in team-managed funds is just a change in reporting manager names, we would expect managers to behave differently when their name is reported and tied to portfolio performance. In any case, just the fact that mutual fund companies advertise their team managed approach as superior, makes it interesting to evaluate differences in performance between sole-managed and team-managed funds.

[2] Many mutual funds underline the importance of the team-managed approach on their funds' prospectuses. For example, consider the following two quotes taken from the website of *Brazos Funds*: "...the Brazos Fund's team approach results in the constant interaction and contribution of the entire team of portfolio managers. No action is taken until the team has had the opportunity to scrutinize the potential investment.", "The Brazos Funds view the team-based approach as an important component in creating less risk for clients and increases their long-term returns."

of team-level characteristics in explaining differences in performance and risk taking. This paper attempts to fill this gap.

Recent literature recognizes the importance of the organizational structure of portfolio management teams. Prather and Middleton (2002), Chen et al. (2004) and Baer et al. (2005) compare the performance of sole-managed and team-managed funds. Prather and Middleton (2002) find that, consistent with the classical decision making perspective, there is no difference in the performance of sole-manager and team-managed mutual funds. Chen at al. (2004) and Baer et al. (2005) do find evidence of underperformance by teams of managers of 5.5 and 4 basis points per month respectively.

In another paper, Qiu (2004) examines the risk-taking behavior of mutual fund managers in response to incentives they are given. He divides funds into two groups: funds managed by single managers and funds managed by multiple managers. He finds that single managers adjust the risk of their portfolio to a much greater extent than multiple managers do in the second half of the year. Further, he finds that loser single-manager funds are more aggressive than loser multiple-manager funds.

In this paper, we hand-collect a unique and much more comprehensive dataset of 2,031 U.S. open-end, domestic-equity mutual fund portfolios (7,713 fund-year observations) in the period between January 1997 and January 2005.[3] Our analysis is

[3] Prather and Middleton (2002) use a sample of 162 open-end mutual funds (147 managed by individuals and only 15 managed by a team). Their requirement of data availability for 156 consecutive months restricts the sample significantly and introduces a serious concern of survivorship bias. Baer et al. (2005) use a much bigger sample (14,848 fund-year observations), however, they include a wide range of mutual funds in their sample, including global and international, utility, balanced as well as sector funds.

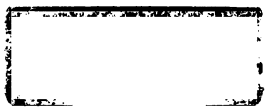
conducted in two parts and provides several new insights regarding the role of portfolio management team structure.[4]

We begin our investigation by using cross-sectional variation to examine whether performance, risk taking and portfolio characteristics depend on whether the fund is sole-managed or team-managed. Our sample period (1997-2005) spans both a bull and a bear market. In contract to other papers, we report results not only for the whole sample periods, but also for the bull and bear market sub-samples (1997-2000 and 2001-2005, respectively. We do find evidence of underperformance by team-managed funds, but this underperformance is only present during the bear market period (45 basis points a year). In "good" market conditions there is no evidence of differences in the performance of sole- and team-managed mutual fund portfolios. Furthermore, evidence of significant underperformance is only present among growth funds and reaches 61 basis points a year in terms of 4-factor alphas.[5]

In the second part of our analysis we delve deeper in to the structure of team-managed funds. We collect data on all managers of team-managed funds and construct

[4] As Sharpe (1981) suggests, we can identify two types of multi-manager team structures. In the most common type of multi-manager team structure, each co-manager is assigned only a part of the fund's assets and has independent decision-making authority on the assets under his or her management. In the other structure, managers make decisions as a committee, collectively deciding on trades after reaching a consensus. However, in reality these two types of teams are not that distinct. Management is not completely diverse in the case of independent sub-managers, since all the managers usually belong to the same management company, share the same pool of analysts, and communicate with each other, and even though consensus has to be reached in committee-type teams, individual members may be held accountable for specific recommendations. That said, one major difference between the two team types is that individual results are more formally and directly observable when each manager has his or her own share of assets. In addition, the compensation and incentive system is probably different across team structures. Unfortunately, detailed information about exact team structures is not available to us.

[5] Funds that have a prospectus objective of "Growth" or "Aggressive Growth" are categorized as growth-oriented funds. Funds with prospectus objective "Equity-Income" or "Growth & Income" are considered as income-oriented funds. Wermers and Ding (2005) examine the relation between manager characteristics and performance and also find that their results hold only for growth-oriented mutual funds. They posit that the difficulty of accurately forecasting earnings growth requires higher experience and ability, so this might be one of the reasons that manager characteristics are important only for those funds.



several team-level characteristics such as team size, team tenure, diversity of experience and other forms of diversity. We then relate team-level characteristics to performance, risk-taking and portfolio characteristics. To the best of our knowledge, this is the first paper that gathers and analyses data on fund managers of team-managed funds. In terms of performance, we find that age diversity, which serves as a proxy for experience diversity, is positively associated with performance in the bear market period. This finding suggests that pooling experienced managers together with younger managers that want to prove themselves, leads to superior performance. Another significant finding is that the common practice of fund families to use the same managers for many of their funds has a negative effect of the funds' performance. Finally, we find evidence that, larger teams which have been working together for a long time, exhibit superior performance in terms of 1-factor and 4-factor alphas. An explanation for this is that when people have been working together for a long time, they learn how to work with each other, and the advantages of the team based approach outweigh its disadvantages such as the possibility of disagreements and conflicts.

Another empirical study, Massa et al. (2006), also examines the performance of single managers, teams of managers as well as anonymous teams of managers.[6] However, they posit that all funds are more or less team managed and the way names are reported has to do with the fund family's decision on who gets credit for the fund's performance. They find that the underperformance of team-funds is solely due to anonymous teams. We also find very weak evidence that underperformance comes from anonymous management teams but this underperformance does not totally explain the superiority of single managers.

[6] Some funds report the fund as team-managed but do not disclose the manager names.

We argue that the declaration of a fund as sole- or team-managed is not just a reporting issue. An analysis of portfolio characteristics reveals that team-managed fund portfolios are significantly different that those of sole-managed funds. Specifically, we document that team-managed funds hold more stocks in their portfolios, turn their portfolio often less frequently and invest lesser amounts of money in their 10 top holdings.

In a multivariate regression setting, we fail to find evidence that single managers take on more total (standard deviation of monthly returns) and systematic (market beta) risk.

Our study relates to literature in other disciplines such as management and psychology that examine teams and group decision making and therefore is of broader academic interest. The mutual fund arena is an ideal place to test a general list of theories of individuals versus team decisions and performance.

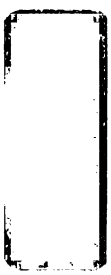
Our findings, taken together with the increased popularity of the team approach in portfolio management, suggest a puzzle. Namely, why do investors and fund families prefer team-managed funds if they do not offer superior risk-adjusted returns?

The remainder of the paper is organized as follows. Section 1.2 provides a brief description of the U.S. mutual funds industry. Section 1.3 presents related literature. We describe our method and data sources and the creation of variables in Section 1.4. In Section 1.5 we describe our hypotheses and present results. Finally, Section 1.6 concludes.

1.2 Institutional Background and Description

The U.S. mutual fund industry has observed explosive growth, especially during the past decade. From $2.8 trillion in 1995, assets managed by mutual funds grew to a record-breaking $8.1 trillion in 2004 (Investment Company Institute (2005)). As the scale of the mutual fund industry has changed, so too have the funds themselves. For example, funds have introduced additional share classes to attract more investors and new sales channels to reach the investment public. Further, the structure of portfolio management teams has changed over time. This section briefly describes the mutual fund industry, setting the background for our paper.

A mutual fund is a corporation or business trust that belongs to all its individual shareholders that purchase shares issued by the fund. Mutual funds are also referred to as open-end funds, as they can continuously offer new fund shares to the public and they are required to buy back outstanding shares when shareholders request that they do so. Like any other company, a mutual fund has a board of directors and its shareholders have voting rights, including the right to elect directors. However, unlike other traditional companies, mutual funds do not have their own employees; instead, they rely on third parties or service providers to carry out their business activities. The board of directors is responsible for administrative decisions (pricing the shares, setting fees, etc.) and negotiates contracts with the following entities: a) the management company (or investment adviser), who runs the fund's portfolio, b) the fund's custodian, who is usually a bank or trust company that holds the fund's assets for safekeeping and handles payments and receipts of the fund's investment transactions, c) the transfer agent, who performs recordkeeping and reporting services, d) the Fund Distributor, who arranges for



the sale of shares, and e) the legal counsel, who provides the fund legal advice. One of the most important functions of the board of directors is to monitor the management company and renew or reject their contract every year. To protect investors, the Securities and Exchange Commission requires that 75% of a board's directors be independent, that is not having a significant relationship with the adviser or the underwriter of the fund.

Even though mutual funds are legally regarded as stand-alone companies, effectively they are not stand-alone entities. Instead, they belong to a broader organizational structure known variously as the "fund family," "fund complex," or "fund sponsor." The fund family appoints the set of directors that oversee the fund and generally manages all the activities needed to start, run, and even close a fund. Big players in the industry include Fidelity, Vanguard, and American Funds, each of which offers dozens of mutual funds.

Investors can buy mutual fund shares through a variety of channels. In addition to the traditional channels of buying mutual fund shares through financial advisers or directly from the mutual fund company, investors can use newer sources such as retirement plans and fund supermarkets. Fund supermarkets offer one-stop service to investors, giving them the chance to buy fund shares from an extensive range of fund families and to easily switch their money between funds.

Another recent development in the mutual fund industry is the introduction of multiple share classes, which allows investors to choose how they want to pay for advisory service commissions paid to brokers. Shareholders pay for financial advisory services through load charges (front- or back-end) and 12b-1 fees. Front-load charges are

charged to investors when they buy new shares and are calculated as a percentage of the initial investment. Back-end (or deferred) load charges are assessed when investors leave the fund, declining as time progresses (the longer the investor stays with the fund, the lower the back-end load charge), eventually disappearing. Most back-end load fees start at 5 percent and decline by one percentage point annually. By law, total front-end and back-end loads cannot exceed 8.5 percent of the initial investment, though competition in the industry has forced fund families to lower loads to an average of 3 percent to 6 percent. 12b-1 fees are part of a fund's annual expense ratio, and include administrative and management fees. Such fees are used to pay marketing and distribution expenses and cannot exceed 0.75 percent of the fund's average net assets per year. To suit the needs of different investors, fund families offer various classes of shares. The most common share classes include class A, B, and C shares, where class A shares generally have a front-end sales charge, no deferred-end sales charge, and a low 12b-1 fee, class B shares usually have no upfront fees but they have back-end charges and 12b-1 fees, and class C shares do not have any type of load charges but they assess a higher 12b-1 fee. Fund families have also developed share classes suitable for investors that hold a large number of shares (institutional, retirement), though the characteristics of these classes vary widely across fund families. Finally, funds offer a no-load class, which gives investors the option to buy funds without using, and hence without paying for, the advice of a financial professional.

Due to varying 12b-1 fees, different share classes have different annual expense ratios (note that administrative and management fees are the same), and consequently different net returns. The annual expense ratio reflects the annual operating costs of running the fund. Unlike load charges, it is not charged directly to the investor, but is

deducted from funds assets. It includes the distribution fee, the management fee, and other administrative expenses. The management fee is paid to the management company for managing the fund's portfolio. Administrative expenses include money paid to the fund's other service providers such as the transfer agent.

The management company (investment adviser) hired by the board of directors of the fund has its own employees and chooses the managers and analysts that will be involved in making investment decisions. The investment adviser could be an internal management firm, which is affiliated with the fund family, or an outside professional portfolio management firm that manages funds from many different fund families. Chen, Hong, and Kubik (2004) investigate mutual funds' make-or-buy decision and find that the decision depends on client demand for and the fixed cost of offering investment styles that are beyond the management company's expertise. They also find that performance is harder to extract from outsourced funds and hence that externally managed funds are more likely to be closed down for poor past performance than comparable internally run funds.

In many cases management of a fund's portfolio is assigned to more than one investment advisor. Vanguard, for example, has advisory contracts with 24 outside management firms, while for about one-third of its funds, multiple firms split the fund's stock-picking duties.[7]

Funds are managed by either a single portfolio manager, who has sole responsibility over investment decisions, or a team of portfolio managers, who share stock-picking decisions. Portfolio management teams can be organized in two ways. First, a portfolio management team can be organized as a committee, where managers

[7] *Forbes* magazine. December 13, 2004, pp 191-192.

together make consensual decisions about which stocks to buy or sell. Teams can also be organized as a portfolio of individual managers, where each manager is assigned a certain share of the fund's assets and can make decisions over its share without having to agree with the recommendations or ideas of the other co-managers.

Empirically, it is difficult to distinguish between those two types of teams as in practice the two types might not be that distinct. In the case of independent co-managers, management is usually not completely diverse, since in general all the managers belong to the same management company, share the same pool of analysts, and exchange ideas with each other. In the case of committee-type management teams, even though a consensus has to be reached, members may be held accountable for specific recommendations and a decision can be influenced more by the most dominant team members. However, one major difference between the organization types is that when individual co-managers have their own share of assets, their performance is more formally and directly observable. The compensation and incentive structures that managers face might also be different between the two management team types. Today, the team-of-managers approach is much more common than the single-manager approach in the mutual fund portfolio management industry. Indeed, as of January 2005, 58.5% of all our sample funds and 60% of total assets under management were managed by teams of managers rather than a single individual.

1.3 Related Literature

While only a few empirical studies consider the team-based approach to portfolio management, several theoretical papers posit why team management might be a superior

strategy. Distinguishing between cases in which one hires several managers to analyze one subset of securities (diversification of judgment) and cases in which different managers are hired to analyze different subsets of securities (diversification of style), Sharpe (1981) shows that the benefits of multiple managers relate to diversification effects. Bad picks by one manager can be offset by better picks of the others in the case that they manage independently; in the case that the managers manage together the diversification of judgment effect protects against the possibility that a particular manager will make a serious error. Thus, if investors want to diversify their investments, multiple-manager funds allow them to easily achieve this goal by investing in a fund that is run by several independent managers rather than by investing in several different funds. Sharpe also argues that specialization may be another determinant of the multiple-manager phenomenon. If managers have specialized knowledge in a particular area, then it would be reasonable to employ many managers to offer specialized knowledge in many areas.

As Sharpe (1981) suggests, we can identify two types of multi-manager team structures. In the most common type of multi-manager team, each co-manager is assigned only a part of the fund's assets and has independent decision-making authority in relation to the assets under his or her management. In the other structure, managers make decisions as a committee, collectively deciding on trades after reaching a consensus. However, in reality these two types of teams are not that distinct. Management is not completely diverse in the case of independent sub-managers, since all the managers usually belong to the same management company, share the same pool of analysts, and communicate with each other, and even though consensus has to be reached in

committee-type teams, specific members may be held accountable for specific recommendations.

Even in the absence of specialization or diversification benefits, however, Barry and Starks (1984) show that the use of multiple managers may still be justified and even optimal in some cases. They develop a model that is based on agency and risk-sharing considerations. An intuitive way to look at their argument is the following. If we suppose that managers are prone to taking on more risk as the amount of money they manage increases, then risk-averse investors who prefer the risk level that the manager would take on if he managed half the money might choose to invest in a two-manager portfolio rather than a single-manager one.

Picher (2004) characterizes the optimal organizational forms and incentive contract for a team of money managers. In his model, the investor (principal) is risk averse and each manager's actions affect both that manager's expected return and the correlation of returns between managers, depending on the risk tolerance of the managers. If the managers are risk tolerant, then a non-cooperative team structure and a contract in which each manager is rewarded both for doing well and for doing better than the team is the most efficient way to encourage managers to exert effort in diversified activities. As the investor and the managers become more risk averse, cooperation among managers becomes the optimal organizational structure.

Holmstrom (1982) is concerned with the moral hazard problem of inducing agents to supply the proper amounts of productive inputs when their actions are not observed. More specifically he studies the moral hazard problem in teams when many agents (members) are involved. Moral hazard is also present in the single-agent case when there

is uncertainty in output. However, in teams, problems can occur even if there is no uncertainty in output. If only the joint output of the team is observable, members of the team that cheat or do not supply enough effort cannot be identified. Holmstrom focuses on this free-rider problem and shows under what conditions it can be alleviated. His conclusion is that the free-rider problems can be largely resolved if there is separation of ownership and labor and if proper incentives (such as penalties or bonuses) are given to the team. More specifically, he shows that no contract that is "budget balancing", that is it allocates all of the team's output to its members, can induce the team member to choose the efficient effort levels. The efficient output is obtained by a contract that gives each member a payoff of zero (the output goes to the principal-owner) if the output is lower than if all the members had chosen the efficient effort levels. Moreover, when individual output is observable, relative performance evaluation of agents can help reduce the moral hazard costs. Holmstrom's theorem depends on the agents' utility functions' being linear in money.

Rasmusen (1987) extends Holmstrom's model to allow for risk averse agents. With risk averse agents there exists a first-best contract that is "budget balancing". This contract is similar to the non-budget-balancing contract in Holmstrom in the sense that less than efficient team output triggers a punishment. However, with risk averse agents this punishment takes the form of a deviation lottery rather than loss of the whole output by the team. Rasmusen describes two forms of this lottery: a) the scapegoat lottery, where only one member is punished and the others take his share, and b) the massacre lottery, where only one agent is rewarded by getting the shares of all the other members. The massacre lottery seems to attain the first-best efficiency level for less risk-averse agents

or more tightly bounded punishments, even though all of the deviation lotteries perform reasonably well.

Sah and Stiglitz (1988) study the decision making of committees and contrast it to certain forms of centralized versus decentralized organizations. In committees each member evaluates every project available to the company and a project is accepted if approved the number of members required to reach a consensus. The second type of organization studied is called hierarchy. In hierarchical organizations the project is evaluated (and either accepted or rejected) by a higher level individual only if approved by the lower levels. Finally, in polyarchical organizations a project is accepted if approved by any one member. Their analysis focuses on two economic trade-offs. The first trade-off is between the errors of not approving good projects and the errors of accepting bad projects. The second trade-off is between the gain from a more extensive evaluation of projects and the extra resources spent on evaluating projects. They derive results concerning the optimal design of each of the three organizational forms and compare the performance between them. For committees they provide a framework that derives the optimal committee size and the level of consensus. For hierarchies they characterize the optimal level of levels depending on the underlying economic conditions. Finally, the also provide a framework on the optimal number of member in a polyarchy. More importantly however, they analyze the relative performance of the three organizational forms under different sets of parameters of the economy. For example, they show that when the portfolio of projects is better, a polyarchy is better than a committee and a committee is in turn better than a hierarchy. They also show that when the evaluations costs are large the relative performance of a polyarchy or a hierarchy is

better compared to a committee. They also underline the economic costs that time delays in making decisions might impose. Anyone who compares the relative performance of different organizational forms should take differences in the time it takes to make decisions into account.

Slezak and Khanna (2000) examine the effect of the organizational form (hierarchy or team) on the collection and sharing of information. In their model each member makes a recommendation on whether to accept or reject a project, and the project is accepted or rejected according to the majority rule. The difference between the two organizational forms they present is that, in a team each member observes the recommendation of the other members and the members announce their recommendations sequentially. Under the hierarchical form, all members report their recommendation to a central authority without listening to other people's recommendations. They identify a disadvantage to the team structure which has to do with the case where recommendations some members can be influenced by what other people think and information gathered by team members might be used inefficiently. Even though such inefficiencies are not present in the hierarchical structure, they recognize the case where the agents still communicate with each other informally and might also create cascades. In that case the principal has to monitor at a cost and enforce the hierarchical structure. When the cost of imposing the hierarchical form is greater than the benefit from its enforcement, teams are the optimal form of organization. They also look at two types of incentives given to agents: an individual bonus, which rewards only the agent that made the correct recommendation, and a team bonus, which goes to the whole team when their decision is good. They show that team bonuses can solve the free-

rider problem only when they are too big. Individual bonuses work better, but give incentives to the members of the team to collude and lead to inefficient use of information. They conclude that the hierarchical form is the optimal organization structure except in the case of high hierarchy enforcing costs described above.

Many other research studies, especially in the management and psychology literature, investigate the decision-making process, behavior, and performance of teams versus individuals. The results differ across studies mainly due to the variety of tasks and measures used in each study, which makes it difficult to make valid generalizations or comparisons. However, as conventional wisdom suggests, all studies agree that teams behave differently than individuals, even though we do not always observe differences in performance.

Hollenbeck et al. (1998) argue that the ideal decision maker is either a team of decision makers that must reach consensus or an individual manager in a hierarchical structure where the support staff is not involved in the final decision. Prather and Middleton (2002) argue that under the classical decision making theory perspective we should see no significant difference in performance between sole-managed and team-managed funds.

Moving on to empirical studies, results are mixed. For instance, Herrenkohl (2004) and Hill (1982) discuss the advantages and disadvantages of teams when it comes to decision-making tasks. Teams, as opposed to single individuals, have a broader range of relevant skills and knowledge. They can also acquire and process a larger amount of information by subdividing responsibilities. On the other hand, teams might not be able to exploit the full range of skills and knowledge of its members because some members

may not be motivated to contribute, some members may influence the final decision more than others, or the diversity of team members' views can sometimes be so broad that they are difficult to reconcile.

In terms of risk taking common sense would suggest that single managers are prone to taking more risk. However, Vinokur (1977), Herrenkohl (2004), Janis (1984) and many other researchers suggested that teams are subject to the risky shift phenomenon. When people are in groups, they make decisions about risk differently from when they are alone. They are likely to make riskier decisions, as the shared risk makes the individual risk less.

Further, while Sah and Stiglitz (1988) argue that teams may be associated with delays in decision making, and thus they suggest that anyone who compares the relative performance of different organizational structures should take differences in the time it takes to make decisions into account, Schmidt et al. (2001) find that teams are more effective decision-makers than individuals. In terms of accuracy in judgment, most studies suggest that group judgments tend to be more accurate than the judgments of typical individuals, and approximately equal to the mean judgments of their members.

However, all teams are not the same. They vary in terms of size and member characteristics. For this reason, a great deal of research studies investigates the effect of team-level characteristics on performance, risk taking and decision making process.

For instance, Herrenkohl (2004) suggests that larger teams may have a broader range of skill and knowledge, but team members might not be as motivated to contribute. Further, the larger the team, the longer it may take to reach a consensus, increasing the possibility of time delays in decision-making (Sah and Stiglitz (1988), Ley and Steel

(1995)). Recognizing that there are advantages when people with varied backgrounds and abilities co-exist in a team, but that larger teams are less cohesive and members of large teams are less likely to cooperate and perform to the maximum of their abilities, Thompson (2004) argues that it is wise to compose teams using the smallest number of people that can do the task.

According to Herrenkohl (2004), the effect of team size depends on the nature of the task relative to the combined knowledge and skill of the team members. In additive tasks, where one person's work is added to the work of others to arrive at a team product, increasing the size of the team has a positive effect until an upper limit is reached, at which point there is no extra benefit from the addition of new members. When any single member can supply the team product (disjunctive task), success depends on the most competent member of the team. Team size has a positive effect in this case too, since the larger the team the greater the likelihood that at least one member will be able to do the job. Finally, in conjunctive tasks, relatively high performance is achieved by very small teams, but decreases rapidly as size increases, since some members might be less able than others and can slow the whole team down, limiting its performance.

Team diversity is the second most frequently studied team-level characteristic. However, research on the effect of team diversity on performance has produced mixed results. Smith et al. (1990) find that educational diversity in top management teams is positively associated with performance. However, in the same study they report that experience diversity is negatively associated to performance. Simons et al. (1999) examine diversity in functional background, education, tenure, and age. The first three measures are considered to be more job-related forms of diversity because they largely

capture experiences, information, and perspectives relevant to cognitive tasks. They find that job-related forms of diversity are positively associated with performance, while age diversity does not have any significant effect.

LePine et al. (2002) examine gender diversity and its effect on decision-making accuracy. In their study they find that decision-making inaccuracy is an exponential function of the number of males on a team. Women-only teams or teams with a balanced gender composition invariably record the highest accuracy, even though, in their experiment, teams competed in a traditionally masculine task by taking the place of a military command-and-control team in a simulation program designed by the U.S. Air Force. Teams in which men constituted the majority performed poorly and all-male teams were worse than any other configuration.

Krishnan et al. (1997) examine whether performance is improved by merging similar or dissimilar members in a team. They present plausible advantages of both cases. More homogeneous teams whose members have similar functional backgrounds might communicate and cooperate better, and thus demonstrate improved performance. On the other hand, different backgrounds and skills can complement one another and lead to improved performance too. They find that differences in functional backgrounds have a positive impact, that is, value-adding synergies are created when dissimilar top management team members come together. They also find that differences in background are negatively related to manager turnover, meaning that those differences are more easily integrated into the new organization while similarities might lead into redundancies and conflict.

Janis (1984) argues that high levels of group cohesion can often result in groupthink. Groupthink is a type of thought exhibited by group members who try to minimize conflict and reach consensus without critically testing, analyzing, and evaluating ideas. Groupthink may cause groups to make hasty, irrational decisions, where individual doubts are set aside, for fear of upsetting the group's balance.

Studies that investigate the relationship between demographic diversity and team performance make the implicit assumption that demographic diversity is associated with cognitive diversity, which in turn has an important effect on team performance. Cognitive diversity refers to the variability of relatively unobservable characteristics such as perceptions, values, attitudes, and beliefs.

1.4 Method and Data

1.4.1 General Method

We conduct our analysis as follows. We first obtain management team structure and team-level characteristics at the beginning of each year t for all the years in our sample period (1997 to 2004). We then relate management team characteristics at time t to portfolio attributes, risk, investment style, and performance over the course of the next year (from t to $t+1$).

We mainly use ordinary least squares (OLS) regressions of portfolio characteristics and risk attributes on management team characteristics. Similar to Chevalier and Ellison (1999), we also use instrumental variable estimation for some of our regressions, using lagged observations as proxies for variables (such as turnover) that appear to be endogenous. In all regressions we estimate clustered standard errors by fund

and include prospectus objective and time dummies even if we do not explicitly show that when we present our regression specifications.

We use all the standard performance metrics to measure fund performance in a given year: raw annual fund returns, style-adjusted returns, one-factor alphas from the market model, and alphas from the Carhart (1997) four-factor model.[8] To estimate the one-factor and four-factor alphas, respectively, we estimate the following models:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \varepsilon_{it}, \tag{1}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \beta_{i2} SMB_t + \beta_{i3} HML_t + \beta_{i4} UMD_t + \varepsilon_{it}, \tag{2}$$

where $R_{it} - R_{ft}$ is the month-t excess gross return for fund i, EMR_t is the excess market return, SMB_t is the difference in returns across small and big stock portfolios, HML_t is the difference in returns between high and low book-to-market portfolios, and UMD_t is the return on a momentum portfolio as computed by Fama and French.

We use the value-weighted NYSE/AMEX/Nasdaq composite index as our market return, and the one-month T-bill rate from Ibbotson Associates as our risk-free rate in calculating excess market returns. Returns on the HML (high minus low book-to-market returns) and SMB (small minus big stock return) zero-investment portfolios, as well as returns on a momentum portfolio (UMD), come from Kenneth French's website.[9]

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[8] We also calculate abnormal returns from the 3-factor model and use them in our regressions. Results are very similar to results when using abnormal returns from the Carhart 4-factor model.

[9] See Kenneth French's website for the definition and calculation of the factor portfolio returns.

When estimating the one-factor and four-factor alphas we use monthly gross fund returns for the 12 months in the year. To calculate the gross monthly return, we divide the annual expense ratio by 12 and add this to the monthly net returns. We use gross returns because we want to measure the performance differences between various forms of management team organization and characteristics. If better managers or organizational forms receive rents through higher expenses, then the performance superiority of manager characteristics might not show up when using net returns. However, we repeat our analysis using fund returns net of management fees and the results are qualitatively the same.

To evaluate the riskiness of the portfolio we use the market betas (the coefficients β_{i1}) from equations (1) and (2), as well as the standard deviation of monthly returns, throughout the course of the year. We also examine differences in the estimated factor loadings (the coefficients β_{i2}, β_{i3}, and β_{i4}, from equation (2)) between team and sole-managed funds.

We estimate all regressions for all funds-years in both the full sample period (1997 to 2004), and the two separate sub-periods (1997 to 2000, bull market; 2001 to 2004, bear market). We also report results separately for growth oriented (prospectus objective of growth and aggressive growth) and income oriented funds (prospectus objective of growth-income and equity-income). Wermers and Ding (2005) examine the effect of manager characteristics and report that their findings are significant only for growth-fund managers. They posit that the reason could be the difficulty in accurately forecasting earnings growth for growth stocks that requires more experience or

specialized skills. It is interesting to see if differences between growth-funds and income-funds are also present in our study.

1.4.2 Data Description

1.4.2.1 Mutual Fund Data

All of our mutual fund data come from the nine January CDs of Morningstar, Inc.'s Principia Mutual Funds Advanced database from January 1997 to January 2005.[10] The January CDs report data as of December 31st of the previous year. Morningstar, Inc. started the Principia database on January 1996. The Principia Mutual Funds Advanced version contains more information, especially regarding managers and monthly fund returns, than the basic version of the database. Using the nine CDs, we extract information for all funds in operation every year from 1997 to 2005.

We start with all the funds in existence in January 1997 and we follow them through 2005 or until they disappear from the database. We also include in our sample all the funds that started their operations after 1997 to minimize concerns about survivorship bias.

Data are gathered for all domestic equity funds with a self-declared investment objective of growth, aggressive growth, growth-income, or equity-income. We exclude index funds, balanced funds, funds of funds, as well as other types of funds that are restricted in some sense in their investment decisions.[11]

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[10] Morningstar, Inc. used different names for this database throughout our sample period. The three different names are: a) Principia Mutual Funds Plus, b) Principia Mutual Funds Pro Plus, and c) Principia Mutual Funds Advanced.

[11] These include socially conscious funds, life cycle funds, target retirement funds and tax managed funds.

For each fund we obtain annual and monthly returns, annual expense ratios and loads, net asset values, total net assets, fund inception dates, mutual fund family names, portfolio characteristics such as turnover, total number of holdings, percentage of assets invested in the top 10 holdings, stock, cash, and bond holdings, as well as manager names. In the "manager name" field the database lists the name of the manager if the fund is solo managed, the names of the multiple managers if the fund's total assets are divided among more than one manager, or the term "Management Team" when more than two people are involved in the management of the fund and they manage together.[12]

From the advanced analytics view of the database we hand-collect each fund's management fees, which are the fees that the management company charges to manage the fund's portfolio. For most funds the management fee on the database is taken from the fund prospectus. For other funds a minimum and maximum management fee range appears in the database; for such funds we calculate the midpoint and use the resulting figure as the fund's management fee.

The funds that appear in the Principia CDs represent fund offerings that the investor can choose from but do not represent distinct investment portfolios.[13] However, while various share classes offer investors different fund choices, they are based the same underlying portfolio and consequently the same before-fee performance. Our unit of observation is the fund. We therefore aggregate multiple share classes into one fund observation. We are careful to cumulate the total assets from all share classes to obtain

[12] The exact description of what the term "Management Team" means, reads are follows: "This is used when there are more than two persons involved in fund management, and they manage together, or when the fund strongly promotes its team-managed aspect".

[13] As Nanda, Wang, and Zheng (2005) document, in the 1990s many mutual funds introduced additional share classes as a way to offer investors more choices about the timing of load payments, or to provide lower expenses to investors with big holdings. They show that by the end of 2002 more than 50% of mutual funds offered more than one share class.

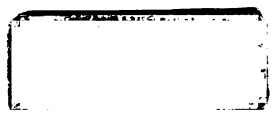
the total assets of the underlying portfolio. In order to identify different share classes of the same fund we match different share classes by four portfolio characteristics: turnover, number of holdings, percentage invested in stock, and percentage in the top 10 holdings. We also verify our matching by looking at the fund names.[14] Table 1.1 has all the funds reported in the Principia database as well as the total distinct fund portfolios we identify.

1.4.2.2 Manager Data

From the advanced analytics view of each CD, we hand-collect additional information about all portfolio managers that are members of a portfolio management team in our sample. The Principia CDs contain a brief biographical sketch for each fund's manager(s). For each manager, we collect data on the starting date at the fund, gender, undergraduate and graduate institutions attended, degrees received (including the year in which the degrees were received), whether they are a Certified Financial Analyst (CFA), the name of the management company for which they work, and other assets managed. Note that for the database's "Management Teams," we can extract starting dates and management companies' names, but not manager-specific names or other information.

After collecting manager-level information from Morningstar, we turn to other sources to complete missing information. We first turn to the 2004 CD of Nelson's Directory of Investment Managers. Nelson's 2004 CD-ROM has information about most of the management companies and managers in the portfolio management industry as of March 2004. Thus, matching manager names and management companies from the 2004 January Principia disk with those from Nelson's CD, we try to retrieve as many missing

[14] Multiple share classes of the same fund have basically the same name. Their names differ only by the name of the share class. Example: "Vanguard Growth A," "Vanguard Growth B," etc.



data as possible. We then turn to each fund's prospectus, which we locate on the fund family website. After completing as much information as possible for the managers of all the funds that appear in our data set in 2004, we track those managers in earlier years and complete their missing information.

1.4.2.3. Team-level Variables

Using the manager characteristics data of managers that work in teams, we create the following team-level characteristic variables:

1) *Team size*: We measure team size as the number of managers in the team.
2) *Team tenure*: We define the team tenure variable as the time (in years) managers have been working together as a team. For teams whose managers joined the fund at different dates, team tenure is calculated from the time since the latest team member was added to the team.
3) *Team Diversity variables*: We create four diversity variables: 1) *Gender diversity*, 2) *MBA diversity*, 3) *Age diversity,* and 4) *Tenure diversity*. Gender diversity is the standard deviation of the values of the dummy variable Gender for all managers in the team. The same method is used for the other three variables (MBA, Age, and Tenure). Each of these variables take the value of zero if the members are exactly similar in the corresponding dimension (for example, all managers are male, have the same age, etc.) and take positive values if members are dissimilar.[15]

[15] There are other ways to calculate diversity. When we conduct the analyses using the coefficient of variation of manager characteristics instead of the standard deviation, the results are similar. One has to be careful, though, with respect to what each metric actually measures. Consider the case of two three-member teams, the first having two managers with MBAs and the second only one. The standard deviation measure

4) *Other team*: This variable is created by averaging the values of the multiple funds dummy variable and shows what percentage of the fund managers are also employed by other funds. This variable takes the value of one if all managers work for multiple funds at the same time, the value of zero if none work for other funds, and values between zero and one depending on how many managers work for other funds. We use this variable to proxy for the level of commitment the team members have to the fund.

1.5 Hypotheses and Results

1.5.1 Single Managers versus Management Teams

The discussion of the research on the behavior and performance of teams versus individuals leads to our hypotheses concerning the characteristics, risk attributes and performance of sole-managed and team-managed mutual fund portfolios.

The portfolio characteristics we look at are turnover, number of securities in the portfolio and the concentration of investment in the top 10 holdings. Consistent with the superior information gathering and processing ability of teams of managers we expect to see a significantly higher number of securities in team-managed portfolios and at the same time less concentration in a small number of securities. In terms of portfolio turnover, if the theory suggesting that teams are associated with time delays due to the time it takes to reach consensus on which securities to buy and sell is true, we expect to see lower turnover in team-managed portfolios.

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would record the same level of diversity for both teams, but the coefficient of variation measure would record different results.

To examine differences in portfolio characteristics we estimate the following regression model in addition to presenting difference-in-the-means tests:

$$PortChar_t = \alpha + b_1(Team_t) + b_2 MgtFee_t + b_3 LogAssets_t + b_4 FundAge_t + b_5 IntAdv_t + \varepsilon_{i,t}, \quad (3)$$

where *Team* is a dummy variable that takes the value of one if the fund is team-managed and zero otherwise, *MgtFee* is the management fee charged by the management company, *LogAssets* is a measure of fund size and is calculated by taking the log of the average of the fund's assets at the beginning and end of year *t*, and *Age* is the fund's age. *IntAdv* is a dummy variable that takes the value of 1 if the investment advisory company the manager(s) work for is affiliated with the fund family complex and 0 otherwise. We estimate the model for all three of our portfolio characteristic variables.

Table 1.2, panels A, B and C present tests for differences in the means between team- and sole-managed funds. We find that portfolios of team-managed and single-manager funds are quite different. As hypothesized, portfolio turnover is significantly higher for single managers (95.56 versus 87.17 for teams), while teams hold more securities in their portfolios.. The average number of stocks in a sole-managed portfolio is 90 compared to 102 for a team-managed portfolio. Team-managed funds also have less concentrated holdings as indicated by the percentage of money invested in their top 10 holdings (difference of about 2.18%). All differences are significant at the 1% level and hold for both the full sample and the two sub-periods.

Findings from multivariate regressions are presented in table 1.3 and are very similar. Teams of managers show lower trading propensity and hold more stocks and less

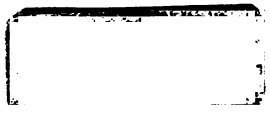
concentrated portfolios. In table 1.3, some other interesting findings are present as well. Funds that are managed internally are quite different that outsourced funds. There exist significantly high differences in turnover, number of holdings and concentration of internal and external funds. Specifically, investment advisors that are affiliated with the fund family trade more aggressively (higher turnover), hold more stocks in their portfolios and concentrate less in their top holdings.

Another interesting finding is that investment advisors that charge higher management fees seem to be more "confident" in their abilities. They turnover their portfolios significantly higher and concentrate in very few stocks.

The above findings suggest that the two distinct forms of organization (single manager versus management teams) exist and the distinction between team-managed and sole-managed funds is not just a reporting issue as suggested by Massa et al. (2006).

As discussed in the literature review research on the performance and risk taking of teams and individual decision makers has produced mixed results. There are advantages and disadvantages associated with team performance so our empirical tests will capture the net effect.

Mutual fund families, in their prospectuses, suggest that benefits of the team management approach are higher diversification, less risk and better risk-adjusted returns. However, our discussion of empirical studies implies that sometimes teams exhibit risk increasing behavior when group polarization and groupthink are present. We look at three measures of portfolio risk: a) the standard deviation of monthly returns, a) the beta from the market model and c) the market beta from the 4-factor model. We use those three measures at the dependent variable in the following model:



$$FundRisk_t = \alpha + b_1(Team_t) + b_2 MgtFee_t + b_3 LogAssets_t + b_4 FundAge_t + b_5 IntAdv_t + \varepsilon_{i,t}, \quad (4)$$

where *Team* is a dummy variable that takes the value of one if the fund is team-managed and zero otherwise, *MgtFee* is the management fee charged by the management company, *LogAssets* is a measure of fund size and is calculated by taking the log of the average of the fund's assets at the beginning and end of year *t*, and *Age* is the fund's age. *IntAdv* is a dummy variable that takes the value of 1 if the investment advisory company the manager(s) work for is affiliated with the fund family complex and 0 otherwise. We also estimate regression 4 using three more measures of risk and/or investment style as the dependent variable: 1) the four-factor SMB beta, 2) the four-factor HML beta, and 3) the four-factor UMD beta as calculated from the performance regressions described in Section 1.4.1. Results are reported in tables 1.4 and 1.5.

Table 1.2 reports differences in the means. Total fund risk, as measured by the standard deviation of monthly fund returns, is lower for team-managed portfolios and the relationship if most significant during the bear market period 2001-2004. However, results from the multivariate regression results in table 1.4 show, that after we account for some control variables, the team dummy coefficient not significant, even though its sign is negative. The same is true for our measures of systematic risk. Therefore, we fail to find evidence that teams of managers hold less risky portfolios.

We find that management fees and the internal investment advisor dummy variables have significant and positive coefficients. Advisors affiliated with the fund family hold much riskier portfolios both in terms of total and systematic risk. The

coefficient for the internal investment advisor dummy is 0.254 and is significant at the 1% level when standard deviation of monthly returns is the dependent variable. When we look at the bull and bear market periods separately, we find that most of the significance comes from the bull market period. Advisors that charge higher fees also take on more risk and results are significant for all sample periods.

Turning to results reported in table 1.5, the most significant finding is that team-managed mutual fund portfolios have higher HML loadings during the bull market period.

To examine differences in performance between teams and single managers we estimate the following model for each performance metric:

$$Perf_t = a + b_1 Team_t + b_2 Turnover_{t-1} + b_3 mgtfee_t + b_4 LogAssets_t + b_5 FundAge_t + b_6 IntAdv_t + \varepsilon_t, \quad (5)$$

where *Team* is a dummy variable that takes the value of one if the fund is team managed, *Turnover* is the fund's turnover over the last year, *LogAssets* is the logarithm of the average fund size, *Age* is the fund's age, and *i* is the index for an individual fund. *IntAdv* is a dummy variables that takes the value of 1 if the investment advisory company the manager(s) work for is affiliated with the fund family complex and 0 otherwise.

Results from performance regressions are reported in table 1.6. The two performance variables we look at are Jensen's alpha and Carhart's 4-alpha. We also run the analysis for style adjusted excess returns and for 3-factor alphas. We do not get any significant results when we use the style adjusted excess returns and results for 3-factor alphas are very similar to those of the 4-factor alphas.

In panel A of table 1.6, which presents results for the whole sample period, we get a negative coefficient for the team dummy for all funds and especially for growth oriented funds though significant only at the 10% level. The most interesting findings appear when we focus on the bear market period. Team-managed funds perform worse than single managers (46.3 basis points a year) in terms of 4-factor alphas. For growth oriented funds the underperformance of team-managed funds is even more significant and reaches 61 basis points annually. Both coefficients are significant at the 5% level.

Before February 2005 SEC regulations did not require funds to report the portfolio managers' names as long as the fund was team managed. Many critics of the team-managed approach have argued that teams often are the training ground for young inexperienced managers. They also complain that without a clear portfolio leader nobody can be held accountable for poor performance or rewarded for higher returns. This depends, of course, on how the team is organized. Single managers might be more concerned about their fund's performance since they bear sole responsibility and stand to receive the entire management fee, whereas managers that are members of a management team might not work as hard (free-rider problem). This problem might be more important than one may initially think if we take into consideration the fact that many of the managers that are members of a team usually manage multiple funds.

In order to check whether the common belief that when funds do not disclose the names of the managers in their teams it is because those managers are young, inexperienced and have inferior investing skills is true, we perform an additional test. We re estimate the performance regressions this time replacing the team dummy variables with two other dummy variables. The former takes the value of 1 when the fund is

managed by a team with known manager names and 0 otherwise. The latter takes the value of 1 when the fund is managed by a team with undisclosed manager names and 0 otherwise. The omitted category is the sole-managed fund.

Results are also reported in table 1.6. Again, we only get significant coefficients for the bear market period. Teams of managers that do not disclose manager names under-perform by 83 basis points a year (p-value of 0.018) compared to underperformance of 38 basis points for teams of managers that disclose manager names. Focusing only on growth oriented funds underperformance of that type of teams is even greater (almost 91 basis points significant at the 5%). Those results provide some support that anonymous management teams perform worse, but also suggest that there is still underperformance but teams with known managers after we account for anonymous teams.

Taken together, findings reported on table 1.6 suggest that sole-managed funds produce better risk-adjusted returns than team-managed funds, especially in poor market conditions. This opposes investors' beliefs and fund complexes' claims about the advantages of the team-based approach in portfolio management.

1.5.2 Management Team Characteristics

The internal organization of portfolio management teams might also have a significant effect on how the mutual fund is run. For instance, are the characteristics of managers in a team usually correlated? Is it better to form a team of managers with similar characteristics or should we look for diversification of characteristics and skills?

Do larger teams perform better than smaller ones? Since more than half of today's mutual funds are team managed, the answers to these and similar questions have important investment implications. Accordingly, we investigate how team-level (team size, diversity) and manager-level (education, age, experience) characteristics of management teams relate to performance and investing behavior.

The first team-level characteristic we consider is team size. A team's size can affect many aspects of team behavior and performance. As we discuss above, larger teams may have a broader range of skill and knowledge, but team members might not be as motivated to contribute Further, the larger the team, the longer it may take to reach a consensus, increasing the possibility of time delays in decision-making.

Next we look at team diversity. As described in section 3, we measure diversity in four dimensions: education, age, gender, and tenure. The discussion of related research implies that bringing managers with diverse backgrounds, specialized knowledge, and unique experiences together in the same team can increase the benefits of diversification, but can also lead to more conflicts. On the other hand, including people with too similar characteristics in the same team might not lead to the desired diversity a team is supposed to achieve.

Since research on the effect of team diversity on performance has produced mixed results, our empirical tests will show what is true for or sample of mutual fund management teams. We posit that education and experience diversity will have a positive effect on performance and that tenure diversity to have a negative effect, as it my lead to more conflicts. Managers that work at the fund for a long time might not agree with the recommendations of new managers, especially when it comes to changing decisions that

the former made in the past. We use age diversity as a proxy for experience diversity; however, age diversity might also have a negative effect to the extent that managers of different ages do not get along well.

The next team-level variable we analyze is team tenure. Team tenure is defined as the amount of time the team has been working together. Longer team tenure is an indication that the team members get along well and are producing satisfactory results; otherwise, a change in the composition of the team would occur. Team tenure might also affect the importance of other team level-variables. For example, we would expect the negative effects of an extremely diverse team, such as disagreement and time delays, to be more significant in newly formed teams than in teams with longer tenure. We hypothesize that teams with long tenure and high diversity levels to perform the best, since they have members with diverse backgrounds that seem to get along well. In sum, we estimate coefficients in the following regressions to investigate the impact of team characteristics on portfolio characteristics, risk, and investment style:

$$\begin{aligned} Dependent_t = a + b_1(TeamSize_{t-1}) + b_2(GenderDiv_t) + b_3(AgeDiv_t) + b_4(TenureDiv_t) \\ + b_5(MBADiv_t) + b_6(TeamTenure_t) + b_7(Other_t / 100) + b_8\mathbf{X}_t + \varepsilon_{i,t} \end{aligned} \quad ,(5)$$

where *TeamSize* is the number of managers in the team, *GenderDiv* is the standard deviation of the values of the gender dummy variable for all managers in the team, *AgeDiv* is the standard deviation of the managers' ages, *TenureDiv* is the standard deviation of the managers' tenure, *MBADiv* is the standard deviation of the values of the MBA dummy for all managers in the team, *TeamTenure* is the amount of time the team

has been together, and *Other* is the percentage of managers employed in other funds. **X** includes all the control variables included in equation (3).

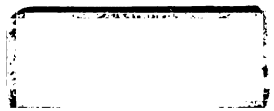
To examine differences in performance between teams and single managers we estimate the following model for each performance metric:

$$Perf_t = a + b_1 TeamSize_t + b_2 GenderDiv_t + b_3 AgeDiv_t + b_4 TenureDiv_t + b_5 MBADiv_t + b_6 TeamTenure_t + b_7 Other_t + b_8 \mathbf{X}_t + \varepsilon_{i,t}, \quad (6)$$

Variable definitions are the same as in equation (4) and **X** corresponds to all the control variables included in equation (3). We also re-estimate the performance regressions including some interaction variables of team-level characteristics

Table 1.7 reports the correlation coefficients between all the team-level variables we examine. The highest correlations always involve the team tenure variable. Specifically team tenure is negatively correlating with team size (-0.1466) and tenure diversity, suggesting that smaller teams and teams of member that started working together approximately at the same time are the ones that are more likely to survive longer.

Results on the relationship between portfolio characteristics and team-level characteristics are presented in Table 1.8. Team members that have been working together for a long time turn their portfolio over much less (coefficient for team tenure is -4.106, significant at the 1% level). This result holds even after we look at the two sub-periods separately. One possible explanation for this finding could be that such teams chose which stocks to buy when they initially formed their portfolio, and they do not



easily agree on changes to their securities choices. This explanation may also shed light on why long-tenured teams have more assets concentrated in their top 10 holdings.

Teams that exhibit high gender diversity also show signs of lower portfolio turnover. The coefficient for gender diversity is negative and statistically significant (-27.263, with a *p*-value of 0.015). Mixed gender teams also hold significantly more securities in their portfolios during the bull market period. The coefficient for gender diversity is -37.809 for the 1997 to 2000 sample period.

We do not find that any of the other diversity variables are significant, except for age diversity, which has a positive and significant relationship with investment concentration in the top 10 holdings of the portfolio. Finally, we find evidence in support of the hypotheses that larger teams have more resources and can follow more stocks. An additional team member increases the number of securities in the portfolio by 16 (*p*-value 0.000) and decreases the concentration of invested assets in the top 10 holdings by 1.571%.

In terms of risk taking team size seems to have an effect (table 1.9). Teams with more members exhibit a lower standard deviation of monthly returns for the full sample and for the bear market period; we do not find a significant relationship for the years 1997 to 2000. Long-tenured teams also take on less risk as measured by the standard deviation of returns, and this holds for all sample periods. Finally, when managers work for multiple teams, the returns of their funds tend to have a higher standard deviation.

Long-tenured and larger teams also have lower market betas. The coefficients for team size and team tenure in Table 1.9 are both negative and have *p*-values of 0.070 and 0.002, respectively. Managers working for many funds hold higher beta portfolios too.

In Table 1.10 we present results on funds' investment style (factor weights). We do not see any striking differences. The only variable that is consistently significant is age and gender diversity; teams with high age and gender diversity have lower HML weights. Teams with high gender diversity also have higher UMD weights.

Table 1.11 reports results on the performance regressions. Looking at the full sample period we can see that age diversity is very important for performance, especially for growth oriented funds. Coefficients of the age diversity variables are highly significant regardless of the performance metric used (1-factor or 4-factor alpha). We find lower 1-factor alphas for teams with high gender diversity. Another interesting finding is that funds run by internal investment advisory firms under-perform their peers.

We do not find any significant relationship between team characteristics and performance for the bull market period. In the bear market period, however, we find evidence that age diversity is very important for performance (all coefficients for age diversity positive and significant at the 1% level). Gender diversity and team size are negatively associated with performance. Finally, in terms of 1-factor alphas, funds that do not have managers that work for multiple funds do better. Results, again, hold only for growth-oriented funds.

In table 1.12 we present results from another set of regressions. We re-estimate the performance regressions, but this time we include a set of interactions variables. We interact team size with some diversity variables, fund size, participation of members in the management of other funds and team tenure. The logic is that the negative, or positive, effects of some variables may become more or less important depending on the number of people in a team. We report only the coefficients for the interaction terms as

well as other variables that show significance. However, the regressions include all variables used in the performance regression in table 1.11.

The most significant findings is that the *TeamSize*TeamTenure* has a positive and significant sign, especially for growth oriented funds. This implies that larger teams that have been working together for a long time perform better. An explanation for that could be that larger teams have a broader range of skills and when they have been working together for a long time people in a team get along well, learn how to work with each other and consequently the advantages of the team dominate the disadvantages such as disagreements and conflicts.

We also find that the interaction variable of *TeamSize* and *AgeDiversity* has a positive coefficient, but is only significant (at the 1% level) for the bull sample period when 1-factor alpha is the performance metric.

1.6 Summary and Conclusion

In this paper, we have examined the effect of the structure and characteristics of mutual fund portfolio management teams on mutual fund portfolio performance, risk and characteristics. Specifically, we have compared the performance of sole-managed and team-managed mutual fund portfolios, as well as the effect team-level characteristics have on performance. Our study uses a unique and comprehensive dataset that covers the period between 1997 and 2005 and enables us to investigate whether differences in performance and trading practices between different types of funds depend on the underlying market conditions.

The analysis of team- versus sole-managed funds indicates at first that single managers behave differently than teams. Single managers hold fewer stocks in their portfolios concentrate more in their top ten holdings and have higher trading propensity. Even though the mean portfolio risk, as measured by the standard deviation of the fund's returns, appears to be higher for single managers, in a multivariate regression setting we fail to find evidence that there are differences in risk between sole-managed and team-managed funds.

In terms of performance we find that team-managed funds under-perform their sole-managed counterparts in terms risk-adjusted returns. Even though there are not differences in performance in the bull market period 1997-2000, team managed funds under-perform by 46 basis points. For growth oriented funds (prospectus objective of growth and aggressive growth) the under-performance is most severe (61 basis points annually). Interestingly, most of the under-performance seems to come from teams of managers that do not disclose their managers' names, supporting the view that non-disclosure of manages names indicates inexperience and low quality of the management team.

We next focus on team-level characteristics of portfolio management teams. We test whether a team's size, tenure, and diversity affect performance and trading behavior. The results show that teams of managers that have been working together for a long time exhibit lower turnover and higher concentration of investment in their top 10 holdings. Further, larger teams hold significantly more stocks in their portfolios, as an additional team member increases the number of securities in the portfolio by 16.

Team size has also an effect on risk taking. For the bear market period (2001 to 2004), larger teams take on less total risk as measured by the standard deviation of monthly returns and hold lower beta portfolios.

Turning to performance, we find that age diversity, which is also a proxy for experience diversity, is very important for performance. The coefficient of age diversity is positive and very significant especially in the bear market period, regardless of the performance metric used (1-factor or 4-factor alphas). Finally, we find that it is not a good practice to have managers working for multiple funds as this reduces the fund's performance (in terms of 1-factor alphas), supporting the hypothesis that those managers are less committed to the fund.

In general our study provides new insights on the performance and organizational structure of portfolio management teams and opens up possible new research dimensions. We find that teams do not out-perform single managers. This cannot explain the choices of fund families and investors who seem to prefer team-managed funds.

Maybe there are other benefits to teams of managers that make them a more popular choice. One of the proposed advantages of management teams are consistency in performance and stability of management. Stability of management refers to smooth transitions in the fund's investment approach when there is management turnover. In teams, when one manager retires only a small portion of the portfolio changes hands. In contrast, single-manager turnover can lead to a complete change in investment style. Investors prefer a more rather than less stable fund management. When the fund has only one "star" manager, investors are likely to follow him if he switches to another fund. Anecdotal evidence from informal discussions with investment professionals indicate that

the fear of losing investors following manager turnover is the most important reason for adopting a team-of-managers approach. We believe future research should address those issues in depth.

APPENDIX 1.

TABLES OF ESSAY 1

Table 1.1
Dataset Summary

This table presents characteristics of the funds included in our dataset. The first row of Panel A presents the number of mutual funds that appear on the nine Morningstar January CDs (January 1997 – January 2005). The second row of panel A lists the number of distinct mutual fund portfolios each year after we account for multiple share classes. Rows 3-6 show the percentage of the mutual fund portfolios in the dataset that are sole-managed or team-managed as well as the percentage of team-managed funds with known manager names. The rest of panel A presents the total assets managed and the average portfolio size for each type of management team. Panel B presents the number and the management team type of the funds that survive in the dataset after we match funds from year t to funds from year t+1 as well as the management team type for funds that could not be matched.

Panel A. All funds									
	1997	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**
Funds (share classes)	1,235	1,407	1,752	2,030	2,384	2,696	3,246	4,438	4,780
Distinct fund portfolios	795	830	926	1,014	1,140	1,235	1,339	1,616	1,645
Sole-managed (%)	68%	64%	59%	55%	52%	50%	46%	42%	42%
Team-managed (%)	33%	36%	42%	45%	48%	50%	54%	58%	59%
Manager names	20%	31%	34%	35%	39%	39%	45%	45%	45%
No manager names	13%	5%	8%	9%	9%	13%	9%	13%	13%
Total Assets (billions of dollars)									
Single-managers	656.54	816.61	931.78	1,072.88	944.68	831.87	631.90	814.62	888.98
Teams	250.60	363.58	556.62	773.21	957.55	827.60	724.68	1,004.02	1,257.31
Manager names	150.06	339.18	464.64	665.04	904.98	766.07	697.35	948.73	1,179.32
No manager names	100.53	24.40	91.97	108.17	52.57	61.52	27.33	55.28	77.99
Average Portfolio Size (millions of dollars)									
Single-managed funds	1,222.62	1,540.78	1,719.16	1,912.45	1,585.05	1,350.45	1,020.85	1,206.85	1,303.50
Team-managed funds	971.32	1,211.96	1,449.54	1,706.88	1,760.22	1,337.00	1,006.50	1,066.98	1,305.63
Manager names	955.84	1,304.55	1,479.76	1,852.50	2,047.47	1,606.03	1,156.47	1,292.56	1,587.24
No manager names	995.37	610.12	1,313.98	1,150.76	515.45	433.30	233.59	267.09	354.53

Table 1.1 (cont.)

Panel B. Funds after matching year t with year t+1								
	1997-98	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**2004-05**
Matched Funds	725	762	845	891	1049	1100	1161	1410
Single-manager funds	494	486	503	486	542	548	539	594
(%)	*68%*	*64%*	*60%*	*55%*	*52%*	*50%*	*46%*	*42%*
Multi-manager	231	276	342	405	507	552	622	816
(%)	*32%*	*36%*	*40%*	*45%*	*48%*	*50%*	*54%*	*58%*
Unmatched funds	70	68	81	123	91	135	178	206
Single-manager	43	44	39	75	54	68	80	81
(%)	61%	65%	48%	61%	59%	50%	45%	39%
Multi-manager	27	24	42	48	37	67	98	125
(%)	39%	35%	52%	39%	41%	50%	55%	61%

Table 1.2
Summary Statistics

This table presents descriptive statistics for all 7,713 fund-year observations in the dataset. Variables are as defined in the data section of the paper. Panel A presents summary statistics for the full sample period while panels B and C present the same statistics for the 1997-2000 and 2001-2004 periods respectively. Differences between team-managed and sole-managed funds significant at the 10% level or better are boldfaced.

Panel A: Period 1997-2004

Variable	Mean (All Funds)	Mean (Single-Manager)	Mean (Team Managed)	Difference (Single-Team)	p-value
Raw annual return	9.483	10.037	8.865	**1.172**	0.019
Style adjusted excess return	0.000	-0.058	0.064	-0.122	0.640
Management fee	0.738	0.733	0.744	**-0.011**	0.040
Portfolio turnover	91.571	95.560	87.123	**8.437**	0.000
Number of securities in portfolio	96.445	90.733	102.810	**-12.080**	0.000
Assets in top 10 holdings	32.207	33.239	31.056	**2.183**	0.000
Fund Age	13.469	13.567	13.361	0.206	0.533
Number of Share Classes	2.370	2.200	2.559	**-0.358**	0.000
Log of Assets	5.512	5.491	5.534	-0.043	0.339
STD monthly returns	5.149	5.319	4.959	**0.360**	0.000
Jensen's alpha	0.286	0.420	0.136	0.284	0.242
4-factor alphas	-0.051	0.114	-0.235	**0.349**	0.089
Beta (market model)	0.996	0.995	0.997	-0.002	0.801
Beta (4-factor model)	0.997	0.993	1.003	**-0.010**	0.075
SMB Beta	0.123	0.121	0.125	-0.004	0.612
HML Beta	0.002	-0.008	0.012	**-0.020**	0.037
UMD Beta	0.019	0.021	0.017	0.004	0.490
Internal Mgt Company	0.769	0.785	0.752	**0.034**	0.001
Number of observations	7,713	3,651	4,062		

Table 1.2 (cont.)

Panel B: Period 1997-2000

Variable	Mean (All Funds)	Mean (Single-Manager)	Mean (Team Managed)	Difference (Single-Team)	p-value
Raw annual return	16.690	17.489	15.438	**2.051**	0.003
Sty adjusted excess return	0.000	0.019	-0.029	0.048	0.920
Management fee	0.717	0.715	0.719	-0.004	0.625
Portfolio turnover	87.092	90.287	82.093	**8.194**	0.003
Number of securities in portfolio	91.904	89.765	95.252	**-5.487**	0.044
Assets in top 10 holdings	33.918	34.495	33.015	**1.480**	0.001
Fund Age	14.134	13.849	14.579	-0.730	0.186
Number of Share Classes	1.950	1.895	2.035	**-0.140**	0.001
Log of Assets	5.687	5.619	5.793	**-0.174**	0.014
STD monthly returns	5.888	5.901	5.867	0.033	0.711
Jensen's alpha	2.020	1.880	2.239	-0.359	0.446
4-factor alphas	2.051	1.865	2.343	-0.478	0.221
Beta (market model)	0.958	0.968	0.944	**0.024**	0.064
Beta (4-factor model)	0.991	0.982	1.005	**-0.024**	0.018
SMB Beta	0.112	0.112	0.112	0.000	0.991
HML Beta	0.040	0.013	0.083	**-0.070**	0.000
UMD Beta	-0.006	0.000	-0.015	0.016	0.145
Internal Mgt Company	0.742	0.745	0.739	**0.006**	0.700
Number of observations	3,122	1,905	1,217		

Table 1.2 (cont.)

Panel C: Period 2001-2004

Variable	Mean (All Funds)	Mean (Single-Manager)	Mean (Team Managed)	Difference (Single-Team)	p-value
Raw annual return	4.529	3.388	5.541	**-2.152**	0.001
Style adjusted excess return	0.000	-0.126	0.112	**-0.237**	0.001
Management fee	0.752	0.7481	0.756	-0.008	0.272
Portfolio turnover	94.649	100.260	89.666	**10.598**	0.000
Number of securities in portfolio	99.566	91.597	106.640	**-15.040**	0.000
Assets in top 10 holdings	31.032	32.120	30.066	**2.054**	0.000
Fund Age	13.013	13.315	12.745	0.570	0.169
Number of Share Classes	2.658	2.473	2.823	**-0.350**	0.000
Log of Assets	5.391	5.377	5.403	-0.026	0.659
STD monthly returns	4.641	4.800	4.500	**0.300**	0.000
Jensen's alpha	-0.906	-0.882	-0.928	0.046	0.859
4-factor alphas	-1.495	-1.447	-1.538	0.090	0.677
Beta (market model)	1.022	1.020	1.024	-0.004	0.639
Beta (4-factor model)	1.002	1.002	1.002	0.001	0.932
SMB Beta	0.131	0.129	0.132	-0.003	0.776
HML Beta	-0.025	-0.026	-0.024	-0.002	0.836
UMD Beta	-0.037	0.040	0.034	0.006	0.332
Internal Management Company	0.787	0.821	0.758	**0.063**	0.000
Number of observations	4,591	2,157	2,434		

Table 1.3
Regressions for Portfolio Characteristics of Sole-managed and Team-managed Funds

This table presents results from the OLS regressions of portfolio characteristics on a team dummy variable, that takes the value of 1 if the fund is team-managed and 0 if the fund is sole-managed, and control variables. The dependent variables are: following-year portfolio turnover, number of securities in the portfolio and the percentage of funds assets invested in the top 10 holdings. The control variables are: the management fee charged by the investment advisor (which serves as a proxy for investment advisor quality), a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	Turnover	Number of Securities in Portfolio	% invested in top10 holdings	Turnover	Number of Securities in Portfolio	% invested in top10 holdings	Turnover	Number of Securities in Portfolio	% invested in top10 holdings
Team Dummy	**-7.423**	**10.695**	**-1.728**	**-7.584**	4.442	**-1.556**	**-7.502**	**14.223**	**-1.824**
	0.016	0.001	0.000	0.038	0.280	0.009	0.046	0.000	0.000
Mgt Fee	**34.584**	**-40.528**	**5.590**	**34.409**	**-26.753**	**5.721**	**34.716**	**-48.201**	**5.573**
	0.000	0.000	0.000	0.003	0.007	0.001	0.000	0.000	0.000
Log of Assets	**-3.617**	**13.107**	**-1.123**	**-2.100**	**15.524**	**-1.526**	**-4.588**	**11.618**	**-0.843**
	0.000	0.000	0.000	0.072	0.000	0.000	0.000	0.000	0.000
Fund Age	-0.005	**-0.404**	**0.049**	0.008	**-0.282**	**0.078**	-0.012	**-0.491**	0.023
	0.964	0.001	0.012	0.957	0.040	0.003	0.928	0.001	0.217
Internal Advisor	**12.220**	**10.400**	**-1.057**	**14.176**	**11.296**	**-1.658**	**10.658**	**9.635**	-0.614
	0.001	0.002	0.056	0.002	0.003	0.025	0.021	0.015	0.295
Constant	**47.574**	**70.050**	**28.510**	**47.488**	**25.988**	**38.192**	**54.873**	**85.757**	**27.018**
	0.000	0.000	0.000	0.000	0.034	0.000	0.000	0.000	0.000
Observations	7713	7713	7713	3122	3122	3122	4591	4591	4591
R-Squared	0.0765	0.1388	0.1215	0.0743	0.195	0.1317	0.0766	0.116	0.1014

Table 1.4
Regressions for Portfolio Risk of Sole-managed and Team-managed funds

This table presents results from the OLS regressions of portfolio risk characteristics on a team dummy variable, that takes the value of 1 if the fund is team-managed and 0 if the fund is sole-managed, and control variables. The dependent variables are: following-year standard deviation of the fund's monthly gross returns, the market beta from the market model and the market beta from Carhart's 4-factor model. The control variables are: the management fee charged by the investment advisor, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	Standard Deviation of returns	Market Beta (Market Model)	Market Beta (4-factor)	Standard Deviation of returns	Market Beta (Market Model)	Market Beta (4-factor)	Standard Deviation of returns	Market Beta (Market Model)	Market Beta (4-factor)
Team Dummy	-0.054	-0.001	**0.013**	-0.088	-0.012	**0.022**	-0.049	0.004	0.007
	0.331	0.934	0.066	0.321	0.445	0.056	0.385	0.727	0.355
Mgt Fee	**0.925**	**0.089**	-0.030	**1.102**	**0.090**	-0.012	**0.819**	**0.090**	**-0.042**
	0.000	0.002	0.115	0.000	0.032	0.658	0.000	0.003	0.053
Log of Assets	0.009	**0.009**	**0.006**	0.001	**0.012**	**0.006**	0.011	**0.006**	**0.006**
	0.653	0.007	0.008	0.979	0.009	0.082	0.578	0.071	0.026
Fund Age	**-0.004**	**-0.001**	**-0.001**	**-0.005**	-0.001	**-0.001**	**-0.004**	**-0.001**	**-0.001**
	0.032	0.042	0.001	0.056	0.106	0.001	0.054	0.049	0.084
Internal Advisor	**0.254**	**0.039**	**0.026**	**0.405**	**0.056**	**0.025**	**0.133**	**0.025**	**0.026**
	0.000	0.001	0.004	0.000	0.001	0.046	0.058	0.055	0.014
Constant	**0.819**	**0.698**	**0.821**	**4.478**	**0.453**	**0.929**	**1.238**	**0.791**	**0.822**
	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Observations	7713	7713	7713	3122	3122	3122	4591	4591	4591
R-Squared	0.4872	0.1715	0.0778	0.3957	0.2569	0.0885	0.5145	0.1099	0.0723

Table 1.5
Regressions for Investment Style / Risk Factor Loadings for Sole-managed and Team-managed Funds

This table presents results from the OLS regressions of portfolio risk-factor loadings obtained for each fund after running Carhart's 4-factor model on a team dummy variable, that takes the value of 1 if the fund is team-managed and 0 if the fund is sole-managed, and some control variables. The dependent variables are following-year SMB, HML and UMD factor weightings. The control variables are: the management fee charged by the investment advisor, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	SMB Beta (4-factor)	HML Beta (4- factor)	UMD Beta (4-factor)	SMB Beta (4-factor)	HML Beta (4- factor)	UMD Beta (4-factor)	SMB Beta (4-factor)	HML Beta (4- factor)	UMD Beta (4-factor)
Team Dummy	0.012	**0.022**	-0.002	0.011	**0.056**	-0.005	0.010	-0.001	-0.002
	0.298	0.096	0.775	0.509	0.006	0.672	0.447	0.947	0.834
Mgt Fee	**0.190**	-0.029	0.014	**0.134**	-0.088	0.047	**0.222**	0.005	-0.005
	0.000	0.408	0.432	0.008	0.120	0.123	0.000	0.887	0.794
Log of Assets	**-0.007**	-0.004	-0.002	**-0.013**	-0.009	0.003	-0.003	-0.001	**-0.005**
	0.054	0.323	0.374	0.020	0.143	0.466	0.410	0.838	0.036
Fund Age	**-0.001**	-0.001	**0.001**	-0.001	-0.001	**0.001**	**-0.001**	**-0.001**	0.000
	0.066	0.160	0.034	0.326	0.352	0.090	0.020	0.090	0.105
Internal Advisor	0.015	**-0.037**	**0.021**	**0.048**	-0.008	**0.035**	-0.011	**-0.061**	0.010
	0.284	0.022	0.012	0.014	0.737	0.007	0.466	0.000	0.285
Constant	**-0.123**	**0.230**	**-0.068**	-0.032	**0.509**	**-0.267**	**-0.143**	**0.213**	-0.011
	0.002	0.000	0.004	0.578	0.000	0.000	0.000	0.000	0.643
Observations	7713	7713	7713	3122	3122	3122	4591	4591	4591
R-Squared	0.1201	0.1205	0.0778	0.1242	0.0983	0.0964	0.1232	0.1343	0.0484

Table 1.6
Regressions for Performance of Sole-managed and Team-managed Funds

This table presents results from the OLS regressions of portfolio performance on 1) a team dummy variable, that takes the value of 1 if the fund is team-managed and 0 if the fund is sole-managed, and some control variables, and 2) two team dummies that indicate whether the names of the managers in the team are disclosed or not. The dependent variables are: the abnormal return (alpha) from the market model and the abnormal return (alpha) obtained from the 4-factor model. The control variables are: the management fee charged by the investment advisor and is a proxy of investment advisor quality, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Results are reported for all funds but also separately for growth oriented funds (prospectus objective of growth and aggressive growth) and income oriented funds (prospectus objective of growth-income and equity-income). Panel A reports results for the full sample, while panels B and C present results for the 1997-2000 and 2001-2004 periods respectively. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

Panel A: Full Sample Period (1997-2004)

	Gross Alpha (1-factor)						Gross Alpha (4-factor)					
	(1)			(2)			(1)			(2)		
	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I
Team Dummy	-0.305	-0.445	0.080				**-0.345**	**-0.498**	0.042			
	0.197	0.145	0.789				0.090	0.062	0.865			
Team - Man. Names				-0.288	-0.482	0.250				-0.317	**-0.513**	0.149
				0.252	0.132	0.443				0.147	0.072	0.584
Team - No Names				-0.378	-0.282	-0.546				-0.460	-0.434	-0.351
				0.354	0.611	0.245				0.132	0.296	0.333
Lagged Turnover	-0.001	-0.002	**0.007**	-0.001	-0.002	**0.007**	**-0.004**	**-0.005**	0.000	**-0.004**	**-0.005**	0.000
	0.605	0.296	0.052	0.605	0.295	0.053	0.010	0.007	0.912	0.011	0.007	0.920

Table 1.6 (cont.)

Mgt Fee	0.652	0.680	0.766	0.643	0.698	0.665	-0.102	-0.337	1.045	-0.116	-0.330	0.982
	0.266	0.315	0.417	0.275	0.304	0.482	0.839	0.562	0.275	0.818	0.572	0.308
Log of Assets	0.079	0.061	**0.167**	0.078	0.063	**0.159**	-0.003	0.006	0.016	-0.005	0.007	0.011
	0.248	0.479	0.084	0.255	0.465	0.097	0.958	0.934	0.870	0.940	0.926	0.907
Fund Age	**-0.031**	**-0.058**	-0.008	**-0.032**	**-0.058**	-0.009	**-0.019**	**-0.037**	0.000	**-0.019**	**-0.036**	**-0.001**
	0.000	0.000	0.411	0.000	0.000	0.360	0.010	0.001	0.980	0.010	0.001	0.010
Internal Mgt Company	-0.023	-0.144	0.278	-0.026	-0.136	0.263	0.048	0.046	0.067	0.043	0.049	0.057
	0.933	0.701	0.364	0.925	0.717	0.389	0.843	0.886	0.823	0.857	0.879	0.848
Constant	**-1.367**	**-1.670**	-0.171	**-1.353**	**-1.701**	-0.028	**1.823**	**2.465**	-0.670	**1.845**	**2.453**	-0.580
	0.057	0.043	0.869	0.061	0.040	0.978	0.003	0.001	0.513	0.003	0.001	0.574
Observations	7713	5425	2288	7713	5425	2288	7713	5425	2288	7713	5425	2288
R-Squared	0.1226	0.1572	0.2709	0.1226	0.1572	0.2717	0.1511	0.1707	0.1314	0.1510	0.1707	0.1319

Table 1.6 (cont.)

Panel B: Bull Market Period (1997-2000)

	Gross Alpha (1-factor)						Gross Alpha (4-factor)					
	(1)			(2)			(1)			(2)		
	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I
Team Dummy	-0.488	-0.449	-0.147				-0.214	-0.261	0.069			
	0.221	0.413	0.752				0.574	0.621	0.881			
Team - *Man. Names*				-0.559	-0.565	-0.111				-0.263	-0.388	0.160
				0.205	0.346	0.834				0.531	0.502	0.753
Team - *No Names*				-0.230	0.005	-0.259				-0.037	0.234	-0.217
				0.730	0.996	0.670				0.948	0.785	0.722
Lagged Turnover	**0.017**	**0.018**	**0.011**	**0.017**	**0.018**	**0.011**	**0.007**	**0.008**	0.001	**0.007**	**0.008**	0.001
	0.000	0.000	0.059	0.000	0.000	0.060	0.019	0.021	0.832	0.019	0.022	0.847
Mgt Fee	1.354	0.982	2.223	1.372	1.004	2.208	**1.321**	0.769	**3.081**	1.334	0.794	**3.043**
	0.199	0.434	0.177	0.195	0.425	0.183	0.199	0.535	0.058	0.196	0.523	0.063
Log of Assets	**0.368**	**0.477**	0.174	**0.369**	**0.480**	0.174	0.060	0.127	-0.063	0.061	0.131	-0.063
	0.002	0.001	0.224	0.001	0.001	0.224	0.611	0.403	0.696	0.607	0.390	0.696
Fund Age	**-0.028**	**-0.063**	0.011	**-0.027**	**-0.063**	0.011	-0.020	**-0.052**	0.019	-0.020	**-0.051**	0.018
	0.051	0.005	0.470	0.054	0.005	0.478	0.187	0.024	0.313	0.191	0.024	0.326
Internal Mgt Company	0.706	0.915	0.562	**0.715**	0.933	0.559	0.407	0.766	-0.077	0.414	0.785	-0.085
	0.103	0.129	0.233	0.098	0.122	0.237	0.337	0.196	0.881	0.328	0.184	0.869

Table 1.6 (cont.)

Constant	**4.039**	**6.127**	**4.450**	**4.010**	**6.082**	**4.465**	**6.010**	**8.053**	**4.155**	**5.990**	**8.004**	**4.192**
	0.001	0.000	0.011	0.001	0.000	0.011	0.000	0.000	0.021	0.000	0.000	0.021
Observations	3122	2043	1079	3122	2043	1079	3122	2043	1079	3122	2043	1079
R-Squared	0.1916	0.2080	0.3479	0.1917	0.2080	0.348	0.169	0.1819	0.158	0.1704	0.182	0.1582

Panel C: Bear Market Period (2001-2004)

	Gross Alpha (1-factor)						Gross Alpha (4-factor)					
	(1)			(2)			(1)			(2)		
	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I	All Funds	AG & G	GI & I
Team Dummy	-0.269	-0.485	0.213				**-0.463**	**-0.612**	-0.015			
	0.342	0.170	0.591				0.035	0.028	0.957			
Team - *Man. Names*				-0.183	-0.441	0.451				**-0.381**	**-0.548**	0.091
				0.533	0.226	0.283				0.097	0.059	0.762
Team - *No Names*				-0.662	-0.687	-0.814				**-0.833**	**-0.907**	-0.473
				0.195	0.299	0.204				0.018	0.049	0.268
Lagged Turnover	**-0.010**	**-0.012**	0.002	**-0.010**	**-0.012**	0.002	**-0.010**	**-0.010**	-0.001	**-0.010**	**-0.010**	-0.001
	0.000	0.000	0.564	0.000	0.000	0.540	0.000	0.000	0.783	0.000	0.000	0.796
Mgt Fee	0.231	0.401	-0.271	0.171	0.372	-0.454	**-0.987**	**-1.059**	-0.472	**-1.043**	**-1.102**	-0.554
	0.740	0.618	0.795	0.806	0.645	0.661	0.065	0.087	0.601	0.052	0.075	0.540
Log of Assets	**-0.148**	**-0.226**	0.191	**-0.155**	**-0.229**	0.169	-0.068	-0.097	0.116	-0.074	-0.102	0.107
	0.089	0.033	0.131	0.078	0.031	0.181	0.311	0.244	0.183	0.273	0.225	0.221

Table 1.6 (cont.)

Fund Age	**-0.037**	**-0.051**	**-0.028**	**-0.037**	**-0.051**	**-0.029**	**-0.020**	**-0.024**	**-0.019**	**-0.020**	**-0.024**	**-0.020**
	0.000	0.000	0.008	0.000	0.000	0.004	0.008	0.044	0.013	0.007	0.041	0.010
Internal Mgt Company	**-0.715**	**-0.980**	-0.055	**-0.733**	**-0.991**	-0.083	-0.325	-0.530	0.153	-0.342	-0.545	0.141
	0.043	0.028	0.900	0.038	0.026	0.845	0.255	0.149	0.650	0.231	0.137	0.674
Constant	**3.431**	**1.631**	**1.245**	**3.528**	**1.682**	1.558	**4.690**	**4.560**	0.121	**4.781**	**4.634**	0.261
	0.000	0.091	0.286	0.000	0.086	0.183	0.000	0.000	0.902	0.000	0.000	0.792
Observations	4591	3382	1209	4591	3382	1209	4591	3382	1209	4591	3382	1209
R-Squared	0.0349	0.0585	0.121	0.0351	0.0586	0.1243	0.0749	0.0896	0.0402	0.0752	0.0897	0.0412

Table 1.7
Correlation Matrix of Team-level Variables

This table presents correlation coefficients of all team-level variables for all 1,193 fund-years for team-managed funds. Correlation coefficients significant at the 5% level or better are boldfaced.

Variable		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
[1]	Team Size	-									
[2]	Gender Diversity	**0.1135**	-								
[3]	Age Diversity	-0.0513	0.0432	-							
[4]	Tenure Diversity	-0.0152	0.0068	**0.1365**	-						
[5]	MBA diversity	**0.0860**	0.0536	**0.0848**	0.0453	-					
[6]	Team Tenure	**-0.1466**	-0.0305	0.0570	**-0.1335**	**0.0600**	-				
[7]	% working for multiple funds	0.0559	**0.0898**	-0.0242	-0.0012	0.0364	**-0.1673**	-			
[8]	Management Fee	**-0.0645**	-0.0542	**0.1160**	**-0.1546**	-0.0199	**0.1439**	**-0.1171**	-		
[9]	Log of funds assets	**0.1866**	0.0134	**-0.1417**	**0.2964**	**0.0602**	-0.0354	**0.1420**	**-0.3133**	-	
[10]	Fund Age	0.0309	0.0017	**-0.0764**	**0.3651**	0.0294	0.0290	0.0276	**-0.3690**	**0.4902**	-

Table 1.8
Portfolio Characteristics and Team-level Characteristics

This table presents results from the OLS regression of portfolio characteristics on team-level characteristics and some control variables. The dependent variables are following-year portfolio turnover, number of securities in the portfolio and the percentage of funds assets invested in the top 10 holdings. Team size is the number of managers in the portfolio management team. Gender Diversity is the standard deviation of the values of the dummy variable Gender for all managers in the team. The same method is used for the other diversity variables (Age, Tenure and MBA). Team tenure is the time managers have been working together as a team. Other team is created by averaging the values of the multiple funds dummy variables for all managers in the team and shows what percentage of the team's managers are also employed by other funds. The control variables are: the management fee charged by the investment advisor and is a proxy for investment advisor quality, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	Turnover	# of portfolio holdings	% invested in top10 holdings	Turnover	# of portfolio holdings	% invested in top10 holdings	Turnover	# of portfolio holdings	% invested in top10 holdings
Team Size	-1.492	**15.927**	**-1.209**	-0.272	**16.433**	-0.681	-1.453	**16.081**	**-1.488**
	0.715	0.001	0.060	0.957	0.004	0.464	0.750	0.003	0.037
Gender Diversity	**-27.694**	-7.600	1.913	**-26.365**	**-37.809**	2.669	**-31.506**	8.544	1.301
	0.013	0.511	0.436	0.058	0.005	0.357	0.019	0.607	0.637
Age Diversity	-8.877	-9.364	**4.952**	-10.553	4.800	**3.810**	-5.819	**-19.284**	**5.634**
	0.184	0.135	0.000	0.193	0.623	0.027	0.426	0.007	0.000
Tenure Diversity	-1.476	**-2.351**	0.321	-0.788	**-4.201**	**0.817**	-1.887	-1.160	-0.084
	0.156	0.013	0.160	0.540	0.000	0.016	0.189	0.402	0.721
MBA Diversity	-1.276	7.035	-1.359	9.703	14.566	0.443	-11.206	1.821	-2.350
	0.919	0.487	0.477	0.489	0.314	0.868	0.460	0.891	0.271

Table 1.8 (cont.)

Team Tenure	**-4.106**	-1.431	**0.916**	**-3.734**	**-1.730**	**0.934**	**-4.056**	-1.131	**0.863**
	0.000	0.180	0.000	0.000	0.130	0.000	0.000	0.408	0.000
Other Funds	10.588	1.489	-0.707	2.190	1.258	-1.515	14.545	1.879	-0.543
	0.166	0.842	0.599	0.816	0.889	0.461	0.106	0.834	0.691
Mgt Fee	8.643	-13.898	**12.508**	**40.519**	16.912	**9.216**	-23.297	-31.043	**14.808**
	0.603	0.520	0.000	0.048	0.501	0.009	0.233	0.217	0.000
Log of Assets	**-6.175**	**12.797**	**-0.922**	-1.501	**15.126**	**-1.022**	**-8.248**	**10.993**	**-0.732**
	0.004	0.000	0.006	0.587	0.000	0.040	0.001	0.000	0.059
Fund Age	-0.020	0.185	0.001	-0.310	0.034	-0.035	0.188	0.270	0.033
	0.927	0.547	0.978	0.198	0.913	0.386	0.553	0.505	0.482
Internal Mgt Company	**15.328**	0.316	-2.240	**21.351**	6.186	-2.285	13.708	0.770	-2.322
	0.038	0.967	0.107	0.022	0.580	0.253	0.118	0.927	0.131
Constant	**93.979**	42.359	**21.767**	**64.532**	-8.354	**27.494**	**114.709**	**69.483**	**22.236**
	0.000	0.177	0.000	0.016	0.835	0.000	0.000	0.035	0.000
Observations	1193	1193	1193	488	488	488	705	705	705
R-Squared	0.1394	0.1982	0.2936	0.1244	0.2268	0.2942	0.1687	0.2126	0.3046

Table 1.9
Portfolio Risk and Team-level Characteristics

This table presents results from the OLS regressions of portfolio risk characteristics on team-level characteristics and some control variables. The dependent variables are following-year standard deviation of the fund's monthly gross returns, the market beta from the market model and the market beta from Carhart's 4-factor model. *Team size* is the number of managers in the portfolio management team. *Gender Diversity* is the standard deviation of the values of the dummy variable Gender for all managers in the team. The same method is used for the other diversity variables (Age, Tenure and MBA). *Team tenure* is the time managers have been working together as a team. *Other team* is created by averaging the values of the *multiple funds* dummy variables for all managers in the team and shows what percentage of the team's managers are also employed by other funds. The control variables are: the management fee charged by the investment advisor and is a proxy for investment advisor quality, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	Standard Deviation of returns	Beta (Market Model)	Beta (4-factor)	Standard Deviation of returns	Beta (Market Model)	Beta (4-factor)	Standard Deviation of returns	Beta (Market Model)	Beta (4-factor)
Team Size	**-0.167**	**-0.024**	-0.012	**-0.330**	**-0.059**	-0.008	-0.068	-0.004	-0.009
	0.014	0.070	0.200	0.019	0.032	0.684	0.201	0.767	0.270
Gender Diversity	-0.205	0.031	0.023	-0.509	0.039	-0.061	-0.048	0.013	**0.079**
	0.322	0.441	0.460	0.188	0.555	0.277	0.805	0.775	0.035
Age Diversity	0.065	-0.008	**-0.047**	-0.058	-0.013	**-0.062**	0.115	-0.007	-0.040
	0.631	0.750	0.012	0.798	0.697	0.010	0.322	0.785	0.105
Tenure Diversity	-0.004	-0.007	-0.003	0.008	**-0.012**	0.000	-0.013	-0.001	-0.006
	0.863	0.117	0.223	0.829	0.074	0.939	0.502	0.741	0.114
MBA Diversity	0.002	-0.001	0.052	0.235	0.002	0.022	-0.125	0.001	**0.076**
	0.992	0.978	0.113	0.539	0.979	0.630	0.528	0.979	0.057

Table 1.9 (cont.)

Team Tenure	**-0.045**	**-0.012**	-0.005	**-0.068**	**-0.017**	-0.006	-0.030	-0.007	-0.004
	0.013	0.002	0.157	0.013	0.003	0.200	0.110	0.108	0.300
Other Funds	**0.323**	**0.089**	0.022	0.300	**0.103**	-0.030	**0.353**	**0.088**	**0.053**
	0.041	0.005	0.375	0.298	0.048	0.380	0.018	0.009	0.065
Mgt Fee	-0.047	-0.047	**-0.119**	0.341	0.078	-0.084	-0.099	-0.098	-0.133
	0.902	0.503	0.018	0.527	0.423	0.191	0.774	0.159	0.031
Log of Assets	-0.015	0.005	0.003	0.025	**0.019**	0.007	-0.033	-0.004	0.001
	0.643	0.440	0.640	0.685	0.087	0.419	0.333	0.650	0.955
Fund Age	-0.002	0.000	-0.001	-0.002	0.001	-0.001	**-0.007**	**-0.002**	0.000
	0.557	0.902	0.316	0.712	0.540	0.330	0.059	0.031	0.613
Internal Mgt Company	0.029	0.019	0.025	0.237	0.068	0.011	-0.106	-0.019	0.036
	0.821	0.501	0.229	0.285	0.122	0.731	0.392	0.518	0.159
Constant	**2.142**	**0.860**	**0.949**	**5.521**	**0.485**	**1.036**	**2.545**	**1.011**	**0.957**
	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.000
Observations	1193	1193	1193	488	488	488	705	705	705
R-Squared	0.5376	0.2077	0.0919	0.4526	0.3404	0.1040	0.5737	0.1336	0.1049

Table 1.10
Investment Style / Risk Factor Loadings and Team-level Characteristics

This table presents results from the OLS regressions of portfolio risk-factor loadings obtained for each fund after running Carhart's 4-factor model on team-level characteristics and some control variables. The dependent variables are following-year SMB, HML and UMD factor weightings. Team size is the number of managers in the portfolio management team. Gender Diversity is the standard deviation of the values of the dummy variable Gender for all managers in the team. The same method is used for the other diversity variables (Age, Tenure and MBA). Team tenure is the time managers have been working together as a team. Other team is created by averaging the values of the multiple funds dummy variables for all managers in the team and shows what percentage of the team's managers are also employed by other funds. The control variables are: the management fee charged by the investment advisor and is a proxy for investment advisor quality, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

	Full Sample Period			Bull Market Period			Bear Market Period		
	SMB Beta (4-factor)	HML Beta (4-factor)	UMD Beta (4-factor)	SMB Beta (4-factor)	HML Beta (4-factor)	UMD Beta (4-factor)	SMB Beta (4-factor)	HML Beta (4-factor)	UMD Beta (4-factor)
Team Size	-0.005	0.017	-0.015	0.011	0.054	**-0.034**	-0.012	0.002	-0.006
	0.780	0.376	0.117	0.718	0.155	0.085	0.500	0.937	0.530
Gender Diversity	-0.072	**-0.166**	**0.076**	**-0.187**	**-0.162**	**0.094**	0.001	**-0.170**	**0.061**
	0.197	0.002	0.006	0.021	0.043	0.047	0.983	0.004	0.050
Age Diversity	-0.035	**-0.051**	-0.018	-0.061	**-0.082**	0.008	-0.013	-0.027	**-0.044**
	0.223	0.100	0.263	0.152	0.074	0.757	0.670	0.432	0.031
Tenure Diversity	0.002	**0.013**	-0.002	0.002	**0.020**	-0.001	0.002	0.007	-0.005
	0.678	0.021	0.466	0.832	0.015	0.862	0.734	0.259	0.115
MBA Diversity	-0.045	0.035	0.014	-0.032	0.034	-0.010	-0.065	0.022	0.042
	0.352	0.498	0.614	0.666	0.646	0.828	0.189	0.713	0.192

Table 1.10 (cont.)

Team Tenure	0.001	**0.010**	**-0.005**	0.000	**0.016**	-0.007	0.000	0.005	-0.003
	0.912	0.025	0.032	0.988	0.034	0.118	0.942	0.316	0.254
Other Funds	-0.011	**-0.132**	0.013	0.013	**-0.174**	0.020	-0.030	**-0.111**	0.009
	0.779	0.000	0.527	0.830	0.012	0.593	0.434	0.003	0.697
Mgt Fee	0.011	-0.082	-0.045	0.029	-0.133	0.032	0.024	-0.042	**-0.099**
	0.891	0.237	0.235	0.807	0.193	0.588	0.773	0.593	0.033
Log of Assets	-0.012	-0.002	-0.004	**-0.029**	-0.013	0.004	-0.001	0.008	-0.010
	0.188	0.850	0.389	0.064	0.377	0.709	0.893	0.468	0.114
Fund Age	**-0.002**	**-0.002**	0.001	-0.002	**-0.003**	0.001	**-0.003**	**-0.002**	0.001
	0.003	0.037	0.138	0.119	0.093	0.491	0.000	0.049	0.212
Internal Mgt Company	-0.029	**-0.106**	0.030	0.033	-0.074	0.034	**-0.067**	**-0.130**	**0.037**
	0.343	0.003	0.114	0.546	0.198	0.313	0.026	0.002	0.072
Constant	0.165	**0.373**	0.024	0.269	**0.646**	-0.157	0.120	**0.360**	0.066
	0.127	0.001	0.696	0.120	0.001	0.169	0.293	0.003	0.336
Observations	1193	1193	1193	488	488	488	705	705	705
R-Squared	0.1512	0.2072	0.0964	0.1922	0.1809	0.0989	0.1516	0.2215	0.1112

Table 1.11
Performance and Team-level Characteristics

This table presents results from the OLS regressions of portfolio performance on team-level characteristics and some control variables. The dependent variables are: the abnormal return (alpha) from the market model and the abnormal return (alpha) obtained from the 4-factor model. *Team size* is the number of managers in the portfolio management team. *Gender Diversity* is the standard deviation of the values of the dummy variable Gender for all managers in the team. The same method is used for the other diversity variables (Age, Tenure and MBA). *Team tenure* is the time managers have been working together as a team. *Other team* is created by averaging the values of the multiple funds dummy variables for all managers in the team and shows what percentage of the team's managers are also employed by other funds. The control variables are: the management fee charged by the investment advisor and is a proxy for investment advisor quality, a dummy variable that takes the value of 1 if the investment advisor is affiliated with the fund family, the fund's age and the log of the fund's average total net assets over the course of the year. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Results are reported for all funds but also separately for growth oriented funds (prospectus objective of growth and aggressive growth) and income oriented funds (prospectus objective of growth-income and equity-income). Panel A reports results for the full sample, while panels B and C present results for the 1997-2000 and 2001-2004 periods respectively. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

Panel A: Full Sample Period (1997-2004)

	All Funds		AG & G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size	-0.293	-0.106	-0.241	-0.227	-0.181	0.356
	0.332	0.675	0.552	0.502	0.616	0.278
STD Gender	**-2.903**	-1.164	**-3.711**	-1.229	-1.343	2.161
	0.006	0.210	0.005	0.291	0.470	0.137
STD Age	**1.654**	**1.444**	**1.714**	**1.683**	0.839	0.234
	0.005	0.003	0.013	0.005	0.231	0.687
STD Tenure	-0.039	-0.037	-0.056	-0.158	0.103	**0.267**
	0.711	0.709	0.694	0.193	0.412	0.032
STD MBA	0.087	0.368	0.344	0.885	1.040	-0.515
	0.930	0.646	0.789	0.398	0.412	0.596
Team Tenure	-0.036	0.019	-0.095	-0.027	0.117	0.117
	0.705	0.755	0.411	0.719	0.379	0.243
Other Funds	-0.872	0.057	-1.154	-0.579	-0.342	0.993
	0.194	0.921	0.165	0.417	0.736	0.303
Mgt Fee	-0.658	-0.679	-0.759	-0.995	-2.656	0.072
	0.630	0.608	0.638	0.520	0.182	0.965
Log of Assets	-0.042	-0.100	-0.227	-0.197	0.301	0.236
	0.838	0.493	0.390	0.269	0.284	0.278

Table 1.11 (cont.)

Fund Age	-0.027	-0.012	-0.028	-0.006	**-0.061**	**-0.052**
	0.189	0.475	0.428	0.837	0.005	0.001
Internal Mgt Company	**-1.519**	**-0.967**	**-2.451**	**-1.389**	1.371	0.484
	0.018	0.046	0.002	0.023	0.154	0.528
Constant	1.739	2.013	3.369	**4.085**	2.498	-2.097
	0.396	0.244	0.172	0.058	0.339	0.308
Observations	1193	1193	872	872	321	321
R-Squared	0.1598	0.1696	0.1831	0.202	0.3974	0.1738

Panel B: Bull Sample Period (1997-2000)

	All Funds		AG & G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size	0.594	0.265	0.946	0.112	-0.262	0.485
	0.384	0.638	0.339	0.890	0.754	0.488
STD Gender	-2.622	0.088	-3.416	0.700	-2.239	-3.349
	0.240	0.962	0.264	0.782	0.453	0.155
STD Age	1.456	0.843	1.345	1.186	1.265	0.000
	0.169	0.349	0.345	0.342	0.197	1.000
STD Tenure	-0.146	-0.076	-0.152	-0.254	0.063	0.305
	0.392	0.657	0.564	0.253	0.751	0.115
STD MBA	0.783	0.769	0.410	0.671	2.201	0.328
	0.652	0.601	0.867	0.745	0.246	0.846
Team Tenure	-0.209	-0.043	-0.234	-0.053	-0.040	0.023
	0.233	0.713	0.253	0.676	0.887	0.935
Other Funds	-0.812	0.628	0.577	0.265	-2.950	0.196
	0.719	0.604	0.726	0.866	0.143	0.923
Mgt Fee	-0.812	-1.276	-1.553	-2.233	-1.382	1.157
	0.719	0.575	0.589	0.424	0.644	0.654
Log of Assets	-0.104	-0.091	-0.430	-0.280	0.565	0.538
	0.774	0.738	0.387	0.415	0.242	0.202
Fund Age	0.004	-0.009	0.038	0.002	-0.055	**-0.059**
	0.898	0.764	0.479	0.968	0.161	0.047
Internal Mgt Company	0.221	-0.522	-1.031	-1.215	**2.584**	1.001
	0.863	0.554	0.553	0.303	0.080	0.426

Table 1.11 (cont.)

Constant	**6.220**	**5.981**	**13.351**	**13.322**	6.369	-2.027
	0.083	0.063	0.010	0.002	0.183	0.655
Observations	488	488	333	333	155	155
R-Squared	0.2313	0.1989	0.2282	0.2400	0.4415	0.1545

Panel C: Bear Market Period (2001-2004)

	All Funds		AG & G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size	**-0.622**	-0.246	**-0.740**	-0.389	0.136	0.370
	0.051	0.363	0.081	0.281	0.708	0.256
STD Gender	**-3.535**	**-2.146**	**-4.121**	**-2.515**	-2.199	-1.973
	0.003	0.042	0.004	0.060	0.248	0.168
STD Age	**1.786**	**1.850**	**2.082**	**2.109**	0.673	0.705
	0.010	0.002	0.008	0.004	0.484	0.293
STD Tenure	0.079	0.027	0.096	-0.035	0.234	**0.244**
	0.567	0.824	0.577	0.820	0.326	0.078
STD MBA	-0.329	0.020	0.266	0.823	-0.763	-1.621
	0.770	0.981	0.846	0.464	0.560	0.102
Team Tenure	0.099	0.067	0.080	0.024	0.093	0.149
	0.329	0.450	0.533	0.840	0.493	0.169
Other Funds	**-1.592**	-0.334	**-2.526**	-1.121	**2.149**	**1.682**
	0.067	0.610	0.015	0.165	0.075	0.044
Mgt Fee	0.600	0.351	-0.642	-0.346	**-4.563**	-0.929
	0.722	0.800	0.727	0.822	0.064	0.644
Log of Assets	-0.011	-0.113	-0.077	-0.166	0.022	0.008
	0.964	0.537	0.804	0.481	0.946	0.975
Fund Age	**-0.068**	-0.019	**-0.102**	-0.014	**-0.083**	**-0.051**
	0.005	0.269	0.025	0.671	0.002	0.000
Internal Mgt Company	**-2.993**	**-1.501**	**-3.757**	**-1.727**	-0.066	-0.282
	0.000	0.019	0.000	0.027	0.956	0.759
Constant	**6.245**	**4.003**	**5.305**	**3.945**	**5.489**	0.078
	0.023	0.032	0.064	0.071	0.036	0.976
Observations	705	705	539	539	166	166
R-Squared	0.0986	0.1173	0.1299	0.1160	0.3469	0.2452

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Table 1.12
Performance and Team-level Characteristics

This table presents results from the OLS regressions of portfolio performance on team-level characteristics and some control variables. The dependent variables are all the same as in table 11. The new variables are the interactions of the *TeamSize* variable with *STD_Age, STD_Tenure, Team_Tenure, LogAssets* and *OtherFunds*. We report the coefficients of the interaction terms of other significant variables. Prospectus objective and time dummies are included in the regressions but their coefficients are not reported. Results are reported for all funds but also separately for growth oriented funds (prospectus objective of growth and aggressive growth) and income oriented funds (prospectus objective of growth-income and equity-income). Panel A reports results for the full sample, while panels B and C present results for the 1997-2000 and 2001-2004 periods respectively. Coefficients significant at the 10% level or better are boldfaced and *p*-values appear below the estimated coefficients. Clustered standard errors by fund are estimated.

Panel A: Full Sample Period (1997-2004)

	All Funds		AG &G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size * STD Age	0.847	0.235	0.401	-0.049	**2.845**	1.387
	0.218	0.685	0.618	0.947	0.014	0.131
Team size * STD Tenure	0.126	0.080	0.326	0.249	-0.193	-0.125
	0.376	0.545	0.101	0.140	0.300	0.415
Team size * Team Tenure	**0.353**	0.133	**0.499**	**0.282**	0.074	-0.117
	0.001	0.178	0.001	0.039	0.432	0.166
Team size * Log of Assets	-0.266	-0.073	-0.459	-0.288	0.127	**0.342**
	0.192	0.666	0.108	0.211	0.576	0.067
Team size * Other Funds	0.710	-0.190	0.789	0.599	-0.067	**-1.531**
	0.294	0.773	0.363	0.473	0.954	0.091
STD Gender	**-2.974**	-1.207	**-4.028**	-1.485	-1.100	-1.880
	0.005	0.202	0.002	0.222	0.562	0.192
STD Age	-0.326	0.888	0.928	1.957	**-5.816**	-2.963
	0.854	0.567	0.668	0.330	0.028	0.171
STD Tenure	-0.341	-0.231	-0.838	-0.768	0.538	0.568
	0.374	0.527	0.129	0.111	0.221	0.143
Team Tenure	**-0.907**	-0.307	**-1.276**	**-0.697**	-0.076	0.451
	0.002	0.222	0.001	0.037	0.817	0.119
Other Funds	-2.785	0.495	-3.191	-2.125	-0.029	**5.013**
	0.153	0.797	0.209	0.383	0.992	0.036

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Table 1.12 (cont.)

Internal Mgt Company	**-1.330**	**-0.891**	**-2.105**	**-1.213**	1.421	0.636
	0.039	0.073	0.009	0.054	0.132	0.403
Constant	3.599	2.210	2.675	3.396	**8.258**	0.307
	0.323	0.496	0.616	0.470	0.095	0.934
Observations	1193	1193	872	872	321	321
R-Squared	0.1683	0.1716	0.1946	0.2079	0.4086	0.1902

Panel B: Bull Sample Period (1997-2000)

	All Funds		AG & G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size * STD Age	**5.773**	2.524	**5.731**	3.073	**4.334**	1.814
	0.004	0.105	0.027	0.128	0.078	0.374
Team size * STD Tenure	0.446	0.322	0.867	**0.655**	-0.326	-0.144
	0.232	0.210	0.151	0.031	0.386	0.633
Team size * Team Tenure	**0.575**	0.044	**0.523**	0.060	0.368	0.260
	0.013	0.813	0.049	0.759	0.712	0.685
Team size * Log of Assets	-0.441	0.199	-0.618	-0.214	-0.206	0.730
	0.274	0.557	0.270	0.643	0.664	0.141
Team size * Other Funds	0.431	-2.049	-1.923	-0.906	0.969	-3.918
	0.831	0.192	0.592	0.732	0.768	0.201
STD Gender	-2.561	0.172	-4.007	0.297	-1.115	-2.114
	0.248	0.927	0.186	0.908	0.733	0.358
STD Age	**-11.302**	-4.746	**-10.998**	-5.344	-8.701	-4.206
	0.012	0.185	0.056	0.253	0.106	0.357
STD Tenure	-1.092	-0.760	-2.062	**-1.689**	0.800	0.605
	0.193	0.225	0.138	0.035	0.312	0.374
Team Tenure	**-1.504**	-0.126	**-1.404**	-0.175	-0.755	-0.534
	0.013	0.784	0.053	0.731	0.716	0.708
Other Funds	-1.023	5.569	4.881	2.540	-4.625	9.859
	0.832	0.173	0.545	0.695	0.566	0.163
Internal Mgt Company	0.852	-0.391	-0.166	-0.950	**2.937**	1.159
	0.498	0.659	0.924	0.426	0.049	0.362
Constant	**13.202**	9.644	13.718	14.776	9.132	4.829
	0.053	0.125	0.291	0.187	0.378	0.568
Observations	488	488	333	333	155	155
R-Squared	0.2542	0.209	0.2547	0.2523	0.4596	0.1827

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Table 1.12 (cont.)

Panel C: Bear Market Period (2001-2004)						
	All Funds		AG & G		GI & I	
	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha	1- factor Alpha	4-factor Alpha
Team size * STD Age	-0.663	-0.669	-1.047	-1.117	**2.162**	1.062
	0.350	0.339	0.225	0.185	0.053	0.158
Team size * STD Tenure	0.060	0.035	0.133	0.105	-0.201	-0.128
	0.683	0.820	0.480	0.580	0.343	0.332
Team size * Team Tenure	**0.288**	0.184	**0.432**	**0.385**	-0.053	**-0.169**
	0.008	0.113	0.008	0.023	0.668	0.050
Team size * Log of Assets	-0.205	-0.185	-0.357	-0.269	0.418	**0.272**
	0.367	0.341	0.209	0.287	0.156	0.094
Team size * Other Funds	**1.252**	0.481	**1.608**	1.150	-0.160	-0.558
	0.095	0.490	0.085	0.183	0.892	0.502
STD Gender	**-3.560**	**-2.215**	**-4.396**	**-2.795**	-2.386	-2.134
	0.002	0.036	0.002	0.040	0.206	0.121
STD Age	**3.521**	**3.580**	**4.914**	**5.070**	-4.480	-1.804
	0.095	0.070	0.053	0.035	0.116	0.398
STD Tenure	-0.092	-0.075	-0.240	-0.306	0.694	0.594
	0.832	0.865	0.666	0.583	0.294	0.137
Team Tenure	**-0.666**	-0.412	**-0.996**	**-0.934**	0.230	**0.677**
	0.027	0.171	0.015	0.023	0.636	0.035
Other Funds	**-5.141**	-1.726	**-6.955**	**-4.362**	2.533	3.407
	0.036	0.405	0.021	0.084	0.486	0.186
Internal Mgt Company	**-3.012**	**-1.545**	**-3.647**	**-1.660**	0.076	-0.027
	0.000	0.015	0.000	0.034	0.950	0.976
Constant	7.153	2.593	4.247	2.913	**13.522**	1.838
	0.139	0.497	0.466	0.545	0.034	0.681
Observations	705	705	539	539	166	166
R-Squared	0.1102	0.124	0.1472	0.1336	0.3606	0.2666

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ESSAY 2. Manager Characteristics and Mutual Funds

2.1 Introduction

Traditionally, mutual fund research has focused on the measurement of fund performance and its persistence over time. The goal of most papers in this literature is to determine whether some funds are able to consistently produce positive risk-adjusted returns. While the results thus far are mixed, there seems to be a consensus that mutual fund managers are not able to outperform benchmarks and produce consistent returns. In this article, we add to this literature by examining how manager characteristics relate to performance, using a much more comprehensive dataset on mutual fund managers than previous research.

Our analysis extends the literature in at least three ways. First, we employ a much larger data set than previous work on the characteristics of mutual fund managers. In particular, in contrast to Chevalier and Ellison (1999), who focus on the 1988 to 1994 bull market period, and Gottesman and Morey (2005), who focus on the 2000 to 2003 bearish period, our sample period (1997 to 2005) spans both a bull and a bear market. This allows us to investigate our hypotheses separately on the full sample and the bull and bear sub-samples (1997 to 2000 and 2001 to 2004, respectively), and thereby take different market conditions into account. Second, we evaluate performance using logit models that show how manager and team characteristics affect the probability of a fund being in the top (or bottom) performance quartile. Finally, we include in our analysis some new manager characteristics and control variables that have not been taken into account in prior literature.

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A recent practice of investment advisory firms is to assign the same manager or managers to the management teams of multiple funds. To the best of our knowledge, this is the first paper to provide evidence on how a manager's participation in the portfolio management team of another fund affects his risk-taking behavior and performance.

Several studies focus on individual fund managers' characteristics and their relation to performance outcomes. Golec (1996) tests whether fund manager characteristics help to explain a fund's performance, risk, and fees. The manager characteristics he analyzes are manager age (years), manager tenure, years of education, and whether the manager has an MBA degree. He finds that younger managers with longer tenure at their funds and MBA degrees extract better risk- adjusted performance. Note that he also analyzes a team size variable. However, as he observes, his sample of 530 funds from 1988 to 1990 includes very few team-managed funds; indeed, all else equal, the coefficient for the team size variable is insignificant. He also finds that funds with low expenses realize better performance, but that large management fees do not necessarily imply poor performance. In summary, out of all the manager characteristics Golec (1996) studies, the most significant predictor of poor performance seems to be the length of time a manager has been with the fund (tenure).

Chevalier and Ellison (1999) also examine the relation between mutual fund performance and fund manager characteristics. In particular, they focus on the manager's age, the average composite SAT score at the manager's undergraduate institution, and whether the manager has an MBA. Their study focuses on 492 single-manager funds whose investment objective is growth or growth and income over the 1988 to 1994 period. Their strongest result is that managers who attend higher-SAT undergraduate

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institutions produce systematically higher risk-adjusted excess returns. They also find that younger managers fair better than older ones. As Gottesman and Morey (2005) report, this last result has been criticized as being the product of the bull market period Chevalier and Ellison (1999) study.

Gottesman and Morey (2005) extend the work of Chevalier and Ellison (1999) on the relationship between fund performance and educational characteristics. In addition to the quality of the undergraduate institution, as measured by the program's average SAT score, they investigate the quality of the MBA program, as measured by the program's average GMAT score, and its effect on performance. They also relate performance to education variables such as whether the manager attends a liberal arts institution, has a CFA designation, or holds any other graduate-level degree (masters or Ph.D). They find that for a sample of 518 single-manager funds tracked between 2000 and 2003, managers who hold an MBA degree from a school ranked in the top 30 of the *Business Week* rankings outperform managers with no MBA or with an MBA from a lower ranked institution. The other education variables seem to be unrelated to mutual fund performance.

Bliss and Potter (2002) examine the effect of the gender in portfolio management. They find that women fund managers hold portfolios with marginally more risk than men. However, they do not find any other significant differences in terms of performance or trading behavior.

We use a unique data set on over 1,200 individual mutual fund managers from more than 500 management companies and 2,660 fund-year observations for the 1997 to

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2005 period. We report results for the whole market period, but also for the two separate bull (1997-2000) and bear (2001-2004) market periods.

Our main results are as follows. First, we find that single-manager characteristics can explain differences in risk taking and investment style. Portfolios of long-tenured and older managers exhibit higher levels of turnover, whereas managers with MBA degrees, especially graduates of highly ranked business schools, exhibit lower turnover during the bearish sub-period. Managers with MBA degrees also hold more stocks in their portfolios and invest a smaller part of the fund's assets in their top holdings, while the opposite is true for older managers.

The results fail to confirm Golec (1996) and Chevalier and Ellison's (1999) finding that MBAs hold more systematic (beta) risk. Instead, we find that long-tenured managers hold the lower-beta portfolios. On the other hand, we confirm Chevalier and Ellison's (1999) finding that managers that attended an undergraduate institution with a high average SAT score outperform other managers, even during a bear market. Interestingly, however, the SAT variable is positively correlated with the dummy for top-tier business schools and negatively correlated with dummies for third-tier and unranked business schools, which implies that those managers who attend high SAT undergraduate programs also attend more prestigious MBA programs, and thus the SAT score's ability to explain performance decreases once we take a manager's MBA program into account.

We fail to find evidence that participation of managers in management teams of other mutual fund portfolios causes any underperformance. We do find, however, that managers employed by many mutual funds turn their portfolios over much often.

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The remainder of the paper is organized as follows. Section 2.2 describes our method, data sources and definition of variables. In section 2.3 we present our hypotheses and results. In sections 2.4 we perform some robustness checks. Finally, section 2.5 concludes.

2.2 Method and Data

2.2.1 Method

We conduct our analysis as follows. We first obtain manager characteristics for all funds at the beginning of each year t for all the years in our sample period (1997 to 2004). We then relate those manager characteristics at time t to portfolio attributes, risk, investment style, and performance over the course of the next year (from t to t+1). We mainly use ordinary least squares (OLS) regressions of portfolio characteristics and risk attributes on management team characteristics. Similar to Chevalier and Ellison (1999), we also use instrumental variable estimation for some of our regressions, using lagged observations as proxies for variables (such as turnover) that appear to be endogenous. To evaluate performance we follow a novel approach compared to other mutual fund performance studies and estimate logit models. For each year we rank all funds into performance quartiles. We then estimate the coefficients of a logit model where the dependent variable takes the value of one if the fund belongs to the top performance quartile (top 25%) and zero otherwise. Manager characteristics are the independent variables. Rather than reporting the actual logit estimates, we report the marginal change

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in probability for each independent variable as well as the log-odds ratio.[1] The odds ratio is the ratio of odds for two different observations of one explanatory variable. For example, an odds ratio of 1.2 for the MBA dummy variable, which takes the value of one if the manager has an MBA and zero otherwise, would mean that managers with MBA degrees have a 20% higher probability of being in the top performance quartile than non-MBAs. For all estimated models (OLS and logit) we estimate clustered standard errors by fund. To check the robustness of the results, in untabulated tests we re-estimate all models using an alternative specification for the dependent variable, giving it the value of one if the fund belongs to the worst (bottom 25%) performance quartile and zero otherwise; the results are available upon request.

We estimate all models for all funds-years in both the full sample period (1997 to 2004), and the two separate sub-periods (1997 to 2000, bull market; 2001 to 2004, bear market). In this way we can determine whether the behavior of manager-specific characteristics depends upon underlying market conditions and levels of uncertainty.

2.2.2 Data Description

2.2.2.1 Mutual Fund Data

All of our mutual fund data come from the nine January CDs of Morningstar, Inc.'s Principia Advanced database from January 1997 to January 2005.[2] The January CDs report data as of December 31st of the previous year. Morningstar started the

[1] We also repeat the analysis by running probit models. The marginal change in probability is almost identical. We choose to report the logit estimation mainly because of the intuitive interpretation of the log-odds ratio.

[2] Morningstar, Inc. used different names for this database throughout our sample period. The three different names are: a) Principia Mutual Funds Plus, b) Principia Mutual Funds Pro Plus, and c) Principia Mutual Funds Advanced.

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Principia database on January 1996. The Principia Advanced version contains more information, especially regarding managers and monthly fund returns, than the basic version of the database. Using the nine CDs, we extract information for all funds in operation every year from 1997 to 2005. We start with all the funds in existence in January 1997 and we follow them through 2005 or until they disappear from the database. We also include in our sample all the funds that started their operations after 1997, so as to minimize concerns about survivorship. Data are gathered for all domestic equity funds with a self-declared investment objective of growth, aggressive growth, growth-income, or equity-income. We exclude index funds, balanced funds, funds of funds, as well as other types of funds that are restricted in some sense in their investment decisions.[3] For each fund we obtain annual and monthly returns, annual expense ratios and loads, net asset values, total net assets, fund inception dates, mutual fund family names, portfolio characteristics such as turnover, total number of holdings, percentage of assets invested in the top 10 holdings, and stock, cash, and bond holdings, as well as manager names. In the "manager name" field Morningstar lists the name of the manager if the fund is solo managed, the names of the multiple managers if the fund's total assets are divided among more than one manager, or the term "Management Team" when more than two people are involved in the management of the fund and they manage together.[4] We also obtain data on the Morningstar equity style box designation for the fund and the Morningstar category to which the fund belongs. These two variables are similar, as they categorize funds among the nine different investment styles according to the style (value,

[3] These include socially conscious funds, life cycle funds, target retirement funds and tax managed funds.
[4] The exact description of what the term "Management Team" means, reads are follows: "This is used when there are more than two persons involved in fund management, and they manage together, or when the fund strongly promotes its team-managed aspect".

growth, and blend) and size (small, medium, large) of their underlying portfolio holdings. The only difference between the two variables is that the equity style box is calculated using the latest portfolio information for the fund, while the Morningstar category is based upon the trailing 36 months. From the advanced analytics view of the database we manually obtain each fund's management fees, which are the fees that the management company charges to manage the fund's portfolio. For most funds the management fee that appears on Morningstar is taken from the fund prospectus For other funds a minimum and maximum management fee range appears in the database; for such funds we calculate the midpoint and use the resulting figure as the fund's management fee.

2.2.2.2 Manager Data

From the advanced analytics view of each CD, we hand-collect additional information about all portfolio managers, regardless of whether they manage a fund individually or as part of a team. The Morningstar CDs contain a brief biographical sketch for each fund's manager(s). For each manager, we collect data on the starting date at the fund, gender, undergraduate and graduate institutions attended, degrees received (including the year in which the degrees were received), whether they are a Certified Financial Analyst (CFA), the name of the management company for which they work, and other assets managed. Out of all distinct managers in our sample, we are able to collect complete information for all of the manager characteristics variables for about 37% of them. This yields complete information for 46% of qll manager-year observations. For 20% of the managers we have available data on all variables except

graduation date and for 40% of them we are missing data on several manager characteristic variables.

After collecting manager-level information from Morningstar, we turn to other sources to complete missing information. We first turn to the 2004 CD of Nelson's Directory of Investment Managers. Nelson's 2004 CD-ROM has information about most of the management companies and managers in the portfolio management industry as of March 2004. Thus, matching manager names and management companies from the 2004 January Morningstar CD with those from Nelson's CD, we try to retrieve as many missing data as possible. We then turn to each fund's prospectus, which we locate on the fund family website. After completing as much information as possible for the managers of all the funds that appear in our data set in 2004, we track those managers in earlier years and complete their missing information.

We obtain data on all manager variables for 42% of the managers, which results in complete information for 56% of all manager-years. It is worth mentioning that for 31% of the managers (28% of manager-years), we are missing only their date of graduation from college. Retrieving those graduation dates would lead to complete information on more than 80% of the manager-years in our sample. We use the data on those managers to perform robustness tests on our findings in Section 2.4. In summary, we create a unique data set, which, to the best of our knowledge, provides the most comprehensive set of mutual fund manager characteristics to date and is the first to include characteristics on managers that work in teams.

2.2.2.3 Benchmark Portfolio Returns Data

To evaluate the risk-adjusted performance of funds we employ returns on benchmark portfolios. The performance metrics we use are described in Section 4.3.2. We use the value-weighted NYSE/AMEX/Nasdaq composite index as our market return, and the one-month T-bill rate from Ibbotson Associates as our risk-free rate in calculating excess market returns. Returns on the HML (high minus low book-to-market returns) and SMB (small minus big stock return) zero-investment portfolios as well as returns on a momentum portfolio (UMD) come from Kenneth French's website.

2.2.3 Variables

2.2.3.1 Distinct Fund Portfolios

The funds that appear in the Morningstar CDs represent fund offerings that the investor can choose from but do not represent distinct investment portfolios. As Nanda, Wang, and Zheng (2005) document, in the 1990s many mutual funds introduced additional share classes as a way to offer investors more choices about the timing of load payments, or to provide lower expenses to investors with big holdings. They show that by the end of 2002 more than 50% of mutual funds offered more than one share class. However, while various share classes offer investors different fund choices, they are based the same underlying portfolio and consequently the same before-fee performance. Thus, in the present study our unit of observation is the fund. This choice has implications for our data collection.

The Morningstar Principia Mutual Funds Advanced Database offers the user the option to extract data about distinct portfolios only. However, this option shows data only

for a fund's oldest share class. For variables such as the portfolio characteristics of a management team, such information is the same across share classes. In contrast, net returns are different across share classes while gross portfolio returns, which are calculated by adding back the annual expenses to the net annual returns reported by Morningstar, are the same for all share classes. Further, using data on only one asset class underestimates the total assets (size) of the portfolio, because it does not takes into account the amount of money invested in the other share classes. We therefore perform our own aggregation of multiple share classes into one fund observation. We are careful to cumulate the total assets from all share classes to obtain the total assets of the underlying portfolio. In order to identify different share classes of the same fund we match different share classes by four portfolio characteristics: turnover, number of holdings, percentage invested in stock, and percentage in the top 10 holdings. We also verify our matching by looking at the fund names.[5]

2.2.3.2 Performance and Risk Measures

Morningstar's calculation of returns is determined each month by taking the change in the fund's monthly net asset value (NAV), reinvesting all income and capital gains distributions during that month, and dividing by the starting NAV. Since fund expenses are usually calculated daily and are reflected in the fund's NAV, returns reported by Morningstar are net returns and are different for each share class. To derive the gross (before- expenses) return of each fund portfolio, which is the same for all share classes, we use a method similar to Gottesman and Morey (2005). We divide the annual

[5] Multiple share classes of the same fund have basically the same name. Their names differ only by the name of the share class. Example: "Vanguard Growth A," "Vanguard Growth B," etc.

expense ratio by 12 and add the monthly expense ratio to the monthly returns. [6] We use those gross portfolio returns to evaluate and compare the performance between the different types of management teams. We also calculate managers' net returns by subtracting the management fee they charge (same for all share classes) from the gross portfolio returns. Again, we divide the annual management fee by 12 and subtract it from the monthly gross returns to arrive at the monthly net returns.

We use three performance metrics to measure fund performance in a given year: the gross annual fund return, the market model one-factor alpha, and the Carhart four-factor alpha. To find the gross annual return we add fund expenses to the net annual return reported by Morningstar. We then run the following two time-series regression models to estimate the one-factor and four-factor alphas, respectively:

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \varepsilon_{it}, \tag{1}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{i1} EMR_t + \beta_{i2} SMB_t + \beta_{i3} HML_t + \beta_{i4} UMD_t + \varepsilon_{it}, \tag{2}$$

where $R_{it} - R_{ft}$ is the month-t excess gross return for fund i, EMR_t is the excess market return, SMB_t is the difference in returns across small and big stock portfolios, HML_t is the difference in returns between high and low book-to-market portfolios, and UMD_t is the return on a momentum portfolio as computed by Fama and French. When estimating the one-factor and four-factor alphas we use monthly gross fund returns for the 12 months in the year. To calculate the gross monthly return, we divide the annual expense

[6] The annual expense ratio includes administrative, 12b-1, and management fees.

ration by 12 and add this to the monthly net returns. We use gross returns because we want to measure the performance differences between various forms of management team organization and characteristics. If better managers or organizational forms receive rents through higher expenses, then the performance superiority of manager characteristics might not show up when using net returns. However, we repeat our analysis using fund returns net of management fees and the results are qualitatively the same.

To evaluate the riskiness of the portfolio we use the market betas (the coefficients β_{i1}) from equations (1) and (2), as well as the standard deviation of monthly returns, throughout the course of the year. We use the estimated factor loadings, the coefficients β_{i2}, β_{i3}, and β_{i4}, from equation (2) as measures of the fund's investment style.

2.2.3.3 Manager-level Variables

Using the information we collect from the biographical sketches, we construct additional variables about the characteristics of individual managers for every manager in our sample, including those that manage in teams. More specifically, for each individual manager we construct the following variables:

1) *Manager age*: We calculate the manager's age, which we use as a proxy for experience, by starting with the manager's undergraduate graduation date, and assuming that the manager is 21 at the time of graduation.
2) *SAT/100*: We record the average SAT score of students at the institution where the manager earned his undergraduate degree. Similar to Gottesman and Morey (2005), we obtain up-to-date SAT scores for the undergraduate school the

manager has attended by searching *collegeboard.com*.[7] We obtain maximum and minimum bounds for the verbal and math sections of the SAT. The bounds are constructed such that the middle 50% of students at the institution fall between those bounds. For some institutions the composite ACT score is also reported, for others only the composite ACT score is reported, and for a few schools (less than 10) neither the SAT nor the ACT lower and upper bounds are reported. For schools for which SAT scores are available, we calculate the average SAT score as follows: We calculate the midpoints of the upper and lower bounds of the verbal and math SAT ranges and then take the average of those midpoints. For schools for which both the SAT and composite ACT scores are available, we regress mean ACT scores (midpoint of lower and upper bounds) on average SAT scores (as calculated above) and predict average SAT scores from the mean ACT scores. We find SAT scores for 422 undergraduate institutions. Finally, for scaling reasons, we divide the SAT score assigned to each manager by 100. The fact that we gather SAT scores for the undergraduate institutions from 2005 and business school rankings from the 1990s might raise some concerns, as the quality of the schools might have changed over time and might be different relative to when the manager actually attended the school. This issue is also raised in Gottesman and Morey (2006), who test for possible changes in the relative quality of schools and find that the rankings of undergraduate institutions and graduate business schools in the early 1980s are very similar to those in 2003. More specifically, they find that the correlation coefficient between the 1983 and 2003 SAT relative rankings is 0.86 and the correlation coefficient for business school

[7] The data are gathered in the summer of 2005.

quality (as measured by the GMAT score) is 0.82. Also, Dechev (1999) reports that changes in the Business Week rankings are mostly transitory.

3) *MBA*: We construct an MBA dummy that takes the value of one if the manager has an MBA and zero otherwise.

4) *CFA*: We create a CFA dummy that takes the value of one if the manager has a CFA and zero otherwise.

5) *Manager tenure*: We calculate a manager's tenure with the fund by subtracting the date the manager started at the fund from the date for which we wish to measure tenure.

6) *Gender*: We create a Gender dummy, which takes the value of one if the manager is male and the value of zero if the manager is female.

7) *MBA program rankings (BW1 to BW5)*: We create five dummy variables that correspond to the quality of the MBA program each manager attended. To do so, we use the last five Business Week business school rankings as reported on Business Week magazine. Business Week rankings come out every two years. We obtain the 1990, 1992, 1994, 1996, 1998, and 2000 rankings. We assign a school to the first ranking category (BW1) if it is present in the first 10 places of the rankings in at least four out of the six Business Week rankings. We assign schools to the second category (BW2) if they are present in the first 15 places in at least four out the sox rankings. Schools are assigned to the second-tier category (BW3) if they are consistently ranked by Business Week (at least four out of six rankings) and to the third-tier category (BW4) if they were ranked in any of the rankings. Finally, we assign all remaining business schools to the "never ranked"

(BW5) category. The five dummy variables (BW1 to BW5) take the value of one if the school belongs to the corresponding category and zero otherwise.

8) *Others*: This variable takes the value of one if the manager works as a portfolio manager for more than one fund at a time. We obtain this information from the advanced analytics view of the Morningstar database.

Manager characteristics in the first (1997) and last (2004) year of our dataset appear in table 2.1. We do not see any significant changes of managers characteristics over this period. About half of the managers have a CFA designation, around 60 percent hold MBA degrees and the majority of managers are male The most significant difference between 1997 and 2004 is that in 2004 more than half of the managers (56%) are employed by more than one mutual funds compared to 46% in 1997. Descriptive statistics of manager characteristics appear in table 2.2 and correlations between variables in table 2.3.

2.3 Hypotheses and results

2.3.1 Discussion of hypotheses

The effects manager age has on performance and portfolio characteristics are ambiguous. Manager age is highly correlated with experience and therefore superior performance. However, Golec (1996) points out that manager age is also a measure of stamina, which is negatively correlated with age and, assuming that investment management is a highly demanding job, could have a negative impact on performance. Moreover, if an older manager is closer to retirement his future earnings from his job might not be that important to him. Chevalier and Ellison (1999) make a similar

argument. Younger managers who want to advance their careers and increase their future income will work and try harder than older managers. We can only measure the combined effect of those two competing hypotheses. If the experience effect dominates, we expect to see superior performance by older managers. If the stamina and career concerns hypothesis is true, we expect younger managers to work harder and better. Both Chevalier and Ellison (1999) and Golec (1996) find that younger managers perform better than older ones. They also find that older managers hold higher beta portfolios.

Tenure is a measure of fund-specific experience but could also be a measure of success. On the one hand a manager's long presence at a fund could be an indication that the fund organization is happy with his performance; however, a manager with a long tenure might have run out of new investment opportunities and ideas. Long tenure is likely to make the manager more risk averse since he probably not get fired unless he significantly underperforms. Moreover, since the existing portfolio is mainly his construct, he would be less willing to turn it over even if some if his holdings are not performing up to par. We expect long-tenured managers to hold more diversified portfolios, have lower trading propensity (turnover), and worse performance than short-tenured managers that have to prove and establish themselves.

The quality and nature of manager education can also prove important for investment management. Golec (1996) underlines the importance of an MBA in identifying well-managed companies and understanding basic investment principles. Further, Chevalier and Ellison (1999) and Gottesman and Morey (2005) suggest that an MBA degree provides superior information benefits, given the connections the manager builds with other members of the financial and business community while attending the

MBA program. Such networking benefits are likely to be greater the higher the prestige of the business school. Accordingly, Gottesman and Morey (2005) also look at the rankings of the business school in which the managers receive their MBA as well as the average GMAT scores of those institutions. They find that managers from high-ranked institutions outperform managers from low-ranked institutions. Of course, it could be the case that managers from more prestigious schools receive a better business education or are hired by better management companies with superior resources and support staff. Note that a CFA designation is also a measure of business-specific (mostly finance-specific) knowledge.

The average SAT score of the undergraduate institution the manager attended can also determine manager performance. In Chevalier and Ellison (1999), the SAT score is the only manager characteristic studied that can explain differences in the risk-adjusted returns (alphas) of mutual funds. Similar to the MBA score above, the SAT score is a measure of the quality of the undergraduate institution, and therefore the quality of the education the manager enjoyed, as well as a measure of the network connections that can result in better access to information.

The next variable we include in our study relates to whether a portfolio manager is a member of the management team of multiple funds. Investment management is a demanding job and managing more than one fund at a time could have negative effects on performance. In addition, a manager who is evaluated on overall performance across the funds he manages might be willing to take more risky positions in the portfolios of funds that are not doing well since he has little to lose in doing so. On the other hand, the

most obvious benefit from managing several funds is the extended network the manager might have access to.

In order to evaluate the effect of manager characteristics on portfolio composition and risk, we estimate each fund portfolio characteristic using OLS equations (3), (4), and (5), where the dependent variables are as follows: portfolio turnover, number of securities in the portfolio, percentage of assets invested in the top 10 holdings, percentage of assets invested in cash, standard deviation of monthly returns, market beta, market beta from the four-factor model, SMB beta, HML beta, and UMD beta. Specifically, we estimate:

$$\begin{aligned}\text{Fund Characteristic}_{i,t} = a + b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + b_3(MBA_{i,t}) \\ + b_4(CFA_{i,t}) + b_5(Others_{i,t}) + b_6(Tenure_t) + b_7(SAT_{i,t}/100) \\ + \sum_n b_n I_{i,t} + b_8(Log\_Assets_{i,t}) + \varepsilon_{i,t}\end{aligned} \quad , \tag{3}$$

$$\begin{aligned}\text{Fund Characteristic}_{i,t} = a + b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + b_3(MBAorCFA_{i,t}) \\ + b_4(Others_{i,t}) + b_5(Tenure_t) + b_6(SAT_{i,t}/100) \\ + \sum_n b_n I_{i,t} + b_7(Log\_Assets_{i,t}) + \varepsilon_{i,t}\end{aligned} \quad , \tag{4}$$

$$\begin{aligned}\text{Fund Characteristic}_{i,t} = a + b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + \sum_k b_k BW_{i,t} \\ + b_3(Others_{i,t}) + b_4(Tenure_t) + b_5(SAT_{i,t}/100) \\ + \sum_n b_n \times I_{i,t} + b_6(Log\_Assets_{i,t}) + \varepsilon_{i,t}\end{aligned} \quad , \tag{5}$$

where *i* is the fund index, *Gender* is a dummy variable that takes the value of one if the manager is male and zero otherwise, *Age/10* is the manager's age divided by 10, *MBA* and *CFA* are dummy variables denoting whether the manager has an MBA or a CFA designation, respectively, *Others* is a dummy variable that takes the value of one if the managers works for multiple funds, and *SAT/100* is the average SAT score of the undergraduate institution the manager attended divided by 100. The variable *MBAorCFA* takes the value of one if the manager has either an MBA or a CFA and zero otherwise. The intuition behind this last variable is that the business- (and finance-) specific education an MBA and a CFA provide are similar and therefore people that have either might behave similarly. The set of *BW* dummy variables (BW1 to BW5)is a set of dummies that take the value of one if the managers attended an MBA program of the respective quality ranking. The set of *I* dummy variables (I1 to I3) accounts for differences in the prospectus objectives of each fund. These dummy variables rake the value of one if a fund has the respective prospectus objective, and zero otherwise. I1 corresponds to the "Growth and Income" objective, I2 corresponds to the "Growth" objective, and I3 corresponds to the "Aggressive Growth" objective. "Equity-Income" is the omitted prospectus objective category.

To evaluate the effect of manager characteristics on portfolio performance we estimate three logit models for each performance measure described in Section 4.3.2. We take all the single-manager funds and rank them in performance quartiles. We then investigate how manager characteristics affect the probability of a fund being in the top performance quartile. Specifically, we estimate and report results for the following three models:

$$\text{Prob(TopQuartile)}_{i,t} = F\Big(b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + b_3(MBA_{i,t}) + b_4(CFA_{i,t}) + b_5(Others_{i,t}) + b_6(Tenure_t) + b_7(SAT_{i,t}/100) + b_8(Log\_Assets_{i,t}) + \varepsilon_{i,t}\Big), \quad (6)$$

$$\text{Prob(TopQuartile)}_{i,t} = F\Big(b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + b_3(MBAorCFA_{i,t}) + b_4(Others_{i,t}) + b_5(Tenure_t) + b_6(SAT_{i,t}/100) + b_7(Log\_Assets_{i,t}) + \varepsilon_{i,t}\Big), \quad (7)$$

$$\text{Prob(TopQuartile)}_{i,t} = F\Big(b_1(Gender_{i,t-1}) + b_2(Age_{i,t}/10) + \sum_k b_k BW_{i,t} + b_3(Others_{i,t}) + b_4(Tenure_t) + b_5(SAT_{i,t}/100) + b_6(Log\_Assets_{i,t}) + \varepsilon_{i,t}\Big), \quad (8)$$

where all independent variable definitions are the same as in OLS regressions (3) to (5).

2.3.2 Results

Tables 2.4 though 2.7, present results of the regression for single managers and reveal a number of interesting findings that can be compared and contrasted with previous literature.

Table 2.4, panels A to D present the results for turnover, number of securities held in the portfolio, and percentage of the fund's assets invested in the top 10 holdings and in cash, respectively. In panel A we find that the manager's age, tenure, and employment in other funds significantly affect turnover, though significance varies with underlying market conditions. Specifically, unlike Chevalier and Ellison (1999) and Gottesman and Morey (2005), we find that older managers turn their portfolio over less often than younger managers, who prove to be more active traders; the coefficient on the age

variable is around -9 for the full sample period, depending on the model specification, and is significant at the 1% level, whereas the coefficient for older managers is higher for the bear market period (coefficient ranging from -11.391 for the first specification of the model to -13.545 for the third specification) and still statistically significant at the 1% level.

However, similar to Gottesman and Morey (2005), we find that manager tenure has a significantly negative effect on turnover and that this is true across all sample periods; a manager with ten more years of tenure is expected to have almost 22% lower turnover. With respect to employment in other funds, we find that managers who work for multiple funds turn their portfolio over more, but this is true only during the bear market period. Our findings for the MBA dummy variable are consistent with past research. In line with Chevalier and Ellison (1999), whose study focuses on a bull market period, we do not find a significant relationship between an MBA degree and turnover in the first subperiod, whereas we do find a positive and significant relationship during the bear market period, confirming Gottesman and Morey's (2005) results. We also find that higher turnover is associated with MBA degrees from lower-ranked institutions. This result is also consistent with Gottesman and Morey (2005), who find that managers from top-ranked MBA programs tend to record lower turnover.

Panel B shows that in terms of number of security holdings in the portfolio, age again seems to have an effect. Older managers have more concentrated holdings, especially during bad market conditions. The opposite holds for managers with MBA degrees -- they significantly hold more securities in the portfolios, especially in the second subperiod (coefficient of 21.738, significant at the 1% level). However, this is not

true for all managers with MBA degrees. Results from the third specification of our regression indicate that managers from top business schools hold more securities (coefficient of 31.186 for managers from the top 10 business schools), while the coefficients for managers from third-tier and unranked schools are not significant at any level.

In panel C, managers with MBA degrees also have less concentrated holdings in their top 10 holdings, which seems to be true for all MBAs, and the same holds for managers with a CFA designation; the coefficient for both dummy variables is negative and significant at the 1% level for all model specifications and sample periods. In contrast, managers with longer tenure behave in the opposite way; the coefficient of the tenure variable is positive and highly significant in all regressions.

Finally, in Panel D, we find that long-tenured managers hold more cash in their portfolio, especially in the bull market period. Managers for high-SAT institutions exhibit the same behavior. There is no relationship between percentage of assets invested in cash and either of these variables for the 2001 to 2004 period.

Previous literature finds a relationship between risk and manager characteristics such as age and MBA education. Table 2.5 reports results for the standard deviation of fund returns and portfolio beta. Focusing on the standard deviation of returns, the only significant variable is manager tenure. In particular, managers that have been working with the fund for a long time exhibit a lower standard deviation of returns during the bull market. There is no significant relationship for the relatively bearish period of 2001 to 2004. In terms of market beta, both Golec (1996) and Chevalier and Ellison (1999) find that managers with an MBA hold more systematic risk. Gottesman and Morey (2005) do

not find any such relationship. Our results are similar to Gottesman and Morey (2005), as we do not find any relationship between quality of education (MBA, CFA, and SAT score) and systematic risk. We do find, however, that older managers hold less systematic risk during a bear market. We also find a negative coefficient on tenure for the whole sample period, especially for the bull market period of 1997 to 2000. In summary, we find that managers that have been with a fund for a long time take on less risk, probably to minimize the probability of losing their position, though the result is not robust in the bear market period of 2001 to 2003.

Table 2.6 shows that our results provide some evidence of differences in terms of investment style. Older managers have higher HML factor weights. This result is significant at the 1% level for the bear market period. Depending on model specification the coefficient ranges from 0.055 (specification 1) to 0.061 (specification 2). Managers with an MBA also have higher HML factor weights, however, this result is due to managers from top business schools (coefficients around 0.10, significant at the 1% level). We do not find evidence of this relationship for managers that graduate from low-ranked business schools.

Performance results are presented in Table 2.7. We report the marginal change in probability instead of the logit estimates, as well as the odds ratio for each independent variable. Similar to Chevalier and Ellison (1999) we find that the most significant manager characteristic with a positive effect on performance is the SAT score of the undergraduate institution. The coefficient of the SAT variable in model specifications 1 and 2 is positive and significant at the 1% level when we use gross portfolio returns as the performance measure. When we account for market risk, the coefficient on SAT is

still positive, but significant only at the 5% level (p-value around 0.03) this time. Finally, using four-factor alpha as our performance variable we continue to obtain positive and significant coefficients, but significance decreases to the 10% level. The SAT variable is significant during both the full sample period and the bear market subperiod. These results are in line with Chevalier and Ellison (1999) and provide evidence that this relationship is present even during a bear market. When we repeat the analysis using the third model specification, in which we include the business school ranking, a very interesting result emerges: the SAT variable is no longer significant, though we the business school rankings dummies continue to show significance. More specifically, we find highly significant negative coefficients for the third-tier and unranked business school dummies for both the full sample period and the bear market subperiod, and a significant positive coefficient for the top 25 business school dummy during the bull market period in terms of four-factor alphas. Managers with an MBA from a third-tier school have 67% less chance of being in the top performance quartile than other managers (including those that do not have an MBA), while managers from unranked business schools have 56% less chance of being in the top performance quartile in terms of four-factor alphas. This result suggests that managers from top business schools perform better than managers from lower-ranked business schools, but not better than managers with no business education. Moreover, our results suggest that managers from low-ranked business schools also perform worse than non-MBAs. Gottesman and Morey (2005) find similar results for the 2000 to 2003 period.

The above results regarding SAT scores and the business school ranking dummies are not that surprising if we take into account the correlations reported in Table 2.3

between the SAT score and the business school ranking dummies. The correlation coefficient between the SAT score and the BW1 dummy is 0.331, and that between the SAT score and the BW5 dummy is -0.328. These correlations suggest that managers that graduate from high-SAT undergraduate institutions go to better business schools and in turn perform better than others. We cannot distinguish whether this superior performance is because these managers are smarter because they graduated from a high-SAT score institution or because they went to a better business school. Both could be the case. And of course other explanations may exist. For instance, managers with high SAT scores and with MBA degrees from top business schools might be hired by better investment companies with more resources and experience, leading in turn to superior performance.

In terms of other manager characteristics the only significant variable is manager gender. Male managers have a higher probability in being in the top performance quartile than women. This result is highly significant for one-factor and four-factor alphas, and for bearish market conditions. Note that we only find a positive and significant relationship during the 1997 to 2000 period when the one-factor alpha is the performance metric used.

In summary, we confirm a number of past findings and we provide several new insights on the role of manager characteristics in mutual fund performance. In terms of performance, we confirm Chevalier and Ellison's (1999) finding that the SAT score of a manager's undergraduate institution has a positive effect on performance, and we show that this result is robust to bear market conditions. Also, consistent with Gottesman and Morey (2005) we find that the quality of the business school matters, but we show that this variable is highly correlated with the SAT score, suggesting that managers with high

SAT scores are the same managers that attend highly ranked MBA programs. In addition, we find that male managers outperform female managers, especially during bad market conditions, and that managing multiple funds does not negatively (or positively) affect the manager's performance.

For robustness, we reestimate all models focusing on the effect manager characteristics have on the probability of the fund being in the worst performance quartile and find similar evidence. The only exception is the *Others* variable. Even though we do not find evidence that when the manager works for multiple funds the fund has a lower probability of being in the top 25%, we do find evidence that a manager working in multiple funds increases the probability that a given fund will be in the worst performance quartile.

4. Robustness Checks

When we perform our analysis for single-manager characteristics, we exclude a significant number of managers because we do not have information about their age. However, for many of them other characteristics information is available. As reported in Table 2.4, if we disregard the manager age variable we have complete information for 72% of managers. In terms of management team-years, disregarding the age variable would lead to complete data for 84% of all management team-years in our data set. To investigate whether our results change when we utilize this larger data set, we reestimate all models, this time dropping the age variable from all regressions. We find that all our results regarding the other manager characteristics are similar. In particular, we obtain slightly different coefficients, but the sign and significance levels are unchanged.

We also perform an additional check. In all our logit regressions we rank the funds by performance quartile and then estimate logit models in which the probability of a fund belonging to the best (or worst) performance quartile is the dependent variable. To determine whether the results are sensitive to our choice of performance categories, we reestimate all logit models, but this time we rank the funds in performance terciles and quintiles. In each case, the results are very similar to those that obtain when we use quartiles. We do not see major changes in the significance and sign of the relationships for any of our results.

5. Summary and Conclusions

In this paper, we study the effect of the structure and characteristics of mutual fund portfolio management teams on mutual fund portfolio formation, risk, and performance. We build a unique data set that contains information about the management teams of more than 2,000 distinct mutual fund portfolios and 1,200 mutual fund managers. Our analysis consists of three parts. We first focus on sole-managed funds and relate individual manager characteristics to risk taking, investment style, and performance. We then compare the performance and portfolio characteristics of team-managed and sole-manager funds. Finally, we examine team-level characteristics of team-managed funds. We conduct our analysis over the 1997 to 2004 period and also for the two 1997 to 2000 and 2001 to 2004) subperiods to determine whether the full-sample results are robust to differing market conditions (bull and bear markets).

We find that single-manager characteristics can explain differences in risk taking and investment style. For instance, portfolios of long-tenured and older managers exhibit

higher levels of turnover, whereas managers with MBA degrees, especially graduates of highly ranked business schools, turn their portfolios over less frequently during the relatively bearish 2000 to 2004 period. Managers with MBA degrees also hold more stocks in their portfolios and invest a smaller part of the fund's assets in their top holdings. The opposite is true for older managers.

We fail to confirm Golec's (1996) and Chevalier and Ellison's (1999) findings that MBAs hold more systematic (beta) risk. Instead, we find that long-tenured managers are associated with lower beta portfolios. In terms of performance we obtain some interesting findings. We confirm Chevalier and Ellison (1999), who report that managers that attend an undergraduate institution with a high average SAT score outperform even during a bear market. However, we show that this is mainly because those managers attend more prestigious MBA programs; the SAT variable is positively correlated with the BW1 dummy and negatively correlated with the BW4 and BW5 dummies. One possible explanation for these findings is that high-SAT managers that attend top-ranked MBA programs are smarter, receive a better education, and enjoy a better network of connections. Of course it could be the case that those managers are hired by better management companies with more resources and experience in portfolio management.

APPENDIX 2.

TABLES OF ESSAY 2

Table 2.1
Manager Characteristics

This table summarizes the characteristics of mutual fund managers in the first (1997) and the last (2004) year of our sample period.

	1997		2004	
	Single Managers		Single Managers	
	N	(%)	N	(%)
Funds with Complete Manager Information	381		344	
Managers managing the above funds	311	100%	241	100%
Managers with CFA designation	166	53%	123	51%
Managers with MBA	196	63%	146	61%
MBA (Rankcode=1)	81	26%	65	27%
MBA (Rankcode=2)	37	12%	23	10%
MBA (Rankcode=3)	30	10%	20	8%
MBA (Rankcode=4)	4	1%	5	2%
MBA (Rankcode=5)	44	14%	33	14%
Managers with other Masters	20	6%	23	10%
Managers with J.D. degree	8	3%	5	2%
Managers with Ph.D.	9	3%	6	2%
Average Manager Age	47.13	-	47.76	-
Average Manager Tenure	5.98	-	6.28	-
Average SAT Score	632.23	-	639.59	-
Number of Male Managers	288	93%	216	90%
Number of Female Managers	23	7%	25	10%
Managers Managing Other Funds	142	46%	135	56%

Table 2.2
Descriptive Statistics of Characteristics Variables

This table presents summary statistics of manager-level variable for the 2,660 single manager-years for sole-managed funds. GENDER is a dummy variable that takes the value of 1 if the manager is male and 0 otherwise. Age is the managers age in years. MBA is a dummy variable which takes the value of 1 if the manager has an MBA. CFA takes the value of one if the manager has a CFA designation and o otherwise. Others is a dummy variable that takes the value of 1 if the manager works for other funds at the same time and 0 if he only is employed by one fund. Tenure is the manager's tenure with the fund in years. SAT is the average SAT score of the manager's undergraduate institution. The five business school rankings variables are dummy variables taking the value of 1 if the manager's graduate school belongs to the corresponding ranking and 0 otherwise.

Varriable Name	N	Mean	Std Deviation	Minimum	Maximum
GENDER (1=Male)	2660	0.9113	0.2844	0	1
Age	2660	47.7192	9.3627	26	84
MBA (1=has MBA)	2660	0.6361	0.4812	0	1
CFA (1=has CFA)	2660	0.5526	0.4973	0	1
Others (1=managers other funds)	2660	0.6462	0.4782	0	1
Tenure	2660	6.0852	5.1037	0.1667	25.9167
SAT	2660	640.7871	71.0796	412.5	745
Gr. School Rank (1-10)	2660	0.2842	0.4511	0	1
Gr. School Rank (11-25)	2660	0.1000	0.3001	0	1
Gr. School Rank (second-tier)	2660	0.0917	0.2887	0	1
Gr. School Rank (third-tier)	2660	0.0218	0.1461	0	1
Gr. School Rank (unranked)	2660	0.1383	0.3453	0	1

Table 2.3
Correlation matrix of manager characteristics variables

This table presents the correlation coefficients of all manager characteristics variables for all 2,660 manager-years of sole-managed funds. Correlation coefficients signicant at the 5% level or better are boldfaced.

Variables		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
[1]	Male	1.000											
[2]	Age/10	**0.076**	1.000										
[3]	MBA	0.032	-0.018	1.000									
[4]	CFA	**-0.067**	**-0.088**	**0.063**	1.000								
[5]	MBA or CFA	**-0.047**	**-0.149**	**0.612**	**0.522**	1.000							
[6]	BW1	0.014	**0.039**	**0.480**	**-0.048**	**0.294**	1.000						
[7]	BW2	-0.019	**-0.108**	**0.249**	0.018	**0.153**	**-0.204**	1.000					
[8]	BW3	**0.051**	-0.004	**0.242**	**0.119**	**0.148**	**-0.198**	**-0.103**	1.000				
[9]	BW4	**-0.109**	**0.053**	**0.116**	**0.073**	**0.071**	**-0.095**	**-0.049**	**-0.048**	1.000			
[10]	BW5	**0.046**	-0.003	**0.308**	0.003	**0.188**	**-0.252**	**-0.131**	**-0.127**	**-0.061**	1.000		
[11]	Others	-0.022	**0.083**	0.020	**0.106**	**0.121**	**0.019**	**-0.108**	-0.021	**0.086**	**0.077**	1.000	
[12]	Tenure	**0.111**	**0.476**	-0.023	0.002	**-0.062**	**0.049**	**-0.062**	-0.028	-0.003	-0.019	**0.053**	1.000
[13]	SAT/100	0.029	0.006	-0.006	-0.002	-0.002	**0.331**	-0.007	**-0.086**	**-0.078**	**-0.328**	-0.011	**0.091**

Table 2.4
Regressions of Fund Characteristics on Manager Characteristics

This table presents results from OLS regressions (3), (4), and (5). In panels A, B, C, and D, the dependent variable is turnover over the course of the year, the number of securities in the portfolio, the percentage of portfolio assets invested in the top 10 holdings, and the percentage of portfolio assests invested in cash, respectively. *Gender* is a dummy variable that takes the value of one if the manager is male and zero otherwise. *Age/10* is the managers age in years divided by 10. *MBA* is a dummy variable that takes the value of one if the manager has an MBA. *CFA* takes the value of one if the manager has a CFA designation and 0 otherwise. *MBAorCFA* is a dummy variable that takes the value of one of the manager has either an MBA or a CFA designation and zero otherwise. *Others* is a dummy variable that takes the value of one if the manager works for multiple funds at the same time and zero if he only is employed by one fund. *Tenure* is the manager's tenure with the fund in years. *SAT/100* is the average SAT score of the manager's undergraduate institution divided by 100. The five business school ranking variables are dummy variables that take the value of one if the manager's graduate school belongs to the corresponding ranking and zero otherwise. *Log of Assets* is the log of the fund's average total net assets over the course of the year. *I1* to *I3* control for the fund's prospectus objective. Time dummies are included in the regressions but their coefficients are not reported. Results significant at the 10% level or better are boldfaced and *p*-values appear in parentheses. Clustered standard errors by fund are estimated.

Panel A: Turnover is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender	-2.546	-2.009	-0.688	7.475	7.643	8.629	-10.865	-9.352	-8.306
	(0.711)	(0.765)	(0.919)	(0.337)	(0.324)	(0.281)	(0.242)	(0.299)	-0.372
Age/10	**-9.564**	**-9.016**	**-10.159**	**-7.772**	**-7.517**	**-7.836**	**-12.838**	**-11.391**	**-13.545**
	(0.006)	(0.007)	(0.003)	(0.031)	(0.037)	(0.030)	(0.009)	(0.014)	(0.007)
MBA	3.592			-7.608			**16.476**		
	(0.569)			(0.282)			(0.043)		
CFA	1.178			-5.514			8.368		
	(0.840)			(0.390)			(0.281)		
MBAorCFA		11.145			-4.773			**27.036**	
		(0.132)			(0.594)			(0.002)	

Table 2.4 (cont.)

BW1			2.647 (0.706)			-0.996 (0.905)			5.656 (0.510)
BW2			-0.459 (0.958)			**-17.201** (0.042)			19.286 (0.165)
BW3			0.406 (0.969)			**-18.244** (0.031)			22.707 (0.240)
BW4			**40.460** (0.083)			-1.418 (0.938)			**75.471** (0.016)
BW5			5.115 (0.598)			-7.766 (0.468)			**21.883** (0.098)
Others	**11.611** (0.011)	**10.689** (0.021)	**10.758** (0.019)	**12.993** (0.017)	**12.618** (0.023)	**12.069** (0.030)	9.191 (0.164)	7.454 (0.264)	8.906 (0.165)
Tenure	**-2.260** (0.000)	**-2.261** (0.000)	**-2.244** (0.000)	**-2.345** (0.000)	**-2.345** (0.000)	**-2.340** (0.000)	**-2.096** (0.024)	**-2.133** (0.019)	**-1.994** (0.031)
SAT/100	-2.969 (0.418)	-2.946 (0.423)	-2.000 (0.589)	-0.920 (0.817)	-0.883 (0.825)	-2.471 (0.563)	-5.146 (0.304)	-4.737 (0.350)	-0.449 (0.927)
I1	**10.387** (0.082)	**10.926** (0.074)	9.155 (0.126)	**11.338** (0.053)	**12.189** (0.041)	**11.047** (0.064)	11.229 (0.265)	11.067 (0.274)	8.114 (0.410)
I2	**39.920** (0.000)	**40.231** (0.000)	**38.375** (0.000)	**40.522** (0.000)	**41.764** (0.000)	**39.105** (0.000)	**39.694** (0.000)	**39.378** (0.000)	**38.139** (0.000)
I3	**73.686** (0.000)	**73.983** (0.000)	**69.215** (0.000)	**74.281** (0.000)	**75.608** (0.000)	**73.314** (0.000)	**72.945** (0.000)	**72.123** (0.000)	**63.684** (0.000)

Table 2.4 (cont.)

Log of Assets	**-5.854**	**-5.994**	**-5.893**	**-4.861**	**-4.924**	**-4.981**	**-6.704**	**-6.785**	**-6.222**
	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.000)	(0.000)	(0.001)
Incercept	**163.994**	**155.567**	**161.766**	**134.299**	**128.176**	**142.828**	**197.934**	**181.791**	**168.968**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1249	0.1267	0.1291	0.1394	0.1365	0.1445	0.1225	0.1251	0.1354

Panel B: Number of Securities in the portfolio is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	1.843	3.795	3.739	-5.494	-4.726	-3.644	8.662	**12.371**	**10.201**
	(0.719)	(0.459)	(0.471)	(0.490)	(0.554)	(0.650)	(0.115)	(0.026)	(0.083)
Age/10	**-9.175**	**-7.985**	**-8.658**	**-8.053**	**-7.686**	**-8.535**	**-10.309**	**-7.513**	**-8.728**
	(0.002)	(0.008)	(0.003)	(0.035)	(0.052)	(0.026)	(0.001)	(0.017)	(0.006)
MBA	**11.842**			3.353			**21.738**		
	(0.011)			(0.562)			(0.000)		
CFA	-8.752			-6.276			**-12.972**		
	(0.102)			(0.317)			(0.034)		
MBAorCFA		5.650			-1.486			12.787*	
		(0.352)			(0.841)			(0.072)	

Table 2.4 (cont.)

BW1			**20.270**			**12.615**			**31.186**
			(0.002)			(0.086)			(0.000)
BW2			**18.701**			13.209			**26.669**
			(0.060)			(0.312)			(0.038)
BW3			9.231			-6.408			**27.548**
			(0.277)			(0.397)			(0.030)
BW4			1.117			10.906			-7.891
			(0.922)			(0.537)			(0.374)
BW5			-8.293			**-17.760**			1.238
			(0.130)			(0.010)			(0.867)
Others	-0.955	-2.589	-0.424	5.489	5.049	6.655	-9.555	**-13.299**	-10.398
	(0.849)	(0.627)	(0.935)	(0.366)	(0.422)	(0.288)	(0.121)	(0.044)	(0.113)
Tenure	-0.371	-0.485	-0.388	-0.317	-0.351	-0.232	-0.363	-0.691	-0.593
	(0.552)	(0.446)	(0.539)	(0.665)	(0.630)	(0.752)	(0.636)	(0.381)	(0.439)
SAT/100	5.455	5.266	0.332	2.977	2.921	-2.388	**7.799**	**7.559**	1.958
	(0.153)	(0.165)	(0.937)	(0.539)	(0.542)	(0.649)	(0.044)	(0.051)	(0.666)
I1	-15.155	-14.814	-12.850	-10.550	-10.359	-10.049	**-25.561**	**-24.946**	-20.808
	(0.105)	(0.115)	(0.158)	(0.263)	(0.266)	(0.278)	(0.066)	(0.080)	(0.124)
I2	-9.252	-8.265	-7.157	-6.097	-5.299	-6.008	-15.958	-14.469	-11.953
	(0.328)	(0.382)	(0.426)	(0.506)	(0.553)	(0.486)	(0.245)	(0.307)	(0.369)

Table 2.4 (cont.)

I3	2.638	5.542	7.318	8.839	11.211	8.105	-5.064	-2.523	5.108
	(0.853)	(0.701)	(0.608)	(0.541)	(0.439)	(0.576)	(0.777)	(0.892)	(0.776)
Log of Assets	**13.603**	**14.027**	**13.252**	**17.539**	**17.658**	**16.919**	**9.125**	**10.268**	**9.043**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Incercept	33.583	23.742	**57.231**	22.574	19.539	56.491	**53.511**	30.759	**73.347**
	(0.193)	(0.391)	(0.038)	(0.519)	(0.592)	(0.132)	(0.057)	(0.315)	(0.019)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1833	0.1761	0.1918	0.2459	0.2441	0.2592	0.1517	0.1315	0.1594

Panel C: Percentage of Assets invested in the Top 10 holdings is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	**2.021**	**1.991**	**2.318**	1.031	1.108	1.320	**2.397**	**2.159**	**2.643**
	(0.098)	(0.096)	(0.065)	(0.568)	(0.534)	(0.475)	(0.042)	(0.066)	(0.031)
Age/10	0.663	0.626	**0.869**	0.578	0.610	0.746	0.841	0.634	**1.079**
	(0.120)	(0.152)	(0.046)	(0.272)	(0.259)	(0.158)	(0.117)	(0.243)	(0.048)
MBA	**-2.327**			**-1.898**			**-3.244**		
	(0.008)			(0.063)			(0.002)		
CFA	**-2.492**			**-2.613**			**-2.000**		
	(0.003)			(0.008)			(0.045)		

Table 2.4 (cont.)

MBAorCFA		**-3.518** (0.007)			**-3.313** (0.037)			**-3.943** (0.008)	
BW1			**-2.036** (0.083)			-1.390 (0.302)			**-3.350** (0.017)
BW2			-1.710 (0.186)			-2.024 (0.200)			-1.465 (0.362)
BW3			**-3.393** (0.004)			**-2.586** (0.064)			**-4.655** (0.001)
BW4			**-3.671** (0.020)			**-3.359** (0.076)			**-3.864** (0.053)
BW5			**-3.072** (0.018)			**-2.848** (0.066)			**-3.751** (0.013)
Others	-0.557 (0.471)	-0.548 (0.487)	-0.787 (0.312)	-1.201 (0.200)	-1.225 (0.201)	-1.389 (0.149)	0.782 (0.415)	0.944 (0.323)	0.599 (0.526)
Tenure	**0.409** (0.000)	**0.403** (0.000)	**0.393** (0.000)	**0.469** (0.000)	**0.463** (0.001)	**0.466** (0.001)	**0.297** (0.016)	**0.302** (0.015)	**0.279** (0.023)
SAT/100	-0.047 (0.928)	-0.051 (0.921)	-0.296 (0.618)	0.947 (0.120)	0.975 (0.118)	0.640 (0.369)	-1.005 (0.103)	**-1.045** (0.097)	-1.121 (0.109)
I1	1.701 (0.184)	1.904 (0.141)	2.059 (0.118)	0.823 (0.597)	0.996 (0.519)	1.048 (0.502)	**2.986** (0.045)	**3.234** (0.034)	**3.447** (0.026)
I2	**4.080** (0.000)	**4.493** (0.000)	**4.556** (0.000)	**3.784** (0.007)	**4.237** (0.002)	**4.137** (0.002)	**4.968** (0.000)	**5.297** (0.000)	**5.528** (0.000)

Table 2.4 (cont.)

I3	**4.242**	**4.775**	**5.129**	**4.646**	**5.324**	**5.519**	**3.955**	**4.309**	**4.684**
	(0.014)	(0.006)	(0.004)	(0.025)	(0.011)	(0.009)	(0.061)	(0.042)	(0.029)
Log of Assets	**-0.937**	**-0.903**	**-0.920**	**-1.647**	**-1.614**	**-1.662**	-0.239	-0.244	-0.182
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.378)	(0.347)	(0.515)
Incercept	**31.096**	**30.876**	**29.853**	**31.802**	**30.961**	**31.263**	**29.942**	**31.134**	**27.694**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1128	0.1046	0.1041	0.1829	0.1753	0.1735	0.0853	0.0755	0.0817

Panel D: Percentage of the assets invested in cash is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	**-1.085**	**-1.027**	**-1.009**	**-1.414**	**-1.306**	**-1.261**	-0.839	-0.844	-0.851
	(0.059)	(0.071)	(0.076)	(0.040)	(0.057)	(0.065)	(0.270)	(0.275)	(0.270)
Age/10	-0.099	-0.062	0.001	-0.204	-0.136	-0.115	0.132	0.124	0.216
	(0.577)	(0.729)	(0.993)	(0.387)	(0.569)	(0.628)	(0.589)	(0.603)	(0.359)
MBA	-0.147			0.054			-0.443		
	(0.676)			(0.899)			(0.318)		
CFA	**-0.754**			**-0.960**			-0.579		
	(0.016)			(0.011)			(0.175)		

Table 2.4 (cont.)

MBAorCFA		-0.322 (0.510)			-0.143 (0.810)			-0.587 (0.354)	
BW1			-0.217 (0.624)			0.157 (0.755)			-0.505 (0.391)
BW2			0.923 (0.146)			1.110 (0.181)			0.305 (0.668)
BW3			**-1.107** (0.008)			**-1.113** (0.038)			**-1.274** (0.038)
BW4			**-1.218** (0.064)			-1.031 (0.346)			**-1.557** (0.020)
BW5			-0.160 (0.729)			-0.260 (0.690)			-0.241 (0.648)
Others	**0.560** (0.091)	0.493 (0.131)	0.536 (0.113)	**0.990** (0.021)	**0.901** (0.034)	**0.990** (0.026)	0.152 (0.751)	0.133 (0.775)	0.106 (0.822)
Tenure	**0.087** (0.075)	**0.083** (0.091)	**0.081** (0.091)	**0.154** (0.024)	**0.150** (0.027)	**0.148** (0.025)	-0.014 (0.734)	-0.017 (0.695)	-0.019 (0.659)
SAT/100	**0.478** (0.022)	**0.473** (0.024)	**0.432** (0.067)	**0.784** (0.006)	**0.776** (0.007)	**0.644** (0.026)	0.191 (0.422)	0.183 (0.453)	0.187 (0.530)
I1	0.363 (0.588)	0.437 (0.519)	0.513 (0.440)	0.879 (0.293)	0.955 (0.253)	0.997 (0.227)	-0.760 (0.261)	-0.687 (0.316)	0.599 (0.385)
I2	-0.044 (0.935)	0.087 (0.875)	0.153 (0.775)	0.131 (0.842)	0.284 (0.665)	0.289 (0.656)	-0.279 (0.649)	-0.177 (0.777)	-0.089 (0.884)

Table 2.4 (cont.)

I3	-0.945	-0.741	-0.578	-1.490*	-1.149	-1.104	-0.603	-0.489	-0.304
	(0.144)	(0.251)	(0.363)	(0.080)	(0.176)	(0.198)	(0.410)	(0.498)	(0.675)
Log of Assets	0.062	0.075	0.068	0.096	0.101	0.080	-0.008	0.002	0.010
	(0.534)	(0.439)	(0.496)	(0.494)	(0.468)	(0.572)	(0.943)	(0.981)	(0.922)
Incercept	2.484	1.918	1.665	0.858	0.025	0.674	4.001*	3.867	3.118
	(0.222)	(0.367)	(0.442)	(0.764)	(0.993)	(0.821)	(0.084)	(0.110)	(0.191)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.0233	0.0188	0.0262	0.0558	0.0492	0.0580	0.0115	0.0081	0.0139

Table 2.5
Fund risk and manager characteristics

This table presents results from the OLS regressions (3), (4) and (5). Panel A presents results when standard deviation of monthly returns over the course of the year is the dependent variable. In panel B the beta from the market model is the dependent variable. In Panels C the market beta from the 4-factor model is the dependent variable. *GENDER* is a dummy variable that takes the value of 1 if the manager is male and 0 otherwise. Age/10 is the managers age in years divided by 10. *MBA* is a dummy variable which takes the value of 1 if the manager has an MBA. *CFA* takes the value of one if the manager has a CFA designation and o otherwise. *MBAorCFA* is a dummy variable that takes the value of 1 of the manager has either an MBA or a CFA designation and 0 otherwise. *Others* is a dummy variable that takes the value of 1 if the manager works for other funds at the same time and 0 if he only is employed by one fund. Tenure is the manager's tenure with the fund in years. *SAT/100* is the average SAT score of the manager's undergraduate institution divided by 100. The five business school rankings variables are dummy variables taking the value of 1 if the manager's graduate school belongs to the corresponding ranking and 0 otherwise. Log of assets is the log of the fund average total net assets over the course of the year. *I1-I3* control for the fund's prospectus objective. Time dummies are included in the regressions but their coefficients are not reported. Results significant at the 10% significance level or better are boldfaced. P-values appear in parentheses. Clustered standard errors by fund are estimated.

Panel A: Standard Deviation of Monthly Returns is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	**0.339**	**0.331**	**0.291**	0.217	0.209	0.182	0.266	0.251	0.216
	(0.048)	(0.047)	(0.083)	(0.262)	(0.278)	(0.344)	(0.157)	(0.174)	(0.249)
Age/10	-0.043	-0.043	-0.037	0.039	0.043	0.049	-0.106	-0.115	-0.103
	(0.566)	(0.568)	(0.619)	(0.671)	(0.641)	(0.588)	(0.264)	(0.229)	(0.276)
MBA	-0.130			**-0.290**			-0.089		
	(0.382)			(0.087)			(0.597)		
CFA	0.004			-0.021			0.079		
	(0.975)			(0.885)			(0.607)		

Table 2.5 (cont.)

MBAorCFA		0.054 (0.768)			-0.026 (0.903)			0.065 (0.777)	
BW1			-0.234 (0.155)			-0.323 (0.110)			**-0.314** (0.079)
BW2			-0.261 (0.184)			**-0603** (0.002)			0.029 (0.924)
BW3			0.227 (0.340)			-0.107 (0.617)			0.488 (0.154)
BW4			**-0.522** (0.046)			**-0.792** (0.025)			-0.218 (0.508)
BW5			-0.012 (0.953)			-0.065 (0.803)			-0.029 (0.901)
Others	0.057 (0.635)	0.051 (0.672)	0.052 (0.665)	**0.248** (0.061)	**0.239** (0.075)	**0.225*** (0.092)	0.099 (0.544)	0.108 (0.512)	0.134 (0.415)
Tenure	**-0.031** (0.013)	**-0.030** (0.014)	**-0.031** (0.011)	**-0.047** (0.001)	**-0.046** (0.001)	**-0.048** (0.001)	-0.021 (0.179)	-0.019 (0.199)	-0.019 (0.201)
SAT/100	-0.035 (0.650)	-0.032 (0.671)	0.008 (0.914)	-0.098 (0.299)	-0.098 (0.308)	-0.055 (0.586)	0.029 (0.728)	0.034 (0.691)	0.097 (0.296)
I1	**0.527** (0.000)	**0.545** (0.000)	**0.527** (0.000)	**0.541** (0.000)	**0.567** (0.000)	**0.540** (0.000)	**0.523** (0.001)	**0.531** (0.001)	**0.513** (0.002)
I2	**1.447** (0.000)	**1.463** (0.000)	**1.469** (0.000)	**1.909** (0.000)	**1.929** (0.000)	**1.915** (0.000)	**1.116** (0.000)	**1.121** (0.000)	**1.132** (0.000)

Table 2.5 (cont)

I3	**3.238**	**3.239**	**3.278**	**4.190**	**4.180**	**4.243**	**2.353**	**2.346**	**2.331**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	0.029	0.023	0.036	-0.028	-0.034	-0.019	0.042	0.034	0.053
	(0.373)	(0.471)	(0.270)	(0.459)	(0.366)	(0.623)	(0.318)	(0.398)	(0.202)
Incercept	**4.232**	**4.121**	**3.918**	**4.999**	**4.817**	**4.647**	**3.693**	**3.681**	**3.227**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.0966	0.0960	0.0999	0.1967	0.1934	0.2011	0.0523	0.0519	0.0588

Panel B: Market Beta is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	0.007	0.007	0.003	-0.022	-0.022	-0.026	0.034	0.035	0.030
	(0.759)	(0.780)	(0.910)	(0.496)	(0.486)	(0.421)	(0.237)	(0.227)	(0.310)
Age/10	**-0.017**	**-0.017**	**-0.018**	0.002	0.003	0.003	**-0.040**	**-0.039**	**-0.042**
	(0.092)	(0.103)	(0.080)	(0.878)	(0.831)	(0.810)	(0.002)	(0.003)	(0.002)
MBA	-0.011			-0.034			0.014		
	(0.566)			(0.141)			(0.538)		
CFA	0.008			-0.002			0.023		
	(0.630)			(0.942)			(0.285)		

Table 2.5 (cont.)

MBAorCFA		0.024 (0.351)			0.004 (0.896)			0.044 (0.154)	
BW1			-0.022 (0.330)			-0.044 (0.146)			-0.013 (0.624)
BW2			-0.039 (0.155)			**-0.081** (0.011)			0.019 (0.612)
BW3			0.046 (0.200)			0.003 (0.929)			**0.107** (0.038)
BW4			-0.020 (0.675)			**-0.072** (0.054)			0.040 (0.616)
BW5			-0.003 (0.921)			-0.001 (0.959)			0.008 (0.802)
Others	0.005 (0.744)	0.004 (0.800)	0.005 (0.764)	0.016 (0.446)	0.014 (0.496)	0.012 (0.573)	-0.007 (0.747)	-0.008 (0.707)	-0.001 (0.959)
Tenure	**-0.006** (0.001)	**-0.006** (0.002)	**-0.006** (0.001)	**-0.010** (0.000)	**-0.010** (0.000)	**-0.010*** (0.000)	-0.002 (0.523)	-0.002 (0.553)	-0.001 (0.594)
SAT/100	-0.002 (0.820)	-0.002 (0.844)	0.003 (0.826)	-0.023 (0.139)	-0.022 (0.140)	-0.015 (0.383)	0.014 (0.274_	0.014 (0.241)	0.021 (0.105)
I1	**0.109** (0.000)	**0.112** (0.000)	**0.107** (0.000)	**0.136** (0.000)	**0.139** (0.000)	**0.135** (0.000)	**0.085** (0.001)	**0.085** (0.001)	**0.080** (0.005)
I2	**0.319** (0.000)	**0.321** (0.000)	**0.319** (0.000)	**0.382** (0.000)	**0.384** (0.000)	**0.383** (0.000)	**0.238** (0.000)	**0.237** (0.000)	**0.236** (0.000)

Table 2.5 (cont.)

I3	**0.578**	**0.577**	**0.577**	**0.724**	**0.723**	**0.730**	**0.416**	**0.414**	**0.406**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	0.0003	-0.001	0.001	0.003	0.002	0.005	-0.002	-0.003	-0.001
	(0.950)	(0.878)	(0.835)	(0.571)	(0.676)	(0.433)	(0.750)	(0.602)	(0.867)
Incercept	**0.854**	**0.834**	**0.829**	**0.866**	**0.838**	**0.806**	**0.896**	**0.877**	**0.862**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1970	0.1973	0.2004	0.2994	0.2972	0.3042	0.1123	0.1132	0.1193

Panel C: Market Beta from the 4-factor model is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	0.011	0.013	0.007	0.007	0.007	0.002	0.020	0.021	0.015
	(0.470)	(0.410)	(0.689)	(0.779)	(0.759)	(0.947)	(0.320)	(0.265)	(0.441)
Age/10	**-0.017**	**-0.016**	**-0.018**	**-0.018**	**-0.017**	**-0.18**	**-0.018**	**-0.016**	**-0.019**
	(0.014)	(0.026)	(0.009)	(0.069)	(0.085)	(0.063)	(0.034)	(0.061)	(0.027)
MBA	0.017			0.017			0.019		
	(0.141)			(0.330)			(0.198)		
CFA	0.012			0.015			0.011		
	(0.297)			(0.359)			(0.434)		

Table 2.5 (cont.)

MBAorCFA		**0.040** (0.016)			**0.037** (0.088)			**0.048** (0.032)	
BW1			0.020 (0.211)			0.030 (0.208)			0.005 (0.758)
BW2			-0.005 (0.807)			-0.022 (0.385)			0.025 (0.417)
BW3			0.014 (0.452)			-0.008 (0.750)			0.045 (0.118)
BW4			-0.027 (0.236)			**-0.069** (0.008)			0.014 (0.679)
BW5			**0.041** (0.014)			**0.054** (0.025)			0.032 (0115)
Others	**0.022** (0.059)	**0.020** (0.090)	**0.022** (0.062)	0.012 (0.462)	0.010 (0.516)	0.012 (0.472)	**0.029** (0.047)	**0.026** (0.073)	**0.032** (0.032)
Tenure	**-0.003** (0.006)	**-0.004** (0.006)	**-0.004** (0.006)	**-0.004** (0.014)	**-0.003** (0.014)	**-0.004** (0.011)	-0.003 (0.102)	**-0.003** (0.095)	-0.002 (0.119)
SAT/100	-0.001 (0.935)	-0.001 (0.943)	0.002 (0.839)	0.007 (0.548)	0.007 (0.575)	0.009 (0.483)	-0.008 (0.336)	-0.007 (0.394)	-0.002 (0777)
I1	0.0370 (0.102)	**0.0380** (0.093)	0.035 (0.117)	0.038 (0.209)	0.037 (0.205)	0.035 (0.227)	0.039 (0.123)	0.041 (0.105)	0.037 (0.153)
I2	**0.117** (0.000)	**0.116** (0.000)	**0.113** (0.000)	**0.100** (0.000)	**0.098** (0.000)	**0.093** (0.001)	**0.131** (0.000)	**0.133** (0.000)	**0.130** (0.000)

Table 2.5 (cont.)

I3	**0.240**	**0.239**	**0.238**	**0.251**	**0.246**	**0.247**	**0.228**	**0.228**	**0.224**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	0.005	0.004	0.005	0.001	0.001	0.002	**0.009**	**0.009**	**0.10**
	(0.147)	(0.188)	(0.0145)	(0.814)	(0.895)	(0.693)	(0.014)	(0.015)	(0.011)
Incercept	**0.929**	**0.908**	**0.931**	**0.911**	**0.904**	**0.916**	**0.942**	**0.907**	**0.916**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Observations	2,660	2.660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.0741	0.0759	0.0762	0.0725	0.0732	0.0809	0.0785	0.0819	0.0799

Table 2.6
Investment style and manager characteristics

This table presents results from the OLS regression (3), (4) and (5). Panel A presents results when the SMB beta from the 4-factor model is the dependent variable. In panel B the HML beta from the 4-factor model is the dependent variable. In Panels C the UMD beta from the 4-factor model is the dependent variable. GENDER is a dummy variable that takes the value of 1 if the manager is male and 0 otherwise. Age/10 is the managers age in years divided by 10. MBA is a dummy variable which takes the value of 1 if the manager has an MBA. CFA takes the value of one if the manager has a CFA designation and o otherwise. MBAor CFA is a dummy variable that takes the value of 1 of the manager has either an MBA or a CFA designation and 0 otherwise. Others is a dummy variable that takes the value of 1 if the manager works for other funds at the same time and 0 if he only is employed by one fund. Tenure is the manager's tenure with the fund in years. SAT/100 is the average SAT score of the manager's undergraduate institution divided by 100. The five business school rankings variables are dummy variables taking the value of 1 if the manager's graduate school belongs to the corresponding ranking and 0 otherwise. Log of assets is the log of the fund average total net assets over the course of the year. I1-I3 control for the fund's prospectus objective. Results significant at the 10% or better are boldfaced. P-values appear in parentheses. Clustered standard errors by fund are estimated.

Panel A: SMB Beta from the 4-factor model is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	**0.047**	**0.049**	**0.042**	**0.060**	**0.061**	0.052	0.034	0.038	0.033
	(0.068)	(0.049)	(0.103)	(0.098)	(0.085)	(0.143)	(0.308)	(0.249)	(0.324)
Age/10	**-0.025**	**-0.023**	**-0.025**	**-0.025**	**-0.024**	**-0.025**	-0.021	-0.018	**-0.024**
	(0.028)	(0.039)	(0.023)	(0.085)	(0.097)	(0.079)	(0.150)	(0.201)	(0.098)
MBA	0.025			0.024			0.025		
	(0.198)			(0.360)			(0.322)		
CFA	-0.003			0.002			-0.009		
	(0.840)			(0.932)			(0.695)		

Table 2.6 (cont.)

MBAorCFA		0.019 (0.482)			0.019 (0.603)			0.019 (0.568)	
BW1			**0.039** (0.098)			**0.058** (0.070)			0.017 (0.556)
BW2			-0.030 (0.344)			-0.017 (0.646)			-0.052 (0.253)
BW3			0.035 (0.383)			0.001 (0.979)			0.076 (0.207)
BW4			-0.031 (0.552)			**-0.154** (0.017)			0.072 (0.282)
BW5			0.037 (0.272)			0.025 (0.569)			0.050 (0.204)
Others	0.007 (0.718)	0.005 (0.811)	0.004 (0.839)	0.033 (0.184)	0.032 (0.196)	0.035 (0.153)	-0.023 (0.352)	-0.027 (0.290)	-0.030 (0.231)
Tenure	0.001 (0.786)	0.0004 (0.833)	0.001 (0.804)	0.001 (0.676)	0.001 (0.688)	0.001 (0.624)	-0.0004 (0.900)	-0.001 (0.815)	-0.001 (0.838)
SAT/100	-0.002 (0.825)	-0.003 (0.809)	-0.004 (0.759)	-0.007 (0.642)	-0.007 (0.627)	-0.016 (0.352)	0.0005 (0.975)	0.0003 (0.982)	0.008 (0.617)
I1	0.004 (0.878)	0.003 (0.888)	0.002 (0.917)	-0.0001 (0.997)	-0.001 (0.974)	-0.001 (0.965)	**0.005** (0.000)	**0.005** (0.000)	-0.003 (0.916)
I2	**0.174** (0.000)	**0.174** (0.000)	**0.172** (0.000)	**0.174** (0.000)	**0.173** (0.000)	**0.169** (0.000)	**0.174** (0.000)	**0.175** (0.000)	**0.168** (0.000)

Table 2.6 (cont.)

I3	**0.424**	**0.426**	**0.426**	**0.421**	**0.423**	**0.425**	**0.429**	**0.431**	**0.414**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	**-0.024**	**-0.024**	**-0.024**	**-0.023**	**-0.023**	**-0.022**	**-0.026**	**-0.025**	**-0.025**
	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
Incercept	**0.189**	**0.176**	**0.206**	0.186	0.185	**0.251**	0.195	0.170	0.161
	(0.055)	(0.075)	(0.044)	(0.160)	(0.168)	(0.073)	(0.115)	(0.167)	(0.201)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1189	0.1182	0.1223	0.1166	0.1161	0.1246	0.1256	0.1247	0.1323

Panel B: HML Beta from the 4-factor model is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	0.014	0.021	0.019	0.036	0.040	0.035	0.004	0.012	0.022
	(0.683)	(0.522)	(0.569)	(0.408)	(0.344)	(0.404)	(0.916)	(0.758)	(0.596)
Age/10	0.005	0.009	0.004	**-0.039**	**-0.038**	**-0.039**	**0.055**	**0.061**	**0.056**
	(0.716)	(0.549)	(0.772)	(0.042)	(0.052)	(0.039)	(0.001)	(0.000)	(0.001)
MBA	**0.073**			**0.086**			**0.051**		
	(0.004)			(0.011)			(0.086)		
CFA	-0.008			0.011			-0.028		
	(0.758)			(0.730)			(0.320)		

Table 2.6 (cont.)

MBAorCFA		0.028 (0.421)			0.052 (0.294)			0.006 (0.875)	
BW1			**0.109** (0.001)			**0.108** (0.000)			**0.106** (0.004)
BW2			**0.062** (0.061)			**0.086** (0.055)			0.030 (0.464)
BW3			-0.002 (0.965)			0.001 (0.991)			-0.019 (0.761)
BW4			0.073 (0.321)			0.007 (0.904)			0.112 (0.298)
BW5			**0.059** (0.092)			**0.114** (0.014)			-0.021 (0.616)
Others	0.004 (0.851)	0.001 (0.967)	0.003 (0.884)	0.009 (0.785)	0.008 (0.813)	0.011 (0.726)	-0.008 (0.765)	-0.014 (0.604)	-0.014 (0.610)
Tenure	**0.005** (0.051)	**0.005** (0.073)	**0.005** (0.049)	**0.008** (0.019)	**0.008** (0.021)	**0.008** (0.019)	0.001 (0.702)	0.001 (0.879)	0.001 (0.829)
SAT/100	0.019 (0.227)	0.019 (0.250)	0.008 (0.655)	0.012 (0.562)	0.011 (0.593)	0.009 (0.712)	0.029 (0.119)	0.029 (0.134)	0.006 (0.759)
I1	**-0.154** (0.000)	**-0.158** (0.000)	**-0.153** (0.000)	**-0.159** (0.000)	**-0.164** (0.000)	**-0.161** (0.000)	**-0.157** (0.000)	**-0.159** (0.000)	**-0.150** (0.000)
I2	**-0.355** (0.000)	**-0.358** (0.000)	**-0.360** (0.000)	**-0.389** (0.000)	**-0.395** (0.000)	**-0.399** (0.000)	**-0.318** (0.000)	**-0.318** (0.000)	**-0.317** (0.000)

Table 2.6 (cont.)

I3	**-0.552**	**-0.548**	**-0.554**	**-0.546**	**-0.543**	**-0.552**	**-0.541**	**-0.537**	**-0.528**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	-0.004	-0.002	-0.005	-0.006	-0.005	-0.006	-0.001	0.002	-0.004
	(0.535)	(0.770)	(0.391)	(0.477)	(0.538)	(0.462)	(0.844)	(0.783)	(0.586)
Incercept	0.070	0.067	0.154	**0.306**	**0.324**	**0.346**	-0.217	-0.241	-0.086
	(0.590)	(0.615)	(0.261)	(0.066)	(0.051)	(0.053)	(0.158)	(0.127)	(0.599)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.1154	0.1092	0.1200	0.1258	0.1190	0.1311	0.1245	0.1198	0.1344

Panel C: UMD Beta from the 4-factor model is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Gender	**-0.038**	**-0.038**	**-0.039**	**-0.052**	**-0.050**	**-0.059**	-0.025	-0.025	-0.029
	(0.047)	(0.048)	(0.044)	(0.080)	(0.090)	(0.096)	(0.271)	(0.271)	(0.211)
Age/10	-0.002	-0.001	-0.001	-0.0001	0.001	0.003	-0.005	-0.005	-0.008
	(0.842)	(0.921)	(0.911)	(0.992)	(0.891)	(0.758)	(0.563)	(0.603)	(0.381)
MBA	-0.004			-0.013			0.008		
	(0.770)			(0.477)			(0.612)		
CFA	-0.007			-0.026			0.013		
	(0.602)			(0.134)			(0.413)		

Table 2.6 (cont.)

MBAorCFA		0.007 (0.704)			-0.012 (0.632)			0.024 (0.211)	
BW1			-0.016 (0.335)			-0.022 (0.352)			-0.010 (0.617)
BW2			-0.022 (0.292)			-0.023 (0.385)			-0.021 (0.468)
BW3			-0.003 (0.875)			-0.023 (0.425)			0.028 (0.330)
BW4			0.002 (0.954)			-0.042 (0.242)			0.039 (0.380)
BW5			0.029 (0.158)			0.013 (0.654)			**0.049** (0.038)
Others	0.021 (0.108)	0.019 (0.142)	0.017 (0.195)	0.006 (0.730)	0.004 (0.825)	0.002 (0.929)	**0.033** (0.045)	**0.032** (0.050)	**0.031** (0.052)
Tenure	-0.0004 (0.765)	-0.0004 (0.757)	-0.001 (0.709)	-0.0001 (0.943)	-0.0002 (0.914)	-0.0004 (0.832)	-0.0004 (0.831)	-0.0004 (0.861)	-0.0002 (0.905)
SAT/100	-0.012 (0.157)	-0.012 (0.157)	-0.005 (0.606)	-0.018 (0.145)	-0.018 (0.146)	-0.013 (0.297)	-0.007 (0.448)	-0.007 (0.483)	0.004 (0.693)
I1	0.011 (0.554)	0.013 (0.494)	0.010 (0.611)	0.009 (0.723)	0.012 (0.647)	0.012 (0.657)	0.017 (0.375)	0.017 (0.370)	0.008 (0.660)
I2	**0.122** (0.000)	**0.125** (0.000)	**0.123** (0.000)	**0.146** (0.000)	**0.151** (0.000)	**0.151** (0.000)	**0.092** (0.000)	**0.092** (0.000)	**0.086** (0.000)

Table 2.6 (cont.)

I3	**0.233**	**0.236**	**0.232**	**0.240**	**0.248**	**0.253**	**0.215**	**0.214**	**0.198**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Log of Assets	-0.006	**-0.006**	-0.005	-0.002	-0.001	-0.001	**-0.008**	**-0.008**	-0.007
	(0.108)	(0.096)	(0.183)	(0.655)	(0.660)	(0.773)	(0.067)	(0.043)	(0.105)
Incercept	0.081	0.065	0.025	0.101	0.076	0.035	0.074	0.064	0.026
	(0.264)	(0.374)	(0.740)	(0.309)	(0.443)	(0.738)	(0.388)	(0.466)	(0.770)
Observations	2,660	2,660	2,660	1,372	1,372	1,372	1,288	1,288	1,288
R-Squared	0.0674	0.0672	0.0699	0.0735	0.0712	0.0731	0.0631	0.0636	0.0691

Table 2.7
Performance Logit Regressions

This table presents results from the logit regressions (6), (7) and (8). Panel A presents results when gross portfolio return is the performance metric used. In panel B the performance metric is the 1-factor market model alpha. In Panel C the 4-factor alpha is the performance metric. GENDER is a dummy variable that takes the value of 1 if the manager is male and 0 otherwise. Age/10 is the managers age in years divided by 10. MBA is a dummy variable which takes the value of 1 if the manager has an MBA. CFA takes the value of one if the manager has a CFA designation and o otherwise. MBAor CFA is a dummy variable that takes the value of 1 of the manager has either an MBA or a CFA designation and 0 otherwise. Others is a dummy variable that takes the value of 1 if the manager works for other funds at the same time and 0 if he only is employed by one fund. Tenure is the manager's tenure with the fund in years. SAT/100 is the average SAT score of the manager's undergraduate institution divided by 100. The five business school rankings variables are dummy variables taking the value of 1 if the manager's graduate school belongs to the corresponding ranking and 0 otherwise. Log of assets is the log of the fund average total net assets over the course of the year. I1-I3 control for the fund's prospectus objective. Time dummies are included in the regressions but their coefficients are not reported. Results significant at the 10% or better are boldfaced. P-values appear in parentheses. Numbers below the p-values are the log odds ratios for each independent variable. Clustered standard errors by fund are estimated.

Panel A: Portfolio gross return is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender	**0.0542**	**0.0552**	**0.0540**	0.0549	0.0523	0.0495	0.0498	0.0568	0.0581
	(0.079)	(0.071)	(0.081)	(0.182)	(0.204)	(0.242)	(0.261)	(0.180)	(0.181)
	1.37	1.37	1.37	1.38	1.35	1.33	1.33	1.39	1.40
Age/10	-0.0088	-0.0089	-0.0096	-0.0041	-0.0049	-0.0052	-0.0194	-0.0148	-0.0175
	(0.418)	(0.412	(0.363)	(0.779)	(0.735)	(0.714)	(0.246)	(0.362)	(0.288)
	0.95	0.95	0.95	0.98	0.97	0.97	0.90	0.92	0.90
MBA	-0.0043			**-0.0512**			0.0462		
	(0.833)			(0.044)			(0.118)		
	0.98			0.76			1.29		

Table 2.7 (cont.)

CFA	-0.0249 (0.211) 0.87			-0.0126 (0.602) 0.93			-0.0453 (0.124) 0.78		
MBAorCFA		-0.0319 (0.227) 0.85			-0.0464 (0.157) 0.79			-0.0197 (0.629) 0.90	
BW1			0.0350 (0.158) 1.20			-0.0206 (0.454) 0.89			**0.1004** (0.011) 1.68
BW2			**-0.0493** (0.083) 0.75			**-0.0859** (0.009) 0.59			-0.0043 (0.935) 0.97
BW3			0.0212 (0.569) 1.12			-0.0282 (0.507) 0.85			0.0801 (0.173) 1.49
BW4			-0.0932 (0.124) 0.55			**-0.1406** (0.019) 0.36			-0.0454 (0.638) 0.77
BW5			**-0.0694** (0.016) 0.67			**-0.0805** (0.023) 0.62			-0.0573 (0.220) 0.72
Others	-0.0177 (0.346) 0.91	-0.0177 (0.346) 0.91	-0.0179 (0.350) 0.91	-0.0116 (0.625) 0.94	-0.0103 (0.659) 0.95	-0.0100 (0.675) 0.95	-0.0187 (0.515) 0.90	-0.0247 (0.397) 0.88	-0.0243 (0.403) 0.88

Table 2.7 (cont.)

Tenure	-0.0003	-0.0005	-0.0004	-0.0046	-0.0046	-0.0043	**0.0053**	0.0045	0.0043
	(0.868)	(0.801)	(0.834)	(0.101)	(0.101)	(0.118)	(0.082)	(0.148)	(0.154)
	0.99	0.99	0.99	0.98	0.98	0.98	1.03	1.02	1.02
SAT/100	**0.0539**	**0.0538**	**0.0349**	**0.0574**	**0.0583**	**0.0463**	**0.0517**	**0.0496**	0.0231
	(0.000)	(0.000)	(0.018)	(0.000)	(0.000)	(0.010)	(0.013)	(0.017)	(0.311)
	1.34	1.34	1.21	1.36	1.36	1.29	1.32	1.31	1.13
Log of Assets	-0.0063	-0.0055	**-0.0077**	0.0043	0.0042	0.0037	**-0.0195**	**-0.0156**	**-0.0211**
	(0.148)	(0.203)	(0.079)	(0.440)	(0.450)	(0.501)	(0.004)	(0.018)	(0.002)
	0.97	0.97	0.96	1.02	1.02	1.02	0.90	0.92	0.89
Observations	2,571	2,571	2,571	1,289	1,289	1,289	1,282	1,282	1,282
Pseudo R-Squared	0.0099	0.0098	0.0153	0.0144	0.0127	0.0183	0.0179	0.0139	0.0254

Panel B: Portfolio gross 1-factor alpha is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender	**0.0873**	**0.0869**	**0.0854**	**0.0798**	**0.0779**	**0.0764**	**0.0913**	**0.0939**	**0.0933**
	(0.002)	(0.002)	(0.002)	(0.041)	(0.047)	(0.057)	(0.013)	(0.009)	(0.009)
	1.69	1.69	1.67	1.61	1.59	1.57	1.74	1.77	1.78
Age/10	-0.0152	-0.0156	-0.0148	-0.0091	-0.0093	-0.0101	-0.0219	-0.0205	-0.0188
	(0.155)	(0.139)	(0.164)	(0.527)	(0.524)	(0.484)	(0.154)	(0.173)	(0.220)
	0.92	0.92	0.92	0.95	0.95	0.95	0.89	0.89	0.90

Table 2.7 (cont.)

MBA	-0.0191 (0.318) 0.90			-0.0374 (0.141) 0.82			0.0023 (0.932) 1.01	
CFA	-0.0197 (0.287) 0.90			-0.0014 (0.955) 0.99			-0.0433 (0.117) 0.79	
MBAorCFA		-0.0285 (0.254) 0.86			-0.0174 (0.603) 0.91			-0.0393 (0.288) 0.81
BW1			0.0072 (0.750) 1.03			-0.0245 (0.376) 0.87			0.0458 (0.182) 1.27
BW2			-0.0474 (0.113) 0.76			**-0.0604** (0.100) 0.70			-0.0328 (0.482) 0.83
BW3			-0.0001 (0.999) 0.99			-0.0120 (0.785) 0.93			0.0105 (0.831) 1.05
BW4			**-0.1221** (0.024) 0.44			-0.0733 (0.358) 0.64			**-0.1749** (0.001) 0.24
BW5			**-0.0532** (0.044) 0.73			-0.0515 (0.161) 0.75			-0.0575 (0.144) 0.71

Table 2.7 (cont.)

Others	0.0037	0.0039	0.0040	0.0289	0.0290	0.0297	-0.0190	-0.0222	-0.0233
	(0.837)	(0.827)	(0.824)	(0.223)	(0.216)	(0.212)	(0.503)	(0.432)	(0.397)
	1.02	1.02	1.02	1.17	1.17	1.17	0.90	0.89	0.88
Tenure	0.0002	0.0002	0.0001	-0.0028	-0.0028	-0.0027	0.0041	0.0036	0.0030
	(0.914)	(0.940)	(0.967)	(0.300)	(0.311)	(0.331)	(0.159)	(0.214)	(0.296)
	1.00	1.00	1.00	0.98	0.98	0.99	1.02	1.02	1.01
SAT/100	**0.0277**	**0.0278**	0.0159	0.0146	0.0152	0.0104	**0.0409**	**0.0395**	0.0186
	(0.035)	(0.035)	(0.275)	(0.383)	(0.366)	(0.565)	(0.035)	(0.042)	(0.388)
	1.16	1.16	1.09	1.08	1.08	1.06	1.24	1.24	1.10
Log of Assets	-0.0037	-0.0035	-0.0045	0.0060	0.0057	0.0059	**-0.0151**	**-0.0128**	**-0.0162**
	(0.380)	(0.0406)	(0.296)	(0.306)	(0.331)	(0.320)	(0.016)	(0.034)	(0.009)
	0.98	0.98	0.97	1.03	1.03	1.03	0.92	0.93	0.92
Observations	2,571	2,571	2,571	1,289	1,289	1,289	1,282	1,282	1,282
Pseudo R-Squared	0.0067	0.0063	0.0095	0.0069	0.0056	0.0080	0.0154	0.0144	0.0214

Panel C: Portfolio 4-factor alpha is the dependent variable

Variable	Full Sample Period 1997-2004			Bull Market Period 1997-2000			Bear Market Period 2000-2004		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Gender	**0.0738**	**0.0731**	**0.0757**	0.0218	0.0195	0.0200	**0.1076**	**0.1084**	**0.1139**
	(0.011)	(0.011)	(0.009)	(0.649)	(0.675)	(0.678)	(0.001)	(0.001)	(0.000)
	1.55	1.54	1.57	1.12	1.11	1.12	1.96	1.97	2.07

Table 2.7 (cont.)

Age/10	-0.0089 (0.394) 0.95	-0.0094 (0.373) 0.95	-0.0075 (0.475) 0.96	0.0096 (0.526) 1.05	0.0099 (0.515) 1.05	0.0098 (0.515) 1.05	**-0.0255** (0.091) 0.87	**-0.0259** (0.082) 0.86	-0.0187 (0.212) 0.90
MBA	**-0.0396** (0.040) 0.81			**-0.0509** (0.082) 0.76			-0.0304 (0.246) 0.85		
CFA	**-0.0358** (0.059) 0.83			-0.0085 (0.757) 0.96			**-0.0591** (0.022) 0.73		
MBAorCFA		**-0.0471** (0.056) 0.78			-0.0232 (0.507) 0.88			**-0.0691** (0.033) 0.70	
BW1			-0.0126 (0.584) 0.93			-0.0368 (0.246) 0.82			0.0098 (0.765) 1.05
BW2			**-0.0611** (0.050) 0.70			**-0.1015** (0.009) 0.53			-0.0169 (0.716) 0.91
BW3			-0.0384 (0.215) 0.81			-0.0622 (0.163) 0.70			-0.0113 (0.791) 0.94
BW4			**-0.1114** (0.020) 0.48			-0.0705 (0.415) 0.65			**-0.1479** (0.007) 0.33

Table 2.7 (cont.)

BW5			**-0.0691**			-0.0182			**-0.1280**
			(0.006)			(0.639)			(0.000)
			0.67			0.90			0.44
Others	-0.0085	-0.0089	-0.0111	0.0150	0.0140	0.0089	-0.0278	-0.0300	-0.0304
	(0.656)	(0.637)	(0.563)	(0.573)	(0.595)	(0.737)	(0.311)	(0.268)	(0.269)
	0.96	0.95	0.94	1.08	1.08	1.05	0.86	0.85	0.85
Tenure	-0.0027	-0.0028	-0.0029	**-0.0055**	**-0.0055**	**-0.0056**	0.0002	-0.0001	-0.0008
	(0.195)	(0.180)	(0.155)	(0.060)	(0.063)	(0.059)	(0.933)	(0.965)	(0.782)
	0.99	0.98	0.98	0.97	0.97	0.97	1.00	0.99	0.99
SAT/100	**0.0316**	**0.0317**	0.0198	0.0296	0.0299	0.0317	**0.0307**	**0.0295**	0.0045
	(0.017)	(0.016)	(0.164)	(0.112)	(0.106)	(0.116)	(0.086)	(0.096)	(0.816)
	1.19	1.19	1.11	1.17	1.17	1.19	1.18	1.17	1.02
Log of Assets	**-0.0097**	**-0.0097**	**-0.0104**	**-0.0152**	**-0.0157**	**-0.0151**	-0.0064	-0.0047	-0.0071
	(0.037)	(0.039)	(0.028)	(0.020)	(0.015)	(0.021)	(0.318)	(0.467)	(0.277)
	0.95	0.95	0.95	0.92	0.92	0.92	0.96	0.98	0.96
Observations	2,571	2,571	2,571	1,289	1,289	1,289	1,282	1,282	1,282
Pseudo R-Squared	0.0112	0.0092	0.0120	0.0127	0.0101	0.0154	0.0179	0.0158	0.0237

ESSAY 3. Portfolio Management Team Changes

3.1 Introduction

A large body of literature has been devoted in assessing mutual fund performance. This research has evaluated the impact of numerous factors on fund performance, including the fund's size, structure, expenses and risk profile as well as individual characteristics and compensation of the managers. The focus on individual managers overlooks a recent trend in the mutual funds industry. Although historically it was common for a fund to have only one person as the portfolio manager, things have changed dramatically in recent years. For instance, according to Morningstar's database of domestic equity funds, in 1997 only 32.5% of all funds and 20% of total mutual fund assets were managed by a team of managers rather than a single individual, whereas in 2005 the corresponding percentages were 58.5% and 60%, respectively. Motivated by the increasingly important role of portfolio management teams recent studies have started to examine differences in the performance and characteristics of sole-managed and team-managed funds and provide an explanation for the preference of team management.

There are two main explanations that have been proposed in the literature so far. One is that fund families are trying to avoid falling victims to "star" managers that leave. A celebrated example of recent years is Elizabeth Bramwell's 1994 separation from Mario Gabelli's GAMCO. Elizabeth Bramwell managed the Gabelli Growth Fund to one of the leading performers in its class. Near the fund's then peak, she left and started her own funds. She was also successful in convincing the SEC to allow her to use her track

record with Gabelli on a limited basis in marketing her new funds. The second one is that groups perform better than individuals when it comes to managing a stock portfolio.

However, evidence so far shows that management teams do not perform better than single mutual fund managers. For instance, Prather and Middleton (2002) find, consistent with the classical decision making perspective, no difference in the performance of sole-manager and team-managed mutual funds. Chen at al. (2004) and Baer et al. (2005) do find evidence of underperformance by teams of managers of 5.5 and 4 basis points per month respectively.

In this paper, we examine the determinants and consequences of team management by focusing on funds that have chosen to change the structure of the portfolio management team. We identify 867 funds that have changed the structure of their portfolio management team in the 1997 to 2004 period. Of those, 530 have switched from sole-manager to a team-managed, and 337 from team-managed to sole-managed. We collect data on the performance, risk, size and other characteristics of the fund portfolios for the year before and the year after the change and we address two broad questions: a) What are the characteristics of the funds that change structure and b) what are the consequences of the change in the performance, risk and size of the fund.

Focusing on management team structure changes helps us overcome the endogeneity problem that is present in past research that has studied the performance of team-managed versus sole-managed funds. In all those studies it is not clear whether the underperformance of team-managed funds is because of the team structure and because of other reasons that also caused the fund to be team-managed. In this paper, the fund

portfolio is exactly the same and the only thing that varies is the management team structure.

We find that team-managed funds switch to sole-managed after poor performance while sole-managed funds switch to team-managed after significant over-performance. When a fund becomes to sole-managed performance improves significantly (184 basis points in terms of 4-factor alphas) while a switch to team management leads to deteriorating performance. Funds that switch from sole-managed to team-managed exhibit a decline in performance of 190 basis points. Taking all this into account, results suggest that team management is not good for performance.

So, why do fund families choose the management team structure? We find that sole-managed funds that switch to teams experience above normal increases in size consistent with the view that fund families, investors, managers, or all of them believe that a single individual manager cannot efficiently manage a lot of money. We also find slight evidence that risk considerations play a role too. Team-managed funds seem to be taking on less risk than their sole-managed counterparts.

Finally we also examine a fund's decision to change the investment advisor altogether. Findings suggest that poor performance is the major reason that leads funds to fire their advisors. In general, our findings, confirm past evidence that team-managed funds do not offer superior risk-adjusted returns but also show that team management turns high-performing funds into poor performers.

3.2 Data

3.2.1 Mutual Fund Data

All of our mutual fund data come from the nine January CDs of Morningstar, Inc.'s Principia Mutual Funds Advanced database from January 1997 to January 2005.[1] The January CDs report data as of December 31st of the previous year. Morningstar started the Principia databases on January 1996. The Principia Advanced version contains more information, especially regarding managers and monthly fund returns, than the basic version of the database. Using the nine CDs, we extract information for all funds in operation every year from 1997 to 2005.

We start with all the funds in existence in January 1997 and we follow them through 2005 or until they disappear from the database. We also include in our sample all the funds that started their operations after 1997 to minimize concerns about survivorship. Data are gathered for all domestic equity funds with a self-declared investment objective of growth, aggressive growth, growth-income, or equity-income. We exclude index funds, balanced funds, funds of funds, as well as other types of funds that are restricted in some sense in their investment decisions.[2]

For each fund we obtain annual and monthly returns, annual expense ratios and loads, net asset values, total net assets, fund inception dates, mutual fund family names, portfolio characteristics such as turnover, total number of holdings, percentage of assets invested in the top 10 holdings, stock, cash, and bond holdings, as well as manager names. In the "manager name" field Morningstar lists the name of the manager if the

[1] Morningstar, Inc. used different names for this database throughout our sample period. The three different names are: a) Principia Mutual Funds Plus, b) Principia Mutual Funds Pro Plus, and c) Principia Mutual Funds Advanced.

[2] These include socially conscious funds, life cycle funds, target retirement funds and tax managed funds.

fund is solo managed, the names of the multiple managers if the fund's total assets are divided among more than one manager, or the term "Management Team" when more than two people are involved in the management of the fund and they manage together.[3]

From the advanced analytics view of the database we hand-collect each fund's management fees, which are the fees that the management company charges to manage the fund's portfolio. For most funds the management fee that appears on Morningstar is taken from the fund prospectus. For other funds a minimum and maximum management fee range appears in the database; for such funds we calculate the midpoint and use the resulting figure as the fund's management fee.

The funds that appear in the Morningstar CDs represent fund offerings that the investor can choose from but do not represent distinct investment portfolios.[4] However, while various share classes offer investors different fund choices, they are based the same underlying portfolio and consequently the same before-fee performance. Our unit of observation is the fund. We therefore aggregate multiple share classes into one fund observation. We are careful to cumulate the total assets from all share classes to obtain the total assets of the underlying portfolio. In order to identify different share classes of the same fund we match different share classes by four portfolio characteristics: turnover, number of holdings, percentage invested in stock, and percentage in the top 10 holdings. We also verify our matching by looking at the fund names.[5]

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[3] The exact description of what the term "Management Team" means, reads are follows: "This is used when there are more than two persons involved in fund management, and they manage together, or when the fund strongly promotes its team-managed aspect".

[4] As Nanda, Wang, and Zheng (2005) document, in the 1990s many mutual funds introduced additional share classes as a way to offer investors more choices about the timing of load payments, or to provide lower expenses to investors with big holdings. They show that by the end of 2002 more than 50% of mutual funds offered more than one share class.

[5] Multiple share classes of the same fund have basically the same name. Their names differ only by the name of the share class. Example: "Vanguard Growth A," "Vanguard Growth B," etc.

In all, we have a total of 7,846 fund-years. Out of those, 867 represent funds-years with a change in the management team structure during that year. We require that there is available information for all fund-year observations for one year before and one year after. This reduces our sample to 3,850 funds-years and 503 funds-years with management changes. For all those funds we also collect information on whether there was a change in the management company that is in charge of the fund portfolio. We could have changes in the management company without having changes in the management team structure.

Table 3.1 summarizes our dataset. Panel A shows all the fund-years with management structure changes by prospectus objective. We can see that most of the changes (530) are from single managers to management teams. However, a sizeable number of funds choose to replace the team of managers with a single manager (337). For the majority of changes, funds decide to keep the same management company (same managers). This means that, in the case of switching from a team to a single manager, some of the managers where fired but one of the old managers stays to manage the portfolio. In the case where the fund moves from a single manager to a team, the original manager is still present but other managers are added to help him manage the portfolio. In the case where the whole management company is replaced (New Managers) then the entire management team (single manager or team) is replaced by another single manager or team.

Table 3.1, Panel B lists all the changes by year and Panel C shows the fund-years that survive the three year window data requirement.

3.2.2 *Performance and Risk Measures*

We use all the standard performance metrics to measure fund performance in a given year: raw annual fund returns, style-adjusted returns, one-factor alphas from the market model, and alphas from the Carhart (1997) four-factor model. However, we report results only for the market model alpha and the 4-factor alpha, which is the most comprehensive performance measure in the literature To estimate the one-factor and four-factor alphas, respectively, we estimate the following models:

$$R_{it} - R_{ft} = \alpha_i + \beta_{im} EMR_t + \varepsilon_{it}, \tag{1}$$

$$R_{it} - R_{ft} = \alpha_i + \beta_{im} EMR_t + \beta_{ismb} SMB_t + \beta_{ihml} HML_t + \beta_{iumd} UMD_t + \varepsilon_{it}, \tag{2}$$

where $R_{it} - R_{ft}$ is the month-t excess gross return for fund i, EMR_t is the excess market return, SMB_t is the difference in returns across small and big stock portfolios, HML_t is the difference in returns between high and low book-to-market portfolios, and UMD_t is the return on a momentum portfolio as computed by Fama and French.

We use the value-weighted NYSE/AMEX/Nasdaq composite index as our market return, and the one-month T-bill rate from Ibbotson Associates as our risk-free rate in calculating excess market returns. Returns on the HML (high minus low book-to-market returns) and SMB (small minus big stock return) zero-investment portfolios, as well as returns on a momentum portfolio (UMD), come from Kenneth French's website.[6]

[6] See Kenneth French's website for the definition and calculation of the factor portfolio returns.

When estimating the one-factor and four-factor alphas we use monthly gross fund returns for the 12 months in the year. To calculate the gross monthly return, we divide the annual expense ration by 12 and add this to the monthly net returns. We use gross returns because we want to measure the performance differences between various forms of management team organization and characteristics. If better managers or organizational forms receive rents through higher expenses, then the performance superiority of manager characteristics might not show up when using net returns. However, we repeat our analysis using fund returns net of management fees and the results are qualitatively the same.

To evaluate the riskiness of the portfolio we use the market betas (the coefficients β_{im}) from equations (1) and (2), as well as the standard deviation of monthly returns, throughout the course of the year. We also examine differences in the estimated factor loadings (the coefficients β_{ismb}, β_{ihml}, and $\beta_{iumd,}$ from equation (2)) between team and sole-managed funds.

3.3 Hypotheses and Results

3.3.1 Hypotheses

Several theoretical papers posit why team management might be a superior strategy. Many other research studies, especially in the management and psychology literature, investigate the decision-making process, behavior, and performance of teams versus individuals. The results differ across studies mainly due to the variety of tasks and measures used in each study, which makes it difficult to make valid generalizations or comparisons. However, as conventional wisdom suggests, all studies agree that teams

behave differently than individuals, even though we do not always observe differences in performance.

Past literature has suggested that the major advantages of teams of managers are ability to process more information and research more investment opportunities, diversification and specialization benefits, and, consequently, better risk-adjusted performance. If those hypotheses are correct we should expect to see significant underperformance of funds that are sole-managed before the structure change and an improvement in performance after the switch to a team of managers has taken place. We should also expect to see underperformance prior the funds' decision to switch management companies.

Another proposed determinant for the switch to team management has been the fund's size. Single managers might not be able to handle the funds management if it becomes very large. At the same time, investors might not feel confident that a single manager can handle the load of a huge fund. Whatever the reason, we should expect to see size to play an important role on whether the fund is sole-managed or team-managed. Finally, another characteristic that could trigger a switch in management could be the extreme risk-taking from the side of the manager(s).

3.3.2 Results

3.3.2.1 Univariate tests

Table 3.2, panels A, B and C present performance results. Panel A shows the mean performance of funds in all categories. Funds that do not change their management team structure (columns 1 and 2) exhibit positive risk-adjusted performance the previous

year. However, performance is significantly lower for funds that also chose to change their investment advisor. Moving to funds that have switched from a team-management structure to a single manager, we find that there is significant underperformance the year before the change. Underperformance is 72 basis points for funds that choose to stay with the same investment advisor and reaches 123 basis points for funds that decide to fire their investment advisor too.

Surprisingly, sole-managed funds that choose to keep the same investment advisor and add more managers have been doing extremely well the year before the change. The mean performance for those funds is close to 200 basis points a year in terms of 4-factor risk-adjusted returns. This means, in opposition to our hypothesis, that underperformance is not the reason sole-managed funds switch to team management. We do find that sole-managed funds that also replace the investment advisor exhibit negative 4-factor alphas.

To summarize the findings in table 3.2, panel A, it seems to be the case that underperformance leads to the replacement of the investment advisor, but when it comes to the change in management teams structures (keeping the investment advisory firm the same) underperformance is not a determinant of the switch to team management. On the contrary, team-managed funds that underperformed are replaced by a single manager. The difference in prior year performance between sole-managed-turned-team funds and team-managed-turned-sole-managed funds is 393 basis points significant at the 1% level.

In panel C we compare following year (after the change) performance with prior year performance and present differences in performance (following year – previous year) for all types of funds. Team-managed funds that keep the same investment advisor

and get rid of all managers except one show an improvement in performance which reaches 326 basis points in terms of market adjusted returns (significant at the 5% level) and 184 basis points in terms of 4 factor alphas (significant at the 10% level). On the other hand, sole-managed funds that added more managers have much worse performance compared to the year before the change. Their market model alpha goes down by 315 basis points (significant at the 5% level) and the 4-factor alpha goes down by 190 basis points (significant at the 10% level).

Table 3.3 presents the risk characteristics of funds the year before and following the management team structure change. Sole-managed funds that switch to teams hold higher beta portfolios and have higher total risk (standard deviation of monthly returns) than team-managed funds that switch to sole-managed. Panel C presents the differences in portfolio risk after and before the change. Funds that switch from team management to single managers exhibit an increase in systematic risk (0.10 increase significant at the 1% level). On the other hand, when funds switch to team management total fund risk, as measured by the standard deviation on monthly returns, goes down and so does the UMD factor loadings. Taken together results in table 3 suggest that risk consideration might explain why some funds prefer team management.

Results on the relationship between the change type and other fund characteristics such as size, inflows, turnover, number of holdings and concentration of holdings are presented in table 3.4. We find that a decrease in assets leads is correlated with changes of the investment advisor. Taking into account results from table 3.2 we conclude that when performance is bad and investors pull out of the fund investment advisors are in trouble. The most interesting finding in table 3.4 is that funds switching from single

managers to teams exhibit a tremendous increase in size the year before the change compared to other funds. On average, sole-managed funds that switch to teams experience an additional increase in assets of $328 million compared to funds that also switch investment advisors (significant at the 1% level) and an additional increase in assets of $258 million compared to funds that switch from team-managed to sole-managed the year before the change. Taking into account that the performance of those funds is positive the year before the change, we conclude that funds switch from sole- to team-managed because of size and not poor performance. An interesting finding in Panel C of table 4 is that when good performing sole-managed funds switch to team-managed their assets do not increase at the same high rate.

3.3.2.2 Probit models

In this section, we explore possible determinants of a fund's management team change and investment advisor change using probit models. We relate the probability of a funds changing advisor, Prob(NewAdvisor), and the probability of a fund changing from team-managed to sole managed, Prob(TeamToSole), to performance, risk and size characteristics of the mutual fund portfolio. First, we estimate the following probit model:

$$\begin{aligned}\text{Prob}(NewAdvisor)_t = {} & b_0 + b_1 * a_{t-1} + b_2 * \beta_{m,t-1} + b_3 * \beta_{smb,t-1} + b_4 * \beta_{hml,t-1} \\ & + b_5 * \beta_{umd,t-1} + b_6 * STD_{t-1} + b_7 * \ln(assets)_{t-1} + \sum_{1998}^{2002} D_n \end{aligned} \quad (3)$$

where a_{t-1} is previous year's risk-adjusted performance (4-factor), $\beta_{m,t-1}$ is last year's portfolio market beta from the 4-factor model, $\beta_{SMB,t-1}$ is the last year's portfolio SMB

beta from the 4-factor model, $\beta_{HML,t-1}$ is last year's portfolio HML beta from the 4-factor model, $\beta_{UMD,t-1}$ is last year's portfolio UMD beta from the 4-factor model, STD_{t-1} is last's years total portfolio risk as measured by the standard deviation of monthly returns, $\ln(assets)_{t-1}$ is last year's fund size as measured by the log of total net assets, and $\sum_{1998}^{2002} D_n$ is a set of year dummy variables. We also reestimate the model replacing the $\ln(assets)_{t-1}$ variable with the $Inc(assets)_{t-1}$ which is the increase in the fund's assets during the year.

To investigate the determinants of the type of management team change we use only the fund-year observations where there is a change in the team structure we estimate the following model:

$$\begin{aligned}\text{Prob(TeamToSole)}_t = {} & b_0 + b_1 * a_{t-1} + b_2 * \beta_{m,t-1} + b_3 * \beta_{smb,t-1} + b_4 * \beta_{hml,t-1} \\ & + b_5 * \beta_{umd,t-1} + b_6 * STD_{t-1} + b_7 * \ln(assets)_{t-1} + \sum_{1998}^{2002} D_n \end{aligned} \quad (4)$$

where all the independent variables are exactly the same as in model (3) and the response variable takes the value of 1 if the fund changes from team-managed to sole-managed and 0 otherwise (sole-managed to team-managed).

Results for model (3) are presented in table 3.5. We estimate the model for all funds (columns 1 and 3), and for team-managed (columns 3 and 4) and sole-managed funds (columns 5 and 6) separately. Similar to the results from univariate tests, we find evidence that funds switch investment advisors mainly because of poor performance (significant at the 1% level). For sole-managed funds, poor last year's performance seems

to be the only reason to change the investment advisor. For team-managed funds we find that high portfolio systematic risk increases the probability of investment advisor change, while high SMB and HML factor loadings size and total fund risk seem to reduce the probability of a change. All results are significance at the 5% level or better.

Table 3.6 reports results from the estimation of model (4). Out main focus is on columns 5 and 6 of table 3.6. When funds do not change investment advisors, the only change is the structure of management team. We find evidence that performance negatively affects the probability of a switch from management team to single manager. The interpretation is that when performance is low the probability of switch to a single manager is higher, which confirms our finding from the univariate tests. Fund size also has a negative effect on the response probability again confirming the finding that high fund size increases the probability that a fund will switch from sole-managed to team-managed.

3.4 Conclusion

In recent years team management has become extremely popular in the mutual fund industry. This study investigates the determinants of management team structure and its consequences in performance and risk. We focus on 503 changes of management team structure and identify the possible reasons that make funds select one structure type over the other.

We find that team-managed funds switch to sole-managed after poor performance while sole-managed funds switch to team-managed after significant over-performance. When a fund becomes sole-managed performance improves significantly (184 basis

points in terms of 4-factor alphas) while a switch to team management leads to deteriorating performance. Funds that switch from sole-managed to team-managed exhibit a decline in performance of 190 basis points. Taking all this into account, our results suggest that team management is not good for performance.

So, why do fund families choose the management team structure? We find that sole-managed funds that switch to teams experience above normal increases in size consistent with the view that fund families, investors, managers, or all of them believe that a single individual manager cannot efficiently manage a lot of money. We also find weak evidence that risk considerations play a role too. Team-managed funds seem to be taking on less risk than their sole-managed counterparts. In general, our findings, confirm past evidence that team-managed funds do not offer superior risk-adjusted returns.

Finally we also examine a fund's decision to change the investment advisor altogether. Findings suggest that poor performance is the major reason that leads funds to fire their advisors.

APPENDIX 3.

TABLES OF ESSAY 3

Table 3.1
Dataset Summary –Management Structure and Investment Advisor Changes

This table summarizes our dataset of management team changes. Panel A present changes by prospectus objective. *New Mgt* indicates that there is a replacement of the management company that is assigned to manage the fund. *Same Mgt* indicates that the original manager(s) is still there and that the only change has to do with the management structure (sole-managed to team-managed and vice versa). Panel B present changes by year. Finally, Panel C presents the status of our dataset after we require data availability for the year before and after the management team structure change.

Panel A: Funds with Management Structure Changes by Prospectus Objective

	Team-Managed to Sole-Managed			Sole-Managed to Team-Managed			All Changes
	All	New Mgt.	Same Mgt.	All	New Mgt.	Same Mgt.	
Aggressive Growth	24	11	13	30	10	20	54
Growth	210	49	161	334	125	209	544
Growth-Income	76	21	55	124	41	83	200
Equity-Income	27	11	16	42	18	24	69
All Objectives	337	92	245	530	194	336	867

Panel B: Funds with Management Structure Changes by period

	Team-Managed to Sole-Managed			Sole-Managed to Team-Managed			All Changes
	All	New Mgt.	Same Mgt.	All	New Mgt.	Same Mgt.	
1997-1998	30	6	24	59	12	47	89
1998-1999	44	12	32	75	28	47	119
1999-2000	33	6	27	60	18	42	93
2000-2001	51	16	35	67	14	53	118
2001-2002	44	15	29	58	27	31	102
2002-2003	36	13	23	70	32	38	106
2003-2004	39	9	30	73	37	36	112
2004-2005	60	15	45	68	26	42	128
All Periods	337	92	245	530	194	336	867

Table 3.1 (cont.)

Panel C: Funds with Management Structure Changes and available data for the previous and following year

	Team-Managed to Sole-Managed			Sole-Managed to Team-Managed			All Changes
	All	New Mgt.	Same Mgt.	All	New Mgt.	Same Mgt.	
1998-1999	33	10	23	56	20	36	89
1999-2000	26	5	21	40	8	32	66
2000-2001	41	10	31	58	12	46	99
2001-2002	34	12	22	46	21	25	80
2002-2003	25	9	16	54	23	31	79
2003-2004	33	8	25	57	30	27	90
All Periods	192	54	138	311	114	197	503

Table 3.2
Performance Characteristics – Univariate Analysis

This table reports the mean performance for all funds in our dataset by the type of change. The performance measures reported are the 1-factor (market model) alphas and Carhart's 4-factor alpha. Panel A reports mean performance the year before the year of the change as well as t-tests for differences in the means between funds with different types of changes. Panel B reports the mean performance for the year following the change. Finally, Panel C reports differences between following-year and prior-year performance. ***,** and * indicate results significant at the 1%, 5% and 10% level respectively.

	Management Structure Change									
	No Change		Team-Managed to Sole-Managed		Sole-Managed to Team-Managed		Differences – Significance			
	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.				
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(1)	(4)-(3)	(6)-(5)	(6)-(4)
Panel A: Previous Year										
1-factor alpha	0.034	1.567	-0.178	-1.020	-0.724	2.912	1.533**	-0.842	3.636***	3.932***
4-factor alpha	0.493	0.825	-1.229	-0.723	-0.360	1.962	0.864*	0.505	2.322**	2.685***
Panel B: Next Year										
1-factor alpha	-0.249	0.663	0.833	2.240	0.660	-0.249	0.912*	1.406	-0.910	-2.489**
4-factor alpha	-0.387	0.083	0.293	1.123	-0.215	0.060	0.470	0.830	0.275	-1.063
Panel C: Next Year- Previous Year										
1-factor alpha	-0.283	-0.903***	1.011	3.260**	1.384	-3.161**				
4-factor alpha	-0.880	-0.741***	1.522	1.846*	0.145	-1.902*				
N (fund-years)	*386*	*3464*	*54*	*138*	*114*	*197*				

Table 3.3
Risk Characteristics – Univariate Analysis

The table reports mean risk by type of change. The risk/investment style measures reported are the 1-factor (market model) market beta, the 4-factor market beta, the SMB, HML and UMD betas from the 4-factor model and the standard deviation of monthly returns. Panel A reports mean risk the year before the year of the change as well as t-tests for differences in the means between funds with different types of changes. Panel B reports the mean risk for the year following the change. Finally, Panel C reports differences between following-year and prior-year risk. ***,** and * indicate results significant at the 1%, 5% and 10% level respectively.

	Management Structure Change									
	No Change		Team-Managed to Sole-Managed		Sole-Managed to Team-Managed		Differences - Significance			
	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.				
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(1)	(4)-(3)	(6)-(5)	(6)-(4)
Panel A: Previous Year										
Market beta	0.995	0.962	1.013	0.925	0.998	1.000	-0.033*	-0.088	0.002	0.075*
Market beta(4f)	1.020	1.003	1.058	0.992	1.061	1.018	-0.017	-0.066	-0.042	0.027
SMB beta(4f)	0.072	0.110	0.144	0.125	0.155	0.081	0.038**	-0.019	-0.074*	-0.044
HML beta(4f)	-0.022	0.041	0.034	0.059	0.084	0.004	0.063***	0.025	-0.080	-0.055
UMD beta(4f)	0.026	0.007	0.027	0.019	-0.005	0.036	-0.020	-0.008	0.041	0.017
STD Returns	6.081	5.993	6.062	5.679	6.101	6.216	-0.087	-0.384	0.115	0.538*
Panel B: Next Year										
Market beta	1.029	0.976	1.062	1.027	1.014	0.975	-0.052***	-0.035	-0.039	-0.052
Market beta(4f)	1.022	0.996	1.034	1.009	0.989	1.019	-0.026**	-0.024	0.029	0.009
SMB beta(4f)	0.088	0.111	0.067	0.100	0.089	0.100	0.0234	0.033	0.011	0.000
HML beta(4f)	-0.042	0.014	-0.077	0.014	0.005	0.027	0.0561***	0.092	0.022	0.013

Table 3.3 (cont.)

UMD beta(4f)	0.031	0.010	0.078	0.045	0.005	-0.031	-0.02**	-0.033	-0.036	-0.0762***
STD Returns	4.945	4.896	5.563	5.362	4.566	5.243	-0.049	-0.200	0.6773***	-0.119
Panel C: Next Year - Previous Year										
Market beta	0.034*	0.015**	0.0486	0.102***	0.015	-0.025				
Market beta(4f)	0.002	-0.007	-0.025	0.018	-0.071**	0.001				
SMB beta(4f)	0.016	0.001	-0.077*	-0.025	-0.066*	0.019				
HML beta(4f)	-0.02	-0.027***	-0.111*	-0.045	-0.079*	0.023				
UMD beta(4f)	0.005	0.004	0.052	0.026	0.010	-0.067***				
STD Returns	-1.136***	-1.098***	-0.4997	-0.316	-1.535***	-0.973***				
N (fund-years)	*386*	*3464*	*54*	*138*	*114*	*197*				

Table 3.4
Portfolio Characteristics – Univariate Analysis

The table reports mean portfolio characteristics by type of change. The portfolio characteristics reported are the: the log of total net assets, the increase in assets throughout the year, the part of increase in assets that represents new money, the fund's portfolio turnover, the number of holdings in the fund's portfolio and the concentration of investment in the top 10 holdings (%).Panel A reports mean values of portfolio characteristics the year before the change as well as t-tests for differences in the means between funds with different types of changes. Panel B reports the mean values for the same characteristics for the year following the change. Finally, Panel C reports differences between following-year and prior-year mean values. ***,** and * indicate results significant at the 1%, 5% and 10% level respectively.

	Management Structure Change									
	No Change		Team-Managed to Sole-Managed		Sole-Managed to Team-Managed		Differences - Significance			
	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.	New Mgt.	Same Mgt.				
	(1)	(2)	(3)	(4)	(5)	(6)	(2)-(1)	(4)-(3)	(6)-(5)	(6)-(4)
Panel A: Previous Year										
Log of Assets	5.83	5.85	5.99	5.52	5.61	5.98	0.02	-0.47*	0.3788*	0.46**
Asset Increase	-61.74	83.17	-15.01	67.87	-2.49	326.48	144.92*	82.88	328.97***	258.61**
New Assets	-15.94	51.97	-79.17	56.50	-60.40	111.08	67.92**	135.67*	171.48**	54.579
Turnover	95.33	90.71	109.43	101.78	121.90	89.37	-4.62	-7.65	-32.53***	-12.409
No of Holdings	104.48	94.91	96.13	88.11	91.61	92.61	-9.56**	-8.02	1.00	4.5
Concentration	32.15	33.56	33.40	32.59	32.13	33.30	1.41***	-0.82	1.17	0.714
Panel B: Next Year										
Log of Assets	5.78	5.95	5.87	5.59	5.54	6.14	0.1671	-0.28	0.60***	0.55***
Asset Increase	-68.91	110.14	-29.51	-33.38	58.75	85.37	179.05	-3.88	26.62	118.75
New Assets	-58.41	40.14	-57.22	-85.18	42.85	63.16	98.55	-27.96	20.31	148.341*
Turnover	108.13	84.36	125.72	93.01	110.05	85.16	-23.77	-32.71**	-24.89***	-7.852
No of Holdings	103.21	95.82	89.00	85.73	97.84	92.99	-7.387	-3.28	-4.86	7.26

Table 3.4 (cont.)

Concentration	30.31	32.12	30.63	31.76	29.00	32.57	1.807	1.13	3.56***	0.802
Panel C: Next Year - Previous Year										
Log of Assets	-0.05	0.10***	-0.12	0.07	-0.06	0.16***				
Asset Increase	-7.17	26.97	-14.50	-101.25	61.25	-241.11**				
New Assets	-42.47	-11.83	21.95	-141.68	103.25	-47.92				
Turnover	12.80***	-6.35***	16.29	-8.77	-11.85	-4.21				
No of Holdings	-1.27	0.91	-7.13	-2.38	6.24	0.38				
Concentration	-1.84***	-1.44***	-2.77**	-0.82	-3.13***	-0.73				
N (fund-years)	*386*	*3464*	*54*	*138*	*114*	*197*				

Table 3.5
Probit Regressions – Change in Management (Investment Advisor)

This table present results from probit regression (3). The dependent variable is a dummy variable that takes the value of one if the fund has replaced the manager(s) with new ones and zero if the same manager(s) are still working from the fund. We run the regressions for all funds, and for team-managed and sole-managed funds separately. The independent variables in regressions (1), (3) and (5) are: the 4-factor alpha, risk factor loadings from Carhart's 4-factor model, the standard deviation of monthly returns, the natural log of the fund's total net assets. In regressions (2), (4) and (6) we replace the log of the fund's assets with the increase in assets. ***,** and * indicate results significant at the 1%, 5% and 10% level respectively. Time dummies are included in the regressions but their coefficients are not reported. Clustered standard errors by fund are estimated.

	Dependend Variable: Management Change (1=New Mgt., 0=Same Mgt.)					
	All Funds		Team-Managed Funds		Sole-Managed Funds	
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
4-factor alpha	-0.009 ***	-0.0086 ***	-0.0102 ***	-0.0098 **	-0.0075 **	-0.0073 **
4-factor beta	0.36262 ***	0.3462 ***	0.7388 ***	0.6830 ***	0.1376	0.1479
4-factor smb	-0.1116	-0.1018	-0.3787 ***	-0.3540 **	0.0903	0.0844
4-factor hml	-0.14785 *	-0.1448 *	-0.3589 ***	-0.3438 ***	0.0310	0.0238
4-factor umd	0.06637	0.0682	0.0881	0.0885	0.0454	0.0450
Std. Dev. Of returns	-0.00915	-0.0083	-0.0583 **	-0.0522 *	0.0194	0.0178
Log of Assets	-0.01179		-0.0469 **		0.0170	
Increase in Assets		0.0000		0.0000		0.0000
Intercept	-1.24846 ***	-1.3103 ***	-0.9822 ***	-1.2383 ***	-1.5516 ***	-1.4613 ***
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	*4353*	*4353*	*2014*	*2014*	*2339*	*2339*

Table 3.6
Probit Regressions – Change in Management Structure

This table present results from probit regression (4). The dependent variable is a dummy variable that takes the value of one if the fund has switched from team-managed to sole-managed and zero if the fund has switched from sole-managed to team-managed. We run the regression separately for three sets of funds: a) All funds that make a team structure change, b) funds that together with the structure change also replace their investment advisor and 3) funds that change their team structure but choose to keep the same investment advisor. The independent variables in regressions (1), (3) and (5) are: the 4-factor alpha, risk factor loadings from Carhart's 4-factor model, the standard deviation of monthly returns, the natural log of the fund's total net assets. In regressions (2), (4) and (6) we replace the log of the fund's assets with the increase in assets. ***,** and * indicate results significant at the 1%, 5% and 10% level respectively. Time dummies are included in the regressions but their coefficients are not reported. Clustered standard errors by fund are estimated.

	Dependend Variable: Management Structure Change (1=Team-Managed to Sole-Managed, 0=Sole-Managed to Team Managed)					
	All Changes		New Mgt.		Same Mgt.	
Independent Variables	(1)	(2)	(3)	(4)	(5)	(6)
4-factor alpha	-0.0180 ***	-0.0163 **	-0.0109	-0.0097	-0.0256 ***	-0.0240 ***
4-factor beta	-0.1027	-0.1481	0.2479	0.2770	-0.2535	-0.3457
4-factor smb	0.2287	0.2411	-0.0096	-0.0045	0.3686 *	0.3835 *
4-factor hml	-0.1061	-0.0885	-0.3130	-0.3368	-0.0094	0.0545
4-factor umd	0.1057	0.1649	0.2614	0.2998	0.0042	0.1039
Std. Dev. Of returns	-0.0552	-0.0532	-0.0458	-0.0548	-0.0460	-0.0381
Log of Assets	-0.0377		-0.0458		-0.0769 ***	-0.0001 **
Increase in Assets		-0.0001 **		-0.0001		
Intercept	0.17709	-0.0114	-1.1314 *	-0.8297	0.76686 **	0.34953
Year Controls	Yes	Yes	Yes	Yes	Yes	Yes
N	*503*	*503*	*168*	*168*	*335*	*335*

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