The Influence of Management Design on Mutual Fund Performance

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Mutual funds are either run by a single manager or by a management team. Which management design is better has long been a topic of interest. In the early 2000s, the proportion of team-managed funds rose, but in 2007 it leveled off. Using the constant term from Carhart's 4-factor model as a measure of management performance and data from Morningstar Inc., this paper adds to the discussion by incorporating another important dimension to this question, i.e., whether the fund changed its management company at the same time. The results indicate, among other things, that single-managed funds that changed management companies, on average, performed better than those that did not change. They also suggest that single-managed funds outperform team-managed funds.

JEL Codes: G10; G14; G23; F39.

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I. Introduction

In the last quarter of a century, government regulated open-end funds have become an important investment category throughout the world. Included in this category are mutual funds, exchange-traded funds, and institutional funds. These funds aggregate the investment funds from many large and small investors, provide professional management services to these investors, and permit investors to invest or disinvest in a timely manner. In doing so, they allow an investor to share in the country's potential largess by mobilizing their savings and funneling these savings into the most productive uses while considering the risks involved.

Compared to the rest of the world, the U.S. is by far the dominant supplier nation of these financial instruments, although European countries as a whole provide a substantial amount relative to the rest of the world. For example, the Investment Company Institute reports that in 2021 the worldwide value of all regulated capital markets amounted to 259.6 trillion U.S. dollars of which government regulated open-end funds amounted to $71.1 trillion.[1] The U.S. portion of this amount is $34.2 trillion (48.1 percent) followed by Luxembourg ($6.4 trillion, 9.0 percent), Ireland ($4.6 trillion, 6.5 percent), China ($3.5 trillion, 4.9 percent), and Germany ($3.0 trillion, 4.2 percent). Moreover, all European countries combined only amount to $23.3 trillion (32.8 percent) of the $71.1 trillion.

In the U.S., mutual funds are by far the largest sector in the government regulated open-end fund category. Mutual funds are a legal entity that is run by a board of directors.[2] The board's responsibility is to select and oversee a management company (a.k.a. investment

1. Nanda, Wang, and Zheng (2005) document that 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 percent of mutual funds offered more than one share class. Multiple share classes of the same fund have basically the same name. Their names differ only by the name of the, i.e. Vanguard Growth A, "Vanguard Growth B, etc.

2. In many parts of the world mutual funds are not referred to as such. For instance, in the European Union (EU) they are called Undertakings for Collective Investment in Transferable Securities (UCITS). Similar to the U.S., each UCITS must be registered in its home country but the registration is valid in all EU countries by the EU's Committee of European Securities. Thus, in this sense, the EU is a single market.

advisory board) that, in turn, appoints a single manager or team of managers to run the fund's portfolio is such a way that the fund's stated investment objectives are met. The board is ultimately responsible for the success of the fund and is accountable to its shareholders.

In 2021, the U.S., mutual funds account for $27.0 trillion of this category's assets, of which $14.7 trillion were invested in equities. In addition, 45 percent of households own mutual funds and 89 percent of these households own at least one equity mutual fund, i.e., one comprised mainly of common and preferred stocks. The current dollar value of these equity funds has increased from 1960 to 2021 at an annual compound rate of 11.8 percent. This growth not only reflects a growing economy but also the effect of the U.S. federal government establishing the Securities and Exchange Commission (SEC) under the auspices of the Securities Act of 1934. This act and many others have formed the framework for ensuring fairness in the financial U.S. markets, especially the timing and of the information relevant to the pricing of stocks. Moreover, over the years, additional laws have been enacted to create tax advantages to promote retirement security and educational opportunities such as 401K retirement accounts and 529 education accounts.[3]

A large body of literature has been devoted in assessing various aspects of mutual fund characteristics, especially those related to performance. This research has evaluated the impact of numerous factors on fund performance. Examples of these factors include education level of manager (Chevalier and Ellison, 1999; Gottesman and Morey, 2006), portfolio size (Chen, et al., 2004; Cuthbertson, 2022), fund flows (Nanda et al., 2005), director boards (Ding and Wermers, 2005); industry concentration (Kacperzyk et al., 2005), turnover (Bliss et al., 2008; Adams et al., 2018), fund manager experience (Porter and Trifts, 2014), information sources (Crawford et al., 2017; Egeman, 2022), fund manager confidence (Jin et al., 2020), institutional shares (Rakowski and Yamani, 2021), and socially responsibility investment policies (Muñoz, 2021).

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3. Other major legislative examples include the Security Act of 1933, the Investment Company Act 1940, the Investment Advisors Act of 1940, the Investment Act of 1970, the Sarbanes-Oxley Act of 2002, the Dodd-Frank Wall Street and Consumer Protection Act of 2010, and the Jumpstart Our Business Startup (JOBS) Act of 2012. Legislation that focuses on tax advantaged investments include the Employee Retirement Income Security Act (ERISA) of 1974, the Revenue Act of 1978 (section 401k), and the Setting Every Community Up for Retirement Enhancement Act (SECURE) of 2019.

In addition to the above factors, a number of papers have focused on the management structure of the fund with particular attention given to whether it is managed by a single person or a team, i.e., two or more people. Regardless of the organizational arrangements made, the goal of a fund is not only to maximize the portfolio performance but also to ensure that all of the other goals set forth in the fund's prospectus are met. Historically, it was common for a U.S. mutual fund to be managed by one person. Two main explanations have been proposed to explain this phenomenon.[4] First, funds try to avoid being victims of "star" managers that leave, especially if the departure is abrupt (Massa et al., 2006). This explanation recognizes that there is no guarantee replacement of equal skill that can be readily found to immediately assume the management role. Second, groups perform better than individuals when it comes to managing a stock portfolio (Sharpe, 1981; Barry and Starks, 1984; Prather and Middleton, 2002). This argument rests on the notion that investors believe that a team of managers is able to process more information, research more potential investment opportunities, and bring a more diversified perspective, especially with respect to risk exposure, to the investment process.

This change in management style did not go unnoticed by either the business or academic worlds. As a result many empirical studies have been done to attempt to understand the change and its financial implications. The results of these studies are mixed. For example, Chen et al. (2004) and Bär et al. (2005) find evidence of underperformance by team-managed funds. Bär et al. (2010) report that individual-managed funds have better risk adjusted returns but exhibit more stable performance. Goldman et al. (2016) maintain that single-managed funds are more profitable than team-managed funds. In contrast, Patel and Sarkissian (2017) conclude that team-managed funds outperform those funds managed by a single person. Karagiannidis (2010) discovers that sometimes single-managed funds outperform team-managed funds during a bear market, but, in all other market conditions, they do not. Other studies, however, contradict the notion that one management structure is better than the other. Prather and Middleton (2002) find no

4. Many management and psychology studies investigate the decision-making process, behavior, and performance of teams versus individuals (e.g., Hill, 1982; Hollenbeck et al.; 1998, Herrenkohl, 2004). The results differ across studies mainly because of the variety of tasks and measures used in each study, making it difficult to make valid generalizations or comparisons. Nevertheless, all studies agree that teams behave differently than individuals, even though differences in performance are not always observed.

difference in the performance of single-managed and team-managed mutual funds. Bliss et al. (2008) that team-managed and single-managed fund performance are equal on risk adjusted basis. Finally, Wang (2016) and Sargis and Chang (2017) document that there is no difference in performance following a management change.[5]

The purpose of this paper is to revisit the mutual fund team-management vs. single-management performance issue by viewing the issue from the perspective of whether or not the change is accompanied by a change in the fund's management company (a.k.a. investment advisor). To accomplish this task, the mutual fund data beginning in 1997 and ending in 2021 are gathered from Morningstar Inc. These data are parsed first by whether or not mutual fund changed its management company and then how the management structure (team-managed and single-managed) either changed or remained the same. Each outcome is considered to be an event. The performance of the fund attributed to the event is measured using the ubiquitous 1-factor capital asset pricing model (Sharpe, 1964; Litner, 1965; Mossin, 1966) and Carhart's (1999) 4-factor version of the pricing model. These estimated attributions are measured by each model's constant term, which is usually referred to as Jensen's (1968) alpha or simply alpha. A positive alpha is consistent with a management company and management structure that adds monetary value to the fund. A negative alpha denotes a negative impact, while a zero value signals neither a positive or negative contribution.

The results show that those mutual funds that changed management companies experienced, on average, larger alphas than those funds that did not change management companies. There are, however, noticeable differences in the composition of these changes. For example, the spread between the single-managed and the team-managed funds that changed their management company is 115 basis points in favor of the single managed fund. In addition, the difference between team-managed funds and team-managed funds that changed to single-management is 185 basis points in favor of those funds that made the change. Finally, the difference between team-managed funds that changed to

5. Earlier studies by Sharpe (1966) and Jensen (1967) support the studies the "no difference" finding. Sharpe (1966), using data from 1953 to 1963 finds that average fund returns are at least as good those of the Dow Jones Industrial Average (DIJA) but after taking expenses into account fall short. Examining mutual fund return data from 1945 to 1964, Jensen (1967) concludes that on average there is no evidence of a superior management effect.

single-managed when compared to single-managed funds that changed to team-managed is 99 basis points in favor of the latter. The overall findings suggest that the single-managed funds are associated, on average, with larger alphas. Nevertheless, during the last 15 years, the market shares of both types of funds have been relatively constant with team-managed funds outnumbering single-managed funds by two to one. A plausible explanation for this phenomenon is that many investors are more comfortable the giving the responsibility of investing their wealth to a fund that is run by a team of experts with a diverse range of experience rather trust their investment to a single expert, even if this expert has a superior investment track record. In sum, they are thinking in terms of modern portfolio theory by wanting diverse management group to handle their investments. After all, the long run economic security of these investors may depend on the performance of their fund(s).

The remainder of this paper is divided into four sections. Section 2 provides the source of the data and gives a preliminary look at the management structure. The statistical approaches used to analyze the data are given and discussed in Section 3. Section 4 presents the research's statistical results along with their economic interpretation. Finally, Section 5 summarizes the results of the analyses and offers concluding remarks.

II. Mutual Fund Data

Data and Their Sources

All of the mutual fund data come from Morningstar Direct, which is the latest version of Morningstar Inc.'s mutual fund database.[6] The list of funds considered contains all the funds in existence from January, 1997 through December, 2021. This list includes not only funds that existed during this entire period but also the funds that ceased or started their

6. Morningstar Direct became available for public use in 2001. Earlier versions in chronological order are Principia Mutual Funds Plus, Principia Mutual Funds Pro Plus, and Principia Mutual Funds Advanced. According to Patel and Sarkkissian (2017), Morningstar Direct is more accurate than Morningstar's Principia offerings because these latter data are not always consistent with the information in the U.S. Securities and Exchange Commission records. In this regard, Karagiannidis (2010) demonstrates that there are also differences between Morningstar Principia and CRSP (Center for Research in Security Prices) data.

operations after 1997. Data are gathered for all domestic equity funds with a self-declared investment objective of aggressive growth, growth, growth-income, or equity-income. Excluded are index funds, balanced funds, funds of funds, as well as other types of funds that are restricted in some sense in their investment decisions. These include socially conscious funds, life cycle funds, target retirement funds and tax managed funds.

The funds that appear in Morningstar Direct represent fund offerings that the investor can choose from but do not represent distinct investment portfolios.[7] However, while various share classes offer investors different fund choices, they are based the same underlying portfolio and consequently the same before-fee performance. Morningstar Direct, however, identifies these unique fund portfolios. For each fund, monthly returns, annual expense ratios, fund inception dates, mutual fund family names, as well as manager names are downloaded. The gross monthly returns for each portfolio are calculated by equally allocating the annual total expense ratio and adding it to each monthly return for each year. This yields the gross monthly return of the fund and is the same for all share classes.

In the "manager history" field Morningstar Direct lists the name of all the fund managers along with their starting and ending dates. These data are used to determine whether a change has been made in management companies, whether the fund is single-managed or team-managed, and if one or both have been changed more than once. This is accomplished in three steps. First, if there is only one manager name listed in a given year, that fund is characterized as an single-managed for the entire year. If, however, there is more than one manager name listed, the fund is labeled as team-managed. Second, it is possible that a fund did not switch their management team structure but still made changes. For example, a fund could be identified as team-managed in one year, but in the next year none of the members are the same. Thus, it is important to determine whether there was a change in the management team composition in addition to management structure. This distinction is made using the following rule. If any of the

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7. Nanda, Wang, and Zheng (2005) document that 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 percent of mutual funds offered more than one share class. Multiple share classes of the same fund have basically the same name. Their names differ only by the name of the, i.e. Vanguard Growth A, "Vanguard Growth B, etc.

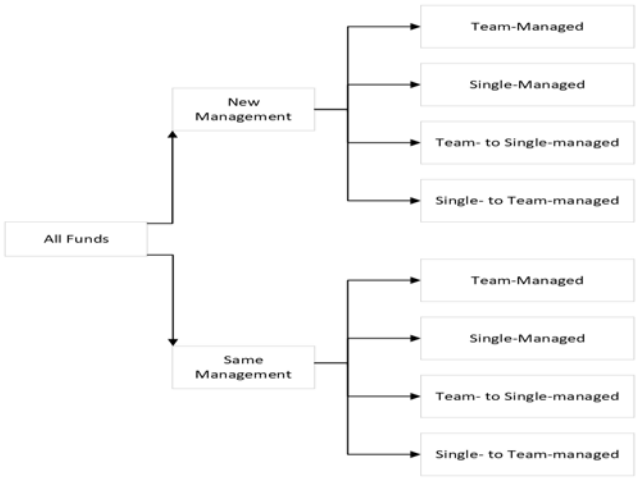

Figure 1—Schematic Diagram of Management Company and Fund Investment Decision Structure

managers listed in any specific year are also part of the management team the following year, the fund is categorized as same-team managed (no change in management company). If none of the managers are common between two consecutive years, the fund is categorized as new-team managed (change in management company). Third, it is also possible that a fund has made one or more of these changes more than once. When this happens, each change is recorded. As a result the data set analyzed is not the number of funds of funds; instead it is the number of fund-years.

Data Overview

Figure 1 provides a schematic perspective of the data used in this study. The first division of mutual funds depends on whether the mutual fund has moved from one management company to another or has remained a client of its current company. The second division relates to the way that the team is managed. Regardless, of the outcome of the management company decision, the fund faces management structure choices. The fund can continue with its current management structure, i.e., if it managed by a single manager or a team of managers, it can keep the status quo. If, however, the fund is single-managed, it has the ability to change to its structure so that it is team managed. Similarly,

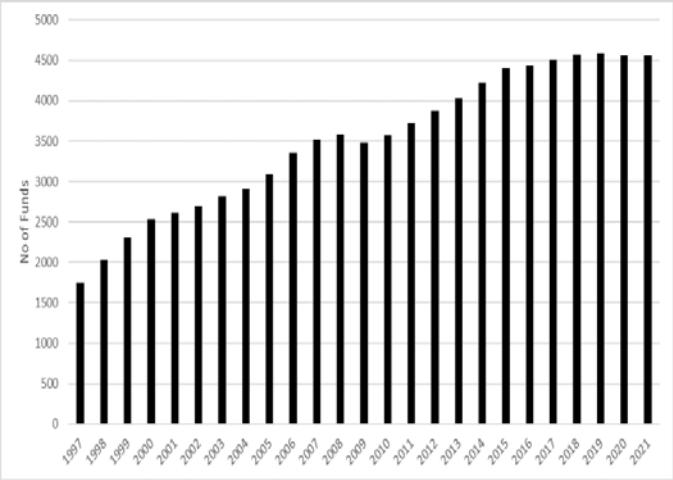

Figure 2—Total Number of Mutual Funds from 1997 to 2021

Note: Graph includes only aggressive, growth, income, and equity-income funds

a team-managed fund has the opportunity to move to a single-managed structure.

Figure 2 is the first of four figures to summarize the data used in this study. It shows the total number of mutual funds from 1997 to 2021 by year, with the total number of fund-years equaling 88,021. Over the 25 year period, the yearly number combined increased by 260 percent, which equates to an annual growth, rate of 3.9 percent. However, this growth rate is not always positive as shown by 2009, 2020 and 2021. These three years were times of financial stress with 2009 being the second half of what is often referred to as "The Great Recession" and 2020 being the start of the COVID crisis that lasted at least until 2022.

Figure 3 examines the relationship between team- and single-managed funds from the perspective of whether or not the switch involved a change in the management company or the fund continued to patronize the current company. The view point is from the team- to single-management perspective. Turning first to all changes, the annual percentage hovers around 50 percent. The average value of this percentage is 49.31 and is not significantly different from one half at any conventional level of statistical confidence (p-value = 0.738). The time series behavior of the new management company is similar to that of the combined group with an average value of 51.90 percent (p-value

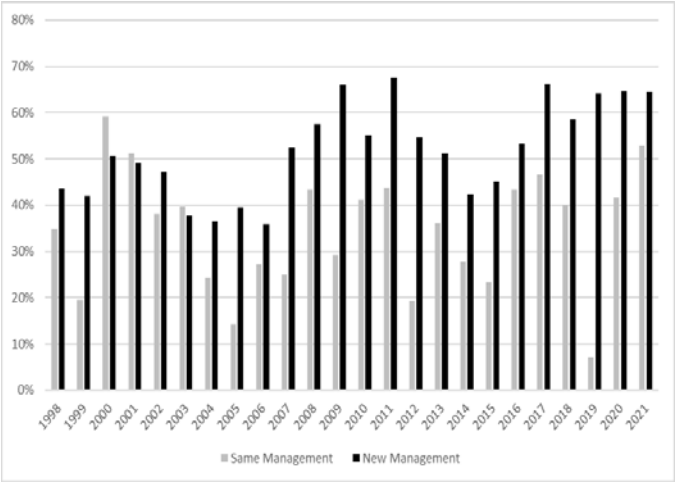

Figure 3—Percent of the Total Number of Mutual Funds that Switched from Team- to Single-Managed, Managed by the Same Company or by a New Company

= 0.371). The behavior of keeping the same management company is somewhat different. Its mean is 34.56 percent (p-value = 0.000), and it time series behavior contains large drops, especially noticeable in 2005 and 2019.

Figure 4 displays the annual percent of mutual funds that are team-managed and those that are individually managed. For the 25 year period being investigated, the market share of the two types of management dramatically shifted. In 1997, 43 percent of the funds were team managed, but in 2021 these funds accounted for 64 percent of the total number of funds. This growth did not occur in a smooth fashion. It began in 2003 and ended four years later in 2007. From 2007 to 2021 there has not been any noticeable trend, with the portion of team-managed funds following a several year cycle peaking in 2015 at 68 percent.

Some of the above changes reflect new funds being established and existing funds exiting the industry. A noticeable number of funds, however, changed from team- to single-managed and vice versa. Figure 5 shows the number of these changes by year for the study period. Of special note is the substantial increase in the number of funds changing from single-managed to team-managed from 2003 to 2007. These

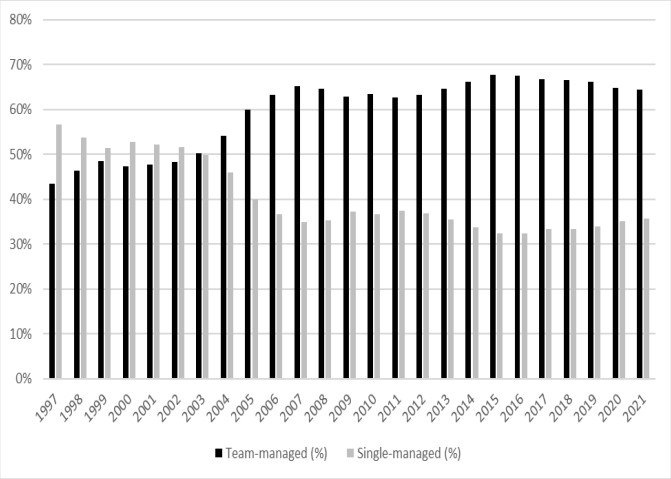

Figure 4—Percent of Total Mutual Funds

changes echo the previously jump in the number of teams movement noted in the previous paragraph concerning Figure 4. Moreover, from 1998 to 2007, in nine of the 10 years (90.0 percent), the number of funds changing from single- to team-managed exceeded the number that changed from team- to single-managed. In contrast, from 2007 to 2021, the number dropped to four out of 14 years (28.6 percent.)

III. Statistical Method and Approach

Fund performance is measured by the 1-factor market model (Sharpe, 1964; Litner, 1965; Mossin, 1966) and the 4-factor market model (Carhart, 1997).[8] The 1-factor model linearly relates the return of a

8. The notion that an asset's portfolio risk and return are linked together is not new. For example, Sullivan (2011) quotes from the Talmud (est. 500 CE) that "… A man should always keep his wealth in three forms: one-third in real estate, another in merchandise, and the other in liquid assets." He also reports that in 1738 Daniel Bernoulli opined that "…it is advisable to divide goods that are exposed to some small danger into several small portions rather than to risk them all together." In the 1950s Markowitz (1952, 1959) and Roy (1952) operationalized these risk-return concepts by developing mathematical models that linked the two concepts, and this linkage became the basis for the 1- factor market model.

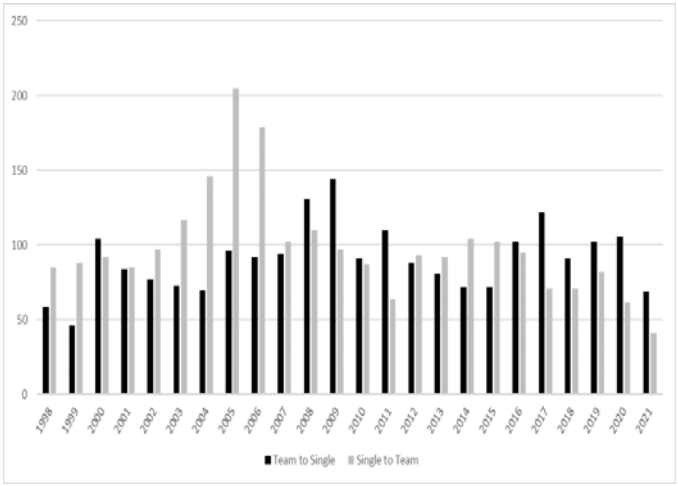

Figure 5—Number of Mutual Funds Changing Management Organizational Structure

stock or group of stocks to the return of the market and includes a constant term. The constant term is interpreted as the amount of the return that is not explained by the market return. The 4-factor model is similar to the 1-factor model but it adds three additional explanatory variables in an effort to better capture additional market influences that are not directly contained in the market return. Because both models are predicated on the notion that the stock market quickly gathers and processes all relevant information, the value of the constant term is attributed to information unavailable to the market as a whole but possibly known by one or a few market participants. As a result, the constant term is often considered a measure of superior stock selection.

The 1-factor model, usually referred to as the capital asset pricing model or simply CAPM, can be specified as

$$R_{i,t} + CM_{i,t} - RF_t = a_i + \beta_{i,m}\left(MR_t - RF_t\right) + \varepsilon_{i,t} \tag{1}$$

where i indicates fund and t denotes month. $R_{i,t}$ is the month-t return for fund i, MR_t is corresponding market return, and RF_t denotes the risk free rate. $CM_{i,t}$ is an addition to the traditional CAPM and represents the cost of managing the mutual fund portfolio so that ($R_{i,t}$ + $CM_{i,t}$) represents

gross return. Gross returns are used because superior managers or organizational forms may receive rents through higher expenses that are passed on to mutual fund investors. As a result, superior performance by might not show up if only net returns are used. The constant term (a_i) measures the amount return of return that is attributed to the fund that is unexpected given the fund's systematic risk ($\beta_{i,m}$). In this context, alpha is typically interpreted as the return associated with the ability of the fund manager(s) to select the stocks that make up the fund. The last term, $\varepsilon_{i,t}$, is the error term and is assumed to be Gaussian distributed with a zero mean.

Carhart (1997) expands the 1-factor model by adding three independent market-related variables to eq. (1). The purpose of these variables is to capture various vagaries in the market that are not adequately captured by the excess market return ($MR_t - RF_t$). These additions result in

$$R_{i,t} + CM_{i,t} - RF_t = a_i + \beta_{i,m}\left(MR_t - RF_t\right) + \beta_{i,SMB}\,SMB_t + \beta_{i,HML}HML_t + \beta_{i,UMD}\,UMD_t + \varepsilon_{i,t} \quad (2)$$

The three variables added eq. (1), are the returns of zero-cost portfolios that are created by creating offsetting short and long portfolio of stocks with opposing characteristics. Specifically, SMB_t measures the return of a portfolio that is long on small capitalization and short on big capitalization stock portfolios. Similarly, HML_t is the return of a portfolio that is long on high book to market stocks and short on those stocks that exhibit a low book-to-market ratio. Finally, UMD_t represents a long position on the previous 12-month return on winners and short position on the losers.

For completeness the estimation results for both models are reported. Nevertheless, the focus of the analysis is the Carhart (1997) version. This is because, as Carhart (1997) and others point out, the return of the market as a whole but it may not adequately pick of some of the internal behavior of the market that might be exploited either by professional stock fund managers as a group.[9] This distinction is important because

9. Carhart (1997) is not the only multifactor asset pricing model used in the professional and academic literature. For instance, 3- and 5- factor have been developed by Fama and French (1993) and Fama and French (2015). The first three factors are the same for each model. Carhart (1997) adds UMD to Fama and French's (1993) model. Fama and French

these fund managers have become aware of this market behavior and have the tools and experience to exploit it.

Mutual fund returns (*R*) and the cost of managing the fund (*CM*) are from Morningstar Direct. *CM* is provided on an annual basis and is equally apportioned to each month. The monthly value-weighted NYSE /AMEX/Nasdaq composite index is used to measure market return, and the one-month T-bill rate from Ibbotson Associates is the risk-free rate (*RF*) employed to calculate excess market returns. Returns on the *HML* (high minus low book-to-market returns), *SMB* (small minus big stock returns) zero-investment portfolios, as well as returns on a momentum portfolio (*UMD*) come from Kenneth French's website (https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data library.html). This website also provides a detailed description of these three variables.

Prior to estimating eq.s (1) and (2), all data are converted to annual decimal units. As a result estimated alpha values are similarly expressed and can be easily converted into percentage returns or basis points. To compare the differences in the alphas between the various pairs of management configurations, a two-sample t-test is used. Instead of asterisks, p-values are used to determine statistical significance because the sample sizes range from under 100 to over 20,000. As is pointed out by Ziliac and McCloskey (2008), Lin, et al. (2013), Shi et al. (2022) and others, large sample sizes give rise to the Large Sample Fallacy (LSF). This phenomenon occurs in statistical significance tests, such as the t- and Z-tests, that use sample size(s) in the denominator of their calculation. Thus, a statistic value for a small sample may be insignificant but the same value may be significant for a large sample. Two solutions to this problem have been traditionally proposed. First, the acceptable p-value can be lowered as sample size increases. For instance, some argue that for a sample size of 10,000 nothing larger than a p-value of 0.01 should be considered significant. Second, the parameter being tested can be viewed as whether or not it is economically meaningful. Abadie (2020) strongly argues that although statistical significance has its uses because it quantifies type-1 and type-2 errors,

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(2015) replaces UMD with RMW and CMA. RMW is the return of a portfolio that is long on stocks associated with robust profits and short on those with weak profits. A CMA portfolio is one that is long on stocks of firms that invest conservatively and short on those that are aggressive investors. Roy and Shijin (2018) extend Fama and French's (2015) model by adding a variable to measure the impact of a company's human capital - the growth rate of labor income (LBR).

it should not be the only measure of importance. Thus, he advocates that not only should the statistical significance results be reported but also those results that do not meet the assumed criterion level in order to provide a truer picture of the phenomena being studied. In this paper, the standard p-values, rounded to 0.000, are recorded for the estimated valued of the parameters of eq.s (1) and (2). However, for the discussions in which the statistical results are discussed in an economic context, p-values are often ignored.

IV. Empirical Analysis

Regression Results

Equations (1) and (2) require that for each change of management that each mutual fund has twelve monthly returns in the year prior to the management change and the same number of returns in the year after the change. Not all of the funds included in Morningstar Direct meet this requirement. A substantial number did, however. As shown in Table 1, the total number of fund-years is 23,919. Most of these (23,234) are attributed to same management changes with the remainder (685) being the number of funds that changed management companies.

Table 1 also presents the performance (1-factor and 4-factor alpha) results for the two classes of management for the year before the management change and the year after the change. It is the difference between these two years that is the crux of the analysis. Both the 1-factor and 4-factor models indicate an increase in alpha (103 and 68 basis points) when a fund changes its investment advisor, and a decrease in alpha (154 and 151 basis points) when a fund does not change. A switch from the current advisor to a new investment advisor amounts to 257 basis points for the 1-factor model and 219 basis points for the 4-factor model. Both are statistically significant despite the relatively large sample size.

When a fund changes an advisor, it also needs to decide if there should be a change in management structure. If the fund is managed by an individual, should it continue to be single-managed or should it be restructured as a team? Similarly, if the fund is team-managed should it continue to be so or would its performance be enhanced if it was changed to a single-managed endeavor? The same questions surface when a fund determines that it is not necessary to change its advisor.

TABLE 1. Management Company Change

	New Management	Same Management	Difference (new − same)
Previous year			
1-factor alpha	1.75	2.55	−0.80 (0.000)
4-factor alpha	1.18	2.34	−1.16 (0.000)
Next year			
1-factor alpha	2.78	1.01	1.77 (0.142)
4-factor alpha	1.86	0.83	1.03 (0.073)
Difference (Next year − Previous year)			
1-factor alpha	1.03 (0.017)	−1.54 (0.000)	2.57 (0.000)
4-factor alpha	0.68 (0.099)	−1.51 (0.000)	2.19 (0.000)
N	685	23,234	23,919

Note: P-values are in parentheses, and those reported as 0.000 are 0.000499 or smaller.

Statistical information involving a single managed and a team managed funds that did undergo a change in investment advisor is provided in Table 2. There are four important takeaways from this table. First, when there was no structural change, the single-managed fund (column 1) significantly outperformed the team-managed fund (column 2) by 75 basis points for 1-factor model and 128 basis points for the 4-factor model. Second, in contrast, when there was a structural change, i.e., single to team-managed (column 3) and team to single-managed (column 4), neither of the factor models generated a significant alpha. Third, the performance difference between the single to a team-managed (column 3) and single-managed (column 1) is statistically insignificant using the 1-factor model, but, according to the 4-factor model, it is statistically significant. Nevertheless, the magnitude of the 4-factor model alpha is small (two basis points) and, hence, can be considered economically insignificant. Fourth, comparing the performance differences between team (column 2) to team to single-managed (column 4) shows that

TABLE 2. Funds that Did Change Management Company

	No Structure Change		Structure Change							
	Single	Team	Single to Team	Team to Single	Column Difference					
	(1)	(2)	(3)	(4)	(4)−(3)	(2)−(1)	(3)−(1)	(4)−(2)	(3)−(2)	(4)−(1)
Previous Year										
One-factor alpha	2.13	0.5	2.84	1.41	−1.43	−1.63	0.71	0.91	2.34	−0.72
					(0.843)	(0.000)	(0.451)	(0.001)	(0.006)	(0.715)
Four-factor alpha	1.05	1.27	1.40	0.83	−0.57	0.22	0.35	−0.44	0.13	−0.22
					(0.126)	(0.000)	(0.026)	(0.009)	(0.000)	(0.961)
Next year										
One-factor alpha	3.53	1.15	3.58	2.83	−0.75	−2.38	0.05	1.68	2.43	−0.7
					(0.098)	(0.008)	(0.018)	(0.064)	(0.843)	(0.906)
Four-factor alpha	2.04	0.98	2.37	2.39	0.02	−1.06	0.33	1.41	1.39	0.35
					(0.423)	(0.001)	(0.081)	(0.065)	(0.193)	(0.609)
Difference (Next year − Previous year)										
One-factor alpha	1.40	0.65	0.74	1.42	0.68	−0.75	−0.66	0.77	0.09	0.02
	(0.061)	(0.340)	(0.405)	(0.333)	(0.338)	(0.006)	(0.808)	(0.001)	(0.005)	(0.233)
Four-factor alpha	0.99	−0.29	0.97	1.56	0.59	−1.28	−0.02	1.85	1.26	0.57
	(0.162)	(0.650)	(0.305)	(0.243)	(0.338)	(0.002)	(0.068)	(0.003)	(0.000)	(0.464)
N	237	197	174	77	251	434	411	274	371	314

Note: P-values are in parentheses, and those reported as 0.000 are 0.000499 or smaller.

regardless of which factor model is used, the team to single-managed fund provides statistically superior returns than the fund that kept the team management.

Statistical information involving the single-managed and team-managed funds that did not undergo a change in investment advisor is provided in Table 3. Similar to Table 2, there are four major takeaways from this table. First, the performance of single-managed (column 1) and team-managed (column 2) both incurred statistically significant losses. The single-managed funds lost 127 (121) basis points using the 1-factor (4-factor) model. At the same time, team-managed funds lost 134 basis points with both factors giving identical results. The difference in loss between the losses, seven and 13 basis points is statistically significant. Second, with structure change, both single to team-managed (column 3) and team to single-managed (column 4), alpha values declined. The only decline that was not significantly different from zero is from the 1-factor alpha value for team to single-managed category. Third, in the previous and next year comparisons cases, the single-managed fund (column 1) outperformed those funds that changed from single to team-managed (column 3). Nevertheless, both experienced a decrease in their 1- and 4-factor alphas. This decrease is smaller and statistically significant for the single to team-managed fund, i.e., five and 13 basis for the 1-factor and 4-factor models, respectively. Finally, there are relatively small but statistically significant differences between the team to single-managed funds (column 4) and the team-managed fund (column 2). For example, the difference in alphas in favor of the team to single-management funds is 58 basis points using the 1-factor model and less than five thousandth of a basis point if the 4-factor performance model is used.

Discussion

The Carhart (1997) 4-factor model results show that funds that remained single-managed significantly outperformed the corresponding team-managed funds by 128 basis points as well the single-managed funds that converted to the team-managed structure by two basis points funds. Team-managed funds underperformed single-managed funds that changed to team-managed funds by 126 basis points. Single-managed funds, team-managed, and single-managed to team-managed also underperformed, by 57 basis points, team-managed by 185 basis points, and 59 basis points when compared the team-managed funds that have changed their structure to single-

TABLE 3. Funds that Did Not Change Management Company

	No Structure Change		Structure Change							
	Single	Team	Single to Team	Team to Single	Column Difference					
	(1)	(2)	(3)	(4)	(4)−(3)	(2)−(1)	(3)−(1)	(4)−(2)	(3)−(2)	(4)−(1)
Previous Year										
One-factor alpha	2.90	2.17	2.17	2.22	0.05	−0.73	−0.73	0.05	0.00	−0.68
					(0.446)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Four-factor alpha	2.25	2.10	1.96	2.02	0.06	−0.15	−0.29	−0.08	−0.14	−0.23
					(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Next year										
One-factor alpha	1.63	0.83	0.95	1.46	0.51	−0.8	−0.68	0.63	0.12	−0.17
					(0.023)	(0.000)	(0.000)	(0.037)	(0.350)	(0.357)
Four-factor alpha	1.04	0.76	1.02	0.68	−0.34	−0.28	−0.02	−0.08	0.26	−0.36
					(0.022)	(0.000)	(0.000)	(0.000)	(0.263)	(0.000)
Difference (Next year − Previous year)										
One-factor alpha	−1.27	−1.34	−1.22	−0.76	0.46	−0.07	0.05	0.58	0.12	0.51
	(0.000)	(0.000)	(0.011)	(0.254)	(0.178)	(0.000)	(0.000)	(0.000)	(0.000)	(0.468)
Four-factor alpha	−1.21	−1.34	−0.94	−1.34	−0.4	−0.13	0.27	0	0.4	−0.13
	(0.000)	(0.000)	(0.056)	(0.022)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
N	5,080	17,211	599	343	942	22,291	5,679	17,554	17,810	5,423

Note: P-values are in parentheses, and those reported as 0.000 are 0.000499 or smaller.

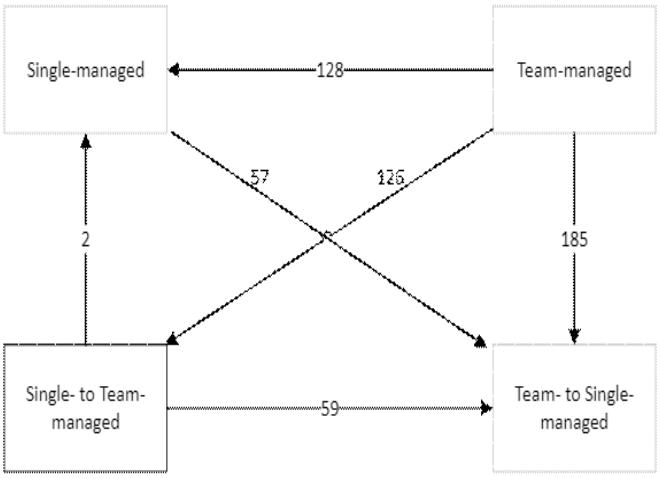

Figure 6—Management Structure Dominance After Change in the Management Company

Note: Changes in 4-factor alpha (in basis points) with arrows indicating the direction of the change.

managed. A graphic depiction of these return differences are shown in Figure 6 for the funds that changed their management company. The arrows show the dominance (positive difference) in terms of 4-factor alpha between the four categories of managed funds.

Figure 7 displays a diagram similar to Figure 6 for the mutual funds that did not change their management but did engage in changing management structure. Single-managed funds outperform team-managed funds by 13 basis points. They also outperform team-managed to single-managed fund by 13 basis points but underperform by 27-basis points the single-managed funds that changed to team-management. The single-managed to team-managed fund outperformed the team-managed fund by 40 basis points and did the same when compared to the single-managed fund that had been team-managed. There is no basis point difference between the team-managed funds and the funds that changed to the single managed category.

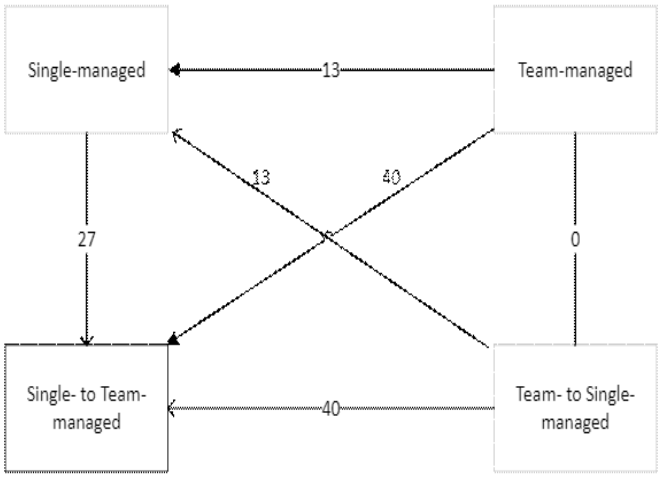

Figure 7— Management Structure Dominance with no Change in the Management Company

Note: Changes in 4-factor alpha (in basis points) with arrows indicating the direction of the change.

The performance differences, as measured by alpha return basis points, between the funds that changed their management company and those that did not change is striking. As shown is Figure 8, the single-managed funds that changed management company outperformed the corresponding team-managed funds by 115 basis points. The team-managed funds that switched to a single-management structure obtained higher performance than not only the team-managed funds (185 basis points), but also the single-managed funds (70 basis points) and those managed funds that changed from single management to team (99 basis points). In contrast, funds that changed from single-management to team management outperformed both single-managed and team managed funds by 29 and 86 basis points, respectively.

These empirical performance relationships suggests the following market dynamics concerning the dual decisions of changing management company and management structure. First, with respect to management skills that are able to be captured by alpha, single-managed funds tend to outperform team-managed funds, but this difference is more notable

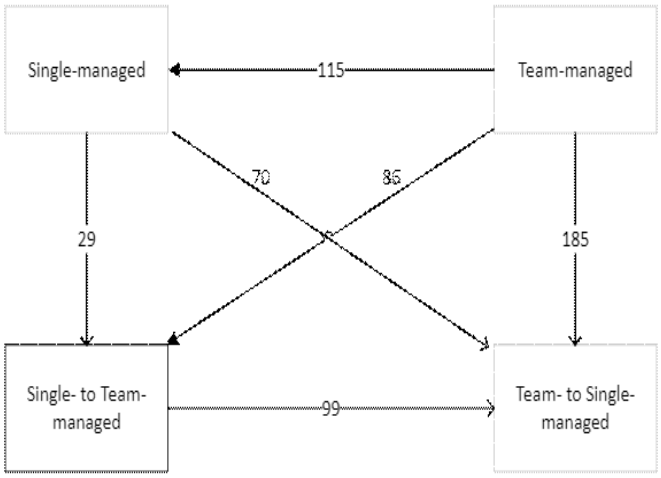

Figure 8—Difference Between the Management Structure Dominances of Funds that Changed Management Companies (Figure 6) and Those Funds that Did Not Change Management Companies (Figure 7)

Notes: Changes in 4-factor alpha (in basis points) with arrows indicating the direction of the change.

in funds that change their management company. This finding supports the notion that the management company is an important factor to consider when investing in a mutual fund. Second, when the management company does not change, there does not appear to be any incentive for a team-managed fund to change its management structure. In contrast, to when there is a change in the management company, there is one. In addition, there seems to be an incentive for a single-managed fund to become team-managed, when there is no change management company. One explanation that has been suggested is the size of the fund.

V. Conclusion

In the last 25 years numerous studies have addressed the issue of whether or not team managed mutual funds outperform funds that are managed by a single manager. Interest in this topic generally began in

the in the 1990s when the most common management was that of a single manager but it was noticed that some funds began to change to a team of managers. This trend continued until the middle of the first decade of the 21st century. Since the then, the changes have continued but in the aggregate there seems to be no strong preference for a fund to be single-managed or team-managed. The decision to change this type of management structure is confounded by another important management decision, i.e., should the fund change its management company.

Using the most recent (at the time this research was done) 25 years of data (1997 – 2021), an extensive analysis of the joint performance of a mutual fund's management company and its management structure tends to favor funds that not only use a single manager but also are willing to change the fund's management. The ultimate responsibility for these decisions rests with the funds a board of directors. The board's actions, however, must reflect the needs of the fund's clientele. Its decisions may reflect the size of the fund, since many investment professionals and investors embrace the view that a single manager is not able to effectively manage a large, diverse stock portfolio.

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