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Do Teams Perform Better than Singles? : Evidence from the Mutual Fund Industry in Korea*

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Abstract

Purpose - The purpose of this paper is to investigate the potential benefits or detriments of team management on fund performance in the mutual fund market. An additional purpose of this study is to examine the optimal number of managers in a fund industry for superior performance.

Research design, data, and methodology - This paper investigates the effect of managerial structure on fund performance in the Korean active mutual fund market between 2001 and 2008. For this, we analyze two risk-adjusted performances measures- the capital asset pricing model (CAPM) and the three-factor model of Fama & French (1993).

Results - First, we found that single-managed funds exhibited superior performance. Second major finding was that as the number of managers in a fund increases, the fund performance deteriorates. Finally, the results reveal that the sharpest performance drop occurs when team size increases from a 5-person team to a 6-person team.

Conclusions – The results suggest that the management structure can be a source of competitive advantage for fund performance. As considering fund performance is the outcome of managers' decision-making, this study contributes to not only the financial literature but also the literature in other areas, such as management and general business.

Keywords: Fund Performance, Managerial Structure, Optimal Size.

JEL Classifications: D7, G11, G23.

1. Introduction

This paper investigates the impact of fund managerial structure on fund performance in the Korean mutual fund market. In the line of inquiry on common factors for superior fund performance and performance persistence, most of the extant studies have focused on fund characteristics, including fund size, money inflows, and past fund performance. From the past few years, a few studies have begun to explore the effect of managerial structure on fund performance, given the trend of growing team management in the mutual fund industry. However, despite the growing interest in this managerial issue in the U.S. mutual fund market, to the best of our knowledge, no research has been conducted outside the U.S.

The recent trend in the U.S. mutual fund market suggests that two or more heads are better than one. There is widespread evidence that, in the U.S., each year more and more mutual funds are managed by teams consisted of multiple professional managers. Bär, Kemp, and Ruenzi (2005) say that 46% of US equity funds were managed by teams in 2003, while this rate was only 5% in 1994. With the growing importance of team management in the mutual fund industry, the question arises whether the performance of team-managed funds is distinctively different from that of single-managed funds. The answer to this question has important implications for investors, fund managers, fund companies, and academicians. As the mutual funds have evolved as a crucial element in portfolios of individual investors, they are increasingly interested in the determinants affecting fund performance and are demanding detailed information on mutual funds for their fund selection. Hence, the study regarding the influence of managerial structure on fund performance can help investors in the fund selection. For fund managers and fund companies, this study is beneficial as they seek better fund performance. If managerial structure influences fund performance, the fund managers and fund companies can generate higher profit by

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adjusting the fund managerial structure, and if not, they can concentrate their efforts on other factors without serious concern regarding the managerial structure. For academicians in finance, this study can inform on the importance of managerial structure, which has not been well investigated to date. In addition, we expect this study could be beneficial not only for academicians in finance, but also for those in other fields, such as management and general business, given the influence of group decision making on performance, which is an attractive, albeit controversial, issue.

While the effect of managerial structure on fund performance is an important issue, very little relevant research has been conducted on this link, although a large body of extant financial literature has examined whether some individual managers have the skills to generate superior performance compared to other individual managers. For example, Grinblatt and Titman (1992), Goetzmann and Ibbotson (1994), Brown and Goetzmann (1995), Elton, Gruber, and Blake (1996), and Bollen and Busse (2005), among others, insist that past winner funds tend to achieve better performance and past loser funds are more likely to produce worse performance. Many researchers also have tried to explain the common factors for superior performance of mutual funds. For example, Grinblatt and Titman (1989) insist that the size of the fund has a negative effect on the fund performance, by showing that the returns for smaller funds are approximately 2.5% higher than the returns for larger funds. A research by Chen, Hong, Huang, and Kubik (2004) also examine the effect of fund size on mutual fund performance.

More recently, attention has turned towards the role of managerial characteristics on the performance of a fund. Fund managers can generate positive excess returns by making correct decisions on asset allocation, security selection, and market timing. Considering that many funds are managed by groups of managers, the fund's management structure can be a source of competitive advantage for a fund. However, while a large number of studies have been devoted to the effectiveness of group and individual decision-makings in the management and psychology literature, only limited research has been conducted in the finance area to identify whether the team is a better management structure.

In the literature outside the financial area, Stock (2004), for example, documents that the behavior of teams is different from that of individuals, but he reports that this difference is not necessarily related to performance. Laughlin, Bonner, and Miner (2002), Sniezek and Henry (1989), and Tindale and Sheffey (2002) report better performance of teams. On the other hand, Steiner(1972)'s model describes the concept of process loss, which leads group decisions to fall short of reasonable productivity. Diehl and Stroebe (1987) and Paulus and Dzindolet (1993) argue that there is the productivity loss associated with group decisions. Kang and Hwang (2017) provide solutions to resolve problems in team management, such as free-rider issue, unfair job assignment, and bickering between team members. By analyzing the hotel industry, Ryu and Lee (2016) present that team commitment of members can have positive influence on innovative activities, the critical factor for success in the recent business environment.

Compared to the extensive debate in the management and psychology literature, only limited research addresses this issue of the relationship between group decision making and performance in the finance literature. In addition, most of these finance studies have been performed in experimental settings (see, for example, McNamara & Bromiley, 1997). Furthermore, mainly due to the lack of details regarding how many people are managing a fund, scarce research is available regarding this issue in the mutual fund industry.

In the economic and finance literature, some studies highlight the positive effect of group decision making, while some note the negative effects of group thinking in the decision making process. For example, the works of Holmstrom (1982), Rasmusen (1987), McAfee and McMillan (1987) and many others imply inferior performance of a group due to the problem of moral hazard. Sharpe (1981), however, asserts that teams can achieve benefits from diversification of judgment and specialization of team members. Analyzing the garment factory operated in Napa, California, from 1995 to 1997, Hamilton, Nickerson, and Owan (2003) find that teams generate lower productivity than individuals.

The list of empirical finance studies that address this issue in the mutual fund market is not very extensive. Additionally, previous studies do not reach a satisfactory degree of consensus. For example, Prather and Middleton (2002) and Bliss, Porter, and Schwarz (2008) find no evidence showing significant difference in fund performances between group decision making and individual decision making. However, the sample used by Prather and Middleton (2002) is known to have large survivorship bias. Some researchers, including Massa, Reuter, and Zitzewitz (2010), have argued that the CRSP data used for the work of Bliss et al. (2008) and Bär, Kempf, and Ruenzi (2011) are not proper for managerial studies. Chen et al. (2004) exhibit evidence that the fund performance of group decision making is inferior to that of individual decision making by approximately 0.04 percent per month, and Bär et al. (2011) also show that the performance of multi-manager funds is not as good as that of single-manager funds.

The major goal of this paper is to empirically study the potential benefits or detriments of team management on fund performance in the Korean mutual fund industry. To the best of our knowledge, no research has attempted to identify whether the group work of fund managers benefits or harms fund performance in other countries outside the US. An additional purpose of this study is to examine the optimal number of managers in a team for superior fund

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performance. Some recent papers investigate whether there exists a linear relation between team size and performance. Using the garment industry, Hamilton et al. (2003) find non-linear benefits of team size on productivity. Laughlin, Hatch, Silver, and Boh (2006) find that a three-person group is optimal for generating superior performance compared to individuals when dealing with sophisticated problems. However, the work of Hamilton et al. (2003) is conducted using an extremely limited sample, and the work of Laughlin et al. (2006) is conducted in a laboratory setting. We believe that the only study addressing this issue in the mutual fund industry is the work of Patel and Sarkissian (2017), which provides evidence that the three-person team is the optimal size for achieving high performance.

To fulfill our goals, we conduct a comprehensive analysis of the impact of management structure on fund performance using detailed Korean mutual fund data. In addition, because the Korean fund industry has experienced tremendous growth since 2005, we investigate the effect of team structure on performance by sub-periods split by 2005, the benchmark year. The size of Korean mutual funds invested mainly in equities was about 4 trillion Korean won at the end of 2000. During 2005, assets under management rose from 8.6 trillion Korean won to 26.2 trillion Korean won and at the end of 2008, the size of this market was 140 trillion Korean won. Along with this growth of the fund industry, fund managers commanding high salaries have begun to inevitably attract the media spotlight, which, in turn, has brought attention on the decision making of these fund managers.

This paper presents three main findings. First, unlike the case of the US mutual fund industry, the portion of single-managed funds has increased in the past decade in the Korean mutual fund market. Second, we provide evidence that the performance of team-managed funds is inferior to that of solo-managed funds. This is robust with two different performance benchmarks, the CAPM adjusted returns and the returns adjusted by the Fama and French (1993)'s three-factor model. When we delve into this issue for two distinct sub-periods (before 2005; 2005 and after), the pre-2005 period does not show any effect of management structure on fund performance, whereas the post-2005 period shows clear evidence of a negative effect of team management on fund performance. Considering the explosive growth of the Korean mutual fund industry since 2005, this phenomenon suggests that after the early stage of the new industry, the Korean mutual market has begun to systematically work beginning in 2005. Third, we find weak evidence of the benefit of three-person groups and also find the sharpest drop of fund performance when the number of managers increases from 5 members to 6 members.

The major contribution of this paper lies in being the first study to examine the influence of team management on fund performance outside the U.S. Our results provide supportive evidence that team management deteriorates fund performance. Furthermore, because team-management exhibits inferior performance, it could explain the phenomenon of the decreasing number of funds managed by teams in the Korean mutual fund industry. This paper has vital implications for fund management companies as well as for individual investors. In addition, showing evidence of negative effects of group decision making, this paper also contributes to the literature in general business area.

The remainder of the paper is organized as follows. Section 2 describes the data sources and analysis methods, and Section 3 presents the empirical results. Section 4 provides conclusions.

2. Data and Methodology

2.1. Data

Our empirical analysis is primarily based on the data from ZeroIn Co., a fund evaluation company in Korea. This data covers most of the detailed information, including monthly fund returns, total net assets, and portfolio holdings until 2008. Because the distinctive influence of decision making on performance by groups and individuals would be most pronounced in funds investing in stocks, we use the sample of Korean active funds that mainly invest in Korean equities. Therefore, our sample does not include index, bond, and international funds for a proper comparison. Information on each stock is obtained from the Data-Guide Pro. Risk-free rates of return are collected from the Economic Statistical System provided by the Bank of Korea. As a proxy for market returns, we use the value-weighted market returns because a fund portfolio includes stocks both in the Korea Stock Exchange (KSE) and the Korean Securities Dealers Automated Quotation (KOSDAQ) market. The KSE, the primary market in Korea, can be is considered the equivalent of the NYSE in the US and KOSDAQ, the secondary market in Korea, is similar to the NASDAQ. We obtain the value-weighted market returns from the KCMI database.

It is well known in mutual fund literature that biases such as incubation, survivorship, and selection can influence results, and accordingly, researchers have attempted to include proper funds in their sample data. Following the commonly used correction method in previous research, we, too, strive to alleviate related biases. One of the severe biases with fund databases is the incubation bias. The incubation bias is emphasized in Evans (2010) with the evidence that funds in their early stages exhibit outperformance of 3.5%. To reduce the incubation bias, which typically occurs at an incubation stage when a new fund is opening to the public, we follow the method used in Fama and French (2010). Adopting their method of setting a $5 million asset under management (AUM) bound, we set a KRW 10 million AUM bound for a fund to be included in our data sample. For the empirical analysis, we also set a 6-month bound, thus requiring a fund to have a return

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history of at least 6 months. With respect to the survivorship and selection biases, we do not expect these biases to significantly distort our results because the main data source, the ZeroIn database, contains both dead and ongoing funds.

In addition to the information extracted from the major data source, we construct a dataset by manually collecting various characteristics of fund managers, such as age and experience, and the number of managers in a fund from the Korean Financial Investment Association. This data covers the period from January 1999 to August 2011 and includes 2,551 funds mainly investing in the Korean equity market. Because the goal of this article is to determine whether team-managed and single-managed funds make different investment decisions leading to different performance outcomes, following standard practice in mutual fund literature, we also omit index, bond, international, and sector funds.

The previous studies addressing the management structure issue in the U.S. mutual fund market extract sample data from the CRSP or Morningstar database. However, as mentioned in extant articles, the information provided by these two data sources has large discrepancies, which could lead to conflicting results regarding the effect of managerial structure on fund performance. In addition, the extant studies use the 12-month horizon for team size, which can introduce bias in their analysis because this dataset ignores the member change of a fund during a year. Because the Korean mutual fund data provides information on the managers involved in a fund on a monthly basis, by using these data we could achieve more accurate results with the consideration of the member change that occurs throughout a year. By merging these two main data sets - one provided by ZeroIn Co. and the other which is hand-collected- we construct our sample of 393 funds with detailed fund manager information for the period from 2001 to 2008.

2.2. Performances Measures

To determine the effects of teams and single managers on fund performance, we analyze two risk-adjusted performances measures. Consistent with Chen et al. (2004), using various benchmarks, we can deal with the heterogeneity of fund styles. One is adjusted by the capital asset pricing model (CAPM), and the other is adjusted by the three-factor model of Fama and French (1993).

For the performance measure using the CAPM as the benchmark, we use the following model:

$$R_{it} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + e_{it} ,$$

where R_{it} is the return on fund i for day t, R_{ft} is the risk-free rate of return for day t, R_{mt} is the return on the KSE and KOSDAQ value-weighted market return, and e_{it} is an error term. Thus, ai represents the excess return of fund i for month t, compared to the benchmark.

For the performance measure using the three-factor model as the benchmark, we use the following model:

$$R - R_{ft}b = a_i + b_i(R_{mt} - R_{ft}) + s_i SMB_t + h_i HML_t + e$$

R_{it}	:	fund return of fund i for time t
R_{ft}	:	risk-free return of time t
R_{mt}	:	market return of time t
SMB_t	:	size effect of time t
HML_t	:	growth effect of time t
e_{it}	:	residual of fund i

Thus, a_i represents the excess return of fund i for month t, compared to the performance when the 3-factor model is used as the benchmark.

2.3. Regression Specifications

To address our major concern, that is, between team-managed and single-managed structures, which one has a positive influence on fund performance, we utilize the following regression model:

$$Performance_{it} = c_0 + c_1 TeamDum_{it} + c_2 Controls_{it} + e_{it},$$

where $Performance_{it}$ is the performance measure and TeamDumit is a dummy variable that equals one if a fund is managed by multiple managers and takes the value zero if a fund is managed by a single manager. $Controls_{it}$ represents a set of controls for fund characteristics, such as size, money flow, and turnover. We also consider the fund- and year-fixed effects to control for year-specific and fund-specific effects. In addition, to mitigate the influence of outliers, we take the natural logs of fund size.

We use the following regression specification to test whether the number of managers in a team systematically affects fund performance. For this, rather than the dummy variable, we use the number of managers in one fund as the independent variable.

$$Performance_{it} = c_0 + c_1 NumMng_{it} + c_2 Controls_{it} + e_{it}$$

In the above model, NumMngit indicates the number of managers involved in making investment decisions for a fund.

We also adopt the following additional regression specifications with a set of dummy variables to determine whether there exists an optimal number of managers for a fund.

$$\begin{aligned} Performance_{it} = {} & c_0 + c_1 2Mng_{it} + c_2 3Mng_{it} + c_3 4Mng_{it} \\ & + c_4 5Mng_{it} + c_5 6Mng_{it} + c_6 7Mng_{it} \\ & + c_7 Controls_{it} + e_{it} \end{aligned}$$

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In the above regression specification, $2Mng_{it}$ stands for a dummy that takes one if the fund has 2 managers at month t, and zero otherwise. Similarly, $3Mng_{it}$, $4Mng_{it}$, $5Mng_{it}$, and $6Mng_{it}$ represent a dummy that takes one if the fund has 3, 4, 5, or 6 managers at month t, respectively, and zero otherwise. $7Mng_{it}$ represents a dummy that takes one if the fund has seven or more managers at month t, and zero otherwise. The other variables are defined as before.

3. Empirical Results

3.1. Time Trend of the Managerial Structure of Korean Mutual Funds

In <Table 1>, we document the yearly trend of the managerial structure of the mutual fund industry in the Korean market from 1999 to August 2011. Interestingly, while academic studies and media in the U.S. report the rapid spread of team management in the mutual fund industry, we find a notable increase in the portion of solo-managed funds in the Korean mutual fund market.

Among the studies that address the management structure issue in the mutual fund industry, Bliss et al. (2008) find that approximately 60% of U.S. equity funds listed in the Morningstar data were managed by teams in 2003, while 30% were team managed in 1992. Massa et al. (2010) report that 71.0% of U.S. mutual funds were managed by a single manager according to the Morningstar data in 1991, while 25.1% were co-managed funds and 3.9% were anonymous funds. These ratios changed to 40.6%, 41.4%, and 18.3%, respectively, in 2004. They also report that according to CRSP data, 79.2% of U.S. mutual funds were managed by a single manager in 1993, while 13.7% were managed by teams and 7.1% were managed by anonymous managers. These ratios changed to 39.1%, 29.9%, and 31.0%, respectively, in 2004. As an example that highlights this increasing trend of team management in the press, in 2013, Forbes says that “the days of a single investment guru managing a fund seem to be on the decline.”

<Table 1> Fund Managerial Structure: Solo-managed vs. Team-managed funds

year	Solo-managed funds		Team-managed funds	
	Obs.	%	Obs.	%
1999	56	6.80	768	93.80
2000	60	3.68	1,572	96.32
2001	88	3.17	2,684	96.83
2002	112	2.87	3,785	97.13
2003	235	4.90	4,562	95.10
2004	516	6.92	6,944	93.08
2005	1,787	13.66	11,294	86.34
2006	3,967	22.13	13,955	77.87
2007	6,091	24.99	18,287	75.01
2008	9,826	29.25	23,768	70.75
2009	12,780	28.51	32,054	71.49
2010	14,753	30.77	33,197	69.23
2011.Aug.	10,631	31.93	22,666	68.07

<Table 1> shows that the percentage of solo-managed funds in all fund-months was just 6.80% while 93.90% of fund-months were managed by teams in 1999. However, the portion of fund-months run by teams has considerably declined since 2003, reaching 68.07% in August 2011. In contrast, the portion of fund-months with a single manager increased to 31.93%.

In <Table 2>, we divide the fund-months with team management into five groups – 2 managers, 3 managers, 4~5 managers, 6~9 managers, and equal to or more than 10 managers per month. The yearly distribution of each management group exhibits a time trend similar to our previous analysis when comparing the portion of single-managed fund-months and team-managed fund-months. Notably, while approximately 60% of mutual fund-months were involved in team management with more than 9 managers in 1999, this proportion of team-managed fund-months run by more than 9 managers has dropped significantly, over approximately one decade, to 3% in August 2011. We note that the proportion of single-managed funds has increased steadily since 2003. <Table 2> shows that the percentage portion of fund-months managed by 2 managers also increased in the late 2000s, increasing from 1.7% in 1999 to approximately 38.6% in 2011. On the other hand, compared to the early 2000s, increasingly fewer funds were managed by teams with equal to or more than 3 managers in the late 2000s.

<Table 2> Fund Managerial Structure: Number of Managers of a Fund

year	1 Manager		2 Managers		3 Managers		4~5 Managers		6~9 Managers		More than 9 Managers	
	obs	%	obs	%	obs	%	obs	%	obs	%	obs	%
1999	56	6.80	14	1.70	0	0.00	0	0.00	268	32.52	486	58.98
2000	60	3.68	24	1.47	0	0.00	0	0.00	792	48.53	456	46.32
2001	88	3.17	204	7.36	258	9.31	0	0.00	1,385	49.96	837	30.19
2002	112	2.87	602	15.45	390	10.01	243	6.24	1,560	40.03	990	25.40
2003	235	4.90	970	20.22	612	12.76	324	6.75	1,567	32.67	1,089	22.70
2004	516	6.92	1,666	22.33	1,389	18.62	1,350	18.10	1,747	23.42	792	10.62
2005	1,787	13.66	2,602	19.89	3,284	25.11	3,270	25.00	1,232	9.42	906	6.93
2006	3,967	22.13	3,889	21.70	3,552	19.82	4,550	25.39	1,964	10.96	0	0.00
2007	6,091	24.99	5,879	24.12	5,934	24.34	5,386	22.09	1,088	4.46	0	0.00
2008	9,826	29.25	7,258	21.61	4,879	14.52	8,101	24.11	3,152	9.38	378	1.13
2009	12,780	28.51	9,900	22.08	5,395	12.03	7,240	16.15	5,127	11.44	4,392	9.80
2010	14,753	30.77	14,072	29.35	6,065	12.65	7,780	16.23	2,803	5.85	2,477	5.17
2011.Aug.	10,631	31.93	12,844	38.57	3,163	9.50	5,129	15.40	532	1.60	998	3.00

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3.2. Does Team-management differ from Single-management?

Fund managerial structure and fund performance: all sample periods

To evaluate whether managerial structure affects performance outcomes, we begin by focusing on a performance comparison between team- and single-managed funds. We examine the performance difference using multiple regressions with a team dummy variable, which takes the value of one if a fund is managed by a team, and zero otherwise. In addition, we include various controls in the regression specification and include both year and individual fund fixed effects to control for year- and fund-specific effects. This test permits us to control for other relevant variables, such as find size, money flow to a fund, turnover, and a fund's past performance. By adopting the CAPM-adjusted and the Fama-French three-factor adjusted-return as our performances measures, we are able to adjust returns for various types of systematic risk.

<Table 3> presents the influence of managerial structure on fund performance. In Panel (A), the CAPM-adjusted return is used as a fund's performance measure. From columns (1) through (5), fund size, money flow, and turnover are included as control variables. According to some previous studies, past fund performance tends to influence the performance of the following period. Therefore, to control for the effect of the previous fund performance, we extend our regression model, in columns (6) to (8), by including past performance of a fund as an additional control variable. Across all the regression specifications, we find that single-managed funds outperform team-managed funds for the sample period using the CAPM-adjusted return as the performance measure. For example, Column (8), including all the control variables in its specification, shows that the coefficient of the team dummy has a statistically significant negative value of -0.0008 per month or approximately 96 bp per year.

Panel (B) of <Table 3> provides the estimation results using the 3-factor model adjusted returns as a fund's performance measure. Consistent with our previous evidence, we find that team-management can deteriorate fund performance. The coefficients for the team dummy are approximately -0.0011 to -0.0012 for our several alternative specifications, which also have statistical significance. These findings provide supporting evidence that team management of a fund leads to inferior outcomes. Obtaining similar empirical results with both the CAPM-adjusted and the three-factor model adjusted returns, we achieve robustness with respect to the effect of team-managed funds on performance.

The R-squared values are also given in <Table 3> along with the coefficients. As evidenced from the table, the R-squared values are lower for regression specifications in Panel (B) than for those in Panel (A). For example, the R^2 of column (8) in Panel (B) is 0.1848, which is lower than that of column (8) in Panel (A), 0.2592.

<Table 3> Fund Performance of Team-management vs. Single-management: Full Sample Periods

Panel A: the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0007 (-3.00)	-0.0007 (-3.18)	-0.0007 (-2.93)	-0.0008 (-3.28)	-0.0008 (-3.21)	-0.0007 (-3.19)	-0.0008 (-3.63)	-0.0008 (-3.53)
Fund size		-0.0005 (-6.58)		-0.0008 (-8.91)	-0.0008 (-8.76)		-0.0010 (-10.76)	-0.0010 (-10.49)
Flow			0.0000 (-0.27)	0.0000 (-1.21)	0.0000 (-2.03)		0.0000 (-1.99)	0.0000 (-1.94)
Past ret						-0.1931 (-19.33)	-0.2004 (-20.14)	-0.2003 (-20.06)
turnover					-0.0016 (-1.40)			-0.0011 (-1.01)
R^2	0.2127	0.2165	0.2186	0.2255	0.2267	0.2489	0.2590	0.2592

Panel B: the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0011 (-3.79)	-0.0011 (-4.01)	-0.0011 (-4.00)	-0.0011 (-4.24)	-0.0011 (-3.99)	-0.0012 (-4.43)	-0.0012 (-4.75)	-0.0012 (-4.50)
Fund size		-0.0007 (-7.71)		-0.0007 (-6.25)	-0.0007 (-6.11)		-0.0008 (-7.66)	-0.0008 (-7.14)
Flow			0.0000 (-0.35)	0.0000 (-1.01)	0.0000 (-2.38)		0.0000 (-2.33)	0.0000 (-2.34)
Past ret						-0.1398 (-14.52)	-0.1451 (-15.08)	-0.1639 (-16.26)
turnover					-0.0047 (-3.65)			-0.0043 (-3.37)
R^2	0.1517	0.1572	0.1549	0.1586	0.1611	0.1737	0.1797	0.1848

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Fund managerial structure and fund performance: early vs. late 2000s

<Table 4> compares the performance difference between the team-managed and the single-managed funds in the subsample periods, 2001 to 2004 and 2005 to 2008. This sample split is motivated by the fact that the Korean mutual fund industry has experienced tremendous growth since 2005. We refer to the time period between 2001 and 2004 as the early stage of the Korean fund industry, while the time period between 2005 and 2008 is the relatively mature stage. We unveil differences in managerial effects on performance during different stages of development in the mutual fund industry.

Interestingly, we find that managerial structure does not have any significant effect on fund performance in the early stage of the fund industry. On the contrary, the empirical results indicate a negative influence of team management after 2005, during the relatively mature stage, which is consistent with the results of the previous test that assessed the total sample.

The results for the subsample of the early stage are shown in Panels (A) and (B). The effect of managerial structure on performance in the relatively mature stage is provided in Panels (C) and (D). Furthermore, in Panels (A) and (C), CAPM-adjusted return is used as a fund's performance measure, and Panels (B) and (D) report the results for the Fama-French 3-factor model adjusted returns.

In Panel (A), we observe that funds with multiple and single managers do not provide any significantly different performance outcomes in the early stage of the fund industry. Even though all of the estimates for the team dummy variable take negative values with various regression specifications, these values do not have statistical significance. The same results are shown across columns (1) through (8) in Panel (B), using the three-factor model adjusted returns as a performance measure.

In contrast, in Panel (C), after conducting a regression analysis using the subsample for the period 2005 to 2008, we find that a negative influence of team management on fund performance at approximately -0.0008 per month or 96 bp per year. The results of Panel (D) confirm our test results. Teams exhibit a lower performance by around 0.0012 per month or 144 bp per year than funds run by a single manager.

Overall, we find that while the fund performance is irrespective of the managerial structure of a fund in the early stage of development of the mutual fund industry, it is significantly impeded when a fund is run by multiple managers during the relatively mature stage of development.

<Table 4> Fund Performance of Team-management vs. Single-management: Early 2000s vs. Late 2000s

Panel A: Years 2000 to 2004, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0002	-0.0003	-0.0002	-0.0005	-0.0003	0.0003	-0.0002	-0.0002
	(-0.17)	(-0.28)	(-0.15)	(-0.39)	(-0.19)	(0.22)	(-0.15)	(-0.12)
Fund size		-0.0003		-0.0006	-0.0007		-0.0006	-0.0006
		(-1.54)		(-3.29)	(-3.08)		(-3.08)	(-2.87)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.33)	(-1.25)	(0.11)		(0.17)	(0.23)
Past ret						0.0986	0.0907	0.0846
						(3.44)	(3.16)	(2.90)
turnover					0.0026			0.0034
					(0.99)			(1.28)
R2	0.0838	0.0857	0.0767	0.0854	0.0842	0.0657	0.0738	0.0723

Panel B: Years 2000 to 2004, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0006	-0.0005	-0.0005	-0.0006	-0.0002	-0.0001	-0.0002	-0.0001
	(-0.37)	(-0.30)	(-0.35)	(-0.39)	(-0.12)	(-0.05)	(-0.11)	(-0.08)
Fund size		0.0002		-0.0001	-0.0001		-0.0001	-0.0001
		(0.88)		(-0.53)	(-0.34)		(-0.43)	(-0.34)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.39)	(-0.52)	(0.32)		(0.31)	(0.38)
Past ret						0.0386	0.0385	0.0341
						(1.34)	(1.34)	(1.16)
turnover					0.0035			0.0043
					(1.06)			(1.28)
R2	0.0706	0.0712	0.0603	0.0606	0.0587	0.0473	0.0475	0.0468

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Panel C: Years 2005 to 2008, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0007	-0.0008	-0.0007	-0.0008	-0.0008	-0.0007	-0.0008	-0.0008
	(-2.92)	(-3.09)	(-2.86)	(-3.18)	(-3.10)	(-3.14)	(-3.54)	(-3.42)
Fund size		-0.0005		-0.0009	-0.0009		-0.0010	-0.0010
		(-6.35)		(-8.36)	(-8.17)		(-10.19)	(-9.99)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-1.82)	(-2.01)	(-1.98)		(-1.93)	(-1.90)
Past ret						-0.2158	-0.2229	-0.2217
						(-20.29)	(-21.05)	(-20.89)
turnover					-0.0021			-0.0015
					(-1.68)			(-1.23)
R2	0.2171	0.2211	0.2235	0.2305	0.2313	0.2627	0.2729	0.2728

Panel D: Years 2005 to 2008, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Team dummy	-0.0011	-0.0011	-0.0011	-0.0011	-0.0011	-0.0012	-0.0013	-0.0012
	(-3.68)	(-3.90)	(-3.91)	(-4.15)	(-3.90)	(-4.38)	(-4.70)	(-4.43)
Fund size		-0.0008		-0.0007	-0.0007		-0.0009	-0.0008
		(-8.13)		(-6.43)	(-6.19)		(-7.90)	(-7.34)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-2.19)	(-2.34)	(-2.36)		(-2.30)	(-2.32)
Past ret						-0.1553	-0.1614	-0.1826
						(-15.18)	(-15.80)	(-17.03)
turnover					-0.0057			-0.0052
					(-4.05)			(-3.75)
R2	0.1568	0.1638	0.1619	0.1664	0.1691	0.1862	0.1933	0.1997

3.3. Is Fund Performance Influenced by the Number of Managers?

Given the finding of the negative effect of team management on fund performance, another interesting question arises. Does team size influence fund performance? We address this question in this section.

The effect of the number of managers on performance: all sample periods

<Table 5> reveals how fund performance is influenced by the number of managers managing a fund. To deal with this question, we use the number of managers running a fund as the explanatory variable. In columns (1) to (4), various controls, such as fund size, money flow to a fund, and turnover, which are presented as relevant factors for fund performance in the extant literature, are included. In columns (5) to (8), we present the results for various regression specifications where a fund's past performance is added as a control variable. This inclusion is also based on the possible relationship between past performance and the performance of the following period, as shown in some of the early works in the mutual fund literature. From <Table 5>, we note that as the number of managers running a fund increases, fund performance deteriorates.

Column (8) of Panel (A) presents the estimation results for the regression where we include fund size, money flow, a fund's past performance, and turnover as control variables. The variable, NumMng, indicates the number of managers managing a fund. The coefficient of NumMng is -0.0006, and the t-value is -9.26. Column (8) of Panel (B) reports the estimation results when the 3-factor model adjusted returns are used. The coefficient of NumMng is -0.0008, and the t-value is -9.85. Even though the R-squared values are higher for Panel A than Panel B, the coefficients for NumMng are all statistically significant in both cases, providing robustness of the empirical test results.

In general, the results documents that the number of managers has negative effect on the mutual fund performance.

The effect of the number of managers on performance: early vs. late 2000s

In <Table 6>, we consider the effect of the number of managers within a fund team on fund performance outcome in a different time phase (early vs. late 2000s). Panel (A) of Table 6 documents the results using the CAPM adjusted-return as a performance measure for a sample period of 2001 to 2004, which is the early stage of development in the Korean mutual fund industry. Panel (B) of Table 6 documents the results using the 3-factor model adjusted return as a performance measure for a sample of

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<Table 5> Fund Performance and the Number of Mangers: Full Sample Periods

Panel A: the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0006	-0.0005	-0.0005	-0.0005	-0.0005	-0.0007	-0.0006	-0.0006
	(-7.95)	(-7.77)	(-7.97)	(-7.70)	(-7.58)	(-9.60)	(-9.34)	(-9.26)
Fund size		-0.0004		-0.0008	-0.0008		-0.0010	-0.0009
		(-6.26)		(-8.54)	(-8.39)		(-10.38)	(-10.11)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.22)	(-1.12)	(-2.02)		(-1.99)	(-1.94)
Past ret						-0.1993	-0.2061	-0.2060
						(-20.00)	(-20.76)	(-20.67)
turnover					-0.0016			-0.0011
					(-1.40)			(-0.98)
R^2	0.2174	0.2208	0.2234	0.2298	0.2654	0.2559	0.2308	0.2654

Panel B: the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0007	-0.0007	-0.0007	-0.0007	-0.0007	-0.0008	-0.0008	-0.0008
	(-8.17)	(-7.96)	(-8.73)	(-8.54)	(-8.36)	(-10.03)	(-9.83)	(-9.85)
Fund size		-0.0006		-0.0006	-0.0006		-0.0008	-0.0007
		(-7.37)		(-5.82)	(-5.67)		(-7.20)	(-6.68)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.30)	(-0.92)	(-2.38)		(-2.33)	(-2.34)
Past ret						-0.1455	-0.1502	-0.1698
						(-15.15)	(-15.65)	(-16.88)
turnover					-0.0047			-0.0043
					(-3.67)			(-3.39)
R^2	0.1566	0.1616	0.1606	0.1638	0.1662	0.1813	0.1866	0.1919

the same subsample, from 2001 to 2004. Panel (C) of Table 6 documents the results using the CAPM adjusted-return as a performance measure for a sample period of 2005 to 2008, the relatively mature stage of development of the fund industry. Panel (D) of Table 6 documents the results using the 3-factor model adjusted return as a performance measure for a sample of the same period, that is, from 2005 to 2008.

We find that while the number of managers does not influence fund performance during the early 2000s, it has a distinctively negative effect on fund performance in the late 2000s. From column (1) to (8), none of the coefficients for NumMng, the independent variable representing the number of managers involved in one fund, has any statistical significance in Panel (A). Showing the same results in Panel (B), we confirm the robustness of the results of our empirical analysis. In contrast, in both Panels (C) and (D), we observe the regression estimates on NumMng with pronounced negative values across all the various regression specifications, having statistical significances. For example, column (8) in Panel (C), analyzing the period of the relatively mature stage, reports the negative estimate value of approximately -0.0007. The analysis results in Panel (D), using three-factor model adjusted returns, consistently report that the increase of the number of managers on a team significantly reduces fund performance, as the pronounced negative estimate value is approximately -0.0009 for the independent variable, NumMng.

In addition, we observe that the R-squared values of our analysis for the early 2000s (Panels A and B) are much lower than those for the late 2000s (Panels C and D). While the R^2s range between 0.16 and 0.28 in the test of the later part of our sample period, the R^2s are only between 0.04 and 0.10 when we conduct our analysis using funds in the early stage of development, from 2001 to 2004.

In sum, the empirical results in this section indicate that after the early stage of fund market development in Korea, the fund market operates more systematically during the late 2000s. We note that this is consistent with the previous analysis comparing team- and single-managed funds as fund performance is significantly impeded when a fund is run by multiple managers during the late 2000s, though it is irrespective of the managerial structure of a fund in the early 2000s.

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<Table 6> Fund Performance and the Number of Mangers: Early 2000s vs. Late 2000s

Panel A: Years 2000 to 2004, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0002 (-1.50)	-0.0002 (-1.49)	-0.0002 (-1.50)	-0.0002 (-1.45)	-0.0002 (-1.27)	-0.0001 (-1.13)	-0.0001 (-1.11)	-0.0001 (-0.96)
Fund size		-0.0003 (-1.51)		-0.0006 (-3.25)	-0.0007 (-3.05)		-0.0006 (-3.08)	-0.0006 (-2.86)
Flow			0.0000 (-0.31)	0.0000 (-1.22)	0.0000 (0.11)		0.0000 (0.17)	0.0000 (0.23)
Past ret						0.0951 (3.31)	0.0875 (3.04)	0.0817 (2.79)
turnover					0.0024 (0.91)			0.0032 (1.21)
R^2	0.0856	0.0874	0.0785	0.0870	0.0855	0.0667	0.0748	0.0730

Panel B: Years 2000 to 2004, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0002 (-1.10)	-0.0002 (-1.11)	-0.0002 (-1.10)	-0.0002 (-1.09)	-0.0001 (-0.91)	-0.0001 (-0.98)	-0.0001 (-0.98)	-0.0001 (-0.81)
Fund size		0.0002 (0.91)		-0.0001 (-0.48)	-0.0001 (-0.31)		-0.0001 (-0.41)	-0.0001 (-0.31)
Flow			0.0000 (-0.38)	0.0000 (-0.51)	0.0000 (0.32)		0.0000 (0.31)	0.0000 (0.38)
Past ret						0.0365 (1.27)	0.0364 (1.26)	0.0323 (1.10)
turnover					0.0033 (1.00)			0.0041 (1.23)
R^2	0.0715	0.0721	0.0612	0.0614	0.0594	0.0481	0.0483	0.0473

Panel C: Years 2005 to 2008, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0006 (-8.05)	-0.0006 (-7.85)	-0.0006 (-8.08)	-0.0006 (-7.80)	-0.0006 (-7.69)	-0.0008 (-9.77)	-0.0007 (-9.49)	-0.0007 (-9.41)
Fund size		-0.0005 (-6.01)		-0.0008 (-7.98)	-0.0008 (-7.80)		-0.0010 (-9.78)	-0.0010 (-9.60)
Flow			0.0000 (-1.82)	0.0000 (-2.01)	0.0000 (-1.98)		0.0000 (-1.93)	0.0000 (-1.89)
Past ret						-0.2221 (-20.96)	-0.2286 (-21.66)	-0.2275 (-21.51)
turnover					-0.0019 (-1.57)			-0.0013 (-1.07)
R^2	0.2226	0.2262	0.2292	0.2355	0.2363	0.2709	0.2803	0.2801

Panel D: Years 2005 to 2008, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Num of manager	-0.0008 (-8.45)	-0.0008 (-8.20)	-0.0008 (-9.09)	-0.0008 (-8.88)	-0.0008 (-8.68)	-0.0009 (-10.49)	-0.0009 (-10.27)	-0.0009 (-10.28)
Fund size		-0.0007 (-7.76)		-0.0007 (-5.96)	-0.0007 (-5.75)		-0.0008 (-7.41)	-0.0008 (-6.87)
Flow			0.0000 (-2.20)	0.0000 (-2.33)	0.0000 (-2.36)		0.0000 (-2.29)	0.0000 (-2.32)
Past ret						-0.1616 (-15.86)	-0.1671 (-16.41)	-0.1891 (-17.70)
turnover					-0.0055 (-3.95)			-0.0050 (-3.63)
R^2	0.1629	0.1693	0.1692	0.1730	0.1755	0.1958	0.2020	0.2087

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3.4. Optimal Size of a Managerial Team for Fund Performance

Knowing that the team-management structure of a fund leads to inferior fund performance and that the fund performance is negatively related with the number of managers running a fund, in this section, we further examine the effect of additional fund managers on performance. Through this analysis, we expect to determine whether there exists an optimal number of managers managing a fund when the fund is managed by multiple managers.

Optimal number of fund managers on a team: all sample periods

In <Table 7>, we present the effect of additional members on a team on fund performance using a set of dummy variables for all sample periods. Panel (A) of <Table 7>, using the CAPM-adjusted returns as the risk-adjusted returns of mutual funds, exhibits the economic value of additional members. Interestingly, including all the control variables in the regression specification (column (8)), we find that the estimates on the dummy of 3Mng, which equals one if a fund is managed by a 3-person team and zero otherwise, are negative but statistically insignificant, while the other dummy variables take strongly negative values with statistical significances. This result suggests that the performance of a fund having a team management structure with 3 managers on a team is not distinctively different from the performance of a fund with a single-management structure. Even though only a limited amount of research has been conducted on the relationship between optimal team size and performance, the results in Panel (A) show weak evidence that is consistent with results of previous studies. Among the extant studies, Laughlin et al. (2006), in a laboratory setting, assert that a three-person group is optimal for achieving superior performance when dealing with sophisticated problems. Similarly, Patel and Sarkissian (2017) provide evidence that largest benefits on performance are gained from a 3-person group.

Another notable feature in <Table 7> is the rapid decline of economic value when team size changes from 5 managers to 6 managers. The value decreases by 0.0024 percent per month (approximately 100bp per year) with the CAPM-adjusted returns in Panel (A) and by 0.0025 (approximately 100bp per year) with the three-factor model adjusted returns in Panel (B). In addition, we also find that the negative economic value between a 6-person team and a 7 or more person-team are not distinctively different. The decrease in performance that occurs when a fund adds one additional member to a team of 6 managers is 0.0003 and 0.0004, respectively, using the CAPM benchmark and the 3-factor model benchmark.

<Table 7> Effect of Team Size on Performance: Full Sample Periods
Panel A: the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0006	-0.0007	-0.0006	-0.0007	-0.0007	-0.0007	-0.0008	-0.0008
	(-2.63)	(-2.79)	(-2.59)	(-2.91)	(-2.86)	(-2.96)	(-3.37)	(-3.27)
3 Managers	-0.0003	-0.0004	-0.0003	-0.0004	-0.0004	-0.0002	-0.0003	-0.0003
	(-1.01)	(-1.25)	(-0.80)	(-1.20)	(-1.09)	(-0.48)	(-0.95)	(-0.84)
4 Managers	-0.0010	-0.0010	-0.0010	-0.0011	-0.0010	-0.0010	-0.0011	-0.0010
	(-2.81)	(-2.89)	(-2.80)	(-2.93)	(-2.77)	(-2.89)	(-3.04)	(-2.89)
5 Managers	-0.0015	-0.0015	-0.0014	-0.0015	-0.0014	-0.0015	-0.0016	-0.0016
	(-3.18)	(-3.21)	(-3.02)	(-3.19)	(-3.09)	(-3.42)	(-3.66)	(-3.54)
6 Managers	-0.0037	-0.0036	-0.0038	-0.0036	-0.0036	-0.0043	-0.0041	-0.0040
	(-5.41)	(-5.32)	(-5.54)	(-5.31)	(-5.26)	(-6.37)	(-6.10)	(-6.06)
7+ Managers	-0.0037	-0.0037	-0.0037	-0.0036	-0.0036	-0.0044	-0.0043	-0.0043
	(-7.68)	(-7.56)	(-7.72)	(-7.53)	(-7.42)	(-9.32)	(-9.14)	(-9.05)
Fund size		-0.0004		-0.0008	-0.0008		-0.0009	-0.0009
		(-6.15)		(-8.33)	(-8.15)		(-10.12)	(-9.81)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.27)	(-1.15)	(-2.03)		(-1.98)	(-1.94)
Past ret						-0.2029	-0.2091	-0.2091
						(-20.34)	(-21.05)	(-20.97)
turnover					-0.0018			-0.0015
					(-1.62)			(-1.31)
R^2	0.2191	0.2223	0.2253	0.2314	0.2326	0.2591	0.2679	0.2682

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Panel B: the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0007	-0.0008	-0.0007	-0.0008	-0.0007	-0.0008	-0.0009	-0.0008
	(-2.52)	(-2.72)	(-2.66)	(-2.87)	(-2.68)	(-3.01)	(-3.30)	(-3.08)
3 Managers	-0.0016	-0.0018	-0.0016	-0.0017	-0.0016	-0.0017	-0.0018	-0.0017
	(-4.17)	(-4.47)	(-4.31)	(-4.59)	(-4.29)	(-4.69)	(-5.04)	(-4.78)
4 Managers	-0.0024	-0.0025	-0.0025	-0.0025	-0.0024	-0.0027	-0.0028	-0.0026
	(-5.53)	(-5.63)	(-6.02)	(-6.11)	(-5.75)	(-6.69)	(-6.82)	(-6.51)
5 Managers	-0.0025	-0.0026	-0.0025	-0.0026	-0.0024	-0.0027	-0.0028	-0.0027
	(-4.55)	(-4.60)	(-4.78)	(-4.90)	(-4.66)	(-5.25)	(-5.42)	(-5.19)
6 Managers	-0.0045	-0.0044	-0.0045	-0.0043	-0.0043	-0.0052	-0.0050	-0.0050
	(-5.45)	(-5.35)	(-5.84)	(-5.67)	(-5.58)	(-6.75)	(-6.56)	(-6.54)
7+ Managers	-0.0048	-0.0047	-0.0049	-0.0048	-0.0047	-0.0055	-0.0054	-0.0054
	(-8.26)	(-8.12)	(-8.90)	(-8.76)	(-8.57)	(-10.21)	(-10.08)	(-10.05)
Fund size		-0.0006		-0.0006	-0.0006		-0.0008	-0.0007
		(-7.43)		(-5.79)	(-5.63)		(-7.15)	(-6.60)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.29)	(-0.90)	(-2.38)		(-2.33)	(-2.34)
Past ret						-0.1458	-0.1505	-0.1701
						(-15.18)	(-15.67)	(-16.91)
turnover					-0.0046			-0.0043
					(-3.60)			(-3.34)
R^2	0.1572	0.1623	0.1614	0.1646	0.1670	0.1824	0.1876	0.1929

Optimal number of fund managers in a team: early vs. late 2000s

<Table 8> shows the results for the subsample periods. As shown in Panel (A) and Panel (B), there is no significantly negative economic value with multiple-manager management during the early stage of the Korean fund market development, from 2001 to 2004. However, as shown in Panel (C) and Panel (D), we find clear evidence of increasing negative value as team size grows. Similar to the results for the full-sample period, using the CAPM-adjusted return as a performance measure (Panel (C)), we could not find any hindering effect of team structure with 3 managers on fund performance. In addition, we find a sharp drop in performance when the number of members increases from 5 managers to 6 managers. The performance gap between a 5-person and a 6-person team is 0.0031% per month (approximately 372 bp per year) and 0.0026% per month (approximately 312 bp per year), respectively, in Panel (C) and Panel (D). Furthermore, we also find that the performance gap between a 6-peron team and a 7 or more person-team is relatively small.

Overall, the sharpest drop in fund performance is observed when the number of managers on a team increases from 5 to 6. Once the team size reaches 6 managers, the negative economic value does not show a sharp increase regardless of the number of additional managers.

<Table 8> Effect of Team Size on Performance: Early 2000s vs. Late 2000s

Panel A: Years 2000 to 2004, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0002	-0.0003	-0.0001	-0.0004	-0.0002	0.0003	-0.0001	-0.0001
	(-0.12)	(-0.20)	(-0.12)	(-0.28)	(-0.11)	(0.24)	(-0.06)	(-0.06)
3 Managers	-0.0004	-0.0007	-0.0003	-0.0010	-0.0007	0.0001	-0.0007	-0.0005
	(-0.24)	(-0.44)	(-0.21)	(-0.64)	(-0.39)	(0.09)	(-0.41)	(-0.30)
4 Managers	-0.0009	-0.0013	-0.0009	-0.0017	-0.0013	-0.0004	-0.0013	-0.0010
	(-0.54)	(-0.75)	(-0.52)	(-0.97)	(-0.71)	(-0.20)	(-0.73)	(-0.58)
5 Managers	-0.0011	-0.0015	-0.0011	-0.0018	-0.0014	-0.0005	-0.0014	-0.0011
	(-0.63)	(-0.80)	(-0.61)	(-0.98)	(-0.72)	(-0.28)	(-0.74)	(-0.58)
6 Managers	-0.0009	-0.0012	-0.0009	-0.0015	-0.0010	-0.0006	-0.0014	-0.0010
	(-0.42)	(-0.56)	(-0.41)	(-0.70)	(-0.47)	(-0.29)	(-0.64)	(-0.45)
7+ Managers	-0.0018	-0.0021	-0.0017	-0.0023	-0.0019	-0.0010	-0.0018	-0.0015
	(-1.03)	(-1.19)	(-1.01)	(-1.35)	(-1.02)	(-0.58)	(-1.01)	(-0.81)
Fund size		-0.0003		-0.0007	-0.0007		-0.0007	-0.0006
		(-1.58)		(-3.33)	(-3.09)		(-3.14)	(-2.90)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.28)	(-1.18)	(0.10)		(0.17)	(0.22)
Past ret						0.0947	0.0864	0.0805
						(3.27)	(2.98)	(2.73)
turnover					0.0024			0.0032
					(0.90)			(1.19)
R^2	0.0860	0.0880	0.0789	0.0878	0.0862	0.0671	0.0755	0.0735

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Panel B: Years 2000 to 2004, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0005	-0.0004	-0.0004	-0.0005	-0.0001	0.0000	0.0000	-0.0001
	(-0.28)	(-0.24)	(-0.27)	(-0.30)	(-0.07)	(0.02)	(-0.03)	(-0.03)
3 Managers	-0.0010	-0.0008	-0.0010	-0.0011	-0.0005	-0.0005	-0.0007	-0.0004
	(-0.50)	(-0.39)	(-0.48)	(-0.55)	(-0.25)	(-0.23)	(-0.30)	(-0.21)
4 Managers	-0.0014	-0.0012	-0.0013	-0.0015	-0.0010	-0.0010	-0.0011	-0.0008
	(-0.66)	(-0.54)	(-0.63)	(-0.70)	(-0.42)	(-0.43)	(-0.51)	(-0.36)
5 Managers	-0.0018	-0.0016	-0.0017	-0.0019	-0.0013	-0.0013	-0.0015	-0.0011
	(-0.79)	(-0.69)	(-0.77)	(-0.83)	(-0.52)	(-0.56)	(-0.62)	(-0.46)
6 Managers	-0.0037	-0.0035	-0.0036	-0.0037	-0.0031	-0.0034	-0.0036	-0.0030
	(-1.37)	(-1.30)	(-1.37)	(-1.41)	(-1.10)	(-1.25)	(-1.30)	(-1.09)
7+ Managers	-0.0025	-0.0023	-0.0024	-0.0026	-0.0019	-0.0020	-0.0021	-0.0017
	(-1.14)	(-1.05)	(-1.12)	(-1.17)	(-0.80)	(-0.86)	(-0.92)	(-0.72)
Fund size		0.0002		-0.0001	-0.0001		-0.0001	-0.0001
		(0.85)		(-0.56)	(-0.34)		(-0.46)	(-0.34)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-0.36)	(-0.50)	(0.31)		(0.31)	(0.37)
Past ret						0.0389	0.0387	0.0346
						(1.34)	(1.33)	(1.17)
turnover					0.0031			0.0039
					(0.93)			(1.16)
R^2	0.0729	0.0734	0.0627	0.0629	0.0606	0.0498	0.0501	0.0487

Panel C: Years 2005 to 2008, the CAPM-adjusted return

Variable	Dependent variable : CAPM adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0006	-0.0007	-0.0006	-0.0007	-0.0007	-0.0007	-0.0008	-0.0008
	(-2.53)	(-2.68)	(-2.49)	(-2.80)	(-2.75)	(-2.90)	(-3.28)	(-3.17)
3 Managers	-0.0003	-0.0004	-0.0003	-0.0004	-0.0003	-0.0001	-0.0003	-0.0002
	(-0.95)	(-1.16)	(-0.75)	(-1.09)	(-0.98)	(-0.38)	(-0.78)	(-0.66)
4 Managers	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010	-0.0010
	(-2.66)	(-2.69)	(-2.66)	(-2.72)	(-2.53)	(-2.70)	(-2.75)	(-2.58)
5 Managers	-0.0013	-0.0013	-0.0012	-0.0013	-0.0013	-0.0014	-0.0014	-0.0014
	(-2.71)	(-2.71)	(-2.54)	(-2.67)	(-2.57)	(-2.85)	(-3.04)	(-2.92)
6 Managers	-0.0040	-0.0039	-0.0041	-0.0038	-0.0038	-0.0048	-0.0045	-0.0045
	(-5.36)	(-5.25)	(-5.52)	(-5.24)	(-5.19)	(-6.55)	(-6.22)	(-6.18)
7+ Managers	-0.0041	-0.0040	-0.0041	-0.0039	-0.0039	-0.0049	-0.0047	-0.0047
	(-7.62)	(-7.47)	(-7.69)	(-7.43)	(-7.35)	(-9.41)	(-9.14)	(-9.06)
Fund size		-0.0005		-0.0008	-0.0008		-0.0010	-0.0009
		(-5.89)		(-7.73)	(-7.52)		(-9.48)	(-9.24)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-1.82)	(-2.00)	(-1.98)		(-1.92)	(-1.89)
Past ret						-0.2266	-0.2326	-0.2315
						(-21.37)	(-22.02)	(-21.87)
turnover					-0.0023			-0.0018
					(-1.88)			(-1.52)
R^2	0.2243	0.2277	0.2312	0.2371	0.2381	0.2746	0.2834	0.2833

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Panel D: Years 2005 to 2008, the three-factor model adjusted return

Variable	Dependent variable : 3FF adjusted return							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2 Managers	-0.0007	-0.0008	-0.0007	-0.0008	-0.0007	-0.0008	-0.0009	-0.0008
	(-2.44)	(-2.64)	(-2.58)	(-2.81)	(-2.61)	(-2.96)	(-3.25)	(-3.02)
3 Managers	-0.0017	-0.0018	-0.0016	-0.0017	-0.0016	-0.0017	-0.0019	-0.0018
	(-4.07)	(-4.35)	(-4.23)	(-4.50)	(-4.19)	(-4.63)	(-4.97)	(-4.68)
4 Managers	-0.0025	-0.0025	-0.0025	-0.0025	-0.0024	-0.0028	-0.0028	-0.0026
	(-5.38)	(-5.43)	(-5.91)	(-5.96)	(-5.55)	(-6.59)	(-6.66)	(-6.32)
5 Managers	-0.0025	-0.0025	-0.0024	-0.0025	-0.0023	-0.0026	-0.0027	-0.0025
	(-4.13)	(-4.15)	(-4.36)	(-4.46)	(-4.21)	(-4.75)	(-4.91)	(-4.65)
6 Managers	-0.0044	-0.0043	-0.0044	-0.0043	-0.0042	-0.0053	-0.0051	-0.0051
	(-4.99)	(-4.85)	(-5.37)	(-5.15)	(-5.05)	(-6.44)	(-6.19)	(-6.20)
7+ Managers	-0.0053	-0.0051	-0.0053	-0.0052	-0.0051	-0.0061	-0.0059	-0.0059
	(-8.19)	(-7.99)	(-8.90)	(-8.69)	(-8.53)	(-10.30)	(-10.10)	(-10.12)
Fund size		-0.0007		-0.0007	-0.0007		-0.0008	-0.0008
		(-7.81)		(-5.90)	(-5.66)		(-7.31)	(-6.73)
Flow			0.0000	0.0000	0.0000		0.0000	0.0000
			(-2.20)	(-2.33)	(-2.35)		(-2.29)	(-2.32)
Past ret						-0.1621	-0.1674	-0.1896
						(-15.90)	(-16.43)	(-17.73)
turnover					-0.0055			-0.0050
					(-3.95)			(-3.66)
R^2	0.1629	0.1694	0.1693	0.1731	0.1757	0.1962	0.2023	0.2090

4. Conclusion

Recent studies highlight that increasingly more fund industries are involved with team management and thus seeked to identify the relationship between the managerial structure of a fund and the fund performance. While this topic is crucial to both practitioners and academicians, only limited studies have been performed thus far and only on the US mutual fund market. This paper examines whether performance differences can be explained by the decision-making theory, investigating whether the fund management structure influences mutual fund performance.

Using the Korean active mutual funds data, we find that funds with multiple managers under perform compared to single-managed funds. This result highlights the investment performance differences between decisions made by single manager and multiple managers. Given this result, we also find that as the number of fund managers involved in a fund increases, the fund performance decreases. Furthermore, our empirical analysis provides novel results which show the performance benefit of a three-person group and the sharpest performance drop from a five-person group to a six-person group. Once the fund management team size reaches six members, the additional negative magnitude of influence with the inclusion of one additional member does not show a sharp increase. The finding is robust to using alternative performances measures, which are the CAPM adjusted returns and the 3-factor model adjusted returns.

In general, this study supports the negative effect of team management of a fund on fund performance. Furthermore, our results shed light on the explanation of the trend over the past decade in the Korean active funds market that fund managerial structure has moved toward the single management structure from the team management, especially since 2005.

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