How do fund families utilize the fund performance evaluation system?:
Study on the 'Evaluation-ship bias' in Korean equity funds

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ABSTRACT

This paper shows how the fund performance evaluation system influences the fund market and fund family behaviors. *Evaluation-ship Bias* is defined as the out-performing of evaluated funds over non-evaluated funds. Regarding the *Evaluation-ship Bias,* this study confirmed two things in empirical analysis of Korean equity funds. First, this paper verified that there was *Evaluation-ship Bias* in Korea, so fund families' performances were over-estimated. Second, it is also found that fund families did favoritism to evaluated funds in management activities. Fund families were more attentive to EV performance and took strategic and risk-taking measures to improve its ratings. This paper suggests that another factor, the performance evaluation system itself, is what causes fund families to favor some funds. The existence of too high numbers of Korean funds is an example of this evaluation system bias. We can expect similar phenomena to occur in other countries as well. We also suggest that the introduction of GIPS will diminish the evaluation system bias and contribute to the development of the Korean fund market.

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I. Introduction

This paper shows how the fund performance evaluation system influences the fund market and fund family behaviors. It is commonly accepted that there is survivorship bias in the evaluation of fund performance. Alternatively, this paper identifies *Evaluation-ship Bias* which, due to the structure of the evaluation system, over-estimates fund performance.

To evaluate fund performance, a fund must generally meet certain requirements such as duration of survival or fund size. An evaluated fund (hereafter *EV*) is defined as a fund that meets the evaluation criteria stipulated by a fund rating agency or other. *EVs* have a tendency to perform better than the average fund. Thus, aggregating only *EVs* in performance evaluation will bias overall performance. We coin this phenomenon *Evaluation-ship Bias*. *Evaluation-ship Bias* is defined as the out-performing of evaluated funds over non-evaluated funds. From this bias, investors receive mis-information about the management capabilities of fund families.

Regarding the *Evaluation-ship Bias,* this study shows two things in empirical analysis of Korean equity funds. First, this paper shows that there is *Evaluation-ship Bias,* which means evaluated funds out-performed non-evaluated funds. Second, it is also found that fund families did favor to *EVs* in management activities. Though these kinds of discriminating behaviors by fund families are not always revealed to succeed, it is evident that funds were unfair treated by fund families. Based on the results, we confirm that evaluation system can make information biased and fund family do favoritism

Theoretically, this study is similar to previous studies that analyze the discriminating behaviors of fund families. For instance, Nanda et al. (2004) describes how fund families try to create a “star” fund in the hopes of spill-over effects. Also, Gasper (2006) argues that some fund families may subsidize a particular fund for better performance.

In comparison to such research, this study highlights the evaluation system as the source of the mis-information and the cause of the favoritism shown by families. In addition, this study suggests that the evaluation principle such as the GIPS should be introduced to prevent the information bias and favoritism of evaluated funds.

This paper is composed as follows. Section II describes the background of Korea’s fund market and practices. Section III & Ⅳ introduces our methodology and data. Section Ⅴ evaluates the existence of *evaluation-ship bias*. Section Ⅵ assesses the existence of favoritism. Section Ⅶ shows that *evaluation-ship bias* contributed to increasing fund flows into fund

families. Lastly, Section Ⅷ is the conclusion.

Ⅱ. Background

The Korean asset management market has experienced remarkable growth in the last 3 years. In particular, the equity market shows unparalleled growth, especially due to direct and active participation by retail investors. Equity funds in Korea grew from $8.2 billion at the end of year 2004 to $68.7 billion, recording an annual average growth rate of 83.6%.

As the market centers on retail investors, performance of the funds is becoming an important criteria for fund selection. However, such emphasis on fund performance is raising controversy regarding its evaluation. Many are voicing concerns that Korea's current evaluation and disclosure system may not be fully objective and fair.

Recent movement to establish GIPS (Global Investment Performance Standards) in Korea manifests this awareness. The National Pension Fund, the largest anchor investor in Korea, announced plans to follow these global standards for fund selection, creating momentum for GIPS adoption by the entire asset management sector.

The main issue on the evaluation system is the unit of performance measurement. Currently in Korean evaluation system, each fund is an evaluated unit while GIPS requires the composite as a unit of evaluation. It is argued that current evaluation is making problems. Especially it makes more problems in which there are too many numbers of funds, likely to Korea[1].

In Korea, only licensed company by law can create the funds[2]. Therefore, though overall fund performance in the same composite should be measured in evaluating family's ability, only some funds are included in evaluation and each fund is evaluated independent off the fund family.

Some argues that fund family utilizes only good performing funds for advertisement behind

[1] As of end of 2006, with 8,030 funds, Korea ranked 3rd in the world in terms of the number of funds, following the US with 8,120 funds and France with 8,092. The average fund size is much smaller, recording USD 31.3 million, compared to the US (USD 1,282.5 million) and France (USD 218.6 million). Source; Investment Company Institute (2007), *2006 ICI Fact Book*

[2] The company is called '"asset management company" by Korean Act. In this paper, we will call it fund family. Compared to mutual funds that are company type funds, most of the funds in Korea are Unit Trust type funds. In the case of Mutual Funds, investors are the shareholders and the asset management company takes part in the BOD. However, Korean fund investors do not have ownership but only the right to the investment returns, and they cannot participate in the actual management of the fund. Therefore, they can not intervene in the fund operation, leaving the entire process to the asset management companies.

bad performing fund. Fund family also substitutes new funds for bad performing funds. In addition, favoritism towards special funds can appear in many ways. Though Gaspar et al. (2006) points out some funds are subsidized, there are several ways for fund family to legally[3] give the favor to specific funds. For example, fund family may assign top performing fund managers to special funds or give the priority in allocation of traded amount. As a result, it often appears that the performance of each fund in the same composite of one family is different.

It is the main reason why GIPS is now introduced. The most anticipated impact the adoption of GIPS will have is the change in performance measurement, from evaluating individual fund performance to a composite. The GIPS standard includes all portfolios that have the same investment objective and strategy into one composite. Accordingly, funds with the same investment objective will be evaluated on overall portfolio performance.

Ⅲ. Methodology

In general, performance evaluation of individual funds takes place only for funds that have certain duration of survival and fund size. *EV*s are defined as funds that meet both these criteria and hence are evaluated by a fund rating agency. On the other hand, *Non-Evaluated fund* (hereafter *NEV*) is a fund that meets the minimum duration of survival but does not meet the minimum fund size. Lastly, a fund that does not satisfy the minimum duration is called *early fund*.

Such duration of survival and fund size criteria exist because funds that are too young or too small can distort performance results. Therefore, it is reasonable to exclude the *NEV*s and *early funds* in performance evaluation of individual fund. However, the argument we raise in this paper is that the exclusion can give biased information regarding the management capabilities of fund families. *EVs* have a tendency to be better than *NEVs* because better performing funds would get more fund flow and longer duration. We define *Evaluation-ship Bias* as the out-performing of evaluated funds over non-evaluated funds, so the overall performance of fund

[3] At around the time of the Asian Financial Crisis, there were cases of illegal asset transfer among funds in Korea. However, after experiencing the ensuing turmoil, regulators enforced more aggressive approaches in countering such actions. Also, with the development of Information Systems to identify such trends, it is now almost impossible for such a situation to reoccur. Even in IPO allocation, asset management companies must allocate IPO amount to each fund in proportion to each fund's AUM.

family is over-estimated[4].

	Duration of Survival	**Fund Size**
Evaluated Fund	meets	Meets
Non-Evaluated Fund	meets	not meet
Early Fund	not meet	N/A

Based on the concept of *evaluation-ship bias,* we did empirical analysis in three way.

First, we conformed the existence of *evaluation-ship bias,* comparing the *EV*s' performance with *NEV*s'. After composing *EV*s' portfolio and *NEV*s' portfolio in terms of ex-*ante* and ex-*post,* we compared two portfolios' risk-adjusted returns. In addition, we compared *EV*s' performance with *NEV*s' by using panel data.

Second, we evaluate whether fund family favors *EV*s over *NEV*s with two methods. We confirmed the favoritism in terms of application of strategies. We also tested if there is difference of management attitude in response to the previous performance.

Third, this study analyzed that well-performing *EVs* contribute to the inflow of funds. We tested whether fund flows into *EVs* & *NEVs* differently responded to the performance. We also analyzed the spill-over effect by *EVs.*

Ⅳ. Data

This study utilizes Korean equity fund data, attained from the Korean Fund Rating Company, for empirical analysis. This time series data includes basic information regarding funds on a monthly basis. The history of equity funds begins from mid 1970s in Korea. However, since data until the 1990s are not available, we use the data starting in year 2000. The Asset

[4] "Survival Bias" refers to when poor performing funds disappear from the market and performance is evaluated only for the surviving funds. Meanwhile, the "Evaluation Bias" refers to the situation where even if the funds have survived; some are excluded from the performance evaluation.

Management Association of Korea keeps all data and information regard funds and distributes it to fund rating agencies and others. Although the data originates with the Association, data from the fund rating agencies have been cleaned; thus we use agency's data.

Table 1. Trends of Equity Funds in Korea

(unit: as of the end of year, number, Million US$)

	Type	Yr 2001	Yr.2002	Yr.2003	Yr.2004	Yr.2005	Yr.2006
No. of Funds	EVs	9	47	59	38	61	124
	NEVs	6	35	65	75	72	88
	Early Funds	116	86	25	48	105	90
	Total Funds	131	168	149	161	238	302
AUM	EVs	272.8	2,083.3	2,168.8	1,740.5	8,739.9	26,385.6
	NEVs	5.0	42.3	141.0	121.1	90.3	188.0
	Early Funds	1,946.8	1,268.9	145.8	647.8	4,650.2	2,134.4
	Total Funds	2,224.6	3,394.5	2,455.6	2,509.3	13,480.3	28,708.0
AUM Per Funds	EVs	30.3	44.3	36.8	45.8	143.3	212.8
	NEVs	0.8	1.2	2.2	1.6	1.3	2.1
	Early Funds	16.8	6.3	5.8	13.5	44.3	23.7
	Total Funds	17.0	20.2	16.5	15.6	56.6	95.1

We select equity funds according to the following:

1. To avoid *Survivorship Bias*, we select all equity funds that existed in year 2000. Since the definition of an EV requires that the fund last a specified duration, the actual period for the empirical test is 6 years, from year 2001 to 2006.

2. Among equity funds that existed since 2000, for performance comparison, we chose funds according to the following conditions. Active, domestic, pure equity type,[5] and public placing funds were included. Index, foreign, mixed and private placing funds were excluded. Some sector funds were included.[6]

3. After checking the data of each fund, we excluded funds that had errors or missing data.

[5] In Korea, an equity fund is defined to have an equity ratio higher than 60% and no bonds. This classification criteria was adopted in 2000.

[6] Several kinds of sector funds are being developed in Korea. However, instead of using a sector specific benchmark, sector funds use the KOSPI as a benchmark like other ordinary equity funds. In reality, there are many cases where sector funds are managed as ordinary funds. For this reason, we include sector funds.

After selection, 518 funds were selected for analysis.

*EV*s have the following criteria. EVs last no shorter than 1 year and are no less than KRW 10bn[7] in AUM. This criterion is commonly accepted in the market, though it varies more or less by agency.[8] Funds with less than 1 year duration are *early funds* and funds with less than KRW 10bn AUM and duration longer than 1 year are *NEV*s.

For whole period, the number of *EV*s is about a third of whole sample. Looking just at AUM amount, *EV*s handle a majority of the funds invested, while *NEV*s handle only about 5% of the funds. (Table 1) The percentage of *EV*s is very different each year. In terms of AUM, while the fraction of *EV*s in 2003 & 2006 is around 90%, in 2004 & 2005 its percentage was around 60%. This implies that performance evaluation only with *EV*s will bias the evaluation of fund family capabilities.

Ⅴ. *Evaluation-ship Bias*

1. Performance Comparison (1): EV Portfolio vs. NEV Portfolio

We compose an *EV* portfolio and a *NEV* portfolio in the following way and then compare their performances.

First, *ex post*, we analyzed the performance of the *EVs & NEVs* by forming each portfolio in the following way. Based on the AUM at the end of every year, *EVs & NEVs* are classified. Then, assuming that each fund is invested with equal weight, we compose *EV* portfolio and *NEV* portfolio. Return of each portfolio is calculated on monthly base.

Risk-adjusted return based on CAPM Model and Fama & French Model (1993)(hereafter "FF Model") (Refer to formula <1> & <2>) will be used as the performance measurement.[9] KOSPI return will be the proxy for market return (R_{mt}) and the 3 month CD rate will be the proxy for risk-free return (R_{ft}).[10] The size effect in the FF Model is the difference between large capital returns and small & mid capital returns from the KOPSI Index. Also, due to a lack of accounting

[7] As of the end of 2006, it amounts to US$ 10.8Million.
[8] These criteria are used by fund rating agencies as well as the distributor and other financial institutions to choose funds and asset management companies.
[9] Hereafter, without specific comment, return is FF Model based.
[10] TB rate may be more appropriate as the proxy of risk-free rate. But, considering the character of bond market, CD is more liquid and regarded as risk-free rate in the short term market. CD rate is also used for calculation of KTB future price.

data for Korean firms, the difference in return between value stocks and growth stocks was imputed with the difference between the KOSPI and KOSDAQ returns. The KOSDAQ market is regarded as the representative of growth stocks being composed of mainly IT sector stocks, in contrast with KOSPI market.

$$R_{it} - R_{ft} = \alpha_i^1 + \beta_{mi}^1 \times (R_{mt} - R_{ft}) \quad \text{---------- (1)}$$

$$R_{it} - R_{ft} = \alpha_i^2 + \beta_{mi}^2 \times (R_{mt} - R_{ft}) + \beta_{si}^2 \times (R_{st} - R_{lt}) + \beta_{vi}^2 \times (R_{qt} - R_{mt}) \text{ ------- ---- (2)}$$

R_{it} : fund return (month to month), R_{mt} : KOSPI Return (monthly),

R_{ft} : 3 month CD rate, R_{st} : Returns of small & mid cap. stocks (monthly)

R_{lt} : Returns of large capital stocks (monthly),

R_{qt} : KOSDAQ Return (monthly),

The Seemingly Unrelated Regression method was used to compare *EV* portfolio with *NEV* portfolio (refer to <Table 2>). Both CAPM and FF models significantly explained fund performance. Among the explanatory variables, market risk premiums and KOSDAQ and KOSPI return difference have significant influences on performance.

The results show that the *EV* portfolio out-performs the *NEV* portfolio. Although not significant, the CAPM model shows that *EV* portfolio has an excess return amounting to 0.398% which is higher than *NEV* portfolio which amounts to 0.298% by 10bps. In the FF model, *EV* portfolio out-performs *NEV*' at a 10% significant level, having a return that is 0.349%, opposed to the 0.235% of NEV portfolio. These results demonstrate the existence of *evaluation-ship bias* in Korean equity funds.

We reclassified the funds *ex-ante*. *EV* portfolio and *NEV* portfolio are composed, based on the AUM at the first of every year. Also, we did the same analysis with a monthly rebalancing of the portfolios.

The results[11] show that there is no significant difference between the performance of *EV*s & *NEV*s in both CAPM and FF model with the yearly classification. It is likewise with monthly rebalancing. As it were, it is not useful for better fund investment whether a fund is *EV* or not.

[11] On yearly base, EVs out-perform by 6.5bps and 8.1bps in CAPM and FF models, respectively. On a monthly base, EVs out-performs NEVs by 3.3bps and 1.9bps in the CAPM and FF models, respectively.

Table 2. Comparison of EVs'and NEVs'performances

	CAPM Model				FF Model			
	Coef.	Std. Err.	t-stat.	p-value	Coef.	Std. Err.	t-stat.	p-value
(EVs)								
Consant	.3982981***	.1286499	3.10	0.002	.3494297***	.1289168	2.71	0.007
$(R_{mt} - R_{ft})$	.8751151***	.0172813	50.64	0.000	.8871518***	.0182245	48.68	0.000
$(R_{st} - R_{lt})$					-.0185027	.0234996	-0.79	0.431
$(R_{qt} - R_{mt})$					-.0346511*	.0198413	-1.75	0.081
	R-Square: 0.9641		n=72		R-Square: 0.9738		n=72	
(NEVs)								
Consant	.2980095**	.1431264	2.08	0.037	.2346252*	.142331	1.65	0.099
$(R_{mt} - R_{ft})$	.8204706***	.0192259	42.68	0.000	.8360063***	.0201208	41.55	0.000
$(R_{st} - R_{lt})$					-.018401	.0259448	-0.71	0.478
$(R_{qt} - R_{mt})$					-.0453778**	.0219059	-2.07	0.038
	R-Square: 0.9620		n=72		R-Square: 0.9727		n=72	
$\alpha_i^E = \alpha_i^{NE}$	Chi-Square: 2.16		P-Value: 0.1420		Chi-Square: 2.74		P-Value: 0.0980	

***, **, * is significant in 1%, 5%, 10% confidence level

2. Performance Comparison (2): Panel Data Analysis

The above analysis failed to consider two important factors. Some funds can switch from EV to NEV in one year, *vice versa*. In these cases, fund family is not expected to have consistent attitude toward those funds. Also the above test did not control fund size. Since the classification into EVs and NEVs is based on differing AUM sizes, the above results may come from a fund size effect

To take these considerations into account, we compare fund performance using panel data. For considering the attitude of fund family, the switched funds were excluded from the selection for samples. Only the funds which have continually survived as *EV* or *NEV* for one year were selected.

In result, we set up year *t* return for fund *i* as a basic unit. If the AUM of every month at year *t* for fund *i* is not less than KRW 10bn, fund *i* at year *t* is an EV. On the other hand, if the AUM of every month is less than KRW 10bn for year *t*, fund *i* is a NEV. We calculated the excess returns for the EVs and NEVs at each year *t* by using formula <1> & <2>[12].

The calculated excess returns, a_{it}, is the dependent variable. Then we compare EV with NEV performance using estimation formula <3>. As suggested above, we include fund size as a control variable in the model. Performance difference is estimated by a dummy variable which identifies EVs and NEVs. As the influence of fund size may differ according to whether a fund is an EV or not, we include both an EV dummy variables (D_{it}^{E}) and a NEV dummy variables (D_{it}^{NE}) multiplied by fund size in model. In addition, the net fund flow change and risk of fund return are also included as explanatory variables.

$$\alpha_{it} = \gamma_1 Flow_{it} + \gamma_2 D_{it}^{E} \times LNSize_{it} + \gamma_3 D_{it}^{NE} \times LNSize_{it} + \gamma_4 STD_{it} + \gamma_5 D_{it}^{E} \quad \text{------- (3)}$$

$LNSize_{it}$: Log value of fund size

$Flow_{it} = (Size_{it} - Size_{it-1}(1+R_{it})) / Size_{it-1}$: Net fund flow change,

$Size_{it}$: fund size, R_{it} : return of fund (year to year)

STD_{it} = risk of fund return (= standard deviation of monthly returns)

D_{it}^{E} : EV Dummy (value is 1 if a fund is EV, 0 if NEV)

D_{it}^{NE} : NEV Dummy (value is 1 if a fund is NEV, 0 if EV)

[12] To decrease estimation error, the coefficients of CAPM and FF Model are estimated by using monthly returns and then excess returns are calculated.

Table 3. Determinants of Performances

	CAPM Model				FM Model			
	Coef.	Std. Err.	t-stat.	p-value	Coef.	Std. Err.	t-stat.	p-value
Consant	-0.2505	0.1013	-2.47	0.013	-0.1964*	0.1098	-1.79	0.074
$Flow_{it}$	0.0020	0.0025	0.81	0.419	-0.0002	0.0029	-0.06	0.949
$LNSize^{E}_{it}$	-0.0073	0.0052	-1.40	0.160	-0.0089	0.0056	-1.57	0.116
$LNSize^{NE}_{it}$	0.0085	0.0051	1.64	0.101	0.0061	0.0055	1.11	0.267
STD_{it}	5.7052***	1.1429	4.99	0.001	0.4893***	0.9147	6.00	0.000
$Dummy_{it}$	0.3619**	0.1545	2.34	0.019	0.3583**	0.1647	2.18	0.030
$LNSize^{E}_{it} = LNSize^{NE}_{it}$	Chi-Square: 5.46 P-Value: 0.0195				Chi-Square: 4.39 P-Value: 0.0361			

***, **, * is significant in 1%, 5%, 10% confidence level

Because the panel data is unbalanced and the dummy variables are time-constant covariates, the fixed-effect method is not applicable in such cases. Instead, we use random-effect GLS Panel Estimation Method.

The estimation result (table 3) shows that EVs outperformed NEVs. The coefficient of the EV dummy is 0.358 which is significant at a 5% confidence level[13]. The better EV performance cannot be attributed to a fund size effect. The coefficients of the fund size effects, γ_2 and γ_3, are not significant. Rather, the signs of γ_2 and γ_3 are interesting because they are opposite. EVs increase in performance as the fund size decreases while NEV increase in performance as the fund size grows.

Ⅵ. Favoritism: Fund families

Irrespective of EV performance, we will show that fund families favor *EVs* in their management process. There are two ways fund families favor EVs. First, fund families prioritize EVs when they can apply strategies to their funds. Second, fund families are more sensitive and responsive to EV performance, especially when a fund's performance ranks very low.

1. Favoritism in the Application of Strategies

Hypothesis 1: The better a fund family's overall performance, the larger the difference between EV and NEV performance for the same fund family.

<Hypothesis1> means that fund families favor EVs when applying their investment strategies. If a fund family behaves in this way, EV performance would be better than NEV performance when an fund family's strategy succeeds, while the probability of high performance decreases when the strategy fails. In this context, <Hypothesis 1> can demonstrate this favoritism.

[13] The out-performance may come from sample bias. It can be interpreted that, among EV, the funds which have persisted in EV character for 1 year would not have worse performance for the cash to go out of. In short, the sample can exclude worst cases in performance. On the contrary, from NEV sample, the best performing funds may be excluded. To test the sample bias, after composing the portfolios using two samples, we tested the performance difference between two portfolios. The result is that EVs outperformed NEVs by 4.3bps and 2.3bps, which is not significant. This result is not different from the previous result using all the samples. Therefore, the sample bias does not matter.

$$\alpha^{k}_{t,Diff} = \gamma_1 \alpha^{k}_{t} + \gamma_2 (R_{Ht} - R_{Lt}) + \gamma_3 SizeRatio^{k}_{it} \quad \text{---------- (4)}$$

α^{k}_{t} : performance (weighted average of returns) of fund family *k* at *t* year

$\alpha^{k}_{t,e}$: weighted average of returns of EVs by fund family *k*

$\alpha^{k}_{t,u}$: weighted average of returns of NEVs by fund family *k*

$\alpha^{k}_{t,Diff}$ $(=\alpha^{k}_{t,e} - \alpha^{k}_{t,u})$

$SizeRatio^{k}_{it}$: the ratio of NEV size to EV size managed by fund family *k* (as of the end of year *t*)

To test <Hypothesis 1>, we use estimation model <formula 4>. The overall performance of each fund family *k* at year *t*, (α^{k}_{t}) is the weighted average of returns of all funds managed by fund family *k*. $\alpha^{k}_{t,Diff}$ is defined as the performance gap between the EV & NEV of fund family *k*. We focused on whether the overall performance (α^{k}_{t}) explains the performance gap ($\alpha^{k}_{t,Diff}$). In the model, we also include two explanatory variables, momentum effect and the ratio of NEV size to EV size. The momentum effect ($R_{Ht} - R_{Lt}$) is based on Carhart (1997). The ratio ($SizeRatio^{k}_{it}$) is included to control the fund families' different responses to EV weight compared to the total AUM.

Based on the sign of excess return α^{k}_{t}, we divided fund families into good companies that have positive returns and bad companies that have negative returns. Among 38 companies in total, there were 23 good companies and 15 bad companies(refer to <table 4>. EV return was higher than NEV return by 2.5% in good company samples while EV returns were higher than NEVs by only 0.2% in bad company samples. The difference between the EV and NEV returns is significant at a 10% confidence level.

Table 4. Good Companies' and Bad Companies' Performances (FF Model)

	N.of obs.	Average	Std. Err.	minimum	maximum
Good Comapny	23	0.0251547	0.0502972	0.0701495	0.1273517
Bad Company	15	0.0022552	0.0473546	-0.0904863	0.1016852

The results of estimation <formula 4> confirms hypothesis 1 (refer to <table 5>. The overall performance of fund families explains the better performance of EVs at a 1% confidence level. As hypothesized, the higher the overall performance of all the fund families, the better the performance of EVs.

Table 5. fund families' performances & EVs' out-performances (FF Model)

	Coef.	Robust s.e.	t-statistics	p-value
Consant	-.005134	.0206216	-0.25	0.803
α_t^k	.314373***	.0759449	4.14	0.000
$R_{Ht} - R_{Lt}$	-.040563	.0628657	-0.65	0.519
$SizeRatio_t^k$	-.026067	.0987822	-0.26	0.792

***, **, * is significant in 1%, 5%, 10% confidence level

2. Differentiated Response to Performance

Hypothesis 2: For all EV and NEV funds with the lowest performance in previous period, the portfolios of EV funds are adjusted to take higher risk than the portfolios of NEV funds.

We set up the hypothesis 2 to confirm that fund families are more active in composing *EV* portfolios. Previous studies show that fund managers will take more risk if performance of previous period is poor. We assume that the attitudes towards *EV*s and *NEV*s differ. The portfolio risk in *EVs* should be changed higher than the portfolio risk in *NEVs*, when previous performances are poor. This should be the case if fund families are more responsive to *EV* performance then to *NEV* performance.

To test hypothesis 2, we use the following method. The copy ratio reflects the attitude towards market risk. The higher the risk-taking, the lesser the copy ratio. Therefore, we tested how much the copy ratio of EVs and NEVs changes, especially for funds that perform the lowest. We can infer that when an fund family is more attentive to a particular EV fund, the portfolio of the *EV* fund is changed to take risk more than its NEV counterpart.

We could not calculate the copy ratio directly; thus, we define the non-copy ratio to be the monthly averaging the absolute values of the relative returns to a benchmark and used it a proxy (refer to <formula 5>).

$$NonCopy_{it} = \sum_{m=1}^{12} \left(\left| R_{it}^{m} - R_{mt}^{m} \right| \right) / 12 \quad \text{---------- (5)}$$

Fund rankings are grouped in quintiles. Using the method used by Sirri & Tufano (1998), we ranked each fund *i*, based on the performance of the whole funds at year (*t-1*) (refer to <table 6>). Then, by <formula 6>, we analyzed the relation between the changing rate of the non-copy ratio and the previous year's ranked value.

$$\Delta NonCopy_{it} = \gamma_1 LowPerf_{it-1} + \gamma_2 LoMidPerf_{it-1} + \gamma_3 MidPerf_{it-1} + \gamma_4 UpMidPerf_{it-1} + \gamma_5 HighPerf_{it-1} + \gamma_6 LNSize_{it-1} \quad \text{---------- (6)}$$

where $\Delta NonCopy_{it} = NonCopy_{it} - NonCopy_{it-1}$

The estimation result shows that the response to performance is different between *EV*s and *NEV*s (refer to <table 6>). In case of *EV*, the non-copy ratio of the lowest performance funds significantly increased. The coefficients of other ranked groups were negative. The better the performance, the less risk is taken.

On the contrary, we can not find any relation between ranking and the change of portfolio in NEVs. Even with the lowest performing NEVs, there is no evidence that fund families change these portfolios actively.

Ⅶ. *Evaluation-ship bias* and fund flow

Why do fund families favor Evaluated Funds? We show that, in terms of fund flows, there are incentives. First, in the same conditions, the inflows into *EV*s are larger than the inflows into *NEV*s. Second, the better *EV*s' performance contributes to the total inflow of funds into the asset management sector.

To test the difference of fund flows between EVs and NEVs, we used <formula 7> as estimation model.

$$Flow_{it} = \gamma_1 LNSize_{it-1} + \gamma_2 Fee_i + \gamma_3 a_{it-1} + \gamma_4 D_{it}^{E} \quad \text{---------- (7)}$$

Table 6. Ranking of previous year's performances and the change of portfolios

	EVs		NEVs	
	CAPM Model	FF Model	CAPM Model	FF Model
Consant	.0269384(0.76)	.0350211(0.91)	.0050543(0.42)	-.0004577(-0.04)
$LowPerf_{it-1}$	.1184856***(3.63)	.132022***(2.72)	-.0295745(-0.96)	.0087809(0.35)
$LoMidPerf_{it-1}$	-.0026302(-0.11)	-.0292267(-0.69)	.0405581(2.06)**	.0018513(0.10)
$MidPerf_{it-1}$	-.0060681(-0.27)	-.008175(-0.23)	-.0108691(-0.57)	.0113179(0.64)
$UpMidPerf_{it-1}$	-.055256**(-2.13)	-.0056055(-0.18)	.0017020(0.09)	-.0050274(-0.28)
$HighPerf_{it-1}$	-.0612191(-0.93)	-.00705(-0.14)	-.0089754(-0.54)	-.0091600(-0.48)
$LNSize_{it-1}$	-.0019616(-1.46)	-.0023132(-1.55)	-.0002881(-0.53)	-.0001830(-0.34)
R-Square	0.2970	0.1990	0.0863	0.0315

Low Performance Quintile("LowPerf") = min {$Rank_{t-1}$, 0.2}

Lower-Middle Performance Quintile("LoMidPerf") = min {0.2, $Rank_{t-1}$- LowPerf}

Middle Performance Quintile("MidPerf") = min {0.2, $Rank_{t-1}$- (LowPerf+ LoMidPerf)}

Upper-Middle Performance Quintile("UpMidPerf")

= min {0.2, $Rank_{t-1}$- (LowPerf + LoMidPerf + MidPerf)}

High Performance Quintile("HighPerf")

= {$Rank_{t-1}$- (LowPerf + LoMidPerf + MidPerf+ UpMidPerf)}

***, **, * is significant in 1%, 5%, 10% confidence level

Results are shown in <table 7>. The coefficient of the *EV* dummy variable is significantly positive at a 5% confidence level. This suggests that, *ceteris paribus*, inflows into *EV*s are higher than inflows into *NEV*s. The main reason is because *EV*s benefit from advertisement, as Jain & Wu(2000) pointed out – an advertisement effect.

Table 7. Comparison between EVs'and NEVs'Fund Flows

	CAPM Model		FF Model	
	Coef.	t-statistics	Coef.	t-statistics
Consant	3.434354	1.51	3.423491	1.39
$LNSize_{it-1}$	-.135433*	-1.67	-.1374652	-1.53
Fee_i	-.5111077	-1.21	-.4987589	-1.20
a_{it-1}	-.5454873	-0.29	1.53838	0.17
D_{it}^{E}	1.573465**	2.07	1.460536**	2.02
R-Square	0.0941		0.0935	

***, **, * is significant in 1%, 5%, 10% confidence level

In addition, if a spill-over effect also exists, there is a higher incentive for favoritism. For this test, we used model <formula 8> to analyze the relation between EV performance and net fund inflow into fund family.

$$Flow_t^k = \gamma_1 LNSize_{it-1}^k + \gamma_2 \alpha_{t-1,Diff}^k \quad \text{---------- (8)}$$

$Flow_t^k = \sum_i Flow_{it}^k$: total net fund inflow of fund family *k* at year t (including below 1 year fund)

$LNSize_{it}^k$: Log value of AUM of fund family *k* at year *t*

The estimation result of Table 8 implies that the performance of *EV*s contributed to the increase in total AUM. The positive performance of the EVs is positively related with the total net cash flows, which is significant at 10% confidence level in the FF model.

Table 8. Fund families' Fund Flows and EVs' Out-performance

	CAPM Model		FF Model	
	Coef.	t-statistics	Coef.	t-statistics
Consant	-48.60068**	-2.15	-51.64524**	-2.08
$LNSize_i^k$	1.918516**	2.17	2.037922**	2.08
$a_{t-1,diff}^k$	4.53976	1.07	26.23179*	1.75
R-Square	0.4385		0.4689	

***, **, * is significant in 1%, 5%, 10% confidence level

Ⅷ. Conclusions

This study analyzes *evaluation-ship bias* caused by the fund evaluation system. This research shows how fund families give favoritism to evaluated funds. Our empirical results of Korean equity funds are summarized as follows:

First, we verified the existence of *evaluation-ship bias*. In the empirical test, *EV* portfolios performed better than NEV portfolios. Thus it is possible that an fund family's performance may be over-estimated.

Second, there are incentives for fund families to favor evaluated funds. They are more attentive to EV performance and take strategic and risk-taking measures to improve its ratings.

This paper contributes to recent studies that focus on the discriminating behaviors of fund families. Adding to previous literature, this paper suggests that another factor, the performance evaluation system itself, is what causes fund families to favor some funds. The existence of such a high number of Korean funds is an example of this evaluation system bias. We can expect similar phenomena to occur in other countries as well.

Our results may not be decisive, owing to the lack of time series data. However, the empirical results we have demonstrate the need to avoid information bias in Korea. We hope that the introduction of GIPS will diminish the evaluation system bias and contribute to the development of the Korean fund market.

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