

# “Fund size effect from the viewpoint of fund families – evidence from Taiwan”

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## Fund size effect from the viewpoint of fund families – evidence from Taiwan

### Abstract

Regarding the relation between the fund size and fund performance, there is no consistent conclusion. This study contributes to the literature by focusing on the influence of fund size on fund performance from the viewpoint of family size. In addition to adopting the one-way sorting method to confirm the relation between the fund size and fund performance which past literature has examined, this study further adopts the double sorting method to investigate the performance of different-sized funds in different-sized families. The authors find that the large families perform the best both based on the raw return and four-factor  $\alpha$  and the medium-sized funds perform the best no matter what the performance proxy is. For robustness, this study adopts the panel data regression analysis to investigate the influence of the interaction between individual fund size and family size on the fund performance. Regarding the size effect of equity funds in Taiwan, the authors find that the medium funds in large family perform the best and the most robust. The result will help clarify whether the fund family size plays an important role in the relation between fund size and fund performance. The result of this study will provide a reference for the fund investors when they are making the investment decisions.

**Keywords:** fund size, family size, fund performance, double sorting, panel data analysis.

**JEL Classification:** G10, G11.

### Introduction

Whether the growth of fund size helps promote the fund performance has been attracting the attention of fund investors (Grinblatt and Titman, 1989; Berk and Green, 2004; Chen et al., 2004; Yan, 2008; Lin and Ma, 2012). Even fund investors in the developing countries also pay much attention in this issue. For recent years, the development of fund industries in developing countries has kept growing. Take Taiwan for example, the number of funds issued in Taiwan keeps growing and the number of fund investors keeps growing as well. However, investors' attention differs among the numerous funds. In addition to the money flows from investors, the difference of fund performance also results in the difference of fund size. Up to June, 2014, the net asset of the smallest equity funds in Taiwan is only 1.84 million dollars, while that of the largest equity funds comes to 350 million dollars. The family sizes of the smallest and largest equity funds are 13.3 and 960 million dollars respectively. And there are 3 and 8 domestic equity funds in their families respectively. The ratio of the size of the largest fund over that of its family exceeds 36%. What is the management performance of such flagship fund and how is the attitude of fund investors to such a fund. It is worthy of further investigation.

Numerous studies point out that the management of large funds is less efficient (Abinzano, Muga, and

Santamaria, 2010). The growth of fund size results in the inelastic management of portfolio (Becker and Vaughan, 2001) and diseconomies of scale (Perold and Salomon, 1991), which erodes the fund performance (Chen, Hong, Huang, and Kubik, 2004). Chow, Lin, Lin and Weng (2011) find that the fund managers of large funds are overconfident. However, there is still merit of large funds. Yan (2008) points out that some scholars suggest the lower commissions of buying stocks, research cost per unit, management and routine expense of funds when the funds get larger. Tufano and Sevick (1997) also demonstrate that the expense fee decreases as the fund size grows. Holmes and Faff (2007) investigating the Australian funds from 1990 to 1999 find that the fund size and fund performance are positively related. Gharghori, Veeraraghavan, and Mudumba (2007) investigating the American funds in 1990 to 2004 have the same conclusions.

Should investors choose large or small funds? There seems no consistent conclusion from the viewpoint of performance. As the fund size grows, if the fund managers can find proper investment target, the performance will be promoted and the risk of portfolio will be diversified (Chen, 2012). However, if the fund managers cannot find proper investment target and keep the investment weight unchanged, the cases of decreasing returns to scale will occur (Pollet and Wilson, 2008). The results of past literature show the positive relation (ex: Becker and Vaughan, 2001; and Hung, 2003; Payne et al., 1999), negative relation (ex: Becker and Vaughan, 2001; Coval and Moskowitz, 2001) or no significant relation (Sharpe, 1966; Dellva and Olson, 1998) between fund size and fund performance. Thus, investors are not able to make investing decisions only according to the fund size.

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In fact, past literature has pointed out that investors may take the fund family into consideration when they are choosing funds (Massa, 2003; Wilcox, 2003). Gaspar et al. (2006) suggest that the existence of fund families may decrease the searching cost of investors due to the advantage of brand marketing. Because the attention of investors is limited (Merton, 1987; Hong and Stein, 1999; Hirshleifer and Teoh, 2003), the large funds in the families are supposed to attract more attention of investors. Sirri and Tufano (1998) demonstrate that searching cost is an important factor of fund flows. For investors, the searching cost of large families is lower due to the advantage of brand. Chen et al. (2004) find that the return of larger funds is lower, while that of larger fund families is higher. Yan (2008) also demonstrates the positive influence of fund family size on the fund performance. The above literature implies that investors should not pay too much attention on the large funds in the large families. Instead, they should focus on the small funds in the large families. Chen et al. (2004) propose the clientele hypothesis which demonstrates that large funds advertise more often. Investors are attracted by the advertisement, which results in the decreasing attention on the performance. However, the small funds can only attract investors by the excellent performance<sup>1</sup>. The advantage of small funds is flexible in investing. And if the small funds belong to the large families, they can make use of the resources and excellent research groups (Bhojraj, Cho, and Yehuda, 2012). Thus, whether investors should choose small funds in the large families needs further investigation.

## 1. Literature review

Some past literature supports the argument that the larger the fund the better the fund performs because of the economies of scale, which is supposed to be related to the fixed cost (Perold and Salomaon, 1991). Tufano and Sevick (1997) also find that the fund expense is decreasing as the fund size grows. Jan and Hung (2003) and Gharghori, Veeraraghavan and Mudumba (2007) verify that the larger American funds have better performance. Holmes and Faff (2007) investigating the Australian funds from 1990 to 1999 find that the fund performance is positively related to the fund performance.

Although some literature supports the positive relation between the fund size and fund performance, some proposes the opposite argument.

Perold and Salomon (1991) point out that the massive trading will have impact on the price, which results in the diseconomies of scale. Becker and Vaughan (2001) argue that when funds get bigger, the portfolio will become less flexible, which results in the difficulty to increase or decrease the positions. Chen, Hong, Huang, and Kubik (2004) also find the negative relation between the fund performance and the fund size. The result of Yan (2008) shows that the funds with the least net assets perform significantly better than that with the most net assets no matter which performance proxy is adopted. Yan suggests that the illiquidity of large funds is an important reason that the fund size erodes the fund performance. Perold and Salomaon (1991) point out that the diseconomies of large funds are related to the increase of trading cost. The large order placed pushes the price up, which increases the trading cost of funds. The market impact effect is thus produced. Bhojraj, Cho, and Yehuda (2012) also find the negative relation between fund size and fund performance. They find that funds in the smallest-sized group have the best stock-picking ability. Bhojraj et al. suggest that although some arguments support that the larger funds have better returns due to the accessibility of information, such advantage will be offset by the other flaws. For example, the large funds cannot make the best investment and have the problem of institutional diseconomies of scale (Chen, Hong, Huang, and Kubik, 2004). Petajisto (2013) believes that the erosion of fund performance by the fund size is related to the active management.

The literature above shows that the positive supporters stress on the better research ability and bargaining power of large funds, while the negative supporters focus on the erosion of performance due to the lack of liquidity of large funds. However, some literature shows no strong relation between the fund size and the fund performance. Berk and Green (2004) offering a rational model of fund management point out that in cross section there is no significant relation between fund performance and size. Grinblatt and Titman (1989) find that the fund size is negatively related with gross returns, while that is not significantly related with net returns. The empirical results of Sharpe (1966) and Dellva and Olson (1998) also report the insignificant relation between fund size and performance.

In fact, the influence of fund size on the fund performance is related to their families. Investors usually take the fund family into account when they are making the investing decisions. Kempf and Ruenzi (2008) address that the characteristics of fund family are important for fund investors. Massa (2003) notes that investors seem to select fund

<sup>1</sup> Nanda, Wang and Zheng (2004) suggest that there is no reason for fund families to promote the poor performance. Kempf and Ruenzi (2008) point out that the funds with persistent performance are more likely to be advertised. For small funds, the promotion of fund performance can not only attract the attention of investors but also raise the possibility to be advertised (Fu, Kang, and Liu).

families first and then choose the individual funds. The family which the individual funds belong to in the distinct market plays an important role. Wilcox (2003) demonstrates that the family brand is important for the long-term investors. Thus, investors may take account of both fund size and fund family size. Pollet and Wilson (2008) further suggest that the fund family may affect the strategy of fund portfolios. Generally, the family decision making process gets more complicated when the number of funds increases. Although some literature reports the negative relation between fund size and fund performance, the relation between fund family size and fund performance is positive. Yan (2008) finds that the fund performance is significantly and positively influenced by the previous performance and size of fund families. The relation between fund performance and fund family size presents the economic benefits from the fixed cost of big families, such as commissions, research and marketing expense and the distribution fee. Warner and Wu (2011) demonstrate that the greater the assets of the fund families, the more possible for funds to reduce expense ratios, which implies that the funds in the big family can enjoy the benefit of economies of scale. Ang and Chen (1998) and Philpot and Rimbey (2000) also provide evidence of positive relation between fund performance and family size. Guedj and Papastaikoudi (2008) further find that funds in the big family are more performance persistent. The literature above mainly focuses on the investigation of equity funds in the developed countries, especially the funds in America. The fund industry in America is a mature and well developed market. Chen, Hong, Huang, and Kubik (2004) investigate whether the fund size erodes the fund performance. The study period of Chen et al. (2004) is 1962-1999. Yan (2008) investigates the relation between fund size and fund performance from 1993 to 2002. The sample of these two studies above is the equity funds in America. The average net assets of the funds in these two studies are 282.5 million dollars and 1152.19 million dollars respectively. This study adopts the equity funds in Taiwan as the sample from Jan. 1995 to Jun. 2014. The average net assets of the sample funds are 238.4 million dollars. Taiwan is the country of an emerging market going towards maturity. Whether employing the data of Taiwan comes to the same conclusion needs further investigation. Furthermore, most of the existing papers focus on the relation between the fund size and fund performance (Gharghori, Veeraraghavan and Mudumba, 2007; Holmes and Faff, 2007; Berk and Green, 2004) or the influence of family size on the fund performance (Yan, 2008; Ferruz, Muñoz, and Vargas, 2010). Our study aims to fill the void in the literature. We will investigate the relation

between the fund size and fund performance based on the fund families in Taiwan. We will further examine the influence of the interaction of fund size and family size on the fund performance.

## 2. Research method

**2.1. The data.** The data of this study is the equity funds in Taiwan<sup>1</sup>. The sample period came from Jan. 1995 to Jun. 2014. The newly raised funds were not included in our sample because there are large inflows in the newly raising periods. And investors are forbidden to the redemption of funds, which leads to the distortion of funds' assets. The newly raised funds were not included in our sample until the permission of their redemption. Following the study of Chen, Hong, Huang, and Kubik (2004), Yan (2008) and Bhojraj, Cho, and Yehuda (2012), this study excluded the foreign and regional funds. There are 188 funds included in the sample. Monthly data of funds' net assets, raw return, fund flows and other control variables were obtained from the Taiwan Economic Journal (TEJ).

**2.2. The comparison of performance between large funds and small funds.** This study aims to investigate the role the fund family plays in the information content of fund size. Referring to Yan (2008), this study divides equity funds in Taiwan into three groups every month based on the size of funds and computes the average monthly performance of each group. The study will focus on the first issue that whether the performance of small (medium) funds is superior to that of large funds. In addition to the raw return of funds (Gruber, 1996), this study adopts four-factor  $\alpha$  (Carhart, 1997) as the proxy of fund performance. The equation is as follows:

$$R_{i,t} - R_{f,t} = \alpha + \beta(R_{m,t} - R_{f,t}) + sSMB_t + hHML_t + mMOM_t + \varepsilon_t, \quad (1)$$

where  $\alpha$  is the 4-factor  $\alpha$  which is the risk adjusted return after considering the four risk factors: the market, the size, the  $B/M$  ratio and the momentum.  $R_{i,t}$  denotes the monthly return of fund  $i$  in month  $t$ ,  $R_{f,t}$  is the risk-free interest,  $R_{m,t}$  represents the monthly return of the market index in month  $t$ ,  $SMB_t$  is the return on a portfolio of small-sized (bottom 50%) stocks minus that on a portfolio of large-sized (top 50%) stocks,  $HML_t$  denotes the return on a portfolio of high book-to-market (top 30%) stocks minus that on a

<sup>1</sup> When computing the four-factor  $\alpha$ , we need to adopt a suitable benchmark. For international funds, the benchmark differs when funds of different style are included such as regional funds, single country funds, global funds. We are not able to find out the matched benchmark for all kinds of international funds. Thus the data of domestic stocks is the most complete compared with those of other foreign countries. Several studies investigating the relation between the fund size and fund performance (ex: Chen, Hong, Huang, and Kubik, 2004; Yan, 2008; Bhojraj, Cho, and Yehuda, 2012) also only adopt the domestic equity funds as the study sample. Following past literature, this study adopts the domestic equity funds as our sample.



portfolio of low book-to-market (bottom 30%) stocks,  $MOM_t$  represents the return on a portfolio of return winners (top 30%) minus that on a portfolio of return losers (bottom 30%).

**2.3. The comparison of large and small funds in the large and small families.** This study further adopts double-sorting method to examine the relation among fund performance, fund size and family size. Firstly, fund families are divided into three groups based on the sum of the equity funds' net assets in the family. Then, the funds in each family group are divided into three groups based on the net assets of the individual funds. Group 1 is the smallest and Group 3 is the largest. There are 9 groups finally. The performance of funds in each group is computed. This study will examine which group has the best performance.

**2.4. Robustness test – the influence of the interaction of fund size and family size on fund performance.** For robustness, this study further employs the panel data regression model to investigate the influence of the interaction of fund size and family size on fund performance. In addition to the fund size and family size, other variables including previous net flows (Zheng, 1999; Frazzini and Lamont, 2008), previous performance (Carhart, 1997; Shu et al., 2002) and risk (Treynor, 1965; Sharpe, 1966), turnover rate (Jan and Hung, 2003) and expense rate (Prather, Berin and Henker, 2004) are included into the regression model as the control variables. Moreover, this study adopts the interaction of fund size and family size into the model as the independent variable. The panel data regression model is as follows:

$$Perf_{i,t} = \alpha + b_1 Perf_{i,t-1} + b_2 Size_{i,t-1} + b_3 Fmsize_{i,t-1} + b_4 Std_{i,t-1} + b_5 Netflow_{i,t-1} + b_6 Turn_{i,t-1} + b_7 Exp_{i,t-1} + (2) + b_8 Bfund \times Bfamily + b_9 Mfund \times Bfamily + \varepsilon_t,$$

where the dependent variable  $Perf_{i,t}$  is the funds' performance. We adopt the raw return ( $Raw_t$ ) and four-factor  $\alpha$  (4factor  $\alpha_t$ ) as the proxy of fund performance. The independent variable  $Size_{i,t-1}$  denotes the logarithmic value of fund net assets for the previous month. The significantly negative coefficient of  $b_2$  represents that the fund performance is significantly and negatively influenced by the fund size and vice versa.  $Fmsize_{i,t-1}$  denotes the logarithmic value of net assets of fund  $i$ 's family for the previous month. The significantly

positive coefficient of  $b_3$  represents the family size has significantly positive influence on the fund performance and vice versa.  $Std_{i,t-1}$  is the standard deviation of raw return of fund  $i$  based on the daily fund return over the previous month, which is the proxy variable of the risk.  $Netflow_{i,t-1}$  represents the net flow rate of fund  $i$  in the previous month, which is the ratio of the amount of net flow over the previous net assets of fund  $i$ .  $Turn_{i,t-1}$  denotes the turnover rate of fund  $i$  in the previous month.  $Exp_{i,t-1}$  denotes the fund expense rate in the previous month.  $Bfund$  equals to 1 represents the large funds,  $Bfamily$  equals to 1 denotes the large fund family,  $Mfund$  equals to 1 denotes the medium-sized funds. The significantly positive coefficient of the interaction variable ( $Bfund \times Bfamily$ ) represents the large funds in the large family are significantly and positively related to the fund performance. If the coefficient of ( $Mfund \times Bfamily$ ) is significantly positive, it denotes the medium-sized funds in the large family are significantly and positively related to the fund performance.

**3. The empirical results**

**3.1. Fund size, fund family size and fund performance.** Tables 1 and 2 are the statistics description of fund family groups and fund groups. The groups in Table 1 are divided according to the family size. The statistics in Table 1 show that the large families (Group 3) perform the best both based on the raw return and four-factor  $\alpha$ . The average net assets of large families are about 540 million dollars. The unreported table demonstrates that the average size of funds in the large families (Group 3) is 126.7 million dollars. Table 2 shows the statistics description of individual funds, which reveals that the medium-sized funds perform the best no matter what the performance proxy is. The average amount of medium fund assets is about 41 million dollars. The statistics in Tables 2 (1) also demonstrate that the larger the funds (the families) are, the lower their expense rate is. The expense rate difference among the large, medium and small funds (families) is significant. Apparently, the effect of economy scale exists in funds and their families. The analysis above demonstrates that the medium-sized funds and funds in the big families perform the best. Should investors choose the medium-sized funds based on the individual funds' net assets or choose the funds in the large families based on the families' size? It is worthy of further investigation.

Table 1. The statistics description of fund families

	Family asset groups			Group1-Group3	Group2-Group1	Group2-Group3
	1	2	3			
Net assets (million dollars)	36.79	137.32	540.94	-504.15	100.53	-403.62
t-value	(23.51*)	(33.33*)	(60.19*)	(-56.33*)	(36.00*)	(-47.93*)
number of funds	1.66	3.03	6.83	-5.17	1.37	-3.80

Table 1 (cont.). The statistics description of fund families

	Family asset groups			Group1-Group3	Group2-Group1	Group2-Group3
	1	2	3			
t-value	<b>(93.53*)</b>	<b>(63.27*)</b>	<b>(87.84*)</b>	<b>(-76.08*)</b>	<b>(36.00*)</b>	<b>(-59.54*)</b>
monthly raw return	0.58%	0.66%	0.79%	-0.21%	0.08%	-0.13%
t-value	<b>(1.18)</b>	<b>(1.40)</b>	<b>(1.61)</b>	<b>(-3.14*)</b>	<b>(1.02)</b>	<b>(-2.08*)</b>
four-factor $\alpha$	-0.02%	0.18%	0.25%	-0.27%	0.20%	-0.07%
t-value	<b>(-0.37)</b>	<b>(4.56*)</b>	<b>(5.01*)</b>	<b>(-9.67*)</b>	<b>(6.77*)</b>	<b>(-3.03*)</b>
expense rate	0.104%	0.101%	0.097%	0.007%	-0.004%	0.003%
t-value	<b>(22.26*)</b>	<b>(22.74*)</b>	<b>(22.81*)</b>	<b>(6.94*)</b>	<b>(-3.72*)</b>	<b>(8.17*)</b>
turnover rate	35.20%	27.23%	22.61%	12.59%	-7.97%	4.62%
t-value	<b>(30.80*)</b>	<b>(31.96*)</b>	<b>(30.20*)</b>	<b>(19.54*)</b>	<b>(-14.03*)</b>	<b>(10.67*)</b>
net flow rate	0.028%	0.021%	0.011%	0.02%	-0.01%	0.01%
t-value	<b>(8.37*)</b>	<b>(6.83*)</b>	<b>(4.48*)</b>	<b>(5.92*)</b>	<b>(-2.27*)</b>	<b>(4.56*)</b>

Note: Fund families are divided into three groups based on the net assets of fund families. Group 1 (3) denotes families with the least (greatest) net assets, and Group 2 is the medium-sized family group. \* 5% significant level.

Table 2. The statistics description of funds

	Fund groups			Group1-Group3	Group2-Group1	Group2-Group3
	1	2	3			
Net assets (million dollars)	15.07	41.37	135.90	-120.83	26.30	-94.53
t-value	<b>(61.73*)</b>	<b>(40.68*)</b>	<b>(44.32*)</b>	<b>(-41.58*)</b>	<b>(32.46*)</b>	<b>(-41.80*)</b>
monthly raw return	0.64%	0.85%	0.73%	-0.09%	0.21%	0.12%
t-value	<b>(1.30)</b>	<b>(1.69*)</b>	<b>(1.49)</b>	<b>(-1.98*)</b>	<b>(4.66*)</b>	<b>(2.45*)</b>
four-factor $\alpha$	-0.03%	0.24%	0.23%	-0.26%	0.27%	0.01%
t-value	<b>(-0.68)</b>	<b>(4.59*)</b>	<b>(4.89*)</b>	<b>(-12.45*)</b>	<b>(13.42*)</b>	<b>(0.24)</b>
expense rate	0.102%	0.099%	0.097%	0.005%	-0.003%	0.002%
t-value	<b>(22.80*)</b>	<b>(22.77*)</b>	<b>(22.81*)</b>	<b>(15.99*)</b>	<b>(-8.47*)</b>	<b>(5.70*)</b>
turnover rate	36.39%	29.27%	21.02%	15.37%	-7.12%	8.25%
t-value	<b>(31.89*)</b>	<b>(32.50*)</b>	<b>(30.91*)</b>	<b>(25.12*)</b>	<b>(-15.17*)</b>	<b>(22.70*)</b>
net flow rate	0.02%	0.01%	0.01%	0.01%	-0.01%	0.00%
t-value	<b>(7.95*)</b>	<b>(5.97*)</b>	<b>(4.50*)</b>	<b>(5.36*)</b>	<b>(-3.68*)</b>	<b>(3.19*)</b>

Note: Individual funds are divided into three groups based on the net assets of funds. Group 1 (3) denotes funds with the least (greatest) net assets, and Group 2 is the medium-sized fund group. \* 5% significant level.

Table 3. Raw return of fund groups (double-sorting)

		Divided based on fund size			Group 3-Group 1
		1	2	3	
Divided based on family size	1	0.64%	0.66%	0.73%	0.10%
		(1.29)	(1.34)	(1.48)	(1.12)
	2	0.77%	0.81%	0.83%	0.06%
		(1.53)	(1.59)	(1.65)	(0.75)
	3	0.65%	0.85%	0.69%	0.04%
		(1.38)	(1.70*)	(1.39)	(0.42)
Group 3-Group 1		0.02%	0.19%	-0.05%	
		(0.21)	(2.73*)	(-0.63)	

Note: Table 3 is the raw return of fund groups of double-sorting on family size and fund size. Group 1 (3) is the smallest (largest) size group. The statistics in parentheses are t values. \* 5% significant level.

Tables 3 and 4 are the result of double-sorting method based on family size and fund size. The statistics show that the medium-sized funds in the large families have the best performance, while the small funds in the small family perform the worst. The average assets of these two groups are 114.82 and 10.65 million dollars respectively (Table 5). The fund family usually represents the brand and image of funds. The fund numbers of large-sized

families are always greater than that of small-sized families<sup>1</sup>. The visibility of large-sized families is much greater than that of small-sized families. The searching cost thus is lower for large family investors. The result

<sup>1</sup> Table 1 reveals that the average equity fund numbers of large-sized families are 6.83 funds, while that of small-sized families are 1.66 funds. The fund numbers of large-sized families are over 4 times that of small-sized families.

of Tables 3 and 4 reveals that what the fund investors should do is to choose the medium-sized funds in the large family because the performance (risk adjusted or not) of these funds is better than other funds.

For robustness, Table 6 further adopts the panel data regression analysis to include other variables which also affect the fund performance as the control variables. The results of Tables 3 and 4 have demonstrated that the medium-sized funds in the large family perform the best. Thus, in Table 6 we include two interaction variables ( $Bfund \times Bfamily$ ) and ( $Mfund \times Bfamily$ ) into the regression model. The variable ( $Bfund \times Bfamily$ ) indicates the interaction of large funds and large families and ( $Mfund \times Bfamily$ ) represents the interaction of medium funds and large families. The evidence in Table 6 is striking. The influence of fund size and

family size on the fund performance is significantly negative after control the other variables. However, the interaction variables reveal that large funds in the large family ( $Bfund \times Bfamily$ ) or medium funds in the large family ( $Mfund \times Bfamily$ ) are positively related to the fund performance. Especially, the medium funds in the large family affect the fund performance significantly and positively no matter which performance proxy is adopted. The result is consistent with that in Tables 3 and 4. The results of Table 6 imply that the fund size and the family size have an interactive effect on each other, which further affects the fund performance. When fund investors are making the investing decisions, they should not simply consider the factor of fund size or simply choose the funds in the large family. They should consider the two factors simultaneously.

Table 4. Four-factor alpha of fund groups (double-sorting)

		Divided based on fund size			Group 3-Group 1
		1	2	3	
Divided based on family size	1	-0.13%	0.00%	0.11%	0.23%
		(-2.61*)	(-0.09)	(1.97*)	(6.95*)
	2	0.18%	0.16%	0.26%	0.08%
		(3.51*)	(2.85*)	(4.67*)	(2.61*)
	3	0.17%	0.33%	0.23%	0.06%
		(3.80*)	(6.51*)	(4.46*)	(2.08*)
Group 3-Group 1		0.29%	0.34%	0.12%	
		(8.83*)	(12.32*)	(5.46*)	

Note: Table 4 is the four-factor alpha of fund groups of double-sorting on family size and fund size. Group 1 (3) is the smallest (largest) size group. The statistics in parentheses are t values. \* 5% significant level.

Table 5. Fund size of fund groups (double-sorting) (million dollars)

		Divided based on fund size			Group 3-Group 1
		1	2	3	
Divided based on family size	1	10.65	17.88	24.34	13.69
		(46.11*)	(59.65*)	(56.24*)	(33.68*)
	2	25.88	41.00	67.91	42.03
		(27.18*)	(40.86*)	(47.70*)	(38.48*)
	3	74.09	114.82	191.51	117.42
		(24.62*)	(33.95*)	(57.44*)	(38.86*)
Group 3-Group 1		63.45	96.94	167.17	
		(22.28*)	(30.25*)	(53.46*)	

Note: Tables 5 is the average net assets of fund groups of double-sorting on family size and fund size. Group 1 (3) is the smallest (largest) size group. The statistics in parentheses are t values. \* 5% significant level.

Table 6. The influence of fund size and family size on the fund performance

	Y:R <sub>t</sub>			Y:4 factor alpha		
Intercept	0.35	0.62	0.64	0.01	0.02	0.02
t-value	(4.73***)	(4.16***)	(4.13***)	(3.19***)	(2.33**)	(2.33**)
R <sub>t-1</sub>	0.10	0.10	0.10			
t-value	(1.24)	(1.28)	(1.28)			
Std <sub>t-1</sub>	-0.09	-0.09	-0.09			
t-value	(-0.48)	(-0.47)	(-0.48)			
4alpha <sub>t-1</sub>				0.77	0.77	0.77
t-value				(22.07***)	(22.19***)	(22.18***)
Netflow <sub>t-1</sub>	3.49	3.05	3.02	-0.14	-0.16	-0.16

Table 6 (cont.). The influence of fund size and family size on the fund performance

	Y:R <sub>t</sub>			Y:4 factor alpha		
t-value	(1.44)	(1.31)	(1.30)	(-1.11)	(-1.24)	(-1.27)
Turn <sub>t-1</sub>	-0.004	-0.005	-0.005	-0.001	-0.001	-0.001
t-value	(-0.39)	(-0.46)	(-0.49)	(-0.62)	(-0.66)	(-0.68)
Exp <sub>t-1</sub>	-78.99	-78.38	-77.99	0.60	0.62	0.63
t-value	(-2.78***)	(-2.81***)	(-2.80***)	(0.96)	(1.00)	(1.03)
size <sub>t-1</sub>	-0.02	-0.005	-0.01	-0.001	-0.001	-0.001
t-value	(-3.94***)	(-3.42***)	(-3.73***)	(-3.41***)	(-4.06***)	(-3.80***)
Fmsize <sub>t-1</sub>		-0.03	-0.03		-0.001	-0.001
t-value		(-3.09***)	(-3.11***)		(-1.53)	(-1.66*)
Bfund*Bfamily			0.02			0.00
t-value			(2.37**)			(1.62)
Mfund*Bfamily			0.01			0.001
t-value			(2.58***)			(2.85***)
n	25840	25840	25840	24209	24209	24209
Adjusted R <sup>2</sup>	0.071	0.083	0.084	0.640	0.640	0.640

Note: \*10% significance level, \*\*5% significance level, \*\*\*1% significance level.

### Conclusions and suggestions

Fund investors have been taking attention on finding a characteristic which can make the well-performing funds stand out. Numerous studies regarding the funds in developed countries have been investigating the influence of fund size on the fund performance. However, there is no consistent conclusions (Chen, Hong, Huang, and Kubik, 2004; Gharghori, Veeraraghavan and Mudumba, 2007; Holmes and Faff, 2007; Yan, 2008). Shu, Yeh, and Yamada (2002) point out that the well-known and large funds can get more attention from investors due to the lower searching cost. In addition to the size of individual funds, the funds in the large family seem to get benefit from the family brand. Thus, the issue of the influence of fund family size on the fund performance is getting more important (Ang and Chen, 1998; Guedj and Papastaikoudi, 2008). Past literature has focused on the relation between fund size and fund performance or the influence of family size on the fund performance in developed countries. This study complements the literature gap by investigating the interaction of fund size and fund family size on the fund performance in Taiwan which can provide reference for fund investors in developing countries.

Using the equity funds in Taiwan from Jan. 1995 to Jun. 2014, this study tries to investigate the relation among fund size, fund family size and fund performance. The result demonstrates that the small funds in the small family perform the worst. These findings are not consistent with Chen, Hong, Huang, and Kubik (2004) and Yan (2008) which examine the American funds. The reason may be that the size of Taiwan's small funds in the small family is too small. The average net assets of these funds are only

10.65 million dollars, which cannot produce the economies of scale. Moreover, the investment strategy of these funds tends to be affected by the redemption of investors. On the other side, the medium-sized funds in the large family perform the best, which is confirmed both in the double-sorting analysis and the panel data regression analysis. The average net assets of these funds amount to 114.82 million dollars. The appropriate size of net assets makes them make investment flexibly. In addition to the advantage of economies of scale, the resource advantage and specialized research from the large families (Bhojraj, Cho, and Yehuda, 2012) also lead the medium-sized funds in the large families to perform the best.

Our empirical findings shed light on research of equity funds in emerging markets by showing that the interaction of fund size and fund family size may affect the fund performance. The result of this study has implications. Firstly, the fund companies should issue considerable funds to extend the family size and construct the excellent research team to let the information be effectively shared by each fund in the family, which will help promote the performance of funds. Secondly, the medium size helps the fund performance the most. It is unfavorable for funds with too few or too many net assets. Finally, fund investors should not only consider the fund size or the family size when they are making the investment decisions. They should take account of both these two factors. The sample of this study comes from the equity funds in Taiwan which is one of the developing countries. Whether the medium funds in the large family in other developing countries or in the developed countries also perform the best is worthy of further investigation.



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