Tournaments in Thai Mutual Funds

ABSTRACT

This study examines whether family (intra-firm) and market (inter-firm) competitions exist in Thai mutual fund industry. Using monthly data of 173 equity funds from 16 asset management companies (families) during 2001 to 2008 and the empirical results show that both family and market tournaments exist in Thai fund management market. Fund managers adjust their fund volatility based on their fund's rolling 7-month ranking. The winner managers tend to increase their fund volatility more than the losers do and the competition in market tournament is more fiercely than that in the family tournament. In addition, the young fund tends to increase fund volatility more than the old ones. By using the family's size and the bank-ownership dummies to investigate the roles of family's size and bank-concentration on fund tournaments, the empirical results still quite similar to those that use all samples to consider.

I. INTRODUCTION

The researches about the behaviors of mutual fund's characteristics in Thailand are still not widely as they should be compared to the other countries. One of the topics that are lack to investigate is about the significant of the ranking of fund in their families[1] and the reaction of the fund managers to response for their funds' interim performance.

Kempf and Ruenzi (2008) show that reaching higher fund's ranking within their families lead to larger capital inflows. In addition, Khorana (1996) finds that fund manager's salary and compensation usually based on the amount of asset under management of their funds. Moreover, Guedj and Papastaikoudi (2003) argue that the relationship between fund's performance and their inflows is convex; fund that has good performance will receive large money inflows into their fund while poor performance fund does not lead to significant capital outflows. Combining these three features, we can expect that portfolio managers care about the relative performance of their funds since it is affected their compensation and job promotion. Thus, the mutual fund tournament may be existed.

The concept of mutual fund tournament is that; after the interim fund's performance release, the money managers changes the level of their fund volatility and hope for better performance in the second half of the year. However, it is not obvious how managers react to this tournament. In the early study of Brown, Harlow and Starks (1996) show that the loser managers (their funds have poor performance at the end of the first half of the year) tend to increase their fund volatility more than the winner managers do in the latter period. They argue that the losers have lose not much from increasing their fund volatility since they face the convex reward scheme, a further deterioration of their fund's performance is not going to hurt them much (their capital outflows are not large amount) while the winner managers have a lot to lose if their fund's rank decrease, so they will lower their fund volatility and try to "lock-in" their fund position. Hence, the losers tend increase volatility of their funds more

[1] Fund family is defined as the entirely of all funds that managed by the same fund management company, i.e. all funds that belong to SCB Asset Management Company are defined as "1" Fund Family (SCBAM Family).

than the winners do. In contrast, Makarov (2008) demonstrates the opposite results; he argues that winning managers tend to increase fund volatility more than the losers do. The strategic interactions between fund managers occur (the decision of fund manager takes the others into account), the winners strategy is that they will replicate the losers' strategy since they want to maintain their funds position. As winners expect the losers to buy more volatile securities in order to improve their fund's rank so they will do the same as the losers do. Sum up, the winners tend to choose riskier portfolios than the losers.

In this paper, I investigate the equity funds in Thailand during 2001 to 2008. The data contains 173 funds from 21 families. The empirical results show the support to the literature of Makarov (2008), the strategic interaction between fund managers in Thailand occur in fund tournaments. The interim winners increase fund volatility more than the losers do in the subsequent period. Moreover, I also find that portfolio managers in Thailand engage in two tournaments those are family (intra-firm) and market (inter-firm) tournaments and the empirical results also show that the competition in market tournament is more fiercely than family tournament. Moreover, I examine the roles of family's size and their connection to bank; the majority results are not affected. The winners in both large and small families tend to increase their fund volatility more than the losers do. In addition, the winners in both bank-managed and nonbank-managed families tend to choose more volatile portfolio than the losers do as well.

II. LITERATURE REVIEW

Brown, Harlow and Starks (1996) use monthly data of 334 growth-oriented funds in US during 1976 - 1991 to investigate the reaction of fund managers after their mid-year fund's performance release. They find that the loser managers tend to increase volatility to their portfolios in the subsequent period more than the winners do. Orphanides (1996) examines the behavior of Growth and Growth and income mutual funds in the US during 1976 to 1993. He finds that, on average, volatility of fund is lowest in the second quarter of the year, then

increasing in the third and fourth quarter and reaching a peak in the first quarter. In addition, he also argues that the relationship between past performance and risk taking behavior for good and bad performed funds are different. For the losers, they adjust their portfolio by increasing risk to their funds and hopes for better performance in the latter part of the year. For the winners, they reduce fund volatility since they want to "lock-in" their funds rank position. Koski and Pontiff (1999) analyze the changing in fund volatility in response to mid-year fund performance and they show that, overall, the relationship between prior fund performance and fund volatility within one year is negative while funds that use derivative have the weaker relationship.

Qiu (2003) uses monthly data of growth-oriented funds in US (same segment as Brown, Harlow and Starks (1996)) during 1992 to 1999 in his research. He claims that his data is a survivorship bias-free data (he already includes "dead funds" to his sample), while the data of Brown, Harlow and Starks (1996) in their study faced survivorship bias problem because they excluded the dead fund data. By the way, the estimation results of his literature shows that the tournament hypothesis presented by Brown, Harlow and Starks (1996) does not exist during 1992 to 1999. He also argues that top ranking funds have the tendency to lock-in their position (in line with Brown, Harlow and Starks (1996)) but funds that have the ranking closer to the top ones have greater desires to increase their fund volatility. Moreover, in an extreme case, the worst ranking funds tend to lock in their position as well since the termination probability of ending funds will increase dramatically if portfolio managers take more risks and if their fund performances turn out to be even worse. Next, Makarov (2008) builds a rational mutual fund tournament model and show that mid-year winners tend to choose riskier portfolio than mid-year losers. He argues that it is not optimal for the losers to increase fund risk by invest more on risky securities if that securities already hold by the winners. The more appropriate strategy for the losers is that they should invest in "different" portfolio from the winners rather than buy more "volatile" securities than the winners do.

Kempf and Ruenzi (2007) investigate monthly data of US equity funds during 1993 to 2001and they concentrate only on 3 largest segments (Small Company Growth, Growth, and

Growth and Income). In addition to Brown, Harlow and Starks (1996), they divide the sample into two groups based on family size (Large family and Small family) and hypothesize that fund managers whose funds belong to large and small family behave differently from each others in the yearly fund tournament. The results of their paper show that, in large family, the mid-year winners have the tendency to decrease portfolio risks in the subsequent period while the mid-year losers tend to increase fund volatility. By the way, in small family, they show that interim winners increase fund volatility in the greater amount than the losers do. They explain that in small family the number of fund managers (or players) in the tournament are small likes "oligopoly market" in Economics extent; the strategic interaction between the managers occur (the decision of portfolio managers take the others into account). Thus, the winners of mid-year tournament increase portfolio risk higher than the losers do since they expect the loser managers to increase their fund volatility in the latter part of the year. To maintain their leading status, the winner managers also do the same thing as the losers do and they do (increase fund volatility) more than the losers do based on their empirical results.

Jans and Otten (2008) study the UK mutual fund industry; their purpose is to test whether fund tournament exist in the UK fund management industry. They use monthly data of 422 UK equity funds from 1989 to 2003 and also include dead fund observations to their data set to avoid survivorship bias problem. They find that, for whole sample period (1989 to 2003), there is no evidence for fund tournament behavior in UK. Then, they split data into two sub-periods based on the year that the literature of Brown, Harlow and Starks (1996) was published (1996). In the first period, 1989 to 1996, the tournament behavior is occurred in UK fund management industry (losers increase fund volatility in the second part of the year more than the winners do) while during 1997 to 2003, second part of the study, the strategic behavior is found; that is the winner funds increase fund risk more than the losers do. They argue that after 1996 (after the publication of Brown, Harlow and Starks (1996)), money managers take the others competitors action into account like a strategic game. Moreover, they also show that the results are stronger for small funds than large funds.

Frye (2001) investigates the performance of bank-managed bond fund compares to the nonbank-managed ones in US market from 1991 to 1999. She argues that there is no evidence that fixed income funds from bank-managed families underperform nonbank funds. In addition, she also indicates that portfolio managers in bank-managed families use more conservative strategy than managers in nonbank families do. Holliday (1994) finds that novice investors are more likely to invest in bank-managed fund since they believe the trustworthy of bank. McTague (1994) shows that bank-managed funds perform poorly compared to nonbank-managed funds and he explains that bank portfolio managers have the reputation of unaggressive investment strategy.

III MARKET BACKGROUND AND DATA DESCRIPTION

Market Background

The first asset management company (MFC) was established in 1975 by the cooperation of Thai government with International Finance Corporation (IFC), a financial arm of the World Bank. Sinpinyo Fund is the first mutual fund that established in 1977 with the size of 100 million Baht. On March 19, 1992, another seven asset management companies were formed and at the end of 1997, newly six asset management companies were founded, making a total of 14 asset management companies. Currently, as of 31 December 2008, there are 21 asset management companies in Thailand.

[Table I is here]

The growth of mutual fund industry in Thailand is quite impressive; assets under management for total market grew from 435 billion Baht in 2002 to 1,534 billion Baht at the end of 2008 while the number of funds increased from 346 in 2002 to 1,105 funds in 2008. The figures above show that fund management business in Thailand has played more important role as times goes by and investors put their money more in this industry.

Data description

The data that used in this study obtained from AIMC (Associate of Investment Management Companies). I used monthly data of NAV (net asset value) and TNA (total net asset) of each equity funds during June 2001 to December 2008 to calculate returns and sizes of each funds respectively. I investigated only equity-funds because the assets under management of fixed-income funds or money-market funds have the different nature compare to equity funds. I eliminated funds that belong to the families that have only one fund because there is no competition in those families and funds that operated less than one year since I investigated in yearly fund tournaments so, those funds had insufficient observations. In sum, the total number of funds that used in this research is 173 funds, 16 fund families and the length of data is 91 months (7 and a half years), June 2001 to December 2008. The risk-free rate that use to calculate sharpe ratio is the 6-month T-bill rate and obtained from ThaiBMA (The Thai Bond Market Association).

IV RESEARCH METHODOLOGY

1. Fund performance measurement

1.1) Total return

Mutual fund total return is computed by using Net Asset Value (NAV). The total return is the different price of each fund adjusted by dividend and divided by price of previous period. The formula is shown as following;

$$R_{it} = \frac{NAV_{it} - NAV_{it-1} + Dividend_{it}}{NAV_{it-1}} \quad (1)$$

Where;

R_{it} = Total return of fund i in period t

NAV_{it} = Net asset value per unit of fund i in period t

NAV_{it-1} = Net asset value per unit of fund *i* in period *t-1*

$Dividend_{it}$ = Dividend giving from holding fund *i* in period *t*

In this paper, I use total return[2] to evaluate the fund's performance in the first part of the year (rolling 7-month). Then, the fund's rank and market's rank are based on their total return value (higher total return, higher fund's and market's rank).

1.2 Sharpe ratio

For robustness test, I also use one of the risk-adjusted ratios to evaluate fund's performance instead of total return. This model was introduced by William Sharpe in 1966 and it is one of the classical financial models. It uses to measure risk-adjusted for return for an investment. Although the model looks simplicity, but it is still widely use especially for measure the fund performance. The concept of this model is that the return of an investment must take the risk factor (standard deviation of that return) into account to make that investment can be comparable with the others. The Sharpe ratio equation is shown below;

$$SR_{it} = \frac{R_{it} - r_t^f}{STD_{it}} \tag{2}$$

Where;

SR_{it} is the Sharpe Ratio for fund *i* in period *t*.

R_{it} is the total return of fund *i* in period *t*.

r_t^f is the rate of return of risk-free asset in period *t*.

STD_{it} is the annualized return standard deviation of fund i in period t.

2. The calculation of family's rank and market's rank

The calculation of our key variables, *Family ranks* and *Market ranks*, are done by this process. For the market ranking of each fund, first, I calculated the total return for the first part of the year (rolling 7-month) for every fund (as the measurement of fund performance), then

[2] I use "total return" as the fund performance measurement because Patel, Zeckhauser and Hendricks (1994) argue that investors care more about raw return than risk-adjusted return.

sorted them based on their total return (the fund that has highest return will considered as the highest ranking). Market ranks are distributed evenly between 0 and 1. For example, consider a mutual fund market that has only 4 funds that are Fund A, Fund B, Fund C and Fund D and the total returns for the first part of the year of each fund are 10%, 5%, 25% and 15% respectively. Then, the market ranks of each fund are 0.25, 0, 1, and 0.75 respectively. The family rank is calculated the same way as market rank except that for family rank, the calculation is done within the family not all the entire market. For example, consider family ABC that has 3 funds and the ordering based on total return is Fund X is the highest ranking follow by Fund Y and the last is Fund Z. So, the family ranks for each fund are 1 for Fund X, 0.5 for Fund Y and 0 for Fund Z.

3. Empirical model

3.1 Existence of family (intra-firm) and market (inter-firm) tournaments

I assume that fund managers involve in yearly tournaments[3]. The model below is employed from Kempf and Ruenzi (2007) to investigate how money managers change their fund volatility during the year based on their rolling 7-month family ranking. The empirical model for this section is;

$$\Delta\sigma_{it} = \beta_F FamilyRank_{it} + \beta_M MarketRank_{it} + \beta_1 FundAge_{it} + \beta_2 FundSize_{it} + \beta_3 \Delta\sigma_{it}^{M} + \varepsilon_{it} \quad (3)$$

Where;

$\Delta\sigma_{it}$ is the change in volatility of fund return from the first to the second part of the year.

$FamilyRank_{it}$ is the fund's rank within its families based on its performance in the first part of the year (rolling 7-month).

[3] Kempf and Ruenzi (2007) argue that fund managers care more about their fund position in one-year intra-firm (family) tournaments more than multi-period tournaments.

$MarketRank_{it}$ is the fund's rank in the market based on its performance in the first part of the year (rolling 7-month).

$FundAge_{it}$ is age of fund.

$FundSize_{it}$ is size of fund ($\ln(TNA_{it})$).

$\Delta\sigma_{it}^{M}$ is the change in the volatility of market return from the first to the second part of the year

The dependent variable of this model, $\Delta\sigma_{it} = \sigma_{it}^{2} - \sigma_{it}^{1}$, is the change in volatility of fund return from the first to the second part of the year, where σ_{it}^{2} (σ_{it}^{1}) represents the annualized standard deviation of fund *i* in the second part (first part) of the year *t*. The length of the first part of the year is seven months same as the well-known literature of Brown, Harlow and Starks (1996) used. This (7, 5) partitioning is reasonable because the mid-year fund performance usually announces at the middle of the year and fund manager needs to take some time to adjust her portfolio[4].

$FamilyRank_{it}$ and $MarketRank_{it}$ are the main explanatory variables of this study, the significant of β_F (β_M) will indicate that fund manager changes volatility of her fund depending on family rank (market rank). The significant of β_F (β_M) will show that the "intra-firm (inter-firm)" tournament of mutual fund occur in Thailand, the fund managers alter their portfolio risk in the latter period depending on the rolling 7-month ranking.

The control variables for this model consist of $FundAge_{it}$, $FundSize_{it}$ and $\Delta\sigma_{it}^{M}$. $\Delta\sigma_{it}^{M}$ is a crucial control variable since it can capture the impact of changing in market volatility during the year. The fund characteristic variables also include in this model those are $FundAge_{it}$ and $FundSize_{it}$. $FundAge_{it}$ is derived from the period of fund *i* during the length of this study. $FundSize_{it}$ is equal to $ln(TNA)_{it}$.

[4] I also used the length of six months instead of seven months as the first part of year. The regression results are quite the same but the effects show up more clearly in the 7-5 partitioning (higher R^2).

Large family vs Small family

To investigate the effect of family's size, I separate data into two groups (funds that belong to "large families" and funds that belong to "small families") based on the mean number of funds that family owned**.** The model for this section is;

$$\Delta\sigma_{it} = \beta_l^F FamRank_{it} \cdot D_l + \beta_s^F FamRank_{it} \cdot D_s + \beta_l^M MktRank_{it} \cdot D_l + \beta_s^M MktRank_{it} \cdot D_s + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it} \quad (4)$$

Where;

$FamRank_{it} \cdot D_l$ is the family rank of fund that belongs to large families.

$FamRank_{it} \cdot D_s$ is the family rank of fund that belongs to small families.

$MktRank_{it} \cdot D_l$ is the market rank of fund that belongs to large families.

$MktRank_{it} \cdot D_s$ is the market rank of fund that belongs to small families.

The average number of competitors within family is around 11 (cutoff). So, families those have funds at least 11 are considered as "large" family, and the others are all small families[5]. Hence, D_l (D_s) equals one if that fund belongs to large (small) family, and zero otherwise. Kempf and Ruenzi (2007) show that β_l^F has the negative value or it can imply that the interim losers increase risk to their funds more than the winners do. While in small families, β_s^F has the positive value so the interim winners increase fund volatility more than the losers do. They explained that in small families, the strategic interaction between money managers occur since there are small players in small families (the competition look likes "oligopolistic" in Economics term); the winners can observe what the losers do and the action of the winners will take the action of the losers into account. If the losers increase risk to their portfolios, the winners will do the same since they want to "lock-in" their funds position. While in large families, the competition is fierce likes "perfect competition" in Economics term, so the strategic interaction between fund managers become less important.

[5] To examine whether the estimation results are sensitive to the variation of the cutoff, I also use 16 funds as the cutoff for separate large and small families; the estimation results are quite the same.

In this study, I expect both of β_l^F and β_s^F would have the positive value since fund management industry in Thailand is very small compare to the US (Kempf and Ruenzi (2007) used US equity fund data in their research). So, the strategic interactions between money managers should be take place both of large and small families.

Bank-managed family vs Nonbank-managed family

Table II below shows the information about the shareholder structure of asset management companies in Thailand and also presents what families that belong to bank.

[Table II is here]

The model that uses to investigate the role of bank in fund tournaments is presented below;

$$\Delta\sigma_{it} = \beta_b^F FamRank_{it} \cdot D_b + \beta_{nb}^F FamRank_{it} \cdot D_{nb} + \beta_b^M MktRank_{it} \cdot D_b + \beta_{nb}^M MktRank_{it} \cdot D_{nb} + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it} \quad (5)$$

Where

$FamRank_{it} \cdot D_b$ is the family rank of fund that belongs to bank-managed families.

$FamRank_{it} \cdot D_{nb}$ is the family rank of fund that belongs to nonbank-managed families.

$MktRank_{it} \cdot D_b$ is market rank of fund that belongs to bank-managed families.

$MktRank_{it} \cdot D_{nb}$ is the market rank of fund that belongs to nonbank-managed families.

To investigate the influence of bank in mutual fund tournaments, I create two dummy variables that are D_b and D_{nb} to interact with $FamRank_{it}$ and $MktRank_{it}$ variables. D_b equals 1 if fund belongs to bank-managed family, D_{nb} equals 1 if fund belongs to nonbank-managed family, and 0 otherwise. In Thailand, number of bank-managed families account to 58% of the mutual fund market and most of them are the big players in Thai market (i.e., SCBAM, BBLAM, KAsset etc) hence the investigation of this effect is very interesting.

V. EMPIRICAL RESULTS

To investigate whether fund tournament exist in Thailand, I use model (3) to examine this phenomena and the empirical results are shown below;

[Table III is here]

The empirical results of model (3) are shown in column A and B of Table I. β_F and β_M are the main focus of this part. The null hypothesis that the family rank and market rank has no impact on the change of fund volatility between the first and second part of the year are rejected at the 1% level. So, money managers change fund volatility based on their interim family and market rank. Hence, a family and market tournaments do both exist in fund management industry in Thailand. In column A, I use the length of seven months as the first part of the year (to in line with the paper of Brown, Harlow and Starks (1996)) while in column B, I choose the length of six months as the first part of the year. The value of both β_F and β_M are positive, hence the strategic interaction between fund managers occurs in family (intra-firm) and market (inter-firm) tournaments, the winners increase fund volatility in the second part of the year more than the losers do. In addition, this results also indicate that fund managers engage more in market tournament than family tournament, since $|\beta_M| > |\beta_F|$. Moreover, this results are similar to some recent literatures (Qui (2003) and Makarov (2008)), who all argue that portfolio managers act strategically in the market tournament. However, this results are against the mutual fund tournament hypothesis that proposed by Brown, Harlow and Starks (1996). For control variables, the coefficient of $\Delta\sigma_{it}^{M}$ is significant and has positive value indicate that the changing of fund volatility depends heavily on the change in market volatility. The estimation results also show that fund's age has the impact on fund tournaments, funds that are young tend to increase fund volatility more than the old ones however, based on 7-5 partitioning, size of fund has no impact on fund tournaments[6]. In

[6] However, the results are not robust since the 6-6 partitioning show that fund's size has the positive impact on changing in fund volatility.

addition, the R^2 of column A and B indicate that the results are more show up clearly in the 7-5 partitioning than the 6-6 partitioning.

Next, I examine the behavior of fund managers in large and small families in fund tournaments and the empirical results are presented below;

[Table IV is here]

I use model (4) to investigate the effect of family's size to the extent of fund tournaments. I choose the mean number of funds (11 funds) within family as a cutoff for large family[7]. So, families that have at least 11 funds are defined as large families (the empirical results are presented in panel 1-A and 1-B), others are defined as small families. By using 11 funds as the cutoff, 69% of the funds are belonging to large families. In addition, I also use 16 funds as the cutoff to show that the empirical results are not sensitive to the differentiation of this cutoff. By using 16 funds as the cutoff (the empirical results are shown in panel 2-A and 2-B), 54% of the funds are belonging to large families. In panel 1-A, the results demonstrate that fund managers in both large and small families behave the same way after their rolling 7-month ranks release, the winner managers tend to increase fund volatility in the latter part of the year more than the losers do. The behaviors of managers in large families contradict with the paper of Kempf and Ruenzi (2007). They argue that in large family, the winner managers tend to decrease their fund volatility and want to "lock-in" their fund's position in the subsequent period so the losers in large families increase portfolio's volatility than the winners do (β_l^F has negative value). They explain that in large families, there are many money managers compete against each other within their families just like "competitive market" in Economics term so their decisions do not take the others into account and behave nonstrategic interaction to each others. However, Kempf and Ruenzi (2007) investigate US mutual fund industry that its size is very large compare to Thai market so the behavior of Thai fund managers in large family that act the same way as the managers in small families do are reasonable results since the number of fund managers in large and small families are both

[7] This method is suggested by Kempf and Ruenzi (2007).

small in Thailand. However, $\left|\beta_s^F\right| > \left|\beta_l^F\right|$ in both Panel 1-A and Panel 2-A estimation results suggest that the winners in small family increase fund volatility more than the winners in large family do in the family (intra-firm) tournament, the implication of this result may be the number of portfolio managers in small family are less than that in the large family so the competition is more fiercely in small family than in large family[8]. The impacts of control variables on risk-taking behavior of portfolio managers are the same as previous section.

Last, I also investigate the roles of bank concentration in mutual fund families whether portfolio managers in these firms engage in family and/or market tournaments or not, the empirical results are shown below;

[Table V is here]

The empirical results show that fund managers in bank-managed and nonbank-managed families all engage in both family (intra-firm) and market (inter-firm) tournaments. They adjust their portfolio risk depend on the rolling 7-month ranking of their funds. In addition, portfolio managers behave strategic interaction in both bank-managed and nonbank-managed families; the winners increase their fund volatility more than the losers do after the rolling 7-month fund's performance release. In addition, the impacts of control variables on risk-taking behavior of fund managers are the same as the two previous sections.

For robustness check, I use Sharpe ratio as the fund performance measurement instead of total return to calculate fund's ranking. The empirical results are shown below.

[Table VI is here]

[Table VII is here]

[Table VIII is here]

The empirical results are quite similar to those that use total return as the fund performance measurement. The intra-firm (family) and market (inter-firm) tournaments still occur in all circumstances. However, the empirical results above show that fund's size has the impact on changing in fund volatility; the higher the fund's size, the higher the changing in

[8] Mas-Colell, Whinston and Green (1995) argue that the strategic interactions are more crucial if there are a few players in the game.

fund volatility[9]. In addition, the goodness of fit (R^2) those obtained from the regressions are slightly less than the R^2 from the model that use total return as the measurement of fund performance.

VI. CONCLUSION

In this study, I examine the existence of intra-firm and inter-firm competitions of portfolio managers in Thailand. Since the retail investors usually think that funds in the same family should be considered as coordinate entities and fund manager should try to do best interest action based on shareholder's wealth not theirs. I investigate 173 equity funds in Thailand during 2001 to 2008 and the empirical results show that fund managers in Thailand involve in both family and market tournament. In both tournaments, the winner managers tend to increase their fund volatility more than the losers do. Kempf and Ruenzi (2007) and Makarov (2008) argue that this phenomenon can be explained as the fund managers behave strategic interaction; their decisions take the others into account. If loser managers want to increase their fund volatility in the subsequent periods, then winner managers tend to use the same strategy because they want to "lock-in" their fund ranking and the empirical results show that the winners increase fund risk more than the losers do. The results of this study are in line with many recent papers such as Qui (2003) and Makarov (2008). Moreover, the results also show that money managers engage more in market tournament than family tournament. This explanation for this may be that fund managers in Thailand usually work as a team-managed rather than single-managed so their incentives to compete against the competitors from other families are more than to compete within their families. In addition, funds that are young tend to increase fund volatility more than the old ones. Moreover, I also investigate the roles of family size and the bank ownership in mutual fund family on the existence of fund tournaments, the results also show that both tournaments still occur and fund managers act strategic interaction. The winners in both large and small families increase their fund volatility

[9] But the empirical results that fund performance measurement based on total return show that fund's size has no impact on risk-taking behavior of fund managers.

than the losers do. While the winners from bank-managed and nonbank-managed have the same response to their rolling 7-month ranking as the winners from large and small families.

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Table I

Growth of mutual fund industry in Thailand

Item/Year	2002	2003	2004	2005	2006	2007	2008
Total Asset Management Company	14	14	17	18	18	21	21
Total Funds	346	429	526	683	808	910	1,105
Total Asset Value (Billion Baht)	435.37	720.03	681.37	962.02	1,222.27	1,610.89	1,533.57

This table shows the evolution of Thai mutual fund market during 2002 to 2008. The data obtained from AIMC.

Table II
Shareholder structure of each families

Families	Major Shareholders	%	Bank-managed families
Aberdeen Asset Management	Aberdeen Asset Management Asia Limited	100	
Asset Plus Fund Management	Asia Plus Securities Public Company Limited	100	
Ayudhya Fund Management	Bank of Ayudhya Public Company Limited	100	*
BBL Asset Management	Bangkok Bank Public Company Limited	75	*
	Bangkok Life Assurance Public Company Limited	10	
	Asia Financial Holdings Ltd	10	
	Bangkok Insurance Public Company Limited	5	
BT Asset Management	Bankthai Public Company Limited	100	*
Finansa Asset Management	Finansa Public Company Limited	100	
ING Funds (Thailand)	Atlas Capital (Thailand) Co., Ltd.	51	
	ING Insurance International B.V.	49	
Kasikorn Asset Management	Kasikornbank Public Company Limited	100	*
Krung Thai Asset Management	Krungthai Bank Public Company Limited	100	*
Manulife Asset Management (Thailand)	Manulife Insurance (Thailand) Public Company Limited	100	
MFC Asset Management	Government Saving Bank	24.5	
	Ministry of Finance	16.7	
	Adkinson Securities Public Company Limited	16.2	
One Asset Management	KGI Securities (Thailand) Public Company Limited	96.8	
Phillip Asset Management	Phillip Securities (Thailand) Public Company Limited	100	
Primavest Asset Management	BBTV Equity Ltd.	50.5	
	Ayudhya Allianz C.P. Life Public Company Limited	39.5	
SCB Asset Management	The Siam Commercial Bank Public Company Limited	100	*
Seamico Asset Management	Seamico Securities Public Company Limited	100	
Siam City Asset Management	Siam City Bank Public Company Ltd	60	*
Thanachart Fund Management	Government Pension Fund	40	*
	Thanachart Bank Public Company Limited	75	
	Government Saving Bank	25	
Tisco Asset Management	Tisco Financial Group Public Company Limited	100	*
TMB Asset Management	TMB Bank Public Company Limited	75	*
	Prudential Life Assurance (Thailand) Public Company Limited	12.5	
	Ocean Life Insurance Co.,Ltd	12.5	
UOB Asset Management (Thai)	United Overseas Bank (Thai) Public Company Limited	100	*

This table presents the shareholder structure of asset management companies in Thailand and also show what families that are bank-managed families. Fund families are considered as bank-managed families if the bank ownership in those families must be at least 50%. As at 31 December 2008. Source SEC (Thailand)

Table III

Risk taking for whole sample

$$\Delta\sigma_{it} = \beta_F FamilyRank_{it} + \beta_M MarketRank_{it} + \beta_1 FundAge_{it} + \beta_2 FundSize_{it} + \beta_3 \Delta\sigma_{it}^{M} + \varepsilon_{it}$$

Independent variable	Description	A	B
$FamilyRank_{it}$	Family rank	0.0052***	0..0066***
		(3.5064)	(3.8851)
$MarketRank_{it}$	Market rank	0.0113***	0.0109***
		(6.7364)	(5.6481)
$DSTD(Market)_{it}$	Change in market	0.4454***	0.4120***
	return volatility	(49.8384)	(37.9206)
$FundAge_{it}$	Fund's age	-0.0006**	-0.0008***
		(-2.3025)	(-2.8934)
$FundSize_{it}$	Fund's size	0.0006	0.0011***
		(1.6279)	(2.7796)
R^2		0.2160	0.1416
Adjusted R^2		0.2156	0.1412
	No. of observations	9,646	9,646

This table contains estimation results from model (3). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). 173 Thai equity funds are investigated from June 2001 to December 2008. The dependent variable is the change of fund volatility between the first and second part of the year. The independent variables consist of fund's rank within its family ($FamilyRank_{it}$), fund's rank in the market ($MarketRank_{it}$), change in volatility of market return from first part to the second part of the year ($DSTD(Market)_{it}$), fund's age ($FundAge_{it}$) and fund's size ($FundSize_{it}$). The calculation of fund's rank is based on its performance in the first part of the year (uses total return as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.

Table IV

Risk taking in large and small families

$$\Delta\sigma_{it} = \beta_l^F FamRank_{it} \cdot D_l + \beta_s^F FamRank_{it} \cdot D_s + \beta_l^M MktRank_{it} \cdot D_l + \beta_s^M MktRank_{it} \cdot D_s + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it}$$

Independent variable	Description	A	B	Independent variable	Description	A	B
	Panel 1 (Cutoff = 11)				**Panel 2 (Cutoff = 16)**		
$FamRank_{it} \cdot D_l$	Family rank in families	0..0039**	0.0018	$FamRank_{it} \cdot D_l$	Family rank in families	0.0041*	0.0018
	with ≥ 11 funds	(2.0330)	(.8133)		with ≥ 16 funds	(1.7939)	(.7060)
$FamRank_{it} \cdot D_s$	Family rank in families	0.0067***	0.0125***	$FamRank_{it} \cdot D_s$	Family rank in families	0.0059***	0.0098***
	with < 11 funds	(3.1205)	(5.0685)		with < 16 funds	(3.1546)	(4.5757)
$MktRank_{it} \cdot D_l$	Market rank in families	0..0113***	0.0143***	$MktRank_{it} \cdot D_l$	Market rank in families	0.0124***	0.0152***
	with ≥ 11 funds	(5.3974)	(5.9648)		with ≥ 16 funds	(4.8929)	(5.2294)
$MktRank_{it} \cdot D_s$	Market rank in families	0.0128***	0.0082***	$MktRank_{it} \cdot D_s$	Market rank in families	0.0107***	0.0087***
	with < 11 funds	(5.1813)	(2.8576)		with < 16 funds	(5.2860)	(3.7000)
$DSTD(Market)_{it}$	Change in market return	0.4449***	0.4124***	$DSTD(Market)_{it}$	Change in market return	0.4456***	0.4125***
	volatility	(49.7290)	(37.9406)		volatility	(49.8128)	(37.9511)
$FundAge_{it}$	Fund's age	-0.0005*	-0.0007***	$FundAge_{it}$	Fund's age	-0.0005**	-0.0008***
		(-1.9302)	(-2.6123)			(-2.2717)	(-2.7497)
$FundSize_{it}$	Fund's size	0.0005	0.0011***	$FundSize_{it}$	Fund's size	0.0006	0.0011***
		(1.5280)	(2.6414)			(1.6080)	(2.6398)
R^2		0.2166	0.1429	R^2		0.2160	0.1422
Adjusted R^2		0.2161	0.1423	Adjusted R^2		0.2155	0.1415
	No. of observations	9,646	9,646		No. of observations	9,646	9,646

This table contains estimation results from model (4). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). Panel A presents the estimation results based on the cutoff of 11 (family that has at least 11 funds is defined as large family) and Panel B presents the estimation results based on the cutoff of 16 (family that has at least 16 funds is defined as large family). $FamRank_{it}$ and $MktRank_{it}$ are interacted with D_l or D_s respectively. D_l (D_s) equals 1 if a fund belongs to large (small) family and zero otherwise. The calculation of fund's rank is based on its performance in the first part of the year (uses total return as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.

Table V

Risk taking in bank-managed and non bank-managed families

$$\Delta\sigma_{it} = \beta_b^F FamRank_{it} \cdot D_b + \beta_{nb}^F FamRank_{it} \cdot D_{nb} + \beta_b^M MktRank_{it} \cdot D_b + \beta_{nb}^M MktRank_{it} \cdot D_{nb} + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it}$$

Independent variable	Description	A	B
$FamRank_{it} \cdot D_b$	Family rank in	0.0033*	0.0056***
	bank-managed family	(1.7716)	(2.5881)
$FamRank_{it} \cdot D_{nb}$	Family rank in	0.0081***	0.0084**
	nonbank-managed family	(3.5714)	(3.2148)
$MktRank_{it} \cdot D_b$	Market rank in	0.0132***	0.0123***
	bank-managed family	(6.6187)	(5.3716)
$MktRank_{it} \cdot D_{nb}$	Market rank in	0.0079***	0.0082***
	nonbank-managed family	(3.0272)	(2.7599)
$DSTD(Market)_{it}$	Change in market return	0.4448***	0.4166***
	volatility	(49.7391)	(37.8682)
$FundAge_{it}$	Fund's age	-0.0006**	-0.0008***
		(-2.3692)	(-2.9292)
$FundSize_{it}$	Fund's size	0.0006	0.0011**
		(1.5648)	(2.5002)
R^2		0.2163	0.1417
Adjusted R^2		0.2157	0.1411
	No. of observations	9,646	9,646

This table contains estimation results from model (5). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). Bank-managed familiy is defined as the family that bank has the ownership in that family more than 50%. $FamRank_{it}$ and $MktRank_{it}$ are interacted with D_b or D_{nb} respectively. D_b (D_{nb}) equals 1 if a fund belongs to bank-managed (nonbank-managed) family and zero otherwise. The calculation of fund's rank is based on its performance in the first part of the year (uses total return as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.

Table VI

Risk taking for whole sample

$$\Delta\sigma_{it} = \beta_F FamilyRank_{it} + \beta_M MarketRank_{it} + \beta_1 FundAge_{it} + \beta_2 FundSize_{it} + \beta_3 \Delta\sigma_{it}^{M} + \varepsilon_{it}$$

Independent variable	Description	A	B
$FamilyRank_{it}$	Family rank	0.0060***	0.0048***
		(4.0550)	(2.8519)
$MarketRank_{it}$	Market rank	0.0095***	0.0109***
		(5.7037)	(5.6597)
$DSTD(Market)_{it}$	Change in market	0.4457***	0.4122***
	return volatility	(49.8361)	(37.9035)
$FundAge_{it}$	Fund's age	-0.0006**	-0.0008***
		(-2.4376)	(-2.9608)
$FundSize_{it}$	Fund's size	0.0007**	0.0013***
		(1.9688)	(3.0801)
R^2		0.2148	0.1398
Adjusted R^2		0.2144	0.1393
	No. of observations	9,646	9,646

This table contains estimation results from model (3). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). 173 Thai equity funds are investigated from June 2001 to December 2008. The dependent variable is the change of fund volatility between the first and second part of the year. The independent variables consist of fund's rank within its family ($FamilyRank_{it}$)**,** fund's rank in the market ($MarketRank_{it}$)*,* change in volatility of market return from first part to the second part of the year ($DSTD(Market)_{it}$), fund's age ($FundAge_{it}$) and fund's size ($FundSize_{it}$). The calculation of fund's rank is based on its performance in the first part of the year (uses Sharpe ratio as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.

Table VII

Risk taking in large and small families

$$\Delta\sigma_{it} = \beta_l^F FamRank_{it} \cdot D_l + \beta_s^F FamRank_{it} \cdot D_s + \beta_l^M MktRank_{it} \cdot D_l + \beta_s^M MktRank_{it} \cdot D_s + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it}$$

Independent variable	Description	A	B	Independent variable	Description	A	B
	Panel 1 (Cutoff = 11)				**Panel 2 (Cutoff = 16)**		
$FamRank_{it} \cdot D_l$	Family rank in families	0.0043**	-0.0001	$FamRank_{it} \cdot D_l$	Family rank in families	0.0048**	0.0015
	with ≥ 11 funds	(2.2375)	(-0.0318)		with ≥ 16 funds	(2.1202)	(0.5648)
$FamRank_{it} \cdot D_s$	Family rank in families	0.0080***	0.0108***	$FamRank_{it} \cdot D_s$	Family rank in families	0.0067***	0.0071***
	with < 11 funds	(3.7374)	(4.4332)		with < 16 funds	(3.6284)	(3.3002)
$MktRank_{it} \cdot D_l$	Market rank in families	0.0101***	0.0148***	$MktRank_{it} \cdot D_l$	Market rank in families	0.0105***	0.0141***
	with ≥ 11 funds	(4.8675)	(6.1893)		with ≥ 16 funds	(4.1267)	(4.8753)
$MktRank_{it} \cdot D_s$	Market rank in families	0.0100***	0.0069**	$MktRank_{it} \cdot D_s$	Market rank in families	0.0090***	0.0091***
	with < 11 funds	(4.0417)	(2.4345)		with < 16 funds	(4.5146)	(3.9327)
$DSTD(Market)_{it}$	Change in market return	0.4455***	0.4131***	$DSTD(Market)_{it}$	Change in market return	0.4458***	0.4126***
	volatility	(49.7578)	(37.9531)		volatility	(49.8184)	(37.9201)
$FundAge_{it}$	Fund's age	-0.0005**	-0.0008***	$FundAge_{it}$	Fund's age	-0.0006**	-0.0008***
		(-2.1225)	(-2.8016)			(-2.3699)	(-2.8796)
$FundSize_{it}$	Fund's size	0.0007*	0.0012***	$FundSize_{it}$	Fund's size	0.0007*	0.0013***
		(1.8768)	(2.9522)			(1.9152)	(3.0169)
R^2		0.2153	0.1409	R^2		0.2149	0.1400
Adjusted R^2		0.2148	0.1403	Adjusted R^2		0.2143	0.1394
	No. of observations	9,646	9,646		No. of observations	9,646	9,646

This table contains estimation results from model (4). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). Panel A presents the estimation results based on the cutoff of 11 (family that has at least 11 funds is defined as large family) and Panel B presents the estimation results based on the cutoff of 16 (family that has at least 16 funds is defined as large family). $FamRank_{it}$ and $MktRank_{it}$ are interacted with D_l or D_s respectively. D_l (D_s) equals 1 if a fund belongs to large (small) family and zero otherwise. The calculation of fund's rank is based on its performance in the first part of the year (uses Sharpe as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.

Table VIII

Risk taking in bank-managed and non bank-managed families

$\Delta\sigma_{it} = \beta_b^F FamRank_{it} \cdot D_b + \beta_{nb}^F FamRank_{it} \cdot D_{nb} + \beta_b^M MktRank_{it} \cdot D_b + \beta_{nb}^M MktRank_{it} \cdot D_{nb} + \beta_1 Age_{it} + \beta_2 Size_{it} + \beta_3 \Delta\sigma_{it}^M + \varepsilon_{it}$

Independent variable	Description	A	B
$FamRank_{it} \cdot D_b$	Family rank in	0.0039**	0.0039*
	bank-managed family	(2.1177)	(1.7954)
$FamRank_{it} \cdot D_{nb}$	Family rank in	0.0094***	0.0067***
	nonbank-managed family	(4.1600)	(2.5838)
$MktRank_{it} \cdot D_b$	Market rank in	0.0122***	0.0127***
	bank-managed family	(6.1336)	(5.5538)
$MktRank_{it} \cdot D_{nb}$	Market rank in	0.0045*	0.0073**
	nonbank-managed family	(1.7502)	(2.4807)
$DSTD(Market)_{it}$	Change in market return	0.4452***	0.4121***
	volatility	(49.7778)	(37.8925)
$FundAge_{it}$	Fund's age	-0.0006**	-0.0008***
		(-2.5271)	(-3.0116)
$FundSize_{it}$	Fund's size	0.0006	0.0011***
		(1.6092)	(2.5996)
R^2		0.2154	0.1401
Adjusted R^2		0.2148	0.1395
	No. of observations	9,646	9,646

This table contains estimation results from model (5). Column A uses the 7-5 partitioning (the length of first (second) part of the year equals to 7(5) months) while Column B uses the 6-6 partitioning (the length of first and second part of the year both equals to 6 months). Bank-managed familiy is defined as the family that bank has the ownership in that family more than 50%. $FamRank_{it}$ and $MktRank_{it}$ are interacted with D_b or D_{nb} respectively. D_b (D_{nb}) equals 1 if a fund belongs to bank-managed (nonbank-managed) family and zero otherwise. The calculation of fund's rank is based on its performance in the first part of the year (uses Sharpe ratio as fund performance measurement). T-statistic values are reported in parenthesis. ***, ** and * are significant at 1%, 5% and 10% respectively.