IMPROVING THE PROBABILITY OF IDENTIFYING SUPERIOR ACTIVE PORTFOLIO MANAGEMENT FOR MUTUAL FUNDS IN THAILAND

TANTIKA   JORNGTAWAN

MASTER OF SCIENCE PROGRAM IN FINANCE
(INTERNATIONAL PROGRAM)
FACULTY OF COMMERCE AND ACCOUNTANCY
THAMMASAT UNIVERSITY, BANGKOK, THAILAND
MAY 2009

IMPROVING THE PROBABILITY OF IDENTIFYING SUPERIOR ACTIVE PORTFOLIO MANAGEMENT FOR MUTUAL FUNDS IN THAILAND

TANTIKA   JORNGTAWAN

Improving the Probability of Identifying Superior Active Portfolio Management for Mutual Funds in Thailand

Tantika Jorngtawan

An Independent Study
Submitted in Partial Fulfillment of the Requirements
for the Degree of Master of Science (Finance)

Master of Science Program in Finance
(International Program)
Faculty of Commerce and Accountancy
Thammasat University, Bangkok, Thailand
May 2009

Thammasat University

Faculty of Commerce and Accountancy

An Independent Study

By

Tantika Jorngtawan

"Improving the Probability of Identifying Superior Active Portfolio

Management for Mutual Funds in Thailand"

has been approved as a partial fulfillment of the requirements
for the Degree of Master of Science (Finance)
On May, 2009

Advisor:

(Asst.Prof.Dr. Sittisak Leelahanon)

Improving the Probability of Identifying Superior Active Portfolio Management for Mutual Funds in Thailand

ABSTRACT

Whether or not the average active fund manager can generate returns that outperform the relevant benchmarks is the most famous topic about the active and passive portfolio management. Inconsistent with previous studies which are normally related to U.S. mutual fund industry, this paper evidences that the average fund manager of Thai domestic equity funds can slightly beat expectation considering both "in-sample" past alpha and "out-of-sample" forecasted alpha. However, in comparison, the median index fund definitely has much more level of outperformance. Since it is found that a significant number of active funds produce positive alpha, several relationships between observable funds' characteristics and their future alpha are studied by both a sequence of Fama and MacBeth (1973) cross-sectional regression and probit regression. It is demonstrated not only that there is a significant persistence between past and forecasted alpha in Thailand over the period from June 2003 to December 2008 but also that there are skillful active fund managers and investors have a way to greatly improve the probability of identifying them.

I. INTRODUCTION

The debate between active management and index management has raged for many years. There have been many papers suggesting that the majority of actively managed equity funds in U.S. seldom overcome the benchmark of stock market according to the several major drawbacks of active management. First of all, the fund managers may follow a wrong strategy in order to try to beat the market and then generate lower return. Not only, the management fees and expense ratios of active funds are also higher than those of passive (index) fund but also the more frequently active management trade, the higher transaction costs it produces. In addition, there's a tax resulting from short-term capital gains of frequent trades.

The first motivation for this study is that most of those researches suggesting that active management strategies fail to outperform the passive management strategies after taking the expenses into account are related to U.S. market which is quite efficient and cannot be beaten easily. Thai market is nevertheless much different from U.S. market. It has been observed not only that there are many more active funds compared to passive (index) funds in Thailand, but also top-ten ranks of fund performance over the last three years are all active funds. That's why the issue of active portfolio management for Thai mutual fund industry came into consideration.

However, the issue of whether the active portfolio management creates any value to investors has often pointed to the questions whether the average fund manager beats a given benchmark or whether the median manager generates superior risk-adjusted return (i.e., positive alpha). As a result, this conventional wisdom held by many investment analysts normally leads to the conclusion that there is no benefit to active portfolio management because the average active manager does not generate returns that exceed those of the benchmark.

Interestingly, **W.V. Harlow and Keith C. Brown (2006)** propose an optional way to answer this issue by first asking the proper question; "Does superior investment performance persist from one period to the next, if so, how can we find those superior managers before the

fact with some degree of success?" Their result strongly confirms that excellent active managers exist and there a chance that investors can find them.

In my study, I will investigate Thai mutual fund industry during June 2003 to December 2008. The main objectives of my study are firstly to examine performance of average active managers whether they can produce positive risk-adjusted returns over the specified period. Secondly, to investigate whether there is a significant degree of performance persistence in Thai active fund samples for forecasted period. Finally, to study whether investors can significantly improve their probability of choosing an active manager who can produce future alphas that exceed expectation. The research questions of my study are therefore "Do superior managers exist?" and "Is there any way to improve the chance of picking them?"

The scope of this study is limited to weekly returns of the Thai domestic equity funds which have been operated during June 2003 to December 2008. However, there are some limitations to this study. The first is funds to be included in this study requires at least 156 prior weeks of returns at any particular date, so the number of fund samples is limited to only 142 active funds and 10 index funds. In addition, expense ratio and portfolio turnover are available in fund semi-annual reports and annual reports respectively. The exact weekly data are not available.

[Table I is here]

[Table II is here]

This study has some benefit for Thai mutual fund industry. For example, since the result indicates that skillful active managers exist and investors have an opportunity to search for them, investors can employ the selection process for their investment decision and enjoy higher returns. However, investors who choose funds in a random way can decide to invest in index funds instead. Moreover, fund managers can use this optional technique to monitor their performance and compare themselves with other managers. Knowing that investors have more chance to choose a manager with superior future performance, managers may try to improve their performance accordingly. This will lead to a development of Thai mutual fund industry as a whole.

3

II. LITERATURE REVIEW

Whether or not investors should select an active manager instead of the indexed investment has studied and published as academic literature for many times over the past period. At the early study, **Jensen (1968)** concludes that the performance of mutual funds (after expenses) is actually inferior to the performance of randomly selected portfolios with equivalent risk over the period 1945 through 1964. Before expense, Jensen finds that mutual funds scatter randomly about the market line of the capital asset pricing model and concludes that mutual fund managers do not appear to possess useful private information. Similarly, **Mark M. Carhart (1997)** suggests that there is no existence of skilled or informed mutual fund portfolio manager. On the other hand, **Carlson (1970)** finds evidence that funds with above-median returns over the preceding year typically repeat their superior performance. **Henriksson (1984) and Chang and Lewellen (1984)** finds that during the 1970s, net returns to fund investors before load fees lie along the Sharpe-Lintner market line. These studies imply that fund managers have access to enough private information to offset their expenses. **Baker *et al.* (2005) and Kosowski *et al.* (2005)** also show that some active fund managers possess legitimate stock selection skills.

The previous studies on performance persistence of mutual funds have brought to contradictory opinions. The earliest research generally concludes that there is no performance persistence while the recent articles lead to the conclusion that an amount of performance persistence exists. For example, **Grinblatt and Titman (1989)** replicate Jensen's procedure using an extensive set of benchmark portfolios and find evidence of a slight persistence effect. Later, in 1992 they extend their earlier analysis to a larger fund sample and find more evidence of persistence in successive five-year holding period. Moreover, the persistence is consistent with the ability of fund managers to earn abnormal returns. Consistent with **Hendricks *et al.* (1993)**, who finds the performance persistence for both good managers and bad managers, **Jegadeesh and Titman (1993)**, also finds the same but he also showed that asset returns exhibit momentum, which means that the winners of the past continue to perform well and the losers of the past continue to perform badly. He proposes that a momentum

strategy that consists of buying the winners from the previous six months, i.e. the assets at the top of the rankings, and selling the losers from the previous six months, i.e. the assets at the bottom of the rankings, earns around 1% per month over the following six months. **Elton *et al.* (1996)** find support for the notion that past risk-adjusted performance is predictive of future performance, particularly for those funds best able to control their expenses.

Malkiel (1995) observes that after accounting for the survivorship bias problem in his fund sample, there was significant performance persistence for good managers in the 1970s, but there was little evidence of persistent risk-adjusted performance during the decade of the 1980s. However, his result still suggests that one should invest in funds that have performed best in the past. However, he highlights that the persistence identified could be due to survivorship bias. In addition, **Black and Timmermann (1998)** find that on average, a portfolio made up of funds that have performed best in historical terms will perform better in the following period than a portfolio made up of funds that have performed worst in historical terms.

While many studies are based on performance measure drawn from the CAPM, the more recent studies use model that took additional factors (size and book-to–market ratio) into account. This three-factor model is introduced by **Fama and French (1996)** who stresses that their model does not explain the short-term persistence of returns highlighted by **Jegadeesh and Titman (1993)** and suggests that research could be directed towards a model integrating an additional risk factor. Later, **Carhart (1997)** finds short-term performance persistence by using momentum strategies. He introduces the four-factor model with momentum as an additional factor. He suggests that the "hot hand" phenomenon (i.e. a manager's ability to pick the best performing stocks) is mainly due to the momentum effect over one year. Likewise, **Daniel *et al.* (1997)** studies fund performance to see whether the manager's stock picking skill can cover the management fees. The conclusion is that performance persistence is due to the use of momentum strategies by the fund managers, rather than the skillfulness at picking winning stocks of them.

In Thailand, there has been some research associated with mutual fund performance; for example, **Mainkamnurd and Soontornkit (1997)** employ many models to estimate alpha between the year 1992 and 1995 and find that Thai mutual fund performance still remains and the past performance is the indicator of the future, by using the same measurement. Similarly, **Groatong (2001)** finds that mutual funds in Thailand are most likely to buy or sell stocks based on their past returns, which is called momentum investment strategy. In addition, that result also shows that on average, fund managers try to select stock based on superior returns over the prior month rather than those of the most recent months. On the other hand**, Tejapaibul (2005)** suggests that by investigating Thai equity funds between June 2000 and August 2004, it is found that investors do not select funds to invest based on past fund performance. Instead, investors prefer to consider some criteria, such as funds with large size, funds with low management fees, and fund with smooth returns. Interestingly, performance or reputation of the asset management companies does not have an effect on investors' decision.

In addition, some literature represents the relationship between factors and the performance of mutual funds. For example, **Sharpe (1966)** identified a negative relation between fund expenses and its performance. **Friend, Blume and Crockett (1970)** illustrated that the portfolio turnover was positively related to its performance. **Malkiel (1993, 1995) and Carhart (1997)** argued that fund returns are negatively impacted by its turnover and total expenses. One of an interesting Thai literature, **Kidsom (1997),** proposes that those mutual funds using high portfolio turnover technique do not provide efficiency to the funds. Instead, they reduce the excess return and yield lower utility of investors.

III. THEORETICAL FRAMEWORK

Portfolio Management

Portfolio management is constructing a group of assets and then making it generate the expected return, given the investor's constraints in terms of risk and asset allocation. There are two major groups of portfolio management:

- Passive portfolio management – this kind of management advocates the efficient market hypothesis, which states that the price on the traded assets reflects all information that is likely to influence it. Therefore, it is aimless to try to beat the market. Instead, investors should try to replicate a market index by investing in the same proportions of securities as those in the index. The superiority of this type of investment is its low management fee. Moreover, since the component of indices is quite stable, the portfolio turnover rate is quite low, and thus this type of investment does not produce too much transaction cost.

- Active portfolio management – the objective of this kind of management is to outperform the market, or a reference benchmark. Active portfolio management is trying to develop strategies to take advantage of temporary market inefficiencies. The possibility for an active manager to add value is related to the difference between the valuation of the securities by the market and their equilibrium value. How long the gap will exist depends on how long the market takes to integrate new information.

Market Efficiency

The market is efficient if the prices of assets at any moment reflect all available information. Fama (1971) suggested that there were three levels of market efficiency, based on what information was reflected in prices.

- Under weak form efficiency, the current price reflects the information contained in the past prices, suggesting that charts and technical analyses that use past prices alone would not be useful in finding undervalued stocks. This form of efficiency can lead to

the existence of active manager who has additional information, and can lead to possibility of achieving better performance than the market.

- Under semi-strong form efficiency, the current price reflects the information contained not only in past prices but also all public information (including financial statements and news).

- Under strong form efficiency, the current price reflects all information, public and private. Following this hypothesis, it is impossible to achieve a better performance than the market.

Performance Persistence

The question of performance persistence in funds is often addressed in two ways. The first is linked to the theory of market efficiency which advises that we cannot guarantee the stability of fund performance over time if market is efficient. The second is about whether an investment performance is the result of the real skill of the manager, and not just luck. In practice, investors are likely to believe that a manager who has performed well one year has more chance to perform well the following year than a manager who has performed poorly.

Carhart's four-factor model

This model is an extension of Fama and French's three-factor model. Fama and French's three-factor model is a factor model that expands the capital asset pricing model (CAPM) by adding size and value factors in addition to the market risk factor in CAPM. In Carhart's four-factor model, momentum factor, which takes into account the anomaly revealed by Jegadeesh and Titman (1993), is added. The four-factor model is thought to make it a better tool for evaluating manager performance and enable the persistence of the returns to be measured.

IV. DATA AND METHODOLOGY

Data

The data used in this study is available and can be accessed via the following;

Weekly Net Asset Value (NAV), Weekly Total Net Asset Value (TNA) and dividend of Thai domestic equity funds are obtained from The Association of Investment Companies (AIMC). Weekly returns of each fund are calculated from,

$$R_{j,t} = \frac{NAV_{j,t} - NAV_{j,t-1} + Dividend_{j,t}}{NAV_{j,t-1}} \qquad (1)$$

Expense ratio and Portfolio Turnover are collected from each fund semi-annual reports and annual reports respectively. Both fund semi-annual reports and annual reports are available in The Securities and Exchange Commission (SEC) website

Price, Market Value, Book-to-market Value, and Price Index of stocks are obtained from Data Stream. The return of SET index used as a benchmark for equity funds in this study are calculated from,

$$R_{m,t} = \frac{SET_t - SET_{t-1}}{SET_t} \qquad (2)$$

Risk-free rates are obtained from Bank of Thailand's 7-day repurchase rate.

Hypothesis

1. For mutual funds in Thailand, there are an appreciate number of active managers who are able to yield positive future excess returns.

2. For mutual funds in Thailand, a median active manager does not outperform expectations.

3. Past actual performance is significantly positively correlated with positive future alphas.

4. Fund expense is significantly negatively correlated with positive future alphas.

5. The probability that managers can generate a positive alpha improves when the investor focus on those managers with a lower expense and superior past performance.

9

<u>Methodology</u>

1. Calculate the empirical distributions of both historical and forecasted alphas for active and index funds by using the four-factor return-generating model in order to indicate whether the median manager can meet return expectations on either a backward or forward looking basis, if not, is there an appreciable percentage of the managers that exceed that expectation.

The four-factor return-generating model of Carhart (1997) is as follows;

$$ER_{jt} = \alpha_j + \beta_{jM} ER_{Mt} + \beta_{jSMB} R_{SMBt} + \beta_{jHML} R_{HMLt} + \beta_{jWML} R_{WMLt} + \varepsilon_{jt} \qquad (3)$$

Where ER_{jt} is week t excess return to the j th fund.

ER_{Mt} is week t excess return on the market.

R_{SMBt} is the difference in week t returns between small cap and large cap (i.e., "small minus big") portfolios.

R_{HMLt} is the difference in week t returns between portfolios of stocks with high and low book-to-market (i.e., "high minus low") ratios.

R_{WMLt} is the difference between the average of the highest returns and the average of the lowest returns from the previous year.

R_{SMBt} and R_{HMLt} are constructed according to the following procedure;

At the end of each year, stocks traded on the exchange are listed and sorted based on their size and book-to-market value.

- Stocks under 50th percentile are assigned as **S (small cap)**
- Stocks above 50th percentile are assigned as **B (big cap)**

Both small cap and big cap portfolios are classified into "high, medium, and low book-to-market" portfolios.

- The **H (high book-to-market)** portfolio consists of stocks above 70th percentile of book-to-market value.

- The **L (low book-to-market)** portfolio consists of stocks under 30th percentile of book-to-market value.

- The **M (medium book-to-market)** portfolio consists of stocks between 30th and 70th percentile of book-to-market value.

Therefore, there are 6 portfolios; *B/H, B/M, B/L, S/H, S/M,* and *S/L.*

The size factor, **SMB (Small minus Big),** is the equal-weighted average of the returns on the small stock portfolios minus the returns on the big stock portfolios.

$$R_{SMBt} = \frac{(S/H + S/M + S/L) - (B/H + B/M + B/L)}{3} \tag{4}$$

The value factor, **VMG (Value minus Growth),** is the equal-weighted average of the returns on the value stock portfolios minus the returns on the growth stock portfolios.

$$R_{HMLt} = \frac{(S/H + B/H) - (S/L + B/L)}{2} \tag{5}$$

R_{WMLt} is then constructed by the same way as $R_{HMLt}.$

Both small cap and big cap portfolios are classified into "winner, medium, and loser prior performance" portfolios.

- The **W (winner prior performance)** portfolio consists of stocks above 70th percentile of prior performance.

- The **L (loser prior performance)** portfolio consists of stocks under 30th percentile of prior performance.

- The **M (medium prior performance)** portfolio consists of stocks between 30th and 70th percentile of prior performance.

Therefore, there are 6 portfolios; *B/W, B/M, B/L, S/W, S/M,* and *S/L.*

$$R_{WMLt} = \frac{(S/W + B/W) - (S/L + B/L)}{2} \tag{6}$$

The momentum factor, **WML (Winner minus Loss),** is the equal-weighted average returns on the winner stock portfolios minus the returns on the loser stock portfolios.

Fund historical alpha coefficients are calculated as follow;

1) Collect weekly return data from June 2000 to December 2008, as well as weekly return data for each of the four risk factors (i.e., E_{RMt}, R_{SMBt}, R_{HMBt} and R_{WMLt})

2) **Beginning in June 2003, calculate the parameters (i.e., α_j, β_{jM}, β_{jSML}, β_{jHML}, and β_{jWML}) of Carhart Model for fund j using the prior 156 weekly returns.** The intercept (α_{jt}) estimated on week t approximates the jth manager's level of value added over the previous three-year (156-week) period. This is labeled as the week in-sample past alpha (*PALPHA*).

3) For each fund j, a new *PALPHA* is obtained for every week from June 2003 through December 2008. Then, generate an empirical distribution of historical fund performance statistics.

Fund forecasted future alpha coefficients are calculated as follow;
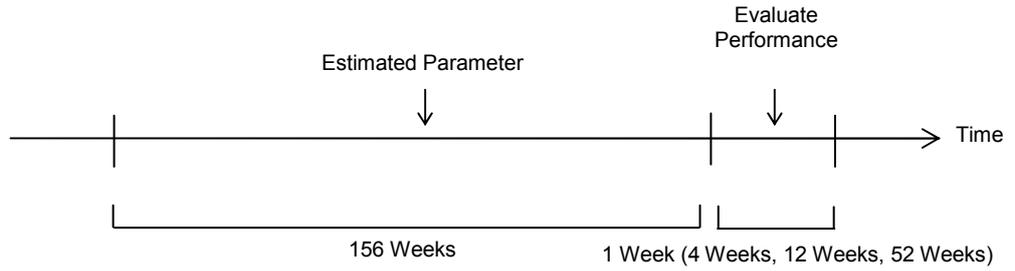
To estimate the jth fund's forecasted alpha (α_{jt+n}) over the period from week t to week $t+n$, the actual excess return (ER_{jt+n}) and the returns for the risk factors (i.e., ER_{Mt+n}, R_{SMBt+n}, R_{HMLt+n} and R_{WMLt+n}) over this future period were used in conjunction with the week t estimated parameters (β_{jM}, β_{jSML}, β_{jHML}, β_{jWML}) from the previous step as follows;

$$ER_{jt+n} = \alpha_{jt+n} + \beta_{jM} ER_{Mt+n} + \beta_{jSMB} R_{SMBt+n} + \beta_{jHML} R_{HMLt+n} + \beta_{jWML} R_{WMLt+n} \qquad (7)$$

The out-of-sample forecasted alpha is measured using four different future week time horizons: 1 week, 4 weeks, 12 weeks and 52 weeks.

2. Estimate regression model using a cross-sectional procedure based on the methodology of Fama and MacBeth (1973) to show the relationship between variables that have been identified as having the impact on investment performance and the future predicted performance. The following regression equation is used:

$$FALPHA_{jt+n} = c_o + c_1 PALPHA_{jt} + c_2 EXPR_{jt} + c_3 ASSET_{jt} + c_4 TURN_{jt} \\ + c_5 DIVER_{jt} + c_6 VOL_{jt} + e_{jt} \qquad (8)$$

Where

$FALPHA_{jt+n}$ is future performance (the out-of-sample alpha forecasted for the jth fund on n-week period into the future)

$PALPHA_{jt}$ is past actual performance (the in-sample historical alpha measured for the jth fund over the three-year (156-week) period ending in week t

$EXPR_{jt}$ is expense ratio of the jth fund

$ASSET_{jt}$ is log of total net asset value of the jth fund

$TURN_{jt}$ is portfolio turnover of the jth fund

$DIVER_{jt}$ is the level of portfolio diversification of the jth fund

VOL_{jt} is the level of return volatility of the jth fund

Future alphas are measured on a rolling 1-week (weekly), 4-week (monthly), 12-week (quarterly), and 52-week (annually) basis over the June 2003-December 2008 period.

Expense ratio is the percentage of total fund assets used to cover expenses related to the operation of a mutual fund. Since expense is taken out of the fund's asset, investors get lower returns when taking into consideration the expense ratio. This amount includes operating expenses and management fees. Management fees include payment to the manager for portfolio management and administration fees payable to the investment adviser that are not included in other categories. A fund's trading activity, the buying and selling of fund assets, is not included in the calculation of the

expense ratio. Every prospectus provides a breakdown of different fees and expenses. Moreover, it can be looked through the fund's annual report.

Portfolio turnover is a measurement of trading activity in a fund's portfolio. It represents the percentage of the portfolio that is bought and sold in exchange for other assets. It can be calculated by dividing either the total amount of new assets purchased or the amount of securities sold – whichever is less – over a particular period, by the total net asset value (TNA) of the fund. A firm with a high portfolio turnover rate will typically incur more transaction cost than one with a low portfolio turnover rate.

Portfolio diversification is measured as a fund's coefficient of determination relative to the return-generating model.

Return volatility is the standard deviation of fund returns

Next, additionally test a series of pooled time-series regression equations by using a probit model in which the future forecasted performance is transformed into a binary variable. To do this, the manager's future risk-adjusted performance now take the value of one if the forecasted alpha in a given period is positive and zero otherwise.

3. Estimate the probability that an active fund manager generates a future alpha given the manager's cell location in a two-way classification associated with past alpha and fund expenses by using the probit regression model in the previous step.

First, cell cohorts are defined by the percentile rankings of PALPHA and EXPR at p5, p25, p50, p75, and p95. Other explanatory variables are equal to their median levels (i.e., p50).

Then, reproduce the test by assuming that an investor also selects fund managers who have the "best" characteristics for these controls. Cell cohorts are defined by the percentile rankings of PALPHA and EXPR at p5, p25, p50, p75, and p95. Other explanatory variables are set as follow; ASSET at p5, TURN at p95, DIVER at p95, and VOL at p95.

V. EMPIRICAL RESULT

During the period between June 2003 and December 2008, it is shown that the average active manager of Thai domestic equity funds could slightly beat expectation. However, on average, index funds had a higher positive level of outperformance.

By first being inferred from the distribution of past alpha (PALPHA) from Table III as shown below.

[Table III is here]

Table III indicates that, for the overall sample, weekly PALPHA value for the median manager of active funds was 0.06%, while that of index funds was 0.29% over the sample period compared to expectations generated by Eq.(3).

Next, even on a forward-looking basis, the result confirms that the average active manager of Thai domestic equity funds had slightly outperformance.

[Table III is here]

[Figure 1 is here]

Panel A, B, C, and D of Table IV shows predicted abnormal performance (FALPHA) at various percentile rankings for the 1-week (weekly), 4-week (monthly), 12-week (quarterly), and 52-week (annually) forecasted periods, respectively. The FALPHA values of active funds falling at the 50th percentile break for each forecasted period are 0.03%, 0.04%, 0.04%, and -0.01%, respectively. Furthermore, as same as the PALPHA distribution previously shown, the mid-points of the FALPHA distributions for the Thai domestic equity index funds for all forecasted periods, except for the 52-week forecasted period, approximately 6-8 times more outperform the benchmark. Nevertheless, for the 52-week forecasted period, the median FALPHA value of active funds could not beat not only the median active manager but also the expectation (i.e., it is slightly negative). Being inconsistent with the results of other forecasted periods may be because the longer the forecasted period, the more variance of the forecasted alpha.

Interestingly, the results listed in the last column of both Table III and Table IV also suggest that there are a lot of funds that produce positive alphas. Therefore, what we should do

next is to find in advance those managers most likely to generate positive future abnormal returns.

The initial attempt to address this issue is to examine if there is a strong degree of risk-adjusted performance persistence in the sample of Thai domestic equity fund or not by analyzing a cross-sectional procedure based on the methodology in Fama and MacBeth (1973). The results are listed in Table V.

[Table V is here]

Table V shows the average values from the time series of the estimated coefficients for each of the alpha forecast periods. The findings suggest us about the direction and strength of the relationship between the characteristics of an active fund and the subsequent future performance. All relationships between past performance and forecasted future performance for four different periods generate positive estimated coefficients (i.e., 1.1238, 1.0590, 1.0981, and 1.2144 for 1-week, 4-week, 12-week, and 52-week returns respectively. Obviously, all of the average coefficients are highly statistically significant (i.e., P-values are equal to 0.000). This shows the significant extent of performance persistence in the sample of Thai domestic equity active funds as long as at least one-year forecasted period.

Once again, by estimating a series of pooled time-series probit regression further, the finding confirms the result of the cross-sectional regression test that, the coefficient on risk-adjusted historical returns is positive and highly statistically significant for all forecasted periods. Moreover, EXPR and ASSET are significantly negatively correlated with positive future alphas. Another finding is that PALPHA is many times more important as an explanatory variable than EXPR and EXPR is nevertheless many times more important as an explanatory variable than ASSET.

[Table VI is here]

Next, we investigate further whether there will be an increase in probability of selecting an active fund manager which generates a positive alpha if we pay attention to factors those have dominant relationship with abnormal future returns. Interestingly, Table VII indicates that by focusing on those managers who have superior past performance and low expense,

setting other explanatory variables equal to their median values, proportion of positive alpha increases.

[Table VII is here]

For example, holding past alpha constant at 50th percentile, ignoring high-expense funds and picking low-expense ones instead enhances the probability of finding a manager who can yield a positive alpha over the 1-week, 4-week, 12-week, and 52-week forecasted period by about 9.05%, 8.22%, 9.10%, and 9.89%, respectively.

On the other hand, when the fund's expense is set at median level, an investor can dramatically increase the probability of identifying a right manager by considering the set of manager who have excellent past performance. For instance, moving from the worst past manager to the best improves the outperformance proportion by 40.02% for 1-week return, 41.49% for 4-week return, 44.81% for 12-week return, and 51.75% for 52-week return.

Finally, it is obvious that past returns have more effect on positive future returns than expense ratios. By looking at 12-week period, selecting the best past manager (p95) with highest expense (p95) yields the chance of future outperformance of 58.20%, while picking instead the worst past manager (p5) with lowest expense (p5) is likely to get a less chance of future performance (i.e., 21.58%).

In addition, the impact on the outperformance probabilities when other explanatory variables are set away from the median values is also examined and shown in Table VIII.

[Table VIII is here]

Table VIII shows a significant increase in outperformance proportions for each cell than those shown in Table VII. Surprisingly, it can be seen from the Panel C that when managers are choosing from the low expense ranking and high past performance ranking, the probability of future outperformance is almost 82%.

VI. CONCLUSION

Should investors invest in active funds those have managers who try to generate higher returns than the market or should investors invest in index funds those try to replicate the

market index by investing in the same proportions of securities as those in the index? This question has been kept debating up to the present. Then, this question normally leads to the next question whether the average fund manager beats a given benchmark or whether the median manager generates superior risk-adjusted return (i.e., positive alpha). A large numbers of previous studies, which are generally related to US mutual fund market, conclude that investors should index their investment as a consequence of no value added from the active portfolio management. Specifically, the median fund manager fails to produce returns that exceed the expectation.

Interestingly, unlike those prior evidences, this study have found that over the period from June 2003 to December 2008, a median manager of Thai domestic equity active funds could slightly overcome the benchmark even on backward or forward looking basis except for only 52-week forecasted period. However, in the view of comparison, the mid-point of each alpha distribution for index funds still has much more level of outperformance than each for active funds. Therefore, as stated by **W.V. Harlow and Keith C. Brown (2006),** this may not be the right way to focus on when we discuss between active versus passive portfolio management. In addition, it is observed that there is a substantial number of active funds produced positive alpha (i.e., approximately 50-60%).

Instead, both the cross-sectional procedure based on the methodology of **Fama and MacBeth (1973)** and the probit regression are employed in order to show the relationship between fund characteristics that have been recently studied and identified as having the impact on investment performance and the future predicted performance. As a result, it is clearly shown that there is a significant persistence between past and forecasted alpha in Thailand over the period from June 2003 to December 2008. Another finding is that fund expense ratio and total net asset value are other fund aspects shown to have influence on future investment performance even of much lower magnitude. This evidence strongly confirms that there are skillful active fund managers and some investors are able to find them.

This study also presents that by the method of selection, it is possible to enhance the probability of selecting an active manager whose future performance outperforms the

benchmark to as much as 82% by not only picking the manager who has excellent past performance with lowest fund's expense ratio, but also taking other observable fund characteristics (i.e., total net assets, portfolio turnover, fund diversification, and fund return volatility) into account.

In conclusion, there's a chance that investors increase their probability of identifying right managers by recognizing that past excellent performance is likely to repeat itself in the future. Furthermore, lower expense ratios and smaller fund sizes seem to also yield superior future performance. By paying more attention to these three data which can be simply found in the fund annual report and prospectus, investors tend to have more chance to select the right investment. Last but not least, it is very important to note that a better alternative for the investor who randomly chooses funds is holding index funds.

REFERENCES

Baks, K., A. Metrick, and J. Wachter, 2001, "Should Investors Avoid All Actively Managed Mutual Funds?: A Study in Bayesian Performance Evaluation," *Journal of Finance* 56, 45-85.

Bogle, J., 1998, "The Implications of Style Analysis for Mutual Fund Performance Evaluation," *Journal of Portfolio Management* 24, 34-42.

Brown, S., and W. Goetzmann, 1995, "Performance Persistence," *Journal of Finance* 50, 679-698.

Carhart, M., 1997, "On Persistence in Mutual Fund Performance," *Journal of Finance* 52, 57-82.

Carlson, R., 1970, "Aggregate Performance of Mutual Funds, 1948-1967," *Journal of Financial and Quantitative Analysis* 5, 1-32.

Chevalier, J., and G. Ellison, 1999, "Are Some Mutual Fund Managers Better Than Others? Cross-Sectional Patterns in Behavior and Performance," *Journal of Finance* 54, 875-899.

Ellis, C., 1975, "The Loser's Game," *Financial Analysts Journal* 31, 19-26.

Ferson, W., and R. Schadt, 1996, "Measuring Fund Strategy and Performance in Changing Economic Conditions," *Journal of Finance* 51, 425-461.

Grinblatt, M., and S. Titman, 1992, "The Persistence of Mutual Fund Performance," *Journal of Finance* 47, 1977-1984.

Grinblatt, M., and S. Titman, 1993, "Performance Measurement Without Benchmarks: An Examination of Mutual Fund Returns," *Journal of Business* 66, 47-68.

Grinblatt, M., and S. Titman, 1994, "A Study of Monthly Mutual Fund Returns and Performance Evaluation Techniques," *Journal of Financial and Quantitative Analysis* 29, 419-444.

Grinold, R., and R. Kahn, 2000, *Active Portfolio Management*, *2e* (McGraw-Hill, New York, NY).

Groatong, C., 2001, "Momentum Investment Strategies: A Study of Mutual Fund Behavior in Thailand," *An Independent Study for the Degree of Master of Science in Finance,* Thammasart University, Bangkok, Thailand.

Kazemi, H., T. Schneeweis, and D. Pancholi, 2003, "Performance Persistence for Mutual Funds: Academic Evidence," Working Paper, Center for International Securities and Derivatives Markets.

Kidsom, A., 1997, "Behavior testing of mutual fund management," *A Thesis for the Degree of Master of Economics,* Chulalongkorn University, Bangkok, Thailand.

Kosowski, R., A. Timmerman, H. White, and R. Wermers, 2005, "Can Mutual Fund "Stars" Really Pick Stocks?: Evidence From a Bootstrap Analysis," Working Paper, University of Maryland.

Lewtaweesap, N., 2002, "Investment Performance of Government Pension Fund (GPF) in Thailand," *An Independent Study for the Degree of Master of Science in Finance,* Thammasart University, Bangkok, Thailand.

Mainkamnurd and Soontornkit, 1997, "Mutual Fund Performance and Persistence: some evidence in Thai Stock Market," *Presentation in JDBA forum.*

Noël Amenc and Véronique Le Sourd, 2003, *Portfolio Theory and Performance Analysis,* Wiley, England.

Sharpe, W., 1991, "The Arithmetic of Active Management," *Financial Analysts Journal* 47, 7-9.

Srisuchart, S., 2001, "Evaluation of Thai Mutual Fund Performance (Market Timing Ability Investigation)," *A Thesis for the Degree of Master of Economics,* Thammasart University, Bangkok, Thailand.

Tejapaibul, V., 2005, "Investor Behavior in Thai Equity Funds," *A Thesis for the Degree of Master of Science in Finance,* Chulalongkorn University, Bangkok, Thailand.

Variyanantakul, P., 2006, "Performance Evaluation of Fixed Income Fund Managers in Thailand," *A Thesis for the Degree of Master of Science in Finance,* Chulalongkorn University, Bangkok, Thailand.

Vattanalpa, T., 2008, "Thai Mutual Funds Performance: Skill or Luck? New Evidence from a Bootstrap Analysis," *A Thesis for the Degree of Master of Economics,* Thammasart University, Bangkok, Thailand.

Wermers, R., 2000, "Mutual Fund Performance: An Empirical Decomposition into Stock-Picking Talent, Style, Transaction Costs, and Expenses," *Journal of Finance* 55, 1655-1695.

Wuthivigaigan, S., 2006, "An Evaluation Mutual Fund Performance Measurement: Evidence in Thailand," *An Independent Study for the Degree of Master of Science in Finance,* Thammasart University, Bangkok, Thailand.

W.V. Harlow and Keith C. Brown, 2006, " The Right Answer to the Wrong Question: Identifying Superior Active Portfolio Management," *Journal of Investment Management,* Vol. 4, No. 4, pp. 1-26.

Table I

Basic Statistic of Thai Domestic Equity Fund Market

At the end of year	TNA (Million Baht)	% of total TNA	No. of Equity Funds	No. of Total Funds
2000	25,529	20.65	102	225
2001	24,192	17.04	93	224
2002	27,222	13.77	99	233
2003	83,384	18.94	99	319
2004	79,928	16.48	132	416
2005	82,565	10.65	151	584
2006	89,752	8.62	164	716
2007	156,240	10.95	221	821
2008	113,635	8.40	233	1,020

This table shows the basic statistic of equity fund industry in Thailand during the year 2000 to 2008. The table provides TNA of equity funds in both an amount of Million Baht and percentage of total TNA of Thai fund market. Also, the No. of equity funds and the No. of total funds are presented. This statistics does not include Country Funds (i.e., funds for foreign investors), and some specific funds such as Funds for Resolving Financial Institution Problem, Property and Loan Funds.

Table II
List of Index Equity Funds

Fund Name	Fund Code	Asset Management Company
1 A.M. SET 50 Fund	1AMSET50	ONEAM
AYF SET50 Long Term Equity Fund	AYFLTF50	AYF
FINANSA Enhanced Equity Fund	FAM EEF	FINANSA
K SET 50 Index Fund	K-SET50	K-ASSET
MFC SET 50 Fund	M-S50	MFC
SCB SET Index Fund	SCBSET	SCBAM
TMB SET50 Fund	TMB50	TMBAM
TMB SET50 Dividend Fund	TMB50DV	TMBAM
TMB SET50 Retirement Mutual Fund	TMB50RMF	TMBAM
UOB Smart Active SET 100 Fund	UOBSAS100	UOBAM

This table shows the list of index equity funds which have been operated during June 2000 to December 2008 and have at least 156 prior weeks of returns at any particular date.

Table III

The distribution of 3-year (156-week) historical alphas: June 2003-December 2008

	No. of obs.	5th	25th	50th	75th	95th	% positive alphas
			Weekly PALPHA Value (%) at percentile				
Active fund	36,552	-1.73%	-0.18%	0.06%	0.19%	0.49%	58.31%
Index fund	2,352	-0.20%	0.07%	0.29%	0.41%	0.53%	84.10%

This table shows the value of the in-sample past alphas (PALPHA) at various percentile rankings. Separate distributions are listed for fund PALPHA values calculated relative to returns from the four-factor model. Expected returns were calculated each week from June 2003 to December 2008 using the prior 3 years (156 weeks) of return data. PALPHA distributions for both active fund sample and index fund sample are listed separately. Percentage of positive alpha values is also shown.

Table IV

The distribution of forward-looking alphas: June 2003-December 2008

Panel A. 1-week (weekly) alpha forecasts

Weekly FALPHA Value (%) at percentile

	No. of obs.	5th	25th	50th	75th	95th	% positive alphas
Active fund	33,912	-1.92%	-0.54%	0.03%	0.56%	1.64%	51.48%
Index fund	2,352	-0.66%	-0.06%	0.24%	0.58%	1.31%	69.73%

Panel B. 4-week (monthly) alpha forecasts

Monthly FALPHA Value (%) at percentile

	No. of obs.	5th	25th	50th	75th	95th	% positive alphas
Active fund	33,486	-1.95%	-0.54%	0.04%	0.57%	1.69%	51.83%
Index fund	2,322	-0.68%	-0.06%	0.24%	0.59%	1.34%	69.94%

Panel C. 12-week (quarterly) alpha forecasts

Quarterly FALPHA Value (%) at percentile

	No. of obs.	5th	25th	50th	75th	95th	% positive alphas
Active fund	32,367	-1.97%	-0.54%	0.04%	0.56%	1.73%	52.01%
Index fund	2,242	-0.70%	-0.06%	0.24%	0.60%	1.36%	69.45%

Panel D. 52-week (annually) alpha forecasts

Annually FALPHA Value (%) at percentile

	No. of obs.	5th	25th	50th	75th	95th	% positive alphas
Active fund	27,000	-2.17%	-0.61%	-0.01%	0.52%	1.62%	49.59%
Index fund	1,842	-0.85%	-0.08%	0.21%	0.58%	1.33%	67.86%

This table shows the values of the forecasted alphas (FALPHA) at various percentile rankings. Forecasted alphas are measured on a rolling periodic basis over the June 2003-December 2008 investment horizon using forecast period of 1 week (weekly), 4 weeks (monthly), 12 weeks (quarterly), and 52 weeks (annually). In each forecasted period, FALPHA distributions for both active fund sample and index fund sample are provided separately. Each distribution also indicates the percentage of positive alpha forecasts.

Table V
Predicting future fund performance: cross-sectional regression

	PALPHA	EXPR	ASSET	TURN	DIVER	VOL	Mean R^2	No. of obs.
				Variable				
1-week FALPHA as dependent variable	1.1238***	-0.0001	-0.0008**	0.0000	-0.0161***	-0.1798***	0.4668	256
	(0.000)	(0.877)	(0.008)	(0.960)	(0.000)	(0.000)		
4-week FALPHA as dependent variable	1.0590***	-0.0006	-0.0004	0.0001	-0.0048	-0.1264**	0.4782	256
	(0.000)	(0.466)	(0.149)	(0.542)	(0.305)	(0.013)		
12-week FALPHA as dependent variable	1.0981***	-0.0010	-0.0002	0.0002*	-0.0041	-0.1175**	0.4944	256
	(0.000)	(0.259)	(0.445)	(0.097)	(0.401)	(0.016)		
52-week FALPHA as dependent variable	1.2144***	-0.0019***	-0.0001	0.0000	0.0059	0.0556	0.4684	239
	(0.000)	(0.000)	(0.659)	(0.640)	(0.308)	(0.520)		

This table report mean values for a time-series of regression parameters estimated cross-sectionally using the Fama-MacBeth (1973) procedure. First, for every fund in the sample on a given week since June 2003, values for past alpha (PALPHA) are estimated from the four-factor model in (3) using the prior 3 years (156 weeks) of return. Second, four sets of FALPHA are calculated for each fund over the subsequent 1-week, 4-week, 12-week, and 52-week periods. These future abnormal performances then become the dependent variables in four separate cross-sectional regressions in which PALPHA, EXPR, ASSET, TURN, DIVER, VOL are the regressors. T-statistics are calculated based on the mean value of estimated coefficients. P-values are indicated in the parenthesis below each average estimated coefficients.

Table VI

Predicting future fund performance: probit regression

	Variable							
	PALPHA	EXPR	ASSET	TURN	DIVER	VOL	Chi-square	No. of obs.
1-week FALPHA as dependent variable	48.6729***	-0.1685***	-0.0596***	0.0072*	0.3789***	1.6306*	571.90	12,837
	(0.000)	(0.000)	(0.000)	(0.058)	(0.000)	(0.076)	(0.000)	
4-week FALPHA as dependent variable	50.5300***	-0.1532***	-0.0641***	0.0064*	0.4496***	1.7763*	611.18	12,837
	(0.000)	(0.000)	(0.000)	(0.096)	(0.000)	(0.057)	(0.000)	
12-week FALPHA as dependent variable	55.1781***	-0.1699***	-0.0645***	0.0093**	0.4813***	2.0075**	690.76	12,837
	(0.000)	(0.000)	(0.000)	(0.016)	(0.000)	(0.038)	(0.000)	
52-week FALPHA as dependent variable	67.7005***	-0.1842***	-0.0642***	0.0129***	0.2673**	0.6863	825.77	12,837
	(0.000)	(0.000)	(0.000)	(0.001)	(0.016)	(0.517)	(0.000)	

This table shows the result of probit analysis of the relationship between an active fund manager's future risk-adjusted returns and several potential explanatory factors over the period June 2003-December 2008. The coefficient estimates and P-values (shown parenthetically beneath each coefficient) for the following explanatory factors are listed; historical risk-adjusted returns (PALPHA), fund expense ratio (EXPR), natural log of total net fund assets (ASSET), portfolio turnover (TURN), fund diversification (DIVER), and fund return volatility (VOL). The dependent variable takes the value of one if the forecasted alpha (FALPHA) is positive and zero otherwise. Four different forecasted time-horizons (1-week, 4-week, 12-week, and 52-week) are used.

Table VII

Probability of identifying a superior active manager by past alpha and fund expenses: median manager controls.

Panel A. 1-week FALPHA as dependent variable

		EXPR					
	Percentile	5th (Low)	25th	Median	75th	95th (High)	**(High-Low)**
	5th (Low)	0.2374	0.2302	0.2196	0.2161	0.1731	**0.0644**
	25th	0.5151	0.5057	0.4916	0.4869	0.4248	**0.0903**
PALPHA	50th	0.5610	0.5517	0.5377	0.5330	0.4705	**0.0905**
	75th	0.5874	0.5781	0.5643	0.5596	0.4973	**0.0901**
	95th (High)	0.6421	0.6333	0.6199	0.6154	0.5543	**0.0878**
	(High-Low)	**0.4047**	**0.4030**	**0.4002**	**0.3992**	**0.3812**	

Panel B. 4-week FALPHA as dependent variable

		EXPR					
	Percentile	5th (Low)	25th	Median	75th	95th (High)	**(High-Low)**
	5th (Low)	0.2322	0.2257	0.2162	0.2130	0.1740	**0.0582**
	25th	0.5197	0.5112	0.4984	0.4941	0.4375	**0.0823**
PALPHA	50th	0.5674	0.5589	0.5462	0.5419	0.4852	**0.0822**
	75th	0.5946	0.5863	0.5737	0.5695	0.5130	**0.0816**
	95th (High)	0.6511	0.6431	0.6310	0.6270	0.5720	**0.0791**
	(High-Low)	**0.4189**	**0.4174**	**0.4149**	**0.4139**	**0.3979**	

Panel C. 12-week FALPHA as dependent variable

		EXPR					
	Percentile	5th (Low)	25th	Median	75th	95th (High)	**(High-Low)**
	5th (Low)	0.2158	0.2089	0.1988	0.1955	0.1549	**0.0609**
	25th	0.5265	0.5171	0.5028	0.4981	0.4353	**0.0912**
PALPHA	50th	0.5784	0.5690	0.5550	0.5503	0.4874	**0.0910**
	75th	0.6079	0.5988	0.5849	0.5803	0.5178	**0.0901**
	95th (High)	0.6687	0.6601	0.6469	0.6425	0.5820	**0.0867**
	(High-Low)	**0.4529**	**0.4511**	**0.4481**	**0.4469**	**0.4271**	

Panel D. 52-week FALPHA as dependent variable

		EXPR					
	Percentile	5th (Low)	25th	Median	75th	95th (High)	**(High-Low)**
	5th (Low)	0.1467	0.1408	0.1323	0.1296	0.0969	**0.0498**
	25th	0.4982	0.4880	0.4725	0.4674	0.4001	**0.0981**
PALPHA	50th	0.5622	0.5520	0.5367	0.5316	0.4633	**0.0989**
	75th	0.5987	0.5887	0.5736	0.5685	0.5005	**0.0982**
	95th (High)	0.6734	0.6641	0.6499	0.6451	0.5795	**0.0939**
	(High-Low)	**0.5268**	**0.5233**	**0.5175**	**0.5155**	**0.4827**	

This table reports the average probability of a manager's outperformance given the manager's cell location in a two-way classification involving past alpha and fund expenses. Cell locations are defined by the percentile rankings of PALPHA and EXPR (i.e., p5, p25, p50, p75, and p95). The other explanatory variables are all at their median levels. Future performances are measured on a rolling 1-week, 4-week, 12-week, and 52-week basis over the June 2003-December 2008 period.

Table VIII
Probability of identifying a superior active manager by past alpha and fund expenses: best manager controls.

Panel A. 1-week FALPHA as dependent variable

		EXPR					
	Percentile	p5 (Low)	p25	p50	p75	p95 (High)	(High-Low)
	p5 (Low)	0.3681	0.3592	0.3461	0.3417	0.2862	**0.0819**
	p25	0.6611	0.6524	0.6392	0.6348	0.5745	**0.0866**
PALPHA	p50	0.7023	0.6941	0.6816	0.6774	0.6193	**0.0830**
	p75	0.7252	0.7173	0.7052	0.7011	0.6446	**0.0806**
	p95 (High)	0.7709	0.7636	0.7526	0.7489	0.6964	**0.0744**
	(High-Low)	**0.4028**	**0.4044**	**0.4065**	**0.4071**	**0.4102**	

Panel B. 4-week FALPHA as dependent variable

		EXPR					
	Percentile	p5 (Low)	p25	p50	p75	p95 (High)	(High-Low)
	p5 (Low)	0.3715	0.3634	0.3514	0.3475	0.2964	**0.0751**
	p25	0.6748	0.6670	0.6553	0.6513	0.5973	**0.0775**
PALPHA	p50	0.7168	0.7095	0.6984	0.6946	0.6430	**0.0738**
	p75	0.7399	0.7329	0.7222	0.7186	0.6687	**0.0712**
	p95 (High)	0.7858	0.7795	0.7698	0.7666	0.7208	**0.0650**
	(High-Low)	**0.4143**	**0.4161**	**0.4184**	**0.4191**	**0.4243**	

Panel C. 12-week FALPHA as dependent variable

		EXPR					
	Percentile	p5 (Low)	p25	p50	p75	p95 (High)	(High-Low)
	p5 (Low)	0.3692	0.3603	0.3470	0.3427	0.2866	**0.0826**
	p25	0.6981	0.6898	0.6771	0.6728	0.6140	**0.0842**
PALPHA	p50	0.7422	0.7345	0.7227	0.7187	0.6631	**0.0791**
	p75	0.7662	0.7589	0.7476	0.7438	0.6904	**0.0758**
	p95 (High)	0.8130	0.8065	0.7966	0.7932	0.7452	**0.0677**
	(High-Low)	**0.4437**	**0.4462**	**0.4495**	**0.4505**	**0.4586**	

Panel D. 52-week FALPHA as dependent variable

		EXPR					
	Percentile	p5 (Low)	p25	p50	p75	p95 (High)	(High-Low)
	p5 (Low)	0.2295	0.2217	0.2104	0.2067	0.1613	**0.0682**
	p25	0.6201	0.6103	0.5954	0.5904	0.5228	**0.0973**
PALPHA	p50	0.6797	0.6704	0.6563	0.6515	0.5863	**0.0933**
	p75	0.7124	0.7035	0.6900	0.6854	0.6223	**0.0900**
	p95 (High)	0.7763	0.7685	0.7565	0.7525	0.6953	**0.0810**
	(High-Low)	**0.5468**	**0.5468**	**0.5462**	**0.5458**	**0.5341**	

This table reports the average probability of a manager's outperformance given the manager's cell location in a two-way classification involving past alpha and fund expenses. Cell locations are determined by the percentile rankings of PALPHA and EXPR (i.e., p5, p25, p50, p75, and p95). The other explanatory variables are standardized to their best levels (i.e., ASSET at p5, TURN at p95, DIVER at p95, and VOL at p95). Future alphas are measured on a rolling 1-week, 4-week, and 12-week basis over the June 2003-December 2008 period.

Figure 1
The distribution of past alphas and 1-week (weekly), 4-week (monthly), 12-week (quarterly), 52-week (annually) forecasted alphas: June 2003-December 2008