Equity Mutual Fund: Performances, Persistence and Fund Rankings

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This study focuses on open-ended equity mutual funds in Thailand. The funds’ performances were examined whether the returns significantly and persistently out-perform the market; whether the use of different measures leads funds with similar rankings. The analyses use various metrics: the traditional fund performance evaluation measures and Data Envelopment Analysis (DEA) technique; Pearson’s correlation coefficients, and cover six different investment horizons. The results suggest that open-ended equity mutual funds analyzed in this study significantly out-perform the market, and the funds’ positive performance sustains for 3-month time-period of investment, at least. The top five funds managed by the Aberdeen, Bangkok Bank and Siam Commercial Bank Asset Management Companies out-perform the bottom five funds between 0.1912 and 1.3187 for six time-periods of investment from 1-month to 5-year. Finally, it is concluded that for individual investors, the results provided by this study can be guidelines for selecting mutual funds for investment.

Keywords: mutual fund, equity fund, open-ended fund, fund ranking

Introduction

Mutual funds have dramatically increased role in financial markets in recent decades. As of the end of 2007, the world mutual fund industry
managed financial assets exceeding $26 trillion (including over $12 trillion in stocks), more than four times the $6 trillion of assets managed at the end of 1996 (Investment Company Institute, 2008, cited in [1]). The number of mutual funds has also grown considerably to more than 66,000 funds worldwide at the end of 2007, including nearly 27,000 equity funds or approximately 40.91%. Although the growth of the mutual fund industry started in the U.S., where the industry plays an extremely important role in stock markets, this trend has spread more recently to other countries around the world [2].

In Thailand, the mutual fund industry started with the first local closed-end fund in 1977 with an initial size of only 100 million baht. The fund was established by the first asset management company, Mutual Fund Company Limited (MFC). Thai mutual funds have been classified by their objectives and/or policies. These are equity fund, debt fund and balanced fund; open-ended fund and closed-end fund; onshore mutual fund and offshore mutual fund; short-term fixed income fund and long-term fixed income fund; and other types of mutual funds such as flexible portfolio fund, fund of funds, warrant fund, property fund, retirement mutual fund and sector fund. The number of these funds and their total assets have increased over time from 240 funds outstanding with total assets of 345.80 billion baht in 1999 to 815 funds and 1,372.87 billion baht in 2007 (as of April 27). At the time, the market share of Thai open-ended equity funds of 138 funds was 5.58%.

This tremendous growth has presented investors with a new dilemma. Most individual investors have been facing choice of investment funds. Apart from the press, which is the primary source of information for investors, individual investors rely on the help of financial planners and other sources of information, such as security analysts, mutual fund management companies and Association of Investment Management Companies (AIMC) (also see [3]).

According to a 1995 survey by the Investment Company Institute, 52% of the respondents rely primarily on printed information in newspapers, magazines and investment newsletters when making mutual fund investment decisions [4]. In addition, an industry, such as Morningstar and Lipper, collects data on mutual funds to compare and rate fund
performance, and supplies investors with information for investment decisions [1]. These sources of information typically provide investors with rankings of mutual funds based on risk-adjusted performance measures. If mutual fund performance is predictable, using these rankings may help investors select funds that will continue to out-perform in the future. In contrast, if performance does not persist, rankings based on past returns have no value [4].

The persistence of mutual fund performance is another issue focused more by studies. For example, [5] Find that funds with the highest returns in the past 12 months are more likely to have above average return in the next 12 months. [6] Suggests that mutual fund returns strongly persist over multi-year periods. [7] Argue that investors use information on persistence as a significant positive relationship exists between fund flows and past returns. However, [4] Does not support this theory. Therefore, the results are inconclusive.

Although most mutual fund studies have concentrated on the use of risk-adjusted performance measure as an alternative for individual investors in selecting investment opportunities, returns on investing in a fund (given risk) reflect the impact of all other factors. [8] Assert that there are several measures can be used to rank mutual funds and the choice of the performance measure is actually important for mutual fund ranking and selection. In this regard, a multi-criteria approach, which simultaneously considers other variables, is appealing. Thus, apart from the traditional fund performance evaluation measures, including the Treynor ratio, Sharpe ratio and Jensen’s alpha, this study applies the Data Envelopment Analysis (DEA) technique to evaluate performance of open-ended equity mutual funds in Thailand.

Past studies of equity mutual fund had emphasized on closed-ended funds rather than open-ended funds. Even though the number of open-ended funds has been increasing, studies related to the mentioned topics on emerging markets, especially Thailand, have been limited. Hence, it is justified to carry out a comprehensive study of performances of open-ended equity mutual funds in Thailand. The investigations largely focus on the funds’ abnormal returns compared to the market using several different metrics; whether or not the funds significantly and persistently out-perform
the market; whether the use of different measures leads funds with similar rankings; and finally providing fund rankings.

As Thailand is an important emerging market in South-East Asia that reduces risk and increases expected returns, rendering significant diversification benefits for globally-minded investors [9] and [10], the results presented by this study can be guidelines for both local and foreign individual investors. Finally this study makes contributions to the literature in terms of a variety of results for Thai open-ended equity mutual funds added to this area for emerging markets.

The study is organized as follows: Section 1 introduces mutual funds. Section 2 reviews the literature of relevant studies of funds’ performances. Section 3 describes data and presents several of fund performance evaluation methods used for analyses in this study. Section 4 includes analyses and results and the last section provides conclusions of the study.

Review of Literature

Although investors display some fund selection ability due to investing in funds with subsequent good performance, in an efficient market, mutual fund managers cannot beat the market and any superior performance is simply luck and does not persist [4]. Early studies on mutual funds; see, for example, [11] and [12] Support the efficient market hypothesis, but later studies such as [13] and [14] Find that past performance of mutual funds can predict future performance. Studies e.g., [15], [16], [17], [18], [19], [11] and [20] conclude that mutual funds under-perform the market. Meanwhile [21] Shows that performance persistence can be attributed to a momentum factor, [22] Uses a large sample of mutual funds and finds performance persistence during 1973-1981, but there is no evidence of persistence during 1982-1991.

Apparently, the evidence on performance of funds and funds’ performance persistence are mixed. However, the more recent findings cast doubts on the efficient market hypothesis and rekindle investors’ hope of earning abnormal returns by plowing through historic performance records.
For example, [23], [6] and [7] suggest that money flows to past good performers.

The literature focuses in general on the U. S. mutual fund industry; see, for example, studies on the U.S. market by [24]; [25] and [1]. Several authors examine fund performances in individual developed countries, such as studies on the U.K. market by [26]; studies on Netherland by [27]; studies on Australia by [28]; France by [29]; Italy by [30] and [31]; Japan by [32]; Sweden by [33]. For emerging countries, although they have attracted the attention of investors all over the world, there have been much less studies on mutual funds; e.g., studies on the Greek market by [34], [35], [36] and [37]; and other markets by [38], [9], [39], [40], [41], [7] and [42].

Notice that U.S. funds are much larger than elsewhere in the world, and domestic funds are larger than international funds, on average. There are reasons to believe that results of studies may be different as there are significant different characteristics between the U.S. mutual fund industry and the rest of the world. These factors include fund size, style, age, fee, economic and financial development, quality of legal institutions and law enforcement, mutual fund industry structure and others (see [43], [2] and [44]). For example, [1] Find mutual funds under-perform the market overall, but provide strong evidence of short-run persistence in both domestic and international funds; however, the persistence is much weaker in non-U.S. domestic funds (also see [24] and [45]). Meanwhile, [4], a U.S study, reports the results do not support the short-term persistent performance hypothesis. In addition, evidence indicates that there is a strong positive relation between the performance of domestic mutual funds and a country’s level of financial development; funds domiciled in countries of common-law traditions perform better; and investors in the U.S. have some ability to select funds as money flows to funds with good future performance [23].

For emerging markets, [27], a Mexico study, find persistence in mutual fund performance both over consecutive times and in the multi-period setting. [36], a Greek study, analyze the behavior of 23 mutual funds for the period 1997-2000 and conclude that the mutual fund industry is relatively young resulting in no definite conclusion. [38], a study on Indian mutual funds, reveal that performance of the fund managers affects the returns of the firm. Moreover, mutual fund is not a widely discussed subject
in developing markets including Thailand, when compared to others. Among few studies that have focused on Thai mutual funds, [46] employs the Jensen’s alpha, the condition model, factor model and portfolio holding model to measure performance of 114 equity funds, and reports statistically insignificant positive returns. [47] Uses monthly NAV and its flow during January 2000 to December 2002 to estimate returns. The performance of the 222 equity funds was examined using the Treynor ratio, Sharpe ratio and Jensen’s alpha. The results out-perform the market, but there is no persistency in performance during the periods of study, which are inconsistent with [1], [7] and [6].

Apart from a limited number of studies on Thai equity mutual funds, these studies have focused on closed-end funds rather than open-ended funds, even tracking the indexes much better than closed-end funds [9]. Moreover, the studies have also been restricted to the conventional fund performance measures. Using more several and different measures may result in a range of outcomes compared to past studies, and this can increase a variety of choices of investment opportunity for individual investors. However, the doubts whether or not the results obtained using diverse measures are reliable leading the selection of measures for analysis funds’ performance is contentious. [48] And [49] Persist that choosing a performance measure is not critical to fund evaluation. Meanwhile, [8] and [50] Contend that the choice of performance measure is important to the performance analysis and selection of mutual funds, and that fund rankings also depend on the applied measures.

Thus, the used performance evaluation method is another controversial issue. Meanwhile a number of past studies employed extensive and sophisticated statistical tools, many studies have applied only the conventional evaluation methods. The Sharpe ratio is suggested as the most widely known and used performance measure for the mutual fund industry.

To disentangle the impact of methods of evaluating the funds’ performance, more methods are used in the analyses. Thus, this study evaluates performances of 138 open-ended equity mutual funds, which were managed by the seventeen asset management companies based in Thailand between May 2002 and April 2007. The funds’ performances were examined using both the traditional approaches: the Treynor ratio, Sharpe ratio and
Jensen’s alpha; and the multi-criteria method: the DEA technique; and then the results were compared to those of the index of the Stock Exchange of Thailand (SET index) whether the average fund performance is significantly and persistently greater than the market. The strength of relationships between the results derived using different measures was also analyzed. Finally, the performances were compared to establish fund rankings, which can be guidelines for individual investors to select mutual funds for their investments.

Data and Methodology

Most Thai studies of mutual funds have been closed-end fund performance analyses, used weekly returns, examined short time-period of data and applied a limited number of performance evaluation methods. This study uses monthly and longer time-period of data covering net asset values and dividends for the five-year period (May 1, 2002 - April 30, 2007). A larger sample consisting of the returns on the portfolio of 138 open-ended equity mutual funds was examined. There are four significant sources of data used for analyses in this study set out as follows: the AIMC, asset management companies, the SET and finally, the Bank of Thailand (BOT) is another source providing 91-day coupon rate of the Thai government bonds.

In early studies, portfolio performance was evaluated mostly in terms of returns because risk was difficult to quantify and it could not be incorporated in evaluation, as there was no measure that combined both return and risk. Recent studies, for example, [52] Suggest that returns on portfolios that belong to the same risk class can be compared using the three different approaches of portfolio performance measurement: the Treynor ratio, Sharpe ratio and Jensen’s alpha. These are absolute measures of portfolio performance, which can be also used to rank different portfolios. [27] Suggest that risk-adjusted performance measures are frequently used to rank investment opportunities. Investors, who are displaying a sufficiently high level of risk or loss aversion, should use a ranking based on the Sharpe ratio, or the expected return measure. A number of studies applied these methods or part of them, e.g., [53], [36], [54], and [55]; and Thai studies, such as [47]. Thus, so far, mutual funds’
performance have primarily been evaluated and ranked using the traditional measures.

Explicitly, [52] and [51] Assert that the DEA technique can be used to assess mutual funds’ performance. The measurement of relative efficiency was addressed by [56] (also see [51] and [11]) and the DEA technique was initiated by [57], and has been applied and revisited by several studies, including [58], [59], [60], [61], [62], [63], [64] and [65].

To answer a question whether or not a method of fund performance measures provides similar rankings compared to the use of different measures, several studies find rank correlation between the rankings according to two measures assessing the values of the Spearman's rank correlation coefficient. However, [50] Suggests that there is no clear interpretation of a particular value for the Spearman's rank correlation coefficient and thus, the value of the coefficient can be misleading (also see [66]). Finally, he concludes that a rank correlation depends on the investment horizon and there are plenty of alternative performance measures exhibiting decreasing rank correlation as horizon increases.

Thai studies on performances of mutual funds mainly used the traditional measures of risk and return or the single rather than multi-criteria approach. These studies have ignored other variables such as diversification, selectivity, market timing, fund management expenses, transaction costs and others. To have a variety of results and check robustness, this study applies several more methodologies. Apart from the traditional performance evaluation methods: the Treynor ratio, Sharpe ratio and Jensen’s alpha; the DEA technique is employed. The Pearson’s correlation coefficients also were calculated for relationship assessments between different performance evaluation measures. Furthermore, the different investment horizons of the analyses of fund performances consisting of six time-periods are included: 1-month (April 1, 2007 – April 30, 2007); 3-month (February 1, 2007 – April 30, 2007); 6-month (November 1, 2006 – April 30, 2007); 1-year (May 1, 2006 – April 30, 2007); 3-year (May 1, 2004 – April 30, 2007); 5-year (May 1, 2002 – April 30, 2007).
**Treynor ratio**

\[ T_p = \frac{r_p - r_f}{\beta_p} \] ........................(1)

Where \( T_p \) is the Treynor ratio, \( r_p \) the portfolio return, \( r_f \) the risk-free return and \( \beta_p \) the systematic risk.

**Sharpe ratio**

\[ S_p = \frac{r_p - r_f}{\sigma_p} \] ........................(2)

Where \( S_p \) is the Sharp ratio, \( r_p \) the portfolio return, \( r_f \) the risk-free return and \( \sigma_p \) the total risk of portfolio.

**Jensen’s alpha**

\[ J_p = r_p - \left( r_f + \beta_p (r_m - r_f) \right) \] ........................(3)

Where \( J_p \) is the Jensen’s measure for portfolio, \( r_p \) the portfolio return, \( r_f \) the risk free return, \( \beta_p \) the systematic risk and \( r_m \) the market return.

**Data Envelopment Analysis (DEA)**

\[
\text{Max } E_k = \frac{\sum_{o=1}^{t} u_o y_{ok}}{\sum_{i=1}^{m} v_i x_{ik}} \] .................................(4)

Subject to:

\[ E_k = \frac{\sum_{o=1}^{t} u_o y_{ok}}{\sum_{i=1}^{m} v_i x_{ik}} \leq 1 \quad k = 1, 2, ..., n \]

\[ u_o \geq 0 \quad o = 1, 2, ..., t \]

\[ v_i \geq 0 \quad i = 1, 2, ..., m \]
Where $E_k$ is the DEA score of $k^{th}$ DMU, $y_{ok}$ the amount of the $o^{th}$ output for the $k^{th}$ DMU, $x_{ik}$ the amount of the $i^{th}$ input for the $k^{th}$ DMU, $u_o$ the weight assigned to the $o^{th}$ output, $v_i$ the weight assigned to the $i^{th}$ input, $t$ the number of outputs, $m$ the number of inputs and $n$ the number of DMUs.

The inputs of the model are the weighted fees and expenses, systematic risk and total risk. The outputs are returns, diversification and manager skill.

In Thailand, the appropriate performance benchmarks used to compare mutual fund returns have been defined by the AIMC. These are the SET index, which is the most widely used as Thai market benchmark for equity funds, and the SET 50, which is also used for equity fund benchmark. However, in this study the SET index is selected as the performance benchmark.

The net return that an investor achieves in investing in a mutual fund depends on dividend and capital gain or loss that comes from the change in the net asset value. Returns of the mutual funds and the market in a time-period were calculated as:

\[
\text{Fund return} = \frac{\text{NAV}_{t+1} + \text{Div}_{t \rightarrow t+1}}{\text{NAV}_t} - 1 \times 100 \quad \ldots (5)
\]

Where $\text{NAV}_t$ is the NAV at the buying month, $\text{NAV}_{t+1}$ the NAV at the month-end of a period and $\text{Div}_{t \rightarrow t+1}$ the amount of cash distributed during the period to shareholders.

\[
\text{Market return} = \frac{\text{SET}_{t+1} - \text{SET}_t}{\text{SET}_t} - 1 \times 100 \quad \ldots (6)
\]

Where market return is the return on the SET index, $\text{SET}_t$ the SET index at the buying month and $\text{SET}_{t+1}$ the SET index at the month-end of a period.

Risks were estimated as the expressed equation:
\[ \text{Var}(r) = \frac{1}{n} \sum_{i=1}^{n} [r_i - r_{am}]^2 \] ...................(7)

Where \( r_i \) is the return of individual mutual fund and \( r_{am} \) the mean rate of returns.

\[ r_p = \alpha + \beta \times r_m + e_p \] ...................(8)

Where \( r_p \) is the portfolio return, \( \alpha \) the intercept term, \( \beta \) the systematic risk, \( r_m \) the market return and \( e_p \) the error term.

The regressing of systematic risk also provided the value of \( r^2 \) that gives the strength of correlation between the fund returns and the market indicating the diversification.

Manager's investment skill = \( (r_p - r_f) - \left( \frac{\sigma_p}{\sigma_m} \right) (r_m - r_f) \) ...................(9)

Where \( r_p \) is the portfolio return, \( r_f \) the risk free return, \( r_m \) the market return, \( \sigma_p \) the total risk of portfolio and \( \sigma_m \) the total risk of the market.

This study finds relationship between the results of performance indexes calculating the Pearson’s correlation coefficient, which was computed following the given formula.

\[ \rho_{XY} = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} \] ...................(10)

Where \( \sigma_X \) is the standard deviation of \( X \), \( \sigma_Y \) the standard deviation of \( Y \), \( \rho_{XY} > 0 \) the values of data set \( X \) increase or decrease in the same direction of set \( Y \), \( \rho_{XY} < 0 \) the values of data set \( X \) increase or decrease in opposite direction of set \( Y \) and \( \rho_{XY} = 0 \) there is no correlation between data set \( X \) and \( Y \).

To test the null hypothesis that the mean return for a sample of \( n \) funds is significantly greater than the market, \( t \)-test statistic is applied.
H₀: Open-ended equity funds under-perform the market
H₁: Open-ended equity funds out-perform the market

To verify if the different performance measures provide the same evaluation about funds, the study finds a relationship between performance indexes by using the Pearson’s correlation coefficient. Therefore, two hypotheses to be tested are:

H₀: There is no positive relationship between the two performance indexes
H₁: There is a positive relationship between the two performance indexes

Results

The following section presents the results of the analyses of performances of 138 open-ended equity mutual funds, managed by the seventeen asset management companies in Thailand between May 1, 2002 and April 30, 2007. The analyses include six different time-periods of investment from 1-month to 5-year horizon. Specifically, this study evaluates Thai open-ended equity mutual funds’ performances whether or not they significantly and persistently out-perform the market. To indicate if there is a significantly positive correlation between the two results estimated using different measures, the Pearson’s correlation coefficient was also computed and analyzed. Finally, the study compares the funds’ performances to provide fund rankings, which can be acceptable investment guidelines.
Table 1: Performances of Open-ended Equity Mutual Funds Compared to the Market Evaluated Using the Treynor, Sharpe, Jensen’s Alpha and DEA Measures; and Presentation of the Pearson’s Correlation Coefficients Analyzing Degrees of Correspondence between Results According to the Different Measures

<table>
<thead>
<tr>
<th>Time period</th>
<th>Treynor (1)</th>
<th>Sharpe (2)</th>
<th>Jensen’s alpha (3)</th>
<th>DEA (4)</th>
<th>(1) vs (2)</th>
<th>(1) vs (3)</th>
<th>(1) vs (4)</th>
<th>(2) vs (3)</th>
<th>(2) vs (4)</th>
<th>(3) vs (4)</th>
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<tbody>
<tr>
<td>1-Month</td>
<td>.0062*</td>
<td>.4519*</td>
<td>.0063*</td>
<td>.0086*</td>
<td>.843*</td>
<td>.920*</td>
<td>.359*</td>
<td>.914*</td>
<td>.240*</td>
<td>.341*</td>
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<td></td>
<td>89%</td>
<td>73%</td>
<td>89%</td>
<td>49%</td>
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<td></td>
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<tr>
<td>3-Month</td>
<td>.0091*</td>
<td>.9919*</td>
<td>.0080*</td>
<td>.0213*</td>
<td>.890*</td>
<td>.901*</td>
<td>.361*</td>
<td>.929*</td>
<td>.271*</td>
<td>.247*</td>
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<td></td>
<td>100%</td>
<td>98%</td>
<td>100%</td>
<td>80%</td>
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<tr>
<td>6-Month</td>
<td>.0048*</td>
<td>.2484*</td>
<td>.0044*</td>
<td>-</td>
<td>.999*</td>
<td>.931*</td>
<td>.095*</td>
<td>.943*</td>
<td>.086*</td>
<td>-.021</td>
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<tr>
<td></td>
<td>98%</td>
<td>98%</td>
<td>98%</td>
<td>78%</td>
<td></td>
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<tr>
<td>1-Year</td>
<td>.0035*</td>
<td>.2305*</td>
<td>.0033*</td>
<td>-</td>
<td>.999*</td>
<td>.942*</td>
<td>.040</td>
<td>.947*</td>
<td>.041</td>
<td>-.059</td>
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<tr>
<td></td>
<td>96%</td>
<td>96%</td>
<td>96%</td>
<td>78%</td>
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<tr>
<td>3-Year (N=99)</td>
<td>.0026*</td>
<td>.1940*</td>
<td>.0025*</td>
<td>-</td>
<td>.989*</td>
<td>.971*</td>
<td>.036</td>
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<td>91%</td>
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<td>91%</td>
<td>83%</td>
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<tr>
<td>5-Year (N=75)</td>
<td>.0082*</td>
<td>.1525*</td>
<td>.0054*</td>
<td>-</td>
<td>.913*</td>
<td>.940*</td>
<td>.068</td>
<td>.967*</td>
<td>-.047</td>
<td>-.076</td>
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<td>100%</td>
<td>87%</td>
<td>100%</td>
<td>76%</td>
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Note: Columns 2-5 present the performances of the funds in terms of out-performance or under-performance compared to the market for six different investment horizons evaluated using the different measures; Columns 6-11 present the Pearson’s correlation coefficients indicating the relationships between results according to the different measures; The percentage presents the number of out-performers compared to the market; N = Total number of open-ended equity mutual funds or 138, except it is stated differently in the parentheses *significant at 5% level; **significant at 1% level

Table 1 shows that on average, the performances of Thai open-ended equity mutual funds significantly out-perform the market for all time-periods of investment, when measured using the Treynor ratio, Sharpe ratio and Jensen’s alpha. The results in terms of positive excess returns are accordance with those suggested by past studies on developed markets,
such as [67], [45] and [23], but are not in line with those reported by [30] and [4]. Also, the results are consistent with those reported by studies on emerging markets, such as [47] and similar to those of [52], but are not supported by [46]. Moreover, the evidence provided by this study indicates that the existing abnormal returns are persistent which is entirely consistent with studies, e.g. [7] and [6].

When the DEA technique is used, the results suggest that for 3-month time-period of investment, performance of the equity mutual funds significantly out-performs the market; meanwhile for 1-month and 1-year time-periods, the funds significantly under-perform the market. This explains that different methods can give different outcomes and that for investors, who are evaluating funds’ performances using the multi-criteria method, should be careful to select their open-ended equity funds.

However, it is concluded that Thai open-ended equity mutual funds analyzed in this study significantly out-perform the market, and the funds’ performance sustains for 3-month time-period of investment, at least.

For further analyses, the results suggest that for 1-month time-period of investment, there is the smallest number of out-performers; or the percentage of total funds outperforming the market is lowest. By comparison based on 1-month time-period of investment, the investment time-period extends, the percentage of total funds outperforming the market increases.

The study assesses correlation between the results obtained using different performance evaluation measures in the analyses, and presents that there is a good relation between the traditional measures. There is high correlation between the results estimated using the Treynor and Sharpe ratios; the Treynor ratio and Jensen’s alpha; and the Sharpe ratio and Jensen’s alpha. Meanwhile, the evidence indicates low correlation between the traditional measures and the DEA technique.

Finally, the funds’ performances according to different performance evaluation measures were compared and ranked as shown (only top ten best performers) in Tables 2-3.
### Table 2: Top Ten Best Performers Ranked Based on Different Performance Evaluation Measures for 1-month, 3-month and 6-month Time-periods of Investment; and Comparison of the Average Performances of Open-ended Equity Mutual Funds and the Market

<table>
<thead>
<tr>
<th></th>
<th>1-month</th>
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<th>3-month</th>
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<th>6-month</th>
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<tr>
<td>Treynor</td>
<td>Sharpe</td>
<td>Jensen</td>
<td>DEA</td>
<td>Treynor</td>
<td>Sharpe</td>
<td>Jensen</td>
<td>DEA</td>
<td>Treynor</td>
<td>Sharpe</td>
<td>Jensen</td>
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<tr>
<td>SCBLT3</td>
<td>SCBLT3</td>
<td>SCBPMO</td>
<td>ABSM</td>
<td>SCBLT3</td>
<td>SCBPMO</td>
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<td>B-INFRA</td>
<td>SCBLT3</td>
<td>SCBPMO</td>
<td>B-INFRA</td>
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<td>(SCB)</td>
<td>(SCB)</td>
<td>(SCB)</td>
<td>Aberdeen</td>
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Note: The funds were managed by the Thai asset management companies stated in the parentheses

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**Table 3:** Top Ten Best Performers Ranked Based on Different Performance Evaluation Measures for 1-year, 3-year and 5-year Time-periods of Investment; and Comparison of the Average Performances of Open-ended Equity Mutual Funds and the Market
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Table 2 presents that for 1-month time-period of investment, SCBLT3, SCBLT3, SCBPMO and ABSM are ranked No. 1 among the top ten best performers, when measured using each of the four performance evaluation measures. These open-ended equity mutual funds were managed by the SCB Asset Management Co., Ltd. and Aberdeen Asset Management Co., Ltd. respectively. For ranking assessment, there is evidence that the traditional measures have closer relationships with each another than the DEA technique, but the Jensen’s alpha and the DEA technique are quite close showing the same second ranked funds. Five out of the top ten ranked funds are the same funds when ranked using all of the four different performance measures. These are ABSM, RL7030, SCBLT3, SCBPMO and V-RMF.

Meanwhile, for 3-month time-period, ABSM and B-INFRA are ranked No. 1 among the top ten best performers, as measured using each of the four performance assessment metrics. These open-ended funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd. Among the traditional measures, the evidence shows that the relationship between the Treynor and Sharpe ratios is closer compared to that between the Sharpe ratio and Jensen’s alpha. The DEA technique is closer the Treynor rather than the Sharpe ratio. However, 60% of the top ten best performance funds ranked using the four different measures are the same funds, which are ABSM, SCBLT3, SCBPMO, B-INFRA, BTP and IBP.

The funds’ performance for 6-month time-period of investment presents that ABSM, ABSM, B-INFRA and ABSM are ranked No. 1 among the top ten best performers, as measured using each of the four performance evaluation methods. These open-ended funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd. The relationships between the DEA method and the Treynor and Sharpe ratios are closer than that between the DEA technique and the Jensen’s alpha. Six from the top ten funds ranked using the DEA method are the same funds ranked using the traditional measures. These are B-INFRA, B-LTF, BERMF, BKA, BKA2 and SCBLT3. Notice that SCBLT3 is ranked among the top ten best performers for 1-month, 3-month, and 6-month time-
periods of investment; meanwhile B-INFRA is ranked among the top ten best performers for both 3-month and 6-month time periods of investment.

For 1-year time-period of investment, ABSM, ABSM, BTP and ABSM are ranked No. 1 amongst the top ten best performers measured by each performance method. These open-ended equity mutual funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd. In the aspect of ranking evaluation, the evidence indicates that the DEA technique has a closer relationship with the Treynor and Sharpe ratios than the Jensen’s alpha. However, 40% of the top ten funds ranked using the DEA technique, which are B-INFRA, BKA2, B-LTF and BTP, are the same funds ranked based on the traditional measures.

The results also present that for 3-year time-period of investment, ABG and BTP are ranked No. 1 amongst the top ten best performers analyzed by each performance evaluation measure. These open-ended funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd consecutively. The relationships between the DEA method and the Jensen’s alpha and Treynor ratio are closer, compared to that between the DEA technique and the Sharpe ratio. Nevertheless, Up to 80% of the top ten funds ranked based on the DEA technique are the same funds as those ranked using the traditional measures. These are ABG, ABSC-RMF, BERMF, B-INFRA, BKA, BKA2, B-SUB and BTP. Two of them, which are B-INFRA and BKA, are ranked amongst the top ten best performers for 6-month, 1-year and 3-year time-periods of investment; meanwhile BTP is ranked among the top ten best performers for both 1-year and 3-year time-periods of investment.

Table 3 also suggests that for 5-year time-period of investment, ABG and B-INFRA are ranked No. 1 amongst the top ten best performers, as evaluated by each performance assessment measure. These open-ended equity mutual funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd. The provided evidence suggests that in terms of fund rankings, the DEA technique seems closer to the Sharpe and Treynor ratios rather than the Jensen’s alpha; however only three from the top ten funds ranked based on the DEA technique are the same funds as those ranked using the traditional approaches. ABG, B-INFRA
and KPLUS are ranked amongst the top ten best performers based on all four different performance methods. B-INFRA is ranked amongst the top ten best performers for 6-month, 1-year, 3-year and 5-year time-periods of investment; meanwhile ABG is ranked amongst the top ten best performers for 3-year and 5-year time-periods of investment.

When the performance indexes of all open-ended equity mutual funds are ranked based on the four different measures, the further analyses suggest that the top five funds out-perform the bottom five funds between 0.1912 and 1.3187, for the investigations of six different time-periods of investment, during 1-month and 5-year. These average out-performances are 1.3187 (1-month); 0.6938 (3-month); 0.3219 (6-month); 0.2008 (1-year); 0.2783 (3-year) and 0.1912 (5-year), respectively. By comparison, the first ranked fund has greater performance than the market approximately 0.1140; 0.2576; 0.0608; 0.0553; 0.0467 and 0.0381, consecutively. Notice that the interesting time-period of investment would be between 1-month and 3-month; however, the latter one is the best investment horizon because of the significance of the funds’ positive performance.

In summary, the study shows that Thai open-ended equity mutual funds having the best performances compared to the market, as evaluated based on the Treynor ratio, Sharpe ratio, Jensen’s alpha, and DEA score are those managed by the Aberdeen Asset Management Co., Ltd. and SCB Asset Management Co., Ltd., for 1-month time-period, and the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd., for the remaining time-periods of investment. Specifically, there are 15, 6 and 3 (repeated) funds were managed by the Aberdeen Asset Management Co., Ltd., BBL Asset Management Co., Ltd. and SCB Asset Management Co., Ltd. respectively.

**Conclusion**

The results show that on average, the performances of Thai open-ended equity mutual funds significantly out-perform the market for all time-periods of investment, when measured using the traditional measures. There is evidence presenting the persistency of these positive performances. Thus, the results are accordance with those reported by most past studies on
developed and emerging markets. However, when the DEA technique is also used, the analyses of the comparison results suggest that different methods give different outcomes, due to low correlation between the traditional measures and the DEA technique. Nevertheless, it can be concluded that Thai open-ended equity mutual funds analyzed in this study significantly out-perform the market, and the funds’ positive performance persists for 3-month time-period of investment, at least.

In terms of fund ranking assessment, performances evaluated using the traditional measures give more similar rankings compared to those applying the DEA technique; perhaps because the traditional fund performance evaluation methods are based on mean-variance theory (also see [8] and [52]). The results suggest that between 1-month and 1-year time-periods of investment, approximately 50%-60% of the top ten best performers are the same funds, when ranked based on both the traditional and the DEA measures. For the remaining time-periods of investment analyzed in this study, there are up to 80% and about 30% of the top ten best performing funds are the same funds. These funds were managed by the Aberdeen Asset Management Co., Ltd., BBL Asset Management Co., Ltd. and SCB Asset Management Co., Ltd. consecutively.

The further analyses suggest that the top five and bottom five ranked funds have different performances between 0.1912 and 1.3187, for six different investment horizons from 1-month to 5-year. Meanwhile, the average outstanding performance between the first ranked fund and the market is between 0.0381 and 0.2576. Three-month is the best time-period of investment due to the significance of the funds’ positive performance.

Additionally, the study provides evidence indicating that the DEA technique can be efficient supplementary tool to assist investors in selecting appropriate funds, particularly in the sense of robustness check. The study also confirms that the DEA technique is an interesting evaluation method selected to be used as an alternative funds’ performance measure other than the three traditional measures. If investors use only the traditional measures, perhaps they may miss their investment opportunities (also see [51]).
This is the first comprehensive study focusing on open-ended equity mutual funds in Thailand. The study investigates funds' performances covering six different investment horizons by using several more metrics. These include the traditional measures, DEA technique and Pearson's correlation coefficients. As a result, this study leads more variety of outcomes and comparison with other markets, and finally, contributes to the area of financial economics providing results that can be guidelines for individual investors for selecting mutual funds.

References


