

## INVESTING IN MUTUAL FUNDS

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**Abstract:** *This study examines 138 open-ended equity mutual funds managed by the seventeen asset management companies in Thailand during the period 2002-2007. Short-term and long-term investment horizons of fund performances were analyzed using various metrics: Sharpe ratio, Data Envelopment Analysis (DEA) technique and Pearson's correlation coefficients. The results suggest that different measures lead to different outcomes; however, short-term rather than long-term investment horizon should be good alternative for individual investors/ investors, and 3-month time period of investment is the best in terms of excess returns to investors. The open-ended equity mutual funds analyzed in this study present significantly out-perform the market between 0.0213 and 0.9920. The best performer is ABSM, which was managed by the Aberdeen Asset Management Co., Ltd., and 70% of the top ten best performers are the same funds ranked based on the two performance evaluation measures.*

**Keywords:** *Equity fund, mutual fund, open-ended fund performance, excess return, investment horizon*

**JEL Codes:** G11

### 1. INTRODUCTION

Mutual funds have dramatically increased role in financial markets in recent decades. The growth of the mutual fund industry started in the U.S., where the industry plays an extremely important role in stock markets; however, this trend has spread more recently to other countries around the world (Khorana, Servaes & Tufano, 2005).

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 has increased over time.

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Consequently, most individual investors are not only facing choice of investment funds but also experiencing a decision of investment horizons whether short-term or long-term is more attractive in terms of excess returns. 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 Brennan, 1995).

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 (Detzler, 1999). 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 (Ferreira, Miguel & Ramos, 2010). 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 (Detzler, 1999).

Past studies of equity mutual funds 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 primarily focus on the funds' excess returns compared to the market using different metrics to answer questions: whether the funds significantly out-perform the market; whether the usage of different measures leads to different fund rankings; and finally short-term or long-term investment horizon is more attractive in the aspect of fund performances.

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 (Bekaert & Urias, 1998 and Khanthavit, 2001), 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.

## 2. REVIEW OF LITERATURE

The evidence on funds' performance is mixed. However, the more recent findings cast doubts on the efficient market hypothesis and rekindle investors' hope of earning excess returns by plowing through historic performance records (also see Zheng, 1999). Thus, if mutual fund performance is predictable, using performance evaluating can help investors select funds that will continue to out-perform in the future (also see Elton, Gruber & Blake, 1996 and Goetzmann & Ibbotson, 1994).

The literature focuses in general on the U. S. mutual fund industry; see, for example, studies on the U.S. market by Grinblatt and Titman (1994), Kothari and Warner (2001) and Ferreira *et al.* (2010). Several authors examine fund performances in individual developed countries, such as studies on the U.K. market by Blake and Timmermann (1998); studies on Netherland by Plantinga and Groot (2001); studies on Australia by Bird, Chin, and McCrae (1983); France by Dermine and Roller (1992); Italy by Casarin, Pelizzon, and Piva (2008) and Panetta and Cesari (2002); Japan by Cai, Chan, and Yamada (1997); Sweden by Dahlquist, Engstrom, and Soderlind (2000). 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 Artikis (2001), Milonas (1995), Noulas, Papanastasiou, and Lazaridis (2005) and Sorros (2001); and other markets by Agrawal (2007), Bekaert and Urias (1998), Borensztein and Gelos (2000), Gupta and Aggarwal (2007) and Khan (2008), Muga, Rodriguez, and Santamaria (2007) and Ong and Sy (2004).

There are reasons to believe that results of studies may be different as there are significantly different characteristics between the U.S. mutual fund industry and the rest of the world. These factors include fund size, style, age and fees, economic development, financial development, quality of legal institutions and law enforcement, mutual fund industry structure, and others such as ability to select funds (see Chen, Hong, Huang, and Kubik, 2004; Gehin, 2004; Khorana et al., 2005; Khorana, Servaes, and Tufano, 2009; Zheng, 1999). For example, Muga, Rodriguez, and Santamaria (2007), a Mexico study, find persistence in mutual fund performance both over consecutive time periods and in the multi-period setting. Noulas, Papanastasiou, and Lazaridis (2005), 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. Agrawal (2007), a study on Indian mutual funds, reveals 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.

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 (Bekaert & Urias, 1998).

Moreover, the studies have also been restricted to the conventional fund performance measures. Using more 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. Moreover, it is unclear that these studies have predominantly emphasized on investment horizon issue, whether short-term or long-term is more attractive in the aspect of fund performances.

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 the Sharpe ratio and DEA technique. The funds' returns derived from short-term and long-term investment horizons were compared to those of the index of the Stock Exchange of Thailand (SET index) whether the average fund performance is significantly greater than the market. Finally, the results were used to establish fund rankings, which can be guidelines for individual investors to make short-term or long-term investment horizon decision.

### **3. 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.

Recent studies, for example, Rao, Srivastava, and Ramachandra (2006) 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. Plantinga and Groot (2001) 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. Thus, so far, performance have primarily been evaluated and ranked using the traditional measures. However, Rao, Srivastava, and Ramachandra (2006) and Nguyen-Thi-Thanh (2006) assert that the DEA technique can be used to assess mutual funds' performances.

Several studies find rank correlation between the rankings according to two measures assessing the values of the Spearman's rank correlation coefficients;

however, Zakamouline (2010) 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 Noether, 1981).

Thai studies on performances of mutual funds mainly used the traditional measures of risk and return 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 more methodologies. Apart from the Sharpe ratio, DEA technique was employed and 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) and 6-month (November 1, 2006 – April 30, 2007) for short-term investment horizons; and 1-year (May 1, 2006 – April 30, 2007); 3-year (May 1, 2004 – April 30, 2007); 5-year (May 1, 2002 – April 30, 2007) for long-term investment horizons.

### 3.1. Sharpe Ratio

$$S_p = \frac{r_p - r_f}{\sigma_p} \quad (1)$$

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.

### 3.2. Data Envelopment Analysis (DEA)

$$\text{Max } E_k = \frac{\sum_{o=1}^t u_o y_{ok}}{\sum_{i=1}^m v_i x_{ik}} \quad (2)$$

Subject to:

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

$$u_o \geq 0 \quad o = 1, 2, \dots, t \quad v_i \geq 0 \quad i = 1, 2, \dots, m$$

Where  $E_k$  is the DEA score of  $k^{\text{th}}$  DMU,  $y_{ok}$  the amount of the  $o^{\text{th}}$  output for the  $k^{\text{th}}$  DMU,  $x_{ik}$  the amount of the  $i^{\text{th}}$  input for the  $k^{\text{th}}$  DMU,  $u_o$  the weight assigned to the  $o^{\text{th}}$  output,  $v_i$  the weight assigned to the  $i^{\text{th}}$  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:

$$\text{Fund return} = \left( \frac{\text{NAV}_{t+1} + \text{Div}_{t \rightarrow t+1}}{\text{NAV}_t} - 1 \right) \times 100 \quad (3)$$

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.

$$\text{Market return} = \left( \frac{\text{SET}_{t+1}}{\text{SET}_t} - 1 \right) \times 100 \quad (4)$$

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:

$$\text{Var}(r) = \frac{1}{n} \sum_{i=1}^n [r_i - r_{am}]^2 \quad (5)$$

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

$$r_p = \alpha + \beta \times r_m + e_p \quad (6)$$

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.

$$\text{Manager's investment skill} = (r_p - r_f) - (\sigma_p / \sigma_m) (r_m - r_f) \quad (7)$$

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.

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. The coefficients were computed following the given formula.

$$\rho_{X,Y} = \frac{\text{cov}(X,Y)}{\sigma_X \sigma_Y} \quad (8)$$

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  $Y$ .

#### 4. RESULTS

The following section presents the results of the analyses of performances of 138 open-ended equity mutual funds, which were 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 out-perform the market and short-term or long-term is more attractive in the aspect of excess returns. To indicate if there is a significantly positive correlation between the two results estimated using different measures, the Pearson's correlation coefficients were also computed and analyzed. Finally, the study compared the funds' performances to provide fund rankings, which can be used as guidelines for individual investors making a decision about investment horizons.

**Table 1**  
**Performance of Thai Open-ended Equity Mutual Funds Evaluated**  
**Using the Sharpe Ratio**

<i>Time period</i>	<i>% Outperform</i>	<i>Mean</i>	<i>Market</i>	<i>Std. deviation</i>	<i>Std. error</i>	<i>t-stat</i>	<i>Sig</i>
1-Month	73	6.0448	5.5929	0.9537	0.0812	5.57	0.000
3-Month	98	3.4219	2.4299	0.5115	0.0435	22.78	0.000
6-Month	98	0.0760	-0.1724	0.1945	0.0166	15.00	0.000
1-Year	96	-0.1709	-0.4013	0.1577	0.0134	17.16	0.000
3-Year	90	0.3139	0.1198	0.1916	0.0193	10.07	0.000
5-Year	87	0.8046	0.6521	0.1497	0.0173	8.82	0.000

Table 1 presents that Thai open-ended equity funds in the sample of this study performs significantly greater than the market for all time-periods of investment, or both short-term and long-term investment horizons. The average percentage point of out-performing funds ranges from 73% to 98%. Even though the Sharpe ratios of the funds and the SET index for 1-year time-period are negative, the funds still perform better than the market.

**Table 2**  
**Performance of Thai Open-ended Equity Mutual Funds Evaluated Using the DEA Technique**

<i>Time period</i>	<i>% Outperform</i>	<i>Mean</i>	<i>Market</i>	<i>Std. deviation</i>	<i>Std. error</i>	<i>t-stat</i>	<i>Sig</i>
1-Month	49	0.9354	0.9440	0.0400	0.0034	-2.53	0.012
3-Month	80	0.9482	0.9269	0.0465	0.0040	5.39	0.000
6-Month	78	0.9079	0.9222	0.0902	0.0077	-1.86	0.065
1-Year	78	0.9251	0.9411	0.0846	0.0072	-2.23	0.028
3-Year	83	0.9432	0.9556	0.0625	0.0063	-1.97	0.052
5-Year	76	0.9686	0.9742	0.0460	0.0053	-1.05	0.296

Table 2 shows the comparison results between the means of the DEA scores of the equity mutual funds and those of the SET index, and suggests that for 3-month time-period of investment, the differences are significantly positive or greater. Those for the remaining time-periods are negative or lesser. Nonetheless, these performances are significant only for 1-month and 1-year time-period analyses. Thus, the results differ depending on time-periods of investment. The results are diverse from those estimated using the Sharpe ratio in the sense of consistency.

The results in terms of positive excess returns are accordance with those suggested by past studies on developed markets, such as Kacperczyk, Sialm, and Zheng (2008), Otten, and Bams (2002) and Zheng (1999), but are not in line with those reported by Casarin *et al.* (2008) and Detzler (1999). Also, the results are consistent with those presented by studies on emerging markets, such as Tirapat (2004b) and similar to those of Rao *et al.* (2006), but are not supported by Nitibhon (2004). However, the evidence provided by this study indicates that the existing excess returns are persistent which is entirely consistent with studies, e.g. Muga, Rodriguez, and Santamaria (2007) and Wermers (2003). Thus, 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 estimated by using the Sharpe ratio and DEA technique suggest that for 1-month time-period of investment, the percentage of



total funds outperforming the market is lowest. The investment time-period extends, the percentage of total funds outperforming the market increases, but the excess returns have no certain pattern. By comparison, when the Sharpe ratio is used, the evidence indicates that 3-month time-period of investment is the most appropriate alternative in terms of excess returns; meanwhile as the DEA technique is applied, 3-month time-period of investment is more appropriate than 1-month time period; however, 1-month time period is more attractive than 1 yr-time-period of investment (see Table 4).

**Table 3**  
**Relationship between Performance Measures: the Sharpe Ratio and DEA**  
**Score for Different Time-periods of Investment**

<i>Method</i>	<i>1M</i>	<i>3M</i>	<i>6M</i>	<i>1Y</i>	<i>3Y</i>	<i>5Y</i>
Sharpe vs. DEA	0.240**	0.271**	0.086**	0.041	-0.008(N = 99)	-0.047(N = 75)

\*\*significant at 1% level; N = 138 except stated differently in the parentheses.

Table 3 suggests that the relationships between the results calculated by the Sharpe ratio and DEA technique are significant for 1-month, 3-month and 6-month time-periods of investment or short-term investment horizon. The correlations are positive but low to very low especially for 6-month time-period of investment. There are no linear relationships between the results for the remaining time-periods of investment or long-term investment horizon.

Finally, the funds' performances according to the two different performance evaluation measures were compared and ranked as shown (only top ten best performers) in Table 4.

Table 4 presents that for 1-month time-period of investment, SCBLT3 and ABSM are ranked No. 1 amongst the top ten best performers, when measured using the Sharpe ratio and DEA technique respectively. These open-ended equity mutual funds were managed by the SCB Asset Management Co., Ltd. and Aberdeen Asset Management Co., Ltd. consecutively.

Meanwhile, for 3-month and 6-month time-periods of investment, ABSM is ranked No. 1 among the top ten best performers, as measured using each of the two performance assessment metrics. The open-ended fund was managed by the Aberdeen Asset Management Co., Ltd.

For 1-year time-period of investment, ABSM is ranked No. 1 amongst the top ten best performers, when measured by each performance evaluation method. The open-ended equity mutual fund was managed by the Aberdeen Asset Management Co., Ltd.

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

**Table 4**  
**Top Ten Best Performers Ranked Based on Different Performance Evaluation Measures for Short-term Investment Horizon (1-month, 3-month and 6-month Time-periods) and Long-term Investment Horizon (1-year, 3-year and 5-year Time-periods); and Comparison of the Average Performances of Open-ended Equity Mutual Funds and the Market**

1-month		3-month		6-month		1-yr		3-yr		5-yr	
Sharpe	DEA	Sharpe	DEA	Sharpe	DEA	Sharpe	DEA	Sharpe	DEA	Sharpe	DEA
SCBLT3 (SCE)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABSM (Aberdeen)	ABG (Aberdeen)	BTP (BBL)	ABG (Aberdeen)	ABG (Aberdeen)
SCBPMO (SCE)	SCBLT3 (SCE)	SCBLT3 (SCE)	SCBLT3 (SCE)	B-INTRA (BBL)	SCBLT3 (SCE)	B-LTF (3BL)	AYFSTECH (Ayudhya)	ABSC-RMF (Aberdeen)	ABSC-RMF (Aberdeen)	B-INTRA (BBL)	TYF (Kasikorn)
ABSM (Aberdeen)	ABSC-RMF (Aberdeen)	SCBPMO (SCE)	RL703C (Kasikorn)	SCBLT3 (SCE)	AYFSTECH (Ayudhya)	B-INTRA (3BL)	B-INTRA (3BL)	ABSL (Aberdeen)	ABG (Aberdeen)	BTF (BBL)	B-INTRA (BBL)
1VAL-D (One)	RL703D (Kasikorn)	IBP (Primavest)	AYFSTECH (Ayudhya)	BKA2 (BBL)	E-INTRA (BBL)	BTP (3BL)	MAX DIV LTF (Siam City)	BTP (BBL)	BERMF (BBL)	BKA2 (BBL)	KPLUS2 (Kasikorn)
V-RMF (One)	AYFSTECH (Ayudhya)	B-INTRA (BBL)	SCBPMO (SCE)	BLA (BBL)	MAX DIV LTF (Siam City)	BKA2 (3BL)	3-LTF (BBL)	EKA (BBL)	OSPD (Thamachart)	KPLUS (Kasikorn)	KPLUS (Kasikorn)
RL7030 (Kasikorn)	BCAF (BBL)	RL7010 (Kasikorn)	AYFLTFDIV (Ayudhya)	BEEMF (BBL)	BERMF (BBL)	BKA (3BL)	AYFLTFDIV (Ayudhya)	B-INTRA (BBL)	TVF (Kasikorn)	KKF (UOB)	SCBPM4 (SCB)
KTTN (Kasikorn)	SCBPMO (SCE)	ABSC-EMF (Aberdeen)	B-INTRA (BBL)	B-LTF (BBL)	BKA2 (BBL)	BERMF (3BL)	BTP (BBL)	BERMF (BBL)	B-INTRA (BBL)	TDF (UOB)	NERMF (Thamachart)
SCBSET (SCE)	V-RMF (One)	BTF (BBL)	SCB3DV (SCE)	BTP (BBL)	B-LTF (BBL)	ABSC-RMF (Aberdeen)	ABSC-RMF (Aberdeen)	BKA2 (BBL)	BKA (BBL)	BKA2 (BBL)	AYFSTECH (Ayudhya)
SPT (Thamachart)	AYFLTFDIV (Ayudhya)	ABC (Aberdeen)	IBP (Primavest)	B-SUB (BBL)	AYFLTFDIV (Ayudhya)	SCBLT3 (SCE)	BTK (BBL)	B-SUB (BBL)	BKA2 (BBL)	APF (UOB)	APF (UOB)
OSPE (Thamachart)	13-LTF (One)	BKA2 (BBL)	BTP (BBL)	AYFSTECH (Ayudhya)	BKA (BBL)	B-SUB (3BL)	BKA2 (BBL)	AYFTW5 (Ayudhya)	E-SUB (3BL)	B-SUB (BBL)	TDF (UOB)

Note: The funds were managed by the Thai asset management companies stated in the parentheses

Mean											
6.0448	0.9354	3.4219	0.9482	0.0760	0.9079	-0.1709	0.9251	0.3139	0.9432	0.8046	0.9686
SET Index											
5.5925	0.9440	2.4259	0.9269	-0.1724	0.9222	-0.4013	0.9411	0.1198	0.9556	0.6521	0.9742
Excess Returns											
0.4519*	-0.0086*	0.9919*	0.0213*	0.2484*	-0.0143	0.2305*	-0.0161*	0.1940*	-0.0124	0.1525*	-0.0056

performance evaluation measure. These open-ended funds were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd respectively.

Table 4 also suggests that for 5-year time-period of investment, ABG is ranked No. 1 amongst the top ten best performers, as evaluated by each performance assessment measure. The open-ended equity mutual fund was managed by the Aberdeen Asset Management Co., Ltd.

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 Sharpe ratio and DEA score are SCBLT3 and ABSM, which were managed by the SCB Asset Management Co., Ltd. and Aberdeen Asset Management Co., Ltd., respectively for 1-month to 6 month time-periods of investment, or short-term investment horizon. Meanwhile, they are ABSM, ABG and BTP, which were managed by the Aberdeen Asset Management Co., Ltd. and BBL Asset Management Co., Ltd., consecutively for 1-yr to 5-yr time-periods of investment, or long-term investment horizon. Finally, it is concluded that the results are robust and 3 month time-periods of investment, or short-term investment horizon is the most appropriate investment horizon for individual investors in terms of excess returns.

## **5. CONCLUSION**

The results show that on average, the performances of open-ended equity mutual funds in the sample of this study lead to significant excess returns for all time-periods of investment, or both short-term and long-term investment horizons, when the Sharpe ratio is used. This explains that the funds out-perform the market. Meanwhile, as 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; however, for 1-month and 1-year time-periods, the funds significantly under-perform the market. This clarifies that different methods can give different outcomes and that for individual investors/investors, who are evaluating funds' performances using the multi-criteria method, should be careful to select their investment horizons.

Specifically, the results are given robustness and it is clear that the asset management companies which manage the funds during the study time-periods show the best performance for 3-month time-period of investment or short-term investment horizon. Also, the study presents that there are significant and positive relationships between the results evaluated using the two metrics for short-term investment horizon, even low correlations. There are no linear relationships between the results for the remaining time-periods of investment or long-term investment horizon.

For further analyses, the results suggest that when the performance indexes of all open-ended equity mutual funds are ranked based on the two different measures; the funds significantly out-perform the market between 0.0213 and 0.9920. The best performer is ABSM, which was managed by the Aberdeen Asset Management Co., Ltd., and 70% of the top ten best performers are the same funds.

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