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Selectivity and Market Timing Performance in a Developing Country's Fund Industry: Thai Equity Funds Case

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Abstract

Fund selectivity and market timing are two fundamental fund manager's abilities that determine fund performance. These issues are re-visited to investigate selectivity and market timing aspects of Thai equity funds from 1992 to 2004. Because this time period contains a business cycle, the findings could empirically evidence varying fund manager behaviors under expansion and contraction phases of an economy. Jensen Alpha is employed to examine the selectivity performance. Treynor and Mazuy (TM), and, Henriksson and Merton (HM) measures are used to test the market timing performance. The achievement of the aim will involve investigation of selectivity and market timing performance in nine overlapping periods (five years each). The overall results indicate that fund managers have negative selectivity and timing abilities. Results on selectivity and market timing performance of the nine overlapping periods indicate that during the early period fund managers did a better job than during the financial crisis period. Selectivity and market timing investigations are sparse in Thailand and the findings of the existing ones are suffer from sampling error. Hence the results of this study could be very useful not only to the Thai fund industry but also to other emerging fund industries in the Asian region.

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Keywords: market timing, selectivity, fund performance, equity fund

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1 Introduction

The examination of selectivity and market timing performance has received considerable recent attention in the literature. Selectivity and Market Timing of fund performance refers to mutual fund managers" ability to select undervalued stocks and time their buys and sells to upswings and downswings in the market [1].

Examination of selectivity and market timing of fund performance has been extensively covered in the finance literatures, with main focus on developed economies experiences. However, almost negligible efforts have been made on the frontier of developing economies experiences.

Thailand is a developing economy with emerging capital markets. The Thai fund industry is relatively new and has therefore received little academic interest in testing for selectivity and market timing in fund performance. In addition, Thailand was subject to a severe financial crisis during which the economy collapsed in 1997. Due to the substantial volatility of the Thai stock market, the ability of fund managers to select appropriate stocks during upswings and downswings of market has become a greater concern to investors, regulators and fund managers themselves. This study expects to provide a valuable scenario for analysis of developing economies experience with an emerging capital market that has undergone a full business cycle.

The first classic risk-adjusted measure, based on mean-variance relationship, called reward-to-volatility ratio was formulated by Treynor [2] to gauge the performance of a portfolio or fund. Then for the same purpose, Sharpe ratio ([3], [4]) was developed using standard deviation as the relevant risk measure. Jensen [5] estimated a proto-type single factor regression model to isolate the fund manager's skill in the form of an intercept (alpha) term. The alpha term measured as constant term for a given portfolio or fund reflects only the selection ability. In addition, A number of alternative measures to capture the market timing attribute and variants have been developed, such as Treynor and Mazuy [6], Quandt [7], Kon and Jen [8], Henriksson and Merton [9], Merton [10], Kon [11], Grinblatt and Titman [12].

Several selectivity and market timing studies completed in the developed countries. The general finding of all these studies is that only a limited number of fund managers have either superior selectivity or timing abilities and the number varies according to the country and prevailing economic situation.

None of study in Thailand has been exmined both selectivity and market timing performance. A few studies have been conducted mearly on selectivity performance, such as Kongcharoen [13], Bhovichitra [14], Mainkamnurd [15], Pornchaiya [16], Jegasothy, Satjawathee, and Tippet [17]. Only few studies are examined market timing ability, including Lonkani [18], Srisuchart [19], and, Chunhachinda and Tangprasert [20]. Conclusions on Thai fund performance from prior studies are variable and most of the studies have the limitation of being for relatively short time periods. This envisages the need for a selectivity and market timing study in Thailand to at least overcome these two limitations.

Therefore, the aim of this study is to examine equity fund managers in Thailand during upswings and downswings of the market, 1992-2004, which undergone at least a full business cycle to see whether the equity fund managers are superior stock selectors or market timers. Given these objectives, two research questions are developed.

1) Did equity fund managers behave as superior or inferior stock selectors during the period of 1992 - 2004?

2) Did equity fund managers behave as superior or inferior market timers during the period of 1992 – 2004?

To gain insight into the information content of performance history, the sample is split into sub-periods, then the selectivity and market timing performance on nine overlapping periods (five years each) beginning in January 1992 and ending in December 2004 will be examined.

The rest of the paper is structured as follows: Section 2 discusses the data set utilized in this study. Section 3 reports the selectivity and market timing performance, and the last section contains the conclusion.

2 Data and Methodology

2.1 Data

Four aspects of the data are considered: sample of funds, individual fund returns, market portfolio return and risk free estimate.

2.1.1 Sample of funds

The starting time period chosen in this study is 1992 because the monopolistic nature of the mutual fund industry in Thailand ceased in 1992 and the Thai parliament passed new securities law entitled "The Securities and Exchange Act B.E. 2535". Hence the investigation period of this study starts from January 1992 and ends in December 2004. Unlike in previous studies the length of study period is sufficiently long enough to cover a variety of market fluctuations as well as short enough to avoid problems that may subsequently arise from the gradual drift caused by fund modern practices and policies. The sample of funds for this study consists of local Thai equity funds as classified by the AIMC (The Association of Investment Management Companies)[4].

To reduce survivorship bias, those funds having a record of NAV monthly data from 1992 to 2004 were only included in the sample set. Apart from those funds remained live for the full time period, the once existed during the study period but got terminated prior to December 2004 are also included in the sample. For example, a fund that existed, say, for the 3-year period January 1996 to December 1998, would be included in the sample (for those years in which it existed). However, 16 funds that have operating life less than 6 months are treated as in-sufficient observation cases and therefore excluded in the analysis. Inclusion of these cases could marginally affect the efficiency parameter estimates. Hence, some degree of survivorship bias is likely to remain in the sample data.

[4] Specialist equity funds, equity support funds and equity funds that changed their classification before December 2004 e.g. from an equity fund to flexible fund, are excluded from the sample set. (Flexible funds have a portfolio mix of fixed income instruments, common stocks, and any financial instruments; the mixture of which depend on the fund managers decision)

In all, the sample set chosen consists of 92 operating funds and 15 terminated funds[5], making the total to be 107.
Required funds return data for the time period from 1992 to 2000 was collected from the study by Jegasothy and Satjawathee [21]. Then, the data was updated through December 2004 using funds return information published by the MFC Asset Management Public Company Limited.

2.1.2 Individual fund returns

In computing fund rates of return (monthly data – the last Friday of each month), it is assumed that all dividend distributions are reinvested on the ex-dividend date. Thus, the monthly rates of return are computed as the change in total value of a fund that contains reinvesting dividend distribution. To smoothen the volatility in the monthly NAV data, log transformation is used [22]. Hence, returns are expressed as a percentage of beginning-of-month asset values, as follows:

$$R_{jt} = \log\left[\frac{NAV_{jt} + D_{jt}}{NAV_{jt-1}}\right] \tag{1}$$

where,
R_{jt} = rate of return for fund j in month t,
NAV_{jt} = the net asset value per unit of fund j on the last Friday of month t,
NAV_{jt-1} = the net asset value per unit of fund j on the last Friday of the preceding month, and
D_{jt} = the total of dividend distributions during month t.

2.1.3 Market portfolio return

For the return of market portfolio (benchmark), conventionally, two options exist: market indices or peer group average. Given the track record of the mutual funds in Thailand, market indices seem to be more meaningful. However, the selection of a Thai market benchmark for this study proved to be difficult because there was no publicly-available market index that includes dividend distributions. The Stock Exchange of Thailand (SET) index is the closest proxy that can be used as it comprises the population of equity securities in the Thai stock market and it is available for the entire study period. Further, Thai equity funds invest mainly in stocks comprising the SET Index (at least 65 per cent of total assets of the portfolio must be common stocks); and the SET index is widely used as the proxy in recent Thai studies (see e.g. [13], [14], [15], [16], [17], [21]). From the SET index, monthly rates of return for the market (benchmark) portfolio are obtained as follows:

$$R_{mt} = \log\left[\frac{SET_t}{SET_{t-1}}\right] \tag{2}$$

where,

[5] Data of terminated funds for only 15 out of 33 funds are available.

R_{mt} = rate of return for the Thai market portfolio in month *t*,
SET_t = the SET Index closing value at the last Friday of month *t*, and
SET_{t-1} = the SET Index closing value at the last Friday of the preceding month

2.1.4 Risk-free estimates

Capital markets investigations of developed countries normally use the Government Bond rate as a proxy for the risk-free rate. This approach is not practicable in this study because the Thai government did not issue new government bonds during the period 1990 - 1998. However, since the deposit rate of commercial banks in Thailand gets a full guarantee from the Thai government, it is effectively risk-free. Hence deposit rates of commercial banks are used as a proxy for the risk-free rate. Further, all prior Thailand's mutual fund performance studies have used deposit rates of commercial banks as a proxy for the risk-free rate (see e.g. [13], [14], [15], [16], [17], [21]). The risk-free proxy used in this study is 12-month deposit rate of Thai commercial banks published in the Monthly Economic Report by Bank of Thailand. Annual rates are converted into equivalent monthly rates using the following equation:

$$R_{ft} = [1 + ((\, i_{min\,t} + i_{max\,t}\,) / 2)]^{1/12} - 1 \qquad (3)$$

where,
R_{ft} = average monthly risk-free rate for month *t*,
$i_{min\,t}$ = minimum 12-month Thai deposit rate in month *t*, and
$i_{max\,t}$ = maximum 12-month Thai deposit rate in month *t*

2.2 Methodology

Four aspects of the methodology are described: estimable selectivity and market timing performance measures, estimational form of alternative models, estimational procedure and nine sub-periods.

2.2.1 Estimable selectivity and market timing performance measures

Rest of the methodological steps adopted in this study are drawn from the selectivity and market timing empirical work conducted by Dellva, Demaskey and Smith [1]. The three popular selectivity and market timing models used in Dellva et.al study, which are Jensen Alpha [5], Treynor and Mazuy [6], and Henriksson and Merton [9] are used in this investigation to obtain relevant parameters.

2.2.2 Estimational form of alternative models

To examine whether the manager is a superior forecaster or stock picker, Jensen Alpha [5] is employed to test for selectivity. If the fund manager can accurately forecast stock prices, the intercept of the Jensen's model will be positive. The Jensen Alpha will be evaluated for statistical significance by testing the null hypothesis that $\alpha_p = 0$ versus the alternative hypothesis of $(\alpha_p > 0)$, and $(\alpha_p < 0)$. The structural form of Jensen Alpha is as follow.

Jensen Alpha (JM):

$$R_{pt} - R_{ft} = \alpha_p + \beta_p\,[\,R_{mt} - R_{ft}\,] + \varepsilon_{pt} \qquad (4)$$

To examine market timing performance, two models will be used. The first model is the quadratic regression equation, which was developed by Treynor and Marzuy [6], adds a quadratic term to the Jensen model [5] to capture the effects of a fund manager who adjusts for risk based on a timing forecast. Fund managers lower the fund beta when they anticipate a market decline and increase the beta when they expect the market to rise, and the second market timing model is dummy variable regression by Henriksson and Merton [10]. This approach is to fit two linear regression to the data, one for rise-market periods, when the fund outperforms risk-free rate, and the other for decline-market periods, when the fund underperforms risk-free rate. The structural form of quadratic regression equation (TM) and dummy variable regression (HM) are transformed into estimable form by appending a time indexed error term as follows.

Treynor and Marzuy (TM):

$$R_{pt} - R_{ft} = \alpha_p + \beta_{1p} [R_{mt} - R_{ft}] + \beta_{2p} [R_{mt} - R_{ft}]^2 + \varepsilon_{pt} \quad (5)$$

Henriksson and Merton (HM):

$$R_{pt} - R_{ft} = \alpha_p + \beta_{1p} [R_{mt} - R_{ft}] + \beta_{2p} [D (R_{mt} - R_{ft})] + \varepsilon_{pt} \quad (6)$$

where,

R_{pt} = the average rate of return for portfolio in time period t,
R_{ft} = the risk-free rate in time period t,
R_{mt} = the average rate of return on the market portfolio in time period t,
β_p = the systematic risk (*beta*) for portfolio *p* (*for Jensen Measure*),
β_{1p} = the pure systematic risk (*beta*) for portfolio *p*,
β_{2p} = the market timing coefficient for portfolio *p*,
α_p = the intercept term of portfolio p,
$E(\varepsilon_{pt}) = 0$, $E(\varepsilon_{pt},\varepsilon_{pt-1}) = 0$, $Var(\varepsilon_{pt}) = \sigma_p^2$ and $\varepsilon_{pt} \sim N(0, \sigma_p^2)$, $t = 1,\ldots T$

Thus in the estimable forms the error term satisfies classical linear regression assumptions. In addition, both market timing models will be evaluated for statistical significance by testing the null hypothesis that $\beta_{2p} = 0$ versus the alternative hypothesis of $(\beta_{2p} > 0)$, and $(\beta_{2p} < 0)$. Although it may see obvious to examine only for significant positive timing ($\beta_{2p} > 0$), this study is also interested in those managers that have significant negative timing ability,$(\beta_{2p} < 0)$.

2.2.3 Estimational procedure

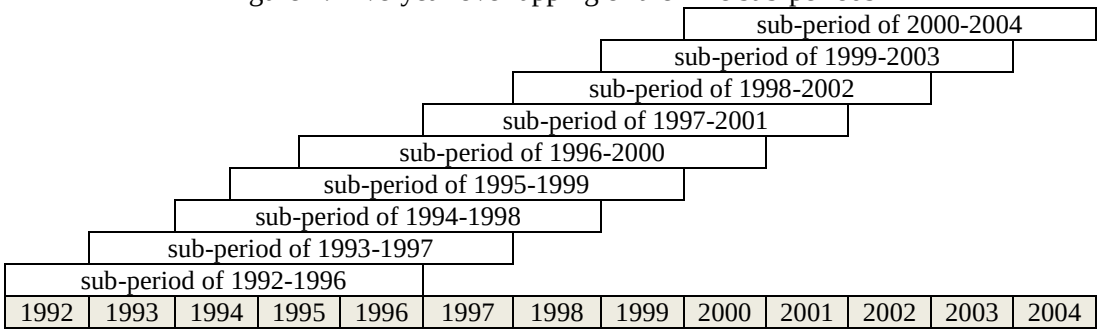
Given the linear structure and assumptions on the error term the estimable models can be estimated with Ordinary Least Square procedure. Estimation of the models is conducted, fund-wise. The intrinsic nature of financial variables is such that many literatures argue the error term of regression models may suffer from spherical disturbances. Therefore the OLS estimation is likely to yield unbiased but inefficient estimates.

To ascertain the presence of spherical disturbances (serial correlation and heteroskedasticity) Durbin Watson and Park test are conducted on the OLS estimates, respectively. If the empirical evidences indicate presence of serial correlation and/or heteroskedasticity, FGLS (Feasible Generalised Least Square) estimation procedure can be adopted to obtain BLUE (Best Linear Unbiased) estimated of the required parameters [23].

2.2.4 Nine sub-periods

To check for stability of results over time, this study not only reports results for the period of 1992 to 2004, but also for various selected sub-time periods. The results of nine overlapping of five-year sub-period beginning in January 1992 and ending in December 2004 is reported to determine whether any particular sub-period stands out over the entire sample period. Similar stability checking procedure also was adopted by Dellva et al [1]. The nine sub-periods can be demonstrated as:

Figure 1: Five-year overlapping of the nine sub-periods



3 Selectivity and Market Timing Performance Results

Given the intrinsic nature of the sample data on fund's earnings, residual analyses were conducted following the OLS estimation which indicated that the selectivity and market timing coefficient estimates of several funds obtained under alternative measures suffered from the problem of spherical disturbances. Among the funds estimated under Jensen measure, 25 funds estimation had the problems of both serial correlation and heteroskedasticity. In addition, there are 31 under HM measure and 32 funds under TM measure suffered from both serial correlation and heteroskedasticity. To obtain BLUE (Best Linear Unbiased) estimate of the required parameters, FGLS (Feasible Generalised Least Square) estimation procedure was adopted for these funds. The estimation results of each measure are presented in Table A, B, and C (Appendix).

3.1 Fund Managers' Ability with Respect to Individual Fund, 1992 –2004

3.1.1 On selectivity performance

To answer the question of whether the Thai fund manager is a superior forecaster or stock picker is obtained by verifying and comparing the sign, size and significance of the estimated selectivity parameter.

To begin with, Jensen Alpha's from Jensen [5] is verified using these verification attributes. Since the Jensen alpha can be legitimately compared across differing time periods, the comparison can be used as a suitable ranking procedure of fund performance. Ranking comparison can be made on the basis of size of the Jensen Alpha and the sign, from positive to negative. Ranking result reported in Table A (Appendix) shows that the mean Jensen alpha value, for all funds is 0.0429. This figure suggests the average

performance for the equity fund industry seems to be marginally higher than that of the market portfolio (normally equal to zero).

Table 1: Numbers of positive and negative selectivity and market timing abilities, 1992-2004

	Jensen alpha (Selectivity)		**TM β_2 (Market Timing)**		**HM β_2 (Market Timing)**	
	Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Number of funds	62	45	12	95	15	92
(sig. at 0.10 level)	(6)	(3)	(2)	(76)	(1)	(61)
Overall means	0.3387	- 0.3646.	0.0205	-0.0114	0.6184	-0.3545
Means of sig. funds	0.0520	-1.5778	0.0156	-0.0116	1.1927	-0.3110

Note: 1. N = 107 funds
2. Dummy variables of HM model: rise-market periods (0) = 73 observations, and decline-market periods (-1) = 34 observations

The high number of the positive Jensen Alpha values (62 funds) is reported in Table 1. This seems to be that more than half of the Thai equity funds outperformed the market benchmark. However, individual *t-test* (also reported in Table A in the Appendix) fails to support this claim because the number of significant positive alpha was every low. Only nine out of 107 funds" Jensen alpha estimates are found to be significant at the 10 percent level, which are approximately 8.41 percent of the sample funds used in this study. This percentage is even marginally lower than that was reported in Jensen's study, which was 10 percent [5]. Of the nine funds with significant Jensen alpha estimates reported, only six are positive and three are negative. Hence, using significance as a verification attribute yields inferior selectivity ability of Thai equity fund managers. The result is consistent with the finding of Jegasothy, Satjawathee and Tippet [17] who also found that Thai fund manager had inferior selectivity performance during 1992-2000.

Theoretically, a higher beta value of the Jensen alpha model characterizes the fund as more sensitive one to market returns and thus having a greater systematic risk. Table A (Appendix) shows that the overall average beta is 0.6983, indicating that almost all beta values experienced are less than the beta value of the market portfolio, which generally treated as equal to 1. This enables to infer that fund managers tend to choose lower systematic risk funds than the market portfolio during the fund selection. All beta estimates were found to be significant at the 5 per cent level.

3.1.2 On market timing performance

To examine market timing performance, parameter estimates of two models are used, the *Treynor and Mazuy quadratic regression equation* (TM) and *Henriksson and Merton dummy variable regression* (HM). The TM and HM results are reported in Table B and Table C (in the Appendix). A positive significant value of the estimated market timing parameter (β_2) infers that managers have superior timing ability while the negative value points to the inferior. All positive and negative significant results are already reported in Table 1.

3.1.2.1. Treynor and Mazuy quadratic regression equation

The estimated β_2 parameter of the quadratic term in TM measure infers that managers timing ability. Table 1 shows that only 12 funds have positive TM beta (β_2) while and among these only 2 are found to be significant at the 10 percent level. However, 76 funds of the estimated funds have negative beta that are significant at the 10 percent level. Hence the overall market timing ability of the fund managers over the study period seems to be inferior.

3.1.2.2. Henriksson and Merton dummy variable regression

The second model employed to examine whether the Thai fund manager possessed superior market timing ability is the Henriksson and Merton (HM) model. In HM, the switching term (β_2) infers the market timing ability. Table 1 illustrates that 15 funds of the sample had positive HM beta$_2$ (β_2). Only 1 out of the 15 HM beta$_2$, estimated on an individual fund basis, are found to be significantly positive at the 10 percent level while 61 funds had negative beta$_2$ at the same level of significance. The results of the HM measure is almost similar that observed previously under TM, that is the fund managers have exhibited in general inferior timing ability over the study period.

3.2 Selectivity and Market Timing Performance of the Funds during the 9 Sub-periods

In order to verify the stability of the overall results (obtained above) over time, the analytical period was divided into sub time periods and examined. The result of nine overlapping five-year sub-periods beginning from January 1992 and ending in December 2004 are reported. The examination is aimed to determine whether any particular sub-period stands out over the entire sample period.

3.2.1. On selectivity performance

Table 2 presents results for selectivity performance for the nine overlapping periods using alphas from Jensen results for the entire period is also reported for the purpose of comparison. To summarize the results, average alphas for the funds in each period are reported. Under all three, the numbers of positive alphas vary over the different time periods.

Table 2: Jensen Alpha: the nine sub-periods with five-year overlapping years

Jensen alpha	**(1) 1992-1996**		**(2) 1993-1997**		**(3) 1994-1998**		**(4) 1995-1999**		**(5) 1996-2000**	
N	82		87		87		88		88	
Average alpha	0.1764		0.3517		-0.2347		-0.4053		-0.5607	
Positive alpha	54		70		8		8		10	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	20	3	23	0	0	11	0	17	0	18
Sig. at 0.05	16	1	15	0	0	4	0	9	0	17
Sig. at 0.01	6	0	9	0	0	0	0	2	0	4

Jensen alpha	**(6) 1997-2001**		**(7) 1998-2002**		**(8) 1999-2003**		**(9) 2000-2004**		**Entire period**	
N	89		92		94		102		107	
Average alpha	-0.3883		-0.0556		0.2175		0.2392		0.0429	
Positive alpha	12		34		51		86		62	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	0	9	5	0	8	0	6	2	6	3
Sig. at 0.05	0	5	1	0	5	0	1	2	4	2
Sig. at 0.01	0	0	0	0	2	0	1	1	0	1

In Table 2, the lower numbers of positive Jensen alpha in third to the sixth period (1994 –2001) indicates that during these time periods a few fund managers had inferior selection ability. However the estimates before and after this time phase indicate the better ability.

Table 2 also reports one-tail significant test results of selectivity at 0.10, 0.05 and 0.01 levels of significance. Again, no positively significant alphas are found for the period from third to the sixth. But the level of significance are stronger in the first and second periods, indicating that during the early periods several fund managers have done the selections reasonably well. This inference is reinforced by the fact that the average positive alpha values, 0.1764 in the first period and 0.3517 in the second period. The results also show that during the eighth and ninth sub-periods (1999-2004) again positive average alpha values are found (0.2175 and 0.2392, receptively), indicating the recovering period.

Investigation on the alpha values from the Jensen Alpha measure infers that in general the fund managers have better fund selectivity performance in the first and second sub-periods than in the third to sixth sub-periods. The decline in selectivity could be the result of high market risk experienced during the economic crisis in Thailand. In 1997, the country was subject to a severe financial crisis that caused unprecedented volatility fund returns leading finally to an economy collapse. The collapse marks the worst recession in modern Thai economic history [24]. Another interesting observation is that average positive alpha estimates for the years beyond the eighth sub-period indirectly signifies that the recovery phase had commenced for Thailand equity fund industry.

3.2.2. On market timing performance

3.2.2.1. Treynor and Mazuy quadratic regression

Results in Table 3 indicate that little or no significant positive timing effects experienced during the sub- period of the third to the ninth. Testing the significance of timing infer that majority of the funds had negative beta (timing) parameter estimates during the third to the seventh periods. These results together indicate that during the financial crisis period several fund managers have behaved as inferior market timers. The inferior market timing ability results to a great extend coincides with the findings of selectivity ability observed earlier, that during the market volatility, fund managers could not outperform the market portfolio.

Table 3: TM beta$_2$ for the nine sub-periods with five-year overlapping years

TM	**(1) 1992-1996**		**(2) 1993-1997**		**(3) 1994-1998**		**(4) 1995-1999**		**(5) 1996-2000**	
Positive TM β_2	32		55		3		3		3	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	14	21	29	6	0	78	1	76	1	80
Sig. at 0.05	9	17	24	5	0	74	0	74	0	77
Sig. at 0.01	5	12	11	2	0	72	0	64	0	69

TM	**(6) 1997-2001**		**(7) 1998-2002**		**(8) 1999-2003**		**(9) 2000-2004**		**Entire period**	
Positive TM β_2	3		5		12		13		12	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	1	78	0	82	2	18	2	11	2	76
Sig. at 0.05	0	77	0	81	1	10	2	5	1	68
Sig. at 0.01	0	64	0	71	0	1	1	3	1	61

3.2.2.2. Henriksson and Merton dummy variable regression

Table 4 also gives the market timing results in terms of the numbers of positive and negative timing coefficients (β_2). There is a litter or no evidence for significant positive timing during the period of the third to the ninth and the result is similar to the observation that was made under the TM model. A stronger significant negative timing coefficients, from the third to the seventh period, indicates that majority of the Thai equity funds have experienced inferior market timing performance. This finding reiterates the experienced of poor timing that fund managers had during the financial crisis.

Nine overlapping of five-year sub-periods beginning in January 1992 and ending in December 2004 was formed in this analysis to determine whether any particular sub-period stands out over the entire sample period. Results based on Jensen alpha indicate that during the early years, several managers have handled selectivity better than other sub-periods, namely, during the middle years only a few fund managers were able to showed adequate level of selectivity skills. The decline in fund manager's fund selectivity performance very likely outcome of the market volatility that is triggered by the economic crisis that commenced in Thailand by 1997. The country was subjected to a severe financial crisis during which the economy collapsed and noted as the worst recession in modern Thai economic history.

Table 4: HM beta$_2$ for the nine sub-periods with five-year overlapping years

HM	**(1) 1992-1996**		**(2) 1993-1997**		**(3) 1994-1998**		**(4) 1995-1999**		**(5) 1996-2000**	
Positive HM β_2	33		54		3		3		3	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	10	19	18	7	0	77	1	68	1	73
Sig. at 0.05	5	14	14	6	0	73	0	61	0	71
Sig. at 0.01	4	10	4	2	0	55	0	46	0	53

HM	**(6) 1997-2001**		**(7) 1998-2002**		**(8) 1999-2003**		**(9) 2000-2004**		**Entire period**	
Positive HM β_2	4		7		17		30		15	
Significance	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.
Sig. at 0.10	1	70	2	73	2	6	2	2	1	61
Sig. at 0.05	0	64	2	67	1	1	2	1	0	56
Sig. at 0.01	0	48	1	36	0	0	0	0	0	44

The selectivity performance result of the first sub-period (1992-1996) is consistent with

Bhovichitra [14] who found that fund manager have handled selectivity well. However, it is diagonally opposite to the findings made by Mainkamnurd [15] for the period of 1992-1995 that the fund underperformed the market portfolio. The fifth sub-period (1996-2000) result of this study is accordance with the findings of Pornchaiya [16] who examined fund performance during 1996-1999 and found that Thai fund underperformed the market benchmark during this period.

For the market timing, the result of the first sub-period (1992-1996) finds that only a few fund managers had significant positive market timing ability. The result is consistent with the findings of Lonkani [18] who investigated on market timing performance during 1992-1995 and indicated that fund managers in general had inferior market timing ability. In addition, result of the ninth sub-period (2000-2004) is similar to the findings of Chunhachinda and Tangprasert [20] who examined market timing ability during 2001-2003 using monthly data. The finding was that the Thai fund managers had poor market timing ability than the market benchmark indications.

The finding of inferior market timing ability is also consistent with prior research in developed countries in the 1990s. These studies include Danial, Grinblat, Titman, and Wermers [25], Beckers [26], Kao, Cheng, and Chan [27], Goestzmann, Ingersill Jr., and Ivković [28], Umamaheswar Rao [29], Dellva, DeMaskey and Smith [1].

4 Conclusion

The aim of this study is to examine the selectivity and market timing performances of equity fund managers in Thailand during the period of 1992-2004. The selectivity ability has been investigated through the measure of Jensen Alpha, and, the market timing ability has been examined through the use of two measures: Treynor and Mazuy(TM), and, Henriksson and Merton (HM).

Thai funds' selectivity performance results strongly indicate that fund mangers' selectivity ability with respect to individual fund was inferior to the market portfolio, only 6 out of 107 funds has significant positive value. A possible explanation of the inferior selectivity performance could be that the funds were significantly affected by a severe financial crisis during which the economy collapsed in 1997. As a result of the crisis funds earned unstable dampening returns across the industry making it hard to form systematic guesses.

Market timing performance results strongly indicate that fund mangers' market timing ability with respect to individual fund was inferior to the market portfolio, only 2 and 1 out of 107 funds had significant positive value for the Treynor and Mazuy, and, Henriksson and Merton models, respectively.

The findings of the nine overlapping of five-year sub-periods are quite interesting with respect to selectivity performance indicating that fund managers did a better job during the early period than during the financial crisis period. Results on market timing performance found a stronger significant negative timing coefficients during the middle period of this study indicated that the majority Thai equity fund had inferior market timing performance. This finding reiterates the experience of poor timing that fund managers had during the financial crisis. Another interesting observation is that average positive alpha estimates for the years beyond the eighth sub-period indirectly signifies that the recovery phase had commenced for equity fund industry in Thailand.

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Appendix

Table A: Selectivity performance of Thai Equity funds based on Jensen Alpha model, 1992-2004

rank	fund code	Jensen Alpha	t-stat	sig. of t-stat	beta	months	rank	fund code	Jensen Alpha	t-stat	sig. of t-stat	beta	months
1	EQ-RMF	1.4487	2.1646	0.0388*	0.5191	30**	55	TISCOEGF	0.0555	0.1727	0.8632	0.6524	145
2	BERMF	1.3095	1.8126	0.0824*	0.3945	26	56	NPAT-PRO	0.0529	0.1703	0.8651	0.7188	121
3	NERMF	1.1317	2.0892	0.0447*	0.4643	33**	57	TNP	0.0430	0.1544	0.8775	0.8699	156
4	AJFSCAP	1.0419	1.5847	0.1166	0.6139	90	58	BKA2	0.0385	0.1172	0.9069	0.7364	130
5	V-RMF	0.9682	1.7712	0.0852*	0.5168	37	59	SSB	0.0333	0.0789	0.9372	0.7940	156
6	ABSC-RMF	0.8955	2.1390	0.0428*	0.4945	25**	60	TEFQ	0.0313	0.0756	0.9403	0.8802	25**
7	ABG	0.7429	1.5088	0.1349	0.7590	90	61	RKEDC	0.0239	0.0465	0.9630	0.6973	98
8	SCBRM4	0.6996	0.7750	0.4439	0.5033	35	62	ONE-UB3	0.0207	0.0669	0.9468	0.7068	133
9	NPAT SAFTY	0.6713	1.5895	0.1215	0.7408	34**	63	TVF	-0.0108	-0.0292	0.9767	0.6374	120
10	SYRUS-M	0.6291	1.0103	0.3142	0.8096	135	64	SMEVC	-0.0333	-0.1720	0.8643	-0.0217	43
11	BMF	0.6091	0.8831	0.3804	0.5350	68	65	RKF-HI	-0.0355	-0.0874	0.9305	0.6691	133
12	OSPD1	0.5584	1.9260	0.0566*	0.5320	116	66	ONE-UB5	-0.0467	-0.1107	0.9122	0.6689	59**
13	OSPD2	0.4854	1.3066	0.1940	0.5340	113	67	NF-PLUS	-0.0675	-0.1558	0.8796	0.6393	10**
14	RKF	0.4610	1.3349	0.1840	0.7295	151	68	TISCOEDF	-0.0678	-0.1224	0.9028	0.6634	128**
15	ABSL	0.4551	0.7517	0.4738	0.3309	9**	69	RKF4	-0.0713	-0.2015	0.8406	0.6596	126
16	N-SET	0.4333	0.9959	0.3362	0.7209	15**	70	B-SUB	-0.0715	-0.2005	0.8414	0.7325	118
17	RKF2	0.4253	1.1491	0.2525	0.7035	137	71	SCBTS3	-0.0796	-0.2305	0.8181	0.6267	131
18	TEGRMF	0.4031	0.0092	0.9927	0.3230	26**	72	TCMEQF	-0.0805	-0.2342	0.8152	0.6171	150
19	APF	0.4004	1.1303	0.2606	0.7370	119	73	DE-1	-0.0857	-0.2260	0.8216	0.8342	125
20	KPLUS	0.3713	1.1554	0.2500	0.7445	131**	74	TS	-0.0910	-0.2691	0.7883	0.8132	129
21	KTTN	0.3491	0.3748	0.7139	0.7236	15	75	SF5	-0.0983	-0.3333	0.7393	0.7867	156
22	KKF	0.3483	0.7364	0.4629	0.7558	126	76	SPF	-0.1268	-0.2810	0.7792	0.7974	128**
23	OSPD3	0.3473	1.0177	0.3111	0.5112	111	77	PISD	-0.1550	-0.3432	0.7321	0.8215	111**
24	ONE-D	0.3472	1.0831	0.2807	0.7038	138	78	AGF	-0.1675	-0.5043	0.6149	0.7891	132
25	ONEUB-G	0.3271	0.5813	0.5633	0.6546	59	79	SCIF2	-0.1705	-0.5377	0.5917	0.7460	132
26	IBP	0.2977	0.3455	0.7352	0.7130	15	80	SCBMF2	-0.1730	-0.4682	0.6404	0.7478	136
27	BCAP	0.2796	0.5766	0.5656	0.7065	97	81	UNF	-0.1990	-0.6089	0.5437	0.8298	130
28	PPSD	0.2772	0.6338	0.5272	0.5553	144**	82	SPT	-0.2090	-0.5771	0.5650	0.7107	116
29	TDF	0.2771	0.8278	0.4094	0.7698	128**	83	SCDF	-0.2134	-0.6867	0.4935	0.7850	126
30	SAN	0.2650	0.8720	0.3846	0.8587	153**	84	BKD	-0.2442	-0.7150	0.4760	0.7349	126
31	KPLUS2	0.2645	0.8062	0.4216	0.7354	131**	85	ONE-PF	-0.2504	-0.5861	0.5594	0.6750	85
32	RPF2	0.2633	0.9866	0.3254	0.8488	156	86	SF7	-0.2625	-0.7942	0.4286	0.8550	127
33	ONE-PR	0.2602	0.8369	0.4042	0.7178	132	87	SCBTS2	-0.2884	-0.7953	0.4279	0.5743	133
34	THANA1	0.2536	0.8260	0.4103	0.7142	132	88	SCBRT	-0.2895	-0.7556	0.4516	0.6837	105
35	ONE-G	0.2238	0.7966	0.4269	0.7253	150	89	RRF1	-0.2977	-0.7143	0.4762	0.8724	143
36	ONE-UB2	0.1875	0.5806	0.5626	0.7406	124	90	SCBMF4	-0.3139	-0.8558	0.3937	0.7448	131
37	ONE-WE	0.1534	0.4914	0.6240	0.7138	133	91	SCBMF3	-0.3229	-0.9098	0.3646	0.7396	135
38	RKF-HI2	0.1507	0.3397	0.7346	0.6753	129**	92	SCBTS	-0.3283	-0.9429	0.3475	0.5976	134

39	USD2	0.1502	0.3786	0.7056	0.6869	133	93	SF8	-0.3393	-0.9953	0.3217	0.8686 116**
40	RKEC	0.1450	0.3809	0.7040	0.6824	121	94	STD	-0.3634	-1.0827	0.2809	0.7863 134
41	SCBDV	0.1367	0.2544	0.8029	0.4437	16	95	SCBPMO	-0.3719	-1.0064	0.3164	0.6446 116
42	RKF3	0.1366	0.3745	0.7086	0.6581	134	96	SCIF	-0.4007	-1.3067	0.1936	0.7647 134
43	BKA	0.1268	0.3797	0.7048	0.7601	133	97	BMBF	-0.4491	-1.3243	0.1880	0.7471 117
44	ONE-FAS	0.1230	0.4118	0.6811	0.7349	132	98	THOR 3	-0.4647	-0.7408	0.4618	0.5203 60
45	ONE-UB4	0.1077	0.3359	0.7376	0.7100	123	99	SCBDA	-0.4833	-1.2172	0.2259	0.7948 124
46	SF4	0.1069	0.2526	0.8009	0.7967	156	100	SCBMF5	-0.5137	-1.3797	0.1702	0.7452 126
47	SW2	0.1030	0.3265	0.7445	0.7748	141	101	STD2	-0.5721	-1.6566	0.1000*	0.7308 133
48	ONE-FF	0.0992	0.2471	0.8054	0.6312	91	102	AJFSEQ	-0.5779	-1.1122	0.2921	0.9178 11**
49	ONE+1	0.0925	0.3080	0.7586	0.7025	133	103	SCBSET	-0.5882	-0.0431	0.9657	1.8218 100**
50	USD	0.0783	0.1944	0.8462	0.6857	133	104	KPE	-0.6316	-0.7042	0.5041	0.6287 9
51	ONE-PRO	0.0782	0.2244	0.8228	0.7352	135	105	SRT	-1.6403	-1.1217	0.2646	0.6852 103**
52	SCBMF	0.0739	0.1797	0.8576	0.6739	149	106	DYNAMIC2	-1.9812	-2.5043	0.0293*	0.3210 13
53	INGTEF	0.0676	0.1585	0.8745	0.8723	67**	107	DYNAMIC	-2.1802	-3.6746	0.0032*	0.8719 13**
54	BTP	0.0604	0.1782	0.8589	0.7003	123	average Jensen alpha		0.0429	-	-	0.6983 -

* significant at the 0.10 level ; ** Funds were re-corrected for Serial correlation and Heteroskedasticity problems using FGLS procedure, so one observation of these funds was lost.

Table B: Market timing performance as measured by Treynor and Mazuy model, 1992-2004

Rank	fund code	TM β2	t-stat	sig. of t-stat	TM Alpha	t-stat	sig. of t-stat	months
1	TEGRMF	0.2215	0.1461	0.8851	-8.1412	0.0062	0.9951	26**
2	EQ-RMF	0.0258	3.6841	0.0010*	0.2296	1.3634	0.1836	30**
3	SCBSET	0.0199	0.1487	0.8821	-13.7063	-1.1935	0.2356	100**
4	NERMF	0.0061	0.4315	0.6691	0.4262	1.5918	0.1216	33**
5	BMF	0.0054	1.6809	0.0976*	-0.0626	-0.0793	0.9370	68
6	TISCOEDF	0.0050	0.5520	0.5819	-0.1518	0.7731	0.4409	128**
7	KPLUS	0.0044	1.1594	0.2485	0.2390	2.4400	0.0160*	131**
8	KPLUS2	0.0039	1.1461	0.2539	0.1490	2.0490	0.0425*	131**
9	USD	0.0032	0.8094	0.4197	0.0552	1.6169	0.1083	132**
10	TDF	0.0021	0.5666	0.5720	0.2758	2.0680	0.0407*	128**
11	APF	0.0014	0.3875	0.6991	0.3744	2.2510	0.0263*	118**
12	SPF	0.0009	0.1677	0.8671	0.0450	1.0544	0.2937	128**
13	SAN	-0.0003	-0.1016	0.9192	0.4157	2.1798	0.0308*	153**
14	NPAT SAFTY	-0.0014	-0.2067	0.8375	0.6946	0.4828	0.6325	34**
15	SCBMF3	-0.0014	-0.4353	0.6641	0.1199	1.4828	0.1405	134**
16	SMEVC	-0.0020	-0.7958	0.4309	0.0916	0.2066	0.8374	42**
17	OSPD1	-0.0022	-1.7889	0.0763*	0.8410	2.5660	0.0116*	116
18	OSPD3	-0.0022	-1.5272	0.1296	0.6355	1.6373	0.1045	111
19	OSPD2	-0.0025	-1.5956	0.1135	0.8112	1.9237	0.0570*	113
20	RKF-HI2	-0.0028	-0.6645	0.5076	0.6918	2.1472	0.0337*	129**
21	TEFQ	-0.0028	-0.1918	0.8496	0.1470	1.2536	0.2226	25**
22	ABG	-0.0029	-1.5545	0.1237	1.1753	2.0908	0.0395*	90
23	SSB	-0.0033	-1.6740	0.0962*	0.4128	0.8659	0.3879	156
24	SYRUS-M	-0.0033	-1.2100	0.2284	1.0524	1.4754	0.1425	135
25	ONE-D	-0.0035	-2.4642	0.0150*	0.7827	2.1683	0.0319*	138
26	SCBMF	-0.0037	-1.9701	0.0507*	0.5109	1.1015	0.2725	149

27	TISCOEGF	-0.0037	-2.5382	0.0122*	0.4916	1.3691	0.1731	145
28	SF4	-0.0038	-1.9157	0.0573*	0.5415	1.1352	0.2581	156
29	ONE-WE	-0.0038	-2.8600	0.0049*	0.6432	1.8434	0.0676*	133
30	SPT	-0.0039	-1.1555	0.2503	0.4440	1.8468	0.0674*	115**
31	SF5	-0.0040	-2.9299	0.0039*	0.3576	1.0931	0.2760	156
32	KKF	-0.0044	-2.1252	0.0356*	0.8822	1.6651	0.0984*	126
33	ONE-G	-0.0044	-3.5179	0.0006*	0.7407	2.4046	0.0174*	150
34	DYNAMIC	-0.0045	-0.2936	0.7746	-2.5506	-2.4531	0.0321*	13**
35	RPF2	-0.0045	-3.6851	0.0003*	0.7746	2.6552	0.0088*	156
36	TCMEQF	-0.0045	-2.8758	0.0046*	0.4435	1.1609	0.2476	150
37	ONE-UB5	-0.0046	-3.1852	0.0023*	0.6828	1.3594	0.1794	60
38	SW2	-0.0047	-3.4265	0.0008*	0.6854	1.9687	0.0510*	141
39	RRF1	-0.0048	-2.5646	0.0114*	0.2776	0.5954	0.5525	143
40	USD2	-0.0048	-2.7714	0.0064*	0.7443	1.6825	0.0949*	133
41	TNP	-0.0049	-3.9100	0.0001*	0.6064	2.0017	0.0471*	156
42	ONE-UB2	-0.0049	-3.6609	0.0004*	0.8287	2.3409	0.0209*	124
43	ONE-PRO	-0.0050	-3.3805	0.0010*	0.7163	1.8610	0.0650*	135
44	THOR 3	-0.0050	-2.4925	0.0156*	0.4205	0.6026	0.5492	60
45	ONE-UB4	-0.0052	-3.8923	0.0002*	0.7593	2.1905	0.0304*	123
46	ONE-FAS	-0.0053	-4.2175	0.0000*	0.7643	2.3921	0.0182*	132
47	SCBRT	-0.0053	-3.5586	0.0006*	0.4551	1.0859	0.2801	105
48	ONE-PR	-0.0054	-4.1305	0.0001*	0.9159	2.7461	0.0069*	132
49	NPAT-PRO	-0.0054	-4.3206	0.0000*	0.7755	2.3173	0.0222*	121
50	ONE-PF	-0.0054	-3.5603	0.0006*	0.6063	1.2988	0.1977	85
51	SCDF	-0.0055	-4.2604	0.0000*	0.4548	1.3749	0.1717	126
52	THANA1	-0.0055	-4.2298	0.0000*	0.9146	2.7853	0.0062*	132
53	ONE-UB3	-0.0057	-4.4254	0.0000*	0.7303	2.2070	0.0291*	133
54	BKA	-0.0059	-4.1859	0.0001*	0.8564	2.3810	0.0187*	133
55	ONEUB-G	-0.0059	-3.5137	0.0009*	1.5082	2.4563	0.0172*	59
56	RKF2	-0.0059	-3.7685	0.0002*	1.1669	2.8857	0.0046*	137
57	BKD	-0.0060	-4.2780	0.0000*	0.4929	1.3563	0.1775	126
58	DE-1	-0.0060	-3.8302	0.0002*	0.6589	1.6119	0.1096	125
59	ONE+1	-0.0060	-4.8331	0.0000*	0.8359	2.6336	0.0095*	133
60	SF8	-0.0063	-4.5164	0.0000*	0.3843	1.0259	0.3071	117
61	SRT	-0.0063	-0.6231	0.5346	-1.3244	-0.8148	0.4171	103**
62	SCBMF2	-0.0063	-4.0062	0.0001*	0.6129	1.5263	0.1293	136
63	BTP	-0.0064	-4.7315	0.0000*	0.8672	2.4374	0.0163*	123
64	SCIF	-0.0064	-5.0602	0.0000*	0.3845	1.1962	0.2338	134
65	STD	-0.0064	-4.5494	0.0000*	0.4217	1.1797	0.2403	134
66	RKF	-0.0064	-4.2081	0.0000*	1.2076	3.2425	0.0015*	151
67	SF7	-0.0065	-4.8737	0.0000*	0.5357	1.5517	0.1233	127
68	ONE-FF	-0.0065	-4.7174	0.0000*	1.1245	2.6709	0.0090*	91
69	TVF	-0.0065	-4.4047	0.0000*	0.8187	2.0915	0.0386*	120
70	BCAP	-0.0066	-3.6470	0.0004*	1.2429	2.3576	0.0205*	97
71	SCIF2	-0.0066	-5.0382	0.0000*	0.6227	1.8825	0.0620*	132
72	UNF	-0.0067	-4.9819	0.0000*	0.6060	1.7776	0.0779*	130
73	BKA2	-0.0069	-5.1826	0.0000*	0.8753	2.5697	0.0113*	130
74	B-SUB	-0.0069	-4.9444	0.0000*	0.8089	2.1817	0.0312*	118
75	PISD	-0.0069	-3.8152	0.0002*	0.7214	1.4568	0.1480	112
76	SCBPMO	-0.0069	-4.8209	0.0000*	0.5247	1.3600	0.1765	116
77	BMBF	-0.0070	-5.3529	0.0000*	0.4432	1.2767	0.2043	117
78	RKEC	-0.0070	-4.5997	0.0000*	1.0288	2.5652	0.0116*	121
79	SCBTS3	-0.0072	-5.0778	0.0000*	0.7844	2.1847	0.0307*	131
80	INGTEF	-0.0073	-1.7220	0.0898*	0.4204	0.8623	0.3917	67**
81	AGF	-0.0073	-5.3587	0.0000*	0.7069	2.0619	0.0412*	132
82	TS	-0.0073	-5.3871	0.0000*	0.7926	2.2817	0.0242*	129

83	SCBDA	-0.0073	-4.5128	0.0000*	0.4208	1.0025	0.3181	124
84	RKF3	-0.0073	-4.8309	0.0000*	1.0349	2.6867	0.0082*	134
85	RKF4	-0.0073	-5.1247	0.0000*	0.8182	2.2351	0.0272*	126
86	V-RMF	-0.0074	-1.2661	0.2141	1.3592	2.1789	0.0364*	37
87	AJFSCAP	-0.0078	-3.2039	0.0019*	2.1829	3.0332	0.0032*	90
88	SCBTS	-0.0078	-5.5192	0.0000*	0.6295	1.7511	0.0823*	134
89	RKEDC	-0.0078	-4.1259	0.0001*	1.1514	2.1018	0.0382*	98
90	SCBTS2	-0.0079	-5.3630	0.0000*	0.6902	1.8330	0.0691*	133
91	RKF-HI	-0.0083	-4.9605	0.0000*	0.9915	2.3208	0.0219*	133
92	STD2	-0.0084	-6.1432	0.0000*	0.4666	1.3372	0.1835	133
93	SCBMF4	-0.0091	-6.3348	0.0000*	0.7813	2.1416	0.0341*	131
94	SCBMF5	-0.0091	-6.4093	0.0000*	0.6034	1.6414	0.1033	126
95	PPSD	-0.0101	-1.6205	0.1073	1.3066	1.8110	0.0723*	144**
96	NF-PLUS	-0.0164	-0.6648	0.5249	0.2759	0.7330	0.4845	10**
97	SCBRM4	-0.0197	-0.6426	0.5251	1.0250	0.7176	0.4782	34**
98	BERMF	-0.0224	-2.1601	0.0414*	1.8306	2.7152	0.0123*	25**
99	ABSC-RMF	-0.0388	-4.5367	0.0001*	1.6585	2.8192	0.0097*	25**
100	DYNAMIC2	-0.0420	-2.1488	0.0572*	-0.7345	-0.8174	0.4327	13
101	N-SET	-0.0449	-1.3562	0.1981	1.2774	0.5265	0.6074	15**
102	AJFSEQ	-0.0512	-3.5468	0.0062*	0.0708	0.1098	0.9150	11**
103	ABSL	-0.0525	-2.5770	0.0366*	1.4297	1.1025	0.3067	9**
104	SCBDV	-0.0542	-2.1190	0.0539*	1.4097	0.7486	0.4674	15**
105	IBP	-0.0683	-1.1247	0.2827	1.5839	0.2612	0.7984	14**
106	KPE	-0.1037	-4.6131	0.0036*	1.0457	1.7969	0.1225	9
107	KTTN	-0.1087	-1.7963	0.0976*	2.4158	0.6404	0.5340	14**

* significant at the 0.10 level

** Funds were re-corrected for Serial correlation and Heteroskedasticity problems using FGLS procedure, so one observation of these funds was lost.

Table C: Market timing performance as measured by Henriksson and Merton, 1992-2004

rank	fund code	HM β2	t-stat	sig. of t-stat	HM Alpha	t-stat	sig. of t-stat	months
1	TEGRMF	4.5371	0.0843	0.9335	-3.1801	-0.1111	0.9124	26**
2	EQ-RMF	1.1927	3.8464	0.0006*	-1.6526	-1.8991	0.0679*	30**
3	AJFSEQ	1.0905	1.1744	0.2704	-2.0179	-1.5080	0.1658	11**
4	TISCOEDF	0.5770	1.3184	0.1898	-1.4709	-1.1207	0.2645	128**
5	V-RMF	0.5514	1.5050	0.1416	-0.3193	-0.3988	0.6925	36**
6	INGTEF	0.3239	1.2343	0.2216	-0.6852	-0.9719	0.3347	67**
7	NPAT SAFTY	0.3029	1.2485	0.2209	-0.5360	-0.6006	0.5523	34**
8	BMF	0.2928	1.6156	0.1110	-0.5851	-0.5819	0.5626	68
9	SPF	0.2053	0.7063	0.4813	-0.5084	-0.5536	0.5809	128**
10	KPLUS	0.0620	0.3177	0.7512	0.2711	0.5045	0.6148	131**
11	SAN	0.0563	0.3782	0.7058	0.1820	0.3400	0.7343	153**
12	APF	0.0426	0.2199	0.8263	0.3455	0.5990	0.5504	118**
13	KPLUS2	0.0192	0.1009	0.9198	0.2733	0.5127	0.6090	131**
14	RKF-HI2	0.0166	0.0571	0.9546	0.4710	0.5196	0.6043	129**
15	TEFQ	0.0056	0.0139	0.9890	0.0692	0.0804	0.9367	25**
16	OSPD2	-0.0273	-0.1610	0.8724	0.6818	0.9982	0.3204	112**
17	SYRUS-M	-0.0274	-0.1649	0.8693	0.7415	0.8018	0.4241	135
18	SCBMF	-0.0541	-0.4788	0.6328	0.2880	0.4735	0.6366	149
19	SMEVC	-0.0610	-0.9251	0.3605	0.1571	0.5647	0.5755	42**

20	OSPD1	-0.0867	-1.1474	0.2536	0.9157	2.1535	0.0334*	116
21	ONE-D	-0.0979	-1.1413	0.2558	0.7495	1.5739	0.1179	138
22	OSPD3	-0.1055	-1.1997	0.2329	0.7904	1.5733	0.1186	111
23	SF4	-0.1125	-0.9570	0.3401	0.5480	0.8756	0.3826	156
24	KKF	-0.1193	-0.9457	0.3462	0.8248	1.1932	0.2351	126
25	SSB	-0.1222	-1.0431	0.2986	0.5121	0.8215	0.4126	156
26	TDF	-0.1234	-0.6016	0.5485	0.7114	1.2259	0.2225	128**
27	USD2	-0.1244	-1.1723	0.2432	0.6552	1.1196	0.2650	133
28	ONE-WE	-0.1291	-1.5744	0.1178	0.6851	1.4935	0.1377	133
29	TISCOEGF	-0.1360	-1.5679	0.1191	0.5947	1.2666	0.2074	145
30	USD	-0.1376	-1.2780	0.2035	0.6371	1.0726	0.2854	133
31	ABG	-0.1500	-1.2516	0.2141	1.4127	1.9455	0.0549*	90
32	SF5	-0.1553	-1.9135	0.0576*	0.5105	1.1817	0.2391	156
33	RPF2	-0.1607	-2.1941	0.0297*	0.8931	2.2914	0.0233*	156
34	ONE-G	-0.1639	-2.1518	0.0330*	0.8690	2.1268	0.0351*	150
35	ONE-UB2	-0.1790	-2.1384	0.0345*	0.9399	1.9810	0.0499*	124
36	TCMEQF	-0.1833	-1.9612	0.0517*	0.6412	1.2786	0.2030	150
37	SW2	-0.1848	-2.2023	0.0293*	0.8584	1.8538	0.0659*	141
38	RRF1	-0.1878	-1.6791	0.0954*	0.4509	0.7410	0.4599	143
39	DYNAMIC	-0.1901	-0.4739	0.6448	-1.8263	-1.7659	0.1051	13**
40	ONE-UB5	-0.2025	-2.0370	0.0463*	0.8033	1.2320	0.2230	60
41	TNP	-0.2060	-2.7176	0.0073*	0.8505	2.1080	0.0367*	156
42	ONE-UB4	-0.2061	-2.4706	0.0149*	0.9508	2.0497	0.0426*	123
43	ONE-PRO	-0.2107	-2.3150	0.0222*	0.9437	1.8605	0.0650*	135
44	ONE-PR	-0.2157	-2.6149	0.0100*	1.1199	2.5004	0.0137*	132
45	THANA1	-0.2215	-2.7255	0.0073*	1.1363	2.5752	0.0111*	132
46	NPAT-PRO	-0.2299	-2.9221	0.0042*	1.0335	2.2917	0.0237*	121
47	ONE-FAS	-0.2328	-2.9592	0.0037*	1.0508	2.4601	0.0152*	132
48	RKF2	-0.2336	-2.4126	0.0172*	1.3738	2.5651	0.0114*	137
49	ONE-PF	-0.2373	-2.3900	0.0191*	0.8338	1.3552	0.1791	85
50	SCDF	-0.2429	-3.0272	0.0030*	0.7566	1.7210	0.0878*	126
51	SCBMF2	-0.2468	-2.5663	0.0114*	0.8342	1.5624	0.1206	136
52	SCBRT	-0.2493	-2.6373	0.0097*	0.7931	1.4308	0.1555	105
53	ONE-UB3	-0.2514	-3.1354	0.0021*	1.0414	2.3547	0.0200*	133
54	RKF	-0.2523	-2.7098	0.0075*	1.4546	2.9160	0.0041*	151
55	STD	-0.2561	-2.9222	0.0041*	0.6713	1.3940	0.1657	134
56	ONE+1	-0.2686	-3.4760	0.0007*	1.1830	2.7758	0.0063*	133
57	N-SET	-0.2708	-0.3233	0.7516	0.8931	0.9063	0.3813	15**
58	THOR 3	-0.2735	-1.9551	0.0555*	0.7915	0.8917	0.3763	60
59	SCIF	-0.2806	-3.5557	0.0005*	0.7330	1.6903	0.0933*	134
60	DE-1	-0.2845	-2.9113	0.0043*	1.0534	1.9611	0.0521*	125
61	ONE-FF	-0.2881	-3.1265	0.0024*	1.3908	2.4691	0.0155*	91
62	SCIF2	-0.2901	-3.5189	0.0006*	0.9858	2.2022	0.0294*	132
63	SCBTS3	-0.2923	-3.2423	0.0015*	1.0817	2.2115	0.0288*	131
64	ONEUB-G	-0.3054	-2.6330	0.0109*	1.8862	2.3627	0.0216*	59
65	SCBMF3	-0.3061	-3.3726	0.0010*	0.9345	1.8476	0.0669*	135
66	TVF	-0.3065	-3.2774	0.0014*	1.2445	2.3843	0.0187*	120
67	SF7	-0.3070	-3.6393	0.0004*	0.9631	2.0875	0.0389*	127
68	UNF	-0.3098	-3.6820	0.0003*	1.0334	2.2586	0.0256*	130
69	SF8	-0.3105	-3.5086	0.0006*	0.8435	1.6999	0.0919*	117
70	AGF	-0.3112	-3.6119	0.0004*	1.0729	2.2933	0.0234*	132
71	PISD	-0.3124	-2.7022	0.0080*	1.1122	1.6896	0.0940*	112
72	RKEC	-0.3142	-3.2551	0.0015*	1.4211	2.6490	0.0092*	121
73	RKF3	-0.3146	-3.3329	0.0011*	1.4075	2.7139	0.0075*	134
74	SCBPMO	-0.3229	-3.5119	0.0006*	0.9597	1.8538	0.0664*	116
75	SPT	-0.3242	-3.6077	0.0005*	1.1280	2.2293	0.0278*	116
76	BKA	-0.3270	-3.8438	0.0002*	1.4543	3.0997	0.0024*	133
77	SCBTS	-0.3297	-3.6912	0.0003*	1.0037	2.0450	0.0429*	134

78	TS	-0.3332	-3.8568	0.0002*	1.2312	2.6207	0.0099*	129
79	BMBF	-0.3333	-4.0029	0.0001*	0.9161	1.9620	0.0522*	117
80	RKF4	-0.3340	-3.7216	0.0003*	1.2625	2.5676	0.0114*	126
81	ABSC-RMF	-0.3365	-0.5017	0.6206	1.3909	1.1052	0.2805	25**
82	SCBTS2	-0.3367	-3.6235	0.0004*	1.0787	2.1046	0.0373*	133
83	SCBDA	-0.3442	-3.4168	0.0009*	0.8999	1.6194	0.1080	124
84	RKEDC	-0.3490	-2.8224	0.0058*	1.5692	2.1255	0.0361*	98
85	NERMF	-0.3560	-0.8135	0.4221	1.2616	1.3837	0.1763	33**
86	BKD	-0.3570	-4.1724	0.0001*	1.1815	2.5203	0.0130*	126
87	AJFSCAP	-0.3577	-2.2803	0.0250*	2.6389	2.7769	0.0067*	90
88	BTP	-0.3678	-4.4109	0.0000*	1.5479	3.3517	0.0011*	123
89	PPSD	-0.3778	-1.1644	0.2462	1.5784	1.7782	0.0775*	144**
90	RKF-HI	-0.3821	-3.6776	0.0003*	1.5157	2.6452	0.0092*	133
91	STD2	-0.3945	-4.5775	0.0000*	1.0294	2.1659	0.0321*	133
92	BKA2	-0.4002	-4.9025	0.0000*	1.6309	3.6732	0.0004*	130
93	B-SUB	-0.4053	-4.7181	0.0000*	1.5869	3.3019	0.0013*	118
94	BCAP	-0.4134	-3.6317	0.0005*	2.1244	3.1106	0.0025*	97
95	NF-PLUS	-0.4330	-0.5487	0.5982	0.7177	0.5786	0.5788	10**
96	SCBMF4	-0.4529	-4.9644	0.0000*	1.4858	3.0012	0.0032*	131
97	SCBMF5	-0.4538	-4.9935	0.0000*	1.2985	2.6079	0.0102*	126
98	SCBRM4	-0.5583	-0.5171	0.6087	1.7127	0.8055	0.4265	34**
99	BERMF	-0.6489	-1.4438	0.1623	2.4783	2.3063	0.0304*	26
100	DYNAMIC2	-0.7442	-1.4183	0.1865	-0.3597	-0.2623	0.7984	13
101	SRT	-0.8328	-1.1418	0.2562	0.5319	0.2235	0.8236	103**
102	SCBDV	-0.8936	-1.6069	0.1321	1.9458	1.7513	0.1034	15**
103	ABSL	-0.9508	-1.5811	0.1579	2.1830	1.8016	0.1146	9**
104	IBP	-1.4999	-1.1276	0.2815	2.9529	1.2671	0.2291	14**
105	KPE	-1.6684	-2.2988	0.0612*	2.0436	1.5395	0.1746	8**
106	KTTN	-1.6873	-1.1823	0.2600	3.3582	1.4589	0.1703	14**
107	SCBSET	-2.2503	-0.4802	0.6321	-3.0948	-0.2058	0.8374	100**

* significant at the 0.10 level

** Funds were re-corrected for Serial correlation and Heteroskedasticity problems using FGLS procedure, so one observation of these funds was lost.