The Presence of Style Drift and its Effects in Thailand's Equity Mutual Funds

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การเปลี่ยนแปลงสไตล์การลงทุนของกองทุนตราสารหุ้นและผลกระทบต่อผลการดำเนินงานของกองทุนในอุตสาหกรรมกองทุนรวมในประเทศไทย

น.ส.ณัฐา เลิศวัฒนาเกียรติ

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Active equity mutual funds have become a widely popular investment for investors with high risk tolerance due to potentially getting a higher return with the benefit of diversification and professional management. Investors can make decision on selecting funds by looking at "style". Style is viewed in two dimensions; size and value-growth orientation at stock level. It helps investors to see how fund manager select stocks and the overall style of stock holding for a whole portfolio. Investors can take this factor into considerations to build portfolio to align with their strategy. But what will happen if the style is changed after purchasing. The interesting question is whether style drift create value for investor.

This study illustrates the existence of investment style drift in active equity mutual funds in Thailand by applying style volatility measurement based on the nine-style of Morningstar's Style Box. The findings provide evidence of the determinants that drive a shift in investment style and the consequences of the style drift on the consistency of risk-adjusted performance. The more intense of style drift tends to happen in fund with higher fund flow, small size, short establishment, mid/small-cap, and/or managed by AMCs under niche banks or non-banks. However, style volatility has a negative relation with risk-adjusted performance in term of Sharpe ratio. Funds with high style drift tends to perform worse than funds with

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Introduction

I. Background

Mutual funds are an importance investment vehicle that enable retail investors with a limited amount of money to invest in a well-diversified portfolio. They provide professional management by fund managers who have skill and expertise in financial markets. A variety of investment strategy is set up as investment choices with unique risk-reward profile. Asset class with incremental step-ups in risk can potentially generate returns better to achieve investor's financial objective.

Equity fund is one of practical investments for most people. The Securities and Exchange Commission (SEC), the regulator in Thailand defines risk level for all equity funds as level 6. However, equity funds have a wide variety of characteristics depend on stocks that fund hold. Large-cap equity funds, mid-small-cap equity funds, index funds, or sector funds have different risk exposure and lead to difference in returns. Investors could choose one which match their own return-risk preference. Nevertheless, there is some research indicating that funds do not always be consistent in their investment styles over period, which is so-called 'style drift'. The studies illustrate the existence of investment style drift among equity mutual funds in many countries such as the United States, the United Kingdom, and China. For clients' perspective, it is an unobserved risk that investors may be unexpectedly exposed to the risk-return spectrum, which is different from their own preference, but do not experience the persistence of investment performance over holding period.

An investment style in this research is based on Morningstar's methodology, so-called "The Morningstar Style Box". It was initiated in 1992 and develop methods over the years to give an intuitive visual illustration of style. Morningstar classifies fund styles in two dimensions: 1) the market capitalization; and 2) the value-growth orientation at the stock level, corresponding to the nine-squares of Style Box as shown in Figure 1. Each style box usually represents the different level of risk; thus, it helps to measure style exposure and determines the investment style of a fund. The traditional style measure is size and book-to-market of stock holdings. To enhance style measurement, Morningstar deploys 10 factors in the aspects of historical-based measures and forward-looking to measure value-growth orientation as shown in Table 1 and uses dynamic breakpoints between large-, mid-, and small-cap stocks to measure size. At portfolio level, the key information used in analysis depends on weight of each dimension such that style measurement of the portfolio is computed, thereby drifting behavior could be captured over time to see how consistency of investment style of fund is. In this paper, style drift is measured in two methods. Firstly, fund style volatility represents the degree of investment style shifting, named as "style drift score" (SDS). Second method is a shift in the Style Box over quarters. The next step after declaring style drift is to examine the shift determinants which drive fund managers' motivation

to change investment style. Last step is to investigate the impact of style shifting on risk-adjusted performance.

Figure 1: *Morningstar Style Box*

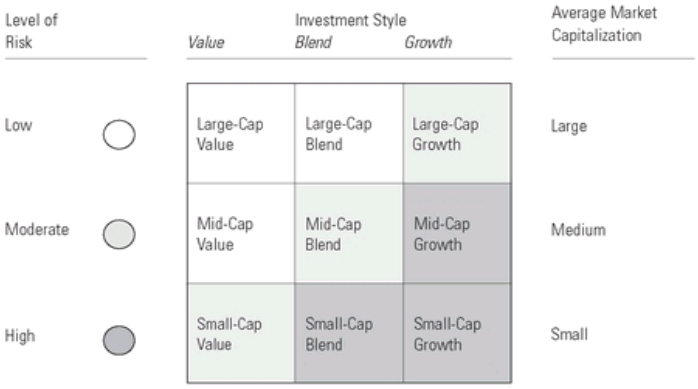


Table 1: *The Morningstar Style Box uses 10 factors for style*

Value Score Components and Weights	Growth Score Components and Weights
Forward Looking:	
1. Price-to-Projected Earnings*	1. Long-Term Projected Earnings Growth
Historical-based measures:	
2. Price-to-Book*	2. Book Value Growth
3. Price-to-Sales*	3. Sales Growth
4. Price-to-Cash Flow*	4. Cash Flow Growth
5. Dividend Yield	5. Historical Earnings Growth

* The calculations are done with the yield form of these variables (i.e. with price in the denominator of the fraction).

II. Objective

The objective of this study is 1) to examine the determinants that drive shifting of investment style, and 2) to examine the consequences of the style drift on the consistency of risk-adjusted performance in retail mutual funds in Thailand.

III. Research Hypothesis

This study examines three specific research questions. The first states about the determinants that drive style drift. Fund size, fund flow and age are expected to be positively correlated to investment style drift. The more intense of style drift tends to happen in mid/small-cap funds and fund managed by investment firm under non-bank.

Larger funds tend to shift in investment style due to encountering diseconomies of scale. To handle with higher fund flow, fund manager utilizes new money by immediately investing, however, good investment opportunities are limited, fund's managers' conviction on stock selection is placed, leading to purchase stocks with different characteristics. Older funds might be faced with changing managers who take care of strategy; therefore, funds may be rebalanced to target position based on his/her investment style, reflecting on changes in fund's style.

With the *second* research hypothesis, we analyse the consequences of the style drift on the consistency of risk-adjusted performance. Funds with high style drift perform worse than funds with consistent strategy. Conversely, funds with top 5% highest investment style drifting tend to generate performance better than the rests in a short-term holding period. However, short-run return is not persistence. Whether the high or low style volatility would have indifference performance for longer term. The other variables are predicted to be negatively correlated to fund performance.

Last research question concerns the effect of economic cycles on fund performance. Style drift in the different stages of economic cycle leads to the different results on fund performance. Style drift in expansion tends to deliver higher return than in recession.

IV. Literature review

Prior studies examine the reason behind style shift behavior to deeply understand why fund managers change their investment style. At the early stage of research in this area, the relationship between manager's characteristics and investment style shift in US mutual fund markets is correlated. Active manager with good track record or years of experience tends to shift investment style more. (Cumming et al., 2009; Wermers, 2012). To extend related factors, Brown et al. (2015) state that style volatility has an explicit effect on future performance compared to past performance, turnover, fund size, and expense ratio. In term of fund size, Chua et al. (2020) specifically explain to support this factor that larger funds have greater incentive to drift due to encountering diseconomies of scale. In addition, Alda (2020) studies fund manager's skills of market timing and stock selection in different market conditions that drive style shift in pension funds.

Moreover, some research extends to the sources of investment style shifting. Wermers (2012) decomposes style drift into active and passive decision. Fund manager with stock-picking skills cause more active style shift and able to deliver higher return. Sha (2020) studies mutual funds in China and classifies the cause of changing styles into two sources: 1) the changes in stock holding by intention of fund manager as active style drift (ASD); and 2) the changes in stock characteristics corresponding to business itself causing stock's size or value-growth orientation as passive style drift (PSD). Based on mutual funds in the US, Brown et al. (2015) focus on the volatility of investment styles, which are defined as direct and indirect components. Along the same lines, indirect shifting is caused by changes in stock characteristics itself. They indicate that indirect style volatility greatly dominates overall shifting.

However, the explanations of the relationship between a shift in investment styles and fund performance is indeterminate. As a higher drifting is driven by managers with good track record or participating in the asset management industry for a long time, such funds tend to have better fund performance even after including the higher

trading and information costs. (Cumming et al., 2009; Wermers, 2012). Herrmann et al. (2015) confirm the conclusion that style shifting activity is positively correlated to risk-adjusted net (gross) return. They cite that style shift factor is able to capture more information than other return-based measures such as tracking error.

In contrast, a hot-hand phenomenon is illustrated in American mutual funds traded in European market (Papadamou and Siriopoulos, 2004). They state that short-run superior return does not persist, and it is inefficient investment for investors. Brown et al. (2015) state that funds with low style volatility significantly outperform funds with high style volatility on a net basis. Cao et al. (2017) focus on small-cap mutual funds in the US and find that the larger and older funds are, the more likelihood of holding mid-to-large cap stocks is. As such, investors are being bound by funds that deviate from its stated objective, resulting in unanticipated risks without persistence in higher abnormal returns. Similarly, Chua (2020) conducts research on Chinese mutual fund industry and concludes that larger funds tend to drift more in order to bet on short-term performance, however, they potentially perform worse due to a weaker ability to picking stocks.

In addition, some research points out further explanations of such a relationship from which fund manager's skills and market conditions are taken into account. Alda (2020) shows the evidence of how well fund performance is with respect to the degree of style volatility from mutual fund market in the UK. To the extent of superior market-timing and stock-selecting skill, fund managers gearing towards the highest style drift likely outperform those who run moderate style shift, especially when the market is booming. Unfortunately, both are facing negative timing effect during recessions even if the high drift strategy can provide gains from stock selection.

Data

The required information for the analysis: 1) weight in nine-square dimension styles; large-value, large-core, large-growth, mid-value, mid-core, mid-growth, small-value, small-core, small-growth on quarterly basis 2) fund return in the period of 3-month and 3-year, 3) monthly fund flow, 4) monthly fund size, 5) inception date, 6) annual turnover, and 7) annual report expense ratio. Data are obtained from Morningstar Direct.

The period covers portfolio holding as of the end of December 2014 to the end of December 2020 on quarterly basis. Funds with inception date after January 1, 2019 are excluded as funds have less than two-year history holding or eight-quarter holding. Only equity mutual funds with the primary share class are selected and then is filtered out by index funds. The number of funds that meet the screening criteria is 253 funds with the maximum 25 data points.

Furthermore, the Four-factor model by Carhart requires return of market, risk-free and stocks in benchmark. For simplicity, the reference benchmark used in this study is SET index and risk-free asset is short-term government bond. Daily return of market index, risk-free return, and market capitalization and daily return of stocks in SET index are obtained from Bloomberg.

To construct the four-factor of Carhart's model, style of stocks is also required. Data are available in Morningstar Direct on monthly basis. However, members in index might be changed over the quarter, due to IPO stocks and delisted stocks at any time, so this point ought to be concerned.

Methodology

I. Measure of style drift

To measure whether there is existence of style drifts in Thailand's mutual funds, two methods would be applied; firstly, fund style volatility represents the degree of investment style shifting as style drift score (SDS).

$$SDS = \sqrt{\frac{1}{T-1} \cdot \sum_{c=1}^{n} \sum_{t=1}^{T} (w_{c,t} - \overline{w}_c)^2} \quad (1)$$

Where:

T is total number of periods;
n is the number of style dimensions, as Morningstar Style Box, n is equal to 9;
$w_{c,t}$ represents weight in each style dimension at each quarter;
w_c is the average weight of style dimension over T periods.

As style is classified into a nine-square grid, the highest weight in any box would be classified as the defined style of that box. If there is a shifting style box between the quarters, it will be defined as investment style drift as the second measurement.

Descriptive statistics

The style volatility of all selected funds is plotted in Figure 2 for 6-year period and Figure 3 for 1-year period. The style drift score distribution is skewed right with long right tail. The frequency on the right tail is fatter indicating that only the limited number of funds would highly have degree of shifting along the period.

Evidence of a shifting style between boxes is shown in Figure 4. Sources of changing style box could be changes in size and/or value-growth, not limited to changing between vertical axis or horizontal axis. The distribution of frequency of changing between boxes during 2015-2020 is roughly equally balanced around the mean, demonstrating that approximately 20% of the total selected funds is maintained style weight by fund manager. While 60% of total funds in the middle of the distribution would shift box in range of 5-9 times of total periods. The rests have moved in the range of between 10 and 17 times. The highest shifter is 17 out of 24 periods.

Figure 2: *Style drift score distribution of 253 funds during 2014-2020.*

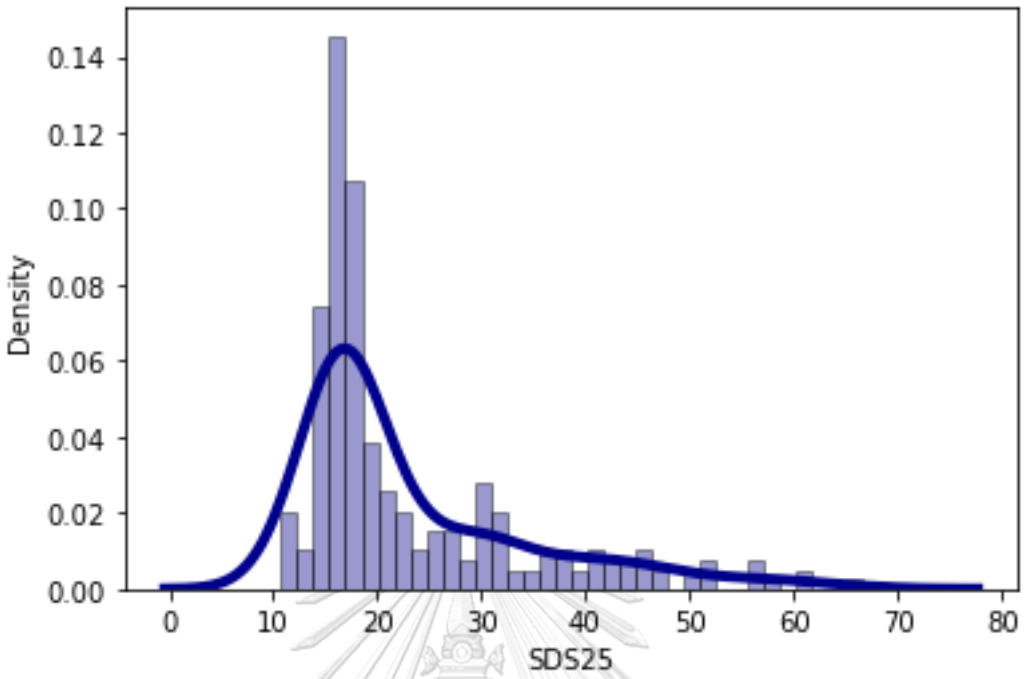


Figure 3: *Style drift score distribution of 253 funds for 1-Year period during 2014-2020.*

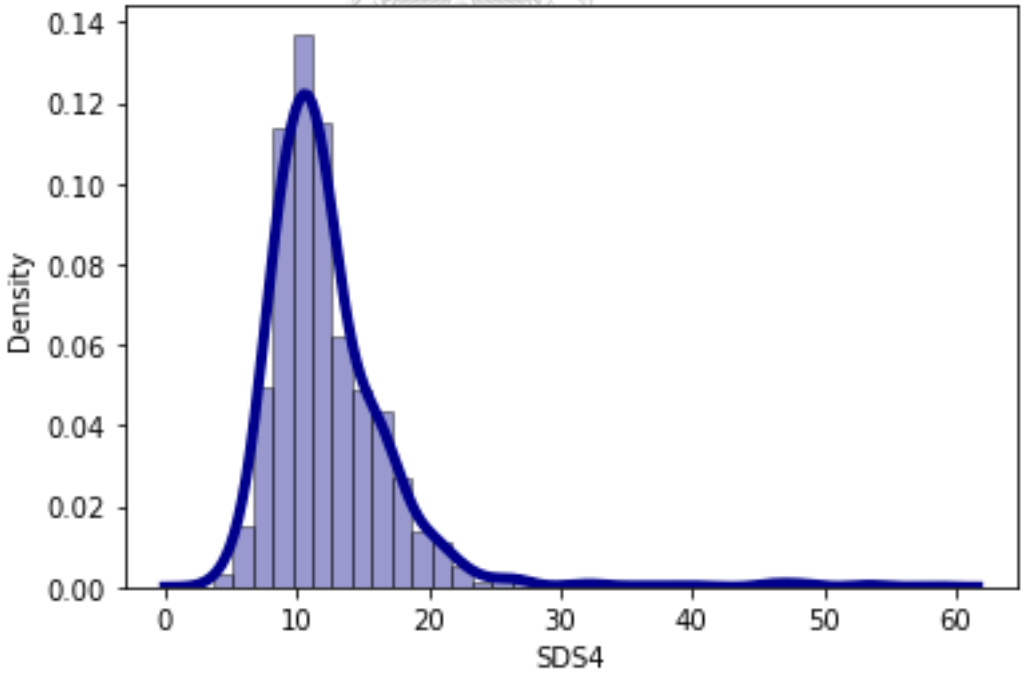


Figure 4: *The number of shifting between style boxes distribution during 2014-2020*

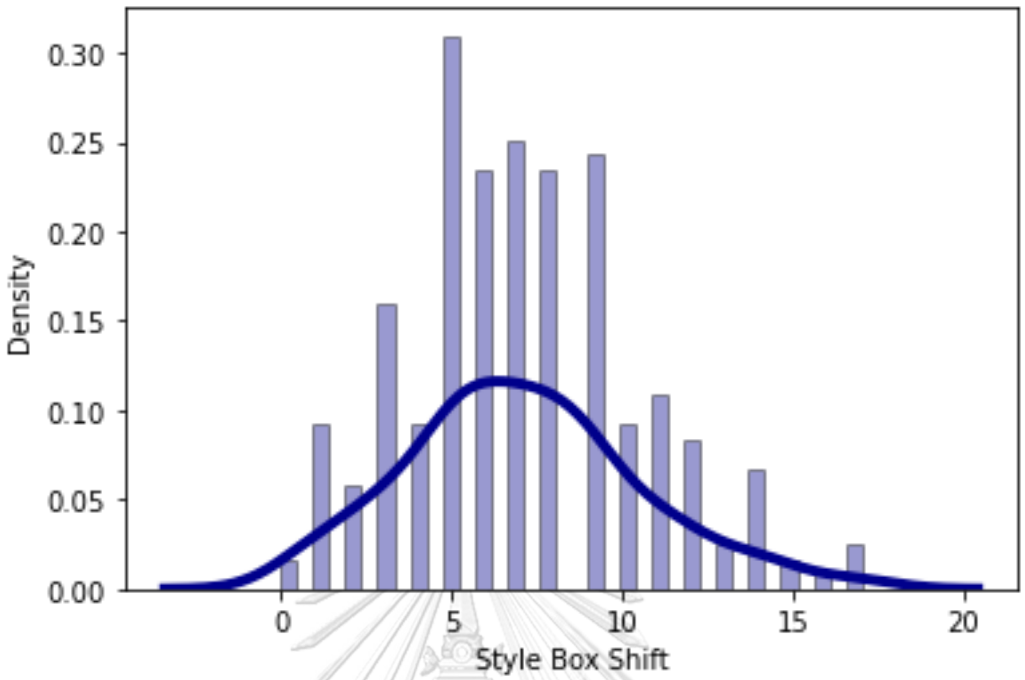


Table 2: *Statistic summary*

	Style Drift Score over 6Y (%) SDS25	**Style Drift Score 2015 (%) SDS4**	**Style Drift Score 2016 (%) SDS4**	**Style Drift Score 2017 (%) SDS4**	**Style Drift Score 2018 (%) SDS4**	**Style Drift Score 2019 (%) SDS4**	**Style Drift Score 2020 (%) SDS4**	**Number of shifting between Style Boxes (Times)**
Maximum	66.47	48.31	38.57	58.05	53.43	26.11	23.17	17
Average	23.21	14.37	10.87	12.84	12.33	11.42	12.58	7.09
Median	17.72	13.82	10.31	11.77	10.70	10.66	11.61	7
Minimum	10.73	7.46	3.58	5.42	5.78	4.77	7.11	0
Standard Deviation	11.25	5.12	4.61	6.50	6.47	3.11	3.30	3.42
Observation	253	177	185	221	246	253	253	253
Top 5%	47.99	22.06	20.56	21.67	23.00	17.34	19.92	
Bottom 5%	13.80	8.30	5.50	6.98	7.01	7.61	8.40	

II. Measure of shift determinants

To examine shift determinants of mutual fund's investment style, the dependent variable Y could be both SDS and the dummy of shifting between boxes over the quarters, and the independent variables included the following possible factors: fund size; fund flow; fund type; fund house; age; turnover; and expense ratio.

Table 3: *Data description and sources*

Variables	Description	Unit	Source of Data
1. Dimension style weight	Weight in nine-square dimension styles for all funds and all stocks. Data is a decimal number ranging from 0 to 100.	Percentage	Morningstar Direct
2. Style drift score (SDS)	The degree of drifting of investment style $SDS = \sqrt{\frac{1}{T-1} \cdot \sum_{c=1}^{n} \sum_{t=1}^{T} (w_{c,t} - \bar{w}_c)^2}$	Percentage	Processing data
3. Shifting between style boxes	A shifting style box between the quarters	Times	Processing data
4. Fund size	Monthly aggregate share-class size	Logarithm of Million baht	Morningstar Direct
5. Fund Flow	Net of all cash inflows (subscription and switch in) and outflows (redemption and switch out) into fund	Hundred Million baht	Morningstar Direct
6. Age	The period of inception date to the end of the studied period	Year	Morningstar Direct
7. Fund type	Based on the Morningstar's category: (1) large-cap equity; (2) mid/small-cap equity	Dummy variable	Morningstar Direct
8. Fund house	Investment management firms have a variety of background, they are categorized into four groups: (1) under large banks; (2) under niche banks which target a specific purpose and focus on a particular group of customers; (3) under non-banks; and (4) fast-moving firms	Vectors of dummies	Morningstar Direct
9. Economic cycle	Dummy variable that takes the value of one to represent recession period and zero otherwise. Period is defined as recession if there is negative in GDP growth at least two consecutive quarters, according to technical recession's definition.	Dummy variable	Bloomberg
10. Turnover	Value of all transactions (buying, selling) divided by a fund's total holdings over a one-year period that announce in annual report.	Percentage	Morningstar Direct
11. Expense	Management fees and operating expenses that charged to investors in a fund	Percentage	Morningstar Direct
12. Actual return	Cumulative total return of mutual funds, including dividends is calculated on each studied period from the source.	Percentage	Morningstar Direct
13. Sharpe ratio	Fund's return in excess of risk-free rate per unit of standard deviation of the excess return, is calculated on each studied period from the source. The risk-free rate is the return on short-term government bond.	Fraction	Morningstar Direct

Based on fund information from Morningstar Direct, more than 80% of the selected funds has size of asset under management concentrated at lower than 3,000 million Baht, while ranking size of the rests have exponentially pattern. Thus, size factor could be transformed to logarithm scale as shown in Figure 6.

In term of *fund house*, it is a variable that represent the group of asset management companies (AMCs) in Thailand's mutual fund industry, which have a variety of background. Investment management firms are categorized into four groups: 1) under large banks e.g. Kasikorn Asset Management Co.,Ltd (KAsset), BBL Asset Management Co.,Ltd (BBLAM), SCB Asset Management Co.,Ltd (SCBAM) and Krungthai Asset Management Co.,Ltd (KTAM), 2) under niche banks which target a specific purpose and focus on a particular group of customer e.g. Land and Houses Fund Management Co.,Ltd (LHFUND), TISCO Asset Management Co., Ltd. (TISCOASSET), 3) under non-banks e.g. Aberdeen Standard Asset Management (Thailand) Limited and One Asset Management PLC, and 4) fast-moving firms e.g. TALIS Asset Management.

As Morningstar has been received portfolio holding of all mutual funds in Thailand according to regulator's requirements. They can monitor change in mutual fund classification by comparing its actual holding with the specific criteria of each category. Therefore, *fund type* classified by Morningstar category should be accurate and suitable with mutual funds in Thailand. Furthermore, turnover and expense ratio are revealed on annually basis, which are collected from fund's annual reports and are available in Morningstar Direct.

By the limitation of data, there are some funds under two asset management that have no information on turnover, one of independent variable in the study of the relationship to fund performance. Thus, two datasets are prepared: the ***first* dataset** is excluded dataset of funds under Kasikorn asset management (KASSET) and Thanachart Fund Management (TFUND) due to missing information on turnover. The ***second* dataset** is included all 253 active equity funds as mentioned in data section.

Two datasets will be tested on regression analysis. However, a concern of selection bias after excluding funds with incomplete data still exists. Therefore, variable distributions of the two datasets were tested as shown in Figure 5, 6 and 7.

As a part of dataset is excluded, style drift score and the number of shifting between Style boxes are inevitably different in the two datasets. All independent variables also change. The statistical summary of variables in each regression model are also illustrated in Table 11 (appendix). The most important concern is that KASSET is the crucial player in the mutual fund industry in Thailand, accounted the largest asset under management among all AMCs and the second asset size of equity fund in Thailand's industry. It is possible that KASSET's information drives the results. As descriptive statistics of average of Sharpe ratio in Table 10, KASSET performs well and rank 4th among all AMCs and to be rank 1st among AMCs under large banks group. The overall

mean of style drift score of the second dataset has average style drift score lower than that of the original dataset as shown in Table 4.

Figure 5: *Style drift score distribution of two datasets during 2015-2020*

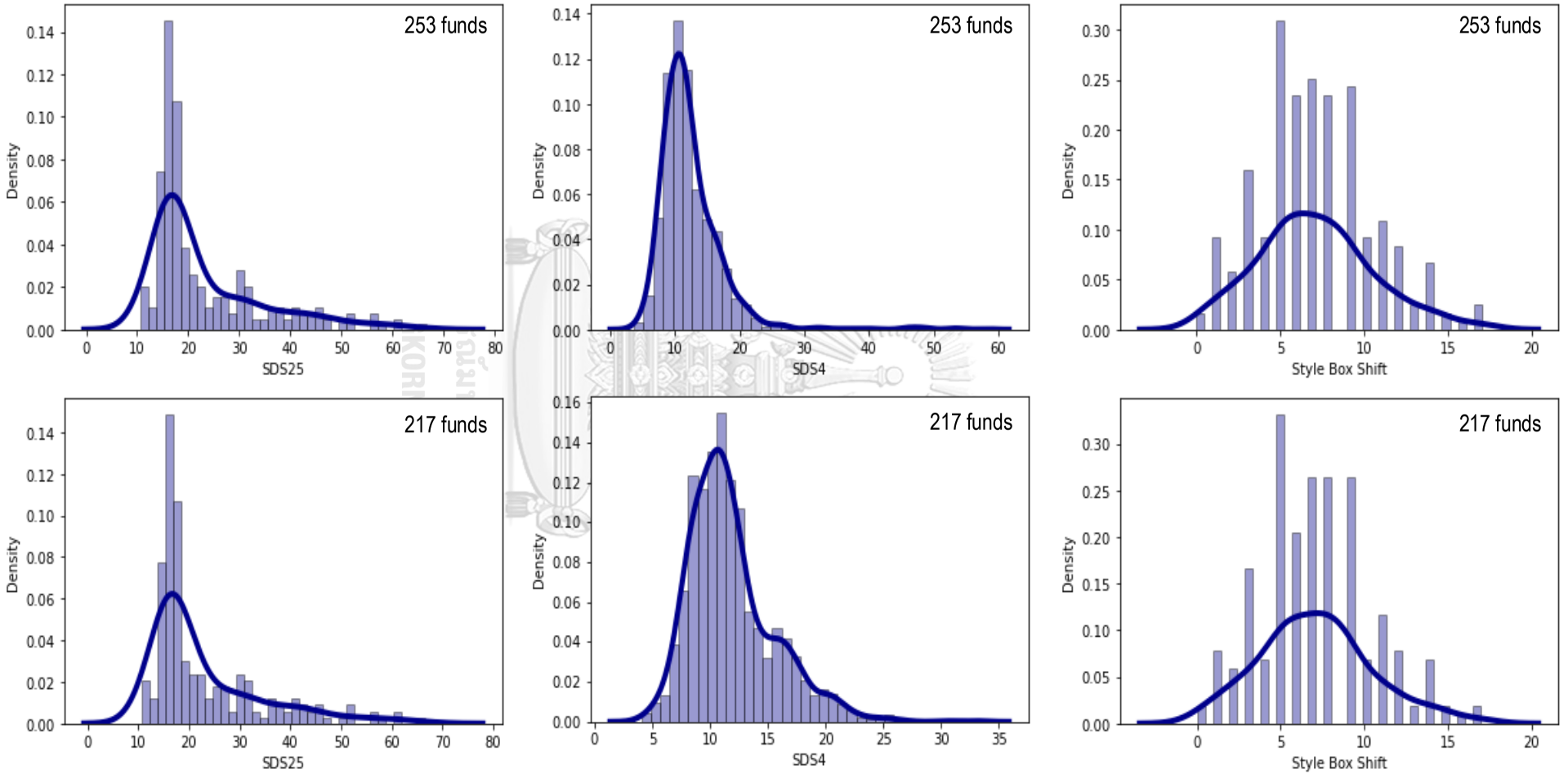


Table 4: *Statistic summary of style drift score and the number of shifting between style boxes of the two datasets*

	Style Drift Score 6Y (%) SDS25	Style Drift Score 2015 (%) SDS4	Style Drift Score 2016 (%) SDS4	Style Drift Score 2017 (%) SDS4	Style Drift Score 2018 (%) SDS4	Style Drift Score 2019 (%) SDS4	Style Drift Score 2020 (%) SDS4	Number of shifting between Style Boxes (Times)
Dataset of 253 funds								
Observations	253	177	185	221	246	253	253	253
Maximum	66.47	48.31	38.57	58.05	53.43	26.11	23.17	17
Average	23.21	14.37	10.87	12.84	12.33	11.42	12.58	7.09
Median	17.72	13.82	10.31	11.77	10.70	10.66	11.61	7
Minimum	10.73	7.46	3.58	5.42	5.78	4.77	7.11	0
Standard Deviation	11.25	5.12	4.61	6.50	6.47	3.11	3.30	3.42
Top 5%	47.99	22.06	20.56	21.67	23.00	17.34	19.92	
Bottom 5%	13.80	8.30	5.50	6.98	7.01	7.61	8.40	
Dataset excluding dataset of KASSET and TFUND								
Observations	217	153	159	188	211	217	217	217
Maximum	66.47	48.31	38.57	58.05	49.03	22.17	23.17	17
Average	22.99	14.30	10.68	12.44	12.01	11.12	12.60	7.12
Median	17.29	13.43	10.20	11.67	10.65	10.59	11.58	7
Minimum	10.73	7.46	4.07	5.42	6.33	4.77	7.11	0
Standard Deviation	11.17	5.38	4.38	5.61	5.86	2.97	3.30	3.35
Top 5%	47.47	22.14	20.85	21.10	19.93	17.17	19.96	
Bottom 5%	13.63	8.25	5.59	6.95	7.59	7.54	8.41	

Figure 6: *Fund size distribution of two datasets as of the end of 2020*

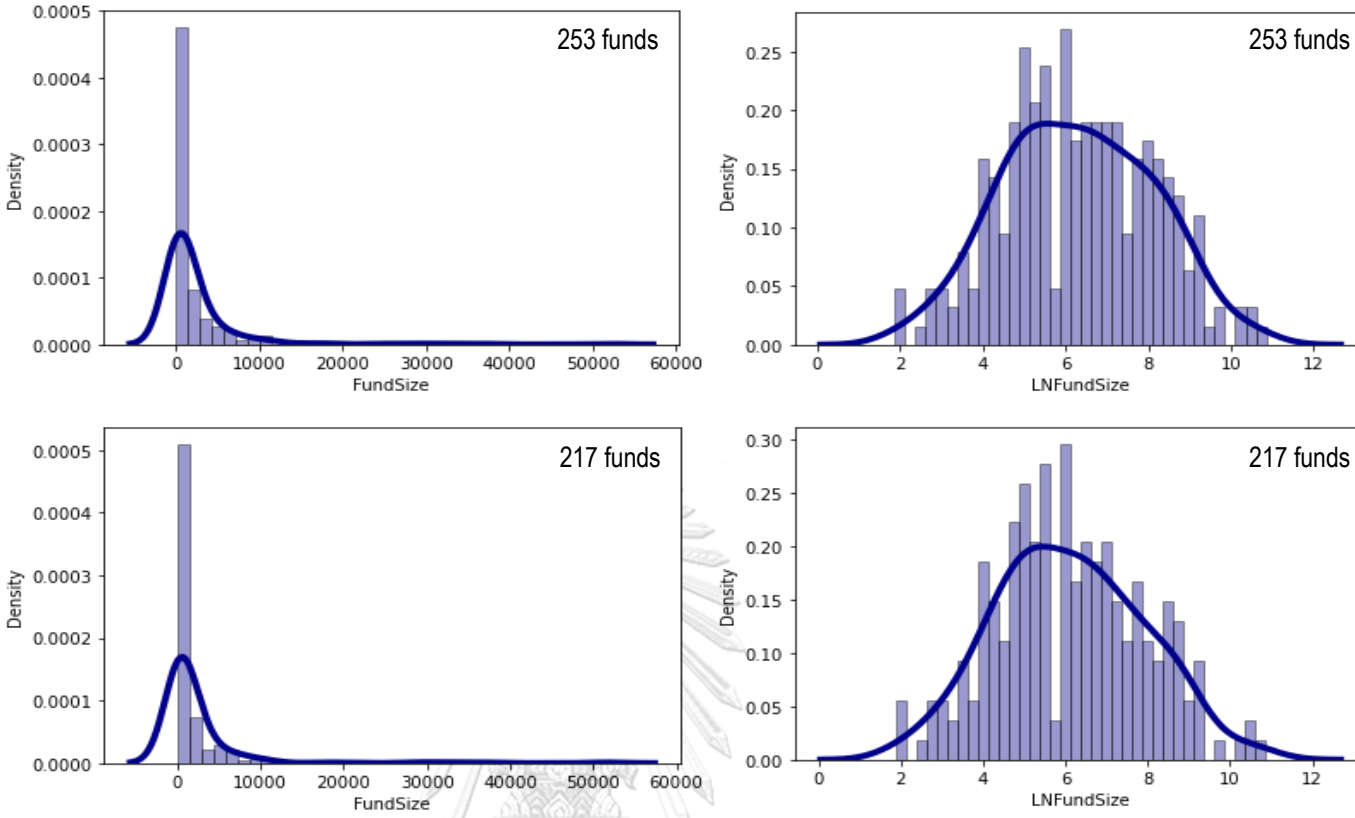
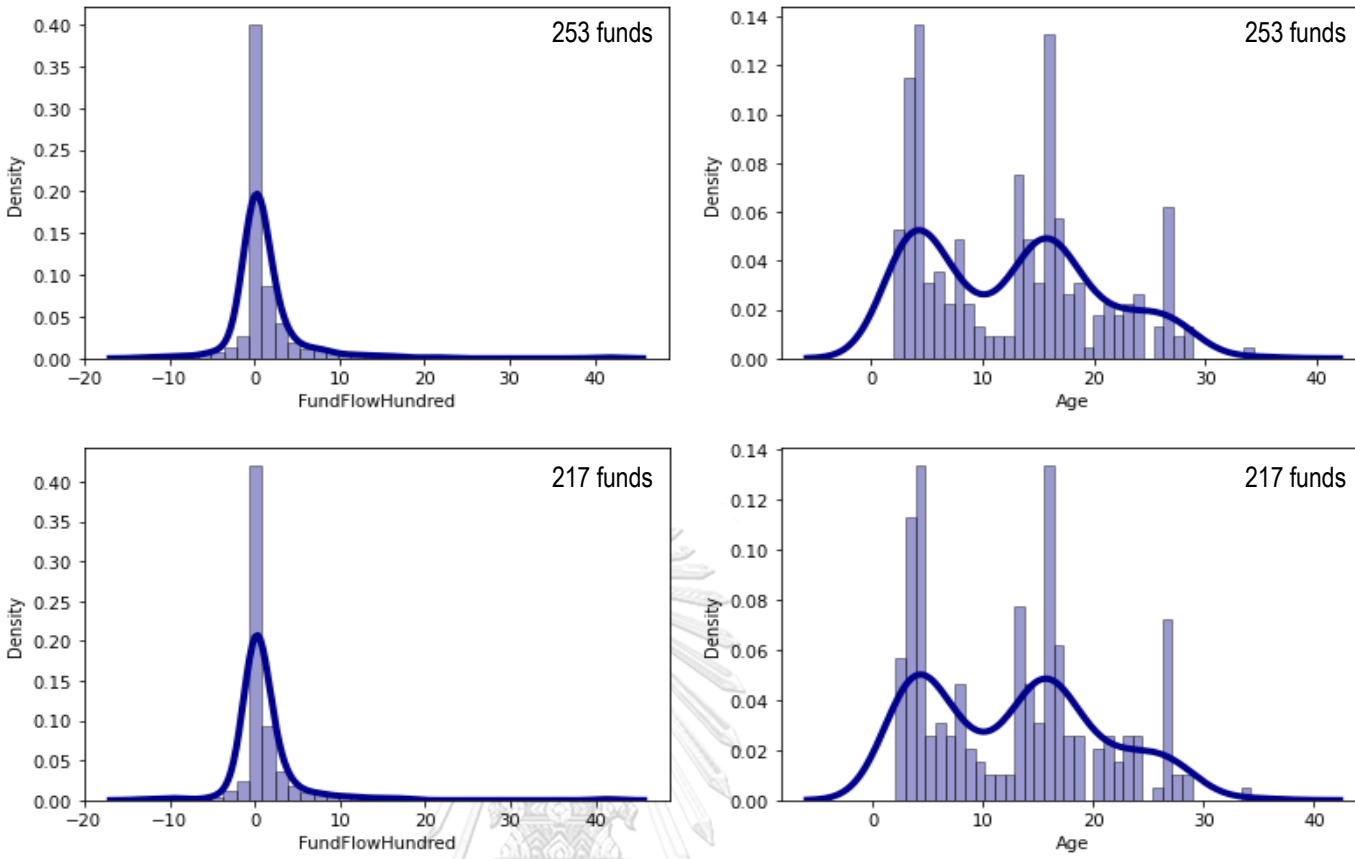


Figure 7: *Aggregate fund flow and age distribution of two datasets as of the end of 2020*



The effect of each determinant to SDS over the studied period could be estimated by the following cross-sectional model.

$$SDS_{25} = \beta_0 + \beta_1 ln(fund\ size)_i + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_i + \beta_5 fund\ flow_i + \epsilon_i \quad (2)$$

Where:

SDS₂₅ is the style drift score for the period of 6 years on quarterly data point (total 25 data points);

fund size$_i$ is the logarithm of the average quarterly size of fund i from 2015 to 2020;

fund type$_i$ is the dummy variable that takes the value of one if a fund is classified as large-cap equity and zero otherwise;

fund house$_i$ is the vector of dummy variables that represents the nature of investment management firms categorized into four groups; (1) under large banks, (2) under niche banks, (3) under non-banks and (4) fast-moving firms

age$_i$ is the period of inception date to the end of the studied period in unit of year;

flow$_i$ is the fund flow during 2015-2020.

In addition to the cross-sectional dimension in first model, SDS is calculated on shorter period to examine the effect of each determinant to SDS over 1-year period could be estimated by the following panel model.

$$SDS_4 = \beta_0 + \beta_1 ln(fund\ size)_{i,t} + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_{i,t} + \beta_5 fund\ flow_{i,t} + \beta_6 economic\ cycle_t + \epsilon_i \quad (3)$$

Where:

SDS_4 is the style drift score for the period of 1 year on quarterly data point (total 4 data points);

fund size$_{i,t}$ is the logarithm of the average size of fund i in year t;

fund type$_i$ is the dummy variable that takes the value of one if a fund is classified as large-cap equity and zero otherwise;

fund house$_i$ is the vector of dummy variables that classified into four groups;

age$_{i,t}$ is the period of inception date to the end of quarter in unit of year;

flow$_{i,t}$ is the fund flow during each year t.

economic cycle$_t$ is the dummy variable that takes the value of one if period t is recession and zero otherwise.

As investment style can be simply measured by shifting between boxes of Morningstar's style box, the third method is tested whether factors drive the probability to drift in investment style using logit model.

$$Y_{i,t}^{*} = (\beta_0 + \beta_1 ln(fund\ size)_{i,t} + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_{i,t} + \beta_5 fund\ flow_{i,t} + \beta_6 economic\ cycle_t + \epsilon_i) \quad (4)$$

The error term ϵ_i follows a logistic distribution.

Where:

Y is the binary variable that takes the value of one when fund's style box shifts from its style box in the previous quarter, and zero otherwise.

fund size$_{i,t}$ is the logarithm of the average size of fund i in quarter t;

fund type$_t$ is the dummy variable that takes the value of one if a fund is classified as large-cap equity and zero otherwise;

fund house$_t$ is the vector of dummy variables that classified into four groups;

age$_{i,t}$ is the period of inception date to the end of quarter in unit of year;

flow$_{i,t}$ is the fund flow during each quarter t.

economic cycle$_t$ is the dummy variable that takes the value of one if period t is recession and zero otherwise.

The dummy variables for *fund type* variable.

$$\beta_{21} D_{fundtypei}$$

Where:

$D_{fundtypei}$ is equal to 1 when fund type is large-cap equity

$D_{fundtypei}$ is equal to 0 when fund type is mid/small-cap equity

To extent the variables of *fund house* in more detail, the terms can be breakdown into vector of dummies represent each type.

The vector of dummy variables for *fund house* variable.

$$\beta_{31} D_{fundhouse1i} + \beta_{32} D_{fundhouse2i} + \beta_{33} D_{fundhouse3i}$$

Where:

$D_{fundhouse1i}$ is equal to 1 when fund house is under large bank

$D_{fundhouse2i}$ is equal to 1 when fund house is under niche bank

$D_{fundhouse3i}$ is equal to 1 when fund house is under non-bank

$D_{fundhouse1i}$, $D_{fundhouse2i}$ and $D_{fundhouse3i}$ are equal to 0 when fund house is fast-growing firm

III. Measure the relationship between style drift and fund's risk-adjusted performance

To examine whether investment shifting affects fund performance, risk-adjusted return from Carhart's (1997) four-factor model is applied in this study as the performance measurement.

$$R_{i,t} - r_{ft} = \alpha_{i,t} + \beta_i^{MKT}(R_{mt} - r_{ft}) + \beta_i^{SMB} SMB_t + \beta_i^{HML} HML_t + \beta_i^{UMD} UMD_t + \varepsilon_{i,t} \quad (5)$$

$R_{i,t}$ is net return in excess of risk-free rate (r_{ft}). In this case, short-term government bond index is used as risk free asset. $MKT_t, SMB_t, HML_t, UMD_t$ are market risk premium, size premium, value premium, and momentum, respectively. It would be computed on 1-quarter, 1-year, and 6-year on daily basis. In addition, the effect of expansion periods and recession period would be tested in replicated model

$\alpha_{i,t}$ is alpha from Carhart four-factor model used as the risk-adjusted return. Shifting in investment style as the key factor is tested if it directly affects fund performance and risk. As investment style is defined by two measures, style drift score is examined as shown in equation 6 and shifting between boxes over quarters would be tested as shown in equation 7.

The other control variables are included in the model as the stated possible factors: fund size; fund flow; fund type; fund house; age. There are two more factors: turnover ratio and expense ratio would be added into the model.

$$\alpha_{i,T} = \beta_0 + \beta_1 SDS_{i,T} + \beta_2 \ln(fund\ size)_{i,T} + \beta_3 fund\ type_i + \beta_4 fund\ house_i + \beta_5 age_{i,T} + \beta_6 fund\ flow_{i,T} + \beta_7 turnover_{i,T} + \beta_8 expense_{i,T} + \beta_9 economic\ cycle_T + \epsilon_i \quad (6)$$

Where:

$\alpha_{i,T}$ is alpha from Carhart four-factor model of fund i for the period T

SDS$_{i,T}$ is style drift score for the period T on quarterly data point;

fund size$_{i,T}$ is the logarithm of the average quarterly size of fund i for the period T;

fund type$_i$ is the dummy variable that takes the value of one if a fund is classified as large-cap equity and zero otherwise;

fund house$_i$ is the vector of dummy variables that classified into four groups;

$age_{i,T}$ is the period of inception date to the end of the period T in unit of year;

$turnover_{i,T}$ is the annual turnover ratio of the period T;

$expense_{i,T}$ is the annual expense ratio of the period T;

$flow_{i,T}$ is the fund flow during the period T.

$economic\ cycle_T$ is the dummy variable that takes the value of one if period T is recession and zero otherwise.

To extend variable of style drift term, dummy variables are added to capture top and bottom of SDS or Style shifting

$$\beta_{11} SDS_{i,t} + \beta_{12} D_{top,i} + \beta_{13} D_{bottom,i} \quad \text{for (6)}$$

Where:

$D_{top,i}$ is equal to 1 when fund i is top 5% SDS of total funds over the studied period

$D_{bottom,i}$ is equal to 1 when fund i is bottom 5% SDS of total funds over the studied period

As there is the second style drift measurement, shifting between boxes of Morningstar's style box would be replaced as a binary variable in equation 7.

$$\alpha_{i,T} = \beta_0 + \beta_1 (Style\ shifting)_{i,T} + \beta_2 \ln(fund\ size)_{i,T} + \beta_3 fund\ type_i + \beta_4 fund\ house_i + \beta_5 age_{i,T} + \beta_6 fund\ flow_{i,T} + \beta_7 turnover_{i,T} + \beta_8 expense_{i,T} + \beta_9 economic\ cycle_T + \epsilon_i \quad (7)$$

Results

According to the limitation of the data and the concerns on the selection bias, two datasets are tested on regression analysis as details in Table 5. Model 1 is used for testing the determinants of style shifting, while model 2 is the regression analysis to see the effect on risk-adjusted performance. The main difference of between model 1.1-1.3 and 1.4-1.6 is the dataset. Model 1.1-1.3 and 2.1-2.3 use the dataset of 217 funds excluding the dataset of KASSET and TFUND, while model 1.4-1.6 and 2.4-2.6 use the dataset of 253 funds as the original dataset.

Table 5: *Model description*

Model	Model Type	Description	Dataset	Reference Equation
1		**Effect of determinants to style drift**		
1.1	Cross-section	$SDS_{25} = \beta_0 + \beta_1 ln(fund\ size)_i + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_i + \beta_5 fund\ flow_i + \epsilon_i$	1	(2)
1.2	Panel	$SDS_4 = \beta_0 + \beta_1 ln(fund\ size)_{i,t} + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_{i,t} + \beta_5 fund\ flow_{i,t} + \beta_6 economic\ cycle_t + \epsilon_i$	1	(3)
1.3	Logit	$Y^*_{i,t} = (\beta_0 + \beta_1 ln(fund\ size)_{i,t} + \beta_2 fund\ type_i + \beta_3 fund\ house_i + \beta_4 age_{i,t} + \beta_5 fund\ flow_{i,t} + \beta_6 economic\ cycle_t + \epsilon_i)$	1	(4)
1.4-1.6		Repeat 1.1-1.3 including funds under KASSET and TFUND	2	
2		**Effect of style drift to Sharpe ratio**		
2.1	Cross-section	$SR_{i,6Y} = \beta_0 + \beta_1 SDS_{25i,6Y} + \beta_2 \ln(fund\ size)_{i,6Y} + \beta_3 fund\ type_i + \beta_4 fund\ house_i + \beta_5 age_{i,6Y} + \beta_6 fund\ flow_{i,6Y} + \beta_7 turnover_{i,6Y} + \beta_8 expense_{i,6Y} + \epsilon_i$	1	(6)
2.2	Panel	$SR_{i,1Y} = \beta_0 + \beta_1 SDS_{4i,1Y} + \beta_2 \ln(fund\ size)_{i,1Y} + \beta_3 fund\ type_i + \beta_4 fund\ house_i + \beta_5 age_{i,1Y} + \beta_6 fund\ flow_{i,1Y} + \beta_7 turnover_{i,1Y} + \beta_8 expense_{i,1Y} + \beta_9 economic\ cycle_{1Y} + \epsilon_i$	1	(6)
2.3	Panel	$SR_{i,1Q} = \beta_0 + \beta_1 (IsShift)_{i,1Q} + \beta_2 \ln(fund\ size)_{i,1Q} + \beta_3 fund\ type_i + \beta_4 fund\ house_i + \beta_5 age_{i,1Q} + \beta_6 fund\ flow_{i,1Q} + \beta_7 turnover_{i,1Q} + \beta_8 expense_{i,1Q} + \beta_9 economic\ cycle_{1Q} + \epsilon_i$	1	(7)
2.4-2.6		Repeat 2.1-2.3 excluding turnover variable due to missing value in KASSET and TFUND	2	

I. The existence of style drift

Style drift score is statistically analyzed using t-test to test whether there is the existence of style shifting in Thailand's active equity mutual funds. The null hypothesis statement is that the mean of style drift score is zero.

As the statistical results in Table 6, it shows that there is style shifting in equity mutual funds in Thailand.

Table 6: *t-statistic on style drift score's mean*

	Dataset 1		**Dataset 2**	
	SDS25	**SDS4**	**SDS25**	**SDS4**
t-statistic	30.23	107.48	32.77	88.38
p-value	0.00	0.00	0.00	0.00
Observations	217	1125	253	1335

II. The determinants of Style drift

As the concerns on the selection bias cannot be neglected, the results from Model 1.4 to 1.6 based on the complete dataset should be considered and interpreted in detail.

The signs of the estimated coefficients of quantitative variables are shown in *Table 7*. Fund flow is *positively correlated* to investment style drift. Conversely, fund size and age have strongly negative relation with investment style drift in both datasets and among 6-year, 1-year, and 1-quarter of investment periods.

Funds scale up their existing asset under management by *higher fund flow*. When a fund attracts more money, fund manager has more resource to invest. To handle with higher fund flow, they try to put the money to work as soon as possible, but good investment opportunities are limited, and are fewer to serve new capital flow. They might buy underperformed stocks or momentum stocks depends on fund's managers' conviction at that moment that have different characteristics, leading to changing in overall fund's style. In addition, using new money to purchase stocks with different characteristics is the easier way than moving from current holding. However, fund flow factor has significantly affected only over 1-year style drift score as the results in *Table 7*.

On the other hand, *fund size* and *age* have negative correlation to investment style drift. Smaller funds tend to shift in investment style due to the flexibility of turning holding in portfolio. Lower amount in a stock is easier to sell in the market and more convenience to buy another stock without market impact on price. Funds with shorter established tends to shift in investment style more. It is possible that fund managers who take care of funds with shorter established might have incentive to boost performance due to marketing purpose and pressure from management. As new launched funds are new products of company, then it has been heavily promoted, it

would be most focused on performance from management team and marketing team during the promotion period.

While categorical variables such as fund type and fund house have distinct impacts on each model 1.4, 1.5 and 1.6 as follows.

Type of fund affects to style drift in the different direction over 6-year and 1-year period. Mid/small-cap funds are likely to change their overall investment style over 1-Year because universe of mid/small-cap stocks are more variety of stock characteristic than that of large-cap stocks that have quite limited options for Thailand's stock market. However, style volatility in mid/small-cap funds would be less than in large-cap funds in the longer-term, 6-year for this study. As large-cap fund is dominated by three styles: large value/core/growth stocks, if there are any changes in styles according to the changes in business cycle, it will be a large movement even it has less chance to happen. While mid/small-cap fund is dominated by six styles: mid value/core/growth and small value/core/growth, when fund manager sells stocks in one style and buys stocks with different style, it indicates a smaller movement, but it tends to be easier to happen.

Figure 9 (appendix) illustrates style allocation of large-cap fund and mid/small-cap fund during 2015-2020 on quarterly basis. Each point represents each dimension weight at end of quarter. Large-cap fund has concentrated in three styles almost 80%. The distance from each point to the average line over 6-year is longer than the distance to the average line of a period of one year. Style allocation of mid/small-cap fund has changed along 6-year, but each point slightly deviates from the average line of 6-year and of each year in similar pattern.

Focusing on the effects of fund house, funds managed by fast-growing companies are more likely to be motivated to shift style to bet on short-term return as the coefficients of fund house under large bank, niche banks and non-banks are negative compared to zero for the based case in model 1.2 and 1.5. It may be because such fund houses have less restriction on management directions and more flexibility to add stock in the universe. However, investment style drifting seems to be insignificant among all type of asset management firms over 6-year and 1-quarter investment period.

Economic cycle factor is significant over 1-year period rather than the shorter period such 1-quarter. It can be interpreted that economic situation do not immediately induce fund manager to change his/her fund's investment style but wait and see if there is technical recession or negative in GDP growth at least two consecutive quarters.

Table 7: *Estimated coefficients of shift determinants on style drift*

This table presents estimated coefficients from equation (2) (3) and (4). Model 1.1-1.3 are excluded funds with missing data of turnover from dataset, total number of funds taken into consideration is 217 funds. While model 1.4-1.6 are tested on a whole dataset of 253 equity mutual funds.

	(1.1)	**(1.2)**	**(1.3)**	**(1.4)**	**(1.5)**	**(1.6)**
	SDS25	**SDS4**	**IsShift**	**SDS25**	**SDS4**	**IsShift**
Observations	217	1125	4506	253	1335	5408
Intercept	44.9260	16.5800	0.1512	44.6819	17.8010	0.3267
	(0.00)***	(0.00)***	(0.13)	(0.00)***	(0.00)***	(0.00)***
FundFlowHundred	0.0980	0.0201	0.0098	0.1659	0.0826	0.0136
	(0.25)	(0.07)*	(0.16)	(0.09)*	(0.00)***	(0.04)**
Age	-0.9341	-0.1153	-0.0117	-0.9873	-0.1966	-0.0208
	(0.00)***	(0.00)***	(0.01)***	(0.00)***	(0.00)***	(0.00)***
LNFundSize	-1.6487	-0.4318	-0.1260	-1.3879	-0.4305	-0.1355
	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***	(0.00)***
FundType_	-1.9628	1.0435	-0.0530	-3.1328	1.1227	0.0220
Small/Mid-Cap	(0.09)*	(0.01)***	(0.28)	(0.01)**	(0.02)**	(0.39)
FundHouse_	1.9354	-0.5471	0.0157	0.8664	-0.6836	0.0029
Under large banks	(0.17)	(0.17)	(0.45)	(0.33)	(0.18)	(0.49)
FundHouse_	-0.1910	-1.0383	-0.0083	-0.8832	-1.1541	0.0019
Under niche banks	(0.46)	(0.02)**	(0.47)	(0.31)	(0.05)**	(0.49)
FundHouse_	-0.4920	-2.5180	-0.0156	0.7362	-1.1339	0.0996
Under non-banks	(0.40)	(0.00)***	(0.44)	(0.34)	(0.05)*	(0.16)
EconomicCycle		0.9938	0.0199		0.7218	-0.0716
		(0.00)***	(0.41)		(0.01)***	(0.20)

Remark: P-value are shown in parenthesis. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Before proceeding to the next section of examining whether investment shifting affects fund performance. Alpha from Carhart's four-factor model is planned to be used as risk-adjusted performance measurement. After applying the alpha into regression model to test how style drift is related to risk-adjusted return, the results are indicated that style drift score and/or the dummy of shifting between boxes are not significantly related to the alpha from the Carhart's four-factor model. I presume that there are two reasons that induce the shortcomings of model as follows.

Firstly, As SMB and HML factors rely on Morningstar's style box, some stocks with no style are excluded from SMB, HML, UML factors. Most of such stocks are small-cap stocks and IPO stocks with extreme returns. It might distort the accuracy of results.

Secondly, as daily returns of stocks are performed to run the regression analysis, the alpha is also resulted in the average alpha over the specific period on daily basis. For example, to find 1-year alpha for 2020, daily return of all factors during 2020 would input to the model, alpha from the model's estimation is used as the average 1-day alpha for 2020, then it will be annualized by multiplying 252. In reality, the distribution of alpha might not be the normal distribution, the average value could not be the representatives of overall alpha for that period. In addition, alpha for each portfolio on each period is separately run regression without checking if the results are reliable, only the alpha from each model on each fund is collected.

Therefore, I decide to use Sharpe ratio as risk-adjusted performance instead, by calculating on fund's actual return deducted by short-term government bond index as risk free asset, then dividing the result by the standard deviation of the fund's actual return.

III. The relationship between style drift and fund's risk-adjusted performance

Style drift score are negative relation to fund's performance risk-adjusted in term of Sharpe ratio. The extreme degree of shifting also deeply explain the effects of style drift to fund performance. funds with top 5% highest investment style drift tend to positively generate an additional risk-adjusted return at a higher amount than the rests, referring to the statistical results in Table 8. The estimated coefficient of top 5% drifting is a higher positive value than that of funds with medium style drift, contributing to the higher Sharpe ratio, dependent variable Y of the studied model. This explanation is persistence in 1-year and 6-year of the investment period. However, based on the second style drift measure, a shifting style box between the quarters cannot estimate *Sharpe ratio* as the result of model 2.3 and 2.6 in Table 8, but it is indicated the positive relationship with fund's *actual return* as shown in Table 12 (appendix).

In addition, the regression results show that Sharpe ratio would be less during the recession. As growth and value stocks should response differently to each stage of

economic cycle due to the different nature of business. Quality value and high growth stocks tend to have good performance in booms; thus, fund with good stock selection also deliver higher returns. Conversely, during the recession, value stocks underperform growth stocks as the expectation on earnings of value stocks have dropped more than for growth stocks, and the valuation on growth stocks have compressed less compared to value. As approximately 60% of stocks in The Stock Exchange of Thailand are value stocks, it is more difficult for fund manager to seek outperformed stocks to deliver abnormal returns in recession.

Mid/small-cap fund has positively significant effects on Sharpe ratio only over 6-year of the studied period. The results in Table 8 also shows the positive coefficient of the dummy of fund house, implying that AMCs under large banks and under niche banks generate superior risk-adjusted return, especially over 1-year and 6-year.

The other variables: fund flow, age, and expense ratio are *negatively correlated* to fund performance. There are two aspects of the reason behind of deteriorating return when a fund faces with a higher net inflow. Firstly, a large amount of immediate inflow would reduce efficiency of cash managing, diminishing portfolio's returns on net basis. Secondly, fund managers have to allocate new money flow in order to maintain the current stock's weight in portfolio by purchasing stocks at undesirable price, leading to an increase in the average cost. The fund would encounter diseconomies of scale.

In term of fund's age, older funds are more likely changed hands to many managers. Funds would be restructured to match manager's style, adding rebalancing cost. Lastly, turnover ratio and expense ratio usually reflect the more activity higher cost, causing the lower net returns.

The key difference of regression models between the two datasets is turnover. The factor is significant only in model 2.1 based on the overall 6-year period but the model is scarified with some datasets of the two AMCs; KASSET and TFUND. Without dataset of these two AMCs, it has affected the results of fund house under large banks to be insignificant. But KASSET is the crucial representative of AMC under large bank. Therefore, selecting incomplete dataset and including turnover into the model might be doubtful. The discrepancies of the results from these two datasets indicate the weakness of taking turnover into considerations, which must be traded off with a dataset that might be significant in explaining the dependent variables.

Figure 8: *Sharpe ratio distribution*

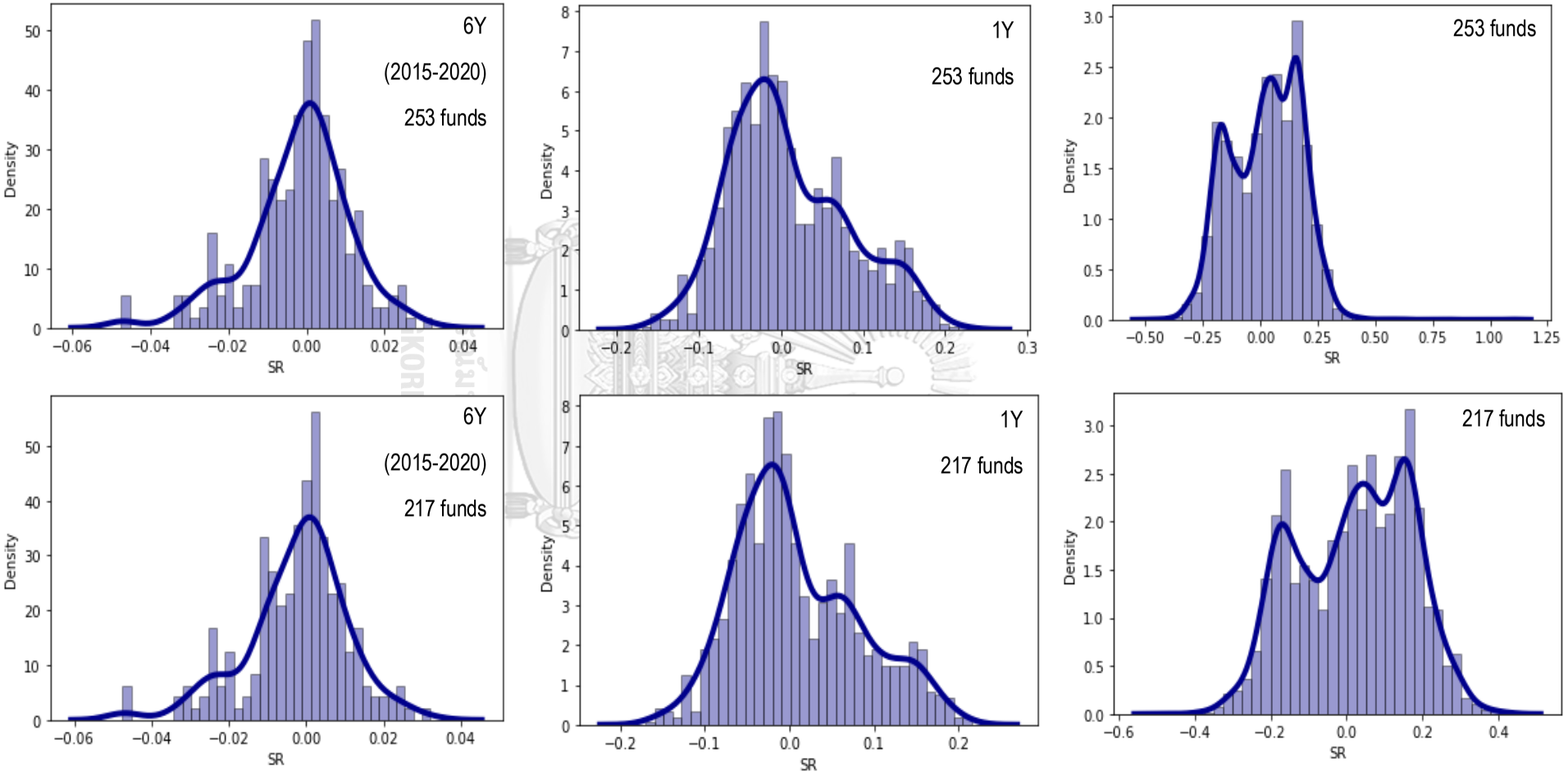


Table 8: *The effects on fund's risk-adjusted performance in term of Sharpe ratio*
This table presents estimated coefficients from equation (6) and (7). The dependent variable is *Sharpe ratio* that represents risk-adjusted performance. Model 2.1-2.3 are excluded funds with missing data of turnover from dataset, total number of funds taken into consideration is 217 funds. While model 2.4-2.6 are tested on a whole dataset of 253 equity mutual funds by excluding turnover variable from the model.

	(2.1)	**(2.2)**	**(2.3)**	**(2.4)**	**(2.5)**	**(2.6)**
	SR_{6Y}	**SR_{1Y}**	**SR_{1Q}**	**SR_{6Y}**	**SR_{1Y}**	**SR_{1Q}**
Observations	217	1125	4506	253	1335	5408
Intercept	0.0159	0.0592	0.0420	0.0179	0.0373	0.0483
	(0.03)**	(0.00)***	(0.01)***	(0.01)***	(0.02)**	(0.00)***
Style Drift	-0.0008	-0.0026	-0.0002	-0.0008	-0.0016	0.0031
	(0.00)***	(0.00)***	(0.48)	(0.00)***	(0.00)***	(0.24)
FundFlowHundred	-0.0001	-0.0006	-0.0036	-0.0001	-0.0003	-0.0021
	(0.26)	(0.01)**	(0.00)***	(0.31)	(0.08)*	(0.00)***
Age	-0.0002	0.0000	0.0000	-0.0003	0.0000	-0.0002
	(0.07)*	(0.46)	(0.46)	(0.02)**	(0.47)	(0.24)
LNFundSize	-0.0003	-0.0016	-0.0011	-0.0005	-0.0011	-0.0015
	(0.30)	(0.12)	(0.22)	(0.14)	(0.20)	(0.11)
ExpenseRatio	-0.0049	-0.0068	-0.0276	-0.0041	-0.0056	-0.0288
	(0.00)***	(0.08)*	(0.08)*	(0.00)***	(0.10)	(0.05)*
Ranking_Middle	0.0073	0.0030		0.0086	0.0041	
	(0.02)**	(0.39)		(0.01)***	(0.34)	
Ranking_Top	0.0127	0.0350		0.0108	0.0356	
	(0.03)**	(0.04)**		(0.04)**	(0.02)**	
FundType_	0.0050	-0.0017	0.0009	0.0051	-0.0020	0.0040
Small/Mid-Cap	(0.01)***	(0.39)	(0.44)	(0.00)***	(0.36)	(0.24)
FundHouse_	0.0018	0.0070	0.0069	0.0047	0.0110	0.0098
Under large banks	(0.26)	(0.20)	(0.20)	(0.04)**	(0.08)*	(0.11)
FundHouse_	0.0048	0.0094	0.0101	0.0050	0.0135	0.0118
Under niche banks	(0.03)**	(0.10)*	(0.08)*	(0.02)**	(0.03)**	(0.05)*
FundHouse_	0.0022	0.0016	0.0041	0.0020	0.0076	0.0057
Under non-banks	(0.21)	(0.42)	(0.30)	(0.21)	(0.15)	(0.22)
EconomicCycle		-0.0284	-0.0503		-0.0300	-0.0516
		(0.00)***	(0.00)***		(0.00)***	(0.00)***
Turnover	0.0010	0.0000	-0.0006			
	(0.00)***	(0.50)	(0.22)			

Remark: P-value are shown in parenthesis. *, **, and *** denote an estimate that is statistically significantly different from zero at the 10%, 5%, and 1% levels, respectively.

Concluding remarks

This paper illustrates the existence of investment style drift in Thailand's equity mutual funds by applying style measurement based on the nine-style of Morningstar's Style Box.

From the dataset of 253 active equity mutual funds over 2015-2020, we found the significant evidence of the shift determinants that drive the shifts in investment style as follows.

Style drift is induced by fund flow, fund size and duration of establishment fund. Fund flow is *positively correlated* to investment style drift. Conversely, fund size and age have *strongly negative* relation with investment style drift in both datasets among 6-year, 1-year and 1-quarter of investment periods. Moreover, mid/small-cap funds have a possibility to change their investment style rather than large-cap funds over 1-year period, but the relationship would be reversed for the longer-term.

With the second research's conclusion, there is a negative relation between style drift score and risk-adjusted performance in term of Sharpe ratio and actual return. Funds with high style drift tends to perform worse than funds with consistent strategy. To extend the consequence of the extreme degree of drifting, funds with top 5% highest investment style drifting positively contribute an additional risk-adjusted return at a higher amount than the rests. In addition, the premium is persistence over 1-year and 6-year investment period.

Regarding to the second style drift measure, a shift in style box between quarters cannot estimate *Sharpe ratio*, but it is indicated the positive relationship to actual return. Therefore, funds with the shift in style box over the quarters tends to generate a superior return on actual basis but the return do not persist on risk-adjusted basis over 1-quarter period.

Investors should be aware of investment style drifting as it affects to risk-adjusted return. It is possible that investor will be exposed to unexpected volatility of return and would not be compensated by a higher risk-adjusted return. However, if investors do not rely their decision on risks, and only concern about the absolute return on actual basis, they are able to seek for good drifting funds, which are adapted to market situation as fund manager can seek for outperformed stocks to deliver an abnormal return only in a short period.

Investors can expect that fund with a higher fund flow, small size and shorter duration of establishment might have high volatility in changing investment style, leading to getting an inferior risk-adjusted return and actual return on net basis for the long term, even it seems to deliver a superior net return in a short period.

Moreover, the observed style drift still follows its prospectus and does not breach any regulations if fund manager is able to invest in the stated investment strategy on average greater than 80% of net asset over the fiscal year as the regulator allows style to deviate from the stated strategy in particular period, but the style on average still above the limit.

Last conclusion is about the effect of economic cycles. Changing in investment style possibly happen in recession according to unusual situation on stock's valuation or company's outlook. Fund manager would try to switch their exposure to safe stocks without concerns in style. However, equity mutual funds could deliver a lower risk-adjusted return in recession.

Appendix

Table 9: *The number of funds under fund type-fund house matrix*

Fund Type/Fund House	Under large banks	Under niche banks	Under non-banks	Fast-moving firms	Total
Large-Cap	57	69	55	24	205
Small/Mid-Cap	13	14	12	9	48

Table 10: *Summary statistic of each AMCs' Sharpe ratio during 2015-2020*

Asset Management Company	Average	Max	Min
TISCO Asset Management Co., Ltd.	1.29%	3.21%	-0.72%
Kiatnakin Phatra Asset Management Co., Ltd.	1.03%	2.37%	-0.16%
Asset Plus Fund Management Co., Ltd.	0.94%	2.71%	-0.20%
Kasikorn Asset Management Co. Ltd	0.58%	2.54%	-1.70%
Manulife Asset Management (Thailand)	0.57%	0.63%	0.51%
Land and Houses Fund Management Co.,LTD	0.34%	1.82%	-2.06%
SCB Asset Management Co., Ltd.	0.30%	1.92%	-1.93%
Principal Asset Management Co., Ltd	0.14%	0.51%	-1.01%
MFC Asset Management PLC	-0.08%	2.44%	-4.62%
UOB Asset Management (Thailand) Co., Ltd	-0.13%	2.22%	-2.02%
TMB Asset Management Co. Ltd	-0.13%	0.58%	-2.66%
Thanachart Fund Management Co., Ltd.	-0.53%	1.28%	-3.41%
BBL Asset Management Co., Ltd.	-0.60%	1.73%	-2.78%
One Asset Management Ltd	-0.64%	0.70%	-2.31%
Krungthai Asset Management PLC	-0.71%	1.40%	-3.03%
Aberdeen Standard Asset Management (Thailand) Limited	-1.01%	-0.51%	-1.74%
Phillip Asset Management Co., Ltd.	-1.08%	-0.96%	-1.20%
Krungsri Asset Management Co., Ltd.	-1.26%	0.86%	-4.74%
TALIS ASSET MANAGEMENT	-1.37%	1.06%	-3.01%
Innotech Asset Management Company Limited	-3.34%	-3.30%	-3.38%

Table 11: *Statistic summary of variables in each regression model*

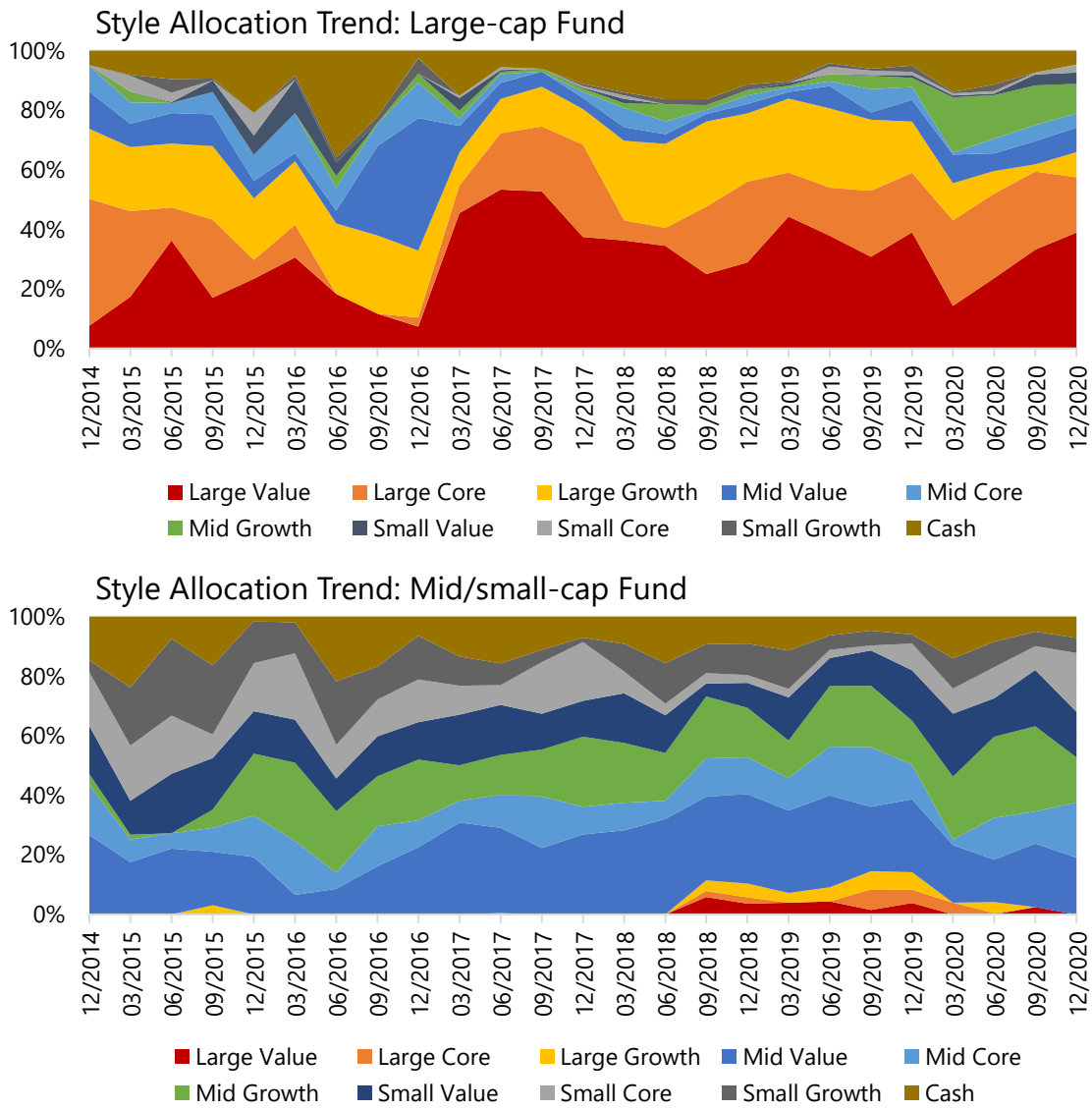
	SDS25	Fund Flow	Age	ln(Fund Size)	SDS4	Fund Flow	Age	ln(Fund Size)	Fund Flow	Age	ln(Fund Size)
	Model 2.1				**Model 2.2**				**Model 2.3**		
Observations	217	217	217	217	1125	1125	1125	1125	4506	4506	4506
Maximum	66.47	41.35	34.29	10.85	33.17	81.17	34.29	11.07	61.30	34.29	11.08
Average	22.99	1.15	12.74	6.09	11.85	1.10	11.99	6.11	0.28	11.60	6.10
Minimum	10.73	-12.64	2.08	1.88	4.07	-67.50	0.92	1.51	-68.00	0.07	1.42
Standard Deviation	11.20	4.20	7.87	1.80	3.70	7.56	7.27	1.87	3.51	7.28	1.87
25%	16.05	-0.04	4.26	4.85	9.30	-0.24	5.16	4.76	-0.10	4.64	4.73
50%	17.29	0.16	13.54	6.05	11.05	-0.01	12.16	6.04	0.00	11.81	6.01
75%	26.80	1.16	17.16	7.35	13.41	0.70	16.30	7.50	0.12	16.10	7.52
	Model 2.4				**Model 2.5**				**Model 2.6**		
Observations	253	253	253	253	1335	1335	1335	1335	5408	5408	5408
Maximum	66.47	41.35	34.29	10.85	58.05	94.80	34.29	11.07	104.81	34.29	11.08
Average	23.21	1.24	12.66	6.29	12.36	1.18	11.71	6.29	0.33	11.20	6.26
Minimum	10.73	-12.64	2.08	1.88	3.58	-67.50	0.60	1.51	-68.00	0.02	0.49
Standard Deviation	11.27	4.36	7.84	1.81	5.11	8.74	7.34	1.87	4.07	7.40	1.88
25%	16.13	-0.05	4.26	5.00	9.40	-0.37	4.45	4.89	-0.13	3.94	4.85
50%	17.72	0.16	13.54	6.22	11.31	-0.01	12.09	6.23	0.00	11.54	6.19
75%	28.43	1.41	17.16	7.68	14.10	0.87	16.21	7.76	0.19	15.89	7.74

Table 12: *The effects on fund's actual return*

This table presents estimated coefficients from equation (6) and (7). The dependent variable is *actual return*. Model 2.1-2.3 are excluded funds with missing data of turnover from dataset, total number of funds taken into consideration is 217 funds. While model 2.4-2.6 are tested on a whole dataset of 253 equity mutual funds by excluding turnover variable from the model.

	(2.1) R_{6Y}	**(2.2)** R_{1Y}	**(2.3)** R_{1Q}	**(2.4)** R_{6Y}	**(2.5)** R_{1Y}	**(2.6)** R_{1Q}
Observations	217	1125	4506	253	1335	5408
Intercept	4.7993 (0.01)**	10.8320 (0.00)***	0.0047 (0.50)	5.5639 (0.00)***	7.9566 (0.00)***	-0.1125 (0.36)
Style Drift	-0.2302 (0.00)***	-0.5184 (0.00)***	0.3455 (0.00)***	-0.2205 (0.00)***	-0.3686 (0.00)***	0.2000 (0.03)**
FundFlowHundred	-0.0265 (0.30)	-0.0953 (0.03)**	0.0421 (0.00)***	-0.0170 (0.35)	-0.0456 (0.14)	0.0493 (0.00)***
Age	-0.0595 (0.05)*	-0.0246 (0.34)	-0.0098 (0.11)	-0.0790 (0.01)***	-0.0184 (0.36)	-0.0093 (0.09)*
LNFundSize	-0.0576 (0.34)	-0.4135 (0.05)**	-0.0586 (0.04)**	-0.1282 (0.15)	-0.3735 (0.04)**	-0.0721 (0.01)***
ExpenseRatio	-1.1928 (0.00)***	-1.0633 (0.10)	-1.1872 (0.01)***	-1.0155 (0.00)***	-0.8924 (0.12)	-0.8723 (0.02)**
Ranking_Middle	0.2695 (0.04)**	1.2050 (0.26)		1.8610 (0.02)**	1.5768 (0.18)	
Ranking_Top	1.5752 (0.03)**	7.8615 (0.01)**		2.3268 (0.07)*	8.2331 (0.00)***	
FundType_Small/Mid-Cap	3.2347 (0.00)***	1.9733 (0.03)**	0.3496 (0.01)***	1.5831 (0.00)***	1.8978 (0.03)**	0.4009 (0.00)***
FundHouse_Under large banks	1.6649 (0.23)	1.6827 (0.12)	0.0940 (0.32)	1.2289 (0.03)**	2.4576 (0.03)**	0.3682 (0.02)**
FundHouse_Under niche banks	0.5209 (0.03)**	1.6950 (0.09)*	0.2816 (0.05)*	1.2064 (0.02)**	2.3889 (0.03)**	0.3853 (0.01)**
FundHouse_Under non-banks	1.1372 (0.17)	0.3403 (0.40)	0.0654 (0.36)	0.5515 (0.19)	1.2009 (0.17)	0.1472 (0.20)
EconomicCycle		-11.3180 (0.00)***	0.4007 (0.00)***		-11.6770 (0.00)***	0.4192 (0.00)***
Turnover	0.6265 (0.00)***	0.1010 (0.23)	-0.0034 (0.43)			

Figure 9: *Style Allocation Trend of the representative funds of Large-cap fund and Mid/small-cap fund*



REFERENCES

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