Risk Shifting in Mutual Funds: Evidence in Thailand

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The paper aims to examine whether risk-shifting behavior exists in Thai equity mutual funds or not. The empirical analysis studies the period from 2005 to 2022. It is investigated that risk-shifting behavior exists in Thailand by having compensation and employment incentive influences fund managers' decision on risk shifting.

Firstly, this study uses the states of the market which are positive and negative market returns as the proxy of compensation and employment incentive, respectively. The finding is illustrated that mid-year losers take more risk of the portfolio in the latter half of the year in both positive and negative market return periods where the greater risk adjustment is found in the positive market return period. This relationship is the same for both tax and non-tax-privileged mutual funds. Also, the paper finds a stronger degree of risk shifting in tax than non-tax-privileged mutual funds.

Secondly, this study uses the profitability of the companies which the fund managers work under as another proxy. High and low profitability companies can refer to the domination of compensation and employment incentives respectively. The paper finds that underperformed fund managers increase the portfolio risk in the latter half of the year when working under high-profitability companies. The result is the same for low-profitability companies but a weaker degree of risk shifting.

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INTRODUCTION

A mutual fund is a financial instrument that pools funds from numerous investors and invests those funds in a wide range of securities, e.g., bonds, stocks, etc. by asset management companies. This vehicle enables small individual investors to access a well-diversified portfolio. Asset management companies appoint financial professionals or so-called “Fund Managers” to manage portfolios’ trading activities.

Fund managers have responsibilities to explore and decide which securities should be invested in portfolios to suit the investment objectives indicated in its prospectus. They have obligation to operate the mutual fund in the investors’ utmost interest. However, fund managers’ compensation is tied to management fees that asset management companies charged to investors to compensate fund managers for their time and expertise in managing their portfolios. Management fees would be charged at a percentage of net asset value. Therefore, there is the occurrence of agency problem between fund managers and individual investors because fund managers who underperform would like to induce flow by taking more risk level to manipulate their compensation numbers. This behavior in mutual funds is called “Risk Shifting”. Apart from the compensation incentive explained prior, employment incentives or concerns about job loss are also essential to fund managers’ decisions regarding risk shifting. Huang et al. (2011) have identified that mutual funds which are increased volatility by fund managers would have poorer performance than other funds that maintain stable level of volatility. It could be implied that risk shifting either is an action of an unskilled manager or is incentivized by agency problems. Therefore, risk shifting cause damage to investors. This paper would like to investigate whether risk shifting of mutual funds exists in Thailand. It could contribute to investors who have a low-risk appetite avoiding investing in mutual funds that tend to increase risk levels over time.

The purposes of the paper aim to study in Thailand are the following. The antecedent literature has mostly focused on studying the risk-shifting behavior in a

developed market like the US, for example, the literature of Huang et al. (2011) and Kempf et al. (2009). Ferreira et al. (2012) have investigated that a less developed market consists of less sophisticated investors. Hence, investors will buy outperformed mutual fund while selling underperformed mutual fund less which encourage fund managers to take more risk level. Moreover, Thailand also has a specific type of mutual fund: a tax-privileged mutual fund. It allows individuals to claim the actual amount of investment in the mutual fund for a tax deduction. Ratanabanchuen and Saengchote (2021) have examined that net inflows of the tax-privileged mutual fund are uncorrelated with market conditions and positive every year, unlike non-tax flows. In addition, it is interesting to study how different characteristics between tax and non-tax-privileged mutual funds could lead to the different behavior of fund managers regarding risk shifting in different market states as Kempf et al. (2009) use market states as a proxy to represent the dominance of compensation and employment incentive over risk-shifting behavior. Furthermore, the contribution of this paper to the general literature is about the use of different proxies of compensation and employment incentives that influence on risk-shifting behavior: profitability of asset management companies.

LITERATURE REVIEW

Risk Shifting Behavior

Brown et al. (1996) have documented that fund managers who underperform the first six months of the year (or called “mid-year losers”) raise more the volatility level of their portfolio in the latter part of the year to increase the chances of catching up with mid-year winners because fund managers consider themselves as the contestants in tournaments regarding the rank of their funds in each year. The finding of a recent paper by Agarwal et al. (2022) are consistent with the prior literature in which funds that have poor performance earlier in the year increase their

holdings in lottery stocks; providing the possibility of outsized returns; later in the year to overtake their peers before the year-end.

The motivation for risk-shifting behavior is agency issues as Huang et al. (2011) have identified negative consequences of mutual funds' performances after risk shifting in which mutual funds which are increased volatility by fund managers would perform poorer than other funds that maintain stable level of volatility. An agency problem arises when an agent (fund manager) does not act in the full utmost interest of a principal (investor). There are conflicts of interest between fund managers and investors in which investors want to maximize their wealth through their investment portfolios' performances while fund managers want to maximize their wealth through their compensation or salary. However, fund managers' compensation is tied to management fees that asset management companies charged to investors to compensate fund managers for their time and expertise in managing their portfolios. Management fees would be charged at a percentage of net asset value in which the amount of net asset value is linked to net inflows. Therefore, it is appealing to fund managers to manipulate their compensation numbers by inducing new money into their funds.

Furthermore, Sirri (1992) has found that investors respond to the rankings of mutual funds' performance measured by relative return. There would be a new larger inflow of investments to the winning funds. Jennifer et al. (2007), Sirri and Tufano (1998), and Chevalier and Ellison (1997) have determined that there is a convex relationship between the flow and performance of mutual funds in which investors buy funds that have great performance more than they sell funds that have poor performance suggesting less sophisticated investors. The reason is asset management companies are likely to advertise well-performing funds instead of drawing interest to poorly performing funds (Sirri & Tufano, 1998). Ha and Ko (2017) also find that the relationship between an alteration in fund risk and net flows are positive and convex which indicates that an increase in risk escalates net flow. As a

result, mid-year losers take more volatility in their portfolio for the second half of the year to increase the chances of catching up with mid-year winners in order to attract new inflows for manipulating their compensation numbers. Mid-year winners will try to lock in their dominating positions over peers by not changing the volatility level of portfolios.

However, Kempf and Ruenzi (2008) have identified that risk-shifting behavior is time-variant. Kempf et al. (2009) have represented that neglecting compensation and employment incentive into consideration of risk-taking behavior could lead to incorrect conclusions.

Compensation and Employment Incentive

The literature review stated above is focused only on analyzing compensation incentives. Pool et al. (2019) and Kempf et al. (2009) have pointed out that employment incentives play an essential role in fund managers' decision-making regarding risk shifting. Fund managers are concerned about losing their job which will be costly due to loss of income, reputation, and future job opportunities. If mid-year losers engage in tournaments by taking on excessive risk, it could lead fund managers to confront a high probability of being fired (Chevalier & Ellison, 1999; Khorana, 1996). As a consequence, mid-year losers reduce the volatility level of their portfolio in the second half of the year when employment incentives dominate over compensation incentives.

Proxy of Compensation and Employment Incentive

Kempf et al. (2009) have used market returns as a proxy of compensation and employment incentives as they can express the market environment the fund manager confronts. After a negative market return, there are low aggregate inflows into funds (Breuer et al., 2007; Karceski, 2002). It leads to weak compensation incentives in the negative market return states as the fund managers' compensation has a positive link to the funds' size. In contrast, low aggregate inflows after the

negative market return period cause many funds to be liquidated (Zhao, 2005). It makes fund managers lose their jobs. To summarize, employment incentives dominate over compensation incentives in the negative market return period.

After a positive market return, there are high aggregate inflows into funds. It leads to strong compensation incentives in the positive market return states in this case. In contrast, the probability of loss of employment is lower in the positive market return period due to few funds' closures (Zhao, 2005). Also, new funds are started during the positive market return period (Robert W. Faff, 2006; Zhao, 2005). Hence, many job opportunities are available in the market. To summarize, compensation incentives dominate over employment incentives in the positive market return period.

RESEARCH HYPOTHESIS

Hypothesis 1: In a positive market return period, I expect a negative relationship between midyear performance and risk shifting of non-tax-privileged mutual funds.

In a positive market return period, a compensation incentive is strong while an employment incentive is weak. As a consequence, mid-year losers increase the volatility level of their portfolio in the second half of the year to manipulate their compensation numbers. On the other hand, mid-year winners will try to lock in their dominating positions over peers by not changing the volatility level of portfolios.

Hypothesis 2: In a negative market return period, I expect a positive relationship between midyear performance and risk shifting of non-tax-privileged mutual funds.

In a negative market return period, a compensation incentive is weak while an employment incentive is strong. As a consequence, mid-year losers decrease the

volatility level of their portfolio in the second half of the year as they are concerned about being laid off, ceteris paribus.

Hypothesis 3: In a positive and negative market return period, I expect a negative relationship between midyear performance and risk shifting of tax-privileged mutual funds.

Ratanabanchuen and Saengchote (2021) have documented that in every year net inflows of tax-privileged mutual funds are positive. It has no correlation with the market performance which can be implied that non-tax flows are more market-driven. As a consequence, mid-year losers take more risk in their portfolio for the second half of the year to manipulate their compensation numbers whether it is in a period of a positive or negative market return.

Hypothesis 4: I expect a negative relationship between midyear performance and risk shifting for funds under the management of highly profitable companies.

Highly profitable companies can represent the leading position in terms of the company's financial health over other asset management companies. Therefore, there are low opportunities for companies to cut costs by laying off employees in the subsequent period. It encourages mid-year losers to raise more the volatility level of their portfolio to manipulate their compensation numbers without worrying about job loss.

Hypothesis 5: I expect a positive relationship between midyear performance and risk shifting for funds under the management of poorly profitable companies.

Poorly profitable companies can represent as weak companies. Therefore, there are high opportunities for companies to cut costs by laying off employees in the subsequent period. Mid-year losers lessen the volatility level of their portfolio as they are concerned about being laid off.

DATA

My study retrieves data from three databases: Bloomberg, Morningstar Direct, and Financial Statements of asset management companies. Bloomberg includes information on SET INDEX which uses as a benchmark to calculate market return. Morningstar Direct includes information on mutual funds which are monthly fund returns, funds' net assets share class, and funds' inception date. Information on net profit and assets is manually collected from asset management companies' financial statements.

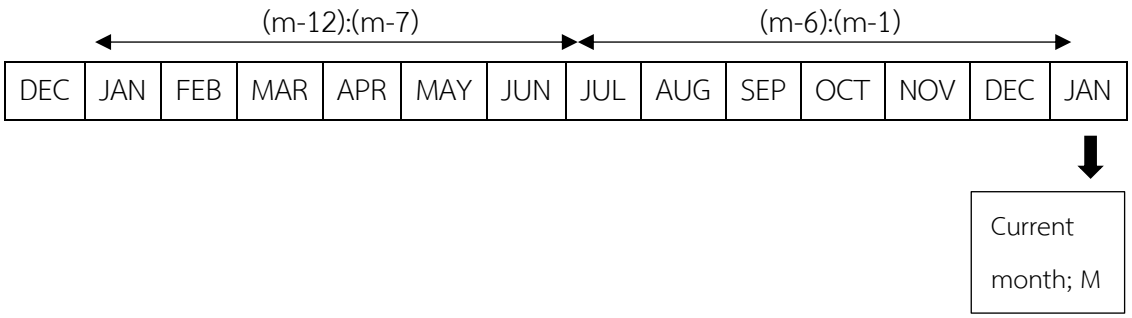
My analysis covers the period from the year 2005 to 2022. I focus studying on opened-ended equity mutual funds in Thailand. I exclude passively managed mutual funds which are index funds as the fund managers only mimic the benchmark's return.

METHODOLOGY

Measurement of Risk Shifting ($\Delta \sigma_{i,(m-6):(m-1)}$)

The risk-shifting measure is calculated from the change in risk or the standard deviations of fund returns from the first to the second half of the year.

$$\Delta \sigma_{i,(m-6):(m-1)} = \sigma_{i,(m-6):(m-1)} - \sigma_{i,(m-12):(m-7)}$$



Measurement of Midyear Performance ($Return_{i,t}$)

To measure midyear performance, I use relative return, which is the difference between the fund's raw total return and market returns. Relative return is one of the methods to measure fund managers' performance in which it represents how fund managers could generate a return over the market.

Funds' relative return in 1st half of the year:

$$Return_{i,(m-12):(m-7)} = [(1+r_{i,m-12})(1+r_{i,m-11})+....+(1+r_{i,m-7})] - 1$$

Measurement of Market States (D_M)

Kempf et al. (2009) have used midyear market returns as the proxy of market states. They have shown that the first half of the year's market returns are the proxy of the second half of the year's market returns. However, in Thailand, it is unable to use the first half of the year's market return as the proxy for the second half of the year's market returns. In Table 1, in the years 2006, 2013, 2015, 2019, 2020, and 2022, the SET index returns of the first half of the year and the second half of the year have different signs. Therefore, this paper will use the second half of the year's market returns as the proxy of market states instead where the market return is calculated from the value-weighted index of securities traded in Thailand's Stock Exchange.

Market return in 2nd half of the year:

$$Return^{market}_{(m-6):(m-1)} = [(1+r^{market}_{m-6})(1+r^{market}_{m-5})+....+(1+r^{market}_{m-1})] - 1$$

In case the market return in 2nd half of the year is positive, I take the value of the dummy variable D_M equal to one to represent positive market return states and zero otherwise.

***Table 1**: SET Index Return*

Year	SET INDEX RETURN	
	1st half	2nd half
2005	4.0%	6.9%
2006	(2.1%)	1.9%
2007	17.4%	11.7%
2008	(8.1%)	(40.2%)
2009	37.3%	24.8%
2010	11.7%	31.7%
2011	3.1%	0.3%
2012	16.7%	20.3%
2013	6.2%	(9.4%)
2014	16.9%	1.9%
2015	2.3%	(13.3%)
2016	14.6%	8.1%
2017	4.1%	12.7%
2018	(7.3%)	(0.8%)
2019	12.8%	(7.5%)
2020	(13.2%)	9.1%
2021	11.5%	5.6%
2022	(3.8%)	7.6%

Measurement of Financial Health of Asset Management Companies (D_High)

High profitability can indicate that the company has good financial health. For this study, I use financial ratio analysis to allow comparison of the different sized firms which is the return on assets (ROA) as it is a popular ratio for many pieces of literature measuring the financial's institution performance. Return on assets measures how a company can efficiently generate a profit using an existing asset. I take D_High equal to one in case the fund is under the management of a company that has ROA above average ROA of all asset management companies (highly profitable companies) and zero otherwise.

Regression approach

My analysis examines the relationship between funds' performances and risk-shifting behavior in the following model:

The First Model (Panel A):

The first model aims to study the relationship between funds' performances and the risk-shifting behavior of fund managers in tax and non-tax-privileged mutual funds and use market returns as a proxy of compensation and employment incentives. The model is extended from Kempf et al. (2009) by adding the dummy variable of tax and non-tax privileged funds.

$$\text{Risk Shifting} = a_0 + a_1 \text{Return}_{i,t} + a_2 \text{D\_Tax} + a_3 \text{D\_M} + a_4 \text{Return}_{i,t} \text{D\_Tax} + a_5 \text{Return}_{i,t} \text{D\_M} + a_6 \text{Return}_{i,t} \text{D\_Tax D\_M} + \text{Control Variables} + \varepsilon_{i,t}$$

Where:

- $\text{Return}_{i,t}$ is the midyear performance of funds
- **D_M** is the dummy variable, equal to 1 in the case of a positive market return period and 0 otherwise.
- **D_Tax** is the dummy variable, equal to 1 if a fund is classified as tax-privileged and 0 otherwise.

Control Variables are in the following;

- $\Delta\text{SD(M)}_t$ is the difference between the volatility (or the standard deviation) of market return of the first and second half of the year.
- $\text{SD(1st)}_{i,t}$ is the volatility (or the standard deviation) of the first half of the year of each mutual fund.
- $\text{FundSize}_{i,t}$ is the logarithm of net assets share class at the end of the studied period
- $\text{Age}_{i,t}$ is the period of the inception date to the end of the studied period

The Second Model (Panel B):

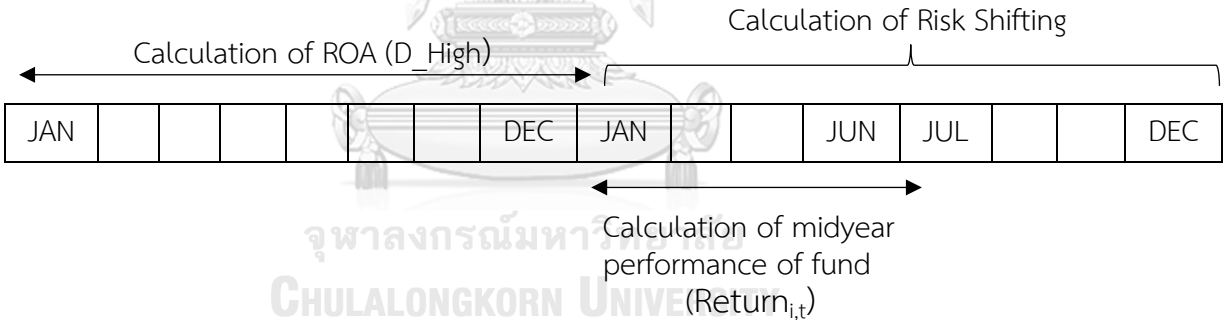
The second model aims to study the relationship between funds' performances and the risk-shifting behavior of fund managers and use the profitability of asset management companies as a proxy of compensation and employment incentives.

$$\textbf{Risk Shifting} = b_0 + b_1\,\textbf{Return}_{i,t} + b_2\,\textbf{D\_High} + b_3\,\textbf{Return}_{i,t}\,\textbf{D\_High} + \textbf{Control Variables} + \varepsilon_{i,t}$$

Where:

- **Return**$_{i,t}$ is the midyear performance of funds
- **D_High** is the dummy variable, equal to 1 if the fund is under the management of a highly profitable company and 0 otherwise.
- Control variables are the same as the first model

Time Interval for Calculation of Model 2



EMPIRICAL EVIDENCE

Descriptive Statistics

The descriptive statistics of data for the first model ("Panel A") are presented in Table 2. The dataset represents the number of tax and non-tax-privileged funds over the period of 2005 to 2022. In 2022, there are 410 Thai equity funds that are in the Morningstar Category of Thailand Fund Equity Large-Cap and Thailand Fund Equity Small/Mid-Cap which consist of 170 tax-privileged funds and 240 non-tax-privileged funds. Furthermore, only 5 out of 18 years which are 2008, 2013, 2015, 2018, and 2019 are considered to be negative market return periods where the SET Index return in 2nd half of the year is negative.

Table 2: *Descriptive Statistics for the First Model ("Panel A")*

Year	Number of Funds						Fund Size	2nd half of the year
	Total	Non-Tax	Tax	*LTFs*	*RMFs*	*SSFs*	(MB)	SET INDEX Return
2005	99	67	32	*21*	*11*		48,533	7%
2006	108	71	37	*26*	*11*		52,690	2%
2007	116	72	44	*30*	*14*		71,778	12%
2008	139	76	63	*47*	*16*		91,363	(40%)
2009	141	78	63	*47*	*16*		95,316	25%
2010	144	80	64	*47*	*17*		126,392	32%
2011	147	83	64	*47*	*17*		170,790	0%
2012	150	86	64	*47*	*17*		197,260	20%
2013	166	98	68	*47*	*21*		334,310	(9%)
2014	175	105	70	*47*	*23*		384,611	2%
2015	184	110	74	*48*	*26*		441,165	(13%)
2016	192	117	75	*48*	*27*		464,317	8%
2017	231	127	104	*71*	*33*		533,182	13%
2018	268	153	115	*78*	*37*		642,799	(1%)
2019	285	163	122	*81*	*41*		722,696	(8%)
2020	308	184	124	*83*	*41*		595,343	9%
2021	389	229	160	*83*	*41*	*36*	623,975	6%
2022	410	240	170	*83*	*45*	*42*	582,942	8%

The descriptive statistics of data for the second model ("Panel B") are presented in Table 3. The dataset represents the number of Thai equity mutual funds under the management of high and low-profit companies, and the number of high and low-profitable asset management companies.

Table 3: *Descriptive Statistics for the Second Model ("Panel B")*

Year	No. of Funds Under Management of			No. of Management Companies		
	High Profit Company	Low Profit Company	Total	High Profit Company	Low Profit Company	Total
2005	74	25	**99**	10	5	**15**
2006	71	37	**108**	11	4	**15**
2007	91	25	**116**	12	3	**15**
2008	75	64	**139**	10	8	**18**
2009	94	47	**141**	10	8	**18**
2010	116	28	**144**	12	6	**18**
2011	97	50	**147**	10	8	**18**
2012	120	30	**150**	12	6	**18**
2013	134	32	**166**	11	8	**19**
2014	115	60	**175**	10	9	**19**
2015	102	82	**184**	9	10	**19**
2016	82	110	**192**	7	12	**19**
2017	127	104	**231**	8	12	**20**
2018	182	86	**268**	8	12	**20**
2019	159	126	**285**	11	9	**20**
2020	167	141	**308**	9	11	**20**
2021	189	200	**389**	9	13	**22**
2022	231	179	**410**	11	11	**22**

Criteria for Selecting the Best-Fit Model

First is performing the Hausman test to choose between the fixed effect model and the random effect model. In case of rejection of the null hypothesis, the fixed effect model is selected. Second is performing Breusch and Lagrangian multiplier test ("LM test") when the Hausman test is failed to reject. For the LM test,

rejection of the null hypothesis can refer that the random effect model is preferred over pooled OLS model while failure to reject the null hypothesis can refer that the pooled OLS model is preferred over the random effect model.

Testing Multicollinearity Problem

For Panel A, the Pairwise Correlation Matrix is presented in Table 4. Even though many independent variables are significantly correlated at a 5% level of significance, there is no concern regarding the multicollinearity problem as the correlations between independent variables are lower than 50%. Therefore, it is unnecessary to drop out any independent variables.

Table 4: *Pairwise Correlation Matrix of Independent Variables of Panel A*

	Return	D_Tax	D_M	ΔSD(M)	SD(1st)	FundSize	Age
Return	**1.0000**						
D_Tax	**-0.0337***	**1.0000**					
P-Value	*(0.0420)*						
D_M	**-0.0394***	**-0.0127**	**1.0000**				
P-Value	*(0.0174)*	*0.4434*					
ΔSD(M)	**0.1464***	**0.0049**	**-0.1221***	**1.0000**			
P-Value	*(0.0000)*	*(0.7661)*	*(0.0000)*				
SD(1st)	**0.1104***	**-0.0391***	**0.0673***	**-0.2870***	**1.0000**		
P-Value	*(0.0000)*	*(0.0181)*	*(0.0000)*	*(0.0000)*			
FundSize	**-0.0596***	**0.2075***	**-0.1135***	**-0.0332***	**-0.0298**	**1.0000**	
P-Value	*(0.0003)*	*(0.0000)*	*(0.0000)*	*(0.0452)*	*(0.0718)*		
Age	**-0.0380***	**-0.2480***	**-0.0290**	**-0.0666***	**-0.0501***	**0.2251***	**1.0000**
P-Value	*(0.0217)*	*(0.0000)*	*(0.0798)*	*(0.0001)*	*(0.0025)*	*(0.0000)*	

For Panel B, the Pairwise Correlation Matrix is presented in Table 5. The correlations between independent variables are also lower than 50%. Therefore, there is no concern regarding the multicollinearity problem. It is unnecessary to drop out any independent variables.

Table 5: *Pairwise Correlation Matrix of Independent Variables of Panel B*

	Return	D_High	ΔSD(M)	SD(1st)	FundSize	Age
Return	**1.0000**					
D_High	**-0.0129**	**1.0000**				
P-Value	*(0.4354)*					
ΔSD(M)	**0.1464***	**0.0049**	**1.0000**			
P-Value	*(0.0000)*	*(0.7661)*				
SD(1st)	**0.1104***	**-0.0391***	**-0.2870***	**1.0000**		
P-Value	*(0.0000)*	*(0.0181)*	*(0.0000)*			
FundSize	**-0.0596***	**0.2075***	**-0.0332***	**-0.0298**	**1.0000**	
P-Value	*(0.0003)*	*(0.0000)*	*(0.0452)*	*(0.0718)*		
Age	**-0.0380***	**-0.2480***	**-0.0666***	**-0.0501***	**0.2251***	**1.0000**
P-Value	*(0.0217)*	*(0.0000)*	*(0.0001)*	*(0.0025)*	*(0.0000)*	

Empirical Results

Panel A: Market States as Proxy of Compensation & Employment Incentives (Non-Tax & Tax-Privileged Mutual Funds)

For Panel A, the model uses the positive and negative market return period as the proxy of compensation and employment incentives. The positive market return period represents compensation incentives while the negative market return period represents employment incentives. The result of Panel A from 3,652 observations of 410 funds is presented in Table 6.

1) Result of non-tax-privileged mutual funds

   The result represents that the midyear performance of non-tax-privileged mutual funds in positive market return periods is strongly negatively correlated to risk shifting at a 1% significant level which supports Hypothesis 1. In other words, mid-year losers take more volatility in their portfolio for the second half of the year in order to catch up with winners for the new inflow which is tied to their compensation numbers. The result implied that risk-

shifting action is founded in positive market return periods when the compensation incentive dominates over the employment incentive which conforms to Kempf et al. (2009).

However, in negative market return periods, the midyear performance of non-tax-privileged mutual funds is also strongly negatively correlated to risk shifting at a 1% significant level which is opposite to Hypothesis 2 and not in line with Kempf et al. (2009). The paper of Kempf et al. (2009) focuses on studying the risk-shifting behavior in the developed market; the US while this paper focuses on studying the risk-shifting behavior in the less developed market; Thailand. Ferreira et al. (2012) have documented that less developed markets consist of less sophisticated investors. Therefore, the paper has observed more convexity of the flow and performance relationship in the less developed market than in the developed market resulting in fund managers taking more risk. It leads to the implication of risk-shifting behavior in Thai mutual funds that the employment incentive cannot dominate over the compensation incentive in negative market return periods.

By comparing the estimated coefficients $| a_1 + a_5 | > | a_1 |$, the risk adjustment is stronger in positive market return periods than in negative market return periods. It suggests that employment risk is higher in negative market return periods than in positive market return periods which leads to lower risk adjustment.

2) Result of tax-privileged mutual funds

The result represents that the midyear performance in both positive and negative market return periods have a negative relation to risk shifting of tax-privileged mutual funds at a 1% significant level which supports Hypothesis 3. In other words, mid-year losers take more risk in their portfolio for the latter half of the year to manipulate their compensation numbers whether it is in a period of a positive or negative market return because in every year, net

inflows of tax-privileged mutual funds are positive and has no correlation with the market performance documented by Ratanabanchuen and Saengchote (2021).

By comparing the estimated coefficients $| a_1 + a_4 + a_5 + a_6 | > | a_1 + a_4 |$, the risk adjustment is stronger in positive market return periods than in negative market return periods suggesting lower employment risk that mutual funds manager could be able to confront in positive market return periods.

3) Compare results of non-tax and tax-privileged mutual funds

The estimated coefficients for tax-privileged mutual funds are higher than for non-tax-privileged mutual funds i.e. $| a_1 + a_4 + a_5 + a_6 | > | a_1 + a_5 |$ and $| a_1 + a_4 | > | a_1 |$. It is suggested that the risk adjustment is stronger in tax-privileged mutual funds than in non-tax-privileged mutual funds which aligned with Ratanabanchuen and Saengchote (2021) that has confirmed the greater convexity of the flow and performance relationship in tax-privileged mutual funds.

Table 6: *Result of Panel A Analysis*

The table represents estimates from the regression of the risk shifting on the midyear fund performance by having market states as a proxy of compensation and employment incentives.

$$\text{Risk Shifting} = a_0 + a_1\,\text{Return}_{i,t} + a_2\,\text{D\_Tax} + a_3\,\text{D\_M} + a_4\,\text{Return}_{i,t}\,\text{D\_Tax} + a_5\,\text{Return}_{i,t}\,\text{D\_M} + a_6\,\text{Return}_{i,t}\,\text{D\_Tax}\,\text{D\_M} + a_7\,\Delta\text{SD(M)}_t + a_8\,\text{SD(1st)}_{i,t} + a_9\,\text{FundSize}_{i,t} + a_{10}\,\text{Age}_{i,t} + \varepsilon_{i,t}$$

Panel A

Risk Shifting	**Fixed Effects**
Return	**-0.0438*** **
	(0.0096)
D_Tax	**Omitted**
D_M	**0.0000**
	(0.0003)
ReturnD_Tax	**-0.0170**
	(0.0144)
ReturnD_M	**-0.0191**
	(0.0140)
ReturnD_TaxD_M	**0.0145**
	(0.0185)
ΔSD(M)	**0.7866*** **
	(0.0091)
SD(1st)	**-0.2367*** **
	(0.0147)
FundSize	**-0.0004**
	(0.0002)
Age	**-0.0003*** **
	(0.0000)
Constant	**0.0179*** **
	(0.0046)
Observations	3,652
Number of Fund	410

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Summary Result of Panel A

Type	Market States	Hypothesis	Variables	Expected Sign	Coefficient	
Non-Tax	Positive	Hypothesis 1	$a_1 + a_5$	Negative	-0.0628	***
	Negative	Hypothesis 2	a_1	Positive	-0.0438	***
Tax	Positive	Hypothesis 3	$a_1 + a_4 + a_5 + a_6$	Negative	-0.0653	***
	Negative	Hypothesis 3	$a_1 + a_4$	Negative	-0.0607	***

*** p<0.01, ** p<0.05, * p<0.1

Panel A (1): Tax-privileged mutual funds.

Panel A (1) analysis is performed to see whether the risk-shifting action is different across types of tax-privileged mutual funds. The result of Panel A (1) is presented in Table 7. The result is consistent with Panel A analysis. The risk-shifting action in which mid-year losers increase the risk level of their portfolio in the second half of the year is founded in all types of tax-privileged mutual funds i.e. LTFs, RMFs, and SSFs in both positive and negative market return periods.

The size of estimated coefficients suggests that the risk adjustment is stronger in positive market return periods than in negative market return periods suggesting lower employment risk that mutual funds managers could be able to confront in positive market return periods.

Table 7: *Result of Panel A (1) Analysis*

The table represents estimates from the regression of the risk shifting on the midyear tax-privileged fund performance by having market states as a proxy of compensation and employment incentives.

$$\text{Risk Shifting} = c_0 + c_1\,\text{Return}_{i,t} + c_2\,\text{D\_M} + c_3\,\text{Return}_{i,t}\,\text{D\_M} + c_4\,\Delta\text{SD(M)}_t + c_5\,\text{SD(1st)}_{i,t} + c_6\,\text{FundSize}_{i,t} + c_7\,\text{Age}_{i,t} + \varepsilon_{i,t}$$

Panel A (1)

RiskShifting	LTFs	RMFs	SSFs
Return	**-0.0501*** **	**-0.0660*** **	**-0.0570*** **
	(0.0138)	(0.0173)	(0.0110)
D_M	**-0.0007**	**-0.0001**	**N/A**
	(0.0006)	(0.0010)	
ReturnD_M	**-0.0089**	**-0.0092**	**N/A**
	(0.0181)	(0.0228)	
ΔSD(M)	**0.7652*** **	**0.8007*** **	**0.5693*** **
	(0.0177)	(0.0253)	(0.0795)
SD(1st)	**-0.2338*** **	**-0.2764*** **	**-0.6949*** **
	(0.0273)	(0.0385)	(0.1062)
FundSize	**-0.0007**	**-0.0010**	**0.0006***
	(0.0005)	(0.0012)	(0.0003)
Age	**-0.0002***	**-0.0002**	**-0.0033**
	(0.0001)	(0.0002)	(0.0024)
Constant	**0.0245** **	**0.0299**	**0.0168*** **
	(0.0104)	(0.0227)	(0.0057)

Standard errors in parentheses

Summary Result of Panel A (1)

Type	Market States	Variables	Coefficient	
LTFs	Positive	$c_1 + c_3$	-0.0590	***
	Negative	c_1	-0.0501	***
RMFs	Positive	$c_1 + c_3$	-0.0752	***
	Negative	c_1	-0.0660	***
SSFs	Positive	c_1	-0.0507	***

*** p<0.01, ** p<0.05, * p<0.1

Panel B: Profitability of Management Companies as Proxy of Compensation & Employment Incentives

For Panel B, the model uses the profitability of asset management companies as the proxy of compensation and employment incentives. The high profitability of asset management companies represents compensation incentives while the low profitability of asset management companies represents employment incentives. The result of Panel B from 3,652 observations of 410 funds is presented in Table 8.

The result represents that the midyear performance of mutual funds under the management of high profitability companies is strongly negatively correlated to risk shifting at a 1% significant level which supports Hypothesis 4. In other words, midyear loser managers who work in highly profitable companies, that have a lower opportunity of cost-cutting compared to low profitable companies, are less worried about being laid off. It incentivizes them to risk shifts for more compensation. However, the midyear performance under the management of low profitability companies is also strongly negatively correlated to risk shifting at a 1% significant level which is opposite to Hypothesis 5. It is suggested that employment incentives hardly dominate over compensation incentives in the less developed markets i.e. Thailand as greater convexity of the flow and performance relationship is founded by Ferreira et al. (2012) which leads to a severe risk-shifting behavior.

By comparing the estimated coefficients $I\ b_1 + b_3\ I > I\ b_1\ I$, the risk adjustment is stronger for funds under the management of high-profitability companies than funds under the management of low-profitability companies suggesting the low employment risk of fund managers who work under high-profitability companies.

In panel A, panel A (1), and panel B, the positive estimated coefficient of $\Delta SD(M)_t$ specifies that the change in market volatility has a positive relation to the risk-shifting behavior of fund managers. And, the negative estimated coefficient of $SD(1st)_{i,t}$ indicates that the fund managers tend to lessen the risk of mutual funds in

the latter half of the year for the funds that have high volatility in the first half of the year suggesting that fund managers have a target of risk level which aligned with Kempf and Ruenzi (2008).

In panel A and panel B except for panel A (1), the negative estimated coefficient of $Age_{i,t}$ indicates that the age of funds and risk shifting are negatively significantly correlated. It is possible that shorter established funds tend to increase portfolio risk because of an incentive to boost performance for marketing purposes and also they have fewer tracking records. However, it is found an insignificant relationship between fund size and risk shifting.

Table 8: *Result of Panel B Analysis*

The table represents estimates from the regression of the risk shifting on the midyear fund performance by having profitability of management companies as a proxy of compensation and employment incentives.

$$\text{Risk Shifting} = b_0 + b_1\,\text{Return}_{i,t} + b_2\,\text{D\_High} + b_3\,\text{Return}_{i,t}\,\text{D\_High} + b_4\,\Delta\text{SD(M)}_t + b_5\,\text{SD(1st)}_{i,t} + b_6\,\text{FundSize}_{i,t} + b_7\,\text{Age}_{i,t} + \varepsilon_{i,t}$$

Panel B

RiskShifting	**Fixed Effects**
Return	**-0.0371*** **
	(0.0058)
D_High	**0.0006**
	(0.0005)
ReturnD_High	**-0.0074**
	(0.0084)
ΔSD(M)	**0.6720*** **
	(0.0150)
SD(1st)	**-0.8956*** **
	(0.0324)
FundSize	**0.0002**
	(0.0002)
Age	**-0.0006*** **
	(0.0001)
Constant	**0.0302*** **
	(0.0045)
Observations	3,652
Number of Fund	410

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Summary Result of Panel B

Profitability of Companies	Hypothesis	Variables	Expected Sign	Coefficient	
High	Hypothesis 4	$b_1 + b_3$	Negative	-0.0445	***
Low	Hypothesis 5	b_1	Positive	-0.0371	***

*** p<0.01, ** p<0.05, * p<0.1

CONCLUSION

Many pieces of paper i.e. Agarwal et al. (2022) and Brown et al. (1996) have documented that risk-shifting behavior exists in mutual funds in which mid-year losers increase the volatility level of their portfolio in the second half of the year to increase the chances of catching up with mid-year winners in order to attract new inflows in the purpose of manipulating their compensation numbers. Not only compensation incentives but also employment incentives play an essential role in fund managers' decision-making regarding risk shifting.

In this paper, I explore whether risk shifting exists in the Thai mutual fund market and whether compensation and employment incentives influence the decision of fund managers on risk shifting. My dataset includes Thai equity mutual funds of both tax-privileged funds and non-tax-privileged funds over the period of 2005 to 2022.

My findings conforms to Kempf et al. (2009) in which mid-year performance of non-tax-privileged and risk shifting are negatively correlated in positive market return periods implying that mid-year losers take more risk in their portfolio for the second half of the year in the circumstances of when compensation incentive dominates. However, it is also found the above risk-shifting behavior of non-tax-privileged funds in negative market return periods as well which is not aligned with Kempf et al. (2009). Furthermore, for tax-privileged mutual funds, the findings are consistent with the hypothesis which is mid-year losers tend to raise the risk level of the portfolio in both positive and negative market return period due to the compensative incentive and the specific characteristics of tax-privileged funds; positive net inflows in every year and no correlation between the net inflows and the market performance (Ratanabanchuen & Saengchote, 2021). Moreover, the paper finds that the degree of risk shifting is stronger in positive market periods than in negative market periods due to lower employment risk in positive market periods. Also, the degree of risk shifting is stronger for tax-privileged mutual funds than non-tax-privileged mutual due to the

greater convexity of the flow and performance relationship in tax-privileged mutual funds.

This paper also furthers study the risk-shifting behavior in mutual funds by using a new proxy of compensation and employment incentive which are return on assets to indicate the profitability of the companies where the fund managers work under that could influence risk-shifting decisions. My analysis also finds that fund managers tend to shift risk more under highly profitable companies which implies higher compensation incentives and lower employment incentives for fund managers who work under highly profitable companies. Either using negative market return or low profitability of asset management companies, the employment incentive is not able to dominate over compensation incentives suggesting the severe risk-shifting behavior of fund managers in Thailand.

In conclusion, the paper finds that risk-shifting behavior exists in the Thai mutual fund market. Therefore, investors who have a low-risk appetite should be careful of investing in mutual funds and avoid investing during the circumstance of compensation incentives dominating.

APPENDIX

Table 9: *Hausman Test for Panel A*

Correlated Random Effects-Hausman Test				
Test Cross-Section Random Effects				
Test Summary		Chi-Sq Statistic	Chi-sq d.f.	Probability
Cross-Section Random		101.09	9	0.0000
Cross-Section Random Effects Test Comparisons				
	Fixed	Random		
	Coefficient	Coefficient	Difference	S.E.
Return	-0.0438	-0.0423	-0.0015	0.0023
D_M	0.0000	0.0004	-0.0004	0.0001
ReturnD_Tax	-0.0170	-0.0047	-0.0123	0.0035
ReturnD_M	-0.0191	-0.0272	0.0081	0.0039
ReturnD_TaxD_M	0.0145	0.0022	0.0123	0.0060
ΔSD(M)	0.7866	0.8009	-0.0143	0.0019
SD(1st)	-0.2367	-0.2282	-0.0085	0.0023
FundSize	-0.0004	0.0003	-0.0006	0.0002
Age	-0.0003	-0.0001	-0.0002	0.0000

Table 10: *Hausman Test and LM Test for Panel A (1)*

SSFs		
Breusch and Pagan Lagrangian multiplier test for Random Effect		
Test Summary between Random Effects and Pooled OLS		
Var(u)	0.0000	
Chi-Sq Statistic	0.1000	
Probability	0.3762	
Variables	Var	S.D.
RiskShifting	0.0001	0.0097
e	0.0000	0.0042
u	0.0000	0.0020

Table 10: *Hausman Test and LM Test for Panel A (1) (continued)*

LTFs				
Correlated Random Effects-Hausman Test				
Test Cross-Section Random Effects				
Test Summary		**Chi-Sq Statistic**	**Chi-sq d.f.**	**Probability**
Cross-Section Random		33.38	7	0.0000
Cross-Section Random Effects Test Comparisons				
	Fixed	**Random**		
	Coefficient	**Coefficient**	**Difference**	**S.E.**
Return	-0.0501	-0.0374	-0.0127	0.0037
D_M	-0.0007	-0.0005	-0.0002	0.0001
ReturnD_M	-0.0089	-0.0265	0.0176	0.0065
ΔSD(M)	0.7652	0.7745	-0.0093	0.0027
SD(1st)	-0.2338	-0.2292	-0.0046	0.0035
FundSize	-0.0007	0.0002	-0.0009	0.0005
Age	-0.0002	-0.0002	0.0000	0.0001

RMFs				
Correlated Random Effects-Hausman Test				
Test Cross-Section Random Effects				
Test Summary		**Chi-Sq Statistic**	**Chi-sq d.f.**	**Probability**
Cross-Section Random		27.82	7	0.0002
Cross-Section Random Effects Test Comparisons				
	Fixed	**Random**		
	Coefficient	**Coefficient**	**Difference**	**S.E.**
Return	-0.0660	-0.0482	-0.0177	0.0045
D_M	-0.0001	0.0004	-0.0005	.
ReturnD_M	-0.0092	-0.0383	0.0291	0.0087
ΔSD(M)	0.8007	0.8218	-0.0210	0.0039
SD(1st)	-0.2764	-0.2718	-0.0046	0.0042
FundSize	-0.0010	0.0006	-0.0016	0.0009
Age	-0.0002	-0.0002	0.0000	0.0002

Table 11: Hausman Test for Panel B

Correlated Random Effects-Hausman Test				
Test Cross-Section Random Effects				
Test Summary		Chi-Sq Statistic	Chi-sq d.f.	Probability
Cross-Section Random		1796.36	7	0.0000
Cross-Section Random Effects Test Comparisons				
	Fixed Coefficient	Random Coefficient	Difference	S.E.
Return	-0.0371	-0.0785	0.0413	.
D_High	0.0006	0.0010	-0.0004	0.0002
ReturnD_High	-0.0074	0.0230	-0.0304	.
ΔSD(M)	0.6720	0.8049	-0.1330	0.0187
SD(1st)	-0.8956	-0.2252	-0.6703	0.0171
FundSize	0.0002	0.0001	0.0001	0.0002
Age	-0.0006	-0.0001	-0.0006	0.0001

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