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An ability to forecast market liquidity – Evidence from South East Asia Mutual fund industry

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Abstract

In this study, a liquidity timing ability of mutual fund managers in emerging markets had been examined. The analysis based on three important emerging markets in ASEAN Economic Community, namely Indonesia, Malaysia, and Thailand. We found that these mutual fund managers have an ability to forecast the market wide liquidity at both aggregate level and portfolio level. Additional, the evidence suggested that the high ability fund managers can successfully manage the liquidity in all markets at portfolio level. Besides, a robustness test demonstrates a similar result.

JEL classification: G11; G12; G21; G23

Keywords: Liquidity timing; Mutual fund performance; Timing ability

1. Introduction

The literature of mutual fund manager' timing ability conventionally focuses on the market timing ability and the volatility timing ability. A mutual fund manager' ability to forecast the market return is firstly focused. The mutual fund managers who successfully time the market return are able to increase the portfolio exposure before the market progresses, and able to decrease the portfolio exposure before the market declines. Consequently, these fund managers produce a superior return. The prior literatures widely studied on the superior performance predominantly market timing ability of fund manager, they failed to document the market timing ability of fund.[4,5,13,25] In contrast, Jiang, Yao, and Yu[18] and Bollen and Busse[5] strongly support that fund managers have market timing ability in the U.S. market. In addition, many studied of the market timing ability of other investment funds—pension funds, hedge funds, and investment newsletters, and failed to document a positive market timing ability.[15,16] Besides, Busses[7] developed a

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volatility timing model in which he allows mutual fund managers to forecast the market volatility rather than the market return.

More recent timing literature suggests that the mutual fund managers have the ability to time the market wide liquidity. This is called the liquidity timing model.[8] Although, the liquidity is one of important risk factors in the market, limited number of studies have focused on the liquidity timing of mutual fund. Particularly, most of their conclusion from prior studies are based on the evidence of developed market. For example, Cao, Chen, Liang, and Lo[8] provide the evidences suggest that both hedge fund and mutual fund managers in US market shows a positive market liquidity timing. Bodson et al[4] and Karstanje et al[21] document a positive liquidity timing of mutual fund managers in U.S mutual fund industry. Although, liquidity plays a more important role in emerging markets,[6,22] the study of liquidity market in emerging market is ignored.

Unlike the previous studies, we aim to examine the ability of mutual fund manager to time the market wide liquidity in emerging markets. Specifically, we aim to explore whether the mutual fund managers in emerging market can strategically adjust their portfolio betas based on their expectation about future market liquidity. We focused our study on the emerging markets for the following reasons. First of all, the liquidity risk plays more important role in emerging markets than developed markets.[19] Therefore, it is important to understand how mutual fund managers allocate their portfolio in the less liquid markets. As a result, the present of liquidity risk allows the opportunity for the mutual fund managers to time the market wide liquidity. To fill in the liquidity timing literature gap, we considered mutual fund managers' liquidity timing ability in three largest emerging economies in Asian Economic Community (AEC) namely—Indonesia, Malaysia, and Thailand[1] during the period of 2000−2017. In order to evaluate the liquidity timing of mutual fund managers, we applied two liquidity measurements—Amihud[1] illiquidity measure, and adjusted-illiquidity measure.[20] Our findings suggest the positive liquidity timing at aggregate levels and suggest the positive liquidity timing of higher performing portfolio at portfolio levels.

The remainder of the study is organized as follows. Section 2 provides brief of liquidity timing model. Section 3 shows data and methodology in this study. Section 4 shows empirical results on both aggregate level and portfolio level. Section 5 demonstrates the result of robustness test. The last section is conclusion and summary.

2. Liquidity timing

2.1. Liquidity measure

The basic definition of asset's liquidity is an ability to trade a given volume of assets or securities without significantly affecting their prices. Many researchers consequently support an important role of liquidity in asset pricing.[1,2] Further, they suggest a negative relationship between the market liquidity and the asset returns. In order to quantify the magnitude of market liquidity, we firstly apply the Amihud[1] illiquidity measure—$ILLIQ_{i,t}$. We construct $ILLIQ_{i,t}$ of stock i in month t as follow:

$$ILLIQ_{i,t} = \frac{1}{T}\sum_{d=1}^{T}\frac{\left|R^{i}_{t,d}\right|}{V^{i}_{t,d}} \tag{1}$$

$ILLIQ_{i,t}$ is the illiquidity measure of stock i in month t where $R^{i}_{t,d}$ is the return of the stock i on day d in month t. The daily trading volume—$V^{i}_{t,d}$ are aggregated for each month t. The daily ratio of $\left|R^{i}_{t,d}\right|$ and $V^{i}_{t,d}$ are aggregated for each month, t average by the total number of trading day—T in month t. The larger $ILLIQ_{i,t}$, the lesser the stock liquidity.

Since, our prime objective is to explore the liquidity timing in the emerging markets where the liquidity is small. Unlike the developed markets where daily zero trading volume are rare, this is more common in emerging markets. As the result, the daily trading volume—$V^{i}_{t,d}$ is possible to be zero. Then, $ILLIQ_{i,t}$ is undefined for zero trading volume. Also, the daily zero trading volume possesses a high correlation with the bid-ask spread.[3,23] To take the effect of zero

[1] Asian Economic Community (AEC) is a group of 10 nations namely Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam. Among these nations, Singapore is the only developed market. We drop Philippines, and Viet Nam from our study due to the lack and incomplete data, while we drop the other markets due to the unavailable of both equity data and mutual fund data. However, at the end of 2017, a data from world bank demonstrate that our sample economics size represents 75.87% of GDP among emerging markets in AEC.

trading volume into account, we applied Kang and Zhang[20] adjusted-illiquidity measure—$AdjILLIQ_{i,t}$. We constructed $AdjILLIQ_{i,t}$ as follow:

$$AdjILLIQ_{i,t} = \left[ln\left(\frac{1}{T} \sum_{d=1}^{T} \frac{\left| R_{t,d}^{i} \right|}{V_{t,d}^{i}} \right) \right] \times (1 + Zerovol_{i,t}) \tag{2}$$

$$Zerovol_{i,t} = \frac{number\ of\ days\ with\ zero\ trading\ volumes\ in\ month\ t}{T} \tag{3}$$

The natural logarithm of Amihud's illiquidity ratio—Eq (1) is adjusted by average number of zero trading volume in month t—the. $Zerovol_{i,t}$

2.2. Liquidity timing model

The prior literature documents a clear connection between market liquidity and the mutual fund performance.[8,9] The mutual fund managers have to manage both the portfolio allocation and fund's liquidity management. For example, as the fund performance affects investor fund flows, the mutual fund managers are incentivized to correct asset allocation according to the market liquidity conditions. Furthermore, the mutual fund managers necessary to manage the portfolio liquidity to meet daily investors' redemption. A high redemption demand can be found in bear market. Hence, it is importance for mutual fund managers to manage their portfolio to satisfy this liquidity constrain. To do so, the mutual fund managers make decisions on holding either cash or risky assets. Given that the mutual fund managers have the ability to time the market liquidity, if the mutual fund managers forecast that the market liquidity will be increased in the future, they will move out of cash, and allocate more toward market portfolio. If the mutual fund managers correctly forecast, the market liquidity improve. Then, the market asset price is increased. As a consequence, the mutual fund managers can generate superior abnormal return. In order to identify the liquidity timing of mutual fund manager, we followed Cao et al (2013) liquidity timing model by allowed the mutual fund managers to manage their portfolio betas based on the expectation of future market liquidity.

$$\beta_{\mathrm{mp}} = \beta_{0\mathrm{mp}} + \gamma_{mp}\left(\mathrm{L_{m,t}} - \overline{\mathrm{L_m}} \right) \tag{4}$$

where γ_{mp} is the coefficient of market liquidity ability. $L_{m,t}$ is the market liquidity in month t, and $\overline{L_m}$ is the rolling mean of the previous 60-month market liquidity.[2]

In order to evaluate the mutual fund performance, we applied the Cahart[10] standard four factor model[3] to explain the mutual fund portfolio returns as follow:

$$r_{pt} = \alpha_p + \beta_{mp} rm_t + \beta_{smb} SMB_t + \beta_{hml} HML_t + \beta_{mom} MOM_t + \varepsilon_{pt} \tag{5}$$

Where rm_t is the market excess return in month t. We follow Fama and French[11] to construct the SMB_t—the size mimic portfolio return, and HML_t—the value mimic portfolio return. We further constructed the MOM_t—the momentum mimic portfolio return follow Cahart.[10] Also, we substituted equation (4) into (5) to develop the liquidity timing model as in equation (6):

$$r_{pt} = \alpha_p + \beta_{0mp} rm_t + \beta_{smb} SMB_t + \beta_{hml} HML_t + \beta_{mom} MOM_t + \gamma_{\mathrm{mp}}\left(\mathrm{L_{m,t}} - \overline{\mathrm{L_m}} \right) rm_t + \varepsilon_{pt} \tag{6}$$

The coefficient of market liquidity timing—γ_{mp} is expected to be positive which indicates that the mutual fund managers can correctly time the market liquidity. The mutual fund managers who successfully time the market liquidity allocate more to market assets if they believe that the market liquidity will be improved in the future. On the other hand, they will allocate more toward cash if they believe that the market liquidity will be lessen in the future. However, the negative value of γ_{mp} indicates no market liquidity timing ability.

[2] See further detail in.[8,9]

[3] We form the SMB, and HML based on the[11] procedure. Then, we form MOM according to[10] procedure. The construction of SMB, HML, MOM are based on domestic equity data which reports in section 3.

3. Data and methodology

3.1. Data

In this study, we had gathered monthly stock returns, monthly market returns, and monthly risk-free rates from the Thomson Reuter Datastream database.[4] We obtained net asset value (NAV), and other mutual fund information from the Morningstar Direct Database. In order to compare the result internationally, we classified the fund objective according to the morning star classification method. Since the aim of this study is to examine the ability of mutual fund managers to forecast the market liquidity, we strongly focused on the domestic equity fund as follow the other mutual fund performance studies (e.g., W. E. Ferson and Schadt[14]; Busses[7]; Cao et al[9]). We excluded international funds, funds of funds, index funds, trigger funds, bond funds, and money market funds. We additional excluded the Islamic fund and sharia fund from our sample for Malaysia and Indonesia market. We also excluded funds which provided data less than 24 months old. The study had done from January 2000 to December 2017. Subsequently, our sample consist of 605 unique funds—329 from Thailand, 148 from Indonesia, and 128 from Malaysia.

Table 1 presents the descriptive statistic of mutual funds by country. At the end of 2017, all of equity funds in our sample generated higher returns than each market return. For example, we found the domestic equity funds in Thailand produce an average return of 1.31 percent per month which is higher than 0.92 percent per month of the market return. During the same period,

Table 1
Demonstrates descriptive statistic for both independent and dependent variable. Panel A shows a descriptive statistic for independent variable. Panel B shows a descriptive statistic for dependent variable. Full sample is the average fund return. P1 is the return of the worst performing portfolio. P10 is the return of the best performing portfolio. R_m are the market return in excess return. *SMB*, *HML*, and *MOM* are the mimic portfolio returns accounting for the size, value, and momentum, respectively. Amihud's illiquidity ratio and Adjusted Amihud's illiquidity ratio also present.

Panel A: Independent variable

	THA				IND				MAL			
	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Min	Max
Rm	0.92%	7.48%	−36.33%	30.80%	1.38%	6.65%	−38.84%	21.97%	0.47%	7.18%	−31.87%	33.08%
Rf	−0.07%	3.11%	−18.21%	37.26%	−0.21%	1.63%	−10.34%	5.60%	0.00%	5.45%	−27.33%	29.42%
SMB	0.20%	0.92%	−2.84%	3.87%	−0.11%	1.62%	−4.98%	10.05%	0.09%	0.82%	−3.95%	5.15%
HML	−0.01%	1.01%	−5.46%	3.24%	0.10%	2.29%	−12.45%	8.87%	−0.03%	1.29%	−8.91%	7.61%
MOM	0.56%	0.11%	0.39%	0.96%	0.68%	0.13%	0.48%	1.17%	0.48%	0.07%	0.36%	0.64%
$ILLIQ_{i,t}$	2.58	3.16	0.18	21.18	0.08	0.06	0.01	0.36	2.55	3.51	0.10	2.70
$AdjILLIQ_{i,t}$	0.41	1.06	−1.71	3.05	−2.76	0.73	−4.58	−1.03	2.69	1.03	−1.50	5.60

Panel B: Dependent variable

THA	Full sample	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
Mean	1.31%	0.44%	0.85%	1.11%	1.16%	1.27%	1.37%	1.49%	1.52%	1.77%	2.09%	1.65%
Std. Dev.	5.83%	5.35%	5.74%	5.99%	6.00%	6.01%	5.97%	6.00%	5.98%	6.00%	5.84%	2.25%
Min	−25.53%	−29.13%	−29.68%	−27.78%	−26.79%	−24.86%	−24.02%	−24.25%	−24.74%	−23.91%	−20.13%	−4.67%
Max	24.87%	17.72%	24.18%	25.52%	26.67%	26.60%	27.33%	26.78%	28.17%	24.18%	23.00%	10.02%
IND	Full sample	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
Mean	1.53%	0.22%	0.75%	1.10%	1.42%	1.43%	1.54%	1.78%	1.91%	2.32%	2.80%	2.58%
Std. Dev.	6.30%	6.67%	6.05%	6.54%	6.76%	6.38%	6.51%	6.54%	6.44%	6.68%	6.20%	3.53%
Min	−31.48%	−35.06%	−32.59%	−35.25%	−36.11%	−33.96%	−31.65%	−32.23%	−31.77%	−28.65%	−17.54%	−8.48%
Max	25.40%	32.85%	23.06%	21.68%	27.50%	20.49%	24.63%	21.39%	23.44%	34.58%	24.37%	17.52%
MAL	Full sample	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
Mean	0.69%	−0.28%	0.15%	0.40%	0.48%	0.56%	0.71%	0.88%	1.02%	1.26%	1.75%	2.02%
Std. Dev.	3.53%	3.63%	3.76%	3.60%	3.51%	3.53%	3.61%	3.47%	3.59%	3.66%	3.95%	2.20%
Min	−12.41%	−15.66%	−16.76%	−14.98%	−14.38%	−12.66%	−12.21%	−11.90%	−11.77%	−9.63%	−8.40%	−4.09%
Max	11.02%	11.27%	11.68%	10.70%	11.23%	12.08%	11.86%	11.87%	11.56%	10.78%	15.99%	11.51%

[4] At the end of December 2017, there are 499 Indonesian stocks, 626 Malaysian stocks, and 648 Thai stocks in our sample. The market returns are based on the Indonesia Stock Exchange (Bursa Efek Indonesia), The Malaysian Stock Exchange (Bursa Malaysia), and Thailand Stock Exchange (SET). Due to data limitation, we use the recommended risk-free rate list from Datastream website. We use Indonesia SBI 90 day, Malaysia T-Bill band 4, and Thailand repurchase rate 3 month as proxies for market risk-free rate for Indonesia, Malaysia, and Thailand respectively. We construct the SMB, HML, and MOM factors for each market based on available data in our sample.

Indonesia equity funds produce the 1.53 percent per month which is higher than that of 1.38 percent per month of the market return. On average, Malaysian mutual funds generate less returns than Thai mutual funds and Indonesian mutual funds. However, the Malaysian mutual funds generate the superior returns than the returns of the market return. The mutual fund return of our sample shows a consistent result with Ferreira, Keswani, Miguel, and Ramos.[12] All the liquidity measures are all positive. This demonstrates that the role of liquidity exists in these markets.

3.2. Mutual fund performance measurement

To measure mutual fund returns, we calculated the total return from NAV as follows:

$$r_{p,t} = \frac{NAV_{p,t} - NAV_{p,t-1}}{NAV_{p,t-1}} \tag{7}$$

where $r_{p,t}$ is the return for mutual fund p in month t and $NAV_{p,t}$ is the price of the mutual fund in month t. For time-series study, the heteroscedasticity and autocorrelation are likely to exist. To alleviate both problems, we estimated our results follow Newey and West[24] heteroscedasticity and autocorrelation-consistent standard errors with one lag procedure.

4. Empirical analysis

In this section, we explored whether mutual fund managers have an ability to time the market wide liquidity at both aggregate and portfolio level. We presented the evidence of liquidity timing in all markets and then we illustrated that the results are robust to both liquidity measurements.

4.1. Aggregate level analysis

Table 2 illustrates that the regression results at the aggregate level for three markets—Indonesia, Malaysia, and Thailand. We estimated t-statistics according to Newey and West[24] heteroscedasticity and autocorrelation-consistent standard errors with one lag. For each market, we estimated the result using both *ILLIQ* and *AdjILLIQ*. We found that the mutual fund managers in these focused markets exhibit the ability to time the market wide liquidity except Malaysia. Based on the Amihud's illiquidity measure, the coefficients are positively significance at 1% for Thai, and Indonesian funds. We further discovered that, at the aggregate level, the mutual fund managers in Thai and Malaysian

Table 2
Demonstrates the liquidity timing ability model at an aggregate level. Model (1) uses Amihud's illiquidity ratio as the liquidity measurement. Model (2) uses the adjusted Amihud's illiquidity ratio as the liquidity measurement. R_i and R_m are the average return of mutual funds and market return in excess return. *SMB*, *HML*, and *MOM* are the mimic portfolio returns accounting for the size, value, and momentum, respectively. γ_{mt} is the estimated coefficient of liquidity timing ability. Adjusted R squared values (R^2) are in percentage. *p*-values obtained by Newey and West[24] procedure. T-statistic are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	THA		IND		MAL	
	Model (1)	Model (2)	Model (1)	Model (2)	Model (1)	Model (2)
	0.925***	0.903***	0.990***	0.989***	1.051***	1.053***
	(32.89)	(37.29)	(48.26)	(48.69)	(15.13)	(15.29)
	0.788*	0.629	−0.283	−0.311*	0.0971	0.0960
	(1.69)	(1.33)	(−1.51)	(−1.78)	(1.47)	(1.53)
	0.557*	0.469	−0.182	−0.197	0.0811**	0.0801**
	(1.74)	(1.43)	(−1.18)	(−1.36)	(2.17)	(2.25)
	−1.288*	−0.718	2.009*	1.825*	0.152	0.157
	(−1.90)	(−0.87)	(1.95)	(1.72)	(0.72)	(0.72)
	0.0129***		1.912***		0.0001	
	(6.75)		(3.15)		(0.03)	
		0.0752***		0.119***		0.00546
		(5.35)		(3.24)		(0.38)
	0.00991***	0.00695*	−0.0123*	−0.0109*	−0.00998	−0.0102
	(3.04)	(1.75)	(−1.91)	(−1.66)	(−0.96)	(−0.96)
R^2	97.0%	96.9%	93.7%	93.5%	87.0%	87.1%

market generate the positive abnormal return unlike the mutual fund managers in Indonesian market. We found the similar results based Adjusted Illiquidity measure.

4.2. Portfolio level analysis

In this section, we evaluated the ability to time the market wide liquidity between the top performance funds and the poor performance funds. Our empirical work in this section allowed the investors to evaluate the liquidity timing

Table 3
Reports the result from Eq. (6) when we apply the Amihud's illiquidity ratio as the liquidity measurement. Panel A presents the result for Thailand while Panel B, and C present the result for Indonesia and Malaysia respectively. We present our results in decile portfolios. The other variables denotations are shown in Table 2. *p*-values obtained by Newey and West[24] procedure are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: THA	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.855***	0.882***	0.908***	0.932***	0.953***	0.937***	0.942***	0.949***	0.957***	0.933***	0.0780**
	(31.52)	(38.68)	(36.21)	(37.40)	(27.64)	(31.58)	(29.26)	(29.34)	(24.46)	(22.81)	(2.32)
β_{smb}	0.775***	0.462**	0.396	0.487	0.794	0.731	0.74	0.844	1.046*	1.608**	0.833
	(2.91)	(1.98)	(1.11)	(1.30)	(1.38)	(1.36)	(1.19)	(1.42)	(1.67)	(2.43)	(1.44)
β_{hml}	0.467**	0.278*	0.278	0.355	0.604	0.586	0.523	0.561	0.791*	1.133**	0.666
	(2.21)	(1.74)	(1.23)	(1.56)	(1.50)	(1.49)	(1.18)	(1.34)	(1.84)	(2.28)	(1.59)
β_{mom}	0.521	0.389	−0.526	−0.635	−0.754	−1.617**	−1.299*	−2.039***	−3.122***	−3.795***	−4.316***
	(0.52)	(0.63)	(−0.72)	(−1.38)	(−0.84)	(−2.12)	(−1.79)	(−3.12)	(−3.43)	(−2.86)	(−4.51)
γ_{mt}	0.00153	0.00301**	0.00739***	0.0111***	0.0156***	0.0169***	0.0166***	0.0162***	0.0180***	0.0228***	0.0212***
	(0.69)	(1.98)	(4.34)	(6.73)	(6.25)	(8.18)	(7.85)	(7.38)	(6.50)	(7.33)	(8.27)
α_p	−0.00657	−0.00131	0.00489	0.00534**	0.00608	0.0117***	0.0113***	0.0155***	0.0227***	0.0296***	0.0361***
	(−1.44)	(−0.35)	(1.38)	(2.02)	(1.43)	(2.90)	(2.91)	(4.15)	(5.32)	(4.50)	(6.54)
R^2	96.30%	97.20%	96.90%	97.30%	96.20%	95.90%	95.80%	95.60%	94.00%	90.60%	23.90%
Panel B: IND	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.968***	0.945***	1.029***	1.037***	1.028***	1.011***	1.001***	1.000***	1.021***	0.864***	−0.104*
	(25.23)	(36.84)	(81.40)	(39.23)	(69.88)	(61.34)	(56.73)	(53.43)	(28.99)	(17.63)	(−1.85)
β_{smb}	−1.228*	−0.129	−0.304*	−0.0867	−0.275*	−0.338***	−0.192	−0.0709	−0.250	0.0457	1.274**
	(−1.70)	(−0.64)	(−1.93)	(−0.47)	(−1.92)	(−3.41)	(−1.01)	(−0.32)	(−1.18)	(0.11)	(2.55)
β_{hml}	−0.673	0.000916	−0.208**	−0.0781	−0.225**	−0.240**	−0.0988	−0.122	−0.162	−0.0171	0.656**
	(−1.31)	(0.01)	(−2.03)	(−0.49)	(−1.99)	(−2.56)	(−0.82)	(−0.66)	(−0.73)	(−0.06)	(2.08)
β_{mom}	1.148	0.0285	1.374	2.963**	1.884**	3.328**	1.226	2.717**	4.332***	1.089	−0.0584
	(0.57)	(0.03)	(1.45)	(2.26)	(2.35)	(2.56)	(1.26)	(2.33)	(3.18)	(0.81)	(−0.03)
γ_{mt}	1.472**	1.708***	1.544***	1.348***	1.731***	1.642***	1.786***	1.866***	2.142*	3.881**	2.409
	(2.11)	(3.45)	(4.70)	(3.77)	(3.09)	(2.79)	(2.97)	(2.85)	(1.86)	(2.10)	(1.10)
α_p	−0.0196	−0.00542	−0.0129**	−0.0202**	−0.0121**	−0.0206***	−0.00529	−0.0138*	−0.0206**	0.00780*	0.0274*
	(−1.39)	(−0.85)	(−2.23)	(−2.53)	(−2.47)	(−2.69)	(−0.87)	(−1.88)	(−2.53)	(1.86)	(1.95)
R^2	78.50%	91.30%	94.80%	93.10%	95.90%	94.70%	95.00%	91.30%	87.30%	77.50%	14.00%
Panel C: MAL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	1.040***	1.034***	1.065***	1.060***	1.038***	1.052***	1.061***	1.048***	1.052***	1.047***	0.00688
	(13.70)	(14.29)	(15.81)	(17.11)	(15.48)	(15.24)	(15.63)	(15.08)	(14.04)	(12.62)	(0.17)
β_{smb}	21.96***	14.28**	8.601	6.627	4.126	2.025	6.645	4.946	10.09	20.23**	−1.727
	(3.11)	(2.20)	(1.20)	(1.14)	(0.62)	(0.37)	(1.00)	(0.78)	(1.19)	(1.98)	(−0.26)
β_{hml}	17.58***	11.50***	7.974**	6.428*	5.237	2.876	6.040	5.318	7.455	11.63*	−5.946
	(4.75)	(3.11)	(2.02)	(1.91)	(1.41)	(0.91)	(1.64)	(1.55)	(1.41)	(1.75)	(−1.20)
β_{mom}	0.152	0.173	0.014	0.284	0.183	0.318	0.149	−0.0207	0.281	0.0585	−0.0932
	(0.67)	(0.74)	(0.06)	(0.97)	(0.95)	(1.46)	(0.66)	(−0.11)	(1.43)	(0.28)	(−0.50)
γ_{mt}	−0.001***	−0.001	−0.001	0.000	0.000	0.001	0.001	0.000	0.001	0.000*	0.001***
	(−2.63)	(−0.50)	(−0.43)	(0.47)	(0.36)	(0.52)	(0.59)	(1.23)	(1.59)	(1.69)	(7.24)
α_p	−0.0215*	−0.0177	−0.00724	−0.0181	−0.0124	−0.0171	−0.00751	0.00215	−0.00918	0.00547	0.0270***
	(−1.91)	(−1.59)	(−0.59)	(−1.29)	(−1.36)	(−1.61)	(−0.67)	(0.22)	(−0.92)	(0.52)	(3.28)
R2	84.20%	83.00%	85.40%	87.20%	86.20%	86.80%	87.00%	86.70%	85.20%	82.40%	18.10%

skill of mutual fund managers. We formed the deciles portfolios based on the past performance follow Cahart.[10] These ten valued weighted portfolios of mutual funds are formed based on the calculation of trailing 12-month returns. We had hold the portfolio for one month and then rebalanced on a monthly basis. This had been generated the time-series of monthly returns for these decile portfolios from January 2001 to December 2017. For the funds that disappear or terminate during the year, we included our value weighted portfolio until they disappeared, as a result, our decile portfolio weights were readjusted correctly and free from the survivor bias problem.

We estimated Eq (6) based on the Amihud's illiquidity measure as the liquidity measure and report the result in Table 3. The P10 is the top 10% or best performing portfolio, while P1 is the bottom 10% or worst performing portfolio. Panel A shows results of liquidity timing of mutual fund managers in Thai market. The coefficient of γ_{mt}—liquidity timing of best performing portfolio is positively and significantly. This supports that the best portfolio can successfully times the market wide liquidity. As a consequence, this best performing portfolio generated 2.96% return per month. On the other hands, our finding indicates an inferior ability to forecast the market wide liquidity of the worst performing portfolio. We further found that this worst performing portfolio cannot generate the positive abnormal return. We further formed the zero investment portfolio—P11 by taking a short position on the worst performance portfolio and taking a long positive on the top performance portfolio.[5] We found the positively and significance of liquidity timing for P11. In addition, P11 is found that it can generate 3.61% per month. Our finding is consistence with the mutual fund performance literature in that the poor performance funds cannot generate the positive abnormal return. Moreover, we found both γ_{mt} and alpha are an increasing function of portfolio performance which have been reported in Thai market.[26] In Panel B, we provided the result based on Indonesian fund, the similar result was found with Panel A. We found all the portfolio have the positive liquidity timing ability. Although, the result in previous section shows that, in general, Indonesian mutual funds generated negative abnormal return, we demonstrated that the best performing portfolio can generate the positive abnormal return of 0.78% per month. Furthermore, we presented that the P11 can generate the positive abnormal return as in Thai market. In Panel C, we found few evidences of liquidity timing for Malaysian funds. Despite, the coefficient of liquidity timing of P10 is positively significance at 10%, its coefficient is 0.000177. We also found that the coefficient of liquidity timing which negative for bottom performance portfolio (P1) and slightly increases for the higher performance portfolio is an increasing function of performance. However, we could not reject the null hypothesis that the coefficients are different from zero for the other Malaysian portfolios. We further discovered that the zero investment strategy—P11 can generate the positive abnormal return in Malaysian mutual fund industry. Our finding here is consistence with the prior literature in that the good performance funds can generate the positive abnormal return, while the poor performance funds cannot generate abnormal return to the investor.[10,17]

Table 4 presents the result based on the Adjusted-illiquidity measure. We found the similar result to Table 3. For example, we found that all best performing portfolios have positive liquidity timing in all markets and all the worst performing portfolios have negative or zero liquidity timing ability in all markets. Hence, this liquidity timing is another source of positive abnormal return of mutual funds.

5. Robustness test

In this section, we controlled for the effect of liquidity risk factor. Since our study focused on the equity mutual funds, the liquidity risk factor has been successfully explained the equity returns. The factor also may potentially affect our result. To examine whether our results are affected by the omitted liquidity risk factor, we include the liquidity risk factor into Eq. (6) as follow:

$$r_{pt} = \alpha_p + \beta_{0mp} rm_t + \beta_{smb} SMB_t + \beta_{hml} HML_t + \beta_{mom} MOM_t + \gamma_{\mathrm{p}}\left(\mathrm{L_{m,t}} - \overline{\mathrm{L_m}}\right) rm_t + \mathrm{LIQ_{m,t}} + \varepsilon_{pt} \quad (8)$$

Where $\mathrm{LIQ_{m,t}}$ is the Amihud illiquidity measures which is constructed according to Eq. (1).

The result from Table 5 shows that the best performance portfolios successfully time the market liquidity, while the worst performing portfolio fail to do so in all markets. Furthermore, the best performing portfolios demonstrates a

[5] The payoff of this zero investment portfolio is similar to the difference performance of the top performance portfolio and worst performance portfolio or the difference between P10 and P1.

Table 4
Reports reports the result from Eq. (6) when we apply the Adjusted-illiquidity ratio as the liquidity measurement. Panel A presents the result for Thailand while Panel B, and C present the result for Indonesia and Malaysia respectively. We present our results in decile portfolios. The other variables denotations are shown in Table 2. *p*-values obtained by Newey and West[24] procedure are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: THA	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.855***	0.882***	0.908***	0.932***	0.953***	0.937***	0.942***	0.949***	0.957***	0.933***	0.0780**
	(31.52)	(38.68)	(36.21)	(37.40)	(27.64)	(31.58)	(29.26)	(29.34)	(24.46)	(22.81)	(2.32)
β_{smb}	0.775***	0.462**	0.396	0.487	0.794	0.731	0.74	0.844	1.046*	1.608**	0.833
	(2.91)	(1.98)	(1.11)	(1.30)	(1.38)	(1.36)	(1.19)	(1.42)	(1.67)	(2.43)	(1.44)
β_{hml}	0.467**	0.278*	0.278	0.355	0.604	0.586	0.523	0.561	0.791*	1.133**	0.666
	(2.21)	(1.74)	(1.23)	(1.56)	(1.50)	(1.49)	(1.18)	(1.34)	(1.84)	(2.28)	(1.59)
β_{mom}	0.521	0.389	−0.526	−0.635	−0.754	−1.617**	−1.299*	−2.039***	−3.122***	−3.795***	−4.316***
	(0.52)	(0.63)	(−0.72)	(−1.38)	(−0.84)	(−2.12)	(−1.79)	(−3.12)	(−3.43)	(−2.86)	(−4.51)
γ_{mt}	0.00153	0.00301**	0.00739***	0.0111***	0.0156***	0.0169***	0.0166***	0.0162***	0.0180***	0.0228***	0.0212***
	(0.69)	(1.98)	(4.34)	(6.73)	(6.25)	(8.18)	(7.85)	(7.38)	(6.50)	(7.33)	(8.27)
α_p	−0.00657	−0.00131	0.00489	0.00534**	0.00608	0.0117***	0.0113***	0.0155***	0.0227***	0.0296***	0.0361***
	(−1.44)	(−0.35)	(1.38)	(2.02)	(1.43)	(2.90)	(2.91)	(4.15)	(5.32)	(4.50)	(6.54)
R^2	96.30%	97.20%	96.90%	97.30%	96.20%	95.90%	95.80%	95.60%	94.00%	90.60%	23.90%
Panel B: IND	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.968***	0.945***	1.029***	1.037***	1.028***	1.011***	1.001***	1.000***	1.021***	0.864***	−0.104*
	(25.23)	(36.84)	(81.40)	(39.23)	(69.88)	(61.34)	(56.73)	(53.43)	(28.99)	(17.63)	(−1.85)
β_{smb}	−1.228*	−0.129	−0.304*	−0.0867	−0.275*	−0.338***	−0.192	−0.0709	−0.250	0.0457	1.274**
	(−1.70)	(−0.64)	(−1.93)	(−0.47)	(−1.92)	(−3.41)	(−1.01)	(−0.32)	(−1.18)	(0.11)	(2.55)
β_{hml}	−0.673	0.000916	−0.208**	−0.0781	−0.225**	−0.240**	−0.0988	−0.122	−0.162	−0.0171	0.656**
	(−1.31)	(0.01)	(−2.03)	(−0.49)	(−1.99)	(−2.56)	(−0.82)	(−0.66)	(−0.73)	(−0.06)	(2.08)
β_{mom}	1.148	0.0285	1.374	2.963**	1.884**	3.328**	1.226	2.717**	4.332***	1.089	−0.0584
	(0.57)	(0.03)	(1.45)	(2.26)	(2.35)	(2.56)	(1.26)	(2.33)	(3.18)	(0.81)	(−0.03)
γ_{mt}	1.472**	1.708***	1.544***	1.348***	1.731***	1.642***	1.786***	1.866***	2.142*	3.881**	2.409
	(2.11)	(3.45)	(4.70)	(3.77)	(3.09)	(2.79)	(2.97)	(2.85)	(1.86)	(2.10)	(1.10)
α_p	−0.0196	−0.00542	−0.0129**	−0.0202**	−0.0121**	−0.0206***	−0.00529	−0.0138*	−0.0206**	0.00780	0.0274*
	(−1.39)	(−0.85)	(−2.23)	(−2.53)	(−2.47)	(−2.69)	(−0.87)	(−1.88)	(−2.53)	(0.86)	(1.95)
R^2	78.50%	91.30%	94.80%	93.10%	95.90%	94.70%	95.00%	91.30%	87.30%	77.50%	14.00%
Panel C: MAL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	1.053***	1.061***	1.047***	1.043***	1.036***	1.066***	1.063***	1.039***	1.055***	1.062***	1.049***
	(15.31)	(15.45)	(15.08)	(13.93)	(16.76)	(15.93)	(17.40)	(15.64)	(15.65)	(15.94)	(15.33)
β_{smb}	0.959	0.634	1.224*	1.218***	1.419*	0.854	0.648	0.413	1.883	6.585	4.907
	(1.46)	(0.97)	(1.81)	(3.15)	(1.80)	(1.25)	(1.12)	(0.62)	(0.35)	(1.00)	(0.78)
β_{hml}	0.801**	0.640*	0.931**	1.740***	1.141**	0.792**	0.630*	0.522	2.752	5.994	5.282
	(2.15)	(1.74)	(2.42)	(4.65)	(2.46)	(2.07)	(1.89)	(1.41)	(0.87)	(1.63)	(1.54)
β_{mom}	0.157	0.103	0.202	0.172	0.179	0.0187	0.289	0.182	0.323	0.150	−0.0189
	(0.77)	(0.42)	(1.13)	(0.66)	(0.59)	(0.07)	(1.01)	(0.98)	(1.53)	(0.68)	(−0.10)
γ_{mt}	0.00546	0.00286	0.00775	−0.0335	−0.00206	−0.00311	0.0143	0.00605	0.0146*	0.0116*	0.00226
	(0.39)	(0.20)	(0.55)	(−1.56)	(−0.07)	(−0.21)	(1.02)	(0.48)	(1.75)	(1.87)	(0.17)
α_p	−0.0102	−0.00747	−0.0125	−0.0224*	−0.0180	−0.00743	−0.0184	−0.0124	−0.0173*	−0.00755	0.00206
	(−1.01)	(−0.64)	(−1.37)	(−1.81)	(−1.25)	(−0.57)	(−1.33)	(−1.39)	(−1.68)	(−0.70)	(0.22)
R^2	87.00%	87.40%	86.20%	84.10%	83.00%	85.40%	87.20%	86.20%	86.90%	87.00%	86.70%

positive abnormal return in all panels as we found in previous section. As a result, our finding in previous section does not drive by the omitted liquidity risk factor.[6]

[6] We do the same robustness test when apply the Adjusted illiquidity measure as the proxy for the market liquidity measure and find that the results are similar. So, to conserve the space, we report the result based on the Amihud illiquidity measure. The results based on the Adjusted illiquidity measure are available upon request.

Table 5

Reports reports the result from Eq. (6) when we apply the Amihud illiquidity measure as the liquidity measurement. Panel A presents the result for Thailand while Panel B, and C present the result for Indonesia and Malaysia respectively. We present our results in decile portfolios. The other variables denotations are shown in Table 2. *p*-values obtained by Newey and West[24] procedure are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel 1A: THA	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.857***	0.884***	0.913***	0.931***	0.954***	0.938***	0.946***	0.952***	0.965***	0.941***	0.0841**
	(31.13)	(40.18)	(37.57)	(36.34)	(26.45)	(31.00)	(29.28)	(29.30)	(25.41)	(23.55)	(2.44)
β_{smb}	0.797***	0.481**	0.446	0.484	0.800	0.739	0.777	0.878	1.126*	1.689***	0.891
	(2.96)	(2.07)	(1.29)	(1.27)	(1.34)	(1.36)	(1.26)	(1.50)	(1.90)	(2.64)	(1.61)
β_{hml}	0.478**	0.288*	0.305	0.353	0.607	0.590	0.543	0.579	0.834**	1.176**	0.697*
	(2.24)	(1.83)	(1.41)	(1.52)	(1.47)	(1.50)	(1.26)	(1.41)	(2.09)	(2.50)	(1.76)
β_{mom}	0.0116	0.00491	−0.144**	−0.0585	−0.0867	−0.177*	−0.198**	−0.266***	−0.460***	−0.528***	−0.539***
	(0.10)	(0.06)	(−2.56)	(−1.03)	(−0.67)	(−1.78)	(−2.36)	(−3.47)	(−5.40)	(−5.43)	(−4.75)
γ_{mt}	0.00100	0.00257	0.00620***	0.0111***	0.0155***	0.0167***	0.0157***	0.0154***	0.0161***	0.0208***	0.0198***
	(0.55)	(1.64)	(3.68)	(6.83)	(6.36)	(8.33)	(8.38)	(7.71)	(6.33)	(7.43)	(7.66)
$LIQ_{m,t}$	0.000213	0.000179	0.000479***	−0.0000262	0.0000593	0.0000822	0.000361**	0.000326***	0.000778***	0.000781**	0.000567*
	(1.04)	(1.11)	(2.88)	(−0.21)	(0.20)	(0.42)	(2.53)	(2.61)	(4.66)	(2.46)	(1.87)
α_p	−0.00494	0.0000561	0.00854***	0.00514*	0.00653	0.0123**	0.0140***	0.0180***	0.0286***	0.0355***	0.0405***
	(−0.97)	(0.01)	(3.03)	(1.82)	(1.17)	(2.56)	(3.17)	(4.22)	(6.44)	(7.08)	(6.58)
Panel 1B: IND	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	0.964***	0.943***	1.028***	1.036***	1.028***	1.012***	1.002***	1.000***	1.024***	0.866***	−0.0987*
	(23.38)	(35.71)	(79.87)	(37.37)	(69.55)	(61.90)	(57.43)	(52.89)	(28.50)	(18.56)	(−1.79)
β_{smb}	−1.282*	−0.154	−0.310*	−0.101	−0.279*	−0.324***	−0.179	−0.0692	−0.202	0.0697	1.352***
	(−1.66)	(−0.72)	(−1.82)	(−0.49)	(−1.80)	(−2.87)	(−0.94)	(−0.29)	(−0.84)	(0.17)	(2.59)
β_{hml}	−0.711	−0.0170	−0.212*	−0.0881	−0.227*	−0.230**	−0.0897	−0.121	−0.129	−0.0000462	0.711**
	(−1.29)	(−0.12)	(−1.92)	(−0.51)	(−1.88)	(−2.14)	(−0.73)	(−0.61)	(−0.53)	(−0.00)	(2.10)
β_{mom}	0.0941	−0.00691	0.135	0.291**	0.187**	0.338***	0.128	0.272**	0.452***	0.118	0.0242
	(0.43)	(−0.08)	(1.42)	(2.05)	(2.30)	(2.66)	(1.34)	(2.26)	(3.52)	(0.95)	(0.12)
γ_{mt}	1.329**	1.641***	1.528***	1.310***	1.721***	1.680**	1.821***	1.871**	2.268*	3.945**	2.616
	(2.16)	(2.83)	(3.95)	(3.29)	(2.83)	(2.57)	(2.77)	(2.57)	(1.89)	(2.03)	(1.20)
$LIQ_{m,t}$	−0.0468	−0.0220	−0.00538	−0.0124	−0.00327	0.0124	0.0112	0.00150	0.0414**	0.0210*	0.0678
	(−0.86)	(−0.73)	(−0.22)	(−0.34)	(−0.14)	(0.39)	(0.44)	(0.05)	(1.99)	(1.75)	(1.18)
α_p	−0.0149	−0.00322	−0.0123**	−0.0190*	−0.0117**	−0.0218***	−0.00642	−0.0139	−0.0248***	0.00570	0.0206
	(−0.97)	(−0.50)	(−2.09)	(−1.90)	(−2.16)	(−2.58)	(−0.99)	(−1.61)	(−2.70)	(0.74)	(1.62)
Panel 1C: MAL	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P10-P1
β_{mp}	1.040***	1.034***	1.065***	1.060***	1.038***	1.052***	1.061***	1.048***	1.052***	1.047***	0.00688
	(13.70)	(14.29)	(15.81)	(17.11)	(15.48)	(15.24)	(15.63)	(15.08)	(14.04)	(12.62)	(0.17)
β_{smb}	3.213***	1.960**	1.588**	1.266*	0.896	1.384*	1.474*	1.762*	2.076**	2.737**	−0.476
	(3.49)	(2.21)	(2.41)	(1.72)	(1.01)	(1.73)	(1.66)	(1.82)	(2.08)	(2.10)	(−0.68)
β_{hml}	2.387***	1.666***	1.415***	1.189**	0.960	1.208**	1.297**	1.404**	1.533**	1.659**	−0.728
	(4.29)	(3.09)	(3.54)	(2.51)	(1.64)	(2.27)	(2.31)	(2.41)	(2.53)	(2.18)	(−1.61)

β_{mom}	0.0360	0.0385	0.211	−0.0350	0.109	−0.0142	0.141	0.268*	0.159	0.0173	−0.0186
	(0.18)	(0.22)	(1.38)	(−0.25)	(0.58)	(−0.08)	(0.98)	(1.88)	(0.90)	(0.08)	(−0.07)
γ_{mt}	0.000500	0.000605	0.000651	0.000669	0.000769*	0.000972**	0.00115**	0.00115***	0.00151***	0.00188***	0.00138***
	(1.03)	(1.23)	(1.42)	(1.46)	(1.68)	(2.19)	(2.55)	(2.67)	(3.39)	(3.93)	(3.72)
$LIQ_{m,t}$	−0.000221***	−0.000256***	−0.000246***	−0.000214***	−0.000222***	−0.000216	−0.000221	0.000231***	0.000237***	0.000191***	0.0000303
	(−4.76)	(−5.73)	(−5.52)	(−4.07)	(−3.88)	(1.45)	(0.95)	(3.76)	(4.36)	(3.40)	(0.70)
α_p	0.000298	0.00630	0.000785	0.0122*	0.00659	0.0133	0.00739	0.00324	0.0107	0.0202*	0.0199**
	(0.03)	(0.68)	(0.10)	(1.65)	(0.76)	(1.46)	(1.00)	(0.49)	(1.25)	(1.79)	(2.00)

6. Conclusion and summary

Unlike the prior studies which was focused only on the role of liquidity timing ability of mutual fund in the develop markets, we presently aim to examine the ability of mutual fund manager to time the market wide liquidity in emerging markets. We provided the evidence of liquidity timing based on cross-country comparison. During our sample period between 2001 and 2017, we found that the equity mutual fund managers in ASEAN Economic Community successfully time the market liquidity. We further demonstrated that the best performing portfolios have the ability to time the market wide liquidity in all markets, while all the worst performing portfolios have negative or zero liquidity timing ability in all markets. Our finding suggests that the liquidity timing is another source of positive abnormal return of mutual funds.

References

1. Amihud Y. Illiquidity and stock returns: cross-section and time-series effects. *J Financ Mark*. 2002;5(1):31−56.
2. Anderson RC, Mansi SA, Reeb DM. Board characteristics, accounting report integrity, and the cost of debt. *J Account Econ*. 2004;37(3):315−342.
3. Bekaert G, Harvey CR, Lundblad C. Liquidity and expected returns: lessons from emerging markets. *Rev Financ Stud*. 2007;20(6):1783−1831.
4. Bodson L, Cavenaile L, Sougné D. A global approach to mutual funds market timing ability. *J Empir Finance*. 2013;20:96−101.
5. Bollen NPB, Busse JA. On the timing ability of mutual fund managers. *J Finance*. 2001;56(3):1075−1094. https://doi.org/10.1111/0022-1082.00356.
6. Brown S, Rhee SG, Zhang L. The return to value in Asian stock markets. *Emerg Mark Rev*. 2008;9(3):194−205.
7. Busse JA. Volatility timing in mutual funds: evidence from daily returns. *Rev Financ Stud*. 1999;12(5):1009−1041.
8. Cao C, Chen Y, Liang B, Lo AW. Can hedge funds time market liquidity? *J Financ Econ*. 2013a;109(2):493−516.
9. Cao C, Simin TT, Wang Y. Do mutual fund managers time market liquidity? *J Financ Mark*. 2013b;16(2):279−307.
10. Carhart MM. On persistence in mutual fund performance. *J Finance*. 1997;52(1):57−82.
11. Fama EF, French KR. Common risk factors in the returns on stocks and bonds. *J Financ Econ*. 1993;33(1):3−56.
12. Ferreira MA, Keswani A, Miguel AF, Ramos SB. The determinants of mutual fund performance: a cross-country study. *Rev Finance*. 2013;17(2):483−525.
13. Ferson W, Mo H. Performance measurement with selectivity, market and volatility timing. *J Financ Econ*. 2016;121(1):93−110.
14. Ferson WE, Schadt RW. Measuring fund strategy and performance in changing economic conditions. *J Finance*. 1996;51(2):425−461.
15. Fung H-G, Xu XE, Yau J. Global hedge funds: risk, return, and market timing. *Financ Anal J*. 2002;58(6):19−30.
16. Graham J, Harvey C. *Grading the Performance of Market-timing Newsletters*. vol. 53. 1997.
17. Huij J, Post T. On the performance of emerging market equity mutual funds. *Emerg Mark Rev*. 2011;12(3):238−249. https://doi.org/10.1016/j.ememar.2011.03.001.
18. Jiang GJ, Yao T, Yu T. Do mutual funds time the market? Evidence from portfolio holdings. *J Financ Econ*. 2007;86(3):724−758. https://doi.org/10.1016/j.jfineco.2006.09.006.
19. Jun S-G, Marathe A, Shawky HA. Liquidity and stock returns in emerging equity markets. *Emerg Mark Rev*. 2003;4(1):1−24. https://doi.org/10.1016/S1566-0141(02)00060-2.
20. Kang W, Zhang H. Measuring liquidity in emerging markets. *Pac Basin Finance J*. 2014;27:49−71. https://doi.org/10.1016/j.pacfin.2014.02.001.
21. Karstanje D, Sojli E, Tham WW, Van der Wel M. Economic valuation of liquidity timing. *J Bank Finance*. 2013;37(12):5073−5087.
22. Lam KS, Tam LH. Liquidity and asset pricing: evidence from the Hong Kong stock market. *J Bank Finance*. 2011;35(9):2217−2230.
23. Lesmond DA. Liquidity of emerging markets. *J Financ Econ*. 2005;77(2):411−452.
24. Newey WK, West KD. Hypothesis testing with efficient method of moments estimation. *Int Econ Rev*. 1987:777−787.
25. Treynor J, Mazuy K. Can mutual funds outguess the market. *Harv Bus Rev*. 1966;44(4):131−136.
26. Wattanatorn W, Padungsaksawasdi C, Nathaphan S, Chunhachinda P. *Liquidity Timing in the Higher Moment Framework: Evidence from Bank Affiliated Fund*. 2016.