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A study on the effect of stock liquidity and stock liquidity risk on information asymmetry: Evidence from Tehran Stock Exchange

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A B S T R A C T

This study investigates the effect of stock liquidity and stock liquidity risk on information asymmetry in Tehran Stock Exchange (TSE) listed companies. In this study, the bid-ask spread is considered as the criterion of information asymmetry. In addition, stock trade volume and the number of stock trades are considered as the criteria of stock liquidity. Some variables such as size, stock price, beta and growth are also considered as control variables. To test the hypotheses of the survey, 202 TSE listed companies over the period 2007-2012 are considered based on the multiple regression (Panel) method. The evidence shows that both proposed criteria, stock liquidity criterion as well as the stock trade volume and the number of stock trades, had negative effects on information asymmetry, but this effect is not statistically meaningful. In addition, evidence shows that stock liquidity risk had positive effect on information asymmetry, which is statistically meaningful. Research results also show that firm size and beta had positive and meaningful effects on information asymmetry. Finally, the results show that growth and stock price had negative meaningful effects on information asymmetry.

1. Introduction

During the past few years, there have been many studies on the effects of various factors on information asymmetry (Amihud et al., 2006). Amihud (2002) demonstrated that over time, expected market illiquidity positively influences ex ante stock excess return, implying that expected stock excess return partly represents an illiquidity premium. In addition, stock returns were negatively associated over time with contemporaneous unexpected illiquidity. Avramov and Chordia (2006) developed a framework, used for single securities to examine whether asset pricing models could describe the size, value, and momentum anomalies. Stock level beta was permitted to change with

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firm-level size and book-to-market as well as with macro-economic variables. They reported that none of the investigated models could capture any of the market anomalies with constant beta but under non-fixed beta, the size and value effects could be explained.

Brown and Hillegeist (2007) investigated two potential mechanisms through which disclosure quality could reduce information asymmetry. The first one was altering the trading incentives of informed and uninformed investors and the second one was associated with reducing the likelihood that investors discover and trade on private information. Their results indicated that the negative association between disclosure quality and information asymmetry was created by the latter reason. In their survey, information asymmetry was negatively associated with the quality of the annual report and investor relations activities.

Butler et al. (2005) explained that stock market liquidity was an important determinant of the expenses of raising external capital. They reported find that, ceteris paribus, investment banks' fees were significantly lower for firms with more liquid stock based on a large sample of seasoned equity offerings. They forecasted that the difference in the investment banking expenses for firms in the most liquid versus the least liquid quintile was about 101 basis points or 21% of the average investment banking fee. They reported that firms could reduce the cost of raising capital by improving the market liquidity of their stock.

Chang et al. (2010) studied the liquidity/stock returns linkage based on data from the Tokyo Stock Exchange. They reported a substantially negative (positive) relationship between liquidity (illiquidity) proxies and returns. They also reported that while the expansionary phases largely confirm the overall finding, contractionary phases did not. They also controlled for liquidity variability in the cross-sectional regressions and reported that the role of the liquidity level indicated strong significance across business cycles, different sub-periods and all Sections of the exchange. In terms of liquidity variability, they reported a strong, significant, and negative association with stock returns.

Fang et al. (2009) studied the relationship between stock liquidity and firm performance and reported that firms with liquid stocks had better performance as measured by the firm market-to-book ratio. The result was robust to the inclusion of industry or firm fixed effects, a control for idiosyncratic risk, a control for endogenous liquidity based on two-stage least squares, and the implementation of alternative measures of liquidity. To determine the causal impact of liquidity on firm performance, they studied an exogenous shock to liquidity and reported that the increase in liquidity around decimalization could improve firm performance. They also reported that liquidity could increase the information content of market prices and of performance-sensitive managerial compensation.

Lipson and Mortal (2009) investigated the relationship between equity market liquidity and capital structure and reported that firms with more liquid equity had lower leverage and prefer equity financing when raising capital. For instance, after sorting companies into size quintiles and then into liquidity quintiles, the average debt-to-asset ratio of the most liquid quintiles was about 38% while the average for the least liquid quintiles was 55%. Liu (2006) reported a significant liquidity premium robust to the capital asset pricing model and the Fama–French three-factor model and explained that liquidity was an important source of priced risk based on a new measure of liquidity.

2. The proposed study

This study investigates the effect of stock liquidity and stock liquidity risk on information asymmetry in Tehran Stock Exchange (TSE) listed companies. In this study, the bid-ask spread is considered as the criterion of information asymmetry. In addition, stock trade volume and the number of stock trades are considered as the criteria of stock liquidity. Some variables such as size, stock price, beta and growth are also considered as control variables. To test the hypotheses of the survey, 202 TSE listed companies over the period 2007-2012 are considered based on the multiple regression (Panel)

method. In this survey, we only consider the shares of the companies whose fiscal year was ended March and they did not change their fiscal year during the study. In addition, the study assumes that all required information were available. The proposed study considers the following regression analysis,

$$Informaion\ Asymmetry_{i,t}\ (BAS_{i,t}) = \beta_0 + \beta_1 Stock\ Liquidity_{i,t} + \beta_2 Stock\ Liquidity\ Risk_{i,t} + \beta_3 Size_{i,t} + \beta_4 Price_{i,t} + \beta_5 Beta_{i,t} + \beta_6 Growth_{i,t} + \varepsilon_{i,t}, \quad (1)$$

where $Informaion\ Asymmetry_{i,t}$ represents information asymmetry of share i at time t and it is calculated by taking the mean values of bed and ask prices as follows,

$$IA_{i,t}\ (Bid\text{-}Ask\ Spread_{i,t}) = (Ask\ Price_{i,t} - Bid\ Price_{i,t}) / ((Ask\ Price_{i,t} + Bid\ Price_{i,t})/2) \times 100, \quad (2)$$

where $Bid\text{-}Ask\ Spread_{i,t}$ states the difference between bed and ask prices. In addition, $Liquidity_{i,t}$ represents the liquidity of shares, which is measured based on the volume of shares traded ($Volume_{i,t}$) as well as the number of shares transactions ($Trade_{i,t}$). $Liquidity\ Risk_{i,t}$ represents the risk liquidity and using the method proposed by Pastor and Stambaugh (2003), this variable is calculated as follows,

$$Liq.Risk_{i,t} = (V_{i,t} - M(V_{i,t})) / S(V_{i,t}), \quad (3)$$

where $V_{i,t}$ represents average price between buy and sell, $M(V_{i,t})$ and $S(V_{i,t})$ represent the mean and standard deviation of prices for the whole study. Finally, the study considers four control variables for the regression model: $Size_{i,t}$ and $Price_{i,t}$ represent the natural logarithm of market value and the last closing price of shares of firm i at time t, respectively. In addition, $Beta_{i,t}$ represents the systematic risk of shares of firm i at time t, which is calculated by calculating the beta shares. Finally, $Growth_{i,t}$ represents the growth of the firm, which is calculated based on the ratio of market share on book value of sum of equities. Table 1 shows some basic statistics associated with the proposed study as follows,

Table 1
The summary of some basic statistics

	Control variables				Independent variables			Dependent
Statistics	*GROWTH*	*BETA*	*PRICE*	*SIZE*	*LIQRISK*	*VOLUME*	*TRADE*	*IA*
Mean	1.809384	0.259754	7.960206	26.76063	-6.60E-08	78708816	7686.115	0.694222
Median	1.432620	0.220595	7.864450	26.63777	-0.330510	9529200.	1601.500	0.463220
Max	57.61422	27.75468	11.16860	31.54480	10.11396	3.64E+09	170322.0	1.999610
Min	-108.0358	-186.2485	5.866500	22.70233	-0.823700	158.0000	9.000000	-0.633910
Standard	4.274825	5.936145	0.918005	1.540319	0.997934	2.56E+08	17835.60	0.643543
Skewness	-12.63394	-25.81000	0.504962	0.476418	4.099448	7.454277	4.932561	0.643324
Kurtosis	398.6639	807.8442	2.768610	3.000158	26.49275	76.56196	33.10805	2.015972
# of	1212	1212	1212	1212	1212	1212	1212	1212

As we can observe from the results of Table 1, some variables have positive kurtosis. We have performed Jarque–Bera test to verify whether the data are normally distributed or not and Table 2 shows details of the results of our survey.

Table 2
The summary of Jarque–Bera test

Control variables				Independent variables			Dependent
GROWTH	*BETA*	*PRICE*	*SIZE*	*LIQRISK*	*VOLUME*	*TRADE*	*IA*
7938015.	32847156	54.21104	45.84870	31266.11	284498.2	50692.67	132.5007
(0.000000)	(0.000000)	(0.000000)	(0.000000)	(0.000000)	(0.000000)	(0.000000)	(0.000000)

As we can observe from the results of Table 2, all variables are normally distributed when the level of significance is five percent. Our further investigation indicates that all data are stationary. Table 2 shows details of our survey on correlation ratios between different pairs of independent and control variables.

Table 2
The summary of correlations ratios

	IA	*TRADE*	*VOLUME*	*LIQRISK*	*SIZE*	*PRICE*	*BETA*	*GROWTH*
IA	1.000000							

TRADE	0.064690	1.000000						
	0.0243	-----						
VOLUME	0.104487	0.818923	1.000000					
	0.0003	0.0000	-----					
LIQRISK	0.126809	0.301446	0.340755	1.000000				
	0.0000	0.0000	0.0000	-----				
SIZE	0.125548	0.440346	0.392068	0.339863	1.000000			
	0.0000	0.0000	0.0000	0.0000	-----			
PRICE	0.034024	-0.080654	-0.096518	0.350657	0.288868	1.000000		
	0.2366	0.0050	0.0008	0.0000	0.0000	-----		
BETA	0.039871	0.038232	0.037618	0.045350	0.069761	0.026123	1.000000	
	0.1654	0.1835	0.1906	0.1146	0.0151	0.3635	-----	
GROWTH	-0.060493	0.030936	0.013729	0.117981	0.107542	0.223042	0.005767	1.000000
	0.0352	0.2819	0.6330	0.0000	0.0002	0.0000	0.8410	-----

The results of Table 2 indicate that there were not strong correlations among independent and control variables except the case of TRADE and VOLUME, which represents a strong and positive correlation. Therefore, we need to consider the effects of TRADE and VOLUME, separately and to do this; we need to perform four models. The first 2 models, model 1 and model 2, the effects of market liquidity, number of shares traded and risk of shares liquidity on information asymmetry are considered and the second model, Model 2, takes into account the effects of control variables as well. In model 3 and model 4, we consider the impacts of market liquidity and volume of trades on information asymmetry. Similarly, in the last model, model 4, we consider the impact of control variables. The implementation of F-Limer test are summarized in Table 3 as follows,

Table 3
The summary of F-Limer test

		Model 1	Model 2	Model 3	Model 4
With or without effects	Limer F	0.615122	1.438609	0.615289	1.440691
	P-value	(1.0000)	(0.0002)	(1.0000)	(0.0002)
Fixed/Random effect	Chi-Square	-	150.808611	-	151.175926
	P-value	-	(0.0000)	-	(0.0000)

The results of Table 3 show that for models 1 and 3, we need to use combined model without effects while for model 2 and 4, we need to use fixed effect model.

3. The results

In this section, we present details of our findings on testing various hypotheses of the survey based on four models. Table 4 summarizes the results of our survey. Based on the results of Table 4, we observe that both proposed criteria, stock liquidity criterion as well as the stock trade volume and the number of stock trades, had negative effects on information asymmetry, but this effect is not statistically meaningful. In addition, evidence shows that stock liquidity risk had positive effect on information asymmetry, which is statistically meaningful. Research results also show that firm size and beta had positive and meaningful effects on information asymmetry. Finally, the results show that growth and stock price had negative meaningful effects on information asymmetry.

Table 4
The summary of regression model for four models

Variable	Statistics	Model 1	Model 2	Model 3	Model 4
C	Coefficient	0.656178	-16.03865	0.655473	-16.04158
	P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)
TRADE	Coefficient	-1.32E-07	-2.83E-09		
	P-value	(0.2193)	(0.9731)		
VOLUME	Coefficient			-5.26E-12	-1.89E-13
	P-value			(0.1375)	(0.9722)
LIQRISK	Coefficient	0.122396	0.147977	0.122060	0.148111
	P-value	(0.0000)	(0.0000)	(0.0000)	(0.0000)
SIZE	Coefficient		0.811594		0.811742
	P-value		(0.0000)		(0.0000)
PRICE	Coefficient		-0.623104		-0.623241
	P-value		(0.0000)		(0.0000)
BETA	Coefficient		0.002421		0.002421
	P-value		(0.0838)		(0.0838)
GROWTH	Coefficient		-0.014624		-0.014619
	P-value		(0.0056)		(0.0056)
	F-value	23.49449	3.735210	23.22915	3.737005
		(0.000000)	(0.000000)	(0.000000)	(0.000000)
	R^2	0.037412	0.435063	0.037005	0.435181
		(0.035820)	(0.318587)	(0.035412)	(0.318729)
Normality test	Durbin-Watson	1.761306	1.969840	1.760563	1.969830
	Jarque–Bera	104.3648	73.25685	104.4104	73.25618
	P-value	(0.000000)	(0.000000)	(0.000000)	(0.000000)

4. Conclusion

In this study, we have studied the effect of stock liquidity and stock liquidity risk on information asymmetry on firms listed on Tehran Stock Exchange. The proposed study has considered the bid-ask spread as the criterion of information asymmetry and stock trade volume and the number of stock trades have been considered as the criteria of stock liquidity. In addition, size, stock price, beta and growth of firms have been considered as control variables. To test the hypotheses of the survey, 202 TSE listed companies over the period 2007-2012 have been considered based on the multiple regression (Panel) method. The results have confirmed that both proposed criteria, stock liquidity criterion as well as the stock trade volume and the number of stock trades, had negative effects on information asymmetry, but this effect is not statistically meaningful. In addition, evidence shows that stock liquidity risk had positive effect on information asymmetry, which is statistically meaningful. Research results also show that firm size and beta had positive and meaningful effects on information asymmetry. Finally, the results show that growth and stock price had negative meaningful effects on information asymmetry.

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