After-market liquidity and IPOs underpricing: Evidence

from Shari'ah and non Shari'ah-based firms

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Abstract: The underpricing of initial public offerings (IPOs) is generally explained with asymmetric information and risk. We complement these traditional explanations with a new theory proposed by Ellul and Pagano (2006) where investors worry also about the after-market illiquidity that may result from asymmetric information after the IPO. The less liquid the after-market is expected to be, the larger will be the IPO underpricing. The samples are the 41 IPOs carried out between 2001-2005. The samples are 7 Shari'ah-based firms and 34 non Shariah-based firms. Shariah-based firms are those included in Jakarta Islamic Index (JII), at least one period (one semester). Regression results show that the relationship between after-market liquidity and underpricing is insignificant unless we use trading frequency as proxy for liquidity for non Shariah-based firms.

Key words: after-market liquidity; initial public offering; underpricing; Shari'ah-based firms

1. Introduction

Ellul and Pagano (2006) provide a model showing that an IPO that is expected to be more illiquid should feature higher underpricing. They model after-market illiquidity as stemming from the asymmetric information that persists after the IPO stage. Equilibrium stock returns must compensate investors for the losses expected from trading with better informed investors and for the associated risk. In the model, there are two types of private information: a signal that becomes public as soon as shares start trading after the IPO, and some residual private information that is disclosed at some later date. The first type of private information creates the standard adverse selection problem at the IPO stage, while the second determines an adverse selection problem in the aftermarket and is reflected in the bid-ask spread. IPO underpricing will impound also the costs caused by the latter, to the extent that some investors expect to liquidate their shares in the after-market. One example of these investors are the so-called flippers, who buy the stock at the IPO with a view of selling it immediately after.

So far, the relationship between returns and liquidity has been analyzed only with reference to seasoned securities unless by Ellul and Pagano (2006). Our research can be seen as extending the insights from this literature to the primary equity market. If seasoned securities pay a liquidity premium, it is reasonable to expect also stocks on the primary market to pay such premium, especially if the market for IPO shares is much less liquid than that for seasoned issues.

The study of IPOs in the Islamic capital market is of interest because IPOs in Islamic capital market are

smaller than those launched in non Islamic capital market. Furthermore, the characteristics of Shariah-based firms are different from the characteristics of non Shariah-based firms. We thus hope to shed light on whether the characteristics and the institutional setting of Shariah-based firms might affect the relationship between after-market liquidity and IPO underpricing. This research makes two distinct contributions to the literature concerning the relationship between after-market liquidity and IPO underpricing. First, we use Shariah-based firms as sample. Second, we use five different measures to calculate the after-market liquidity: quote price, effective price, trading volume, trading turnover and trading frequency.

The remainder of the paper is organized as follows. In section 2, we provide a brief literature review concerning the relationship between the liquidity and the stock returns. Section 3 describes the methodology of this paper. Section 4 describes the results. And section 5 describes the conclusion and remarks for the future research.

2. Literature review

Many studies argue that illiquid securities provide investors with a higher expected return to compensate them for the larger trading costs they have to bear. The first paper to model and test the relationship between after-market liquidity and returns in the context of unseasoned securities is Ellul and Pagano (2006). The model's predictions are supported by evidence for 337 British IPOs carried out between 1998 and 2000. Using various measures of liquidity, they find that expected after-market liquidity is important determinant of IPO underpricing.

In the context of seasoned securities, the first study to model that relationship is Amihud and Mendelson (1986). They argue that investors require a premium for holding illiquid stocks (measured by bid-ask spread) and that there is a clientele effect whereby investors with longer holding periods will own assets with larger spreads. Implication is that by helping to increase liquidity, firms can lower their cost of capital. The paper, an early microstructure paper, examines the effect of illiquidity (defined as the cost of immediate execution) on asset pricing. The bid-ask spread is one such cost. Their study is on NYSE/AMEX stocks and the period is 1961-1980.

Other studies confirm the suggestion of Amihud and Mendelson (1986) that illiquidity is priced. Eleswarapu (1997) finds evidence that the level of the spread determines stock returns on the Nasdaq. Datar, Narayan and Radcliffe (1998) find support for this suggestion on the NYSX by using turnover ratio as proxy variable for liquidity. Also Brennan, Chordia and Subrahmanyam (1998) find that asset returns are strongly negatively related to trading volume.

Moreover, Amihud (2002) finds further confirmation that illiquidity contributes to the explanation of the cross-section of expected returns. In addition to that, he shows that, over time, expected market illiquidity has positive impact on expected returns. He uses data on NYSE stocks, 1963-1996.

Butler, Grullon and Weston (2005) shows that stock market liquidity is an important determinant of the cost of raising external capital. Using 2,387 seasoned equity offerings (SEOs) from 1993-2000, they find that, after controlling for other factors, investment banks charge lower fees to firms with more liquid stocks. They also find that the time to complete an SEO declines with the level of market liquidity. These results imply that stock market liquidity may affect the value of a firm through its effect on flotation costs. The sample is firms listed on Nasdaq, Amex, and NYSE.

The relationship between liquidity and returns is not only found in USA, but also in Japan. Fang, Sun and Wang (2006) conduct a study on the relationship between illiquidity and stock returns among stocks listed on the Tokyo Stock Exchange. They find that illiquidity has a positive impact on stock returns in Japan in general but not

in the second sub-sample period of 1990-1999.

Liquidity affects also the returns of fixed-income securities, according to several studies. Among these is by Goldreich, Hanke and Nath (2002) who investigate the impact of expected liquidity on current securities' prices. They analyze the prices of Treasury securities as their liquidity changes predictably, in the transition from on-the-run to the less liquid off-the-run status. They show that more liquid securities command higher prices, but this liquidity premium depends on the expected future liquidity over their remaining lifetime rather than on their current liquidity.

3. Methodology

3.1 Sample and data

Table 1   Number of IPOs and underpricing over 2001-2005

Year	No. of IPOs	Underpricing	Overpricing
2005	8	7	1
2004	12	10	0
2003	6	4	1
2002	22	18	2
2001	29	25	3
Total (%)	77 (100%)	64 (83.12%)	7 (9.09%)

Notes: This table shows us the number of initial public offerings (IPOs) every year from 2001-2005. Underpricing is positive initial returns as firms go public. It means that the stock price at the IPO stage will jump subsequently (The close price is higher than the offer price at IPO stage). The window period of underpricing is one day. Overpricing is negative initial returns as firms go public. At this condition, the close price is lower than the offer price at IPO stage. The window period is one day.

Table 2   Number of samples categorized into Shari'ah and non Shari'ah

Year	Full sample	Shari'ah firms	Non Shari'ah firms
2005	4	0	4
2004	7	2	5
2003	2	1	1
2002	10	3	7
2001	18	1	17
Total (%)	41 (100%)	7 (17.07%)	34 (82.93%)

Notes: This table reports IPO samples carried out between 2001-2005. The sample of this research has the following criteria: common stock offerings, and non-financial firms. Final sample (full sample) is 41 firms. They are categorized into Shariah-based and non Shariah-based firms. The first covers 7 companies, and the latter consists of 34 companies. Shariah-based firms are those included in Jakarta Islamic Index (JII), at least one period (one semester). JII is published twice a year. JII consists of 30 companies.

Population of this research is the firms listed in Indonesian Stock Exchange (IDX). Target population is the firms that went public over period January 2001 to December 2005. The sample of this research must meet the following criteria: common stock offerings (both unit-offerings and non unit-offerings), and non-financial firms. This research does not use the financial firms as sample because the level of asymmetric information between non-financial firms and financial institutions is quite different (Rahman & Yung, 1999; Badrinath, Kale & Ryan, 1996; Alli, Yau & Yung, 1994). The firms that went public over 2001 to 2005 are 77 (see Table 1). Financial firms are twenty five. Nine firms are not underpriced (two Shariah-based and seven non Shariah based firms). Two firms are excluded since we do not find the data needed related to this research. Final sample (full sample) is 41 firms. They are divided into Shariah-based and non Shariah-based firms. The first covers 7 companies, and the

latter consists of 34 companies (see Table 2). Shariah-based firms are those included in Jakarta Islamic Index (JII), at least one period (one semester). JII is published twice a year. JII covers thirty companies. Data were taken from JSX statistics, Indonesian capital market directory (ICMD), and prospectus.

3.2 Variables

Variables in this research are positive initial return at IPO, expected liquidity, standard deviation of market return prior to IPO, firm age, sales by insiders, and gross proceeds from offering at IPO.

Underpricing is measured by raw return. The window period of underpricing is the first trading day. The underpricing is the return earned on the 1st day of trading on the stock exchange and is defined as follows:

$$UP = log(P_1/P_0)$$

where, UP = underpricing, P_1 = close price on the 1st day of trading, P_0 = offer price.

This measure differs slightly from that used in the literature, which is the percent return from the offer price to the after-market price $(P_1-P_0)/P_0$. We rely on the former measure of underpricing for one reason—from a statistical point of view, the $log(P_1/P_0)$ is much closer to a normally-distributed variable than the measure $(P_1-P_0)/P_0$ so far used in the literature.

After-market liquidity is the liquidity after the stocks immediately sold at the IPO. The window period of liquidity is one month trading (20 trading days) after IPO. We assume there is no company action over that period. We use five measures to calculate the liquidity. They are quote spread, effective spread, trading volume, turnover ratio and number of trading transactions. Quote spread is average daily quote for 20 trading days after IPO. Daily quote is measured with $(Q_A-Q_B)/M$, where Q_A=ask price, Q_B=bid price and M=mid quote. Effective spread is average daily effective spread for 20 trading days after IPO. Daily effective spread is measured with $2|P-M|/M$, where P=close price and M=mid quote. Trading volume is logarithm of average daily volume for 20 trading days after IPO. Trading turnover ratio is average daily turnover ratio for 20 trading days after IPO. Daily turnover is defined as trading volume divided by outstanding common stocks. Trading frequency is logarithm of average daily trading frequency for 20 trading days after IPO.

Volatility of daily market return is standard deviation of daily return on the security exchange 20 trading days before IPO, an indicator for the market uncertainty surrounding a new issue. Firm age is logarithm of establishment of the company to the date of its IPO. Age is a useful proxy for risk. Ritter (1991) finds that there is a strong negative relationship between age of the firm and the IPO initial return. Sales by insiders is the amount of shares (in percentage) sold by insiders. If the initial owners know that their company is of low quality, at the IPO stage they will sell a large stake, as in the adverse selection model by Leland and Pyle (1977). Proceeds is another proxy for risk. It is logarithm of fund raised in the IPO. It reflects the maintained hypothesis that smaller offerings are more speculative (Beatty & Ritter, 1986).

3.3 Regression model

The basic objective of this research to identify the relationship between the expected liquidity and the initial returns in unseasoned market. To do so, in the first part we run the regressions for the full sample. Then, we run the regressions for the sample of Shari'ah-based firms. And finally, we run the regression for the sample of non Shari'ah-based firms. Along with the control variables, we have built the following regression model to find out the relationship between liquidity and initial returns at IPO stage as following:

$$UP = β_0 + β_1LIQ + β_2MKTSTD + β_3LogAGE + β_4SALESbyINS + β_5LogPROCEEDs + ε_i \qquad (1)$$

where, UP = underpricing (the first day positive initial return) defined as $log(P_1/P_0)$ where P_1= close price on the 1st day of trading and P_0=offer price; LIQ = after-market liquidity, using 5 measures such as quote spread,

effective spread, logarithm of trading volume, trading turnover, and logarithm of trading frequency; MKTSTD=standard deviation of market return prior to IPO, Log*AGE*= logarithm of establishment of the company to the date of its IPO, *SALESbyINS*= percentage of shares sold by insiders at the IPO stage and Log*PROCEEDs*= logarithm of gross proceeds at the IPO.

4. Results

Table 3 and Table 4 report descriptive statistics about underpricing, liquidity measures, market standard deviation, the firm age, sales by insiders, and proceeds from the offerings at IPO for Shari'ah-based and non Shari'ah-based firms. The level of underpricing between Shari'ah and non Shari'ah-based firms is quite different. For Shariah-based firms, the highest underpricing is 69.23% and the lowest is 3.33%. The standard deviation is 27.77%. The mean is 37.71%. The median is 45.71%. For non Shari'ah-based firms, the highest underpricing is 204% and the lowest is 3.85%. The standard deviation is 59.47%. The mean is 60.27% and the median is 30.33%.

Table 3   Descriptive statistics—Shari'ah-based firms

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Underpricing (%)	37.71	45.71	27.77	3.33	69.23
Quote spread (%)	2.57	1.87	1.507	1.18	4.84
Effective spread (%)	2.57	1.87	1.507	1.18	4.84
Volume (1,000 shares)	22,430.07	8,345.65	23,945.31	693.30	60,733.88
Turnover (%)	3.26	2.69	3.33	0.12	10.43
Frequency (times)	321.49	246.00	241.73	43.45	664.50
Market standard deviation (%)	1.27	1.10	0.54	0.69	2.40
Firm Age (years)	18.39	21.81	12.76	2.62	31.70
Insiders' sales (%)	24.68	30.00	12.86	7.21	45.05
Proceeds (million rupiahs)	387,571.29	59,578.20	704,900.13	10,000.00	1,944,444.00

Notes: This table reports statistics about underpricing, liquidity measures, market standard deviation, age of the firm, insiders' sales and gross proceeds at IPO for the 7 IPOs (Shari'ah-based firms) carried out between January 2001-December 2005. Underpricing is measured with $(P_I-P_0)/P_0$, where P_I = close price on the 1st day of trading, and P_0 = offer price; liquidity measures cover quote spread, effective spread, trading volume, trading turnover, and trading frequency. Quote spread is average daily quote for 20 trading days after IPO. Daily quote spread is measured with $(Q_A-Q_B)/M$, where Q_A=ask price, Q_B=bid price, and M=mid quote. Effective spread is average daily effective spread for 20 trading days after IPO. Daily effective spread is measured with $2|P-M|/M$, where P=close price, dan M=mid quote. Trading volume is average daily trading volume for 20 trading days after IPO. Trading turnover ratio is average daily turnover ratio. Daily turnover is measured with trading volume divided by outstanding common stocks. Trading frequency is average daily frequency for 20 trading days after IPO. Market standard deviation is standard deviation of daily return on the security exchange 20 trading days prior to IPO. Firm age is the establishment of the company to the date of its IPO (in years). Insiders' sales is the amount of shares sold by insiders at the IPO stage. Proceeds is gross proceeds at the IPO (in rupiahs).

For all measures of liquidity, it is found that non Shari'ah stocks are more illiquid than Shari'ah stocks. For non Shari'ah stocks, the mean of quote spread is 4.26%, the mean of effective spread is 3.91%, the mean of trading volume is 6,833,150 shares, the mean of trading turnover is 2.34%, and the mean of trading frequency is 180.41 times. For Shari'ah stocks, the mean of quote spread is 2.57%, the mean of effective spread is 2.57%, the mean of trading volume is 22,430,070 shares, the mean of trading turnover is 3.26%, and the mean of trading frequency is

321.49 times. The higher (the lower) the quote spread or effective spread, the more illiquid (liquid) the stocks. The higher (the lower) the volume or the turnover or the trading frequency, the more liquid (illiquid) the stocks.

Table 4   Descriptive statistics—non Shari'ah-based firms

Variables	Mean	Median	Standard deviation	Minimum	Maximum
Underpricing (%)	60.27	30.33	59.47	3.85	204.00
Quote spread (%)	4.26	2.85	5.10	1.27	30.27
Effective spread (%)	3.91	2.85	3.68	1.27	20.79
Volume (1,000 shares)	6,833.15	3,793.65	7,564.15	330.43	31,106.80
Turnover (%)	2.34	1.40	2.45	0.22	9.51
Frequency (times)	180.41	112.53	154.03	11.55	694.05
Market standard deviation (%)	1.22	1.13	0.30	0.78	1.90
Firm Age (years)	10.75	9.64	7.34	2.19	32.45
Insiders' sales (%)	26.75	25.00	12.77	6.98	72.26
Proceeds (million rupiahs)	167,218.01	23,850.00	501,913.84	7,800.00	2,855,000.00

Notes: This table reports statistics about underpricing, liquidity measures, market standard deviation, age of the firm, insiders' sales, and gross proceeds at IPO for the 34 IPOs (non Shari'ah-based firms) carried out between January 2001-December 2005. Underpricing is measured with $(P_1-P_0)/P_0$, where P_1 = close price on the 1st day of trading, and P_0 = offer price; liquidity measures cover quote spread, effective spread, trading volume, trading turnover, and trading frequency. Quote spread is average daily quote for 20 trading days after IPO. Daily quote spread is measured with $(Q_A-Q_B)/M$, where Q_A=ask price, Q_B=bid price, and M=mid quote. Effective spread is average daily effective spread for 20 trading days after IPO. Daily effective spread is measured with $2|P-M|/M$, where P=close price, dan M=mid quote. Trading volume is average daily trading volume for 20 trading days after IPO. Trading turnover ratio is average daily turnover ratio. Daily turnover is measured with trading volume divided by outstanding common stocks. Trading frequency is average daily frequency for 20 trading days after IPO. Market standard deviation is standard deviation of daily return on the security exchange 20 trading days prior to IPO. Firm age is the establishment of the company to the date of its IPO (in years). Insiders' sales is the amount of shares sold by insiders at the IPO stage. Proceeds is gross proceeds at the IPO (in rupiahs).

Table 5, Table 6, Table 7, Table 8 and Table 9 report regression results between after-market liquidity and IPO underpricing. For Shari'ah firms, the relationship between liquidity and IPO underpricing is insignificant for all measures of liquidity. The signs of the coefficient are positive unless we use quote spread and effective spread as proxies for liquidity. For non Shari'ah firms, the relationship between liquidity and IPO underpricing is also insignificant unless we use trading frequency as a proxy for liquidity which is significant at level of 1% (*t* stat=2.82). The signs of the coefficients are positive. When we regress for full sample, also the relationship between after-market liquidity and IPO underpricing is insignificant unless we use trading frequency as a proxy for liquidity which is significant at level of 1% (*t* stat=2.99).

The results of this research do not support among them: Ellul and Pagano's findings (2006), and Amihud and Mendelson's findings (1986) both in the context of unseasoned and seasoned equity offerings. We assume that there are different characteristics between Indonesian market and U.S market. We argue that most of Indonesian investors hold their IPO stocks for a long term so that they do not require aftermarket illiquidity risk premium. However, U.S investors are mostly flippers where they buy stocks at IPO, subsequently, they sell the stocks immediately in the secondary market. U.S investors require risk premium for aftermarket illiquidity.

Table 5   Regression results between IPO underpricing and quote spread

Variables	Full sample	Shari'ah firms	Non Shari'ah firms
Intercept	1.23***	1.60	1.23***
	(3.61)	(4.12)	(2.80)
LIQ (Quote spread)	0.53	-1.88	0.59
	(1.17)	(-1.08)	(1.16)
MKTSTD	4.81	2.66	3.92
	(0.81)	(0.55)	(0.47)
LogAGE	-0.04	-0.11	-0.03
	(-0.62)	(-1.64)	(-0.37)
SALESbyINS	0.16	0.22	0.13
	(0.96)	(0.97)	(0.61)
LogPROCEEDS	-0.11***	-0.13	-0.11**
	(-3.37)	(-3.83)	(-2.54)
R^2	0.3359	0.9455	0.2963
F	3.54	3.47	2.35
Significance F	0.0107**	0.3854	0.0661*
Observation	41	7	34

Notes: The dependent variable is underpricing. The underpricing is the positive initial return earned on the 1st day of trading on the stock exchange and is defined as $\log(P_1/P_0)$, where P_1 = close price on the 1st day of trading, and P_0 = offer price. LIQ is average daily quote spread for 20 trading days after IPO. Daily quote is defined as $(Q_A-Q_B)/M$, where Q_A=ask price, Q_B=bid price, and M=mid quote. MKTSTD is standard deviation of daily return on the security exchange 20 trading days prior to IPO. LogAGE is logarithm of establishment of the company to the date of its IPO. SALESbyINS is the amount of shares sold by insiders at the IPO stage (in percentage). LogPROCEEDS is logarithm of gross proceeds at the IPO. Figures in parentheses are *t*-statistics. ***, **, and * are 1%, 5%, and 10% level of significance, respectively.

Table 6   Regression results between IPO underpricing and effective spread

Variables	Full sample	Shari'ah firms	Non Shari'ah firms
Intercept	1.28***	1.60	1.27***
	(3.63)	(4.12)	(2.81)
LIQ (Effective spread)	0.49	-1.88	0.60
	(0.78)	(-1.08)	(0.83)
MKTSTD	4.57	2.66	3.67
	(0.76)	(0.55)	(0.43)
LogAGE	-0.04	-0.11	-0.04
	(-0.70)	(-1.64)	(-0.44)
SALESbyINS	0.17	0.22	0.14
	(1.02)	(0.97)	(0.66)
LogPROCEEDS	-0.11***	-0.13	-0.11**
	(-3.42)	(-3.83)	(-2.56)
R^2	0.3216	0.9455	0.2799
F	3.32**	3.47	2.18*
Significance F	0.0147	0.3854	0.0853
Observation	41	7	34

Notes: The dependent variable is underpricing. The underpricing is the positive initial return earned on the 1st day of trading on the stock exchange and is defined as $\log(P_1/P_0)$, where P_1 = close price on the 1st day of trading, and P_0 = offer price. LIQ is average daily effective spread for 20 trading days after IPO. Daily effective spread is defined as $2|P-M|/M$, where P=close price, dan M=mid quote. MKTSTD is standard deviation of daily return on the security exchange 20 trading days prior to IPO. LogAGE is logarithm of establishment of the company to the date of its IPO. SALESbyINS is the amount of shares sold by insiders at the IPO stage (in percentage). LogPROCEEDS is logarithm of gross proceeds at the IPO. Figures in parentheses are *t*-statistics. ***, **, and * are 1%, 5%, and 10% level of significance, respectively.

Table 7   Regression results between IPO underpricing and trading volume

Variables	Full sample	Shari'ah firms	Non Shari'ah firms
Intercept	1.33***	1.53	1.36***
	(3.90)	(2.75)	(2.85)
LIQ (logVolume)	0.02	0.02	0.02
	(0.53)	(0.31)	(0.32)
MKTSTD	3.70	2.21	3.32
	(0.62)	(0.29)	(0.38)
LogAGE	-0.06	-0.11	-0.05
	(-0.99)	(-1.21)	(-0.63)
SALESbyINS	0.19	0.31	0.19
	(1.18)	(1.03)	(0.88)
LogPROCEEDS	-0.13***	-0.14	-0.13***
	(-3.77)	(-2.63)	(-2.93)
R^2	0.3155	0.8923	0.2651
F	3.22**	1.66	2.02
Significance F	0.0169	0.5276	0.1065
Observation	41	7	34

Notes: The dependent variable is underpricing. The underpricing is the positive initial return earned on the 1st day of trading on the stock exchange and is defined as $\log(P_1/P_0)$, where P_1 = close price on the 1st day of trading, and P_0 = offer price. LIQ is the logarithm of average daily trading volume for 20 trading days after IPO. MKTSTD is standard deviation of daily return on the security exchange 20 trading days prior to IPO. LogAGE is logarithm of establishment of the company to the date of its IPO. SALESbyINS is the amount of shares sold by insiders at the IPO stage (in percentage). LogPROCEEDS is logarithm of gross proceeds at the IPO. Figures in parentheses are *t*-statistics. ***, **, and * are 1%, 5%, and 10% level of significance, respectively.

Table 8   Regression results between IPO underpricing and trading turnover

Variables	Full sample	Shari'ah firms	Non Shari'ah firms
Intercept	1.49***	1.43	1.69***
	(3.65)	(4.73)	(2.78)
LIQ (Turnover)	0.19	0.90	0.10
	(0.22)	(1.66)	(0.09)
MKTSTD	2.10	2.60	-1.36
	(0.31)	(0.72)	(-0.12)
LogAGE	-0.05	-0.13	-0.03
	(-0.78)	(-2.48)	(-0.30)
SALESbyINS	0.21	0.38	0.22
	(1.19)	(2.48)	(0.91)
LogPROCEEDS	-0.13***	-0.12	-0.15**
	(-3.18)	(-4.66)	(-2.37)
R^2	0.2743	0.9686	0.2198
F	2.34*	6.18	1.35
Significance F	0.0647	0.2958	0.2770
Observation	41	7	34

Notes: The dependent variable is underpricing. The underpricing is the positive initial return earned on the 1st day of trading on the stock exchange and is defined as $\log(P_1/P_0)$, where P_1 = close price on the 1st day of trading, and P_0 = offer price. LIQ is average daily trading turnover ratio for 20 trading days after IPO. Daily turnover ratio is defined as trading volume divided by outstanding common stocks. MKTSTD is standard deviation of daily return on the security exchange 20 trading days prior to IPO. LogAGE is logarithm of establishment of the company to the date of its IPO. SALESbyINS is the amount of shares sold by insiders at the IPO stage (in percentage). LogPROCEEDS is logarithm of gross proceeds at the IPO. Figures in parentheses are *t*-statistics. ***, **, and * are 1%, 5%, and 10% level of significance, respectively.

Table 9   Regression results between IPO underpricing and trading frequency

Variables	Full sample	Shari'ah firms	Non Shari'ah firms
Intercept	1.35***	1.51	1.31***
	(4.72)	(2.65)	(3.61)
LIQ (log Frequency)	0.13***	0.03	0.15***
	(2.99)	(0.29)	(2.82)
MKTSTD	1.79	2.82	2.86
	(0.33)	(0.41)	(0.38)
LogAGE	-0.07	-0.10	-0.06
	(-1.34)	(-1.10)	(-0.85)
SALESbyINS	0.19	0.29	0.22
	(1.26)	(0.89)	(1.18)
LogPROCEEDS	-0.14***	-0.13	-0.14***
	(-4.81)	(-2.82)	(-3.83)
R^2	0.4503	0.8916	0.4257
F	5.74***	1.64	4.15***
Significance F	0.0005	0.5292	0.0060
Observation	41	7	34

Notes: The dependent variable is underpricing. The underpricing is the positive initial return earned on the 1st day of trading on the stock exchange and is defined as $\log(P_1/P_0)$, where P_1 = close price on the 1st day of trading, and P_0 = offer price. LIQ is the logarithm of average daily trading frequency for 20 trading days after IPO. MKTSTD is standard deviation of daily return on the security exchange 20 trading days prior to IPO. LogAGE is logarithm of establishment of the company to the date of its IPO. SALESbyINS is the amount of shares sold by insiders at the IPO stage (in percentage). LogPROCEEDS is logarithm of gross proceeds at the IPO. Figures in parentheses are *t*-statistics. ***, **, and * are 1%, 5%, and 10% level of significance, respectively.

Among the control variables, only logarithm of proceeds that significantly determines IPO underpricing for full sample and non-Shariah based firms at level of 1% and 5%, respectively.

5. Conclusion and remarks for future research

This research explains the relationship between the after-market liquidity and returns in unseasoned securities. In general we find that there is no relationship between underpricing and after-market liquidity for Shari'ah and non Shari'ah-based firms. In other words, the relationship between underpricing and after-market liquidity is weak. Among the control variables, only proceeds from the offerings that significantly influences the IPO underpricing. Moreover, descriptive statistics show that Shari'ah-based firms are more liquid than non Shari'ah based firms for all measure of liquidity. The level of underpricing is lower for Shari'ah based firms than non Shari'ah.

This research uses very small samples especially for Shari'ah based firms. For the next research it is needed to extend the period of research in order to get more Shari'ah-based samples. The window period of underpricing in this research is the first day of trading. Ljungqvist (2005) argues that it takes some times to get the equilibrium after IPO for stock price in the developing market. He suggests that the researcher(s) may use the window period of underpricing more than one day trading. Liu (2006) argues that there are four dimensions of liquidity—trading cost, trading quantity, price impact, and trading speed. In this research, we use only two dimensions; trading cost (quote spread and effective spread) and trading quantity (trading volume, turnover ratio, and trading frequency). Each proxy of liquidity in this research only captures one dimension. For future research, the researcher(s) may need to take a consideration to use all dimensions of liquidity and capture more than one dimension of liquidity such as Liu's LMx measure (that capture four dimensions of liquidity) and Amihud's illiquidity measure.

References:

Alli, K., Yau, J. & Yung, K.. (1994). The underpricing of IPO of financial institutions. *Journal of Business Finance and Accounting, 21*(7), 1013-1029.

Amihud, Y.. (2002). Illiquidity and stock returns: Cross-section and time-series effects. *Journal of Financial Markets, 5,* 31-56.

Amihud, Y. & Haim, M.. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics, 17,* 223-249.

Badrinath, S. G., Kale, J. R. & Ryan, Jr. H. E.. (1996). Characteristics of common stock holdings of insurance companies. *Journal of Risk and Insurance, 63,* 49-76.

Beatty, R. P. & Ritter, J. R.. (1986). Investment banking, reputation, and the underpricing of initial public offerings. *Journal of Financial Economics, 15*, 213-232.

Brennan, M. J. & Subrahmanyam, A.. (1996). Market microstructure and asset pricing: On the compensation for illiquidity in stocks returns. *Journal of Financial Economics, 41*, 441-464.

Brennan, M. J., Chordia, T. & Subrahmanyam, A.. (1998). Alternative factor specifications, security characteristics, and the cross section of expected stock return. *Journal of Financial Economics, 49*, 345-373.

Butler, A., Grullon, G. & James, W.. (2005). Stock market liquidity and the cost of issuing equity. *Journal of Financial and Quantitative Analysis, 40*(2), 331-348.

Chalmers, J. M. R. & Gregory, B. K.. (1998). An empirical examination of the amortized spread. *Journal of Financial Economics, 48*, 159-188.

Chordia, T., Subrahmanyam, A. & Anshuman, R.. (2001). Trading activity and expected stock returns. *Journal of Financial Economics, 59*, 3-32.

Datar, V., Narayan, N. & Radcliff, R.. (1998). Liquidity and stock returns: An alternative test. *Journal of Financial Intermediation, 1*, 203-219.

Eleswarapu, V.. (1997). Cost of transacting and expected returns in the nasdaq market. *Journal of Finance, 52*, 2113-2128.

Ellul, A. & Pagano, M.. (2006). IPO underpricing and after-market liquidity. *Review of Financial Studies, 16*(2), 381-421.

FANG, J., SUN, Q. & WANG, C. Y.. (2006). Illiquidity and stock returns: Evidence from Japan. Working paper, Institute for Finance and Accounting, Xiamen University.

Goldreich, D., Hanke, B. & Nath, P.. (2002). The price of future liquidity: Time-varying liquidity in the US treasury market. Working paper, London Business School.

Leland, H. E. & David, H. P.. (1977). Informational asymmetries, financial structure, and financial intermediation. *Journal of Finance, 32*, 371-387.

Liu, W. M.. (2006). A liquidity-augmented capital asset pricing model. *Journal of Financial Economics*, 631-671.

Ljungqvist, A.. (2005). IPO underpricing. In: B. Espen Eckbo (Ed.), *Handbook of Empirical Corporate Finance*, Elsevier/North-Holland, Chapter 12.

Rahman, H. & Yung, K.. (1999). Insurance IPOs—A test of the underpricing theories. *Journal of Insurance Issues, 22*(1), 61-77.

Ritter, J. R.. (1991). The long run performance of initial public offerings. *Journal of Finance, 46*, 3-27.

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