International Journal of Business and Society, Vol. 14 No. 2, 2013, 299 - 318

IPO UNDERPRICING AND AFTERMARKET LIQUIDITY: EVIDENCE FROM MALAYSIA

Ros Zam Zam Sapian
National University of Malaysia

Ruzita Abdul Rahim♣
National University of Malaysia

Othman Yong
National University of Malaysia

ABSTRACT

This study empirically examines the influence of underpricing on the aftermarket liquidity of 191 initial public offerings (IPOs) that are listed on Bursa Malaysia, an emerging stock market in the South-East Asia, from June 2003 to December 2008. This hypothesized effect is based on the liquidity theory which posits that underpricing contributes to the higher level of aftermarket liquidity. Despite the focus on only underpriced IPOs, the preliminary results are still consistent with those of the recent studies in reporting dramatically low initial returns particularly in 2008, the year that witnesses the sub-prime financial crisis in the United States. The multiple regression results indicate that there exists a significantly positive relationship between Malaysian IPO under-pricing and the level of IPO liquidity in the secondary market. This finding implies that the issuers' decision to underprice pays off. Even though they receive less new capital than they would otherwise have, their highly liquid shares have greater chances of survival in the secondary market and so do the future seasoned equity offerings.

Keywords: Initial Public Offerings; Aftermarket liquidity; Underpricing; Malaysian IPO market

1. INTRODUCTION

A listing status from a stock exchange is a significant event in the life cycle of a competitive firm as it flags a great achievement and persistent quality. However, what are the factors that motivate owners of a firm to get their firm listed? According to Zingales (1995), the listing allows the original owners to liquidate their interest in the firm and recapture their initial investments. Mikkelson, Partch and Shah. (1997) meanwhile suggest that in addition to attaining liquidity on their stock interest, the listing also allows the original owners to raise a large pool of funds for investment and growth purposes.

♣ Corresponding Author: Ruzita Abdul Rahim, Associate Professor, School of Management, Faculty of Economics and Management, Universiti Kebangsaan Malaysia, 43600, UKM Bangi, Selangor, Malaysia, Tel: +603-89215764; E-mail: ruzitaar@ukm.my

If liquidity is the driving force that motivates firm owners to list their IPOs, what are the benefits to these owners from having shares that are highly liquid? Previous studies argue that the value of liquidity could differ from one firm's owner to another. For instance, Hahn and Ligon (2006) suggest that shares that are highly liquid allow the remaining shares to be traded at prices that generate greater returns. Whereas, Ellul and Pagano (2006) argue that investors are content with a lower required rate of returns on highly liquid IPOs, allowing issuers to offer the new shares at highest or optimal prices. From yet another perspective, issuers of highly liquid shares are believed to have the tendency to issue subsequent seasoned equity offerings (SEO) at lower floatation costs. This proposition is based on a study by Butler et al. (2005) which finds that *ceteris paribus,* investment bank fees for SEOs are significantly lower for firms that have highly liquid IPOs than those whose IPOs are less liquid. Their findings suggest firms can reduce their floatation costs of raising external funds by improving the liquidity of their outstanding shares.

The existing evidence on the relationship between liquidity and underpricing is far from conclusive particularly because most are established from the developed markets. One of the first studies, which is conducted by Booth and Chua (1996), suggests that a disperse ownership is the mediator in the positive relationship between IPO underpricing and aftermarket liquidity. They also claim that investment banks purposely underprice the IPOs to create a broad initial ownership dispersion that eventually increases the level of aftermarket liquidity of the new issues. The results of the other studies also show that there is a positive relationship between underpricing and IPO liquidity in the secondary market. In other words, highly underpriced IPOs tend to show a higher level of liquidity in the secondary market (Hahn and Ligon, 2006; Pham et al., 2003; Zheng and Li, 2008). Pham et al. (2003) stress that the high level of underpricing broadens market participation and subsequently creates a diffuse ownership structure. This condition influences the trading activity of the new shares that leads to a higher level of liquidity for the IPOs.

Unlike Booth and Chua (1996), Hahn and Ligon (2006), Pham et al. (2003) and Zheng and Li (2008) who posit that underpricing is the driving factor, Ellul and Pagano (2006) claim that liquidity is the independent variable in the underpricing-liquidity relationship. Liquidity will influence the IPO returns (or underpricing) due to the uncertainties in the level of liquidity of the new shares after they are listed. The findings of their study show that IPOs that have low expected liquidity will generate a higher level of underpricing. In a separate study, Pritsker (2006) finds results which are somewhat similar to those of Ellul and Pagano (2006). He proposes that when illiquidity is combined with an imperfect competition, it creates a condition where the IPOs will experience underpricing and underperformance. Morales-Camargo (2006) re-examines the model proposed by Booth and Chua (1996), Ellul and Pagano (2006) and Pritsker (2006) and finds that IPOs that have a high level of underpricing show a higher level of liquidity after listing. This finding is more consistent with the model proposed by Booth and Chua (1996) than those suggested by Ellul and Pagano (2006) and Pritsker (2006).

The voluminous studies on the relationship between liquidity and IPO underpricing have generally been done on developed markets including those in Asia and Asia Pacific, while one

that involves stock market in Malaysia is still scant. Previous studies on Malaysian IPOs focus on factors that influence IPO underpricing (Abdullah and Mohd., 2004; How et al., 2007; Jelic et al., 2001; Wan-Hussin, 2005; Yong, 1996; Yong and Isa, 2003; Yong et al., 2002), investors' demand, size effect and IPO performance (Yong, 2007), short-term performance of IPOs (Yong et al., 2001), long-term performance of IPOs (Ahmad-Zaluki et al., 2007; Dawson, 1987; Ku Ismail et al., 1993; Wu, 1993; Yong et al., 2001), regulations and underpricing of IPOs (Mohd., 2007), Shari'ah compliant IPOs (Abdul Rahim and Yong, 2010) and initial premium, flipping activity and price spread of IPOs (Yong, 2010).

Filling this gap is the main motivation of the present study. The result of this study is expected to shed light on the relationship between underpricing and aftermarket liquidity specific to the IPO market in Malaysia. This study addresses the question of whether or not the degree of underpricing has a significant influence on the liquidity of the IPOs after the new issues are traded on Bursa Malaysia for the first time. The importance of addressing this issue is paramount in an emerging equity market like Malaysia. As argued by Rouwenhorst (1999), among the firm characteristics that investors pay attention on when investing in an emerging market is the level of liquidity of the stock itself. Accordingly, knowledge about the factors that influence the liquidity level of IPO in the secondary market would help the investors in strategizing their investment trading mechanism. Similarly, the owner of the firms would benefit from a liquid secondary market because such market would enhance the value of their stake holdings.

Liquidity is not only important in asset pricing but also an indicator of a financial market health. As such liquidity is both a micro and a macro concern in any given economy. It provides the depth of monetary churns needed in a vibrant financial market. Liquidity represents the opportunity for investors to enter and exit a market efficiently, allowing investors to trade at a fast pace with little risk of being stuck to a particular investment. Especially for a developing financial market like Malaysia, ensuring liquidity is a basic tenet to attract sizeable local and foreign-based companies to go public *via* the Bursa Malaysia. Liquidity of the bourse is also necessary to support SEOs and other quoted quasi-equities and derivatives. In this regards, research efforts capable of enhancing the knowledge about liquidity are paramount in ensuring the health of a given asset class or the vibrancy and attractiveness of the financial market as a whole.

The remainder of this paper is organized in the following manner. The next section discusses the reviews on past studies relating to the relationship between underpricing and aftermarket liquidity. The following two sections present the data and methodology and the findings and discussions of the findings. The paper ends with the conclusion and implications of the study.

2. LITERATURE REVIEW

The fact that liquidity is an *unobservable* variable (Acharya and Pedersen 2005, pp. 385) has delayed the attention on this factor as an issue of study despite its importance. Various efforts have been attempted to find a good proxy for liquidity, including that by Pagano (1989), who proposes that the level of liquidity for a particular asset can be measured from

two dimensions: (1) risks on the final value of the asset; and (2) the existence of a market which is ready to absorb the effect of selling the asset without causing an adverse impact on its price. Meanwhile, Demsetz (1968) posits that illiquidity could be measured based on the degree of incompatibility between buyers and sellers of the assets at a particular time, and the incompatibility depends on the number of shareholders. Therefore, a broader shareholder or investor base is expected to generate a higher level of liquidity compared to a limited base. From another viewpoint, Holmström and Tirole (1993) suggest that in cases where the ratio of retail investors is high, the presence of asymmetric information is less significant. This reduces adverse selection cost, encourages more trading activities and subsequently increases level of liquidity in the secondary market.

The liquidity of the secondary market for outstanding shares or IPOs is an aspect that should be of great concerns for many stakeholders including investors, issuing firms and market makers. From the investors' perspective, a stock market that is characterized as highly liquid has the advantage of offering low transaction costs and less volatility in the immediate aftermarket. A high initial liquidity can also reduce the costs that will be incurred by a market maker who acts as the trader of last resort. Finally, because a liquid market attracts stock analysts and investors, it has the advantages of reducing the degree of underpricing for shares that are issued for the first time and providing for the issuing firms an easy access to capital markets in the future (Corwin et al., 2004).

2.1. Factors Influencing Stock Liquidity

Past studies have documented a number of factors that influence stock liquidity in the secondary market. Among them are the characteristics of stock issues, stock market and macroeconomic condition. For instance, Pritsker (2006) and Morales-Camargo (2006) find that the allocation of IPOs to institutional investors negatively influences the liquidity of the new shares in the secondary market. On the contrary, Kini and Mian (1995) suggest that the participation of institutional investors improves the shares' liquidity. This latter proposition is supported by Rubin (2007) who finds that liquidity relates positively with the total institutional ownership. Rubin (2007) associates this relationship with the argument that institutional investors trade more frequently than the other investors.

With regard to stock market characteristics, Chordia et al. (2001a) posit that stock market returns and volatilities are capable of influencing stock liquidity and trading activity. Stock market volatility influences stock liquidity through its impact on inventory risk and the risk of participating in short-term speculative activities. The proposition that a high volatility deteriorates a stock liquidity is also empirically supported by Handa and Schwartz (1996) and Foucault (1999).

On the impact of macroeconomic factors on stock liquidity, Eisfeldt (2004) discovers that stock liquidity fluctuates according to changes in the productivity of real sectors and investments. Chordia et al. (2001a) explain that the market liquidity and trading activity are influenced by factors like returns and volatility of the equity market as well as short-term interest rates. Furthermore, their study exhibits an increase in the trading activity prior to major macroeconomic announcements such as GDP and unemployment rates. In a later study

in the US, Chordia et al. (2005) find that the fluctuation in the liquidity level in aggregate influences bond and stock markets and it is correlated with the monetary policies.

The direct and indirect impacts of macroeconomic shocks on stock liquidity are further reinforced by the findings of Watanabe (2004). Using time-series data, Watanabe (2004) examines and finds that for the US market, the economic factors characterized as fundamental play important roles in influencing liquidity and the impact is more prevalent for period prior to 1984 when the business cycle is more volatile. Meanwhile, economy-wide innovations do not only influence market liquidity but also other market variables such as returns, volatilities, and stock turnover which are considered important drivers of liquidity.

2.2. Underpricing and Aftermarket Liquidity

The strong evidence on the relationship between returns and liquidity premium in the existing stock market has motivated many studies to examine whether such a relationship holds in the IPO market (e.g., Booth and Chua, 1996; Ellul and Pagano, 2006; Hahn and Ligon, 2006; Li et al., 2005; Zheng and Li, 2008). Among the first is by Booth and Chua (1996) which hypothesizes that the relationship between underpricing and aftermarket liquidity should be positive. This study claims that issuing firms purposely underprice their IPOs to create a disperse ownership which in turn improves the liquidity of the new issues in the secondary market. Using 2,151 IPOs listed on the US stock markets, the results of their study prove that a disperse ownership mediates the relationship between underpricing and the aftermarket liquidity. Much later, this issue is re-examined by Zheng and Li (2008) using data of 1,179 IPOs listed on NASDAQ. Their results lend strong support for that of Booth and Chua (1996) when IPOs which have many non-block institutional investors show high secondary-market liquidity. They also find results which are consistent with those of Pham et al. (2003) and Hahn and Ligon (2006) in that there exists a direct relationship between IPO underpricing and aftermarket liquidity.

In a study on Australian IPOs, Pham et al. (2003) posit that underpricing is a selling factor in attracting outside dispersed investors into the market. The width of investor base and inequality in the distribution of the new investors has positive and negative impact on the trade turnover, respectively. However, the direction of these relationships is reversed when the liquidity factor is measured using the bid-ask spread. Based on their findings, Pham et al. (2003) claim that the level of IPO liquidity in the secondary market increases when there is an increase in the number of shareholders and a reduction in the concentration of shareholding distribution. In addition, their results also show that the ownership structure serves as a catalyst in the relationship between IPO underpricing and its aftermarket liquidity. According to Ellul and Pagano (2006), liquidity affects returns on IPOs because of the uncertainties in the new issues after they get listed for the first time. In their study, expected liquidity is significantly and negatively related to IPO underpricing. In a separate study, using a fully-rational symmetric-information and dynamic imperfectly competitive model, Pritsker (2006) explains the trading transactions of IPO stocks in the secondary market, and finds that illiquidity, when combined with an imperfect competition environment, can cause IPO stocks to experience underpricing (or underperformance). This finding is almost similar with that of Ellul and Pagano (2006) except that the latter assumes that the market is in a perfect competition mode.

Li et al. (2005) examine how underpricing and share retention influence liquidity of the IPOs aftermarket. Using a sample of 2,256 IPOs listed on NASDAQ, they find that underpricing relates positively with share turnover and negatively with percentage spread which are proxies of liquidity. These relationships are significant even after controlling for other factors. In a more comprehensive study, Hahn and Ligon (2006) test the relationship on 10 measures of liquidity. Their results confirm that there is a positive relationship between underpricing and liquidity in the secondary market. They suggest that firms are willingly underprice their IPOs to enhance the liquidity of their shares after they are listed. This motive is consistent with one of firms' goals when they go public, i.e. to gain liquidity for their stock interest. Around the same period, Morales-Camargo (2006) brings in an additional evidence from the Hong Kong IPO market using models which have been proposed by Booth and Chua (1996), Ellul and Pagano (2006) and Pritsker (2006). Their findings are less consistent with those of Ellul and Pagano (2006) and Pritsker (2006). On the contrary, it is more supportive of that by Booth and Chua (1996) as underpricing is a significant driver of the aftermarket liquidity of the IPOs.

3. METHODOLOGY

This study uses a sample of 191 of the total 281 IPOs that are listed on Bursa Malaysia from June 2003 to December 2008. The distribution of the sample IPOs is as presented in Table 1. In selecting the final sample, this study follows Li et al. (2005) and Zheng and Li (2008) in excluding Real Estate Investment Trust (REITs) IPOs, Booth and Chua (1996), Ellul and Pagano (2006), Li et al. (2005) and Zheng and Li (2008) in excluding closed end fund IPOs and Li et al. (2005) and Zheng and Li (2008) in excluding IPOs of restructuring firms and IPOs that involve bonus issues, due to their unique characteristics (Chordia et al., 2001a). This study also omits IPOs that do not have complete data and IPOs that are overpriced.

Table 1: Distribution of IPO sample

Year	2003[t]	2004	2005	2006	2007	2008	Total
Listed IPOs	41	72	79	40	26	23	281
Selected IPOs	36	51	50	30	18	6	191
Percentage	88%	71%	63%	75%	69%	26%	68%

Note: [t] IPOs in 2003 are limited to issuance from June 2003 onward
Source: Bursa Malaysia (2003-2008)

The study period begins on June 2003 to cater for a structural change in the definition of the standard board lot (SBL) from 1,000 units to 100 units which was effectively implemented on 26 May 2003. Prior to the new SBL, Bursa Malaysia allows 3 types of trading lot sizes; 100 units for MESDAQ counters, 200 units for some selected counters and 1,000 units for the remaining. The purpose of the SBL is to encourage participation and affordability of investors especially the retail investors. It is also expected to increase trading activities for high price stocks with an objective to improve the efficiency and liquidity of the stock market.

Liquidity is also improved through reduction of odd lots trading with the new SBL. The new SBL is also expected to increase spread which addresses the issue of allocation of stock ownership. Amihud et al. (1999) prove that reduction in the minimum trading units has caused a large and significant increase of retail and individual investors in a firm and accordingly the liquidity of the stocks in the market. By limiting the study to period after the implementation of the SBL, this study minimizes the inconsistencies due to differences of trading lot size which has the potential to influence the level of liquidity of an IPO and the results of the study.

In measuring the aftermarket liquidity of the new issues, this study employs four volume-based measures of liquidity *(LIQ);* (1) trading volume (Demir et al., 2004; Zheng and Li, 2008), (2) dollar volume (Chordia et al., 2001b), (3) share turnover (Chordia et al., 2001b; Datar et al., 1998; Easley et al., 2002; Li et al., 2005; Morales-Camargo, 2006; Pham et al., 2003) and (4) illiquidity (Amihud, 2002). For the purpose of measuring an aftermarket liquidity, this study differs slightly from the standard formulas as it averages the values of liquidity measures over the period of 60 trading days after the first week of listing;

$$VOL_i = \frac{1}{60}\sum_{t=6}^{t+59} VOL_{i,t} \tag{1a}$$

$$DVOL_i = \frac{1}{60}\sum_{t=6}^{t+59} P_{CLi,t} \text{ x } VOL_{i,t} \tag{1b}$$

$$TURN_i = \frac{1}{60}\sum_{t=6}^{t+59} \left| \left(VOL_{i,t} \Big/ NOSH_{i,t} \right) \right| \tag{1c}$$

$$ILLIQ_i = \frac{1}{60}\sum_{t=6}^{t+59} \left| \left(|R_{i,t}| \Big/ DVOL_{i,t} \right) \right| \tag{1d}$$

where, $VOL_{i,t}$ = trading volume of IPO i on day t where $t = 6, \ldots, t+59$,
$P_{CL,i}$ = closing price of IPO i,
$NOSH_i$ = the number of outstanding shares of IPO i,
$|R_i|$ = absolute return of IPO i,
$DVOL_i$ = dollar volume of IPO i,
$TURN_i$ = shares turnover of IPO i, and
$ILLIQ_i$ = illiquidity of IPO i.

This study excludes data of the first 5 trading days to avoid the effect of abnormal trading activities due to flipping activities or price support by the underwriters that may have a significant enough influence on the aftermarket liquidity (Krigman et al., 1999). Few past studies have shown that during the first week of listing, the trading volumes of IPOs are abnormally high (Aggarwal, 2003; Aggarwal and Rivoli, 1990; Ellis, 2006; Miller and Reilly, 1987; Pham et al., 2003). The preliminary results of this study does show that the trading activities during the first week of listing are much higher than those in the following weeks. Also consistent with Ellul and Pagano (2006), Morales-Camargo (2006) and Pham et al. (2003), this study limits the period for calculating liquidity to 60 trading days after the first week of listing to minimize disturbances due to other corporate events and/or market-wide shocks.

The main explanatory variable in this study is underpricing. Underpricing occurs when the IPOs are offered at a price lower than the price when the new issues are listed on a stock exchange for the first time. When IPOs are first traded on the stock exchange, normally the price increases, at times to a level higher than 100 percent of the offer price. To a certain extent, this price hike shows that the IPOs are highly demanded and therefore, it suggests that the offer price has been set lower than it worth. A higher offer price will clearly generate greater proceeds to the issuers and optimize shareholders' value. From the investors' viewpoint, the underpricing allows them to acquire the IPOs at a competitive price, sell them at a higher market price and reap handsome profits.

This study adopts two measures of underpricing, namely (1) *UNDO* which has been previously employed by Abdul Rahim and Yong (2010) and Yong and Isa (2003) and (2) *UNDC* which has been used by Booth and Chua (1996) and Zheng and Li (2008). The mathematical representations of these measures are as follows:

$$UNDO_i = \frac{\left(P_{OP,i} - P_{OFF,i}\right)}{P_{OFF,i}} \tag{2a}$$

$$UNDC_i = \frac{\left(P_{CL,i} - P_{OFF,i}\right)}{P_{OFF,i}} \tag{2b}$$

where, $P_{OP,i}$ = opening price of IPO i on the first listing day,
$P_{OFF,i}$ = offer price of IPO i,
$P_{CL,i}$ = closing price of IPO i on the first listing day,
$UNDO_i$ = underpricing of IPO i based on its opening price, and
$UNDC_i$ = underpricing of IPO i based on its closing price.

Based on the liquidity theory (Li et al., 2005) and most empirical evidence (Pham et al., 2003; Zheng and Li, 2008), this study hypothesizes that underpricing is positively associated with liquidity of the IPOs in the secondary market. To statistically test this hypothesis, this study proposes the following cross-sectional multiple regression equation;

$$LIQ_i = \alpha + \beta_1 (UND_{i,j}) + \beta_2(DTECH_i) + \beta_3(SIZE_{OFF,i}) + \beta_4 (P_{OFF,i}) + \beta_5 (RISK_i) + \sum_{T=2003}^{2008} \Pi_T (D_T) + \varepsilon \quad (3)$$

where, α = intercept term of regression equation,
β, π = estimated coefficient or loading of the explanatory factor,
LIQ_i = aftermarket liquidity of IPO i (in natural log),
$UND_{j,i}$ = underpricing of IPOi where j = *UNDO* or *UNDC*,
$DTECH_i$ = dummy variable for IPOs issued by high technology firms,
$SIZE_{OFFi}$ = offer size (units) of IPO i (in natural log),
P_{OFFi} = offer price of IPO i,
$RISK_i$ = volatility of stock i return,
D_T = dummy variable for year of listing where T = 2004, …, 2008, and
ε = error term of the regression equation.

It is important to note that in determining the role of underpricing in explaining the variations of aftermarket liquidity, this study takes into consideration several control variables. These are firm characteristics namely risk and sectoral nature of the issuing firm. *RISK* is the standard deviation of the issuing firm's stock returns (Chen et al., 2006) over the period of 60 days after the first week of the IPO listing and *DTECH* takes a value of 1 if the issuing firm is in technology sector and 0 otherwise. *DTECH* is to control for the different characteristics of high technology companies which Pham et al. (2003) find exhibit a level of liquidity which is higher than those in other industries. This argument is more eminent in the case of Malaysia because the characteristics of technology companies attract speculators to their stocks, which subsequently increase the stocks' liquidity. The other control variables are issue characteristics namely size ($SIZE_{OFF}$) and price (P_{OFF}) of the offer. Finally, macroeconomic characteristics and/or possible structural shifts are controlled for by including listing year dummies (D_T) (Chen et al., 2006). Appendix A listed down several major events during the study period. The possibility that these events and other structural shifts may have influence on the main variables in this study is suspected because as depicted in Appendix B, the levels of aftermarket liquidity and underpricing change quite obviously throughout the study period.

To establish the realibility of the results, several diagnostic tests are performed to test the existence of multicollinearity among explanatory variables, the normality of data distribution, and the heteroscedasticity and autocorrelations of the regression residuals. The specification of models is tested using Ramsey's RESET (Regression Equation Specification Error Test) while *Cook's Distance* and *DFFITS* are used to test whether or not there is influence of the outliers.

4. RESULTS AND DISCUSSION

Table 2 presents some summary statistics on the variables used in this study. The mean underpricing *UNDO* and *UNDC* of the IPOs are 39 percent and 44 percent, respectively. These values indicate a drastic drop from 166.7 percent reported in Dawson (1987), 167.4 percent in Yong (1991), 114.6 percent in Ku Ismail et al. (1993), 80.3 percent in Loughran et al. (1994), 61.8 percent in Paudyal et al. (1998), 99.25 percent in Jelic et al. (2001), 94.91 percent in Yong and Isa (2003), 87.73 percent in Yong et al. (2002), 78.44 percent in Abdullah and Mohd. (2004), 83 percent in Wan-Hussin (2005) and 95.2 percent in Ahmad-Zaluki et al. (2007) for the period of 1990 to 2000. However, the values correctly reflect the recent trend in Malaysian IPO market. For the period of 1999 to 2007, Abdul Rahim and Yong (2010) report an initial return of 31.44 percent while for the period of 2004 to 2007, Yong (2010) report 27.77 percent. The slight difference with these recent studies may be attributed to the sample as this study only concentrates on IPOs that are underpriced. Still, the maximum values reported in both UNDO and UNDC indicate that chances remain for extremely high initial returns from IPO investment. However, on the average performance, a closer look at the patterns in Panel B of Appendix B indicates that the declining trend is quite persistent throughout the study period except for 2007, whether the initial returns are calculated for the underpriced IPOs only or the whole sample.

Table 2: Descriptive Statistics

Variables	Mean	Median	Minimum	Maximum	Std. Dev.
UNDO(%)	39.665	27.143	0.800	207.692	38.806
UNDC(%)	44.419	28.667	0.735	263.636	46.736
VOL (unit)	1,174,536	558,650	33,823	12,099,315	1,729,792
DVOL(RM)	1,118,846	567,493	34,562	15,681,140	1,811,735
TURN	0.038	0.019	0.001	0.385	0.050
ILLIQ	8.58E-07	1.26E-07	3.550E-09	6.080E-05	4.680E-06
$SIZE_{OFF}$ (unit)	36,108,206	30,000,000	3,706,000	202,000,000	29,028,397
P_{OFF} (RM)	0.814	0.700	0.160	3.000	0.536
RISK (%)	3.190	2.981	0.632	9.576	1.478

Notes: *UNDO* and *UNDC* are measures of underpricing represented in equation (2), VOL, DVOL, TURN and ILLIQ are volume-based liquidity measures represented in equation (1), $SIZE_{OFF}$ and P_{OFF} are the size and price of the IPO issue and RISK is the standard deviation of the issuer's stock returns.

Next, the average trading volume (*VOL*) shows that only about 3.25 percent of the total IPO units issued ($SIZE_{OFF}$) are traded during the 60 days after the first week the IPOs are listed. This is consistent with the reported average *TURN* which is 3.7 percent of the total shares outstanding. Translated into dollar value (*DVOL*), the trading is equivalent to 3.81 percent of the total worth of the IPOs ($SIZE_{OFF}$ x P_{OFF}) issued. The average size of offers is 36.1 million units while the largest offer is reported to issue more than 200 million units. Meanwhile, the mean offer price is RM0.814 whereas the risk of the issuers is 3.190 percent. The median, minimum, maximum and standard deviation values of each variable are also reported in Table 2 for additional reference purposes.

4.1. The Impact of Underpricing on the Aftermarket Liquidity

Despite the four alternative measures of liquidity, this study concentrates only on *VOL* and *DVOL* when discussing the regression results. This study ignores the results based on TURN and *ILLIQ* because the former results in model misspecifications while the latter fails the F-statistics tests.[1] The regression results using *UNDO* to proxy for IPO underpricing are reported in Table 3. Panels A and B show that the coefficients on underpricing are consistently positive and significance. This finding suggests that underpricing has a direct and significant relationship with the level of liquidity of IPOs in the secondary market. This result is consistent with those of Pham et al. (2003), Li et al. (2005), Hahn and Ligon (2006) and Zheng and Li (2008), despite the different measurement that is employed. For example, Pham et al. (2003) use bid-ask spread and share turnover which are somewhat similar to the percentage spread and turnover used by Li et al. (2005). Similar to this study, Zheng and Li (2008) use trading volume. The findings of this study suggest that even though the underpricing causes the issuing firms to receive lesser proceeds than they otherwise could have earned, they still benefit from the underpricing as it allows them to increase the liquidity of the new shares in the secondary market. Zheng, Ogden and Jen (2005) propose three explanations for how underpricing leads to a higher aftermarket liquidity. First, underpricing serves as a catalyst for the short-term trading activities. Second, underpricing increases the number of investors who obtain and react to new information on the new issues. Lastly, underpricing reduces the investors' reservation on bid-ask spreads and increases the probability of new information and this trigger trading activities.

Table 3: Regression Results on the Relationship between Underpricing *(UNDO)* and Aftermarket Liquidity

Panel A: Liquidity *(VOL)*			**Panel B: Liquidity *(DVOL)***		
Variables	**Coefficient**	**t-stats**	**Variables**	**Coefficient**	**t-stats**
C	2.606	1.413	C	2.948	1.504
UNDO	0.405	2.341*	UNDO	0.750	2.922**
DTECH	0.089	0.564	DTECH	0.023	0.105
$LNSIZE_{OFF}$	0.598	5.795**	$LNSIZE_{OFF}$	0.532	4.898**
P_{OFF}	-0.401	-2.607**	P_{OFF}	0.591	3.893**
RISK	29.227	5.961**	RISK	25.847	3.790**
D_{2004}	-0.444	-2.321*	D_{2004}	-0.639	-2.945**
D_{2005}	-0.718	-3.660**	D_{2005}	-1.010	-4.027**
D_{2006}	-0.274	-1.223	D_{2006}	-0.372	-1.473
D_{2007}	-0.230	-0.917	D_{2007}	-0.426	-1.530
D_{2008}	-0.988	-2.548*	D_{2008}	-1.198	-3.582**
Adjusted R^2	0.464		Adjusted R^2	0.286	

Notes: Asterisk ** and * indicate 1 percent and 5 percent respectively. The t-statistics are estimated using White's (1980) heteroskedasticity-consistent method.

[1] These regression results can be made available upon request from the corresponding author.

With regard to the control variables, several show significant influences on the aftermarket liquidity including offer size ($SIZE_{OFF}$) and price (P_{OFF}), firm's risk (*RISK*) and several listing years (D_T). Consistently, larger issue IPOs are more likely to have higher aftermarket liquidity whereas the impact of offer price is always significant but depending on the measurement of liquidity. A higher offer price leads to a lower liquidity in the form of trading volume (*VOL*) but it leads to a higher liquidity in the form of dollar volume (*DVOL*). These contradicting relationships suggest that after the listing, high priced IPOs tend to be less actively traded than low priced IPOs, but the dollar value of this trading is higher because the price of the new issues keeps on rising or at least remains constant. On the other hand, the results also suggest that lower priced IPOs allow investors to trade in larger volumes (negative relationship) because these new issues are more affordable (positive relationship). A quick calculation on the correlations between these variables supports these propositions. Offer price is found to be significantly and positively correlated with the average aftermarket price (Spearman's rho = 0.864) while significantly and negatively correlated with aftermarket volumes (rho = -0.441).

A firm's risk is found to be consistently, positively related to liquidity. This finding contradicts the expected relationship but could be due to the characteristics of the studied market or period. Given that in this study, high risk firms are characterized as those whose stock returns deviate more than the expected values (standard deviation), then it follows that their trading volumes (*VOL*) and dollar volumes (*DVOL*) are also higher. More precisely, if the greater deviations are the results of more frequent stock turnover, then it is suggesting that it leads to higher aftermarket liquidity. Alternatively, in a thin stock market like Malaysia, the liquidity might be interpreted as a form of advantage or returns that investors would appreciate as a compensation for bearing the higher risks.

Finally, the results in Table 3 also indicate that three listing years (2004, 2005 and 2008) have significant negative impacts on aftermarket liquidity regardless of the measure of liquidity used. The coefficients on the respective yearly dummies suggest that relative to 2003, these years have significantly greater negative impact on aftermarket liquidity. In other words, the IPO market is significantly less liquid in 2004, 2005 and 2008 than in 2003. This finding correctly describes the patterns of liquidity especially as measured by *VOL* and *DVOL* in Panel A of Appendix B.

For robustness, regression equation (3) is re-examined using *UNDC* to proxy for underpricing. The results[2] do not show any significant difference from those obtained using the initial *UNDO* measure. Specifically, underpricing remains significantly and positively related to aftermarket liquidity and so do the other relationships.

[2] The results of this regression may be made available upon request from the corresponding author.

5. CONCLUSIONS AND IMPLICATIONS

This study examines the impact of underpricing on the aftermarket liquidity of IPOs in an emerging market environment. To achieve its objective, this study uses data of 191 IPOs listed on the Bursa Malaysia from June 2003 to December 2008. In testing the relationship between underpricing and aftermarket liquidity, several variables including offer size and price, firm's risk, technology industry and listing year effect are controlled for. The final results are based on cross-sectional multiple regressions which have passed several main diagnostic tests.

Several conclusions have been drawn from the results of the study. First and most important is that underpricing consistently has a significant and direct impact on the IPO aftermarket liquidity. This finding lends a strong support to the findings by Hahn and Ligon (2006), Li et al. (2005), Pham et al. (2003) and Zheng and Li (2008). Second, the market for IPOs tends to be more liquid for offers that are larger and issued by firms which stock returns are more volatile. The latter may suggest a liquid market resulting from more frequent trading and therefore, greater deviation. Alternatively, in a thin stock market like Malaysia, the liquidity might be interpreted as a form of advantage or returns that investors would appreciate as compensation for bearing the higher risks. Third, offer price has a negative impact when VOL is the measure of liquidity and a positive impact when DVOL measures liquidity. One possible explanation is the affordability of the IPOs causes high priced IPOs to be less traded but continue to see rising values and therefore have a greater dollar value. Whereas, low priced IPOs are more frequently traded as they are more affordable but with gradual price reduction, they end up having a lower dollar volume. Lastly, certain events in the economy and market have reduced the liquidity in 2004, 2005 and 2008 (sub-prime crisis in the United States) to a level lower than that in 2003.

With regard to the main result of this study, it has a great implication on the Malaysian stock market, specifically in the IPO market. A liquid stock market provides advantages to its investors, and eventually the benefits transmit into the economy as a whole. A liquid stock market allows its investors to sell their shares at the right time and competitive price. This attracts more investors from local or abroad to participate in the trading activities specifically ones that involve IPOs. In turn, this condition improves chances for local firms to raise external equity funds from IPO market and indirectly, this encourages more firms to go public and acquire their listing status. New equity capital is fuel for corporate growth and income generation which in turn is a necessary ingredient for greater national incomes and higher economic growth. The other implication on issuing firms is that when for some reasons these issuers underprice their IPOs with liquidity as their motive, they are more likely to achieve that goal. Evidently, regardless of the measure of liquidity that is being tested, the positive impact persists. This could actually work for the benefit of the issuers because even though they receive less new capital than they would otherwise have, their decision pays off because highly liquid shares have greater chances of "survival" in the secondary market. So do theirs in raising new seasoned equity offerings.

ACKNOWLEDGEMENT

The authors would like to acknowledge that this paper is part of a research project funded by the Fundamental Research Grant Scheme (FRGS) awarded by the Ministry of Higher Education, Malaysia. We would also like to thanks insightful comments from participants of the International Conference on Marketing and Management Sciences, Phuket, Thailand, December 21-23, 2011.

REFERENCES

Abdul Rahim, R., & Yong, O. (2010). Initial returns of Shari'ah compliant IPOs in Malaysia. *Journal of Islamic Accounting and Business Research, 1*(1), 60-74.

Abdullah, N. A., & Mohd, K. N. T. (2004). Factors influencing the underpricing of initial public offerings in an emerging market: Malaysian evidence. *IIUM Journal of Economics and Management, 12*(2), 193-212.

Acharya, V. V., & Pedersen, L. H. (2005). Asset pricing with liquidity risk. *Journal of Financial Economics, 77,* 375-410.

Aggarwal, R. (2003). Allocation of initial public offerings and flipping activity. *Journal of Financial Economics, 68,* 111-135.

Aggarwal, R., & Rivoli, P. (1990). Fads in the initial public offering market? *Financial Management, 19,* 45-57.

Ahmad-Zaluki, N. A., Campell, K., & Goodacre A. (2007). The long run share price performance of Malaysian initial public offerings (IPOs). *Journal of Business Finance & Accounting, 34*(1&2), 78-110.

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

Amihud, Y., Mendelson, H., & Uno, J. (1999). Number of shareholders and stock prices: Evidence from Japan. *The Journal of Finance, 54*(3), 1169-1184.

Booth, J. R., & Chua, L. (1996). Ownership dispersion, costly information, and IPO underpricing. *Journal of Financial Economics, 41*(2), 291-310.

Bursa Saham Kuala Lumpur Berhad Annual Report. 2003 - 2008.

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

Chen, C. R., Guo, W., & Mande, V. (2006). Corporate value, managerial stockholdings and investments of Japanese firms. *Journal of International Financial Management and Accounting, 17*(1), 29 – 51.

Chordia, T., Roll, R., & Subrahmanyam, A. (2001a). Market liquidity and trading activity. *The Journal of Finance, 56*(2), 501-530.

Chordia, T., Sarkar, A., & Subrahmanyam, A. (2005). An empirical analysis of stock and bond market liquidity. *The Review of Financial Studies, 18*(1), 85-129.

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

Corwin, S. A., Harris, J. H., & Lipson, M. L. (2004). The development of secondary market liquidity for NYSE-listed IPOs. *The Journal of Finance, 59*(5), 2339-2373.

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

Dawson, S. M. (1987). Secondary stock market performance of initial public offers, Hong Kong, Singapore and Malaysia: 1978-1984. *Journal of Business Finance and Accounting, 14*(1), 65-76.

Demir, I., Muthuswamy, J., & Walter, T. (2004). Momentum returns in Australia equities: The influences of saiz, risk, liquidity and return computation. *Pacific-Basin Finance Journal, 12,* 143-158.

Demsetz, H. (1968). The cost of transacting. *The Quarterly Journal of Economics, 82*(1), 33-53.

Easley, D., Hvidkjaer, S., & O'Hara, M. (2002). Is information risk a determinant of asset returns? *The Journal of Finance, 57,* 2185-2221.

Eisfeldt, A. L. (2004). Endogenous liquidity in asset markets. *The Journal of Finance, 59*(1), 1-30.

Ellis, K. (2006). Who trades IPOs? A close look at the first days of trading. *Journal of Financial Economics, 79,* 339-363.

Ellul, A., & Pagano, M. (2006). IPO underpricing and after-market liquidity. *Review of Financial Studies, 19*(2), 381-421.

Foucault, T. (1999). Order flow composition and trading costs in a dynamic limit order market. *Journal of Financial Markets, 2,* 99-134.

Hahn, T., & Ligon, J. (2006). *Liquidity and initial public offering underpricing*. Retrieved October 1, 2007, from http://ssrn.com/abstract=929141.

Handa, P., & Schwartz, R. A. (1996). Limit order trading. *The Journal of Finance, 51*(5), 1835-1861.

Holmström, B., & Tirole, J. (1993). Market liquidity and performance monitoring. *Journal of Political Economy, 101,* 678-709.

How, J., Jelic, R., Saadouni, B., & Verhoeven, P. (2007). Share allocations and performance of KLSE Second Board IPOs. *Pacific-Basin Finance Journal, 15,* 292-314.

Jelic, R., Saadouni, B., & Briston, R. (2001). Performance of Malaysian IPOs: Underwriters' reputation and management earnings forecast. *Pacific-Basin Finance Journal, 9,* 457-486.

Kini, O., & Mian, S. (1995). Bid-ask spread and ownership structure. *Journal of Financial Research, 18,* 401-414.

Krigman, L., Shaw, W. H., & Womack, K. L. (1999). The persistence of IPO mispricing and the predictive power of flipping. *The Journal of Finance, 55*(3), 1015-1044.

Ku Ismail, K. N. I., Zainal Abidin, F., & Zainuddin, N. (1993). Performance of new stock issues on the KLSE. *Capital Markets Review, 1*(1), 81-95.

Li, M., Zheng, S. X., & Melancon, M. V. (2005). Underpricing, share retention, and the IPO aftermarket liquidity. *International Journal of Managerial Finance, 1*(2), 76-94.

Loughran, T., Ritter, J. R., & Rydqvist, K. (1994). Initial public offerings: International insights. *Pacific-Basin Finance Journal, 2,* 165-199.

Mikkelson, W. H., Partch, M. M., & Shah, K. (1997). Ownership and operating performance of companies that go public. *Journal of Financial Economics, 44,* 281-307.

Miller, R. E., & Reilly, F. K. (1987). An examination of mispricing, returns and uncertainty for initial public offerings. *Financial Management, 16,* 33-38.

Mohd, K. N. T. (2007). Regulations and underpricing of IPOs. *Capital Markets Review, 15*(1&2), 1-27.

Morales-Camargo, E. (2006). Underpricing and aftermarket liquidity: An empirical exploration of Hong Kong IPOs. *University of Arizona Working Paper.*

Pagano, M. (1989). Trading volume and asset liquidity. *The Quarterly Journal of Economics, 104*(2), 255 – 274.

Paudyal, K., Saadouni, B., & Briston, R. J. (1998). Privatization initial public offerings in Malaysia: Initial premium and long-term performance. *Pacific-Basin Finance Journal, 6,* 427-451.

Pham, P. K., Kalev, P. S., & Steen, A. B. (2003). Underpricing, stock allocation, ownership structure and post-listing liquidity of newly listed firms. *Journal of Banking and Finance, 27,* 919-947.

Pritsker, M. (2006). *A fully-rational liquidity-based theory of IPO underpricing and underperformance. Finance and Economics Discussion Series.* Washington, D.C: Federal Reserve Board.

Rouwenhorst, K. G. (1999). Local return factors and turnover in emerging stock markets. *The Journal of Finance, 54*(4), 1439-1464.

Rubin, A. (2007). Ownership level, ownership concentration and liquidity. *Journal of Financial Markets, 10,* 219-248.

Wan-Hussin, W. N. (2005). The effects of owners' participation and lockup on IPO underpricing in Malaysia. *Asian Academy of Management Journal, 10*(1), 19-36.

Watanabe, A. (2004). Macroeconomic sources of systematic liquidity. *University of Alberta Working Paper.*

White, H. (1980). A heteroskedasticity-consistent convariance matrix estimator and a direct test for heteroskedasticity. *Econometrica, 48,* 817-838.

Wu, T. S. (1993). The long-run performance of initial public offerings in Malaysia. *Capital Markets Review, 1*(1), 61-80.

Yong, O. (1991). Performance of IPOs of securities in Malaysia. *Malaysian Accountant,* 3-6.

Yong, O. (1996). Size of the firm, over-subscription ratio and performance of IPOs. *Malaysian Management Review, 31*(2), 28-39.

Yong, O. (2007). Investor demand, size effect and performance of Malaysian initial public offerings: Evidence from post-1997 financial crisis. *Jurnal Pengurusan, 26,* 25-47.

Yong, O. (2010). Initial premium, flipping activity and opening-day price spread of Malaysian IPOs. *Capital Markets Review, 18*(1&2), 45-61.

Yong, O., & Isa, Z. (2003). Initial performance of new issues of shares in Malaysia. *Applied Economics, 35,* 919-930.

Yong, O., Yatim, P., & Sapian, R. Z. Z. (2001). Initial and long-run performance of new issues on the Malaysian stock market. *Corporate Finance Review, 5*(6), 28-41.

Yong, O., Yatim, P., & Sapian, R. Z. Z. (2002). Size of offer, over subscription ratio and performance of Malaysian IPOs. *Malaysian Management Journal, 6*(1&2), 35-51.

Zheng, S. X., & Li, M. (2008). Underpricing, ownership dispersion, and aftermarket liquidity of IPO stocks. *Journal of Empirical Finance, 15*(3), 436-454.

Zheng, S. X., Ogden, J. P., & Jen, F. C. (2005). Pursuing value through liquidity in IPOs: Underpricing, share retention, lockup, and trading volume relationships. *Review of Quantitative Finance and Accounting, 25,* 293-312.

Zingales, L. (1995). Insider ownership and the decision to go public. *The Review of Economic Studies, 62*(3), 425-448.

APPENDICES

Appendix 1: Major Events throughout the Study Period

2003 – Credits in foreign currencies were upgraded from BBB+ to A- by Standard & Poor, dollar America depreciated after the G7 meeting recommended that the Asian countries practice more flexible currency exchange rate, changed in standard board lot (SBL) from 1,000 units to 100 units, the Securities Commission announced that time needed to get IPOs listed will be reduced from 25 trading days to 13 trading days, and Datuk Seri Abdullah Ahmad Badawi was appointed the fifth Prime Minister of Malaysia.

2004 – Datuk Seri Najib Tun Razak was appointed as the Deputy Prime Miniter and Minister of Finance II and the cabinet was reshuffled, Barisan Nasional (the ruling political party) won a majority in the 11th national election, Temasek Holdings Ptd from Khazanah Ltd. acquired 5 interest in Telekom Malaysia and the gross domestic product (GDP) was announced to reach 7.6 percent for the first quarter.

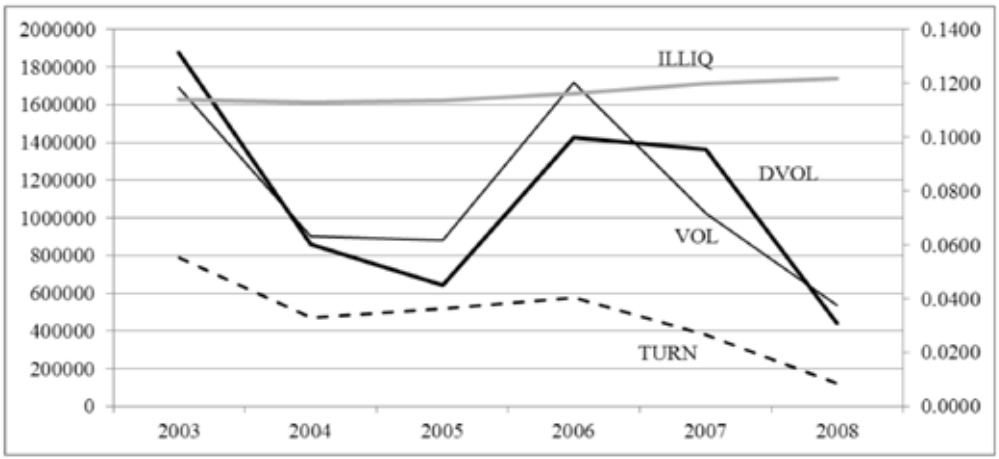
2005 – The GDP for 2004 was announced to reach 7.1 percent, Bursa Malaysia (the Malaysian stock exchange, as a company) was listed on the stock exchange, five stock brokers and one manager of foreign funds had been awarded licenses to operate in Malaysia, major banks in Malaysia guaranteed to provide share margin financing facilities to stock investors, Malaysian Ringgit was de-pegged to the American dollar, crude oil had a price hike reaching a record level of USD70 per barrel, Bank Negara Malaysia (BNM, the central bank) increased the overnight policy rate to 3 percent and the Federal Reserve of the US increased the interest rate to 4.25 percent.

2006 – BNM announced an increase of the overnight policy rate to 3.25 percent, gas price increased by 30 cents per liter, the 9th Malaysia Plan was announced, a military coup took place in Thailand, South Korea tested their nuclear weapons, the three largest plantation companies in Malaysia announced a merger plan, Malaysian Ringgit appreciated against the USD to RM3.52/USD and the Thailand government announced a capital control to curb speculation on the Thai baht.

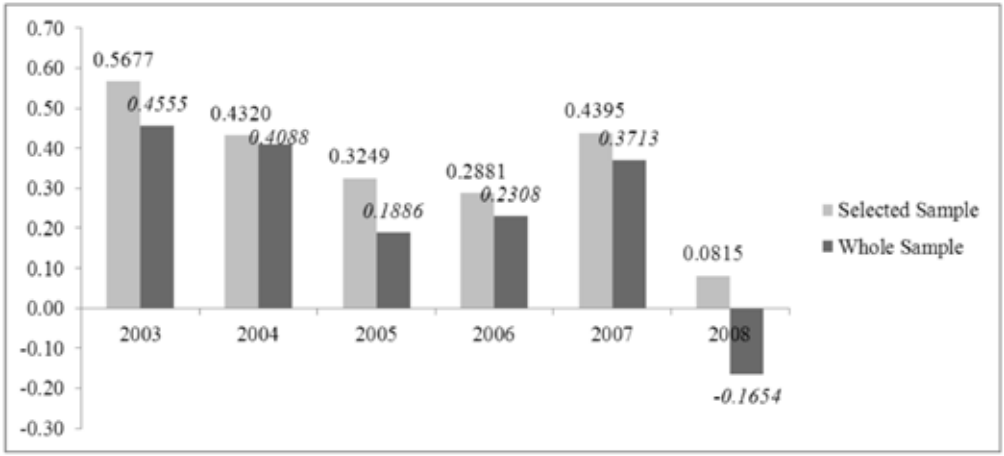
2007 – Trading volume in Bursa Malaysia reached a new record high of 4.78 billion shares, the Kuala Lumpur composite index (KLCI) slumped by 4.64 percent following the US weak performance due to the country's uncertain economic condition, property taxes and incentives for the Iskandar Development Region were announced, the Malaysian government launched the North and East Corridor Economic Regions, and crude oil price increased to USD99.29 per barrel.

2008 – The Malaysian Parliament was dissolved to allow for the 12th national election, price of petrol increased by 41 percent to RM2.70 per liter while price of diesel increased by 63 percent to RM2.58 per liter, few actions were announced to improve the performance of bond and equity markets including the merger of main and second boards and the rebranding of the MESDAQ market, and the *global financial instability* had caused a bankruptcy to the Lehman Brothers and the fall of the AIG Group.

Panel A: Average yearly liquidity



Panel B: Average yearly underpricing (or initial returns)



Notes: The value of ILLIQ is multiplied by 1,000,000.