



An Empirical Examination of Over-Subscription in the Malaysian IPO Market

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ABSTRACT

This paper examines the effects of the involvement of informed investors and the presence of information asymmetry in fixed-price mechanism on over-subscription ratio in the Malaysian initial public offerings (IPO). Analyzing the data on 373 IPOs listed on Bursa Malaysia from 2000 to 2012, we find an insignificant positive relationship between informed investors and over-subscription. However, the relationship between information asymmetry and over-subscription is strongly negative. The negative effect of company size suggests that big companies that are considered to have lower information asymmetry receive less investors' interest, as investments in low risks companies are expected to provide lower initial returns.

Keywords: fixed price mechanism, informed investors, information asymmetry, Malaysian IPOs, over-subscription ratio

INTRODUCTION

In Malaysia, most IPOs are offered through fixed pricing mechanism and it makes it difficult for the issuers and potential investors to gauge the true value of companies. Investors are required to make advance payments for subscription of initial public

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offerings (IPOs) in Malaysia. The advance payment method renders fixed price IPOs less inviting compared to the book-building pricing mechanism (Chowdhry and Sherman, 1996a) as the investors have to bear the opportunity cost. However, in fixed pricing method, the possibility of variance in adverse selection cost for uninformed investors is not as high as the book-building mechanism, which is more uncertain. Fixed price mechanism gives the issuer and underwriters greater degree of freedom in setting the offer price of IPOs. However, the final offer price is still subject to the approval of the Securities Commission (SC) of Malaysia, in order to ensure it is priced on a fair value basis (Abdul-Rahim and Yong, 2010).

Similar to the practices in the United Kingdom (UK) and other Asians countries, for instance Hong Kong, Singapore and Thailand, the offer price of IPOs in Malaysia is determined within two weeks to two months prior to listing. This implies that the offer prices do not completely reflect the true value of the IPOs. It creates an opportunity for potential investors to obtain information before subscribing to the company shares. In general, countries with high investors demand would generally attempt to push up the prices of IPOs.

Prior theoretical and empirical evidence indicates that countries that employ fixed pricing method, such as the UK and most of the Asian countries, have higher level of underpricing and over-subscription ratio (Chowdhry and Sherman, 1996a). They argue that when there is information leakage from the informed investors due to the allocation of shares largely to informed investors, a larger over-subscription level could be observed. The level of over-subscription also increases when there is a longer period between offer date and closing of the bidding date, giving rise to information leakage (Chowdhry and Sherman, 1996a and 1996b).

This study is motivated by Chowdhry and Sherman (1996a) who stated that over-subscription ratio (a proxy used to represent investors' demand) is vital to the success of an IPO issuance as it is a good indicator of companies' value. In an attempt to understand more about investors demand on IPO, this study extends the work of Low and Yong (2011) by examining the involvement of informed investors and the presence of information asymmetry, which have not been explored by previous researches¹. Informed investors or institutional investors are considered to be a long term investor (Gasparino, 1999). They normally trade in large transaction and hold a substantial share in a firm. Thus, their presence would very much affect the demand on IPOs. Lin et al. (2007) argued that when IPO shares are more valued, informed or institutional investors are more inclined to subscribe to the IPOs as compared to uninformed investors as the informed investors would have information about the quality of the IPOs. Based on Rock's (1986) winner curse hypothesis, it is argued

¹ This is according to the authors' knowledge

that insiders or informed investors know better about the true value of a company as compared to uninformed investors (Ritter and Welch, 2002). Informed investors would only subscribe to the IPO if they believe the company would have a better prospect. As such, most likely the uninformed investors would invest in the IPO.

Furthermore, the presence of information asymmetry is also expected to play a significant role in explaining oversubscription of IPOs. Information asymmetry is associated closely to the size of firms. Big firms would normally have a longer track record of operating history and their data is made publicly available. They are followed by financial analysts. Thus, there is less information asymmetry on big firms. In contrast, small and young firms have a higher uncertainty where the level of information asymmetry is high which makes it difficult to estimate its value (Goergen *et al.*, 2006). Investors would be reluctant to subscribe to IPOs with a higher information asymmetry unless they are compensated with higher returns.

It is proposed that participation of informed investors and effects of information asymmetry (firm size) provide a signal of the future prospects of a company. As informed investors are the institutional investors, they have access to detailed information on the firm's future prospects. Thus, greater involvement of informed investors provides a good signal to the uninformed investors (Chowdhry and Sherman, 1996b). Meanwhile, as argued by Eldomiaty (2008), the level of information asymmetry in developing markets is higher than in developed markets. Thus, it does not allow investors to simply accept the findings from other markets. Hence, this study aims to shed light on selected important pre-listing information (involvement of informed investors and information asymmetry effects) that affects investors demand during the subscription period.

The findings of this study would benefit issuers as they would understand factors that might affect investors demand on fixed price IPO. This would help them to manage the IPO in an efficient and effective manner. For investors, information from this study would enable them to make better investment decision when buying IPO particularly for the uninformed investors. They would be able to decide whether or not to follow the decision of informed investors in subscribing to IPOs as these investors have better knowledge on the prospect of a company as suggested by the winner curse hypothesis. Furthermore, investors could also decide whether or not to participate in companies with a higher information asymmetry that have higher risks and returns. Most importantly, it would benefit the regulator to improve on the existing guidelines and regulation so as to protect investors' interest. The finding of this study would enable the regulator to know whether informed or institutional investors could determine the oversubscription of IPOs. If they could, action would need to be taken to curb the problem to ensure the price of the IPOs is not far off its true value. Furthermore, the result of this study reveals that investors are attracted

to subscribe to small companies that have a higher information asymmetry, the regulator would probably need to have a stringent disclosure requirement on small companies so as to reduce information asymmetry. This is clearly stated in the Malaysia Financial Sector Blueprint 2011-2020. A transparent environment with less information asymmetry would attract broader types of participants which could in turn contribute in developing our market as a center of economic activity in the Asian region. The rest of the paper discusses the literature, research methodology, findings and finally, the conclusion of the present study.

RELATED LITERATURE

In fixed price mechanism, an IPO price is determined prior to the allocation. In contrast, the price of an IPO in book-building mechanism is determined by compiling and comparing bids among groups of investors. As stated by Chowdhry and Sherman (1996a and 1996b), over-subscription ratio is a credible source of information in fixed-price mechanism. This is because retail investors have to make advance payments for the IPOs and they face unknown potential investor demand for the price that has already been fixed. Further, in fixed price mechanism system, including in Malaysia, issuers are not entitled for the interest on the advance payment, which otherwise could have been used to reduce the underpricing cost. However, in the book-building mechanism, interest on the advance payment method is not ignored.

According to Mazouz *et al.* (2009), issues relating to underpricing and over-subscription ratio vary across the different offering methods. As pointed out by Van Bommel *et al.* (2010), in fixed price mechanism investors face higher uncertainty on the “true” value of the IPOs in the aftermarket of trading. Ritter (1991) argued that companies are more attracted to go public when investors behave irrationally and are optimistic. The good signal not only increases the company’s share price but also that of the industry as well. Based on empirical works, both small and young companies tend to have higher information asymmetry (Goergen *et al.*, 2006, Beatty and Ritter, 1986, Mohd-Rashid *et al.*, 2014). Thus, the higher uncertainty sends a negative signal to investors who assume it to be risk neutral and is likely to reduce over-subscription. Mohd-Rashid *et al.* (2013) and Benveniste and Busaba (1997) stated that issue size does matter when investors’ demand is strong. However, Low and Yong (2011) found no significant relationship between over-subscription ratio and offer size. On the other hand, Chowdhry and Nanda (1996) showed that high demand IPOs are associated with smaller offer price (small companies), which has larger underpricing.

Rock's (1986) winner curse hypothesis suggests that companies that have involvement of informed investors are associated with low risks and accordingly they obtain lower initial returns. Informed investors normally have better knowledge of the companies and would purchase the IPOs only if they believe it is worth the price, such as in terms of the growth prospects of companies. This shows that the uninformed investors are more prone to purchase IPOs than the informed investors are involved in. Thus, involvement of informed investors and presence of information asymmetry do affect the level of investors demand. This variable is distinctive since none of the previous studies examined the interaction relationship of both informed investors and information asymmetry on investors demand.

Investor enthusiasm is one of the key features in determining investors demand. If the first day returns are high, generally it would attract more investors to bid for the IPO (Che-Yahya *et al.*, 2014). Accordingly, when investors are optimistic about the shares, it creates a cascade on the demand. This argument is further supported by Shiller (1990) using impresario hypothesis, that is, high initial returns leave a good impression on the investors. Loughran *et al.* (1994) showed that the demand for investors is high when the initial returns are high and investors are well informed about the investment. The above discussion shows that investors' optimism does create a cascade on demand. This is especially true when underpricing is high which responds to investor sentiment. Very few researchers have associated underpricing with investor sentiment (Cornelli *et al.*, 2006, Mohd-Rashid and Abdul-Rahim, 2012, Mohd-Rashid *et al.*, 2013, Fennee, 2009, Bayley *et al.*, 2006). We conjecture that investor sentiment, using the proxy of dummy initial returns (*DUMMYIR*) and over-subscription, is positively correlated.

Previous studies also show that there are other factors that play an important role in fixed price mechanism IPOs (Chowdhry and Sherman, 1996a and 1996b). Under the fixed price method, the offer price of the IPO must be set prior to the listing or when potential investors apply for shares. The gap between the offer and listing dates are on average between two to four weeks. As suggested by Loughran *et al.* (1994), a longer period between offer and listing leads to greater underpricing. However, Chowdhry and Sherman (1996b) argued that the longer offer periods, tend to increase the chances of information leakage and if it is good to buy the shares, it would cascade the over-subscription. Thus, present study uses *DELAY* as a proxy for information leakage.

In addition, in fixed-price mechanism, investors face the opportunity cost of funds from the time they submit the application until the IPO goes for listing. Fung *et al.* (2004) and Low and Yong (2011) found that when there is a longer period between the last day of IPO application and the listing date, it signals low quality

IPOs and reduces bidding applications by investors. This study follows Low and Yong (2011) in using proxy for the opportunity cost of funds (*OCF*), that is, the last day of application to the listing date of the IPO.

The demand and supply theory model shows that a company with lower offer price is associated with increasing investors' demand. Investors are more likely to bid for IPOs where prices are normally set lower, as they believe it is undervalued. Assuming that investors are optimistic, higher investor demand pushes up the initial returns. In other words investors are compensated with higher initial returns for bearing high risks (lower offer price) IPOs. Offer price has been used as a proxy for risk in previous studies by Willenborg (1999) who found that offer price is positively and significantly associated with initial returns. Bradley and Jordan (2002) measured the risk of IPOs using the reciprocal of the offer price. Their finding also showed that initial returns and risks are positively and significantly correlated. Further, Beatty and Welch (1996) argued that a small company with a lower offer price tends to attract more investors to subscribe to the IPOs. Thus, we infer that risk of IPOs (*RISK*) and investors' demand are positively correlated.

The phenomenon of hot market also plays an important role in influencing investor optimism. According to Loughran and Ritter (2002), recent market conditions reflect investor interest in subscribing to IPOs. Ma and Faff (2007) and Mahmood *et al.* (2011) argued that the most recent market conditions prior to IPO listing does influence investors sentiment and over-subscription. Derrien and Womack (2003) used the three months pre-IPO market price to proxy for market conditions (*MKTCON*). Therefore, we conjecture that market conditions and investors' demand are positively correlated.

DATA AND METHODOLOGY

The sample of this study comprises 373 IPOs, listed on Bursa Malaysia (Malaysia's Stock Exchange) between 2000 and 2012. Data on IPOs were from January 2000 onwards to allow sufficient time for the Malaysian market to recover from the Asian 1997/98 financial crisis. The one-year gap after the crisis reduces any lingering effects of the Asian financial crisis. The data on IPOs were from the Bursa Malaysia website, company prospectus and Star-online. The data on over-subscription ratio were from various newspaper reports. The sample of the IPOs in this study excludes IPOs that involve restricted offer-for-sale; restricted public issues; restricted offer-for-sale to eligible employees; restricted offer-for-sale to Bumiputera investors (Malays and indigenous people); special and restricted issues to Bumiputera investors; tender offer; and special issues. This is to avoid

less meaningful outcomes, which is consistent with Abdul-Rahim and Yong (2008) and Yong (2007). Finally, the sample of this study excludes companies that have an extreme outlier and IPOs that have limited information availability.

To examine the impact of the involvement of informed investors and information asymmetry on over-subscription ratio, a cross sectional regression model is applied as follows:

$$OSR_i = a + \beta_1 DPRIVATE_i + \beta_2 MKTCAP_i + \beta_3 DummyIR_i + \beta_4 DELAY_i + \beta_5 OCF_i + \beta_6 RISK_i + \beta_7 MKTCON_i + \varepsilon_i \quad (1)$$

where *OSR* is over-subscription ratio, *DPRIVATE* is institutional investor participation, market capitalization (*MKTCAP*), investor sentiment (*DummyIR*), information leakage (*DELAY*), opportunity cost of fund (*OCF*), IPO risk (*RISK*), and market condition (*MKTCON*).

Further analysis is carried out to examine the interaction effect between informed investors (institutional investors) and information asymmetry, as the present study believes that the signaling mechanism differs according to the level of information asymmetry. This argument is also consistent with Yung and Zender (2010) who claimed that the level of information asymmetry in the IPOs does affect the signaling mechanism. Therefore, the present study argues that level of information asymmetry moderates the relationship between informed investors and investors' demand. This moderating effect is examined using the interaction term (*DPRIVATE x MKTCAP*) which is entered into the regression model as follows:

$$OSR_i = a + \beta_1 (DPRIVATE * MKTCAP)_i + \beta_2 DPRIVATE_i + \beta_3 MKTCAP_i + \beta_4 DummyIR_i + \beta_5 DELAY_i + \beta_6 OCF_i + \beta_7 RISK_i + \beta_8 MKTCON_i + \varepsilon_i \quad (2)$$

The dependent variable in this study is the over-subscription ratio (OSR) which indicates the investors' demand and it measures the number of times the IPO is oversubscribed. A positive over-subscription indicates that the IPOs are demanded more than they are supplied while a negative over-subscription ratio implies lower investors demand. In Malaysia, Abdul-Rahim and Yong (2010) found that higher demand puts upward pressure on the aftermarket price of the IPO, which results in an increase in initial returns. The formula for OSR is as follows;

$$OSR = \frac{\text{Total number of IPOs Subscribed}}{\text{Total Offer Units}} \quad (3)$$

The two independent variables are the involvement of institutional investors (or informed investors) and information asymmetry effect. Firstly, offers of shares to institutional investors are proxied through private placements. In the present study, institutional investor involvement is proxied by a dummy for private placements (*DPRIVATE*), in which one represents IPO issued through private placements and zero otherwise. Level of information asymmetry is proxied using the company size, which is measured based on the market capitalization of the IPO. The large market capitalization is associated with big company size that has low information asymmetry effect and vice versa. Past studies that used market capitalization as a proxy for company size include those by Chambers and Dimson (2009), Chahine *et al.* (2011), and Yung and Zender (2010). Similarly, Goergen *et al.* (2006), Beatty and Ritter (1986) and Barclay and Smith (1995) used size as a proxy for level of information asymmetry on small and young companies that are more exposed to greater uncertainties and higher level of information asymmetry. The formula for market capitalization (*MKTCAP*) is as follows:

$$MKTCAP = \text{Pre} - \text{IPOShares} \times \text{POfferPrices} \quad (4)$$

Five variables found to be significant in over-subscription studies are the control variables. When investors are enthusiastic about the IPO, the investors' demand would be high. We use dummy initial returns (*DUMMYIR*) as suggested by Low and Yong (2011), but the measurement differs slightly, where dummy 1 consists of companies with initial returns higher than the average of the IPO initial returns for the whole year and zero for IPOs with lower than average initial returns. The present study hypothesizes that when investor enthusiasm is high, the over-subscription ratio increases. The longer the gap between the offer and closing dates of IPOs, the greater the opportunity for information to leak out. Thus, it would reduce the over-subscription ratio (Chowdhry and Sherman, 1996b). This study uses the number of days from the IPO opening until closing of the application to represent information leakage (*DELAY*). The third variable, as put forth by Fung *et al.* (2004), is the advance payment method in Malaysia that creates an opportunity cost of funds for potential investors due to the length of time from the last day of IPO application to the listing date. Investors lose the interest income earned from the other securities by putting their money as advance for the IPO allocation, without knowing whether they would succeed in subscribing to the IPOs. Following Low and Yong (2011), Fung *et al.* (2004), we use the number of days from the last day of IPO application until its listing date to proxy the opportunity cost of funds (*OCF*). The present study also argues that company risk could influence investor's decision to subscribe. To attract investors, companies with high risks would compensate with

high initial returns. The high risk IPOs would have a lower offer price to attract investors. We use reciprocal of offer price to represent company risk (RISK), as suggested by Bradley and Jordan (2002). The fifth variable, that is, prior market conditions also influences the over-subscription ratio. As indicated by Derrien and Womack (2003) and Agarwal *et al.* (2008), hot market conditions lead to over-subscription. To represent the market conditions (*MKTCON*), we use the average of three months EMAS index returns prior to IPO listing. We hypothesize that market condition is positively related to over-subscription ratio.

EMPIRICAL RESULTS

Table 1 presents the descriptive statistics of the sample of 373 IPOs, listed from January 2000 to December 2012. The average over-subscription ratio is 30.45 times, and the minimum over-subscription is -0.89 times, while the maximum over-subscription is 263 times. This indicates that over-subscription ratio varies for each IPO issued in Malaysia. The large differences in over-subscription supports motivation of this study to examine factors that influence investors demand.

Table 1 Descriptive statistics of variables (January, 2000 to December, 2012)

Variable	Mean	Median	Std. dev.	Min.	Max.
Over-subscription (times)	30.45	16.37	42.30	-0.89	263.42
Private Placements (RM million)	24.78	9.00	103.29	0.00	1885.00
Market Capitalization (RM million)	470.03	72.00	2734.85	16.00	40400.00
Initial returns (%)	28.90	15.33	52.33	-50.55	404.16
DELAY (days)	12.48	12.00	5.56	1.00	74.00
Opportunity cost of funds (OCF) (days)	18.64	16.00	7.89	6.00	71.00
RISK (ratio)	1.68	1.31	1.27	0.19	8.33
Offer price (RM)	1.00	0.76	0.76	0.12	5.05
Market condition (%)	4.30	4.52	12.64	-29.12	39.24

Note: Over-subscription is the number of times the IPOs are over-subscribed. Private placement is the involvement of informed (institutional) investors. Market capitalization is the number of pre-IPO shares multiplied by the offer price. Initial return is percentage change in offer price and closing price on the first day of listing. *DELAY* is number of days from opening to closing of IPO application. Opportunity cost of funds is the number of days from closing of the application to the listing day. RISK is reciprocal of the offer price. Market condition is the average return of EMAS Index, three months prior to listing.

The average size of IPOs with involvement of informed investors (private placement issues) is RM24 million, while the highest value of IPOs with involvement of informed investors in IPOs is RM1,885 million. Market capitalization, which represents company size, has a mean of RM470 million, with the lowest being RM16 million and the highest, RM40,400 million. This shows a huge difference in size between small and big companies in the Malaysian market. On average, the initial return is 28 per cent and the lowest is negative 50 per cent, while the highest is 404 per cent. *DELAY* a proxy for information leakage shows an average number of days from the opening to the closing of IPO application is 12 days, with the longest about 74 days and the shortest, one day.

The proxy for opportunity cost of funds is the length between closing dates of the application to the listing date. On average, the mean value is 18 days with a maximum that is close to the offer period of about 71 days. The risk of the IPO is on average 1.68 and up to a maximum of 8, which indicates a large variance between companies with high and small risks.

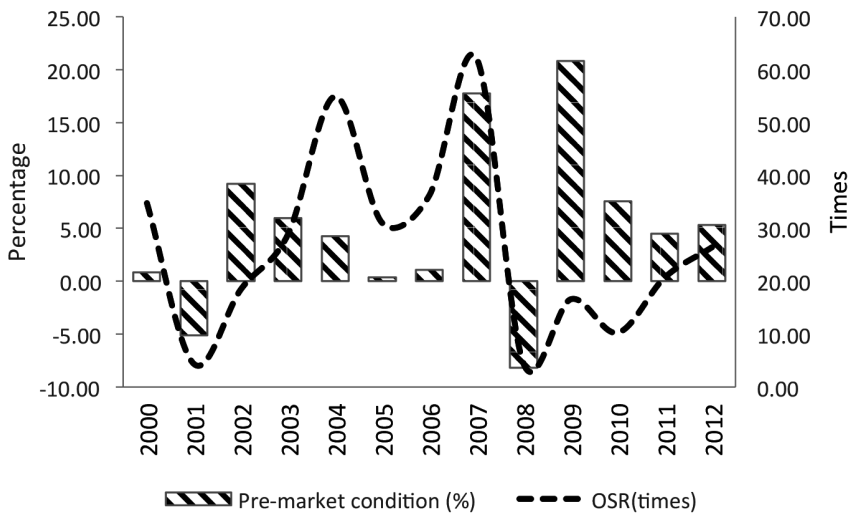


Figure 1 Average Over-subscription and pre-market condition of IPO issues from January, 2000 to December, 2012

Finally, the market condition, reflected by the average return of three months EMAS index prior to the IPO listing, shows an average of 4 per cent, with the highest being 39 per cent and the minimum a negative 29 per cent. Figure 1 illustrates that

market conditions have positive association with over-subscription. The declining trends in market conditions could be attributed for the lower investor demand (over-subscription), which indicates investors are reluctant to subscribe when the market is in cold condition and there is uncertainty about the investment.

Table 2 presents the correlation matrix between the variables. Most of the independent variables have a correlation of less than 0.6 except for DELAY and OCF which shows a significant relationship of 0.897. Further test, using VIF (variance inflation factors), is done prior to regression analysis to confirm that there is no multicollinearity problem. Results in Table 2 also indicate that big firms, with longer offer period and higher opportunity cost of funds have fewer investors subscribing to their IPOs.

Table 3 displays the differences between high and low investors demand, big and small companies, high-private and low-private investors. Panel A shows that high and low investors demand IPOs differ substantially. The high investors demand group has an over-subscription ratio of 77.11 times compared to the low demand, which is 2.43 times. The company size differs dramatically between big and small companies. Results show that there is high investors demand for the small companies' IPOs that have lower offer price. This contributes to the higher initial returns for the highly demanded IPOs. It shows that the investors are more interested to subscribe to the IPO if the offer price is low and there is greater involvement from informed investors when the market condition is relatively good.

Another interesting point to note is that small companies have higher informed investors' involvement and this influences investors to subscribe more shares. As mentioned before, the involvement of informed investors signals that the company has good future prospects. The winner's curse theory also suggests that investors face less adverse selection problems, if the IPOs have the involvement of large informed investors.

Panel C represents the difference between high and low private placements. The highly informed investors (high private placements) prefer to subscribe to IPOs with lower offer prices (represented by small companies) due to expectation that investors would receive higher initial returns for high risk IPOs. In Panel B, the opportunity cost of funds is lower for the small companies, which might attract informed investors to subscribe to the IPOs.

The cross-sectional multiple regression analysis results shown in Table 4, quantify the role of company size (information asymmetry) and informed investors, in explaining investors demand (over-subscription ratio). The coefficients reported in Table 4 are generated using the Newey-West procedure to correct for autocorrelation (Durbin-Watson is initially 1.44). The heteroskedasticity White

Table 2 Pearson's correlation matrix among variables

	OSR	DPRIVATE	MKTCAP	DUMMIR	DELAY	OCF	RISK
DPRIVATE	0.153***						
MKTCAP	-0.258***	-0.325***					
DUMMYIR	0.417***	-0.048	-0.236***				
DELAY	-0.135***	-0.258***	0.005	0.051			
OCF	-0.124**	-0.301***	0.044	0.081	0.879***		
RISK	0.305***	0.362***	-0.431***	0.140***	-0.256***	-0.245***	
MKTCON	0.144***	0.016	0.036	0.144***	-0.194***	-0.162***	-0.066

Notes: ** indicates significance at 5% and *** indicates significance at 1% (2-tailed). *DPRIVATE* is dummy private placements. *MKTCAP* is market capitalization. *DUMMYIR* is the dummy for initial returns. *DELAY* is number of days of the offer period that proxies for information leakage. *OCF* is the opportunity cost of fund, using the number of days from closing of application to the listing date. *RISK* is the reciprocal of offer price. *MKTCON* is average returns three months prior to IPO listing.

Table 3 Mean values among sub-groups of IPOs

	OCF (days)	Delay (days)	Private (%)	Offer price (RM)	Initial return (%)	OSR (times)	Risk (ratio)	Pre-market cond. (%)	Market cap. (million)
Panel A:									
High-demand IPOs	17.83	11.52	51.77	0.83	57.83	77.11	2.03	9.29	97.47
Low-demand IPOs	20.37	13.54	37.76	1.09	7.48	2.43	1.47	0.82	994.34
Wilcoxon Z-statistic	-1.13	-2.97***	-2.97***	-3.03***	-8.49***	-12.93***	-3.03***	-4.86***	-6.05***
Panel B:									
Big-company (Low-IA)	20.23	12.40	36.90	1.48	13.52	13.57	1.00	2.78	1425.54
Small-company (High-IA)	16.66	11.90	62.64	0.49	40.85	43.26	2.75	3.89	41.54
Wilcoxon Z-statistic	-2.63***	-1.47	-5.65***	-10.21***	-3.67***	-5.96***	-10.21***	-0.61	-12.93***
Panel C:									
High-private placements	15.75	11.21	74.07	0.57	36.74	43.69	2.67	4.53	364.94
Low-private placements	22.27	13.48	2.14	1.62	34.04	20.23	0.88	4.59	1101.84
Wilcoxon Z-statistic	-6.26***	-4.46***	-13.38***	-10.08***	-1.17	-2.39***	-10.08***	-0.46	-2.49***

Notes: *** indicates statistical significance at the 1% level. IA represents information asymmetry; Based on Fama and French's (1993), we have segregated the high and low investors demand by taking IPOs with the lowest investors demand quartile (30 percent lowest from the sample) and assigned them as low demand portfolio whereas IPOs in the highest investors demand quartile (30 percent highest from the IPOs sample) to be assigned to high-demand portfolio. This classification is also used to segregate between big and small companies and high-private and low-private placements; Definition of each variable appeared in Table 1 and 2 except for percentage of private placement which is calculated by dividing the number of issues owned by the institutional investors over the total number of issues.

test detects heteroskedasticity problems, hence, 'White consistent standard errors and covariance' are used instead. The regression model also passes the RAMSEY test for model specification.

The results in Table 4 are consistent with the correlation analysis in Table 2. The adjusted-R² shows that the independent variables in the model could explain 21 per cent of the variations in over-subscription ratio. We find that company size (*MKTCAP*) is strongly negative in explaining the over-subscription ratio. That is, the bigger the company size (lower information asymmetry), the lower the number of investors who subscribe to the IPO. Another possible explanation is that big companies have larger issue size, such that over-subscription is lower because there are more shares to meet the demands of investors. This finding is in line with Chowdhry and Nanda (1996) who found that small companies are associated with high demand. The result is also consistent with Benveniste and Busaba (1997) who stated that company size does matter in explaining over-subscription. In the context of this study, the company size, which reflects the level of information asymmetry, does influence the rate of over-subscription of IPO. Companies that face greater uncertainty have higher demand from the investors.

Meanwhile, involvement of informed investors (*DPRIVATE*) is positive but insignificant in explaining the over-subscription ratio. The positive relationship is consistent with Rock (1986) who argued that the higher the involvement of institutional investors, the higher the demand and accordingly the returns. As informed investors subscribe more to shares that they believe have good prospects, the involvement of informed investors is expected to create a herd mentality among the others. However, the findings in this study show no significant relationship between private placement and over-subscription. The findings are contrary to the winner's curse argument. This could be due to the expectation from investors that participation of informed investors who are knowledgeable would lead to price amplification of the IPO and hence generate interest among investors to subscribe.

Evidence of investors' enthusiasm (*DUMMYIR*) is positively significant in explaining the over-subscription ratio. This finding is consistent with that of Cornelli *et al.* (2006), Sahoo and Rajib (2010) and Low and Yong (2011). Thus, enthusiasm of investors, based on the movement of price (underpricing), reflects investors' over-subscription and leaves an impression that the underwriter is offering a good IPO. The finding also supports impresario hypothesis put forward by Shiller (1990), that is, investors impression creates demand for the IPOs.

As for information leakage (*DELAY*), it is negatively related to over-subscription but the finding is not significant. The negative coefficient suggests that the longer the offer period for investors to place their order, the lower the over-subscription. This is not surprising since, the longer offer period suggests

the highest possibility of information leakage, which could cause the issue to fail should any bad news be revealed. Thus, investors face a high risk on IPOs that have longer offer period and accordingly investors would lower their demand for such IPOs. This finding is consistent with that of Chowdhry and Sherman (1996b), who stated that under the UK method the price is set early, and the longer offer periods do create information leakage.

We find a significant negative relationship between the opportunity cost of funds (*OCF*) and over-subscription ratio. The result is not surprising, since investors in Malaysia have to pay an advance for allocation of shares applied. The longer the period from the closing of IPO application to the listing date, the higher the opportunity cost of funds. Thus, it reduces the investors' interest to subscribe to the IPOs. The finding is also consistent with Chowdhry and Sherman (1996b) who argue that the costs of subscribing increase when there is high demand from investors.

The risk of the IPO measured using the reciprocal of offer price shows that it is positive and highly significant in explaining the over-subscription. It indicates companies with high risk (lower offer price) obtain more subscriptions from investors. This is because investors realize that they are compensated with high

Table 4 Regression results for over-subscription model for 373 IPOs, listed from January 2000 to December 2012

Dependent variable is over-subscription ratio		
Variable	Coefficient	t-statistic
MKTCAP	-3.933	-2.785***
DPRIVATE	3.452	0.981
DUMMYIR	28.409	5.476***
DELAY	-0.197	-0.437
OCF	-0.440	-2.037**
RISK	6.471	2.736***
MKTCON	0.337	2.612***
Adjusted R ² = 0.2183		Durbin Watson D= 1.447
F-statistic= 15.844***		Ramsey Reset Test= 2.665

Note: ***, **denote statistical significance at the 1% and 5% levels. *MKTCAP* is market capitalization, number of pre-IPO shares multiplied by the offer price. *DPRIVATE* takes value 1 if there is participation from private placement and zero otherwise. *DUMMYIR* takes the value 1 if the returns are higher than the average initial returns. *DELAY* is the number of days between the opening and closing of IPO application. *OCF* (opportunity cost of funds) is the number of days between the last day of application and the listing day. *MKTCON* (market condition) is the average returns of EMAS Index, three months prior to listing. *RISK* is the reciprocal of the offer price.

initial returns for bearing such high risks. This is in line with the finding in Table 3, that company with high risk which offers lower offer price appears to have higher demand from investors. The finding is also consistent with Bradley and Jordan (2002) who pointed out that lower offer price is more likely to create higher returns through higher investors demand.

The impact of market conditions is positively and strongly significant in influencing the over-subscription of IPOs. It suggests that if the market condition before the IPO listing is hot (high returns), then it would have an advantage of attracting investors and creating interest for investors to subscribe to the IPOs. It also shows that good market condition reduces the uncertainty of the investment. Thus, it reduces investors' fears and contributes to over-subscription of the IPOs. The result is consistent with Loughran and Ritter (2002), who conjecture that past market conditions influence the investors to bid for more or less of the shares. Our main findings show that company size which captures the level of information asymmetry, investors' enthusiasm, opportunity cost of funds, risk and market conditions are significant in explaining the over-subscription of IPOs.

According to Chowdhry and Sherman (1996a), informed investors do not subscribe to the IPO if they have superior and ex-ante information indicating that the IPO is overpriced. In the light of this, we argue that the influence of informed investors' participation and information asymmetry on investors demand is not significant. This study adds an interaction effect between informed investors and information asymmetry ($DPRIVATE \times MKTCAP$) as an additional explanatory variable in Table 5. Further, to avoid multicollinearity problem in the interaction term, the centering method is used (Aiken and West, 1991). Centering method is done by subtracting each predictor by the mean of the predictors (Cohen *et al.*, 2003).

The finding in Table 5 shows that, the interaction term is significant and negatively related to over-subscription at the 10 per cent level. From the finding, it is evident that the involvement of informed investors becomes significant by having an interaction term ($DPRIVATE \times MKTCAP$). The result shows the influence of informed investors on over-subscription depends on the level of information asymmetry. It is expected that the demand of IPOs would be significantly higher if the firm size is smaller. In other words, if there exists institutional investors and firm size is smaller there will be a higher demand on IPOs. However, if there is no involvement of institutional investors, whether or not the firm size is small or big, it would not influence investors to subscribe. Further, the influence of institutional investors or private placement would only be significant if the firms have a higher information asymmetry.

Table 5 Interaction effect between private placement and market capitalization

Dependent variable is over-subscription ratio		
Variable	Coefficient	t-statistic
DPRIVATE*MKTCAP	-4.880	-1.770*
MKTCAP	-1.912	-1.447
DPRIVATE	4.944	1.350
DUMMYIR	28.249	5.436***
DELAY	-0.172	-0.382
OCF	-0.421	-1.955**
RISK	5.880	2.506**
MKTCON	0.342	2.653***
Adjusted R ² = 0.219		Durbin Watson D= 1.447
F-statistic= 14.084***		Ramsey Reset Test= 2.454

Note: ***, **, * denotes statistical significance at the 1%, 5% and 10% levels.

Our finding supports the argument by Chowdhry and Sherman (1996b) that informed investors subscribe and bid for good quality IPOs as they have superior information about the companies. The public only becomes aware of the information that is available to informed investors at the time the IPOs are over-subscribed. Informed investors would only bid for the share if they believe that its true value is higher than the offer price. Further, informed investors are more attracted to subscribe to the IPOs of small companies (as shown in Table 3) for speculative purposes. As argued by Yong (2013), small companies are more speculative, thus investors bid for the share to gain higher initial returns on the day of listing.

CONCLUSION AND IMPLICATIONS

The present paper examines the effects of information asymmetry and involvement of informed investors on over-subscription of IPOs, using data from 373 IPOs, listed from January 2000 until December 2012. The preliminary result suggests that average over-subscription is about 30 times. There is a wide difference between high and low over-subscription ratio. This indicates that investors' preference to subscribe varies in this market. Our findings show that company's size (information asymmetry) is negatively significant in explaining over-subscription of IPOs. It implies that the higher the information asymmetry level, the greater the investor interest to subscribe as investment in companies with high risks are compensated

with higher initial returns. The finding also suggests that to increase the interest of investors, companies should have lower opportunity cost of funds, that is, the IPOs are offered under good market conditions, high investors' enthusiasm, and lower offer price. The reason being, once investors realize that the issue price is "low", there is over-subscription of the company's shares. Other findings show that there is no significant relationship between informed investors and offer period with IPO over-subscription. However, by adding an interaction term between informed investors and information asymmetry level, a significant negative relationship is observed between the interaction term ($DPRIVATE \times MKTCAP$) and over-subscription. It indicates that the influence of informed investors on over-subscription depends on the level of information asymmetry.

In Malaysia, investors place their IPO's subscriptions and advance payment for the application without knowing the actual number of shares they would obtain. Similarly, issuers fix the offer price of IPOs without knowing the investors demand or interest on their shares. Thus, to compensate the adverse selection problem and uncertainty, investors obtain higher initial returns, especially in companies with higher uncertainty. The finding of this study suggests that in fixed price mechanism, regulators should ensure issuers disclose important information that might affect investors' decision to subscribe to the IPOs.

Result of this study is constrained by a limited number of variables to understand factors affecting over-subscription of IPOs. It is likely that other factors, such as underwriter's reputation and macroeconomic variables might affect investors demand. Besides, there might be other proxies that could be used as an alternative to some of the variables used in this study. For example, the number of institutional investors given private placement or the percentage of units through private placement could be utilized to represent institutional investors. Similarly, a better measure could be used to replace firm size as a proxy for information asymmetry. This is because firm size is not only being used specifically to represent information asymmetry but was also used as a proxy for firm visibility, financial market access and noise trading in other research. The use of these different proxies may improve the result of this study.

Another limitation of this study is related to involvement of informed investors and presence of information asymmetry. The argument in the literature shows that there were two opposing forces at work. An existence of informed investors exacerbates information asymmetry whereby a high level of information asymmetry would shun uninformed investors from subscribing to the IPOs, thus providing a negative signaling effect to the market. In contrast, when informed institutional

investors subscribe to the IPOs, uninformed investors would follow suit as generally informed investors would know the true value of a company, hence providing a positive signaling effect to the market. With such propositions, future research should focus on a model that is specified in quadratic form.

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