

Regulations and Underpricing of IPOs

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Abstract: The IPO market in Malaysia has historically been tightly regulated. However, with the formation of the Securities Commission (SC) in 1993, the regulations have eased slowly. This paper investigates the relationship between underpricing and regulations by looking at 546 IPOs from 1990 to 2002. Underpricing refers to the initial return that an investor earns if he buys shares of the IPO at the offer price and sells it at the end of the listing day at the market price. Regulations are measured by the relaxation of the pricing method, the required allocation to indigenous investors, the mechanisms to protect minority shareholders, and the length of time periods. The first three features of regulations are unique to Malaysia. The findings are mixed regarding the relaxation of the pricing guideline in 1995 since it did not lead to lower underpricing for the period from 1996 to 7 November, 1997 or before the Asian financial crisis. The fraction of shares set aside for indigenous investors does not affect underpricing; length of time from price setting to listing date related negatively to underpricing. Finally, the protective mechanisms led to more underpricing for firms that went public between 1996 and 6 November, 1997 or those that went public after 1998, that is, after the Asian financial crisis.

Keywords: Regulations, IPO, underpricing

1. Introduction

The return earned by an investor if he buys shares in an initial public offering (IPO)¹ at the offer price and sells them on the listing day at the market price is on average positive. This first-day return of an IPO is better known as an initial return or underpricing. On average, in any country, IPOs are underpriced. Table 1 shows the level of underpricing in selected countries. The highest level of underpricing, or initial return, is experienced in China for A-shares IPOs. A-shares are shares that can only be traded by Chinese citizens. Chen *et al.* (2004) found that for 701 A-shares IPOs from 1992 to 1997, the average (median) level of underpricing is 298 per cent (145%). Chan *et al.* (2003) also found that A-shares experienced a high level of underpricing. They found that the underpricing for 570 A-shares IPOs is 177.8 per cent. The lowest level of underpricing is experienced in Mexico. Aggarwal *et al.* (1993) found that for 44 IPOs in Mexico from 1987 to 1990, the average (median) underpricing is 2.8 per cent (0.7 per cent). However, Hensler *et al.* (2000) found that the level of underpricing is higher at 18.52 per cent for 68 IPOs from 1987 to 1993.

Underpricing of new issues by Malaysian listed firms is among the highest in the world. Dawson (1987), using a sample of 21 firms from 1978 to 1983, reported that the average underpricing was 167 per cent on the first day that the shares were listed. Ku Ismail

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¹ An initial public offering refers to the sales of shares by an unlisted firm to the interested investors for the purpose of seeking listing on an exchange.

Table 1: Underpricing of IPOs in various countries

Study	Country	Sample period	Average underpricing
Ritter (1991)	US	1975-1984 (1,526 IPOs)	14.06%
Keloharju (1993)	Finland	1984 to 1989 (80 firms)	8.7%
Levis (1993)	UK	1980 to 1988 (712 IPOs)	14.3%
Aggarwal <i>et al.</i> (1993)	Brazil	1980 to 1990 (62 IPOs)	78.5%
Aggarwal <i>et al.</i> (1993)	Chile	1982 to 1990 (36 IPOs)	16.3%
Aggarwal <i>et al.</i> (1993)	Mexico	1987 to 1990 (44 IPOs)	2.8%
Kunz and Aggarwal (1994)	Switzerland	1983 to 1989 (42 IPOs)	35.8%
Kim <i>et al.</i> (1995)	Korea	1985 to 1989	57.56%
Cai and Wei (1997)	Japan	1971 to 1992 (180 IPOs)	49%
Firth (1997)	New Zealand	1979 to 1987 (143 IPOs)	25.87%
Ljungqvist (1997)	Germany	1970 to 1993	9.2%
Kooli and Suret (2004)	Canada	1991 to 1998 (445 IPOs)	20.57%
Lee <i>et al.</i> (1996)	Australia	1976 to 1989 (266 IPOs)	16.41%
da Silva Rosa <i>et al.</i> (2003)	Australia	1991 to 1999 (333 IPOs)	25.47%
Chan <i>et al.</i> (2003)	China	1993 to 1998 (570 A-share IPOs)	177.8%
Chan <i>et al.</i> (2003)	China	1993 to 1998 (39 B-share IPOs)	11.6%
Hensler <i>et al.</i> (2000)	Mexico	1987 to 1993 (68 IPOs)	18.52%
Kiyamaz (2000)	Turkey	1990 to 1996 (163 firms)	13.1%
Chen <i>et al.</i> (2004)	China	1992 to 1997 (701 A-shares)	298%
Chen <i>et al.</i> (2004)	China	1992 to 1997 (117 B-shares)	25%
Dawson (1987)	Malaysia	1978 to 1983 (21 firms)	167%
Ku Ismail <i>et al.</i> (1993)	Malaysia	1980 to 1989 (63 firms)	114.6%
Loughran <i>et al.</i> (1994)	Malaysia	1980 to 1991 (132 firms)	80.3%
Yong (1996)	Malaysia	1990 to 1994 (224 firms)	72.85%

et al. (1993) report an underpricing of 114.6 per cent for a sample of 63 firms that went public from 1980 to 1989. Loughran *et al.* (1994) report an underpricing of 80.3 per cent for a sample of 132 firms that went public from 1980 to 1991. Yong (1996) reports an underpricing of 72.85 per cent for 224 initial public offerings (IPOs) from 1990 to 1994. Compared with other emerging markets, Malaysia appears to be at the top of the list in providing a deep discount on its IPOs (Loughran *et al.* 1994).

The different levels of underpricing observed in different countries show that there might be some unique features in each country and these features might affect underpricing. For example, A-shares in China are severely underpriced. One explanation for this observation is that these firms used to be a part of government enterprises and even after the selling of shares in IPOs, the government still owns these firms. Therefore, the higher the holdings of the government, the higher is the level of underpricing that investors require to protect them from the agency problem with government-linked companies. Furthermore, for each firm, the higher the share the government holds, the lower is the liquidity of the shares. Therefore, investors need to be protected against this illiquidity problem in the form of

higher return, that is, underpricing. Thus some part of underpricing could be explained by these unique features.

The purpose of this paper is to look at four unique features in the IPO market in Malaysia. These features are in the form of government regulations that firms have to meet. The four features are the pricing method of IPOs, share allocations to indigenous investors, lag time from the setting of offer prices to the listing of IPOs, and mechanisms to protect minority shareholders. These four features are explained in the next section. By using 546 IPOs listed on the Main Board and Second Board of the Kuala Lumpur Stock Exchange (KLSE) from January 1990 to December 2002, this paper examines the relationships between the level of underpricing and the four features of government regulations in the Malaysian IPO market. The relaxation of the pricing guideline in 1995 led to more underpricing for the period from 1996 to 7 November 1997; the fraction of shares set aside for indigenous investors did not affect underpricing; the length of time from price setting to listing date led to more underpricing, and finally, the protective mechanisms led to more underpricing for firms that went public between 1996 and 6 November, 1997 or those that went public after 1998.

The rest of the paper is organised as follows. The next section reviews the institutional setting in Malaysia followed by a section on underpricing literature, and Section 4 describes the hypotheses to be tested. Section 5 covers data and methodology while Section 6 reports the empirical results. Additional analyses are discussed in Section 7 while the final section concludes the discussion of the underpricing determinants for Malaysian listed companies.

2. Institutional Setting in Malaysia

Loughran *et al.* (1994) show that institutional differences in pricing and allocation of shares play an important role in explaining cross-sectional differences in underpricing among the 25 countries that they reviewed. They also mention that Malaysia is more regulated compared to the other countries and this might affect the pricing of new issues. Below is a description of the process of going public in Malaysia.

To be listed on the KLSE, a firm must get approvals from four different authorities: the Securities Commission (SC)², Foreign Investment Committee (FIC), Ministry of International Trade and Industry (MITI), and KLSE itself. Approvals from MITI, FIC, and KLSE are easier to get compared to SC. SC might approve, amend or reject a firm's request for listing. To get an approval from SC or CIC, a firm must meet certain criteria and must submit an application to SC. In the application, a firm must state, among other things, the price at which the shares will be offered or the offer price, the number of shares to be offered, the purpose of the initial public offering (IPO), the use of the proceeds to be raised from the IPO, the riskiness of investing in the firm's shares, the financial performance for the past three or five years, the value of landed properties if a valuation exercise is undertaken, and the ownership structure of the firm. After getting an approval, a firm publishes a prospectus and this prospectus could be anywhere between 100 to 300 pages, depending on the firm's

² SC took over the functions of Capital Issues Committee (CIC) in March 1993. Prior to March 1993, firms had to get CIC approval before offering the shares to the public.

Table 2: Subscription rates for the different time periods

Period/Year	Average	Std dev	Max	Min	Median	Number of IPOs
1990	36.999	30.997	113.62	6.52	25.935	26
1991	27.205	17.631	70.73	2.45	22.58	35
1992	18.573	11.926	48.62	2.4	16.88	29
1993	38.712	19.715	113.67	11.48	35.075	44
1994	44.917	31.287	224.98	11.39	36.39	67
1995	61.634	27.367	144.71	13.91	58.2	47
1996	71.384	36.105	182.1	10.9	70.755	74
Jan 97 to 11/6/97	65.012	46.130	201.25	1.14	50.92	69
11/7/97 to Dec 1998	1.952	2.662	13.45	0.21	1.22	34
1999	9.838	6.281	25.12	1.9	8.09	19
2000	32.546	18.328	80.36	6.49	31.81	38
2001	7.389	17.226	74.03	0.11	1.8	18
2002	18.429	18.576	71.15	0.53	12.03	39
1990 to 2002	41.136	35.812	224.98	0.11	32.2	539

nature of business and size. There are several features of this regulation that are worth mentioning.

First is the government requirement that at least 30 per cent of a firm's outstanding shares must be held by the indigenous population, the majority of whom are Malays. The government came up with this ruling after the racial riots on 13 May, 1969. The catalyst of that riot is that the non indigenous were controlling the economy of Malaysia while the indigenous, who made up about 60 per cent of the population, were marginalised. By 1970, the indigenous population controlled less than 5 per cent of Malaysia's economy. After the riots, the government decided that the indigenous population should control at least 30 per cent of the firms' shares in Malaysia.

Second is the length of time from getting an approval to listing of the firm on the KLSE. There are six dates that a firm has to go through in selling their shares to the general public. The first date is the first approval obtained from SC. For some firms, the first approval date is also the final approval date, that is, the firm gets an approval on its first attempt. However, many firms have to go to SC more than once before they get the final approval because there might be certain conditions attached to the first approval and the firms have to meet these conditions before they can get the final approval. After getting the final approval, a firm issues a prospectus on the firm. Prospective buyers of the firm's shares can obtain a copy of this prospectus from brokerage firms, commercial banks, investment banks, and other distributors.

An investor who wants to buy the firm's shares must then fill out some forms contained in the prospectus and mail them together with the payment before the closing date for

application. The forms must be received by an issuing agency before the closing date for application to be considered. If the offer is oversubscribed, the issuing agency allocates the shares by randomly drawing the applications. This balloting process is carried out on the balloting date.

IPOs in Malaysia are usually oversubscribed. Dawson (1987) finds that the oversubscription rate³ was 44 times while Yong (1996) reports an oversubscription rate of 32.3 times. Using 539 IPOs from 1990 to 2002, we found that the average (median) subscription rate is 41.136 (32.2) with the lowest subscription rate being 0.11 and the highest being 224.98 as shown in Table 2. As for years, the highest average subscription rate of 71.384 was experienced in the year 1996 while the lowest was observed during the period of Asian financial crisis, from November 1997 to December 1998. During this period, the average subscription rate was only 1.952. Finally, the shares are listed on KLSE on the listing date.

The longer the length of time from the date of setting the offer price to the closing date for application, the riskier is the issue to the firm because if anything happens to the firm or to the market during this time period, investors might stay away from the IPO. The date of setting the offer price is usually similar to the date of the final approval. Similarly, the longer the length of time from the closing date for application to the listing date, the riskier is the issue to an investor who has been allocated the shares in the IPO because any news that comes out during this period might affect the value of the IPO shares, which would only get traded on the listing date. Thus, the length of time from the date of price setting to the listing date could affect the level of underpricing.

Table 3 shows the number of days taken for the various time periods. The average length of time taken from the setting of price, which is assumed to be the final approval date, to the prospectus date is 80 days. The length of time from prospectus date to closing date for application is 14 days. Only 51 firms mentioned their balloting dates and expected dates of listing. For these firms, the length of time from closing date to balloting date is about six days and the length of time from balloting date to the actual date of listing is 24 days. A firm's expected date of listing might not be the same as the actual date of listing because if a firm sees that the market is declining, it could request that the KLSE does not begin trading of its shares until it deems that the market has stabilised. That is the main reason why we see that for those 103 firms that have an expected date of listing, the length of time from the closing date to the expected date of listing is not equal to the length of time from the closing date to the actual date of listing. However, the average difference between the expected and actual dates of listing is only one day with a median of zero. Therefore, on average, firms stick to their expected listing date.

The third feature of regulation in Malaysia is the pricing of an IPO. Prior to 1996, companies had to abide by the SC's guideline on the pricing of an IPO. This guideline was based on price to earnings (P/E) multiples. For each major industry, SC had a range of P/E multiples and a firm was required to use a P/E multiple in this range to price its shares. As an example, if a bank expects its earnings per share (EPS) to be RM0.30 and its P/E ratio is 12, then the offering price of its IPO is RM3.60 (EPS multiply by P/E multiple). Even after SC

³ Subscription rate refers to the number of times that the shares of an IPO available for sale are subscribed to. A subscription rate of 100 means that for each share being offered in an IPO, the IPO firm receives 100 applications.

Table 3: Length of various time periods (in days)

Time period	Average	Standard deviation	Maximum	Minimum	Median	Observation (# of firms)
AD to LD	124.560	54.978	475	40	113	502
AD to PD	80.476	51.747	392	4	71	502
PD to CD	13.582	22.261	41	-351	14	546
PD to LD	43.386	8.528	101	28	42	546
CD to LD	29.804	23.507	399	14	27	546
CD to BD	5.765	1.945	15	3	6	51
BD to LD	24.020	11.156	67	12	20	51
LD to ELD	1	5.938	47	-6	0	103
BD to ELD	22	8.908	67	11	20	51
CD to ELD	28.476	8.891	71	17	26	103

Notes:

- AD to LD : the length of time from the setting the offer price to the listing.
 AD to PD : the length of time from the setting the offer price to the issuance of prospectus.
 PD to CD : the length of time from the issuance of prospectus to the closing date for application for the IPO.
 PD to LD : the length of time from the issuance of prospectus to the listing.
 CD to LD : the length of time from the closing date for application to the listing.
 CD to BD : the length of time from the closing date for application to the balloting.
 BD to LD : the length of time from the balloting to the listing.
 LD to ELD : the difference between actual and expected dates of listing.
 BD to ELD : the length of time from the balloting to the expected listing.
 CD to ELD : the length of time from the closing date for application to the expected listing.

abolished this guideline in 1996, underwriters and firms still use P/E multiples to price the IPOs. A firm has to state the way that it sets the offer price in its prospectus and in nearly all prospectuses, P/E multiples are mentioned as one of the methods to determine the offer price. Sometimes firms would supplement P/E ratios with other measures such as net tangible assets but the P/E multiple remains the most popular way of setting the offer price. Related to the pricing aspect is the requirement that a firm must have a forecast of its profits for at least one year. This forecast is very important because it gives the EPS and based on this and the price earnings multiple, the firm decides its offer price.

Finally, the regulatory bodies require that firms in construction, property, or infrastructure development industries that intend to get listed on the Main Board, and all firms intending to get listed on the Second Board, provide either lock-in provisions or profit guarantees. A lock-in provision is the promise by the majority shareholders of a firm, as identified by the SC, that they will not sell their shares for a certain period of time. Since 1998, for firms that have to provide the lock-in provisions, the majority shareholders are not allowed to sell their shares for one year after the listing. After that period, they can sell up to one-third of their shares every year. Prior to 1998, the requirement was that the majority shareholders were not allowed to sell their shares for one year after the listings and after that period, they could sell up to one-fifth of their shares every year for the Main Board firms and 15 per cent every year for the Second Board firms. For firms that choose to provide a profit guarantee, the majority shareholders have to guarantee that its profits each year for

the next three years will not fall below a certain level. If the actual profit is less than the guaranteed profit for any year, the majority shareholders have to pay an amount equal to this difference to the firm. The profit guarantee was introduced in 1995 by SC. These mechanisms are designed to protect minority shareholders of the firms.

3. Literature Review

There are a number of models that have been advanced to explain underpricing, but the three prominent models of information asymmetry, signaling, and bookbuilding have attracted the most attention. The information asymmetry model, as proposed by Rock (1986), assumes that investors are divided into two groups, and if an issue is oversubscribed, shares would be rationed. The two groups of investors are informed investors and uninformed investors. Furthermore, investors are assumed to be more knowledgeable about a firm's value than either the investment bank employed by the firm or the management of the firm. Investors might be more knowledgeable because they might know more about the firm's competitors, the quality of management, or the discount rate of the firm. In Rock's model, if a new issue is underpriced, it would attract investors from both groups and consequently the number of shares applied for by investors would be greater than the number of shares available for subscription. If the number of shares available for subscription is assumed to be pro-rated to all applicants, then the number of shares actually received by each investor is less than the number applied for. However, if a new issue is overpriced, it would attract only the uninformed investors as informed investors would not participate in overpriced issues. Consequently, in the overpricing scenario, investors might get all shares that they applied for. Therefore, since uninformed investors would not get all underpriced shares but might get all overpriced shares, they are exposed to risk. Thus, to attract uninformed investors to participate in the IPO market, they must be compensated for this information asymmetry risk by offering a discount on an average IPO. This implies that one hypothesis associated with Rock's model is that uninformed investors earned a risk-free rate of return.

Koh and Walter (1989), using data from IPOs in Singapore, found evidence that uninformed investors earn a risk-free rate of return. Furthermore, they found that the correlations between underpricing and proportions applied for are negative for investors applying for less than 100,000 shares and positive for investors applying for 250,000 shares or more. The same findings are observed in the correlations between underpricing and the proportion of shares allocated to investors. These findings indicate that uninformed investors, defined as investors who applied for less than 100,000 shares, applied for and obtained overpriced issues while informed investors, defined as investors who applied for 250,000 shares or more, applied for and obtained more underpriced issues. Their regression results provide further support to Rock's model.

In Malaysia, there is a time lag between the setting of the offer price and the listing date, as discussed in Section 2. In this case, there might be some information flows into the market. Chowdry and Sherman (1996) developed a model to explain this phenomenon. In their model, the information leakage would lead to more underpricing because for 'good' firms, the information leakage would lead to more uninformed investors participating in the offering. On the other hand, if the firm is 'bad', informed investors would not participate and their actions might leak to the market and consequently lead to uninformed investors not participating in the offering. Therefore, to induce investors to participate in an offering, the

offer price must be low enough. A low offer price leads to more underpricing. Therefore, the time lag would worsen the information asymmetry model of Rock (1986). Evidence in Loughran *et al.* (1994) supports Chowdry and Sherman's (1996) hypothesis. In Malaysia, the time that elapses from the setting of the offer price to the listing date is around 125 days or about 4 months, as summarised in Table 3. Furthermore, in Malaysia, the time length for each firm varies as each firm has to get an approval from SC. Thus, we can use Malaysian data to test for Chowdry and Sherman's prediction that the time length is positively related to underpricing.

The signaling models of Allen and Faulhaber (1989), Grinblatt and Hwang (1989), and Welch (1989) are based on the assumption that firms know more about their values than investors or underwriters. These models state that firms use underpricing to reflect their qualities. A higher quality firm is able to underprice its offering as it can recoup its losses by subsequent equity offerings or by allowing the existing owners to sell their shares at a higher price in the future. However, low quality firms cannot afford underpricing their issues as investors will learn about the quality of these firms in the near future. Consequently, if these firms or their owners attempt to sell shares in the future, they may not obtain favourable market reactions.

Jegadeesh *et al.* (1993) tested the above hypothesis by examining the incidence of seasoned equity offerings (SEO)⁴, the length of time between IPO and SEO, the size of SEO, and the market reactions to SEO announcements. They found that risk-adjusted returns, after a firm is traded on an exchange, explain more about incidence, time length, and size of SEO than the underpricing. Only for market reactions to SEO announcements does underpricing play a more significant role than risk-adjusted returns. Therefore, they concluded that market feedback plays a more important role in explaining SEO than signaling models.

Michaely and Shaw (1994) undertook more thorough tests of the signaling models and they concluded that those models cannot explain underpricing. To test Allen and Faulhaber's model, they looked at the relationship between underpricing and earnings and underpricing and dividends. They did not find that firms with positive earnings in the first year of public operations have more underpricing compared to firms with negative earnings. Furthermore, they found that firms that pay dividends in the first three years after public operations do not experience more underpricing as predicted by the Allen and Faulhaber's model. To test for Welch's hypothesis, Michaely and Shaw (1994) looked at the evidence of a success of SEO. To measure success, they used the size of SEO and market reactions to SEO announcements. If Welch's predictions hold, they expected to see a positive relationship between underpricing and both size of SEO and market reactions to SEO announcements. Using a simultaneous equations model, they found that size of SEO cannot explain underpricing but underpricing leads to smaller SEO. This finding is different from Welch's prediction. Furthermore, by looking at risk-adjusted returns associated with SEO, they found that higher underpricing leads to lower adjusted returns. Therefore, Michaely and Shaw could not find any support for Welch's predictions. Finally, Michaely and Shaw (1994) tested the model of underpricing as predicted by Grinblatt and Hwang (1989). Grinblatt and Hwang (1989) predicted that underpricing is positively related to the fraction of shares

⁴ A *seasoned* equity offering refers to the sales of additional shares by a *listed* firm to interested investors.

held by insiders for a given variance level, firm value is positively related to the underpricing for a given fraction of shares held by insiders, and firm value is positively related to the underpricing for a given variance level. However, Michaely and Shaw (1994) did not find any support for any of these predictions. Finally, Espenlaub and Tonks (1998) tested the signaling models in UK and found mixed evidence. No relationship was found between underpricing and the incidence or probability of future offerings but found underpricing to be positively related to the size of subsequent equity offerings.

Benveniste and Spindt (1989) used another model to explain underpricing. In their model, known as bookbuilding, investors are assumed to know more about a firm's value compared to either the owner or the underwriter. However, unlike Rock's model, investment banks in this model perform valuable functions. Investment banks carry out road shows to attract potential investors to participate in the IPOs. Interest from potential investors is kept in a 'book'. Investors understand that their indication of interest affects the offer price and the number of shares allocated to them. To induce truth telling, the offer must be priced so as to reward the investors commensurate with the level of private information that they have. It is difficult to test bookbuilding theory as investment banks do not have to make public of their books. However, Lowry and Schwert (2004) support the bookbuilding hypothesis by observing that even though underwriters adjust the final offer price based on the market feedback that the underwriters get during the road shows, the adjustment is not a full adjustment. Therefore, underwriters leave some 'money on the table' to the investors for telling the truth.

Finally, the role of underwriters has to be examined. Information asymmetry and signaling models look at the role of underwriters as passive intermediaries. Bookbuilding, on the other hand, views underwriters as marketing intermediaries that set price based on investor interests. A few different models of underwriters have been put forward. Booth and Smith (1986) view underwriters as certifiers. In their model, underwriters certify that the offer price reflects all inside information. Carter and Manaster (1990) provide a model of underwriting based on Rock's model. In their model, informed investors would spend resources in evaluating high risk firms. Based on the option pricing model, the riskier the firm, the higher the value of a call option on the firm's offer price. By spending resources on high risk firms, the value of informed investors' investments would increase. Since underpricing is costly, low risk firms employ underwriters with high reputation to signal their characteristics. Since informed investors are not interested in low risk firms, these firms experience less underpricing, a result consistent with Rock's model. In Carter and Manaster's model, an underwriter's reputation is exogenous. Chemmanur and Fulghieri (1994) look at the endogeneity of underwriters' reputations. In their model, owners have more information about their firms than underwriters, and underwriters have more information than investors. To prevent them from marketing bad firms, underwriters are willing to spend money in evaluating firms. Since investors cannot observe the amount of resources devoted by the underwriters in evaluating firms, investors use the underwriters' past performance as a way to value the firms. Therefore, reputations developed by underwriters are important to them. Among the predictions of this model is that underpricing by the more reputable underwriters is less but the fees paid to them are higher.

Even though the three theories as discussed above are the main theories to explain underpricing, the role of regulations cannot be underestimated. Kim *et al.* (1995) looked at

the effects of government regulation on underpricing in their study of long run performance of IPOs in Korea. They looked at two periods, before and after 25, June 1988. Before June 1988, firms had to use the formula set by the regulators in setting their offer prices and after 25 June 1988, firms were free to set their own offer prices. They found that underpricing fell, from 65.20 to 52.30 per cent after firms were allowed to set their own offer prices instead of following the formula set by the regulators.

The effects of regulations are more pronounced in China where a lack of investment opportunities and hefty underpricing in new shares have led investors to participate in IPOs. Chan *et al.* (2003) and Chen *et al.* (2004) looked at the effects of regulations on underpricing in China. Chan *et al.* (2003) tested three features of regulations on underpricing by looking at 570 IPOs from 1993 to 1998. The three features were the percentage of equity held by state and legal entities after the IPOs, the length of time from offering of the shares to listing, and the developmental stage of the provinces from which the IPOs originated. They looked at the percentage of equity held because most firms in China are owned by state or legal entities and at the provinces' developmental stage because of the government's desire to spread out economic development to all provinces. The developmental stage is measured by looking at the number of investors in that province. The higher the developmental stage of a province, the higher the quality of the IPOs that come out from that province and consequently the higher the underpricing. They found that underpricing is positively related to the length of time and developmental stage and negatively related to the holdings of state or legal entities.

Chen *et al.* (2004) looked at the length of time from offering to listing and the equity retained by state or legal entities. They found that the length of time is positively related to underpricing while the retention by state or legal entities is negatively related to underpricing.

4. Hypotheses

The main hypotheses that are tested in this paper are the relationships between underpricing and regulations. The objective of a firm when it sells its shares to investors is to maximise its proceeds. Therefore, if any aspect of the regulation leads to lower proceeds, from a firm's perspective, the regulations then impose costs to the firm. Aspects of regulations that are tested in this study are the percentage of shares allocated to indigenous investors, the pricing method of the shares, the length of time from the date of price setting to the date of listing, and the protective mechanisms in the form of either a lock-in provision or a profit guarantee.

One of the thorniest issues in IPO in Malaysia is the government regulation that states that at least 30 per cent of a firm's shares have to be allocated to the indigenous investors. Once in a while, ethnic associations in Malaysia would voice their concern about this ruling. The associations argue that by still adopting this ruling, firms that are controlled by the non indigenous are reluctant to sell their shares to the general public since they believe that they have to lower their offer prices.

The expected relationship between underpricing and percentage allocated to indigenous investors is not clear. On one hand, it can be argued that, consistent with the ethnic associations' allegations, by allocating the shares to indigenous investors, the authorities have excluded other investors from participating who might have higher value. Therefore, the relationship should be positive as the offer price has to be lowered to attract these

investors. On the other hand, the number of indigenous investors is quite large. Indigenous share is about 60 per cent of Malaysia's population. Therefore, competition among investors in this group could lead to a higher offer price. The variable that we use to capture this relationship is the fraction allocated to indigenous investors, BUMI. BUMI is the ratio of the shares allocated to indigenous investors to the shares allocated to non indigenous investors.⁵ A firm has to set aside at least 30 per cent of its total shares to indigenous investors. For example, assume a firm currently has 40 million shares outstanding and the indigenous investors hold five million of the shares. If the firm wants to go public and sell 20 million of *new* shares, then it has to set aside 13 million of these *new* shares to indigenous investors so that out of the total shares outstanding of 60 million (40 million plus 20 million) after the IPO, the indigenous investors control at least 18 million shares (or 30 per cent of the 60 million shares). Even though a firm has to allocate at least 30 per cent of the shares that it offers to indigenous investors, firms that are controlled by the government are exempted from this ruling. The average BUMI is 1.735 and the median is 0.9077. The maximum percentage of BUMI is 28.286 while the minimum is 0, which refers to the firm controlled by the government.

To capture the relationship between underpricing and the pricing method based on the P/E multiple, the absolute difference, or DIFFPE, between the P/E multiple observed in the market, or PEMKT, and the P/E multiple used by a firm, or PEFIRM, is used. On average, PEFIRM is always lower than PEMKT. Since PEFIRM should be around the PEMKT, then the larger the difference between PEMKT and PEFIRM, the bigger should be the underpricing. Therefore, we should observe a positive relationship between underpricing and DIFFPE.

The P/E multiple is calculated for each firm to get PEFIRM, where PEFIRM is equal to the offer price divided by the forecasted earnings per share. In Malaysia, firms that applied for listing on either the Second Board or the Main Board of the KLSE are required to provide forecasts of their earnings. The average PEFIRM during the sample period is 9.317 and the median is 8.92. The average PEMKT is 25.177. PEMKT is calculated for each IPO one month before the prospectus date of the IPO. The average difference between PEMKT and PEFIRM, or DIFFPE is 15.86. Therefore, the price-earnings ratio used by a firm is very low compared to the market. This observation is consistent with the practice in China. Chan *et al.* (2003) found that the average P/E multiple for IPOs is 15.00 while the market P/E is 36.17 and this might explain the underpricing in China. In China, an IPO offer price was determined based on a fixed pricing formula set by the regulators before July 1999. Firms were allowed to set their own pricing range beginning from July 1999 and for the 286 firms that went public from 1999 to 2001, the average underpricing is 107.5 per cent which is lower than the underpricing of 177.8 per cent experienced by the 570 IPOs from 1993 to 1998. However, whether the change in underpricing between these two time periods in China is due to the change in price setting regulation remains to be determined. Chen *et al.* (2004) found that the higher is

⁵ Another variable that is used to capture this relationship is FRAC which is equal to the number of shares set aside for indigenous investors divided by the total number of shares issued in the IPO. The average and median for this variable are 40.97 per cent and 36.66 per cent respectively. However, since the results of using FRAC are similar to the results of using BUMI, I do not report the results in this paper.

the market P/E relative to an IPO's P/E, the greater the underpricing. Firth (1997) looked at 143 IPOs in New Zealand from 1979 to 1987 and found that the correlation between relative P/E and underpricing is positive where relative P/E is equal to an IPO's P/E multiple divided by its competitors' average P/E multiple.

Prior to 1996, the Capital Issues Committee (CIC) or SC set the range of P/E multiples that can be used by a firm. Starting from 1996, firms have the flexibility to set their own offer prices and to use any P/E multiple that they deem appropriate. The period beginning from 1996 is also marked by the Asian financial crisis, which started in mid-1997 and ended in 1998. To control for these two periods, we used two dummy variables, D4967 and D4AFC. D4967 is the dummy that takes on the value of one for IPOs from 1996 to 6 November 1997 and D4AFC is the dummy from 7 November 1997 to the end of 1998. The dummy for the Asian financial crisis is used because investors might become more risk averse as a consequence of the crisis, therefore they might demand a higher compensation for the greater perceived risk, leading to more underpricing. Finally, changes in investors' sentiments after the Asian financial crisis are controlled by using a dummy variable, D499. D499 is a dummy that takes on the value of 1 for IPOs in 1999 and beyond. Therefore, we used three dummies to represent the three different time periods. Since investor sentiments during these three periods might also be related to the other variables, interactions between the time period dummies and these variables are used.

The length of time from the date of price setting to the date of listing would make participating in an IPO riskier for the underwriters and investors as information might be revealed about the firm during this time period. Underwriters are exposed to the risk from the date of price setting to the closing date for application. If there is any adverse movement in the market during this time period, investors might not be willing to participate in the IPO and the underwriters have to pay for the unsubscribed shares. This is exactly what happened during the Asian financial crisis. The underwriters' experience during the crisis led them to mention in their subsequent underwriting agreements that if something untoward happened to the stock market, then they would have the right to terminate their underwriting agreements.⁶ As for the investors, they bear the risk of adverse information from the closing date of application to the listing date. Therefore, we expect that underwriters and investors would ask for extra compensation in the form of underpricing, as modeled by Chowdry and Sherman (1996). Furthermore, since investors have to pay when they apply for the shares, then the longer the time period that their money is tied up in the IPO, the higher should be the expected underpricing because of the missed opportunity to invest somewhere else. Consequently, the relationship between underpricing and the length of time from the date of price setting to the date of listing, or T1, is expected to be positive. The length of time is influenced by both the regulation and a firm's choice. In the absence of regulation, the ideal time to set the offer price of an IPO is right before the listing of the shares. However, the

⁶ For example, in the prospectus issued by Yikon Corporation, it is stated in Clause 3.02 (a) that "Notwithstanding anything herein contained, the Underwriters or any of them may at any time before the Listing Date by notice in writing to the Company and the Offerors terminate their respective obligations under this Agreement if in the reasonable opinion of the Underwriters:... (vii) the composite index of the KLSE falls below 600 points." The average market index for the one-month period before the signing of the underwriting agreement was 720.

regulation set by the authorities does not allow for this scenario to happen since the offer price will be set only after getting the approval from the authorities; from the approval to the listing of the shares, a firm has to go through listing stages as required by the regulatory authorities. Examples of the listing stages are the signing of an underwriting contract, the issuance of a prospectus to the prospective investors, the share applications by investors, and the balloting if the shares are oversubscribed. After these stages are completed, the shares are listed. Overall this process, from signing the underwriting agreement to the listing takes between two to three months to complete. Therefore, regulation does affect the length of time. However, some firms might not want to begin the listing process right immediately after getting the authorities' approvals. Thus, the length of time is also a choice for a firm.

To control for the public information that comes out during the period between price setting and listing, returns and standard deviations on the EMAS Index are used. The EMAS Index is one of the indices provided by the KLSE. Since the length of time among firms from price-setting to listing is not equal, we standardised the returns and standard deviations by estimating monthly returns and standard deviations. For returns, the standardisation was accomplished by calculating the following formula: $AMR1 = (TR1 / \text{Length of time}1) * 22$ where AMR1 is the adjusted monthly return, TR1 is the total return from the price-setting date to the listing date, Length of time 1 is the length of time, in business days, from price-setting to the listing, assuming 22 business days in a month. For standard deviations, we used the following formula: $AMSD1 = DSD1 * 22^{1/2}$ where AMSD1 is the monthly standard deviation and DSD1 is the daily standard deviation from price setting to listing.

The relationship between market returns, AMR1, and underpricing should be positive since the better the performance of the market, the better should be the performance of individual firms. The coefficient of AMSD1 is expected to be positive because investors would demand a higher compensation during a volatile period, that is, when AMSD1 is high.

Finally, protective mechanisms, in the form of a profit guarantee, or PG, and a lock-in provision, or LIP, might affect the pricing of IPOs. If the majority shareholders of a firm behave opportunistically, that is, selling their shares right after the IPO because they think that the future performance of the company will be bad, protective mechanisms can alleviate this problem. However, in Malaysia, shares of a firm are tightly held by a few individuals or a family. For an average firm, the majority shareholders own 76.25 per cent. Since they own a large number of shares, it is very difficult for them to behave opportunistically because if they want to sell a large number of shares in the market, the selling action would send a negative signal to the market and would cause the share price to tumble. Therefore, the effects of these protective mechanisms are not clear. Out of 546 firms in this study, 309 firms provide lock-in provisions, 107 firms provide profit guarantees, and the other 130 firms do not have to provide either lock-in provisions or profit guarantee. Information about lock-in provisions and profit guarantees are taken from the prospectuses of the issuing firms. Even though SC could direct a firm to provide a protective mechanism, it is up to the firm to choose either to use LIP or PG.⁷

⁷ However, the results of this chapter show that both LIP or PG led to greater underpricing in the period before the Asian financial crisis and both mechanisms did not influence underpricing during the crisis.

To better reflect the relationship between costs of going public and government regulations, we controlled for several variables. The first group of variables is the variables that are associated with firm risk and the variables used are the natural logarithm of gross proceeds, or GP, from the IPOs and the type of board, or BOARD, on which a firm is listed.⁸ Gross proceeds are equal to the number of shares issued in the IPO multiplied by the offer price. Larger firms, that is, firms with higher gross proceeds, are more well-known and consequently investors do not require a higher level of underpricing for these firms as compared to smaller firms. BOARD refers to either the Main Board or the Second Board of the KLSE. Firms listed on the Main Board are bigger, more well-known, have higher profits, and have been in existence longer than the firms on the Second Board. Therefore, we expect investors to require lower underpricing from firms that are seeking listing on the Main Board.

The second group of variables is related to the level of retained ownership, or OWN. A higher level of retained ownership reflects higher faith of the owners in the firm's future performance. Therefore, it would lead to lower underpricing. This is consistent with the model proposed by Leland and Pyle (1977). Leland and Pyle's model states that fractional ownership retained by existing owners of a firm signals their faith in the future performance of the firm. Higher retained ownership signals higher future cash flows of the firm. Therefore, higher retained ownership would lead to lower underpricing. However, higher ownership might also reflect higher agency costs and in this case, it should lead to more underpricing. Since Morck *et al.* (1988) and McConnell and Servaes (1990) argue that the agency costs associated with managerial ownership are non linear, to capture this non linearity, we used the square of retained ownership, or OWNSQ. On the contrary, by holding a large fraction of a firm, the majority shareholders are making the shares less liquid and in this case investors want extra compensation for investing in illiquid shares in the form of more underpricing. Therefore, the sign associated with this variable is not clear. OWN is defined as $(AL - AI) / AL$ where AL is the amount of shares outstanding after the IPO and AI is amount of shares issued in the IPO.

The other control variables used are interest rates, underwriter reputation, borrowing ratio, and industry. Interest rates, or DEPRATE, are measured by looking at the three-month fixed deposit rates. Investors have a choice of either participating in the IPO and paying for the subscription costs up front or investing in fixed deposits. The expected relationship between underpricing and interest rates is negative. In periods of high interest rates, we expect individuals to put their money in fixed deposits over IPOs. The underwriter reputation, or UWR, is measured by using a dummy variable with one to represent the top six underwriters and zero otherwise. Carter and Manaster (1990) and Chemmanur and Fulghieri (1994) argue that underpricing should be negatively related to reputation. The borrowing ratio or BR is measured by looking at a firm's total bank borrowings as a fraction of total assets. Bank borrowings reflect the confidence of a bank in the future performance of a firm. Since banks evaluate a firm thoroughly before they extend a loan, then the act of extending a loan or a line of credit reflects the banks' confidence in the ability of the firm to pay off its debts.

⁸ We also used age of the firm as a measure of risk since younger firms are expected to have higher risks. Age is measured as the length in years from the firm's incorporation to its listing. However, the results associated with age are not significant and therefore, they are not reported in this paper.

Therefore, the expected relationship between borrowings and underpricing is negative. Slovin and Young (1990) found that the existence of a banking relationship is associated with lower underpricing. However, their sample consists of high risk firms, that is, firms that are small and young. The final variable that we controlled for is the industry dummy based on the KLSE's classification of industry. There are five industries that we controlled for in this paper.

5. Data and Methodology

This study covers 546 IPOs listed on the Main Board and Second Board of the Kuala Lumpur Stock Exchange (KLSE) from January 1990 to December 2002. Prospectuses of the IPOs and *Investors' Digest* were examined to extract the relevant variables. Underpricing is measured in the following manner:

Underpricing = $(P_o / P_f) - 1$ where

P_o is the share price at the end of listing day and P_f is the offer price.

Using the variables described in the previous section, the following full model is estimated:

$$U_j = X_j\beta + \gamma_1 \text{AMSD1}_j + \gamma_2 \text{AMR1}_j + \gamma_3 \text{T1}_j + \gamma_4 \text{DIFFPE}_j + \gamma_5 \text{BUMI}_j + \gamma_6 \text{LIP}_j + \gamma_7 \text{PG}_j +$$

$$\sum_{i=1}^3 \delta_i D_{ij} + \sum_{i=1}^3 \mu_i D_{ij} * Z_j + \sum_{j=1}^{546} \alpha_j \text{DiffPE}_j * Z1_j + \varepsilon_j \text{ where}$$

U_j : degree of underpricing for firm j

X_j : control variables for firm j

(control variables are the natural logarithm of gross proceeds, board, retained ownership, squared of retained ownership, deposit rates, underwriter reputation, borrowing ratio, and industry classification).

AMSD1_j : monthly standard deviation of KLSE index from the date of price setting to date of listing for firm j

AMR1_j : monthly return of KLSE index from the date of price setting to date of listing for firm j

T1_j : length of time from the date of price setting to date of listing for firm j

DIFFPE_j : difference between PEFIRM and PEMKT for firm j

BUMI_j : fraction of the shares set aside for indigenous investors relative to non indigenous for firm j

LIP_j : lock-in provision by the majority shareholders of firm j that they will not dispose off their shares for a certain time period where LIP is equal to one for a firm that has to provide it

PG_j : profit guarantee given by the majority shareholders of firm j that the profit of firm j will meet certain target for each year for the next three years and if the profit falls short of this target for any particular year, the majority shareholders will make up for the shortfall (PG is equal to one for a firm that has to provide the guarantee)

D_{ij} : dummies for the three different time periods - D4AFC, D4967 and D499 (the dummy of D4AFC is equal to one if the IPO of firm j is undertaken during the Asian financial crisis and it is equal to zero if the IPO is

undertaken at any other time period. The base period is from 1990 to 1995).

- Z : all explanatory variables, i.e., all control variables, AMSD1, AMR1, T1, DIFFPE, BUMI, LIP, and PG
- $D_t Z$: interactions between dummy variables for the time periods and the explanatory variables
- ZI_j : all explanatory variables excluding the DIFFPE
- $\text{DIFFPE}_j * ZI_j$: interactions between DIFFPE for firm j and ZI
- ε_j : error term for firm j

Besides the fully unrestricted model (full model) above, two other models were estimated. One is the restricted model and the other is the preferred model. The restricted model refers to the full model without the interaction terms while the preferred model was derived by dropping the insignificant interaction terms from the full model.

The definitions of the variables are summarised in Table 4. Descriptive statistics for the variables used in this study are provided in Table 5 while the descriptive statistics for underpricing in each time period is provided in Table 6. The average (median) length of time from price setting to listing is 125 days (113 days). Chan *et al.* (2003) found that for 570 IPOs in China, the average (median) length of time is 57.25 days (25 days). Chen *et al.* (2004) found that for 701 IPOs in China, the average (median) length of time is 259 days (51 days). The average total asset in 1995 currency is RM129,781,409.⁹ The percentage of shares retained by the substantial shareholders is very high at 76.25 per cent. The average gross proceeds are RM27,294,483. The level of underpricing of 87.79 per cent is higher than in most countries. Table 6 shows that underpricing is very high for the five years before the start of the Asian financial crisis. The underpricing reached the highest level in 1996 with underpricing being 194.9 per cent. However during the Asian financial crisis, underpricing was -1 per cent and after the crisis, underpricing never regained the luster of the pre-crisis era. A look at the correlations among the variables reveal that the highest correlation is 0.715.

6. Results

To begin the analysis, we chose a preferred model based on the F -statistics. The F -statistics, when the restricted model is compared against the full model, is 4.9826 with the critical 5 per cent level being 1.3585. Therefore, in this case, the hypothesis that the omitted interaction terms are equal to zero is rejected. Furthermore, when the restricted model is compared to the preferred model, the F -statistic is 21.5151 while the 5 per cent level is 1.8491, and thus the null hypothesis that the omitted variables in the restricted model are equal to zero compared to the full model is also rejected. Finally, when the preferred model is compared to the full model, the F -statistic is 1.2739 while the critical F -levels at 5 per cent

⁹ RM is the Malaysian currency. Prior to July 1997, RM was floated against the USD but the rate hovered around RM2.50 for USD1. RM was fixed to USD starting from 1 September 1998 to 21 July 2005 at RM3.80 for USD1. On 22 July 2005, RM was once again floated. The exchange rates fluctuated wildly from July 1997 to 1 September 1998 due to the Asian crisis.

Table 4: Variables affecting underpricing and their definitions

Variables	Definition
DIFFPE	The difference between the price-earnings multiple observed in the market and the price-earnings multiple used by a firm in pricing its IPO. The price-earnings multiple of the market is set by averaging its price-earnings multiple over a period of one month before the prospectus date.
BUMI	Fraction of shares allocated to indigenous investors as opposed to non-indigenous investors
LIP	Lock-in provision that is an undertaking by the majority shareholders of a firm that they will not dispose of their shares for a certain time period where LIP is equal to one for a firm that provides it, zero otherwise.
PG	Profit guarantee given by the majority shareholders of a firm that the profit of the firm will meet a certain target for each year for the next three years and if the profit falls short of this target for any particular year, the majority shareholders will make up for the shortfall. PG is equal to one for a firm that provides it, zero otherwise.
AMR1	The monthly market return from the price-setting date to the listing date.
AMSD1	The monthly standard deviation of the market returns from the price-setting date to the listing date.
T1	Length of time, in days, from the date of price setting to the listing date.
GP	Natural log of gross proceeds where gross proceeds = number of shares offered in the IPO * offer price. Gross proceeds are in 1995 currency.
OWN	Fraction of shares held by directors and majority shareholders. Retained ownership is defined as $(AL - AI) / AL$ where AL is the amount of shares outstanding after the IPO and AI is amount of shares issued in the IPO.
OWNSQ	The square of OWN.
DEPRATE	Three-month deposit rates.
BR	Borrowing ratio is defined as total bank borrowings as a fraction of total assets.
UWR	Underwriter reputation is defined as one for the six largest underwriters, zero otherwise.
BOARD	Board is equal to one for firms that are listed on the Second Board and is equal to zero for firms that are listed on the Main Board.
Industry dummies	Dummy variables that take a value of one if a firm is in a particular industry, zero otherwise.
Time period or year dummies	Dummy variables that take a value of one if an IPO is offered in a particular time period or year, zero otherwise.

Table 5: Descriptive statistics

Variables	Average	Median	Standard deviation	Maximum	Minimum
Underpricing	0.8779	0.6912	0.8575	4.000	-0.5385
AMR1	-0.0059	0.0013	0.0542	0.1629	-0.3557
AMSD1	0.0612	0.052	0.0334	0.3143	0.0190
T1	124.5604	113	54.9784	475	40
FRAC	0.4097	0.3666	0.2	0.8972	0
BUMI	1.735	0.9077	2.4709	28.2857	0
PEFIRM	9.317	8.922	2.616	25.517	3.3167
PEMKT	25.177	26.530	6.964	42.15	9.08
DIFFPE	15.860	16.090	7.163	33.426	-2.621
Total assets	129,781,409	74,594,278	187,075,785	1,947,180,157	18,839,611
Gross proceeds	27,294,483	16,076,847	47,423,849	833,333,333	3,434,705
OWN	0.7625	0.7947	0.1058	0.9288	0.4638
DEPRATE	0.0614	0.0671	0.0183	0.1027	0.032
BR	0.1941	0.1624	0.1672	1.1438	0
UWR	0.7766	1	0.4169	1	0
BOARD	0.6777	1	0.4678	1	0
LIP	0.5659	1	0.4961	1	0
PG	0.1960	0	0.3973	1	0

Notes:

FRAC : Fraction of shares allocated to indigenous investors.

PEFIRM : Price-to-earnings multiple used by the firm.

PEMKT : Price-to-earnings multiple observed for the firms in the market one month prior to the listings of the IPOs.

Total Assets : Total assets in Ringgit Malaysia. Total assets are in 1995 currency.

Underpricing : Underpricing is equal to (Closing price on listing day – Offer price)/Offer price.

Gross Proceeds : Gross proceeds in Ringgit Malaysia. Gross proceeds are in 1995 currency.

Other variables are defined in Table 2.6.

and 10 per cent are 1.3931 and 1.2945 respectively. Therefore, we cannot reject the null hypothesis that the omitted variables in the preferred model are equal to zero.

Table 7 shows the results for the restricted and the preferred models.¹⁰ There are six significant differences between the two models. The constant term and the deposit rates are not statistically significant in the restricted model while in the preferred model, they are statistically significant. Furthermore, the D4AFC dummy and the AMSD1 are statistically significant in the restricted but not the preferred model. Finally, GP and Board are statistically significant in both models but have opposite signs. The differences between these two models emphasise the importance of omitted variables.

Based on the preferred model, the fraction set aside for indigenous investors, BUMI, is not statistically significant. This evidence is consistent with the notion that, since there are

¹⁰The results of the full model are similar to the results of the preferred model and thus they are not reported.

Table 6: Underpricing for various time periods

Period/Year	Average	Std dev	Maximum	Minimum	Median	Number of IPOs
1990	0.629	0.455	1.731	0.0877	0.417	25
1991	0.382	0.342	1.32	-0.038	0.279	28
1992	0.464	0.455	1.783	-0.084	0.292	37
1993	0.965	0.565	3.167	0.02	0.813	43
1994	1.111	0.579	3	0.336	0.990	63
1995	0.845	0.356	1.635	0.2	0.777	48
1996	1.949	0.891	4	0.383	1.923	81
Jan to 11/6/97	1.382	0.985	4	0.029	1.274	63
11/7/97 to 1998	-0.010	0.340	1.567	-0.538	-0.007	43
1999	0.301	0.215	0.818	-0.028	0.24	19
2000	0.608	0.464	1.941	-0.064	0.498	38
2001	0.225	0.617	1.8	-0.385	0.004	18
2002	0.158	0.250	1.046	-0.211	0.066	40
All	0.87787	0.857	4.000	-0.538	0.691	546

many indigenous investors who are interested in participating in the IPOs, the competition among them allows firms to set competitive offer prices which leads to an insignificant effect of this variable on underpricing. Regulations aside, by complying with the government regulation that requires a firm to allocate at least 30 per cent of its shares for indigenous investors, the firm might find that it will be easier to deal with government agencies in the future especially if the firm wants to issue more shares in the future through rights issue.¹¹

The absolute difference between the P/E of the market and the P/E of a firm, DIFFPE, is statistically significant and the sign is as expected. Given that the average (median) DIFFPE is 15.86 (16.09), it seems that firms do not price their IPOs closer to the market's P/E multiples. Chen *et al.* (2004), using Chinese data, and Firth (1997) using data on New Zealand, found that the relative difference between P/E of a benchmark, for example, market or similar firms, and the P/E of an IPO is positively related to underpricing. Therefore, these analyses, including the present one, point to the importance of using P/E multiples closer to the market P/E multiple in pricing an IPO. However, the effect of DIFFPE is moderated by the negative coefficients for GP*DIFFPE and BOARD*DIFFPE.

Returns on the EMAS Index from price setting to listing, that is AMR1, affect the underpricing positively. The coefficient for AMR1 is 2.909 and that means that a one-standard deviation increase in returns would lead to a 15.77 per cent increase in underpricing. Ritter (1984), Chan *et al.* (2003), Lowry and Schwert (2004), and Ljungqvist (1997) all find

¹¹ Firms are also allowed to distribute a bulk of their shares to indigenous institutional investors or to indigenous directors. 81 firms gave at least 5 per cent of their shares to these investors or directors. Using a dummy variable to represent these placements, we estimated the preferred model. The results do not change; the placements have no effect on underpricing when we used the placements instead of BUMI as one of the explanatory variables.

Table 7: The estimation results for the two models where the dependent variable is the underpricing.

Variables	The restricted model: without interaction terms		The preferred model: limited interaction terms	
	Coefficients	P-value	Coefficients	P-value
Constant	2.454	0.116	-3.473	0.047
Own	4.461	0.179	3.677	0.191
OwnSq	-3.240	0.173	-2.476	0.221
UWR	-0.078	0.186	-0.021	0.680
GP	-0.209	0.000	0.152	0.038
Board	-0.325	0.002	0.288	0.020
BR	-0.181	0.182	-0.115	0.292
LIP	0.090	0.386	-0.147	0.202
PG	0.179	0.174	0.134	0.287
DEPRATE	-3.285	0.289	-5.276	0.065
T1	-0.001	0.001	-0.001	0.000
AMR1	2.974	0.000	2.909	0.000
AMSD1	-1.634	0.078	-0.358	0.676
DIFFPE	0.050	0.000	0.338	0.000
Bumi	-0.009	0.230	0.005	0.526
D4967	0.915	0.000	8.194	0.000
D4AFC	0.554	0.000	0.135	0.264
D499	-0.095	0.496	0.057	0.961
D4967*LIP			0.861	0.000
D499*LIP			0.317	0.015
D4967*PG			0.441	0.028
D499*PG			-0.716	0.002
D4967*AMSD1			-8.886	0.001
D499*AMSD1			9.312	0.001
D4967*GP			-0.441	0.000
D499*GP			-0.063	0.346
GP*DIFFPE			-0.016	0.002
Board*DIFFPE			-0.037	0.000
Industry dummies	Yes		Yes	
Adjusted R ²	0.60309		0.71477	

positive associations between underpricing and overall market returns. This is not surprising since market returns reflect sentiments about the future performance of the economy. Good or poor economic performance affects all firms. So the association between underpricing and market returns is positive.

The length of time from price setting to listing date, T1, is negatively related to underpricing. We expect that as the length of time increases, investors are exposed to more risks and they have to be compensated for these risks, as modeled by Chowdry and Sherman

(1996) and supported by Chan *et al.* (2003) and Chen *et al.* (2004). However, the finding in Malaysia does not support this conjecture. A possible explanation for this is that after a firm gets the approval from SC to go public, the firm's management waits for the right time to get listed on the KLSE. If the stock market is going up, the firm lists immediately but if the market is going down, the firm waits until the market rebounds. Therefore, in this case the length of time reflects the flexibility given to the firm to list its shares and firms postpone their listing if the stock market is going down. As support to this conjecture, the length of time from the price setting to the listing is 160 days during the Asian financial crisis period, that is, from 7 November 1997 to the end of 1998. This average is about a month longer than the average for the whole sample of 125 days. Therefore, it seems that firms wait to get listed until they believe that the market would react favorably to their listings. Of course, the coefficient for T1 is -0.001 which raises the question about its economic significance. A one standard deviation increase in T1 leads to a decrease in underpricing of -5.5 per cent. Therefore, while statistically significant, the effect of T1 on underpricing is rather small. The coefficient for standard deviation from price setting to listing, that is, AMSD1, is an insignificant -0.358.

The coefficient for the dummy variable representing the period from the beginning of 1996 to the onset of the Asian financial crisis, D4967, is a statistically significant 8.194. This means that firms are willing to provide more underpricing to investors during this period. We might expect that as firms are allowed to set their own prices beginning from 1996, the level of underpricing should fall, but this is not the case. One explanation for this phenomenon may be that underwriters price the IPOs during this period as they have priced past IPOs without taking into account that investors are becoming more bullish and are willing to pay higher prices for these IPOs. We found that the average P/E multiples used by the underwriters did not change between the period 1990-1995 and the period 1996-6 November 1997, that is, 9.762 to 9.845. The difference of 0.083 between the average P/E multiples for these two periods is not statistically significantly different from zero, that is, the *p*-value is equal to 0.771. Therefore, firms and underwriters are still using the same P/E multiples. However, the difference between the market's P/E multiple and the firm's P/E multiple, or DIFFPE, of 1.415 between these two periods is statistically significant with a *p*-value of 0.013. Therefore, it appears that underwriters and firms are not willing to price these bullish sentiments into the offer prices. The reason for this might be that if the IPO is not fully subscribed, the underwriters still have to pay for the gross proceeds to the firms. In Malaysia, the underwriting agreement between underwriters and a firm is based on a standby agreement. In standby agreements, underwriters have to underwrite the portion of the IPO that is offered to the public. Underwriters usually sign the agreement with the firm about a month before the closing date of the application.¹² If the market turns bearish during this period and investors do not apply for the IPO shares, then the underwriter has to buy the unsold portion and sell these shares in the future. Therefore, the risk of an IPO not being fully subscribed might prevent the underwriters from pricing the bullish sentiments into the offer price.

¹² The closing date for the application is the relevant date for underwriters because they will know whether the IPOs are fully subscribed or not based on the applications received up to this date.

The dummy variables for the other two time periods are not statistically significant. The dummy for the Asian financial crisis, D4AFC, is a statistically insignificant 0.135 while the dummy for the period after the financial crisis, D499, is statistically insignificant at 0.057. We expect that the coefficient for D4AFC should be positive because if a firm wants to entice investors to participate in an IPO during a volatile and uncertain period, the firm and its underwriters have to provide for more underpricing. However, this is not the case. A possible explanation is that the average P/E multiple used by a firm during the Asian financial crisis was 9.524 and this is not statistically different from the average P/E multiple used during the prior two boom periods, that is, 1990 to 1995 and 1996 to 6 November 1997. However, the DIFFPE during this period fell to 3.036 compared to 18.314 in 1990-1995 and 19.729 in 1996-6 November 1997. Therefore, though market P/E had fallen during this period compared to previous periods, companies were still using high P/E ratios. As a result, we might expect unwillingness on the part of investors to participate in the IPOs being offered during this period. This can be observed in Table 2 where the subscription rate was the lowest during this period compared to any other period. Furthermore, we also might expect that since the offer price does not reflect investors' sentiments, the IPO would be overpriced and this is what we observe in Table 6. Therefore, the evidence is consistent with the notion that we do not observe a positive and significant D4AFC because of the unwillingness of firms and underwriters to price their IPOs based on market conditions.

The lock-in provision, LIP, has a statistically insignificant effect of -0.147. Therefore, an IPO with the majority shareholders providing a lock-in provision does not lead to a decrease in underpricing. However, it is interesting to note that firms that went public either before the crisis, which is from January 1996 to 6 November 1997, or after the crisis, which is from 1999 onwards, experienced more underpricing. The interactions between these two time periods with the lock-in provision are positive and statistically significant. The coefficient for the interaction between the period before the crisis and lock-in provision, D4967*LIP, is a statistically significant at 0.861. It appears that the firms that went public during this period did not take into account the protective mechanisms that they were providing or it might mean that because so many firms were going public during this period, compared to other periods, investors demanded more underpricing. Ritter (1984) shows that during the hot IPO market of the early 1980s in the US, underpricing was higher and this higher underpricing was driven by the going public of many natural resources firms. Since the natural resources firms were small and young, they were risky and investors demanded more underpricing. Of 144 firms that went public before the Asian financial crisis, 99 are listed on the Second Board and since these firms are smaller and younger than those on the Main Board, the higher underpricing experienced by firms with protective mechanisms during this period might reflect their higher risks.

As for the coefficient for the interaction between the period after the crisis and the lock-in provision, D499*LIP, it is statistically significant at 0.317. Therefore, it seems that the lock-in provision during this time period is associated with more underpricing. A potential explanation for this is that since the firms that have to provide for LIPs are the firms with high risks, the higher underpricing might reflect the riskiness of these firms.

The coefficient for the profit guarantee, PG, is 0.134 but is not statistically significant. As for the interactions between the profit guarantee and the three different time periods, the interaction between the profit guarantee and the period before the Asian financial crisis,

D4967*PG, is statistically significant and is associated with more underpricing as the coefficient is 0.441. Therefore, in this case, the profit guarantee is not able to reduce underpricing. A possible explanation is that if a firm fails to meet its guaranteed profit, it could always go to SC and blame the general economic condition, which is beyond its control. This is what happened in 1998. Since the economy was performing poorly, many firms approached SC and asked for a reprieve for failing to meet their guaranteed profits and SC granted their requests. Therefore, in this case, the profit guarantee is not valuable in protecting minority shareholders. Furthermore, the guaranteed profits for the second and third years are always lower than in the first year. Therefore, it is not difficult for the firms to achieve their guaranteed profits for all three years. Out of 106 firms with available information on the profit guarantee, the average of second and third years guaranteed profits is 82.72 per cent of the guaranteed profit of the first year. Furthermore, only 11 firms guaranteed that their profits for the second and third years would be higher than in the first year. Therefore, it appears that firms were playing safe when they provided their profit forecasts and this failed to protect the minority shareholders. The interaction between the profit guarantee and the period after the Asian financial crisis, D499*PG, is statistically significant and is associated with less underpricing. The coefficient for D499*PG is -0.716 but it should be interpreted cautiously since only nine firms provided the profit guarantees after the Asian financial crisis and all firms that provided these guarantees went public in the early part of 1999. After 1999, no firm provided the profit guarantee.

As for the control variables, only GP, BOARD, and DEPRATE affect underpricing. The coefficient for gross proceeds is positive, 0.152, and is inconsistent with the conjecture that investors demand less underpricing for larger firms. Even though there is a positive relationship between underpricing and gross proceeds, it is moderated by the interaction term GP*DIFFPE, since the coefficient is -0.016, and by listing prior to the Asian financial crisis since the interaction term D4967*GP is -0.441. As for the board, the coefficient is statistically significant at 0.288. This is consistent with the view that investors demand more underpricing for smaller and younger firms, that is, the firms that are listed on the Second Board. However, this relationship is mitigated by the interaction term Board*DIFFPE, which has a coefficient of -0.037. Interest rates, or DEPRATE, are negatively related to underpricing with a coefficient of -5.276 and a *p*-value of 0.065. A one standard deviation increase in interest rates would have led to less underpricing by 9.66 per cent. Even though the standard deviation observed in the market, or AMSD1, is not statistically significant, the interaction terms D4967*AMSD1 and D499*AMSD1 are statistically significant. As for the other control variables, they are not statistically significant. Even though borrowing ratios have the expected negative sign, it does not influence underpricing. This result might be due to the fact that companies in Malaysia must have a profit record of at least three years before they can be listed on the KLSE, which might reduce the information asymmetry problem between firms and investors. Ownership structure does not explain underpricing either. Firms in Malaysia are tightly held. The average percentage of shares owned by a few individuals or a family is 76.25 per cent and the minimum retained ownership is 46.38 per cent. A firm with 80 per cent of its shares being held by a few individuals might be able to reduce its agency costs. However, the reduction in that firm's agency costs might not be higher than a firm with 50 per cent of its shares being held by a few individuals especially if the costs of trading in the firm's shares are taken into account.

7. Additional Tests

In this section, the models are re-estimated using year dummy variables, an adjusted measure of underpricing, and also after dropping some outliers.

The results for many of the variables do not change if year dummy variables were used instead of time-period dummy variables. However, by using year dummies, the estimate for the profit guarantee of 0.225 is statistically significant at the 10 per cent level and the estimate for the board on which the firm is listed is not statistically significant anymore. As for the year dummies, the dummies representing years 1996 to 1999 are statistically significant at the 1 per cent level. The higher adjusted *R*-square of the estimation model that employs time-period dummy variables (0.715) leads us to choose it over the model that employs year dummy variables, which has an adjusted *R*-square of 0.654.

The regression model is re-estimated by using underpricing adjusted for market movements as the dependent variable. The adjusted underpricing is measured in the following manner: Adjusted underpricing = $[(P_o/P_f) - 1] - [(I_o/I_f) - 1]$ where P_o is the share price at the end of listing day, P_f is the offer price, I_o is the market index at the end of the listing day, and I_f is the market index on the price-setting date. The rationale behind using the adjusted underpricing is that since the offer prices for IPOs are set on the price-setting date and the length of the price setting date is, on average, about 125 days, then the underpricing that we observe for the IPOs reflects to some extent the general market movement. Therefore, to measure the 'true' underpricing, market movements are netted out when we calculate the level of underpricing. Nevertheless, the correlation between the adjusted underpricing and the unadjusted underpricing is a very high 0.970. The results of this model are similar to the results discussed in the previous section except that the monthly market returns from the price-setting date to the listing date, or AMR1, are not statistically significant anymore and the dummy variable for the Asian financial crisis period, or D4AFC, is statistically significant at 0.312. Therefore, according to this estimation model, investors required a higher level of compensation if they were to be persuaded to participate in the IPO market during this risky and volatile period.

Finally, the model is re-estimated by dropping extreme observations, that is, outliers. Outliers are defined as firms with underpricing more than two standard deviations away from the mean. There are 27 firms with extreme observations with all of them experiencing underpricing greater than 260 per cent. The results of regressions based on the remaining 519 firms change for some of the variables compared to the full sample. We find that firms that provide LIP experience less underpricing as the coefficient is a significant -0.215. GP is not statistically significant anymore while the borrowing ratio, BR, and the ownership variables, OWN and OWNSQ, are significant. BR has a negative effect of -0.261 (*p*-value of 0.001) on underpricing. A one standard deviation change in borrowing ratio leads to a 4.36 per cent change in underpricing, therefore, the impact of BR on underpricing is small. As for the ownership variables, the relationship between underpricing and ownership is nonlinear and the underpricing is maximised when the ownership fraction is 0.7143.

In summary, in all three cases, the signs for almost all of the coefficients of interest do not change. T1, LIP, PG, BUMI, and DIFFE have the same sign or remain insignificant except for LIP when the estimation model is based on time-period dummies without outliers. Other than that, the results are robust to these different specifications.

8. Conclusion

This paper provides empirical tests on the relationship between regulations and underpricing using 546 initial public offerings on the Kuala Lumpur Stock Exchange from 1990 to 2002. Even though the IPO market in Malaysia is highly regulated, no previous study has looked at the effects of regulations on underpricing. This paper attempts to fill this gap. Four features of regulation are investigated in this paper: (i) length of time from price setting to listing date, (ii) fraction of shares set aside for indigenous investors, (iii) liberalisation of the pricing method from 1996, and (iv) mechanisms designed to protect the minority shareholders.

We find that the length of time from price setting to listing date is negatively related to underpricing. This result might reflect the flexibility given to a firm to list its shares once it gets the approval from the SC. Realising that the length of time might affect underpricing, SC has shortened the time from the closing date of application to the listing date from an average of 25 days to 13 days starting from 1 December 2003.¹³

The fraction of shares set aside for indigenous investors does not seem to affect underpricing. Since there are many indigenous investors, firms do not have to worry about this requirement when they set their offer prices. Therefore, the concerns of ethnic associations that this requirement leads to lower offering prices are unfounded.

The average P/E multiples used by firms in this study are less than 10 from 1992 to 1996. Even after SC allowed for firms to set their own offer prices in 1996, the P/E multiple used in that year does not differ from previous years. However, the P/E multiple used in 1997, from January to 11 November is about 24 per cent higher than in 1996. Therefore, firms seemed to finally be warming up to the relaxation of price regulation; the onslaught of the Asian financial crisis ended this trend. After the crisis, the average P/E multiple hovered around 8. Because of the Asian financial crisis, we cannot see whether the relaxation of the pricing regulation leads to higher P/E ratios used by a firm that is going public, although we still observe lower underpricing starting from 1998. The lower underpricing is driven by, among other factors, the narrowing gap between the average market P/E ratio and the average firm P/E ratio.

Finally, the protective mechanisms led to more underpricing for firms that went public between 1996 and 6 November 1997 or those that went public after the Asian financial crisis. Since the protective mechanisms were provided by firms with higher risks, the higher underpricing during these two periods might reflect the higher risks associated with these firms.

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¹³ The length of 25 days is from SC estimation. The length of time from closing to listing in this paper is about 29 days.

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