CHAPTER 3: RESEARCH METHODOLOGY

This chapter presents the methodology employed in this study. It starts with information on data collection and sample selection procedures. The sample characteristics and descriptive analysis of the sample IPOs were shown. Next, the empirical methodologies for both short run underpricing and long run underperformance were explained. Having defined the variables, the model is then formulated in the study. Based on the basis of previous empirical research, the explanatory variables used in the model are intended to examine whether the variables are capable of explaining the initial underpricing of IPOs in Malaysia. The priori expectations and definitions for each explanatory variable are elaborated here. Finally, the several hypotheses are proposed based on the literature to assess the relationship between the explanatory variables and the magnitude of underpricing.

3.1 Sample Selection and Data

To investigate the determinants of IPO underpricing and initial market returns in Malaysia, a sample of 313 IPO identities in relation to new listings on the Main Board in Bursa Malaysia from 1 January 1998 to 31 December 2008 was collected. The data for each IPO was extracted from the Bloomberg database and Bursa Malaysia website. The closing price for Kuala Lumpur Composite Index from 1998 to 2008 was also extracted from the Bloomberg to be used as a benchmark.

The data was then analyzed using the Statistical Package for Social Sciences (SPSS) version 16.0 program. Prior to inputting into the program, coding was developed for each variable.

Table 1 : Number of New IPOs Listings in Bursa Malaysia by Year

Year	Total Number of IPOs	Number of IPOs included	% of IPOs included
1998	28	23	82%
1999	21	19	90%
2000	38	36	95%
2001	20	20	100%
2002	51	38	75%
2003	58	36	62%
2004	72	43	60%
2005	79	38	48%
2006	40	20	50%
2007	26	25	96%
2008	23	15	65%
Total	456	313	69%

Table 1 above exhibits the number of IPO listings by year. The initial sample size of IPOs listed on the Bursa between 1998 and 2008 collected is 456. The sample selection is guided by the availability of data. The selection criteria, specifically the availability of the post 3-year share prices, IPO gross proceeds and identification of underwriters further reduces the sample size to 313. This constitutes 69% of all IPOs in the study period. The number of IPOs in the sample varies from year to year depending on the type of analysis being conducted and the time frame being considered. The highest number of IPOs is observed in 2005 with 79 IPOs while the lowest is in 2001 with only 20 IPOs.

Table 2 : Frequency of IPOs and Gross Proceeds by Years

Year	Number of IPOs included	Gross Proceeds (RM '000)	% of total
1998	23	777,741.40	3%
1999	19	554,635.30	2%
2000	36	916,640.00	4%
2001	20	2,829,088.90	12%
2002	38	2,973,290.10	13%
2003	36	3,189,860.10	14%
2004	43	3,158,503.20	14%
2005	38	3,674,074.40	16%
2006	20	1,623,365.70	7%
2007	25	2,450,773.70	10%
2008	15	1,222,363.40	5%
Total	313	23,370,336.20	100%

Table 2 reports the distribution of IPOs the gross proceeds by year. In terms of the percentage of gross proceeds, 2005 seems to be a dominant year in the Malaysian IPO market with the highest percentage of total proceeds (16%) realized in 2005, followed by 14% in 2003 and 2004.

Table 3 : Division of IPOs and Gross Proceeds by Sectors

Sectors	Number of IPOs	Gross Proceeds (RM '000)	% of total
Construction	12	436,075.51	2%
Consumer Products	68	2,070,926.45	9%
Finance	3	1,146,000.00	5%
Industrial Products	114	4,730,304.27	20%
Infrastructure	2	1,964,593.50	8%
Plantation	10	1,304,654.53	6%
Properties	12	1,243,410.56	5%
REITs	11	2,234,319.21	10%
Technology	13	632,545.88	3%
Trading Service	68	7,607,506.30	33%
Total	313	23,370,336.20	100%

Table 3 shows the division of IPOs among sectors and the division of proceeds by sectors. Of the 313 IPOs, 114 IPOs are under industrial products category, 68 IPOs from both consumer products and trading service and 13 IPOs under Technology. Meanwhile, both Properties and Construction sectors have 12 IPOs each, REITs record 11 IPOs, Plantation 10 IPOs and Finance 3 IPOs while the remaining 2 IPOs from Infrastructure.

The gross proceeds raised by the sample IPOs vary substantially. In terms of gross proceeds, the Trading Service sector topped the list with the highest proceeds at RM7.6billion, followed by Industrial Products at RM4.7billion. The least amount of gross proceeds raised is from Construction sector at RM436million.

3.2 Empirical Methodology (Short run Underpricing)

For each IPO, two short run measures of performance are used which are widely practiced in international empirical studies: the raw returns and the excess or adjusted returns.

In line with research methods used by Ritter (1991) and Jelic et al. (2001), the raw returns for each stock is defined as relative price change from offer price to closing price at the end of first trading day as follows:

$$\text{Initial Return} = \frac{Pi - P_0}{P_0} \quad X\ 100$$

where Pi = closing price on the first day of the firm. Po is the IPO offer price. Working the same way using IPO price as a base, the raw returns for 2^{nd}, 3^{rd}, 4^{th}, 5^{th}, 10^{th}, 20^{th} day are calculated as well.

As suggested by Loughran and Ritter (2000), adjusting the raw returns with an appropriate benchmark is important because it often determines the presence of positive or negative abnormal returns. Hence, even though raw returns are measured but they may not be adequate for measuring both short and long run performances of an IPO. An

appropriate benchmark is also usually used when making comparisons with respect to risks and returns as suggested by Drobetz, Kammermam, Walchli (2002).

Selection of an appropriate benchmark is important when calculating the abnormal returns and comparing the results to that benchmark because quantitative measurements for the short and long run performances of IPOs can be very sensitive to the method and benchmark employed.

According to Ewing and Ozfidan (2003), the National 100 Index of the Istanbul Stock Exchange is more established and thus it is a less risky benchmark compared to a portfolio comprised of IPO stocks. Besides, the use of market returns to calibrate nominal returns could result in a situation where there are more positive excess returns than if a riskier benchmark was used.

Meanwhile, Jelit et al. (2001) used the Kuala Lumpur Composite Index as the benchmark in their studies on the Malaysian IPO market which clearly represents the sample of IPOs being analyzed.

Following the same formula used to calculate the raw return, the same interval is also used to estimate the raw returns for the KLCI of the Bursa. It is calculated as:

$$\text{Initial Return} = \frac{KLCI_i - KLCI_0}{KLCI_0} \text{ X } 100$$

where $KLCI_i$ = Closing point of the KLCI on the first day. $KLCI_0$ is the closing point of the KLCI on the IPO listing date.

The estimation of excess return combines the returns of the shares with the fluctuations of the market. In order to evaluate whether a firm's IPO over or under-performs the market, the difference between the raw return of the IPO and the return of the KLCI is calculated for the same time interval. The initial market-adjusted return for each stock is defined as the initial raw return less the corresponding market return on initial day. This kind of evaluation will reveal whether the IPO over or underperform the market. It is defined as follows:

$$\text{Market-adjusted Return} = \left[\frac{Pi - P_0}{P_0} - \frac{KLCI_i - KLCI_0}{KLCI_0} \right] \text{ X } 100$$

where *i, 0* are defined as above, P is the closing price of the stock and KLCI is the value of Bursa Index.

3.3 Empirical Methodology (Long run Underperformance)

In order to gain further understanding of IPO underpricing, share returns up to three years subsequent to listing are analyzed. "Fad" or "speculative bubble" explanations of initial underpricing suggest a link between initial returns and post-listing performance. While IPO underpricing is widely documented, there is relatively little evidence of long run performance.

For this purpose, the closing share price of the IPO on the day of listing was obtained together with the closing prices for the 36 months following the day of listing. Long term performance of IPOs is examined by analyzing their holding period return over a period of time and comparing them with the market return. Hence, aftermarket

returns are calculated as holding period return, i.e. buying the IPO shares on the first trading day and holding them for a pre-determined period of time. The predetermined periods are 6, 9, 12, 18, 24 and 36 months. The average buy and hold returns ($RET_{i,t}$) is calculated as follows:

$$RET_{i,t} = \prod_{t=1}^{n}(1 + r_{i,t}) - 1$$

where n is the number of months comprising the period and $r_{i,t}$ is the return of the stock *i* at time *t* calculated as the percentage change of the price of stock *i* from first day price of month t ($Price_{i,0}$) to the last day price of month t ($Price_{i,t}$)

$$r_{i,t} = \frac{Price_{i,t}}{Price_{i,0}} - 1$$

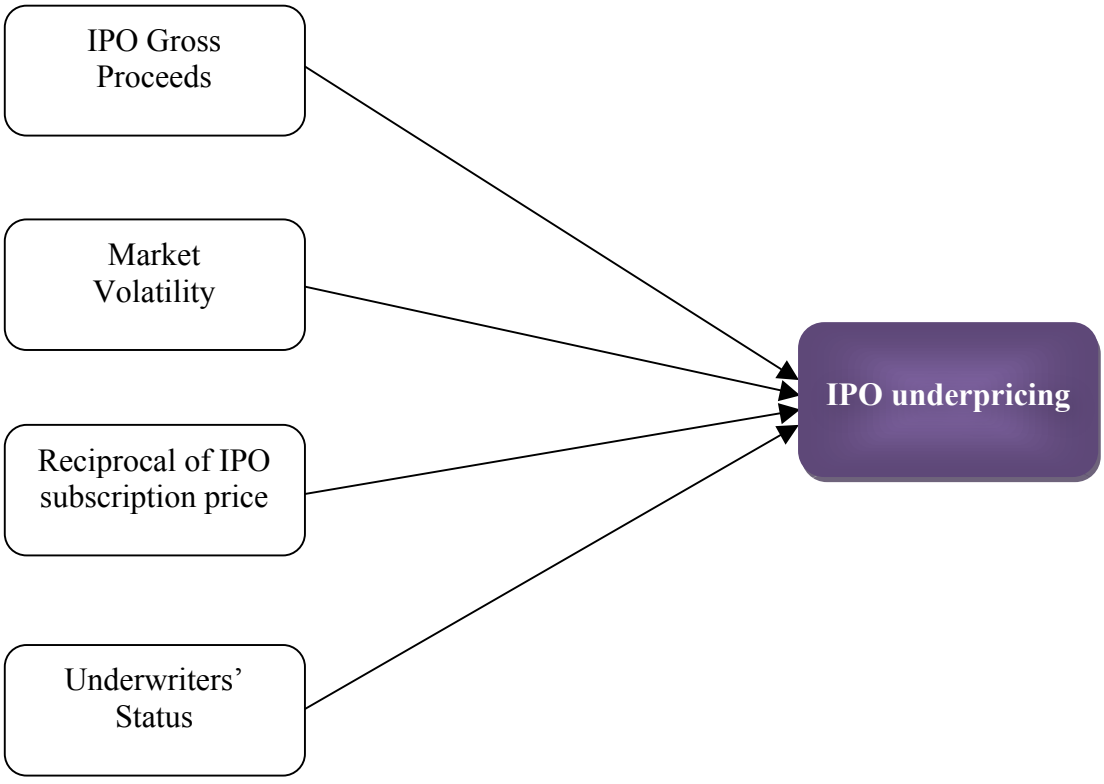
3.4 Determinants of IPO Underpricing and the Model

There are a number of hypothesis regarding the possible explanations for IPOs performances. Generally, the literature on underpricing relates to underpricing phenomena to ex-ante uncertainty as in [Rock (1986); Beatty and Ritter, (1986)]. The study is further expanded to determine possible explanations for underpricing phenomenon in the Malaysian context. The empirical analysis is extended to examine whether the variables capable of explaining the initial returns of IPOs in other developed markets can explain the initial return in Malaysia.

In line with these studies, a positive relationship between the level of underpricing and the level of ex-ante uncertainty of a new issue is expected. Since it is not possible to measure ex-ante uncertainty directly, a number of variables are used as proxies. There are two variables used as proxies for ex-ante uncertainty in this study. They are IPO size measured by the gross proceeds from going public and market volatility.

Based on the literature review presented in chapter 2, a framework has been developed to investigate to assess the impact of IPO gross proceeds, market volatility, reciprocal of the IPO subscription price and underwriters' status on the level of underpricing.

Figure 2: Research Framework



The ordinary least squares regression is used to determine the factors affecting IPO initial returns. The explanatory power of these variables on initial underpricing listed is explored by estimating the following equation. The explanatory variables used in the model are selected on the basis of previous empirical research.

$$RETURN = \beta_0 + \beta_1 (Size) + \beta_2 (MV) + \beta_3 (RECIPO) + \beta_4 (UW\ Status) + Ci$$

where:

Size = Gross proceeds raised from IPO

MV = Market Volatility of FBM KLCI

RECIPO = Reciprocal of the IPO subscription price

UW Status = Underwriter Status

Ci = An error term

The priori expectations and elaborations on each explanatory variable are as follows:

IPO Size (size): Size of the offering is defined as the number of shares multiplied by the offer price It is argued in the previous literature that IPOs larger in size signal their intrinsic value by underpricing by a larger margin [Allen and Faulhaber (1989), Grinblatt and Hwang (1989)]. Thus, a positive relationship between this variable and the initial underpricing is expected.

Market Volatility (MV): Empirical evidence suggests that IPOs which go public during hot markets (the period when stock market has high return) have high first day returns.

The success of IPO issue sometimes depends on the timing of the issue, whether the overall market sentiment is bullish, bearish or flattish. In a very volatile market, IPO subscribers would expect a higher return to compensate for the risks they take. The underwriters are likely to suggest a lower offer price so that the intrinsic value of the IPO stock would not fall below the offer price even if the market is in bearish mode. This may result in a higher initial premium to subscribers. Hence, the market condition at the time of launching the IPO and listing of IPO is very critical. Following the method adopted by Menyah et al. (1995), market volatility is measured by the standard deviation of daily KLCI market returns over two months (40 working days) prior to listing date. A positive relationship is expected between this variable and the level of initial underpricing.

Reciprocal of the IPO subscription price (RECIPO): The larger the subscription price, the more difficult it will be for average investors to acquire the stocks as higher priced IPOs are beyond the affordability of average IPO investors. As such, the demand for pricey IPO is lesser than the cheaper priced IPOs as the price can be extremely high. Therefore, the reciprocal of IPO subscription price is expected to have a positive relationship on the level of initial underpricing.

Underwriters' status (UW Status): A substantial body of literature examines the effect of underwriter reputation on the initial performance of IPOs, as reported in Beatty and Ritter (1986). In Malaysia, Jelic et al. (2001), using data from 1980 to 1995, report that underwriters with a better reputation tend to, on average, increase initial underpricing; this contradicts the results reported in studies on underwriters' role in other countries,

such as Beatty and Ritter (1986). Beatty and Welch (1996), however, suggest that a negative relationship between the level of IPO underpricing and underwriters' reputation may be reversed due to changes in the economic environment. Thus, a positive relationship is expected between the reputation of underwriter and the level of initial underpricing.

Based on the above literature and theoretical framework, the following hypotheses are proposed:

H_1: There is a positive relationship between size of an IPO offering and the level of initial undepricing.

H_2: There is a positive relationship between market volatility and the level of initial undepricing.

H_3: There is a positive relationship between reciprocal of the IPO subscription price and the level of initial undepricing.

H_4: There is a positive relationship between the reputation of underwriter and the level of initial undepricing.

In order to test H_4 for Malaysian IPOs, a dummy variable is employed. This variable takes the value of 1 if the underwriter is reputable and zero if the underwriter is non-reputable. Studies have used several proxies to measure the reputation of underwriters. The measure used here is based on the assumption that and Commerce International Merchant Bankers (CIMB) and Arab Malaysian Merchant Bankers (AMMB) are the prestigious underwriters. These two firms are designated as prestigious

underwriters in this study based on their IPO market share. In an article published by Asiamoney (November 1999) titled "Humbling of Daim Zainuddin" by Matthew Montagu-Pullock, the author states: "CIMB is considered to be Malaysia's number one or number two merchant bank, together with AMMB.

3.5 Conclusion

There are a number of hypothesis regarding the possible explanations for IPOs performances. This chapter presented an overview of the research framework and the research model employed to examine to what extent the explanatory variables are capable of explaining the initial underpricing of IPOs in Malaysia. The explanatory power of these variables on initial underpricing is explored by adopting regression analysis in order to determine the factors affecting IPO initial returns in Malaysia. The priori expectations and definitions for each explanatory variable are elaborated here. In addition, this chapter also discussed on the empirical methodologies employed for both the short run underpricing and long run underperformance. Finally, the several hypotheses are proposed based on the literature to assess the relationship between these explanatory variables and the magnitude of underpricing. Following that, chapter 4 will discuss the empirical results and analysis on each of the hypothesis as laid out in this chapter.