MEASURING THE COSTS OF IPO UNDERPRICING THE ISSUER'S VIEW

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ABSTRACT

Previous studies of initial public offer (IPO) underpricing on the KLSE concentrate on the difference between the offer price to the public and the market price once trading begins. This is a reasonable measure of underpricing for new investors, but it is not the appropriate measure of underpricing for issuers. This paper presents revised measures of IPO underpricing for use by issuers. They reveal that (1) underpricing measured from the issuer's viewpoint is greater than previously reported, (2) the cost of underpricing IPOs by companies about to be listed on the KLSE are quite high, and (3) there is thus more room than previously believed for improvement in the accuracy of pricing new share issues.

1. INTRODUCTION

Owners of shares worth $3 each are unlikely to sell them willingly for just $1.29, yet this is what 93 companies did on average when they made initial public offers (IPOs) of new shares in Malaysia between 1979 and the end of 1992. While a high level of underpricing like this for new shares is very attractive for investors, as witnessed by the large oversubscriptions reported for most issues, the other side of the coin is that high underpricing can be quite costly for the issuers. When shares are sold for less than they are worth, value is transferred away from the issuer's original shareholders to the new investors. (Dawson, 1987a and 1987c) Furthermore, the lower the offer price, the greater the number of shares that must be offered to raise a given amount of funds. More shares issued means there will be greater decreases in reported earnings per share, asset backing per share, and voting power retained by the original shareholders. With more shares outstanding, dividends per share will either decrease or additional funds must be paid out to retain the same per share dividend payment as before (Dawson 1985).

Many reasons are proposed to explain why the new shares in IPOs are underpriced

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despite the disadvantages for issuers (Ibbotson, Sindelar, and Ritter 1988, and Ismail, Abidin, and Zainudin 1993). Perhaps the most important reasons given for underpricing are various pricing restraints applied by the then Capital Issues Committee and uncertainty about the value of the new shares. Without an existing market price to refer to, the issuer must estimate, given the constraints applied by the issuing authorities, what the shares are worth, and this can be difficult to do. If the issuer sets too high an offer price, investors might not subscribe. The issuer, its advisors, and those interested in the development of the KLSE as a way to raise funds would incur the public embarrassment of a failed issue. Better to be safe, most issuers appear to decide based on studies of underpricing around the world, and to err on the side of setting the offer price price too low rather than too high.

Other explanations are also offered for IPO underpricing. For example Rock (1986) developed the"winners curse" argument which suggests that new issues must be underpriced on average to get investors, especially uninformed investors who are worried about paying too much, to turn in bids. Koh and Walter(1989) found evidence in a study of Singapore IPOs to support this view. Investment bankers have an incentive to underprice to make it easier to sell the issue, and to develop a good reputation among investors. Law suits by unhappy investors are less likely when issues are underpriced. An underpriced issue may make it easier to market a subsequent sale of shares. Most likely all the available explanations for underpricing have some validity, and their influence will vary by time, issuer, and the market where the IPOs are made.

2. HOW UNDERPRICING IS MEASURED

In general underpricing compares the offer price to what the shares are worth. The traditional measure of IPO underpricing reported in the financial press and in studies of IPOs by issuers seeking a listing on the KLSE (for instance Dawson 1987b, Hassan 1992, Hassan 1993, Ismail, Abidin, and Zainudin 1993, Tay 1993, Wong and Chiang 1986, and Yong 1991) is the percentage difference between the price at which the shares are offered to the public (Po) and the price at which they begin to trade on the market(Pm) calculated as follows:

$$UPinvestor = (Pm - Po)/Po\ (100) \tag{1}$$

If shares, for example, are offered at \$1.50 and begin to trade at \$2.50, underpricing is 67 percent measured as follows:

$$\text{UPinvestor} = (2.50 - 1.50)/1.50\,(100) = 67 \text{ percent}$$

Equation (1) tells how much new investors gained by buying at the offer price and we can refer to it as the investor oriented underpricing measure (UPinvestor). This traditional, or investor oriented measure is not, however, an accurate measure of underpricing for the issuer. From the issuer's viewpoint, whenever new shares are underpriced the market price when trading begins is less than the actual value of the new shares offered. This is because the observed market price (Pm) occurs after the dilution of share value caused by selling new shares for less than they are worth. Therefore a more appropriate comparison for the issuer (UPissuer) is between the offer price (Po) and the value of the original shares if there had been no new issue underpricing (P*) as shown in equation (2):

$$\text{UPissuer} = (P^* - Po)/Po(100) \tag{2}$$

A simple example will clarify the difference between the observed market price (Pm) and the value of the shares before the IPO is underpriced (P*). Let us assume the issuer's shares are worth \$3 if there is no IPO underpricing, and that there are 50 million shares outstanding, giving a total issuer value of \$150 million. Next we assume that an additional 25 million new shares are offered to the public for \$1.50 each, rather than at their actual value of \$3 per share, to raise \$37.5 million in new funds. After the new issue the firm will have added \$37.5 million to its value and be worth \$187.5 million. Since 75 million shares are now outstanding, when trading begins the market price (Pm) should be the \$187.5 million total value divided by 75 million shares or \$2.50 per share. The market price declines to \$2.50 from \$3.00 because the issuer has sold new shares for just \$1.50 and this has diluted the original value of \$3.00. The greater the number of new shares issued compared to the original shares, and the lower the offering price relative to the value of shares without IPO underpricing, the greater the dilution of value will be.

Now we can contrast the two measures of underpricing. As shown earlier the traditional, investor oriented measure of underpricing in equation (1) compares the \$2.50 market price to the \$1.50 offer price and underpricing is 67 percent. The issuer based measure of underpricing in equation (2), however, compares the \$3 value of the shares without IPO underpricing to the \$1.50 offer price and underpricing is now 100 percent. Obviously these two measures give different results. For new investors underpricing is 67 percent and for the issuer it is 100 percent.

The alert observer will note that in the example the three values, the offer price (Po), the subsequent market price (Pm), and the share value without IPO underpricing (P*), are all known while in an actual offer only the first two values are known and the value of the shares without IPO underpricing is not observable since the company was not listed on the KLSE before the IPO was made. Indeed, if it was known what the shares were worth, then pricing of the new shares would be a lot easier and IPO underpricing would not be the factor it is today.

Fortunately the share value without underpricing (P*) can be derived once trading begins by finding the total value of the issuer after the IPO is made, then subtracting the funds added by the IPO to get the value of the issuer without the new funds, and then dividing this value by the number of shares outstanding before the IPO was made, as follows:

$$P^* = ((St)(Pm) - (Sn)(Po)) / So \tag{3}$$

where:
- P* = value of a share without IPO underpricing
- St = total number of shares after the IPO
- Pm = market price of the shares when trading begins
- Sn = number of new shares issued in the IPO
- Po = offer price for the new shares
- So = original number of shares outstanding.

Using the previous example, the value of the original shares before underpricing of the new issue diluted their value is

$$P^* = ((75{,}000{,}000)(\$2.50) - (25{,}000{,}000)(\$1.50))/50{,}000{,}000 = \$3.00$$

This is the same $3.00 value we assumed at the start of the example, but now we have derived it from information available for any IPO, namely the offer price, the opening market price, the number of shares issued, and the total shares outstanding.

Issuer underpricing is calculated so far in a way which is comparable to the traditional investor oriented underpricing. The term "underpricing," however, implies that shares are sold for less than they are worth, yet the measures of underpricing referred to previously are both measures of how much more the value is than the offer price. When it is desirable to conform more closely to the meaning of underpricing, the measures could alternatively be calculated as how much less the offer price is. DUP investor and DUP issuer will measure the discount from what the shares are worth, Pm for the new investors and P* for the issuer, to the offer price (Po). This changes the two calculations of underpricing to:

$$\text{DUPinvestor} = (\text{Pm} - \text{Po})/(\text{Pm})(100) \tag{4}$$

$$\text{DUPissuer} = (\text{P}^* - \text{Po})/(\text{P}^*)(100) \tag{5}$$

For investors, shares with a market value of $2.50 would have been bought for $1.50, a discount of $1.00 or 40 percent. For issuers, shares worth $3 would have been sold for an offer price of $1.50, a discount of $1.50 or 50 percent. Discount underpricing calculations are merely a different way to calculate underpricing. The general relationships are the same as before, and they will be useful in calculating the costs of underpricing.

3. THE COSTS OF UNDERPRICING

The traditional investor based view of underpricing examines the gain earned by investors whose shares rise in value from the offer price to the opening market price. The issuer based view of underpricing draws attention to the other side of the transaction: the corresponding decrease in value that occurs for the issuer and its original shareholders as a group. This transfer of value is one of the costs of issuing an IPO. We can use our new insights about the value of the shares issued, as developed in Section 2 earlier, to calculate the costs of underpricing in three ways as follows:

(1) Underpricing cost as a percentage of the new funds raised:

$$(\text{Sn})(\text{P}^* - \text{Po})/(\text{Sn})(\text{Po})(100) \tag{6}$$

This formula is derived from the issuer's discount underpricing and is equivalent to a cost of capital calculation. It relates the costs of underpricing to the actual funds raised. It is similar to saying we raised funds with a bank loan and the cost of these funds is the interest rate.

(2) Underpricing cost as a percentage of the equity before the IPO was underpriced:

(Sn)(P* - Po)/(So)(P*)(100) (7)

This measure is also derived from the issuer's discount underpricing and it tells the issuer what proportion of the original value of the firm is transferred from the existing shareholders to the new shareholders as a result of IPO underpricing.

(3) Undepricing cost as the dollar value transferred to the new investors by the underpriced IPO:

(So)(P* - Pm) (8)

This is merely the dollar value lost by the issuer and transferred to the new investors. To provide perspective it will usually be advisable to compare this dollar value to either the new funds raised, as in the first measure above, or to the value of the issuer, as in the second measure above.

Using the previous example, if an issuer with 50 million original shares offers 25 million new shares worth \$3 before the dilution of underpricing for \$1.50 to the public and trading subsequently begins at \$2.50, then the cost of underpricing cost as a percentage of the new equity raised is 100 percent calculated as:

(25,000,000)(\$3.00 - \$1.50)/(25,000,000)(\$1.50)(100) = 100%

As a percentage of the issuer's equity before the underpriced IPO the cost is 25 percent calculated as:

(25,000,000)(\$3.00 - \$1.50)/(50,000,000)(\$3.00)(100) = 25%

As dollars transferred to the new investors the cost is \$25 million calculated as:

(50,000,000)(\$3.00 - \$2.50) = \$25,000,000

Of course the cost to the issuer, \$25 million, is equal to the \$25 million gain handed to the new investors when their 25 million new shares go from the \$1.50 offer price to the \$2.50 market price.

A few additional observations are in order before we apply the new issuer based measures of underpricing to IPOs on the KLSE. First, only new shares not already held by investors are relevant. If existing shareholders offer part or all of their shares to the public, commonly called an offer for sale, underpricing of these shares will not affect the issuer. The selling shareholders do receive less than the shares are worth, and that is a loss for them individually, but there is no change in the value of the firm since the firm receives no new funds. An offer for sale is no different than an ordinary sale of existing shares by one investor to another as occurs everyday for most companies. These daily sales affect only the buyer and the seller as individuals, and not anyone else.

A second point is that the measure of issuer based underpricing will be greater than investor based underpricing whenever the offer price is less than the value of the shares without underpricing. Only if the new shares are offered at their undiluted value will the two measures be the same, and of course they will then each be zero since there is no underpricing.

Third, occasionally an IPO is overpriced, as occurred when Econstates sold shares for $1.30 and trading closed the first day at $1.25. When overpricing occurs the measures of underpricing will become negative and the transfer of value is reversed. With overpriced IPOs the value is transferred from the new investors to the original shareholders.

A fourth point is that occasionally part of the IPO is sold on a tender basis, and therefore the effective offer price is different from the offer price for the rest of the issue. Tenaga, for instance, sold 60 million shares by tender in its IPO of 2,314,953 shares[1]. When some new shares are sold for a different price, the value of the shares without underpricing (P* in equation 3) used in the calculation of issuer based underpricing can be adjusted as follows:

$$P^* = ((St)(Pm) - (Sn - Sten)(Po) - (Sten)(Pten)) / So \qquad (9)$$

where: Sten = number of shares subject to tender,

Pten = average price received for the tendered shares.

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[1] The offer price to the public was $4.50. The price paid for the tendered shares ranged from $6.55 to $ 7.10, raising an additional $130 million from the 60 million shares offered by tender.

Fifth, it is commonly believed that new shares would not be underpriced if they were offered at the observed market price (Pm) rather than the offer price (Po). This analysis shows that an IPO would still be underpriced if offered at Pm. The correct offer price to completely avoid underpricing is P*, which is higher than Pm.

And a final point: future IPO issuers can use these formulas to calculate the potential cost of underpricing. The first step is to estimate the value of the shares (P*), then given the amount of funds to be raised, or the number of new shares to be issued, the cost of underpricing can be estimated for various potential offer prices.

4. IPO UNDERPRICING: 1979-1992

So much for formulas and theory. We can now apply the measures for issuer and investor based undepricing to 93 IPOs of new shares made between 1979 and the end of 1992. Offers for sale were excluded. Some IPOs combine new issues of shares with offers for sale of existing shares and only the new shares are included in the study. One additional issue was also dropped from the study. The offer of 134,999,000 shares by Arab Malaysian First Property Trust in 1989 represented virtually all of the 135 million total shares outstanding after the issue and the underpricing results distort the calculations of averages.[2] The offer price (Po) in the study is the price at which shares are offered to the public. The market price (Pm) is the closing price on the first day of market trading. No adjustment is made for market changes between the offer date and the start of trading since it can be assumed the offer price is set by the issuer, and viewed by the investor, in anticipation of the market price when trading begins.

The widely reported traditional measure of investor based underpricing and the related measure of issuer based underpricing are presented in Table 1 for the entire 1979 to 1992 period and for various subperiods. While investor based underpricing averaged 98.2 percent over the entire period, issuer based underpricing was a considerably larger 132.5 percent. As noted in the introduction, issuer underpricing of 132.5 percent means that shares worth \$3.00 are offered for \$1.29. A similar relationship between investor and issuer underpricing held for each year, and for the 1979-1988 period compared to the more recent 1989-1992 and 1991-1992 periods. Of particular note is the sharp decline in IPO underpricing during the last four years following the 1989 revision in pricing guidelines by the Capital Issues

[2] *The shares were offered at \$1.00 and the market price at the end of the first day was \$1.39. Investor based underpricing was thus 39 percent, while the issuer based underpricing was more than 5 million percent.*

Commitee. Although underpricing for KLSE IPOs remains higher than for IPOs in other markets, the recent issues show a big improvement.

Table 1

Issuer and Investor Based Underpricing
93 IPOs by KLSE Issuers: 1979-1982

Time Period	**Number Of IPOs**	**Average Investor Underpricing**	**Average Issuer Underpricing**
1979-1992	93	98.2 %	132.5 %
1979-1988	47	140.0	188.2
1989-1992	46	55.5	75.6
1991-1992	24	43.2	54.0
1979	1	76.0	102.4
1980	1	112.0	149.5
1981	4	165.6	210.9
1982	5	60.4	93.5
1983	9	221.6	297.1
1984	11	141.4	189.6
1985	6	144.8	190.3
1986	4	45.7	63.1
1987	3	174.9	250.2
1988	3	100.4	127.0
1989	5	64.2	113.3
1990	17	70.4	95.1
1991	10	27.6	38.3
1992	14	54.4	65.2

IPO underpricing leads to the transfer of value from the existing shareholders to new investors. As we have seen, this transfer can be measured in comparison to the funds raised (Table 2), or to the total value of the issuer (Table 3). In both cases the transfer of value associated with the high level of underpricing for KLSE IPOs can be unexpectedly large.

As shown in table 2, there were four IPOs which caused the original shareholders to lose more than 3 times the amount of new funds raised. In 37 IPOs the original shareholders as a group lost at least as much value as was raised with the new issue. As incredible as it sounds, this is equivalent to saying the original shareholders for these 37 IPOs would have been better off if they raised the same amount of funds with new shares priced at their actual value, had paid for these new shares from their own pockets, and then gave away these shares to the new investors free of charge. Moving further down Table 2, only 20 issuers had less than 25 percent underpricing costs. Only one IPO led to an increase in value for the original shareholders and this was the IPO by Econstates that was overpriced. The average IPO in the study transferred value equal to 98.2 percent of the new funds raised. The median transfer of value was 77.9 percent, which means half the IPOs transferred more, and half transferred less value.

Table 2

Value Lost by the Original Shareholders
As a Percent Of New Funds Raised

Value Lost as % Of New Funds	Number of IPOs
Greater than 300%	4
200 ≤ 300%	11
100 ≤ 200%	22
50 ≤ 100%	21
25 ≤ 50%	15
0 ≤ 25%	19
Less than 0%	1
Total	93

The value transferred when IPOs are underpriced can also be compared to the original value of the firm before the IPO was underpriced. Table 3 shows that once again there is quite a range of results. Five firms transferred more than 30 percent of their original shareholders' value, while 24 lost less than 5 percent. On average issuers of the 93 IPOs lost 11.7 percent of their value because of IPO underpricing. The median loss was 10.3 percent.

Table 3

Value Lost by Issuers as a Percent
Of Value Without Underpricing

Value Lost	Number of Issues
Greater than 30%	5
20 ≤ 30%	11
15 ≤ 20%	14
10 ≤ 15%	20
5 ≤ 10%	19
0 ≤ 5%	23
Less than 0%	1
Total	93

5. SUMMARY AND CONCLUDING OBSERVATIONS

Underpricing of IPOs can be costly for the issuer, and is greater than previously believed. The traditional measure of underpricing, the increase from the offer price to the opening market price tells new investors how much they gained when the offer price they bought at is less than the market price when trading begins. A revised issuer based measure of underpricing described in this paper compares the offer price to the value of the shares if there is no underpricing. Whenever the offer price is less than the subsequent market price, in short when there is underpricing, the measure of issuer based underpricing is greater than the investor based underpricing. For the 93 IPOs between 1979 and 1992 in this study, investor underpricing was 98.2 percent while issuer underpricing was a significantly greater 132.5 percent.

Underpricing means value is transferred from the issuer's original shareholders to the new investors and this transfer can be quite large, and hence costly. On average issuers in the study transferred value equal to 98.2 percent of the new funds raised, and 11.7 percent of the total firm value. There are several steps that can be taken to reduce this high cost.

First, less underpricing is an obvious choice, and the data show that 46 IPOs on the KLSE during the 1989-1992 period had less issuer based underpricing (75.6%) than the 47 earlier IPOs from 1979 through 1988 (188.2%). This is a move in the right direction which accelerated in 1991-1992. IPOs in other markets have remained attractive to potential investors with an even lower level of underpricing, so further improvement can presumably be achieved.

A second step is to reduce the number of new shares issued in an IPO relative to the existing shares already outstanding. For example, if only one new share is issued at a low price there is very little value transferred and not much of a price decline caused by dilution. If many shares are issued at a low price, then the value transferred is larger. The 52 IPOs from 1979 through 1989 increased the shares outstanding by 43.4 percent on average. The 41 IPOs from 1990 through 1992 reduced this to 33.4 percent. Again, this is a move in the right direction if an objective is to reduce the transfer of value. Of course, the KLSE listing requirements for most companies of 25 percent of the issued and paid up capital being in the hands of the public must be kept in mind. Should additional funds be needed it will make more sense to issue fewer shares in the IPO when the price is uncertain, and to raise additional funds later when a market price is available. A similar result can be achieved by offering part of the issue at an offer price and the rest at a tender price. Alternatively the entire issue could be offered on a tender basis with the expectation that the probable price will be closer to the opening market price yet equal to what new investors are willing to pay.

A third step is for existing shareholders to subscribe for new shares. If they are allocated new shares, the increase in value for their new investment can offset, in part or totally, the decrease in value for the original shares held.

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