Underpricing in New Equity Listings: A Conceptual Re-Appraisal*

Kevin Keasey
Paul McGuinness

ABSTRACT. This paper appraises the existing approaches used to measure the underpricing of Initial Public Offerings (IPOs). The conceptual problems surrounding the measurement of IPO underpricing are noted to be significant and suggest that underpricing costs and returns may need to be evaluated with reference to the particular characteristics of individual offerings. For example, details of the number of primary shares on offer, the effect on corporate control of listing, the information effects resulting from listing, the liquidity of shares pre-offer, the impact of speculative activity on post-listing firm value and, finally, the actual dating of an IPO may all need to be considered. In short, the existing measures suggested for IPO underpricing do not allow managers/owners in IPO firms or investors in IPO stocks to assess, unequivocally, the respective costs and returns from underpricing in such issues.

1. Introduction and background

It is well known that equity markets provide a conduit for economic growth by allowing firms to acquire large sums of financing for productive investment uses. This attraction is of particular value to small firm managers/owners who may experience difficulties in financing their operations through conventional outlets; namely organised debt and banking markets. In launching a successful listing of stock on an equity exchange, however, the small firm manager faces some pressure to underprice his/her stock which, despite the perceived growth benefits associated with an equity listing, suggests an initial dilution in firm value when new shares are issued to outsiders through the listing (see Dawson, 1987, and Barry, 1989, for further clarification). The existence of this underpricing phenomenon appears to be widespread given an array of studies documenting offering prices in initial public offerings (IPOs) set at significant discounts to the first market prices in such offerings. In assessing the size of these discounts, reference can be made to Table I in McGuinness's (1993b, pp. 18–20) review of initial IPO returns across market studies in the major IPO markets in Europe, North America and the Asian Pacific region. As background, this table is reproduced as Table I in this paper (for other, less detailed, comparisons of international IPO returns reference can also be made to Dawson, 1987a, Ibbotson and Ritter, 1991, and Loughran, Ritter and Rydqvist, 1994). In brief, the information shown in Table I reveals a consistent pattern of underpricing across different markets, time periods and measurement return forms. For further discussion and detailed comparisons of the returns across the markets and studies scrutinised in Table I, reference should be made to McGuinness (1993b).

In addition to the magnitude and form of returns documented in Table I, it is also clear that the majority of studies measure the returns over very short trading intervals. Indeed, there is a suggestion in the empirical literature that significant returns on the trading days subsequent to the first date of listing are, on average, unattainable (see, for instance, McDonald and Fisher, 1972, Neuberger and Hammond, 1974, Block and Stanley, 1980, and Dawson, 1987a). These studies suggest that underpricing is eliminated in early trading. Moreover, the accounts conform to an

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Kevin Keasey
School of Business and Economic Studies
University of Leeds
UK

and

Paul McGuinness
Department of Finance
Chinese University of Hong Kong
Shatin, N.T.
Hong Kong

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TABLE I
Summary review of the levels of underpricing reported across markets and time periods: evidence for Europe, North America and the Pacific Basin

Market and study	No. of issues	Study period	Average initial Ret. (%)	
1(a). European Markets				
United Kingdom				
1. Merritt, Howe and Newbould (1967, pp. 133–141)	149	1959–63	13.7	M^{2}
2. Davis and Yeomans (1976)	275	1965–71	10.6	M^{aw}
3. Buckland, Herbert and Yeomans (1981)	297	1965–75	9.7	M^{aw}
4. Levis (1990)	123	1985–88	8.6	M^{1}
5. Levis (1993)	184[$]	1980–88	11.5	M^{1}
France				
6. McDonald and Jacquillat (1974)	31	1968–71	3.0	M^{1}
7. Jacquillat, McDonald and Rolfo (1978)	60	1966–74	5.2	R^{w}
W. Germany				
8. Dawson and Reiner (1988)	51**	1977–85	28.0	U^{1}
9. Uhlir (1989)	97	1977–87	21.5	M^{1}
1(b). North American Markets				
United States of America				
10. Reilly and Hatfield (1969)	53	1963–65	9.6	M^{ff}
12. Stoll and Curley (1970)	205	1957–63	42.4[#]	M^{1}
13. McDonald and Fisher (1972)	142	1969	28.5	M^{1}
14. Logue (1973)	250	1965–69	41.7	M^{m}
15. Reilly (1973)	53	1963–65	9.6	M^{ff}
Reilly (1973)	62	1966	9.9	M^{ff}
16. Neuberger and Hammond (1974)	816	1965–69	17.0	M^{w}
17. Bear and Curley (1975)	140	1969	12.9	R^{w}
18. Ibbotson (1975)	112*	1960–69	12.8	R^{mc}
19. Ibbotson and Jaffe (1975)	128	1960–70	16.8	M^{m}
20. Reilly (1977)	486	1972–75	10.9	M^{wed}
21. Block and Stanley (1980)	102	1974–78	6.0	M^{w}
22. Neuberger and LaChapelle (1983)	118	1975–80	27.7	M^{w}
23. Ritter (1984b)	1028	1977–82	26.5	U^{1}
Ritter (1984b)	325	1980–81	48.4	U^{1}
24. Beatty and Ritter (1986)	545	1981–82	14.1	U^{1}
25. Chalk and Peavy (1987)	649	1975–82	21.7	M^{1}
26. Miller and Reilly (1987)	510	1982–83	9.9	M^{1}
27. Ibbotson, Sindelar and Ritter (1988)	8668	1960–87	16.4	C
28. Balvers, McDonald and Miller (1988)	1182	1981–85	7.8	U^{1}
29. Tinic (1988)	70	1923–30	5.2	M^{w}
Tinic (1988)	134	1966–71	11.1	M^{w}
30. Johnson and Reilly (1988)	962	1981–83	10.5	U^{1}
31. Beatty (1989)	2215	1975–84	22.1	U^{1}
32. Muscarella and Vetsuypens (1989)	38	1970–87	7.1	M^{1}
33. Aggarwal and Rivoli (1990)	1598	1977–87	10.7	M^{1}
34. Mauer and Senbet (1992)	1002	1977–84	18.9	U^{b}
35. Garfinkel (1993)	494	1981–83	10.2	U^{1}
36. Mohan, Chong and Sauer (1993)	81[†]	1991–92	9.0	M^{1}
Mohan, Chong and Sauer (1993)	267	1991–92	11.9	M^{1}
Canada				
37. Jog and Riding (1987)	100	1971–83	11.0	M^{1}
1(c). Pacific Basin Markets				
Australia				
38. Finn and Higham (1988)	93	1966–78	29.2	M^{1}
39. How and Low (1993)	523	1979–89	16.1	M^{L1}

Table I (Continued)

Market and study	No. of issues	Study period	Average initial Ret. (%)	
1(c). Pacific Basin Markets *(Continued)*				
Hong Kong				
40. Dawson and Hiraki (1985)	31	1979–84	10.9	U^1
41. Dawson (1987a)	21	1978–83	13.8	M^1
42. McGuinness (1993)	92	1980–90	16.6	M^1
Japan				
43. Dawson and Hiraki (1985)	114	1979–84	51.9	U^1
Singapore				
44. Dawson (1984)	29	1979–83	37.5	U^1
45. Wong and Chiang (1986)	48	1975–84	56.0	M^1
46. Dawson (1987a)	39	1978–83	38.4	M^1
47. Koh and Walter (1989)	70	1973–87	27.0	r^1
48. Dawson (1991)	61	1978–90	41.0	U^1
49. Saunders and Lim (1990)	17	1987–88	45.4	M^1
50. Koh, Lim and Chin (1992)	53	1975–87	37.6	M^1
Malaysia				
51. Dawson (1987a)	21	1978–83	166.6	M^1

Source: McGuinness, 1993b, pp. 18–20.

Abbreviations for Table 1 (parts a, b, c)

* Indicates the number of portfolios/groups of stocks analysed.
** Indicates ordinary and preference shares included in study samples.
\# Indicates initial average returns after removal of outliers.
$ Indicates exclusion of placements from study sample results.
M^1 Initial excess market returns between the first closing traded price in the new issue and the offering price.
$M^{L,1}$ Initial excess market returns between the first closing traded price in the new issue and the offering price measured in natural logarithmic form.
M^2 Initial excess market returns between the second closing traded price in the new issue and the offering price.
M^w Initial excess market return between the closing traded price one week after issue and the opening offer price.
M^{wed} Initial excess market return between the first traded price on the Wednesday after the issue and the opening offer price.
M^m Initial excess market return between the traded price one month after issue and the opening offer price.
M^{aw} Initial excess market return between the average of the first week's traded prices and the opening offer price.
M^{ff} Initial excess market return between the closing traded price on the first Friday following issue and opening offer price.
U^1 Initial return between the first closing traded price and the opening offer price unadjusted for changes in the market index.
U^b Initial return between the first bid price and the opening offer price unadjusted for the market [see Mauer and Senbet (1992, p. 68) where first bid price typically means first closing price].
R^{me} Risk adjusted returns between the closing traded price at the end of the first month following flotation and the opening offer price.
R^w Risk adjusted return between the closing traded price at the end of one week of trading and the opening offer price.
r Initial unadjusted returns less the continuously compounded risk-free return over the initial return holding period.
C Returns measured using a combination of different forms (see, for example, Ibbotson *et al.*'s study, 1988, p. 41).
† IPOs traded in U. S. where some shares are issued internationally.

efficient markets view of the market where investors drive security values closer to their intrinsic values in early market trading. While this view is a contentious one since a relatively long period of post-listing returns may be needed to fully evaluate this argument, it appears that investors subscribing to shares in the first *few days* of trading will probably fail to realise any gains from any perceived underpricing in IPO stocks. Indeed, Barry and Jennings (1993, p. 62) note for U.S. IPOs that if an investor misses out on the initial subscription offer in IPO shares he/she will probably be unable to benefit from any underpricing in an IPO even if he/she can acquire the newly listed shares in initial market trading. In fact, Barry and Jennings (1993) conclude in their study that:

> '... virtually all of the initial return due to the underpricing of initial public offerings occurs at the opening transaction. Alternatively, we show that "underpricing" is

corrected (to within transaction costs) by the price-setting process that establishes the opening price. After the opening trade, continued price movement during the first day is not worth the cost of round-trip commissions except, perhaps, for the most advantaged customers.' (p. 62)

Having established both the ubiquitous nature of IPO underpricing and its determination in initial market trading, it is important to ask why such underpricing arises. An impressive theoretical literature has developed in this regard (see, for example, Baron, 1982; Ritter, 1984; Rock, 1986; Beatty and Ritter; 1986, Allen and Faulhaber, 1989; Welch, 1989 and Grinblatt and Hwang, 1989). Whilst a number of complex model forms feature within the literature, one recurring observation is that investors operating in the new issue market require some form of premium on any initial investment in IPOs. One explanation for this investor premium is offered in Rock (1986) where positive initial returns are required to compensate and draw uninformed investors into the new issue market. In this model, uninformed investors suffer from a 'winner's curse' due to the rationing of shares in initial offerings. This 'winner's curse' arises because uninformed investors face a high probability of receiving shares in overpriced or lowly subscribed issues and a low probability of receiving shares in the more lucrative oversubscribed issues. This arises because informed investors only apply for shares in the latter type of issue (according to the Rock Model). Given this bias, Rock argues that new issues should, on average, be priced at some discount to their after market price to compensate the uninformed investor so that he/she can, on average, earn at least a riskless rate of return from his/her investments in new issue shares. The viability of this modelling form has, however, been questioned recently in Keasey and Short (1993).

Alternative explanations for IPO underpricing have also been framed in terms of insurance against potential litigation suites (see, for instance, Ibbotson, 1975 and Tinic, 1988). In the U.S.A., for example, investors have the right to sue the issuing parties to an IPO under the aegis of the 1933 Securities Act if, as noted in Tinic (1988, p. 798), the issuing parties fail to demonstrate 'due-diligence' in the dissemination of information relating to the issue. In particular, Tinic (1988) notes that:

'. . . Section 11 of the Securities Act of 1933 mandates investment bankers to conduct "due-diligence" investigations to avoid liability not only for false or misleading information about the prospects of the issuer but also for material omissions in the registration statement.' (p. 798)

Tinic (1988, p. 800) then argues that protection against liability under the 'due-diligence' clause is extremely difficult to operationalise. In fact, Tinic notes that:

'If the investment banker and the insurer could not specify the standards for diligent investigation, the resolution of their conflicts would require additional litigation. Instead, underpricing of the offering may provide the issuer and the underwriter with protection against potential legal liabilities more efficiently.' (p. 800)

Given this argument, investment bankers to IPOs may have good reason to underprice issues and, importantly, to ensure that prices do not fall significantly in the initial listing period. However, in lowering the offering price, the issuing firm obviously 'gives capital away' to the market. Consequently, owner/managers have to consider a trade-off between the dollar value of funds raised and the expected costs of litigation (see Hensler's, 1990, modelling formulation of this insight). However, the significance of this trade-off has been thrown into doubt by recent findings in Drake and Vetsuypens (1993). From 93 IPO firms sued for alleged mis-statements in their IPO prospectuses (and/or registration statements), Drake and Vetsuypens note that U.S. law suites are typically initiated by poor longer term price performance rather than by initial underpricing. In fact, they note that:

'. . . plaintiffs entitled to damages include investors who bought stock in the after-market for up to 14.7 months, on average, after the IPO. Underpricing the IPO at the offer date is irrelevant to these after-market investors' incentive to sue and has little effect on the issuer's potential damage payments.' (Drake and Vetsuypens, 1993, p. 72)

Given the remarks above, the validity of the insurance against litigation argument for IPO underpricing appears questionable. However, as Vetsuypens and Drake acknowledge, litigation suites avoided by firms underpricing at IPOs are necessarily excluded from their study sample. Consequently, underpricing may still function to deter potentially damaging litigation suites.

Whilst a range of other appealing arguments

can also be advanced to explain underpricing, it is not the intention of this paper to survey these explanations in detail (for existing surveys see Smith, 1986 and Tinic, 1988). Instead, attention is focused on the measurement and definition of underpricing in new listings. This issue warrants attention given the conceptual problems surrounding the measurement of such underpricing. To date, underpricing has usually been defined in terms of the returns available to investors between the initial offering date in the shares and a subsequent market/trading price in the shares (as is indicated in Table I). It will be argued that this definition of underpricing is a rather simplistic one and, in particular, fails to express the real costs facing the pre-listing stockholders or issuers in firms approaching equity markets. While this problem has been ameliorated to some degree by Dawson's (1987b) distinction between 'issuer-oriented' and 'investor-oriented' measures of underpricing, further investigation of this issue is still warranted, given the complexities of the issuance process and, in particular, the operation of liquidity, signalling and information effects at the time of an IPO. It is argued in this paper that these complexities make it very difficult to infer the pre-listing value of a firm's stock from its market value. This in turn raises questions as to what the real level of underpricing actually is in an IPO.

In re-appraising the measurement of underpricing in IPOs, four areas of discussion are considered. First, the measurement form(s) of underpricing used in the existing empirical literature are further examined and re-evaluated. This is then followed by a discussion focusing on how the definition of underpricing may differ if an 'issuer-oriented', as compared to an 'investor-oriented', perspective is introduced. In particular, it is argued that whilst the definition of underpricing may be perspective dependent from a theoretical standpoint, it is not easy to operationalise the concept from either a theoretical or empirical standpoint. Section Three then considers how the very process of issuing a share can lead to changes in a share's valuation, whilst section Four discusses how far market values can be used to proxy for the intrinsic value of newly listed shares. The fifth and final section then draws the arguments together to consider the standing of existing empirical work and the possible modifications to the measurement and definition of IPO underpricing.

2. Existing measures of underpricing and other perspectives

In contrast to the theoretical literature on the underpricing of initial public offerings, which has taken the phenomenon as given and has not considered its exact definition nor measurement, researchers involved with empirical work have at least been forced to give some consideration to the exact measurement of IPO underpricing. The usual approach, as indicated in Table I and Section One of this paper, has been to measure underpricing as the difference between a post-offering market price (in the newly listed shares) and the initial offering price, all divided by the initial offering price in the shares. While this measurement form is prominent, some concern has been raised about whether such returns should be adjusted for market movements (and, therefore, the risk levels in the IPO stocks). Although both unadjusted (see, for example, Ritter, 1984b; Tinic, 1988 and Dawson and Reiner, 1988) and adjusted return forms (see, for example, Stoll and Curley, 1970, Chalk and Peavy, 1987 and Levis, 1990, 1993) are analysed in the empirical literature, it is questionable whether such adjustments are needed given the short trading intervals considered between the offering and after-market stock prices. Of course, if IPOs are concentrated in either bull or bear markets, market adjustments may have a non-trivial effect. Nonetheless, the majority of studies considered focus on IPOs over extensive time-frames where a range of market conditions prevail. Consequently, the impact of market conditions on *average* initial return levels, in the majority of studies, is probably minimal.

The measurement forms described (whether adjusted or unadjusted for market changes) have a number of virtues to commend them. First and foremost, they seem to reflect how most commentators perceive the underpricing of IPOs; consider, for example, the press coverage relating to privatisation issues in the U.K. Second, they measure the gains/losses from underpricing that all investors with access to an offering have the potential to entertain. Third, once the time frame

of the market price (in relation to the offering date) has been agreed, the measurement form offers a reasonably objective and potentially informative means of comparison. While there is some disagreement in this regard, it is worth noting that the majority of studies in this area (see Table I) indicate that investor returns (from underpricing) should be measured between the initial offering date in the shares and the first closing traded price in the shares. However, it is also important to note that if an efficient secondary market exists, the precise length of the initial trading interval used should be irrelevant. As indicated earlier, there is a suggestion in the literature that trading returns on days immediately following the first date of listing are, in general, insignificant (see, for example, Dawson, 1987a). However, it is pertinent to note that this observation may vary in importance across markets. In fact, some study authors have sought to control for this by taking into account stock price volatility in early market trading (see, for example, Davis and Yeomans', 1976, analysis of U.K. IPOs).[1]

A more significant critique of the underpricing measure discussed above is offered in Dawson (1987) and Barry (1989). In both of these papers, it is argued that the costs of underpricing for the issuers (pre-listing stockholders) in IPOs are not necessarily the opposite, in terms of sign, of the returns available to investors. In other words, the scaled difference between a post-offering market price and the initial offering price in IPO shares need not reflect the underpricing faced by pre-offering stockholders. This argument is relevant in IPOs where *new* shares are on offer to the public. In offerings where all the shares on offer are existing (vendor) shares, the comments of Dawson and Barry do not apply.[2] When an IPO involves the issue of new shares, which is particularly common in small firm listings where the motivation for listing typically reflects capital financing needs, Dawson and Barry argue that shares held by pre-offering shareholders suffer a dilution in value. As an example, Dawson (1987, p. 159) cites the case of a unlisted company with one million shares valued at \$20 pre-offer which floats its stock by selling one million new shares for \$10. Assuming a mechanical dilution process, Dawson argues that the shares should sell in the after market for \$15 (= [(1 mill. × \$20) + (1 mill. × \$10)]/2 mill.). This provides an underpricing level of 50% using the conventional underpricing measure of market price less offer price, all divided by offer price. Dawson argues, however, that the conventional measure does not recognise the full extent of underpricing since shares worth \$20 before the offering were sold for only \$10. This suggests an actual underpricing level for the pre-listing stockholders (issuers) of 100%, according to Dawson. One problem with this argument, as noted in Barry (1989), is that it only applies to pre-offering shareholders who actually sell shares at the time of offer. For any pre-offering shareholders retaining shares until the market for the stock is established, the loss per share suggested by Barry, in terms of the example given, is only \$5 (\$20–\$15).

The arguments of Dawson and Barry highlight the need to consider a measure of underpricing for issuers that incorporates a pre-offering value for IPO shares. In spite of their differences, both Dawson and Barry agree on the way in which the pre-offering value of shares, P_p, can be inferred. In particular, it is assumed that P_p is calculated using the market capitalisation of the offering firm's shares at the first market price less the gross amount of funds raised from the new shares issued all divided by the number of pre-offering shares (see Dawson, 1987, p. 159, for clarification of this[3]). The basis of this calculation, in terms of the example cited, is that the market values the firm at \$30 million with \$10 million of this amount arising from new money raised and the remaining \$20 million reflecting the value of pre-listing stock holdings.

The above arguments indicate that IPO underpricing is dependent upon the perspective of the interested party. The arguments also highlight the fact that relative value gain/loss depends upon the starting and endpoints of the comparison and that these themselves probably differ across interested parties. More importantly, the arguments question whether it is appropriate to take a post offering market price and translate it into a pre-offering benchmark price. These doubts are reinforced when a number of other issues are considered. First, there is the question of whether a share value achieved on a recognised stock exchange could have been achieved via a private sale of shares pre-offering. In other words, the valuation of

shares may contain a liquidity component. In general, it is open to doubt whether the values achieved on an organised open market reflect the value that can be achieved through a private sale. There is also the added complication that the lack of a liquid market pre-offering may force any sale of shares to be conducted on block and this brings with it the impact of control issues on the valuation of shares.

A further matter of concern with Dawson's and Barry's use of market prices in deriving the pre-offering value of shares is that they use the underpriced valuation of new shares offered as part of their calculation. In terms of Dawson's (1987, p. 159) numerical example quoted earlier, he deducts from the $30 million market value an 'underpriced' amount of $10 million (equal to the value of new money raised) to obtain the pre-offering value of $20 million. Given that the $10 million raised from the new shares issued is seen to be *underpriced* to attract buyers to the offer, it is difficult to accept that this should form a basis for the valuation of the shares prior to the IPO. In terms of market values all that is known is that the firm in question is worth $30 million. Therefore, unless assumptions can be made about the separable value of the projects to be funded from the $10 million new money raised, it is impossible to determine the value of shares pre-offering. The problems involved with using market valuations as a basis for inferring pre-offering values, and hence the level of 'issuer-oriented' underpricing, are considered further in the following two sections.

3. The effect of offering shares on valuation

If market prices are to be used to infer pre-offering values then some consideration needs to be given to how the very process of issuing IPO shares affects perceived value. In dealing with this issue, substitution, price pressure and information effects are considered (see Scholes, 1972, for detailed discussions of these effects).

In the finance literature, it is often assumed (see, for example, Modigliani and Miller, 1958) that a firm can regard the price of its shares as being largely independent of the number of shares it wishes to sell. If, for instance, the firm decides to expand and issue more shares, one can assume that the additional shares will be priced at existing levels if the income streams attaching to the new shares are similar to those on existing shares. This substitution view of the capital market is based upon the notion that any particular share is simply a right to a defined income stream and that a number of close substitutes, in an individual's potential portfolio of assets, can provide similar income steams. If this argument is correct, the price effects of a new issue of shares should be marginal and market prices should, therefore, offer a fairly accurate estimate of pre-offering value. If this argument is to apply to IPOs, however, one needs to make the additional assumption that the market is able to accurately judge the value of an IPO firm in terms of its previously unlisted status.

In contrast to the substitution hypothesis, proponents of the price pressure effect (see, for example, Lintner, 1962) argue that the sale of new shares necessitates price reductions. In this argument, shares on offer from a specific firm are deemed to be unique and if investors are to be encouraged to acquire more of them, they must be induced to do so by price discounts. In other words, the demand curve for a firm's shares is perceived to be downward sloping so that an increase (shift) in the supply of shares in issue leads to a reduction in the value of individual shares (see Shleifer, 1986, for empirical support for this view for listed U.S. stocks).[4] This view assumes, of course, that there are no compensating information effects which reduce or offset such price-pressure.[5] Nonetheless, if price pressure effects are significant in IPOs, market prices in the immediate post-offering period will only partially reflect pre-offering values.

The final perspective examined in this section focuses upon the impact of information effects upon stock valuations. As an example of this, Myers and Majluf (1984) and Myers (1984) indicate that share issues may provide an adverse signal of firm value to the market. In this argument, an information asymmetry is modelled between the issuing firm to an offering and the potential investors to the offering. Specifically, the issuing firm is assumed to know the NPV of funds raised in the offering whilst potential investors do not. Given this, the issuing firm in Myers and Majluf's (1984) model always issues shares if the NPV of funds raised exceeds any underpricing

costs in the issue. In particular, Myers and Majluf (1984) and Myers (1984) argue that issuing firms will always go to the market if they can overprice an issue. In contrast, they will only go to the market when an issue is underpriced if the costs of IPO underpricing are less than the NPV of funds raised. Given this asymmetry in motivations, Myers and Majluf (1984) note that an issuing firm's decision to enter the market may indicate that the issue is either overpriced or offers a relatively low level of underpricing. As a consequence, an IPO may provide an adverse signal to the market. It should also be noted that the adverse signalling effect alluded to in Myers (1984) and Myers and Majluf (1984) can also be framed in a wider context in terms of Akerlof's (1970) model of quality uncertainty.

Akerlof's (1970) arguments suggest that more valuable IPO firms may be discouraged from selling shares on the market because of the market's inability to distinguish 'good' from 'bad' firms. Again, this suggests an adverse signal of value for firms entering the market through an IPO. However, it should be remembered that the issuing firm can circumvent this unfavourable signal, to a certain degree, by attempting to signal any favourable information relevant to value through other actions, i.e., by selling a relatively small proportion of the firm's equity to outside investors (see Leland and Pyle, 1977) or by disclosing and committing the firm to investment projects post-issue which have significantly positive NPVs (see Trueman, 1986, for further elaboration of this point).[6]

While negative informational effects appear significant in the theoretical literature (see Akerlof, 1970; Myers and Majluf, 1984, and Myers, 1984), it can also be argued that positive informational effects may result from an IPO. While this argument is not readily addressed in the literature, it is conceivable that the actual offering event in an IPO may signal that the issuing firm has greater access and potential for the financing of current and future investment projects.[7] This view may be particularly important if the issuing firm has disclosed a prior intention, in the prospectus document to the initial offering, to use any funds raised from a new issue of shares to finance lucrative positive NPV investment projects. Given the possibility of positive information effects, the market price of shares, in some offering firms, may actually provide an inflated measure of pre-offering share values so that the costs of underpricing are overstated. However, in assessing these information arguments as well as those suggested in Akerlof (1970), Myers and Majluf (1984) and Myers (1984) it needs to be remembered that the basic premise of the extensive signalling literature (see, for example, Leland and Pyle, 1977, Trueman, 1986, and Carter and Manaster, 1990) is that the pre-offering owners have to find means to inform new shareholders of firm value. This implies that participants in the market cannot unequivocally assess the value of newly listed offering firms. In other words, market prices offer an imperfect insight into pre-offering firm value.

4. Market value as a proxy for intrinsic value

This section presents further arguments questioning the empirical and theoretical validity of the existing measurement forms used for IPO underpricing. In particular, it is noted that the market valuations achieved by an IPO firm may not accurately reflect their intrinsic value. This point is not only damaging to Dawson's (1987a) and Barry's (1989) issuer based measures of underpricing but also to the 'investor-oriented' measures of underpricing commonly adopted in the literature.

In considering the use of market values as proxies for intrinsic values, there is a need to evaluate both the notion of intrinsic value and the efficiency of capital markets. In broad terms, the intrinsic value of an asset is determined as its *fundamental value* which, in turn, reflects the discounted value of the expected cashflow returns from holding the asset over its useful life. However, market prices may move away from intrinsic values simply because investors are willing to pay higher prices today on the premise that prices will be high tomorrow. This view, in common with those highlighted in Summers' (1986) seminal discussion of investor irrationality, indicate that asset prices may not necessarily reflect intrinsic/fundamental values. Moreover, Summers (1986) argues that valuation errors can be persistent and, as a result, may not be apparent when examining historical asset returns. This

movement of market prices from intrinsic values has been extensively researched in the so called 'bubbles' literature (see Camerer's, 1989, comprehensive review). In fact, as early as the 1960s, economists argued (see, for example, Hahn, 1966, and Samuelson, 1967) that in the absence of complete futures markets, asset values might follow 'bubble paths' where market prices diverge from intrinsic values.

More recently, Shleifer and Summers (1990) have argued that as long as uncertainty exists when a bubble is going to break, and investors are risk-averse and have limited time-horizons, markets may not be fully arbitraged. This conclusion builds on Summers (1986) early work where he notes that the *efficient markets' literature* (EML) simply assumes that investors are able to spot when market prices are askew from intrinsic values without considering how market players might identify possible deviations between intrinsic and market values. It is pertinent to note, however, that even where valuation errors can be identified, there is ample evidence, according to Summers, that that such errors are not arbitraged away (see Summers, 1986, pp. 599–600, for a review of such evidence).[8] This has obvious implications for IPOs since it suggests that initial market values in newly listed stocks may not necessarily be congruent with intrinsic values. Furthermore, the implied ability of market participants to determine a firm's intrinsic value, in the EML, is significant in the present context because it questions why issuing firms in the IPO literature attempt to signal their value to investors in the market.

Given the above criticisms of the EML, some indication of why valuation errors persist is required. Shleifer and Summers (1990) address this issue in terms of risk factors. They note that the EML is based upon the argument that riskless arbitrage ensures that prices are maintained in some form of relative ordering. This is achieved by assuming that the assets in question have perfect substitutes and that any price differential between perfect substitutes can be removed through riskless arbitrage activities. However, this may not necessarily be the case. To illustrate, Shleifer and Summers (1990, p. 21) note that:

> '. . . an arbitrageur who thinks that stocks are underpriced cannot buy stocks and sell the substitute portfolio, since such a portfolio does not exist. The arbitrageur can instead simply buy stocks in hopes of an above-normal return, but this arbitrage is no longer riskless. If the arbitrageur is risk averse, his demand for underpriced stocks will be limited.' (p. 21)

In the context of the illustration above, Shleifer and Summers argue that risk limits the ability of arbitrageurs to bring mis-priced assets into line with fundamentals. As an example, suppose an asset has current selling price above that justified by its stream of expected dividends. Given this, any arbitrageur selling the asset short runs the risk that future expectations about the dividends may improve leading to an increase in stock price. This possibility is referred to as *fundamental risk* in Shleifer and Summers (1990) and may result, ultimately, in the stock lender closing out the short seller's position at considerable cost to the short seller. As a result of this, risk averse arbitrageurs may shy away from driving any over priced assets down to their intrinsic values (see Shleifer and Summer, 1990, p. 21, for further elaboration).[9] Even if the position is not 'closed out', an investor selling an asset short still runs the risk of considerable loss at a designated asset repayment date due to a price increase in the asset. In sum, the arguments suggest that potential profit opportunities may be neglected due to risk factors which, in turn, has a deleterious effect upon the efficiency of stock pricing.[10]

The importance of uncertainty for the eventual efficiency of markets is heightened when the decision making environment of the EML is contrasted with recent findings in the experimental decision literature. In the EML, a world of uncertainty, where agents wrestle with an unknowable future, is translated into one where agents compute probability density functions to solve problems. Doubts over the future are transformed into subjective probabilities which are in themselves easily transformed into decisions via well defined utility functions. In this situation, the agent delineates any environmental uncertainties in terms of well defined, ordered probabilities and any inabilities to define problems, choose solution algorithms or define ones objectives are pushed aside via the well ordered logic of the expected utility framework.

In contrast to the well ordered decision environment of the EML, evidence from the experi-

mental decision literature (see, for example, Kahneman *et al.*, eds., 1982, and Shoemaker, 1982) suggests that decision makers behave in ways which systematically violate the expected utility axioms of rationality. Frey and Eichenberger (1989) provide an excellent summary of the most frequently discussed of these 'anomalous' modes of behaviour. Some of these are summarised below:

Reference Point Effect: Alternatives are assessed in relation to a reference point, i.e., the present situation, rather than their effects upon wealth.

Sunk Cost Effect: Individuals consider the past as well as the future.

Framing Effects: The way in which decisions are constructed and information presented have an impact upon eventual decisions/outcomes.

Availability Bias: Recent, vivid events are overweighted in decision-making.

Representativeness Bias: Prior probabilities are systematically misconceived and fail to reflect sample size.

Certainty Effect: Certain outcomes are given greater weight in decisions than those that are uncertain even when calculated expected utilities are equal.

(See Frey and Eichenberger (1989, pp. 424–425) for further discussion of these behavioural forms.)

The behavioural forms highlighted are understandable when one considers the complexity of an individual's decision environment. Future uncertainties, for example, mean that any attempts at optimisation run into the logical puzzle of deciding how much search should be undertaken given that payoffs to rival strategies cannot be known in advance. Add to this the physiological limitations of human information processing (see Heiner, 1986, for a discussion of information overload), and it is not too surprising that individuals adopt heuristic forms to deal with uncertainty. The contrast between this view of the decision environment and that underpinning the EML is well captured by Davidson (1978),

> 'Uncertainty, it is often implied, merely 'muddies the waters' without altering the essential conclusions. In the real world, however, uncertainty is significant in its effects on all economic activity. Many of the institutions of our modern economy would have no function in a world of certainty. Uncertainty plays a vital role . . . the future is enigmatic and full of potential surprise.' (p. 12)

A further deficiency in the EML is its preoccupation with market forms dominated by large numbers of atomistic investors. In reality, major stock markets are becoming increasingly dependent upon large institutional players. This is likely to have a number of consequences. First, it is unclear how far the information processing of such organisations reflects that assumed for individuals (see March, 1987, for an in depth discussion of organisational decision making and information processing). Second, and more importantly, it seems unlikely that the decision frames of major institutions match those of the atomistic investor. The market of the individual investor is one of price taking, whereas the major institutions have the power to influence the behaviour of underlying firms and the market itself. Consequently, if institutional investors and/or large individual investment concerns dominate in markets, a 'market-making' process may emerge. In the case of IPOs, and other assets, it is conceivable that 'market-makers' could play an important role in supporting asset values, building speculative bubbles and/or eroding asset values.

All of the above points considered in this section suggest that market prices may not necessarily reflect intrinsic values. Moving on to consider IPOs in particular, one factor which casts doubt over the lack of correspondence between market and intrinsic values is the relative changeability of post-listing returns (see Aggarwal and Rivoli, 1990 and Ritter, 1991). Indeed, recent evidence in the IPO literature indicates an initial period of favourable returns in IPOs, followed by a reversal in this trend over the longer term (see, for example: Aggarwal and Rivoli, 1990 and Ritter, 1991, for U.S. IPOs; Uhlir, 1989, for West German IPOs; McGuinness, 1993, for Hong Kong IPOs; and Levis, 1993, for U.K. IPOs). This pattern of post-listing return behaviour represents something of an anomaly to supporters of the efficient markets hypothesis. However, explanations for this pattern of return behaviour can be offered in terms of 'speculative bubbles' (see Shiller, 1990, and Camerer, 1989, for further discussion and excellent reviews of the bubbles literature). Indeed, Aggarwal and Rivoli (1989) suggest a 'bubble building' mechanism in the U.S. IPO market where underwriters in U.S. offerings attempt to place shares in 'strong hands' rather

than 'weak hands'. Investors with 'strong hands', in this argument, then hold newly listed stock for a significant period in the post-listing period and, in so doing, artificially repress the supply of stocks in the after-market. The result of this action is to force market prices upwards for a period of time in the post-listing period.[11] Empirical support consistent with this 'bubble building' hypothesis is indicated in Aggarwal and Rivoli (1989, p. 90) given an initial rise in stock prices during the first few months of listing followed by a marked decline in post-listing returns in U.S. IPOs.

In Ritter (1991), a similar pattern of post-listing return behaviour in unseasoned offerings is also noted. As in Aggarwal and Rivoli, a speculative effect is posited to explain this behaviour. However, Ritter suggests that the negative trend in post-listing returns in his study is consistent with an IPO market where participants are overly optimistic about the earnings prospects of young, growth driven companies during certain periods. Eventually, however, a correction for this exuberant pricing behaviour occurs, according to Ritter (1991), producing a longer term decline in stock prices. This view, as indicated above, is likely to be more relevant in offerings involving relatively small, immature firms and has obvious implications for the firms of interest in this paper. Given this, Ritter's arguments, in common with the 'speculative bubbles' hypothesis, question whether market valuations can be used to infer the intrinsic value of firms entering IPO markets. Moreover, it questions the empirical workability of the existing IPO underpricing measurement forms offered, from both issuer and investor-oriented perspectives, and also suggests that the measurement of underpricing is very sensitive to the relative dating of the post-listing market price used in deriving IPO underpricing levels.

Finally, the arguments in Ritter (1991) also indicate the importance of the actual dating or timing of an IPO. This is also re-affirmed in Loughran and Ritter's (1993) recent study of U.S. issues over the extended period 1968–87. In general terms, Loughran and Ritter show that firms going public during 'market peaks', i.e., during heavy issue periods, typically produce lower post-listing returns for investors than firms going public during low-volume periods (1974–78 in Loughran and Ritter's sample). This in turn complements earlier work by Ritter (1984) on 'Hot' and 'Cold' issue market periods in the U.S. where issues during 'Hot' (heavy issue periods) produced significantly higher initial returns for investors subscribing at the offering price. The implication of this and Loughran and Ritter's (1993) recent study is that while investors may achieve higher initial returns from IPOs during heavy issue periods, the longer term prognosis from holding these stocks is not that favourable. For the issuers, however, it is not clear, in theory, whether higher offering prices can be obtained during 'Hot' or 'Cold' issue periods; bearing in mind that the increased initial returns in 'Hot' issue periods may reflect inflated market values for the stock rather than heavily discounted offering values. However, one can argue that issuers should be able to generate higher offering prices in their stock during bull or 'peak' market periods. Indeed, Loughran and Ritter note that the cost of equity capital for IPO firms is lowest during such periods. However, it is conceivable that a heavy concentration of issues during such periods may pose a significant strain on market liquidity so that issuers selling stock towards the end of such periods, or subsequent to such periods, are forced to underprice their stock significantly to ensure a full subscription for the stock on offer. In short, the arguments indicate that market timing of an IPO plays an important role in the determination of both investor returns and issuer costs in the underpricing of IPOs.

5. Discussion and Conclusions

This paper has critically evaluated existing measures and definitions of IPO underpricing. After considering the empirical evidence and theoretical arguments in support of the underpricing concept, the paper discussed how decision making, information processing and market conditions might limit the applicability of the conventional underpricing measures adopted in the literature. More specifically, the discussion of these issues indicated that the conceptual problems surrounding the measurement of underpricing are far from trivial and suggest that underpricing costs and returns may need to be evaluated with reference to a plethora of details; centring on, for example, the number of primary shares on offer,

the effect on corporate control of listing, the information effects resulting from listing, the liquidity of shares pre-offer, the impact of speculative activities on post-listing firm value and the actual timing of the offer. In short, the small firm owner/manager may receive market values on his retained stock which are incongruent with, in the first instance, the pre-offering value of his/her stock and, in a more fundamental sense, the intrinsic value of his/her stock. This is obviously significant in assessing both the costs of underpricing for the issuer and the prospective returns available to IPO investors and pre-listing stockholders in an issue.

Notes

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[1] The possibility of some volatility in market prices during the first few days of trading in newly listed shares (see, for instance, Davis and Yeoman's, 1976, analysis of IPOs in the U.K.) suggests that the magnitude of initial investor returns may be time-dependent even within a relatively short trading period. One response to this, has been to take some average of closing market prices in newly listed shares over the first few days of trading. Davis and Yeomans (1976) and Buckland et al (1981), for example, measure the post-offering value of IPO shares by taking the average of closing market prices over their first week of trading.

[2] Offerings that involve distributions of new shares are often referred to as primary issues in the literature whilst offerings which involve the distribution of existing shares are referred to as secondary issues (see Scholes, 1972, for an example of the use of this distinction). In practice, however, many issues involve a combination of both primary and secondary shares.

[3] In terms of the example considered in Dawson, the calculation would be as follows:

$$\frac{(2 \text{ million shares} * \$15) - (1 \text{ million shares} * \$10)}{1 \text{ million shares}} = 20$$

[4] In contrast, Scholes (1972) indicates some support for the substitution hypothesis based upon findings from an examination of secondary stock offerings in the U.S. In other words, Scholes suggests the existence of flat (highly elastic) demand curves for a company's stock.

[5] In this context, positive information effects, flowing from a new issue of stock, would lead to a shift in the demand curve for stock to the right.

[6] See Keasey, McGuinness and Short (1992) for a recent review of the signalling devices available to pre-listing stockholders in IPO firms.

[7] This point is suggested in Welch (1989) where it is noted that many firms making IPOs use their listed status to raise significant amounts of new capital from seasoned offerings shortly after the initial listing date.

[8] The empirical evidence of the 80s and 90s casts further doubt over the validity of an efficient capital market. For example, efficiency tests in Shiller (1981) and Leroy and Porter (1981) indicate that there is too much volatility in the movement of share prices to support the idea of an efficient capital market.

[9] Shleifer and Summers explain why market participants may be forced to settle transactions or close their trading positions in terms of finite time horizons. These in turn are determined by cumulative transactions costs and the periodic performance evaluation of a number of market participants according to Shleifer and Summer (consider, for example, pension fund managers).

[10] In response to this point, however, investors can hedge any risk associated with short positions in the cash (equity) market by acquiring a call option or warrant in the same equity asset. However, call options and warrants on small sized stocks may not be available. If this is the case, an imperfect hedge to a short cash market position may be obtained by taking a long position in a stock index futures contract. This may help to remove, to some degree, the risk aversion of investors and ultimately increase trading volumes and, therefore, information flows in capital markets.

[11] It should be stressed that issuers and investment bankers to IPOs in the U.S. have some discretion in the sale of shares to favoured clients (see Benveniste and Spindt, 1989). In contrast, regulatory authorities in the U.K. encourage shares to be sold equitably and are keen to safeguard against discriminatory practices in the allocation of shares to applicants in oversubscribed offerings.

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