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Equity Rights Issues: Theory and Practice

by

Stephen Patrick Keef

submitted for the degree of

Doctor of Philosophy

at

The University of Aston in Birmingham

June 1983

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Summary

Two primary issues are examined in this study. Firstly, which financial variables are associated with the success of a rights issue. The results suggested that the market capitalisation, relative size of the issue and the return on capital employed were of importance. The statistical significance of the discount, measured as the difference between the current market price and the subscription price and the importance of the pre-issue share price was difficult to explain.

Secondly, a postal questionnaire (n = 110) was used to determine private shareholders' knowledge of rights issues with particular reference to the importance of the issue price. The respondents were randomly chosen from two public companies and the data did not exhibit a statistically significant difference between the two groups. Over half of the respondents showed an ill-informed view and were classed as naive. The naive view was independent of the shareholders' characteristics. We have strong evidence to argue that the sample is representative of private shareholders as a population. The respondents' attitude towards the new issue was in accord with the perfect market model.

Three supplementary topics were examined. A superior method to measure the discount offered in a rights issue showed that the subscription price chosen by a sample of the rights issues in 1976 was not inconsistent with that expected from perfect market theory. Theoretical evaluation of The Stock Exchange's procedure to adjust traded call option contracts when the underlying security is subject to a rights issue argued that an inconsistent method was used. The examination of the equilibrium between the direct and indirect routes of equity purchase during the subscription period of a rights issue produced results that were not inconsistent with the mooted option characteristic of a right.

Key words: Rights issues, Private shareholders, Option, Success, Discount

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Chapter 1 Introduction

1.1 Objectives of the study

This study naturally divides into five sections. Part 1 contains an examination of the theoretical aspects of a rights issue within the assumptions of the perfect market. It seeks to examine how the parameters of the issue, particularly the subscription price, will affect the net wealth of the shareholder. It takes into account aspects such as the implied scrip issue effect in the rights issue and the level of risk associated with the issue price exceeding the current market price.

A literature survey follows the theoretical section and seeks to determine how stock markets react to rights issues. Since it is apparent that the major factor affecting the share price movement in a rights issue is the implied scrip issue element, it is appropriate to initially review stock markets' treatment of scrip issues.

Part 2 contains two theoretical chapters. The first examines a new parameter to measure the discount offered in a rights issue. The new parameter will be used to examine the issue price strategies of 108 companies that came to The London Stock Exchange with rights issues during 1976. The second evaluates the manner in which The Stock Exchange adjusts the terms of option contracts when the underlying security is subject to a rights issue.

A review of the procedure adopted by The London Stock Exchange to adjust the terms of a traded call option contract, when the underlying security is subject to a rights issue, suggests that the adjustment may not be perfect. The procedure would appear to be ill-founded in that it attempts to maintain only the absolute difference between the share price and the exercise price. This will not guarantee preservation of the option value.

Part 3 consists of an empirical investigation into the variables that are associated with the success of a rights issue. The major stimulus for this part of the study was the reading of small statements in The Financial Times Newspaper which detailed the proportion of shares accepted in recent rights issues. The sample of equity rights issues ($n = 108$) of 1976 showed that the percentage acceptance rate ranged from below 20 per cent to almost 100 per cent.

The finding that the discount appeared to be strongly associated with the success rate gave rise to the hypothesis of the naive, or ill-informed, approach to a rights issue. Part 4 presents the results of a postal questionnaire sampling the private shareholders of two public companies which had recently carried out a rights issue of ordinary equity. The goal of the questionnaire was to characterise the importance attached by the private shareholder to the choice of the issue price and to determine their attitudes towards rights issues.

Part 5 of the study investigates the equilibrium between the direct and indirect routes of equity purchase during the subscrip-

tion period of a rights issue. Perfect market theory suggests that the ratio of the two costs should be constant throughout the subscription period. An alternative hypothesis postulates that there are two effects that may influence this ratio. They are the option characteristic of a right and the increased trouble effect associated with the indirect route of equity purchase.

1.2 Importance of the study

The Stock Exchange acts as the medium where scarce economic resources are distributed across competing claims. During the ten year period, 1970 to 1979, rights issues accounted for over 77 per cent of the new monies raised by companies.¹ And, as shown in Table 1.1, the percentage has grown over the decade. Assuming that preference share issues have remained relatively stable over the period, the increase in importance of rights issues can be attributed to the decline of debt issues. High rates of inflation over the period have resulted in the decline of the long term debt market and the recourse to greater dependence on short term borrowings. This together with the erosion of real rates of return and therefore the real value of retentions, has combined to weaken the equity base of companies. Thus new issues of equity have become unavoidable. These aspects together with the regulations of The Stock Exchange, which require all new equity issues which will rank pari passu with existing equity to be by way of rights, illustrate the increasing

¹ The statistic excludes money raised by the Government and public bodies.

Table 1.1 New Issues by Companies by type of security

Year	Per cent of total			Total, million pounds
	Debt	Preference	Ordinary	
1970	80.4	4.9	14.7	353.4
1971	51.3	1.9	46.8	663.6
1972	30.9	1.1	68.0	956.4
1973	20.4	6.7	73.0	210.5
1974	26.4	0.0	73.6	162.1
1975	13.5	2.8	83.7	1,578.4
1976	8.0	3.8	88.2	1,160.9
1977	9.9	3.6	86.5	947.3
1978	1.3	6.2	92.5	662.5
1979	6.9	3.9	89.2	885.1
Total				7,580.0
Weighted average	19.5	3.3	77.2	

Source: Midland Bank Review, Spring 1981, p.25, Table 4.

importance of rights issues.

The importance of the allowable range parameter can be illustrated by two points. Firstly, the existing measure of the discount is not consistent between firms due to differing nominal share values. Secondly, as the empirical evidence will show, it produces a result that is not inconsistent with perfect market theory of rights issues, whereas the existing parameter would tend to suggest a bias in the choice of issue price.

In April 1978 The Stock Exchange introduced its Option Trading Market. The use of the correct procedure to adjust the terms of a traded call option contract when the underlying security is subject to a rights issue is necessary for an orderly market. The use of an incorrect procedure, as the theoretical analysis will suggest, must introduce a degree of weakness into the market.

Various text books discuss rights issues but tend to skim over the variables that make an issue successful. Although some writers may tentatively suggest variables that could be important, it is apparent that there is a paucity of research into this subject and thus it would appear that these comments are more like considered judgements rather than evidence supported by fact. Thus a study that could shed some light onto the important determinants of the success of a rights issue will be of benefit to various sectors of society. Examples could include financial advisers such as Merchant Banks, Brokers, financial directors of public companies and investors.

The significance of achieving a successful rights issue can be considered to incorporate aspects of the following:

- (a) Equity cost of capital argument. If the issue is not a success there is the chance that the unsubscribed shares will be unloaded onto the market by the underwriters and this may depress the share price. However, the study by Scholes (1972) on secondary issues would tend to deny this price pressure argument.

- (b) Synergy and psychological aspects. A successful issue will give the market confidence in the company and along a similar vein one would not be surprised if the employees and shareholders also took a greater pride or felt a greater sense of belonging to the company if the issue were a success.
- (c) Future capital raising. If the issue is not a success it is possible that the shares will suffer a decline in value greater than that expected for the theoretical ex-rights price. One would expect that the firm may find it much more difficult in the future to raise capital by way of debentures, overdrafts etc..
- (d) Publicity. A successful issue will tend to bring the name of the company to other investors, and this together with the resultant drop in share price to the predicted ex-rights price could well increase the number of shareholders and therefore create a better market in the shares. In the case of a small company, the rights issue could well be the stimulus for institutional investors to participate in their equity.
- (e) Immediate problems. As is true of the raising of all capital in general, the prime risk confronting a company which engages in a rights issue stems from the possibility that a large part of the issue will not be subscribed. This in turn can severely distress the company who may have to postpone or even cancel investment projects, may encounter problems in meeting fixed payment schedules and consequently may have to seek inappropriate and costly alternative sources of finance.

This, it could be claimed, is the prime basis why such issues are underwritten.

In its final form this study on the variables that are associated with the success of rights issues should be of considerable benefit to companies considering raising new money on the equity market by way of rights. Equally, the importance to underwriters, who by their very definition are intimately involved with the outcome of such issues, must not be overlooked.

Thus this study attempts to provide answers to the following types of questions that could be raised in the boardrooms of a company and which, as often as not, will be directed at either the Director of Finance or a financial consultant.

- (1) What effect does size have on the success of a rights issue?
Which proxy for size is important?
- (2) Does our recent profitability record play an important part?
Are the shareholders more concerned with the most recent results or is it some form of weighted average that is of more importance?
- (3) Similarly, is our growth pattern a significant factor that will be taken into account?
- (4) What effect does the discount have? Is the irrelevance theory really true or do the comments of some financial pundits, which indicate that the discount is of some importance, have any validity?
- (5) Is our gearing ratio conducive to a successful issue?

- (6) Which market indicators, if any, will have a bearing on our issue, should we wait until the Minimum Lending Rate is lower or until the Stock Exchange index is firmer?

All these questions, and many more along the same line, are probably asked before a rights issue is undertaken; the paucity of published information into the subject area suggests that the decisions are almost a game of chance rather than the considered analytical technique they should be.

Marsh (1979b) has concluded that we cannot reject the hypothesis that the UK market is efficient with respect to rights issue announcements and Merrett, Howe & Newbould (1967) have shown that The Stock Exchange treated the drop in price to the ex-rights price in a near perfect manner. Thus the observation that the discount offered in a rights issue was significantly associated with the success rate must be considered as a somewhat surprising result. Consideration of this paradoxical result lead to the hypothesis that the stock market may exhibit a degree of weakness in that some shareholders may take a naive view of the signal manifested by the subscription price in a rights issue. The term 'naive' is used in its dictionary sense to mean a simple or ill-informed understanding. This stimulated a study, based on a postal questionnaire, to determine private shareholders' knowledge of rights issues, paying particular attention to the importance of the subscription price and their attitudes to the fund raising issue.

It was decided to concentrate on the population of private shareholders for the following compelling reasons. Firstly, such an exercise, to the author's knowledge, has not been carried out before; although other researchers, namely Lee & Tweedie in the UK, Lease, Lewellen & Schlarbaum in the USA and Chenhall & Juchau in Australia, have investigated private shareholders' understanding of other financial and accounting aspects. Secondly, a survey of institutional and professional investors, an interesting and fruitful area for further research, was not carried out since it would appear reasonable to expect this population to be well informed on the underlying principles and practice of rights issues. After all, it is these investors who have the major impact on the stock market which has been shown to be efficient. Thirdly, if the naive hypothesis can be shown to have any significant support, the publication of the results may stimulate the appropriate authorities to take corrective action to help eradicate the weakness. We can cite, for example, the Government through the Companies Acts, The Stock Exchange with its self-regulation or even the companies themselves. Such an argument can be perceived to be of considerable current interest in view of the fact that the private shareholder is rapidly becoming a minority of direct equity holders. Legislation in the UK concerned with consumer protection and industrial relations is starting to acknowledge that minorities demand protection in excess of that implied by *laissez faire* and *caveat emptor* philosophies.

The author would like to acknowledge the help and assistance of the Company Secretaries of the two public companies who not only allowed access to their share registers but also gave permission for their shareholders to be surveyed by the postal questionnaire. Since the publication of the names of the two companies would not add significantly to the study, it has been decided to keep their identities confidential.

A right is a true economic option and the characterisation of the option effect during the subscription period of a rights issue would represent an advance in our knowledge and understanding of rights issues.

Chapter 2 Perfect Market Theory of Rights Issues

2.1 Introduction

This chapter examines the fundamental theory of rights issues within the assumptions of the perfect market theory² and critically reviews the effect of a rights issue on the net wealth of a shareholder and the importance of the issue price. Once a company has a stock market quotation for a given class of security, it is generally accepted that the only fair way of issuing further securities of that class, for cash, is through the mechanism of a rights issue.³

Both a rights issue and a new issue⁴ are similar in that they involve the issuing of new shares for cash. However, the major difference is that in a new issue the shares are normally issued to new shareholders whereas in a rights issue they are initially offered to existing shareholders through what is termed the pre-emptive right. The pre-emptive right consists of two components, namely the first choice, or option, to subscribe to the new shares, and if this option is not exercised, the freedom to sell the option to a third

² Chapter 3 will review the empirical evidence and will discuss the true relevance of a rights issue in the real world.

³ In the UK, The Stock Exchange rules state that all issues for cash must be offered to existing shareholders unless the latter have specifically resolved to the contrary at a Company General Meeting. Where the amount of cash to be raised is relatively small, The Stock Exchange will allow the placing of securities if the company can show that a rights issue would be unduly expensive or impracticable.

⁴ We shall specifically presume that a new issue consists solely of new money, that is, the proceeds of the issue accrue to the company rather than directly to the existing shareholders.

party. It should be noted that the shareholder is under no obligation to either subscribe or to sell his rights; although in the uncommon situation where the unaccepted shares are not sold on the behalf of entitled shareholders, such a static inertia would deny economic logic.

Using a new issue as an example, it is proposed to illustrate the fundamental basis of a rights issue, that is, the protection of the shareholders' interest in the company.⁵ A share in a company represents a claim on the future earnings of the company together with any salvage value should the company be liquidated. We shall investigate a company carrying out a new issue, paying particular attention to the influences of the issue price and assuming that the new shares are fully subscribed. If the issue price of the shares is exactly correct then the new shareholders will have purchased a part of the equity, which ranks equal with the shares of the original stockholders, at a true and fair price. If the issue price was set too high then it is reasonable to conclude that the new shareholders have been disadvantaged in having overpaid for their share of the equity; they have effectively provided an unwarranted rent to the existing shareholders.⁶ A similar, reverse argument holds for the

⁵ Berle & Means (1937, p.144) discuss the origins of the pre-emptive right in the USA,

"... the Massachusetts Court observed that every shareholder was entitled to his pro rata share of control or voting power; and also his pro rata share in assets of the corporation (which might include a surplus); ...".

⁶ Beranek (1963, p.215) summarises the correct, real world, approach to a new issue as,

situation where the new shares are issued at below their true or intrinsic value.

We now need to consider the implications of issuing shares at a discount and furthermore what does this discount represent. A rights issue can be perceived to consist of part scrip issue and part new issue,⁷ it is the pre-emptive nature of the option that protects the interests of the existing shareholders from the implicit dilution. One approach would be to consider a scrip or bonus issue. Thus if a company which had an issued capital of 100,000 shares effected a one for one scrip issue, that is, gave to existing shareholders one new share for every one they held; the following consequence would ensue. First, the number of shares in issue would increase two fold to 200,000. Second, a shareholder who originally owned a certain percentage of the equity of the company would still own the same proportion, even though his number of shares would have doubled. Third, within the province of a perfect market the stock market's estimate of the worth of the company, that is, it's market capitalisation, should not change. So in a perfect market, we must conclude that a scrip or bonus issue does not affect the short term wealth of the shareholder.

"... acting to benefit most the existing stockholders, there is one, and only one, subscription price per share - the highest attainable price."

⁷ See, for example, Keane (1972, p.40), Bacon (1972, p.60), Levy & Sarnat (1971, p.840) and Russell Nelson (1965, p.647).

Modigliani and Miller (1958, p.266) offer another view when they suggest,

"... retained earnings can be regarded as equivalent to a fully subscribed, pre-emptive issue of common stock."

Since profits, that is, retained earnings and dividends, accrue to the ordinary shareholders on a pro rata basis and assuming that the rate of dividend distribution is perceived by the management of the company to be in the best interests of the shareholders, then we could argue that a rights issue is a form of reverse dividend. In the case of a rights issue the cash flows from the shareholders to the company rather than in the reverse direction with a dividend. Assuming that the market reacts in a perfect manner then we can suggest that if dividend distributions do not affect the net wealth of the shareholder then a similar situation will pertain with a rights issue. Alternatively, the argument can be phrased in the reverse manner.

All text books⁸ which discuss the mechanism and rationale of rights issues, present the theoretical argument which illustrates the action taken by the shareholder confronted by a rights issue, does not influence his short term wealth in a perfect market. The notation is as follows:

⁸ See, for example, Van Horne (1975), Weston & Brigham (1979), Bera-
nek (1963), Samuels & Wilkes (1971)

Current market price of existing shares prior to the rights issue, that is, cum-rights share price	.....	C
Issue price of new shares	.....	P
Number of existing shares	.....	No
Number of new shares issued	.....	Nn
Rights ratio, the number of existing shares required to be owned to be able to subscribe for one new share	.....	$R = N_o/N_n$

We shall assume the rights issue occurs in a perfect market; this implies not only the shares are priced at a true or fundamental value but also such an equilibrium is stable during the period being examined. We shall also presume the shareholder is faced with a range of choices which are limited by the two extremes of either subscribe to the new shares in the proportion allotted or sell the rights which have been conferred upon him.

2.2 The parameters and their derivation

(a) Theoretical ex-rights price. Some time after the announcement of a rights issue, dealings commence in the new shares. Assuming they rank *pari passu* in all respects with the existing shares, then they are virtually indistinguishable and thus they will be theoretically valued at the same price - this is termed the ex-rights price. These homogeneous shares are valued at their weighted price using the equation,

$$\begin{aligned} \text{Ex-rights price} &= \frac{\text{value of shares before issue} + \text{value of new capital raised}}{\text{total number of shares after issue}} \\ &= \frac{C.No + P.Nn}{No + Nn} \end{aligned}$$

Rearranging and substituting the rights ratio, $R = No/Nn$, we get,

$$= \frac{C.R + P}{R + 1} \quad (1)$$

(b) Value of a right. In a rights issue each existing share is effectively given a pre-emptive right to purchase a part of a new share at the subscription price. R , the rights ratio, is the number of rights required to subscribe to a single new share. The value of a right can be theoretically derived using the logic that an investor will be financially indifferent between buying a share either directly from the company after having purchased sufficient rights in the market, or indirectly from other shareholders in the stock market. Thus,

$$\begin{array}{l} \text{Direct purchase from} \\ \text{the company} \end{array} = \begin{array}{l} \text{Indirect purchase from} \\ \text{other shareholders} \end{array}$$

$$P + R.Vr = C - Vr$$

$$\begin{array}{l} \text{Subscription} + \\ \text{price} \end{array} + \begin{array}{l} \text{Value of} \\ \text{appropriate} \\ \text{number of} \\ \text{rights} \end{array} = \begin{array}{l} \text{current market} \\ \text{price, cum-} \\ \text{rights} \end{array} - \begin{array}{l} \text{value of the} \\ \text{single right} \\ \text{attached to} \\ \text{the share} \end{array}$$

Rearrangement gives,

$$Vr, \text{ value of a right} = \frac{C - P}{R + 1} \quad (2)$$

Implied in the indirect purchase mechanism is that the relationship between the cum-rights, ex-rights and value of a right prices is,

$$\begin{array}{rcl} \text{Cum-rights} & & \text{Ex-rights} & & \text{Value of} \\ \text{price} & = & \text{price} & + & \text{a right} \end{array}$$

Thus from equations (1) and (2) we get,

$$\begin{array}{rcl} \text{ex-rights} & \text{value of} & & & \\ \text{price} & + & \text{a right} & = & \frac{C.R + P}{R + 1} + \frac{C - P}{R + 1} \\ & & & & = C, \text{ the cum-rights price.} \end{array}$$

(c) Alternative derivation. We can arrive at an estimate for the cum-rights, ex-rights and value of a right prices using a more detailed and lengthy argument; whether or not this process can be classified as a proof for the earlier and straightforward derivations is a matter of debate. We shall again assume a perfect market with the implications of stable prices set by supply and demand and that the new shares rank pari passu with the original shares.

We shall conduct the rights issue within the context of two distinct sets of shareholders cum investors who interact in the market. The existing shareholders are those who owned shares prior to the rights issue and let us assume that they carry out a null cash change transaction. Thus they sell all of their pre-emptive rights at V_r each and thus realise $No.V_r$ cash; which they immediately use to purchase new shares (to them) at their now homogeneous ex-rights price of C' . We shall explicitly ignore both transaction costs and taxation since their absence is implied in the perfect market assumption. Thus the existing shareholders have, at no cost to themselves, increased the number of shares they own by $No.V_r/C'$. In effect they have benefited from a scrip issue, namely,

$$\begin{array}{rcl}
 \text{No} & \rightarrow & \text{No} & + & \frac{\text{No.Vr}}{\text{C}'} \\
 \text{number of shares} & & \text{existing shares} & & \text{new shares} \\
 \text{owned pre-issue} & \rightarrow & & &
 \end{array}$$

Using the scrip issue effect in a perfect market it would appear reasonable to argue that the shareholder, and the market, would put the same valuation on the increased holding as they did on the pre-issue holding.

Thus,

$$\begin{array}{rcl}
 \text{No.C} & = & (\text{No} + \text{No.Vr/C}')\text{C}' & , \\
 \text{Number of existing} & & \text{Increased number of shares} & \\
 \text{shares at their cum-} & & \text{at their new valuation,} & \\
 \text{rights price} & & \text{the ex-rights price} &
 \end{array}$$

simple rearrangement gives,

$$\begin{array}{rcl}
 \text{C} & = & \text{C}' & + & \text{Vr} & . & (3) \\
 \text{Cum-rights} & & \text{Ex-rights} & + & \text{Value of} & & \\
 \text{price} & = & \text{price} & & \text{a right} & &
 \end{array}$$

This equation, which has been derived earlier, illustrates one of the important aspects of a rights issue in a perfect market, that is, the drop in price of a single share, from its cum-rights price to its ex-rights price, is exactly balanced by the value attributed to the right so attached to the share.

Now, let us introduce external investors who become shareholders by purchasing the rights, subscribing to the new issue and the selling some of their equity to the existing shareholders. In aggregate, these external shareholders would calculate the monies they expended as follows,

For the purchase of No rights at Vr each	.....	No.Vr
less the sale of No.Vr/C' shares at the ex-rights price, C'	.....	(No.Vr.C'/C')
plus the subscription for Nn shares at the issue price, P	.....	Nn.P

Thus, total monies expended =		Nn.P

They would calculate the size of their shareholding as follows,

From subscription to the rights issue	.....	Nn
less shares sold back to existing shareholders	.....	(No.Vr/C')

Thus total shareholding =		Nn - No.Vr/C'

Hence the price they paid per share will be,

$$\frac{\text{total cost}}{\text{number of shares}} = \frac{P.Nn}{Nn - No.Vr/C'}$$

Substituting No = R.Nn we get,

$$\begin{aligned} \text{Price per share} \\ \text{to external investor} &= \frac{P.Nn}{Nn - R.Nn.Vr/C'} \\ &= \frac{P.C'}{C' - R.Vr} \end{aligned} \quad (4)$$

The market will treat the shares of the existing shareholders and the new investors as perfect equivalents since the new shares rank pari passu with those existing prior to the rights issue, then the external shareholders' shares will be valued at the ex-rights price, C'.

Thus equation (4) can be re-written,

$$C' = \frac{P.C'}{C' - R.Vr}$$

and if we put $Vr = C - C'$, as shown in equation (3) we get,

$$C' = \frac{P.C'}{C' - R.C + R.C'}$$

Since $C' \neq 0$ then $C' - R.C + R.C' = P$ thus $C' + R.C' = P + R.C$, gives, $C' = (P + R.C)/(R + 1)$, the ex-rights price as shown in equation (1). Similarly by using the complementary nature of the ex-rights price and the value of a right we can determine an estimate for the latter.

2.3 Effect on the wealth of the shareholder

In order to investigate the effects of a rights issue on the net wealth of a shareholder we shall assume the shareholder owns, immediately prior to the rights issue, a mixed portfolio of cash and shares as shown below,

Shares	:	Q units at current price, C	=	Q.C
Cash	:	M	=	M

Hence value of portfolio			=	Q.C + M

We shall further assume that the cash, M, is more than sufficient to subscribe to all the new shares allotted to the shareholder. We now propose to examine how the value of the shareholder's portfolio changes when he adopts the two extreme strategies open to him, that is, he either accepts all the shares allotted or sells all of the pre-emptive rights attached to his existing shares.

(a) Accepts all the new shares allotted. The shareholder is offered Q/R new shares at a cost of P each. After the rights issue he will thus own Q + Q/R shares valued at their ex-rights price and he will have reduced his cash balance by Q.P/R. Thus he would value his new portfolio as follows,

Shares : Q + Q/R shares at the ex-rights price

$$= \left\{ Q + \frac{Q}{R} \right\} \cdot \frac{\{C.R + P\}}{\{(R + 1)\}} = Q.C + \frac{Q.P}{R}$$

Cash : original cash less money subscribed for new shares

$$= M - \frac{Q.P}{R} = M - \frac{Q.P}{R}$$

Hence value of post rights issue portfolio = $\frac{Q.C + M}{R}$

Thus we have illustrated that when the shareholder accepts all the shares allotted in a rights issue his net wealth is not affected in the case of a perfect market.

(b) Sells all rights. The shareholder sells Q rights and still retains his original Q shares whose price has dropped to the ex-rights price. Thus he would value his portfolio as follows,

Shares : Q shares at ex-rights price

$$= Q \cdot \left\{ \frac{C.R + P}{R + 1} \right\} = \frac{Q.C.R + Q.P}{R + 1}$$

Cash : Original cash plus the proceeds from the sale of Q rights

$$= M + Q \left\{ \frac{C - P}{R + 1} \right\} = M + \frac{Q.C - Q.P}{R + 1}$$

$$\text{Hence value of portfolio} = \frac{Q.C.R + Q.P}{R + 1} + \frac{Q.C - Q.P}{R + 1} = \frac{Q.C.R + Q.C - Q.P + Q.C - Q.P}{R + 1} = \frac{Q.C.R + 2Q.C - 2Q.P}{R + 1}$$

Thus we have illustrated that when the shareholder sells all his rights he is allotted in a rights issue then his net wealth is not affected in the case of a perfect market.

(c) Mixed strategy. The shareholder sells a proportion, B, where $0 \leq B \leq 1$, and uses the remaining rights to subscribe for new shares. Thus his portfolio would be valued as follows,

Shares : the opening position of Q shares is increased

by $(1 - B)Q/R$ new shares, all of which are valued

at their ex-rights price of $\frac{C.R + P}{R + 1}$.

$$= \left\{ Q + (1 - B) \frac{Q}{R} \right\} \left\{ \frac{C.R + P}{R + 1} \right\} \quad (5)$$

Cash : the shareholder sells B.Q rights at $\frac{(C - P)}{(R + 1)}$

$$= \frac{B.Q(C - P)}{(R + 1)},$$

but subscribes to $(1 - B)Q/R$ shares at the issue price P

$$= -(1 - B) \frac{Q.P}{R},$$

hence cash change is $\frac{B.Q(C - P)}{(R + 1)} - (1 - B) \frac{Q.P}{R}$. (6)

The shareholder will value his post-rights issue portfolio at the value of his shares (see equation (5)) adjusted for the cash changes he has experienced (see equation (6)). Summation of these two equations shows

$$\left\{ Q + (1 - B) \frac{Q}{R} \right\} \left\{ \frac{C.R + P}{R + 1} \right\} + \frac{B.Q(C - P)}{(R + 1)} - (1 - B) \frac{Q.P}{R}$$

$$= \left\{ \frac{1}{R(R + 1)} \right\} \left\{ \begin{array}{l} Q.C.R.R + Q.P.R + Q.C.R + Q.P - B.Q.C.R - B.P.Q \\ + \\ B.Q.C.R - B.Q.P.R - Q.P.R + B.Q.P.R - Q.P + B.Q.P \end{array} \right\}$$

$$= \frac{Q.C.R(R + 1)}{R(R + 1)} = Q.C,$$

which is identical in value to the pre-rights issue portfolio and illustrates that, in a perfect market, the net wealth of the shareholder has not been affected by whatever proportion of the rights he sells.

2.4 Irrelevance of the issue price

In a perfect market there is absolutely no shadow of doubt that a scrip or bonus issue has any influence whatsoever on the net wealth of the shareholder. Within this assumption is the implication that the market capitalisation of the company is independent of the number of shares in issue.⁹ The market will fully acknowledge the dilution implied in the scrip issue whilst still maintaining the stable market capitalisation of the company as a whole.

Now, in a theoretical environment, a company which is seeking to raise a given amount of capital via rights faces an infinite choice of issue prices. Mathematically the choice can be expressed by the equation,

$$\begin{array}{rcccl} \text{Value of capital} & & \text{Number of new} & & \text{Issue price of} \\ \text{to be raised} & = & \text{shares issued} & \times & \text{new shares} \\ & & & & \\ V & = & Nn & \times & P \end{array}$$

Within the obvious constraints¹⁰ that the shares have to be issued in positive integers, we must now investigate the influences of the two extreme strategies of either issuing a small number of shares at a high issue price or choosing a low issue price and thus issuing a greater number of shares. In a perfect market the result is obvious; no matter what the degree of dilution implied in the rights issue, be it relatively small or relatively great, the market will correct the share price to the homogeneous ex-rights price. Earlier

⁹ We could assume that the announcement has already been made and that we are dealing with the price adjustments at the ex-date.

¹⁰ The practical constraint of the lowest issue price being defined by the nominal share value is discussed in Chapter 4.

we have shown, for an undefined issue price and rights ratio, that the net wealth of the shareholder is not affected by a rights issue. Hence due to the scrip issue element of a rights issue the actual parameters, namely the rights ratio and the issue price, are totally irrelevant in a perfect market.

Using the argument presented by Wakoff (1973) we can determine the parameters that influence the pre-issue and post-issue market capitalisation of the company. Using the relationship,

$$\begin{array}{rcccl}
 E & + & V_r & = & C \\
 \text{ex-rights} & & \text{value of} & & \text{cum-rights} \\
 \text{price} & & \text{a right} & & \text{price}
 \end{array}$$

we can determine zV , the change in value;

thus

$$zV = E + V_r - C .$$

Now since $E = R.V_r + P$ we get

$$zV = E + \frac{E - P}{R} - C$$

substituting $R = N_o/N_n$ and rearranging

$$\begin{aligned}
 zV &= E + \frac{E - P}{R} - C = E - C + \frac{E}{R} - \frac{P}{R} \\
 &= E - C + \frac{E.N_n}{N_o} - \frac{P.N_n}{N_o} = \frac{1}{N_o} \left\{ E(N_o + N_n) - C.N_o \right\} - \frac{P.N_n}{N_o}
 \end{aligned}$$

which gives

$$zV = \frac{1}{No} \left\{ E(No + Nn) - C.No - P.Nn \right\} .$$

inverse of
post-issue
pre-issue
cash raised
number of
market
market
in the rights
old shares
capitalisation
capitalisation
issue

Inspection of the above equation shows that any change in the valuation of the company associated with the rights issue is independent of the issue price or the number of shares issued. The relationship would suggest that the change in value experienced by a shareholder is solely related to the difference between the pre-issue and post-issue capitalisation of the company's equity. It should be noted that this statement is self evident and that this presentation relies heavily upon the financial indifference between the direct and indirect route of equity purchase which is a circular argument.

2.5 Scrip issue effect in a rights issue

We shall assume that the scrip effect is acknowledged first. This leads to the new shares being issued at the ex-scrip¹¹ price. The rights issue can be described as,

$$\begin{array}{l}
 \text{No at C} \\
 \text{pre-issue}
 \end{array}
 \Rightarrow
 \begin{array}{l}
 \text{(No + Nn) at} \\
 \text{post-issue}
 \end{array}
 \frac{C.R + P}{R + 1} .$$

Now if we introduce the relationship,

¹¹ Which is also the ex-rights price since the subscription price will be equal to the market price.

$$\begin{array}{rcl}
 N_n & = & N_s \quad + \quad N_p \\
 \text{new shares} & & \text{scrip issue} \quad \quad \text{shares purchased} \\
 \text{issued} & & \text{shares} \quad \quad \quad \text{at ex-scrip price}
 \end{array}$$

we get,

$$\begin{array}{rcl}
 \implies & (N_o + N_s) \text{ at } \frac{C.R + P}{R + 1} & + \quad N_p \text{ at } \frac{C.R + P}{R + 1} \\
 & \text{existing plus scrip} & \text{the purchase of shares at} \\
 & \text{shares} & \text{the ex-scrip price}
 \end{array}$$

Now if we consider, in isolation, the scrip issue element¹² we get,

$$N_o.C = (N_o + N_s) \left\{ \frac{C.R + P}{R + 1} \right\}$$

which on rearrangement gives,

$$\frac{N_s}{N_o} = \frac{C - P}{C.R + P} \quad (7)$$

We can interpret this equation as illustrating;

- (a) the greater the rights ratio, R, the lower the scrip issue effect,
- (b) the lower the ratio of issue price to current market price, P/C, the greater the scrip issue element.

Lee (1975, p.315 and p.344) approaches the dilution aspect from the opposite direction and suggests that a rights issue can be considered to be a new issue at the current market price, that is, cum-rights, followed by a scrip issue. As shown below, the fact that the scrip element is acknowledged either first or last does not affect the general result. If we follow the logic of Lee (1975,

¹² Since the subscription price is the same as the market price of the old shares, the value of a right is zero and, therefore, can be ignored in the analysis.

p.344), the number of shares issued in the rights issue would be apportioned as follows,

$$\begin{array}{rcl}
 \text{Shares issued at current market price} & = & P.Nn/C \\
 \text{Scrip issue shares, by deduction} & = & Nn - P.Nn/C \\
 \text{Total number of shares issued} & = & \frac{\quad}{\quad} \\
 & & Nn
 \end{array}$$

It should be noted that the number of 'existing' shares has now been increased to $No + P.Nn/C$. Therefore, the scrip ratio, as defined earlier, is given by,

$$\frac{\text{Scrip issue shares}}{\text{'Existing' shares}} = \frac{Nn - P.Nn/C}{No + P.Nn/C}$$

Rearrangement gives,

$$= \frac{C.Nn - P.Nn}{C.No + P.Nn} = \frac{C - P}{C.No/Nn + P}, \text{ since } R = No/Nn$$

$$= \frac{C - P}{C.R + P},$$

which is the same as equation (7), derived earlier.

When a shareholder effects a 'null cash change' strategy, that is, sells sufficient rights to subscribe to the remaining shares, he effectively benefits from a scrip issue in that he receives a number of free shares and that the market price of each share, assuming they rank pari passu, drops. The question we must investigate is whether this is a true scrip issue or whether the parameters of the issue, namely the rights ratio and the issue price, affect the degree of the scrip issue effect.

Let us assume that the shareholder owns Q shares at a current market price C . He sells his Q rights at $(C - P)/(R + 1)$ to realise $Q(C - P)/(R + 1)$ cash which is immediately used to purchase shares at their ex-rights price of $(C.R + P)/(R + 1)$. Thus he purchases

$$\left\{ \frac{Q(C - P)}{R + 1} \right\} / \left\{ \frac{C.R + P}{R + 1} \right\} = \frac{Q(C - P)}{C.R + P} \quad \text{new shares.}$$

Hence the ratio of

$$\frac{\text{increase in number of shares}}{\text{original number of shares}} = \frac{\left\{ \frac{Q(C - P)}{C.R + P} \right\}}{Q}$$

$$= \frac{C - P}{C.R + P}, \text{ as before, see equation (7).} \quad (7a)$$

A similar, but subtly different, argument and derivation to measure the stock dividend component in a rights offering is proposed by Levy & Sarnat (1971, p.841) and their conclusions are in agreement with this study. As a consequence we can conclude that the primary factors of a rights issue, that is, the rights ratio and the issue price, do not affect the interests of the shareholder since we have shown that the shareholder who effects a 'null cash change' strategy benefits from the theoretical scrip issue effect.¹³

Another way to examine the influences of the parameters of a rights issue is to examine the loss of control that a shareholder suffers if he adopts a null cash change strategy. It is obvious that such a shareholder will suffer a diminution in his proportionate stake in the firm for the very reason that the equity of the

¹³ The neutrality of scrip issues must, of course, be fully acknowledged.

company has been increased and he has not contributed to this new capital. However, we are interested whether the choice of the issue price, or alternatively the implied dilution, will affect this decrease in control.

A shareholder who owned Q shares pre-issue will control Q/N_0 proportion of the firm. After the issue the proportionate control in the firm will be given by

$$\frac{Q + F}{N_0 + N_n}$$

where F represents the free shares implicit in the scrip effect. Thus, using the pre-issue degree of control as the base, the proportionate change in control will be given by,

$$\frac{\text{Control post-issue}}{\text{Control pre-issue}} = \frac{Q + F}{Q} \cdot \frac{N_0}{N_0 + N_n}$$

From equation (7a) we get,

$$\frac{F}{Q} = \frac{C - P}{C.R + P}$$

Thus,

$$= \frac{N_0}{N_0 + N_n} \left\{ 1 + \frac{C - P}{C.R + P} \right\}$$

Which on rearrangement gives

$$= \frac{N_0}{N_0 + N_n} \left\{ \frac{C.R + P + C - P}{C.R + P} \right\}$$

$$= \frac{N_0}{N_0 + N_n} \left\{ \frac{C.R + C}{C.R + P} \right\} \quad \text{Putting } R = N_0/N_n \text{ we get,}$$

$$= \frac{No}{No + Nn} \left\{ \frac{C.No/Nn + C.Nn/Nn}{C.No/NN + P.Nn/Nn} \right\} = \frac{No}{No + Nn} \left\{ \frac{C.No + C.Nn}{C.No + P.Nn} \right\}$$

$$\text{Proportionate change in control} = \frac{C.No}{C.No + P.Nn}$$

Since both variables, that is, C.No and P.Nn, are constants for a given issue it is apparent that the choice of the issue parameters are irrelevant. It is the value of the sum raised, compared to the current market capitalisation, that directly influences the loss of control that a shareholder will experience if he opts to follow a null cash change strategy.

2.6 Dilution and the effect on earnings per share

Ceteris paribus, a scrip issue will reduce the earnings per share of a company even though its financial circumstances do not change. However, when an adjustment is made for the new shares issued the statistic will be found to be stable. The goal of this section is to investigate the effect of a rights issue on the earnings per share statistic, and after having corrected for the dilution inherent in the rights issue, to determine if the parameters of the issue are of critical importance.

If E_o represents the earnings of the company in the full year prior to the rights issue, then,

$$EFS(\text{pre-issue}) = E_o/No . \quad (8)$$

Now we have shown that the scrip effect in a rights issue increases the number of free shares by

$$N_s = N_o \left\{ \frac{C - P}{C.R + P} \right\}$$

therefore the 'adjusted for scrip effect' earnings per share will be,

$$\begin{aligned} \text{EPS}(\text{pre-issue, adjusted}) &= \frac{E_o}{N_o} \cdot \frac{N_o}{N_o + N_s} = \frac{E_o}{N_o + N_s} \\ &= \frac{E_o}{N_o + N_o \left\{ \frac{C - P}{C.R + P} \right\}} \quad (9) \end{aligned}$$

Rearrangement gives,

$$\begin{aligned} &= \frac{E_o}{N_o} \cdot \frac{1}{1 + \frac{C - P}{C.R + P}} = \frac{E_o}{N_o} \cdot \frac{1}{\frac{C.R + P + C - P}{C.R + P}} \\ &= \frac{E_o}{N_o} \times \frac{C.R + P}{R + 1} \cdot \frac{1}{C} \end{aligned}$$

Unadjusted earnings per share \times $\frac{\text{theoretical ex-rights price}}{\text{actual cum-rights price}}$

This is the factor to adjust the past earnings per share statistics recommended in the Statement of Standard Accounting Practice Number 3 (1974, Appendix 1, paragraph 17): Earnings Per Share.

Let us define the earnings attributed to the old monies raised by the rights issue as E_n . It should be noted that we are specifically assuming that the company has the benefit of the new monies for a full year and that the fundamental earnings capacity of the original

capital has not changed. Hence the post-issue earnings per share statistic will be,

$$\text{EPS}(\text{post-issue}) = \frac{E_o + E_n}{N_o + N_n}$$

The proportionate change in earnings per share is given by the relationship,

$$\frac{\text{EPS}(\text{pre-issue, adjusted}) - \text{EPS}(\text{post-issue})}{\text{EPS}(\text{pre-issue, adjusted})}$$

$$= \frac{\frac{E_o}{N_o + N_o \left\{ \frac{C - P}{C.R + P} \right\}} - \frac{E_o + E_n}{N_o + N_n}}{\frac{E_o}{N_o + N_o \left\{ \frac{C - P}{C.R + P} \right\}}}$$

rearrangement gives,

$$= 1 - \frac{E_o.R + E_n.R}{(R + 1)N_o} \cdot \frac{N_o}{E_o} \cdot \frac{(R + 1)C}{C.R + P}$$

$$= \frac{E_o.C.R + E_o.P - E_o.R.C - E_n.R.C}{E_o(C.R + P)} = \frac{E_o.P - E_n.R.C}{E_o(C.R + P)}$$

$$= \frac{P}{C.R + P} - \frac{E_n}{E_o} \cdot \frac{R.C}{C.R + P} = \frac{P.N_n}{C.No + P.N_n} - \frac{E_n}{E_o} \cdot \frac{C.No}{C.No + P.N_n}$$

$$= \frac{E_n}{C.No + P.N_n} \left\{ \frac{P.N_n}{E_n} - \frac{C.No}{E_o} \right\} \quad (10)$$

Inspection of equation (10) illustrates that the proportionate change in earnings per share, adjusted for the scrip effect, is independent of the choice of the issue price.

A summary of the effects of a rights issue on the firm's earnings per share statistics would suggest that provided all other things remain constant, the differences can be fully attributed to the scrip element. Furthermore, since corrections can be made to take into account the influences of the free shares, we must surmise that there is no obvious benefit in choosing a specific issue price in a rights issue. Statement of Standard Accounting Practice Number 3 (1974): Earnings Per Share does not demand that the past earnings per share statistics are corrected to take into account changes in equity capital, their recommendations, which have been discussed earlier, are qualified by the statement that they are for general guidance and do not form part of the SSAP.¹⁴

¹⁴ It is apparent that Marsh (1977), of UK stockbrokers Phillips and Drew, has fallen into the trap of confounding his presentation by not fully taking into account the important aspect of the scrip effect when he advocates the issuing of the,

"... minimum number of additional shares, so that the earnings attributable to their existing shares are diluted as little as possible."

2.7 Primary risk

Most researchers¹⁵ agree that the major risk in a rights issue is related to the possibility that the market price, ex-rights, will fall below the issue price. Such a risk is important to the company where the issue is not underwritten since a poor subscription rate combined with the fact that the new shares, rejected by the existing shareholders, cannot be marketed at their original issue price to new investors at the end of the subscription period. This could possibly result in either the postponement of a capital investment project or the recourse to more expensive or inappropriate alternative sources of finance. In the situation where the issue is underwritten, it is admitted that the company will not suffer in a financial sense but the underwriting syndicate stands to lose a significant amount of money

It is proposed to examine this aspect in two ways where the risk of the issue being a failure is represented by the drop in price the basic security can accommodate without the market price sinking to the issue price. Firstly, let us assume that the market reacts in a perfect manner with respect to the implicit dilution in the rights issue. Thus the expected ex-rights price will be given by,

$$\frac{C'.R + P}{R + 1}$$

¹⁵ See, for example, Van Horne (1975, p.329), Levy & Sarnat (1971, p.840), Keane (1972, p.40), Briston & Cottam (1970, p.28) and Bacon (1972, p.64).

where the prime (') reflects the adjusted price of the pre-issue share. Thus for the share price, ex-rights, to drop to the break-even point we get,

$$\frac{C'.R + P}{R + 1} = P, \text{ which, since } R > 0, \text{ gives } C' = P.$$

Thus the absolute price gap, $C - C'$, is maximised when the lowest possible issue price is chosen, that is, $C - P$ represents a measure of the risk that the market price will drop below the issue price. This simple model, which has been criticised by Levy & Sarnat (1971, p.842), can be made more sophisticated by representing the price differential as a proportion of the cum-rights price at the time the decision is made. This produces the estimate $(C - P)/C$ which is similar to the simple estimate since the cum-rights price, must of necessity, be a constant at any given point in time.

Secondly we could use the difference between the expected ex-rights price and the issue price as a measure of the inherent risk. The estimate will be represented as a proportion of the the ex-rights price, as proposed by Levy & Sarnat (1971, p.843). Thus the risk gap is given by,

$$\frac{\left\{ \frac{C.R + P}{R + 1} \right\} - P}{\left\{ \frac{C.R + P}{R + 1} \right\}} .$$

Since $\frac{C.R + P}{R + 1} - P = \frac{R(C - P)}{R + 1}$, then

$$\frac{\left\{ \frac{C.R + P}{R + 1} \right\} - P}{\left\{ \frac{C.R + P}{R + 1} \right\}} = \frac{R(C - P)}{C.R + P} \quad [= \text{Levy \& Sarnat (1971)}] .$$

Putting $R = N_o/N_n$ we get,

$$= \frac{(C - P)N_o/N_n}{C.N_o/N_n + P} = \frac{N_o}{C.N_o + P.N_n} (C - P) .$$

For a given rights issue the parameters N_o , $C.N_o$ and $P.N_n$ are constants, therefore, we arrive at a similar conclusion as before where the lower the issue price the lower the risk that the market price will be exceeded by the subscription price.

It should be noted that the dissention between this presentation and that of Levy & Sarnat (1971) does not represent a significant area of disagreement; it can be resolved as follows. For a given rights issue where the sum to be raised is a constant, then the issue price and rights ratio are related, that is,

$$\frac{P.N_n}{C.N_o} = k = \text{constant, putting } R = N_o/N_n \text{ we get } P/R = C.k .$$

Thus the Levy & Sarnat (1971) measure of risk,

$$\frac{R(C - P)}{C.R + P} \xrightarrow[\text{putting } P = R.C.k]{\text{putting}} \frac{R(C - R.C.k)}{C.R + R.C.k} = \frac{1 - R.k}{1 + k} .$$

that is,

$$\frac{R(C - P)}{C.R + P} = \frac{N_o}{C.N_o + P.N_n} . (C - P) = \frac{1 - R.k}{1 + k} ,$$

is defined solely in terms of the rights ratio. Hence we arrive at two, equivalent, estimates, and the difference depends upon whether the rights ratio, R , or the implied discount, $C - P$, is emphasised. It is implicit that the alternative variable is automatically taken into account by the assumption of a fixed sum raised.

The result that the risk of potential failure¹⁶ is related to the choice of the issue price, would, *ceteris paribus*, seem to be a little suprising since all the other attributes that have been investigated, show that the subscription price is not an important decision factor. However, it does add support to the school of thought which argues that underwriting is unnecessary if a low issue price strategy is adopted.

2.8 Concluding remarks

A theoretical analysis of rights issues within the assumptions of a perfect market has shown that there is no foundation to believe that the issue price is of any importance, except for the risk of the current market price falling below the subscription price, nor that the action of the shareholder will influence his short term wealth. However, one should realise that the assumption implicit in the perfect market treatment of rights issues must of necessity lead to these conclusions.

¹⁶ See Dewing (1941, pp. 1195 and 1199) who recounts how companies can induce their loyal shareholders to "subscribe to new stock at a price higher than the market."

In the next chapter we review the empirical evidence on the manner in which stock markets treat rights issues. We seek to determine whether they follow the perfect market model.

Chapter 3 Empirical Evidence on Rights Issues: A Literature Survey

3.1 Introduction

In the preceeding chapter we have arrived at the conclusion that the major factor affecting the share price movement of a rights issue carried out in a perfect market is the degree of dilution attributable to the scrip issue element. In a perfect market there is no doubt that a scrip issue has no effect on the net wealth of the shareholder. The theoretical argument for the irrelevance of a scrip issue to the net wealth of the shareholder in the short term is presented by Millar & Fielitz (1973, p.35). They suggest that the operating and financial attributes of the firm, for example, production efficiency, asset base, gearing and the interest charges on debt and preference shares, are not affected. Neither the total equity nor the pro rata ownership of the firm is changed; all that occurs is that the number of shares in issue is increased proportionally. As stated by many researchers a scrip issue results in the cutting of the corporate pie into smaller pieces.

3.2 Scrip issues

A brief consideration of the whole gamut of behavioural and psychological influences would suggest that there are factors which may introduce a degree of inefficiency into the market's treatment of scrip issues. Possible advantages to existing shareholders would centre around the following points.

- (a) The reduction in share price may add to the psychological attraction of the share.¹⁷
- (b) The capitalisation of the reserves, precluding them from being distributed in the form of dividends, may add to the security rating of the company, particularly in the eyes of suppliers of debt and materials.
- (c) Averting the illogical criticism relating to the ratio of the dividend to the nominal value of the shares.
- (d) Following on from (a) above, the reduction in the share price may lead to a wider base of shareholders and therefore a better market in the shares through an increase in the frequency of trading.
- (e) As suggested by Finn (1974, p.93) the scrip issue may convey some favourable information to the market, for example, dividends, earnings etc., about the firm's future. However, as shown by the Fama, Fisher, Jensen and Roll (1969) study it would appear that the market anticipates the increased dividend by up to five months before the issue is announced. Furthermore, they came to the conclusion that expected returns cannot be increased by purchasing shares immediately after the scrip issue becomes effective.

The main disadvantages of a scrip issue would appear to centre around the administrative costs to the firm. These would include the once only cost associated with the issuing of the new share certificates and, if the greater number of shares results in the

¹⁷ See Keef (1979, p.13) and Finn (1974)

increase in the marketability of the stock as suggested earlier,¹⁸ the extra and continuing cost of administering transfer of title. Millar & Fielitz (1973, p.36) cite the work of Sosnick¹⁹ who estimated that there were ten different costs incurred in effecting a scrip issue. Furthermore, the costs incurred by the recipient shareholder should not be ignored.

An exhaustive study by Baker in the 1950's concluded,

"Despite the virtually unanimous opinion to the contrary, stock split-ups alone do not automatically bring about a lasting increase in the market price of stocks which already have a broad base of ownership." (1956, p.106)

and

"Despite strong opinion to the contrary, however, stock dividends alone, whether large or small, produce no lasting gains in market price for widely held stocks on national exchanges." (1958, p.114)

and

"... no real resistance against ex-dividend price decline can be attributed to stock dividends ... On the average, the market prices of stock-dividend shares reflect the fact that more shares of ownership represent the same total corporate equity." (1959, p.378).

Johnson (1966), on the other hand, found a significant relationship between the proportionate price change and the split factor. However, the caveat added to the results, namely, p.685,

¹⁸ Copeland (1979) concludes that there is a permanent, rather than temporary, decrease in relative liquidity following a scrip issue.

¹⁹ S. Sosnick, "Stock Dividends are Lemons, Not Melons", California Management Review (Winter 1961), pp.61-82. Not read by author.

"The conclusions from interpretation of the above results are based on the underlying assumption of valid model design and satisfactory statistical properties for the data."

would suggest that this result must be evaluated with respect to his model which attempted to control for such fundamental factors as earnings and dividends as well as for general movements in the stock market indices.

As a contrast to Johnson (1966), we can quote the work of Finn (1974) and Firth (1977b), both of whom used a similar regression procedure where the split effect was treated as a dummy variable, yet found that scrip issues had no influence on share prices.

Firth (1977a, p.131) in a literature survey acknowledges the compounding influence of firms issuing news of dividend changes and other favourable news at the same time as scrip issues are announced, and concludes,

"All of these studies, however, showed that no profitable trading rules could be based on the announcement of a capitalisation issue, and thus that the market adjusted share prices instantaneously and accurately for the new information."

Fama, Fisher, Jensen & Roll (1969) examined the process by which share prices adjust to the information content that is implicit in a scrip issue. The market model was used to determine how abnormal returns, compared to the market return, varied over a period 30 months before and after the scrip issue. It was reported that there were significant positive abnormal returns over the 30 month period up to the scrip issue. They concluded that companies tend to split

their shares during 'abnormally' good times.²⁰ After the split, the abnormal return became zero indicating that the information content had been fully reflected in the share price. Dividing their sample into two categories, those companies who reported increased dividends and those companies that declared reduced dividends, they showed that the pre-issue, positive abnormal return could be explained by the market's expectation of future dividends.

They came to the conclusion that scrip issues, per se, had no effect on the returns of the shares and thus a profitable trading rule could not be devised. With respect to the efficient market hypothesis they concluded, p.20,

"... the evidence indicates that on average the market's judgement concerning the information implications of a split are fully reflected in the price of a share at least by the end of the split month but most probably almost immediately after the announcement date."

With the exception of the study of Johnson (1966), the empirical evidence of Firth (1977b), Finn (1974), Baker (1956, 1958, 1959) and Fama, Fisher, Jensen & Roll (1969), has not found sufficient evidence to support the hypothesis that stock markets exhibit inefficiency with respect to scrip issues. The general conclusions are that they have no relevance, whatsoever, to the shareholder or investors; and consequently they are believed to be a wasteful exercise.

²⁰ In light of their evidence, to be discussed later, it would appear that scrip issues occur at the end of an abnormal period.

3.3 Price adjustments at ex-rights date

There have been four empirical studies which have measured and investigated the relationship between the theoretical ex-rights price and the actual ex-rights price. An examination of the information presented in Table 3.1 would indicate that the evidence provides support for the near perfect nature of rights issues in Aus-

Table 3.1 Regression analysis of actual ex-rights price versus predicted ex-rights price

Authors	Period of data	Country	Sample size	Slope	Intercept	Coefficient of determination
Russell Nelson	1946/57	USA	380	1.018	ns	ns
Weston	1962/67	Australia	290	0.9792	0.1085	0.883
Merrett, Howe & Newbould	1963	UK	110	1.012	-0.047	0.996
Bacon	1965/68	USA	72	1.02	ns	ns

Note:

ns represents not specified.

tralia, UK and USA.

The study by Merrett, Howe & Newbould (1967) of 110 rights issues that came to The Stock Exchange in 1963 produced the equation

$$y = -0.047 + 1.012x$$

actual
ex-rights
price

theoretical
ex-rights
price

with a correlation coefficient of +0.9978, which on 108 degrees of freedom is statistically significant at far better than the 0.1 per cent level.²¹ The implied coefficient of determination indicates that changes in the theoretical ex-rights price will explain 99.56 per cent of the variation observed in the actual ex-rights price. A restatement of this conclusion is that only 0.44 per cent of the observed variability is not explained by their empirical model.

Merrett, Howe & Newbould (1967) reported that the conventional formula was not absolutely correct since the observed deviation of the coefficients, from those predicted by theory, was found to be statistically significant at the 1 per cent level, that is, there is a one in a hundred chance that the deviations of this magnitude could occur solely by chance. They surmised,

"While this average underestimate is relatively small it clearly calls for some explanation.",

and evaluated:

- (a) Their use of the Daily Mail share index to correct for general price movements over the short time delay of 24 hours between the measurement of the two share prices.

We can suggest that since the time period was relatively short, the need to correct for general changes in the level of confidence in the market can be questioned. The argument, as it were, is that the

²¹ For comparison, the critical value of the correlation coefficient on 100 degrees of freedom at the 0.1 per cent level is 0.3211.

dramatic influences of the rights issue adjustment would overwhelm the effects of general price movements. A further criticism is that it implies that all stocks examined in the study react in an identical manner with respect to changes in the index.²²

(b) The tendency for rights issues to be accompanied by favourable news from the company.

This aspect has been discussed in respect of scrip issues and is difficult to quantify in an absolute manner.²³ Nevertheless, we can suggest that companies are more likely to release favourable rather than unfavourable information at the same time as they announce their rights issue and this intuitive interpretation is not inconsistent with the observations by Merrett, Howe & Newbould (1967) that the theoretical model underestimates the actual ex-rights price by 1.23 per cent. However, since the first day of trading the shares as ex-rights is normally a few days after the announcement of the rights issue, it would be reasonable to expect that any information issued at the same time would be discounted by the market before the shares are first traded ex-rights. Whether there will be a carry over of this favourable information must be uncertain and improbable in light of the empirical evidence on the efficient markets hypothesis and the speed of adjustment of share prices to new information.

²² As adopted by more recent researchers, the capital asset pricing model or similar model could be used to estimate the beta of the security.

²³ See, for example, White & Lusztig (1980) and Firth (1977b) who adopted methodologies to overcome this problem.

(c) The strategies adopted by the Institutions who delay acting until the very last moment and the logic of potential shareholders waiting until the shares become ex-rights.

Provided the Institutions had decided to subscribe to the rights issue there are two benefits associated with delaying their action till just before the closing deadline. The first is related to risk, there is a chance, albeit small, that the company would suffer a serious setback during the subscription period. The second is that the subscription monies can earn interest on deposit if the pre-emptive right is exercised at the last moment. Whether this logical strategy would affect the supply and demand for the shares in the market is doubtful since one would not expect an institution which had decided to sell their shares in the company to delay their action due to the announcement of the rights issue. The research of Scholes (1972) into the competing price pressure versus substitution hypotheses for secondary issues would tend to deny this argument. The logic of investors delaying purchase of shares until they become ex-rights is related to the inconvenience associated with subscribing to the issue.²⁴ There is also the possibility that 'naive' investors believe that they are able to purchase the shares at a bargain without realising that the equity had been diluted.²⁵ Although such naive shareholders exist, it should be remembered that the effect they will have on the market must of necessity be small.

²⁴ See Chapter 12 where this aspect is examined in greater detail.

²⁵ See Chapter 9 where this hypothesis is examined.

The studies of Bacon (1972) and Russell Nelson (1965) in the USA have, in general, produced similar results to those found by Merrett, Howe & Newbould (1967) in the UK. The slightly higher estimate for the slope found in the Bacon study can be explained, in part, by the fact that the two share prices were measured one month either side of the ex-rights date. Therefore a greater deviation from that predicted by theory would not be unexpected.

The study by Weston (1974) in Australia, which was basically a replication of the Merrett, Howe & Newbould study, tested a number of dividend related hypotheses which can be interpreted at two different levels. The first is that the statistically significant correlation coefficients concur with the results of Merrett, Howe & Newbould and illustrate the near perfect market treatment of rights issues in Australia. The second aspect is related to the fact that Weston reported an overstatement of the actual ex-rights price by the theoretical model. It does, however, require that the statistically significant deviation observed by the Merrett, Howe & Newbould study is attributed solely to random sampling errors.²⁶ Furthermore, the study by Weston, which did not use a market indicator to correct for changes in general price movements, presented the standard errors of the regression coefficients. When these are taken into account there is very little evidence to support the hypothesis that the slope of the Australian data deviates significantly from the the value of unity predicted by the theoretical model.

²⁶ We can imply that a result which is statistically significant at the 1 per cent level is strong evidence. Of this there is no doubt, but by no means can it fall within the category of 'absolute and beyond a shadow of doubt'.

Dewing (1941, pp.1209-1211) reviewed the treatment of rights issues by stock markets in the USA during the early part of the century and raised two interesting points in relation to rights issues. Firstly, he argued that in order to establish a free market for the rights it would be necessary for them to be offered at a slight concession to their theoretical value, even though there were no other reason to depress the value of the right. He based his argument on the fact that the indirect route of purchase involves more 'trouble' on the part of the investor. In support of his interpretation he relied on the study of Werly²⁷ who examined 40 rights issues of each of the falling market of 1920-1921 and the rising market of 1927-1928. It was found that there was an underestimate, on average, from that predicted by theory of about 0.5 per cent. The fact that the statistical importance of this underestimate was not stated means that we cannot support either of the mutually exclusive hypotheses, namely, that rights were treated in an efficient manner or that there was a small, yet significantly, inefficiency in the market's treatment of rights consistent with the argument advocated by Dewing.

The second point concerned the behaviour of the rights price during the subscription period, it was suggested that there was a common belief among stockbrokers that rights sell for the most at the beginning of the subscription period. This was based upon an economic supply and demand argument, which suggested that the sudden

²⁷ Werly, C.M., "Privileged Subscriptions", Harvard Graduate School of Business Administration, 1929, quoted by Dewing (1941, p.1209), but could not be traced by the author.

increase in the supply of rights without a corresponding increase in demand would inevitably depress the price. Dewing indicated that this was a mere assumption on the part of the brokers but quoted the work of three authors who found the adage to be true, although no account was taken of the general trend of the stock market over the subscription period. The summarised data presented in Table 3.2 would indicate support for the belief but the relatively high chi-square statistic, 26.658 on 4 degrees of freedom which is statistically significant at the 0.1 per cent level, would indicate that the

Table 3.2 When rights attain their highest price during the subscription period

Parameter measured	Author	Period studied	Number of stock or rights reaching highest price		
			Beginning	Middle	End
Stock	Mears	1906-1912	47	20	24
Stock	Beckman	1913-1929	101	71	43
Right	Werly	1918-1929	88	29	74
Total			236	120	141
Per cent of Total			47.5	24.1	28.4

Source: Dewing (1941, p.1210)

performance of the stock market may be an important characteristic. Soldofsky & Johnson (1967) examined 29 rights issues on the New York Stock Exchange in the year ending 31st December 1966 and tested the

Wall Street adage "Stockholders should sell rights early". They surmised that the maxim should be treated with a 'grain of salt' and advised shareholders, who were considering selling rights, to analyse the current stock market trend and its relationship to the company making the rights issue before making a decision.

In Chapter 6 the theoretical aspects of the opposing influences of the option-trouble effects, implied in the adage 'sell rights early' and the arguments of Dewing are examined. Chapter 12 presents an empirical examination of how the option effect may influence the equilibrium between the ex-rights and rights prices.

3.4 Information content of the announcement of rights issues

Marsh (1979b) has examined the reception of rights issues by The Stock Exchange within the framework of abnormal returns and the efficient market hypothesis. Conceptually the study can be considered very similar to the work of Fama, Fisher, Jensen and Roll (1969) although it should be pointed out that Marsh (1979b) used a variety of models. Marsh (1979b) reported abnormal returns prior²⁸ to the announcement (also reported by Scholes (1972) in an addendum to his secondary issues study), but with reference to the post-announcement period he commented, p. 852,

"... the striking feature here is the apparent existence of abnormal returns after the news had been made public."

²⁸ The results of the five variants of the time-series models were in general agreement.

However, after exhaustive reanalysis of the data taking into account such factors as cancelled issues, the independence of the beta estimates, the possibility of a small number of single abnormal results biasing the average result, he concluded that the random sub-sample used to calculate the abnormal return was not representative of rights issues as a whole over the period under consideration. It was finally concluded that the weightings used for the sample of rights issues (equally weighted portfolio) and the market index (market value weighted) was the prime cause of the high abnormal return subsequent to the announcement date. When the analysis was repeated using portfolios weighted by company size, the abnormal return was found to be some 2 per cent. This lead to the argument that the weightings were a critical factor and, therefore, it was difficult to reach a firm conclusion as to market efficiency.

White & Lusztig (1980) used an across time across securities multiple regression model incorporating dummy variables to separate out the effects of other information noise, such as, dividends, earnings and other announcements²⁹ that occurred near to the announcement of the rights issue. They concentrated solely on the announcement date in order to avoid errors which may be attributed to the incorrect price adjustments for the inherent scrip effect on the first day of rights. Their analysis confirmed the findings of Marsh (1979b) and Scholes (1972) in that the announcement of the rights issue carried negative information but they could not find sufficient evidence to reject the null hypothesis that prices react swiftly to new informa-

²⁹ See also Firth (1977b) for a similar study on scrip issues.

tion.

Scholes (1972) in his study of secondary issues found support for the substitution hypothesis as against the price pressure argument, in that the reported small drop in price was independent of the size of the issue. In an addendum it was reported that again the size of the rights issue was not associated with the level of the negative abnormal return. This was also confirmed by Marsh (1979b).

The conclusions reached by Marsh (1979b) and White & Lusztig (1980) could be predicted by the use of deductive logic. The argument, as it were, is that if a rights issue can be adequately described as being part new issue and part scrip issue, then the manner with which the stock markets treat these events can be used to predict how they will react to a rights issue. A simple model³⁰ would be,

$$T(\text{rights issue}) = T(\text{new issue}) + T(\text{scrip issue})$$

where operator T represents the market's treatment of the event. Taking the scrip element first, the Fama, Fisher, Jensen & Roll (1969) study showed that there was an anticipatory abnormal return prior to the announcement of the scrip issue. However, after the issue was announced there was no further abnormal return relative to

³⁰ A more sophisticated model would be given by

$$\begin{aligned} T(\text{rights issue}) &= a.T(\text{new issue}) + b.T(\text{scrip issue}) \\ &+ c.T(\text{new issue} \times \text{scrip issue}) \end{aligned}$$

If $a = b = 1$ and $c = 0$ we get the simple model.



the market.³¹ We can argue that the new issue element in a rights issue is nearer to a secondary issue than it is to a classical new issue. The prime basis for this argument is that the equity already has a quoted share price prior to the issue in the former case. Thus the study by Scholes (1972) can be used to predict the reaction to the new issue element. The evidence indicated that prior to the secondary issue the securities did not exhibit any signs of abnormal returns. However, immediately after the event there was an instantaneous decline of approximately one per cent in the share price.

Using this information we could predict the following for a stock market's treatment of a rights issue. Firstly, there will be positive abnormal gains prior to the announcement of the issue. This has been reported by Marsh (1979b, p.851), Smith (1977, p.283) and Scholes (1972, p.210).³² Secondly, the announcement of the rights issue will be interpreted as negative information by the market. This has been reported by Marsh (1979b, p.858), Scholes (1972, p.210) and White & Lusztig (1980, p.32). It is worth noting that the researchers, mentioned above, all reported that abnormal returns were independent of the size of the issue; this provides strong support for the conclusions reached by Scholes (1972, p.211), namely,

"Corporations, like individuals, can sell shares at existing market prices."

³¹ For the aggregated data set.

³² Scholes (1972, p.210) extends the argument from secondary issues to rights issues with respect to the negative information element but does not specifically acknowledge the pre-announcement scrip abnormal return.

which leads to the argument that rights issues should always be a success. That is, since all the new shares can always be marketed at the prevailing price, then underwriting, as an insurance function, is not necessary if the primary risk is avoided.

3.5 The true importance of a rights issue³³

We have shown that the perfect market approach to a rights issue illustrates that both the issue price and the action taken by the shareholder are irrelevant. We have also shown, using the scrip issue effect, that the share price, per se, that is, the cum-rights price at the time of the issue, is not a factor of any importance. Now, very few people would agree with the tenet that stock markets are absolutely equivalent to the economists' perfect market dream. So we have to accept that the valuation of companies, say proxied by the market capitalisation of their ordinary equity, will on occasions be temporarily over or under-stated. The purpose of this section is to illustrate that in the real world a shareholder facing a rights issue, where the company's shares are not at a fair and true equilibrium, does not entertain any greater risk than does a shareholder who owns shares in a mirror company. We shall define the mirror company as one which is identical in every respect except the important fact that it is not carrying out a rights issue. Let us examine two companies, see Table 3.3, which are quoted on a stock market with the benefit of hindsight. Company A's shares are currently and temporarily over-valued and those of Company B are

³³ This is an amended version of Keef (1980).

Table 3.3 Valuation of companies A and B

Company	Status of share price relative to intrinsic value
A	Temporarily over-valued
B	Temporarily under-valued

under-valued.³⁴ If two investors were to invest a fixed sum of money each into the equity of one company, what would be the outcome when the share prices returned to their equilibrium or intrinsic values? Obviously, the shareholder of Company A would suffer a decrease in wealth and the converse would be true for the investor in Company B. It is fair, and patently obvious, to say that the shareholder in Company A has been disadvantaged. Of this there is no doubt, but surely this is a major risk inherent in equity ownership.

Now, let us assume that both Company A and Company B carried out a rights issue. Now excluding actions that are a mixture of those to be stated, the four basic strategies open to the shareholder are:

- (i) sell all his shares, that is, existing shares and their rights;
- (ii) sell the rights attached to his existing shares;
- (iii) accept the new shares allotted;
- (iv) purchase more shares as well as subscribe to the new issue.

³⁴ In an efficient market where share prices fully reflect all available information, see Fama (1970), the concept of over or under-valuation of a security's price is denied. In this section we are specifically assuming that new information becomes available and that this results in the adjustment of the share price. Such an argument is not inconsistent with the efficient market hypothesis.

The majority of authors tend to ignore the two extreme options of either selling all the shares or further investment over and above that required by the rights issue. Dewing (1941, p.1191) cites what he calls a "pertinent and summary comment" to the effect that a rights issue represents, in reality, a compulsory choice on the part of the shareholder. Either to increase his investment in the company by the amount of the subscription monies, or to dispose of part of his holding as represented by the sale of rights. Keane (1972, p.43) arrives at a similar conclusion. Riley (1980, p.6), however, partially acknowledges the choices available when he comments upon the way in which shareholders apparently react,

"... a subscription for new shares in a rights issue is not so much a rational investment decision as an act of blind faith in the company's management."

Although the Lex Column (1979c) refers to an investigation by brokers, Wood Mackenzie, and stated,

"... it could signal the time to reconsider their overall commitment to the company."

For the sake of simplicity we shall assume that the shareholder has just been stimulated, by the announcement of the impending rights issue, to review his holding in the company concerned. If the shareholder perceives the shares to be over-valued then he will sell all his shares and put the cash so realised to other uses. This is the only strategy open to the reasonable, logical man who has confidence in his judgement. On the stock market where share prices may react upwards and downwards due to new information being continually available, say for example the announcement of the

rights issue, we can argue that any such loss or gain associated with this new piece of information is again one of the inherent risks associated with share ownership.

If the shareholder perceives, at the time, the shares to be under-valued, then he will invest further monies in the equity of the company. The point to be discussed is whether this should be effected through the purchase of existing shares or by the rights allotted in the rights issue. Well, if we assume that the stock market operates in a near perfect manner in valuing the complementary value of a right and the ex-rights price, then the difference is a matter of semantics. Except of course where transaction costs may show a marginal advantage. Thus in the real world, as would be expected where arbitrage acted upon two almost identical securities, shareholders are financially indifferent to either buying new shares through the medium of rights, that is purchase sufficient rights to be able to subscribe for the new shares, or by purchasing existing shares ex-rights.

Now to further our argument, let us introduce two shareholders whose financial constraints are presented in Table 3.4 and who besides being shareholders of Company B have come to the same belief that the shares of Company B are under-valued. Investor Y, who has more than sufficient cash available for investment can not only subscribe to the rights issue but can also invest as much money as he wishes into the equity of the company.

Table 3.4 Financial situation of shareholders A and B

Investor	Financial situation
X	Devoid of cash
Y	More than sufficient cash available

Now Investor X, who has no spare cash available for investment can neither participate in the new issue nor even increase his holding by buying existing shares. Assuming that he cannot benefit from an increase in personal gearing by borrowing - if he could he would be in a basically similar situation to Investor Y - then he has no choice but to sell his rights. The question one must ask is, "Has he been disadvantaged, say compared to Investor Y?". Well, the answer is a mixture of "yes" and "no" and depends upon the interpretation of the word 'disadvantaged'. It is obvious, if we use the connotation related to equality of wealth, that he is at a strong disadvantage in that he cannot fully back his judgement. However, this is a fact of life and no concern to the argument of this study.

Having been forced to sell his rights leads one to question whether he will get a fair price for them. In a perfect market the answer would be in the affirmative and the balance of the empirical evidence suggests that in the real world the same conclusion will be reached. So we must conclude that Investor X has been forced to sell his rights at a value based upon the temporarily depressed price. Being unable to participate in the rights issue, yet confi-

dent that the share prices are depressed temporarily, his best strategy is to effect a null cash change operation. That is, sell his rights and immediately re-invest the monies into existing shares at their ex-rights price. Thus he has basically benefited from a scrip issue which most people would accept as being effectively neutral to the net wealth of the shareholder.

So a shareholder owning a pre-emptive right to participate in a rights issue is in the same situation as another investor who is debating investing in the equity of the company under investigation. The potential investor has the choices of buy-sell-hold and these are basically the same alternatives facing the existing shareholder confronted with a rights issue.

Finally, we would like to squash the myths related to the accepted adages that the best strategies for the company is to set a high issue price when the current share price is at a peak, and thus incur what some authors consider unnecessary underwriting expenses.

The logic of going back to the market when the company's current share price is high, has a number of attractions; not least of all the fact that the high price represents a significant interest and confidence in the equity of the company. But one must question whether this aspect is of any importance. For those analysts who support the need to underwrite³⁵ the rights issue we can suggest

³⁵ Marsh (1980, p.714) using the Black and Scholes (1973) option pricing model found that,

"... underwriting, taken alone, and ignoring side payments was considerably over-priced."

that such a mechanism must surely guarantee the success of the issue as far as the company is concerned. For the proponents of the opposing view, that the best strategy is to set a relatively low issue price so as to make underwriting unnecessary since the rights will always have a positive value, we must come to the same conclusion. So whether or not the share price is at a peak would appear to be irrelevant. Riley (1980, p.5) discusses at some length the wrongs of rights issues and suggests,

"There is a suspicion that managers do indeed try to obtain capital on advantageous terms, and they do this by selecting a moment at which they sense that the market - perhaps only temporary - is setting too high a price on the company's shares. Many finance directors, in fact, believe that it is their job to do precisely this. They try to select a time when the stock market is cyclically high - implying that it is an unfavourable moment for shareholders to invest new money. They try to select periods when their own company's profits are performing strongly, because the rating in the stock market will be high. But shareholders would be better served by being offered an opportunity to subscribe for new shares when the market was low."

Although Riley (1980) is only expressing his suspicions on their attitude to rights issues, he strongly infers that the financial directors are seeking to obtain new capital at an unduly low cost. And, furthermore, he implies that this may be favourable to the company but unfavourable to the shareholder. The tenet implied in this extract is based upon false logic. The cost of equity capital is not a static parameter, in an analogous fashion it can be considered somewhat similar to a clearing-house bank's base rate. To say that it is advantageous to take out a variable interest rate bank loan when the base rate is low, has little foundation. In this situation

the borrower has to pay the going rate, set by the market, and the same considerations apply to the equity³⁶ component of the weighted average cost of capital. The suggestion of an action being to the good of the company yet unfavourable to the shareholders is so preposterous as to need no further comment.³⁷

In fairness to Riley (1980), one must support the general conclusion, but not necessary the logic used to arrive at such a view, that shareholders should not participate in rights issues when shares are at their peak values.³⁸ The basis for this conclusion must lie in the illogicality of purchasing any security when the price is at a cyclical maximum.

Assuming that share prices move in a cyclical manner and reflect the level of confidence on the stock market, there would appear to be benefits in making rights issues at the time of a downturn of the share price rather than when it was at a peak. No matter what the discount offered, the issuing of new shares at the time when the existing equity is at a peak, results in the shareholders suffering a reduction in net wealth. If, however, the company can make its rights issue at the time when its shares are at the bottom of a minor recession, then the shareholders³⁹ will see their stockholding

³⁶ The capital asset pricing model could be used to determine the required rate of return on equity.

³⁷ See Edge (1965a), Grinyer (1972, p.51) and "The Rights Issue Controversy", Report of the Meeting Held on December 11th, 1969, in The Investment Analyst, No. 26, May 1970, pp.36-37.

³⁸ Elsewhere Riley, see Lex Column (1979a), entirely agrees with these arguments. See also Modigliani & Miller (1959, p.660).

³⁹ Who subscribe to the issue but not those who sell their rights.

increase in value after the issue. Such a strategy, is of course easy to define in theory but most probably is very difficult to effect in practice. Dewing (1941, p.1200) quotes the case of The American Telephone and Telegraph Company in the periods before the First World War; they carried out a number of rights issues at peak share prices and it was reported that shareholders felt 'dissatisfied'. However, each time the stock was offered to shareholders since the war, their market price was at the bottom of a minor recession and it was suggested that it not only gave greater satisfaction to shareholders but greater assurance of success and reliability of subsequent issues. Dewing (1941, p.1200), however, added the informed comment that,

"This difference regarding the period at which new stock was offered may have been the result of accident, ...".

Modigliani & Miller (1959, p.662) support this argument and imply that such speculation, namely the prediction of how share prices will react in the future and thus provide windfall gains or losses for shareholders, should not necessarily be an important determinant in choosing the timing of a rights issue.

The major logic used to justify a high issue price in a rights issue is the fact that it protects the shareholder who through his own unique circumstances is forced to sell his rights when the share price is currently depressed. This rationale is irrefutable but relies very heavily on the market temporarily taking a pessimistic view on the current share price compared to its intrinsic value. If the share price were overvalued then the contrary would be true,

that is, it is in the best interests of the shareholder to set the issue price as low as is possible. The debate over the relative merits of the issue price compounded by the deviation of the share price from an intrinsic norm hinges on what is the true effect of selling the rights. The Capital Gains Tax (1973) treatment of the proceeds obtained by selling rights gives the answer, it is a part disposal of the asset. Beranek (1963, p.213) confirms this view when he states,

"The proceeds received by the rights-selling shareholder do not constitute a windfall - it is a return of his capital."

The greater the dilution, that is the lower the rights ratio and the lower the issue price, then the greater the degree of part disposal. But in the case of the shares being over-valued this is only part of the way towards the indicated strategy, namely if the shareholder believes this situation to pertain, then he should divest himself of all his holding in the company rather than just the segment implicated by the rights issue.

This section of the analysis has attempted to separate the inefficiency of the market into two discrete sections, namely the treatment of the dilution inherent in a rights issue and the possibility of a temporary deviation of the share price from an intrinsic or fundamental norm. Whether these two aspects are mutually exclusive, as implied in the analysis presented, is a moot point.

However, empirical evidence would tend to support this argument. Dewing (1941, p.1212) cited the exhaustive study by Beckman of 243

rights issues during the period 1913 - 1925 in the USA and reported that the results were inconclusive. Merrett, Howe & Newbould (1967, pp.67-68) examined the performance of 95 companies one year after their rights issue of 1963 and found, on average, a 3.5 per cent capital appreciation higher than the Daily Mail 640 share index. However, whether their reported 10 per cent statistical significance can be taken as definitive evidence must be a matter of debate. The Russell Nelson (1965) study, cited earlier, measured the ratio of adjusted prices of 380 rights issues in the USA during the period 1946 - 1957 and found that over the period of six months before the issue till six months after the issue, the average price decline was 0.2 per cent. Furthermore, this difference was not found to be statistically significant and Russell Nelson (1965, p.649) concluded,

"... the evidence is consistent with the hypothesis that stock prices, adjusted for the split-up effect and deflated to remove market movements, are the same six months before and six months after a rights offering."

Based upon a survey of 16 major companies which came to the market with rights issues in excess of 25 million pounds in the period May 1975 to May 1977, stockbrokers Wood Mackenzie⁴⁰ suggested that these large companies had tended to underperform the market during the subsequent period. Although the results are undeniable for this very small sample, it is difficult to extend the argument to the general case, even for large companies during this difficult trading period. The results were strongly criticised by Marsh (1979a) and Wood Mackenzie went to some lengths to qualify the

⁴⁰ See Riley (1980, p.4) and Lex Column (1979c).

implications of their results.

The fact that some time after the rights issue has been effected the market proves that the share price was at a maximum, a minimum or even a saddle point is the gist of investing in the equity of companies; the gains or losses to be made from such share price movements are the same whether or not the company is carrying out a rights issue.

3.6 Concluding remarks

A review of the empirical evidence would suggest that the market, on average, is not intrinsically inefficient. Few would deny that a particular rights issue may exhibit a significant inefficiency, compared to the theoretical model, but as has been argued earlier, the market is always reacting to new information, of which a rights issue is an integral part. The exceptionally high coefficient of determination between the actual and theoretical ex-rights prices reported by the Merrett, Howe & Newbould (1967) study can be used as very strong evidence to support the belief that the stock market uses the theoretical model to arrive at the ex-rights price on the first day of trading. A review of the manner in which stock markets treat the announcements of rights issues has not highlighted significant departures from the efficient markets hypothesis.

Chapter 4 Rights Issues: The Allowable Range of the Issue Price

4.1 Introduction

Within the assumptions of the perfect market, as discussed in Chapter 2, there do not appear to be any sound financial reasons for the subscription price in a rights issue to be of any importance.⁴¹ There is strong empirical evidence to show that stock markets are efficient with respect to rights issues.⁴² This leads to the hypothesis that rights issues should not show a bias in the choice of the issue price, that is, *ceteris paribus*, the subscription price should be randomly distributed. Any consistent bias would be an indication that those companies seeking further capital via rights believe that the choice of issue price is important. It should be noted that the reasons for the choice of issue price may be non-financial.

Jones-Lee (1971) has presented a theoretical justification for a high issue price strategy but the paper generated considerable controversy⁴³ and can be criticised for examining only one side of the argument. A possible explanation for a low issue price strategy could be to exploit the naive private shareholder characterised in Chapter 9. But again this aspect is not that convincing when consideration is given to the high degree of control exercised by

⁴¹ Except that the lower the issue price the lower the primary risk.

⁴² See Chapter 3.

⁴³ See the replies by Newbould & Wells (1971), Briston (1972), Keane (1972) and the rejoinder by Jones-Lee(1972).

institutional investors.

Before the empirical data relating to the issue price can be discussed, it is necessary to arrive at a suitable methodology to characterise the issue price. As is argued in the following section, the generally accepted procedure to measure the parameter cannot be considered satisfactory.

4.2 Parameter specification

In the United Kingdom, the subscription price in a rights issue must of necessity fall within the following boundaries:

$$\text{NSV} \leq P \leq C$$

Nominal share value	Issue price	Current market price
---------------------------	----------------	----------------------------

The regulations of The Stock Exchange will not normally allow shares to be issued at below par value unless there are exceptional circumstances: in this situation special permission is required. Thus the nominal share value (NSV) effectively defines the lower limit of the subscription price. The upper constraint on the issue price is the current share price (C). We can argue that if the subscription price is greater than the current market value, then the rights issue is doomed to failure since the shareholders can purchase further shares at a lower price from the market.

Having specified the practical constraints on the issue price, we can now introduce the concept of the allowable range and measure the position of the issue price within this range.

$$\begin{aligned}
& \text{Position of issue} && \text{Actual} && \text{Minimum} \\
& \text{price within} && \text{issue} & - & \text{issue} \\
& \text{allowable range} & = & \text{price} && \text{price} \\
& && \text{-----} && \text{-----} \\
& && \text{Maximum} && \text{Minimum} \\
& && \text{issue} & - & \text{issue} \\
& && \text{price} && \text{price} \\
& && \text{-----} && \text{-----} \\
& && \text{P - NSV} && \\
& & = & \text{-----} && \\
& && \text{C - NSV} && \quad (1)
\end{aligned}$$

Many researchers⁴⁴ rather glibly discuss the discount offered in a rights issue and where they do not explicitly define their parameter, we must assume they are implicitly referring to the relationship of the issue price solely to the current share price, that is, P/C.⁴⁵ Such a parameter has little meaning in the context of inter-firm comparison due to the non-uniformity of nominal share values. It can be compared to parameters such as earnings per share and dividend per share, etc., which suffer from similar comparative defects.

To illustrate the potential error inherent in the simple approach, we can examine the deviation between the two position variables, D.

⁴⁴ See, for example, Merrett, Howe & Newbould (1967, pp.56-57), Briston & Cottam (1970, p.32) and Manley (1976, p.38).

⁴⁵ The simple discount = (C - P)/C and the simple position of the issue price = P/C are complementary.

$$D = \frac{P}{C} - \frac{P - NSV}{C - NSV}$$

simple - allowable
range

$$= \frac{NSV}{C} \cdot \frac{C - P}{C - NSV} \quad (2)$$

Now since it is necessary that $C \geq P \geq NSV$, then $D \geq 0$. The conditions where the two variables will give the same value, that is, when $D = 0$, are as follows;

- (a) $P = C$ the issuing of new shares in a rights issue at the current market price, it is contended, is a high risk strategy and thus is uncommon.
- (b) $NSV = 0$ unlike some countries, the issuing of shares of no par value is not permitted by UK regulations.

Since these conditions, when the two estimates produce the same value, can be discounted as being extreme and uncommon, we must arrive at the conclusion that in real life the simple estimate must deviate from the allowable range estimate. Furthermore, the simple estimate must always overstate the actual position of the issue

price. The difference between these two estimates can reach quite alarming proportions and this can be illustrated by the example

Table 4.1 An illustration of the different simple discount values that can be equivalent to a constant position of the discount within allowable range

	Company				
	A	B	C	D	E
Current share price, C, pence	200	200	200	200	200
Issue price, P, pence	29	38	42.5	65	110
Nominal share value, NSV, pence	10	20	25	50	100
Simple discount, per cent	85.5	81.0	78.8	67.5	45.0
Discount within allowable, per cent	90.0	90.0	90.0	90.0	90.0

shown in Table 4.1. All five companies have the same issue price, 10 per cent from the lower limit, when measured on the allowable range basis. However, the simple position of the issue price ranges from 14.5 to 55 per cent.

In a rights issue there are effectively two degrees of freedom; the issue price and the number of new shares to be issued. We can propose, *ceteris paribus*, that the normal order of the decisions facing a company which is contemplating the possibility of a rights issue would be:

- (a) the need for a rights issue compared to other sources of finance;
- (b) the amount of cash to be raised;
- (c) the issue price of the new shares.

The possibility of a complicated feedback system within the decision framework detailed above is fully acknowledged, but we can assume that this iterative process has exhausted itself, thus we can face the issue price decision in isolation. In this situation, where the amount of cash to be raised is held constant, we have reduced the decision to one degree of freedom. Besides the issue price there are two other aspects of importance in a rights issue; these are, the rights ratio and the theoretical ex-rights price. These parameters are also constrained by the limits on the single degree of freedom. Thus the position of the issue price within the allowable range will be numerically equal to the positions of the rights ratio and the theoretical ex-rights price within their respective allowable ranges. This is shown in the following section.

Using the notation as follows,

No = number of shares pre-issue
 Nn = number of new shares issued
 R = rights ratio = No/Nn
 C = current share price, cum-rights
 P = subscription price
 V = cash raised by the issue = $P.Nn$
 S = market capitalisation = $C.No$

(a) Rights ratio

$$R = N_o/N_n = (S.P)/(V.C) .$$

At the maximum issue price, when $P = C$,

$$R(\max) = S/V,$$

and at the minimum issue price when $P = NSV$,

$$R(\min) = (S.NSV)/(V.C) .$$

Using the allowable range concept we get,

$$R' = \frac{R - (S.NSV)/(V.C)}{S/V - (S.NSV)/(V.C)} ,$$

which rearranges to

$$R' = (P - NSV)/(C - NSV) .$$

(b) Theoretical ex-rights price

$$E = (C.R + P)/(R + 1) .$$

At the maximum issue price, when $P = C$,

$$E(\max) = C,$$

and at the minimum issue price, when $P = NSV$,

$$E(\min) = (R.C + NSV)/(R + 1) .$$

Using the allowable range concept we get,

$$E' = \frac{(R.C + P)/(R + 1) - (R.C + NSV)/(R + 1)}{C - (R.C + NSV)/(R + 1)} ,$$

which rearranges to

$$E' = (P - NSV)/(C - NSV) .$$

Thus, it can be argued, the concept of the allowable range is a powerful measure of the characteristics of a rights issue.

4.3 Discussion

The hypothesis, that the issue prices do not show a noticeable bias, can be interpreted in two ways. The first test would indicate that the distribution would be uniform across their possible ranges while the second would suggest that the mean value of the parameter should approach the mid-point of the range. It should be noted that the hypothesis does not imply that each company does not consider its own issue price to be of importance or that companies do not have bona fide reasons for their choice of issue price. Rather we are testing whether there is an observed general level of concensus between companies on the level of the subscription price in a rights issue.

Since the issue price is irrelevant there is no benefit to be gained by choosing a specific subscription price, thus we would expect the issue price to be uniformly distributed. In testing this hypothesis we should be mindful that the tails of the distributions may be influenced by the following aspects. The primary risk of a rights issue, that is, the possibility that the current share price will fall below the subscription price, suggests that both parameters will exhibit a 'thin' tail at the top limit. In the case of the simple, but not the allowable range, parameter the nominal share value constraint on the issue price will result in a similar effect⁴⁶ at the bottom limit.

⁴⁶ This, of course, is a major criticism of this parameter

Inspection of the data for the two parameters, see Table 4.2, indicates that the distributions are far from uniform⁴⁷ even allowing for the unquantified distortions mentioned earlier.

Alternatively, we could postulate that the mean value of the distribution should approach the mid-point of the range, that is, 50 per cent.⁴⁸ After all, a parameter which is dependent on many random influences will exhibit a tendency to regress towards the mean. The central limit theorem would argue that the distribution of the means would be normal, even though the population was non-normal, and this would allow the use of the z-test to determine whether the estimate of the sample mean deviates significantly from the expected value.

The simple estimate, using the expected value of 50 per cent, produces a calculated z-value of 14.9, which is statistically significant at better than the 0.1 per cent level. Although this is strong evidence to suggest that, on average, the companies followed a high issue price strategy we must be mindful that there appear good reasons to believe that this parameter has little meaning in the context of interfirm comparison.

The use of the allowable range variable produces a calculated z-value of 1.62 which is not statistically significant at the 10 per cent level for a double tailed test. Thus we do not have sufficient

⁴⁷ To illustrate the degree of deviation from the expected uniform distribution the calculated chi-square for the simple parameter is 104.0 on 9 degrees of freedom, which is statistically significant at better than the 0.1 per cent level. We should bear in mind, however, the influences of 'thin' tails.

⁴⁸ Again, we should note the 'thin' tails effect.

Table 4.2 Comparison of simple discount and discount within allowable range for 108 rights issues of 1976

Class boundary expressed as a percentage	Frequency	
	Position of issue price within allowable range	Simple position of issue price
90 - 100	-	1
80 - 90	1	18
70 - 80	29	66
60 - 70	30	11
50 - 60	18	6
40 - 50	7	1
30 - 40	5	-
20 - 30	5	1
10 - 20	2	2
0 - 10	11	2
Summary statistics		Percentage
Median	62.5	76.1
Weighted mean	53.6	71.6
Standard deviation	23.1	15.1
z (calc)(a)	1.62	14.9

Note:

(a) The z-value was calculated using the formula, see Yeomans (1968, p.74),

$$z(\text{calc}) = \frac{\bar{x} - \mu}{s/\sqrt{n}}$$

where \bar{x} = mean
 μ = critical value
 s = standard deviation
 n = sample size

evidence to reject the null hypothesis that states that the weighted mean of the empirical data does not deviate significantly from the hypothesised mid-point of 50 per cent. Acknowledgement of the primary risk must increase the z-value, nevertheless, we can be confident that the results of the allowable range parameter are far closer to our expectations than those of the simple discount measure.

4.4 Concluding remarks

This chapter arrives at the following conclusions. First, there is good reason to reject the conventional, simple position of the issue price when it is measured solely against the current market price. Using this parameter specification leads to the conclusion that the majority of companies, in the sample, followed a high issue price strategy. This conclusion is mooted to be erroneous.

Second, the concept of the allowable range is theoretically consistent in that it not only measures the position of the issue price within the practical limits, but as predicted by theory, also measures the position of other important factors of a right rights issue; that is, the rights ratio and the theoretical ex-rights price. When this parameter is used to measure the position of the issue price we arrive at a conclusion that is not inconsistent with the published evidence on the efficiency of rights issues.

Finally, within the context of efficient markets one may ask why it is necessary to measure the position of the issue price. The

answer to this criticism is clear and simple. Firstly, it is necessary to continually test the market for imperfections; secondly, it is obviously impossible to determine how measures of inefficiency, abnormal returns, etc., relate to a specific parameter unless the parameter can be measured and characterised in a reliable and adequate fashion.

Chapter 5 Terms of Option Contracts: Adjustments for Rights Issues

5.1 Introduction

The aim of this chapter is first, to investigate the theoretical approach to the adjustment of the terms of a call option contract so as to incorporate the inherent dilution of a rights issue. Second, to make a comparison of the theoretical approach with the practice currently adopted by The Stock Exchange in the operation of their Traded Call Option Market. Finally, to determine whether the observed differences can be exploited to produce a profitable trading rule.

The problem will be initially approached from the stance that the net wealth of the option holder, in a perfect market, should not be affected by the rights issue. Such an argument would appear to be a reasonable extension of our understanding of the effects of a rights issue on the net wealth of the shareholder. Furthermore, we shall explicitly assume that the size of the option contract, as a proportion of the issued equity of the company, will not change; that is, in the case of a rights issue the number of shares specified in the option contract will be increased pro rata to the inherent scrip element.

5.2 Adjustments for scrip issues

As implied in the simple example used in the publicity material issued by The Stock Exchange (1981, p.17), a scrip issue requires that both the exercise price and the number of shares specified in the option contract are adjusted. The value of an option, within the assumptions of a perfect market, is given by $\text{Max}(0, S-E)$ where S is the current market price and E is the exercise price.⁴⁹ At this stage of the analysis we shall assume that $S > E$ and thus we are denying the possibility of an "out of the money" option. This assumption will be relaxed at a later stage of the analysis. Assuming that the net wealth of the option holder is not affected, the model to respecify the option contract is shown in Table 5.1, where

$$A*(S-E) = A'*(S'-E'), \quad (1)$$

is a necessary condition for financial indifference. S' represents the ex-scrip share price and will be defined by $(S*B)/(B+1)$ where B is the scrip ratio of one new share for every B held.

However, we still have two unknowns, A' , the post-scrip issue number of shares per option contract and E' , the post-scrip issue adjusted exercise price, and only one equation and thus a unique solution is not possible. If we accept that a scrip issue is solely the cutting of the corporate pie into smaller pieces, then there is support for the argument that the option contract should refer to a fixed proportion of the issued equity, both before and after the

⁴⁹ The argument by Merton (1973, p.145) that the intrinsic value of an option is $\text{Max}(0, E_r)$ where r represents the present value of a riskless bond that pays one pound at the expiration date is acknowledged. Since it is a common factor throughout the analysis to follow, it has been ignored.

Table 5.1 Adjustment to the terms of an option contract, scrip issue (a)

Time	Number of options per contract	Intrinsic value of each option	Value of portfolio
Pre-scrip issue	A	S - E	A (S - E)
Post-scrip issue	A'	S' - E'	A'(S' - E')

Note:

(a) Assuming unchanged wealth of the option holder in a perfect market

scrip issue. After all, an option is the right to purchase a stock or share at a given price within a specified time period; and a share represents a given proportion of the future income stream of the firm together with the same proportion of any disposal value. Thus in order to take into account the scrip issue dilution, the adjusted number of shares specified in the option contract will be given by,

$$A' = A * \frac{(B + 1)}{B} \quad (2)$$

Substitution of A' into equation (1) gives,

$$E' = E * \frac{B}{(B + 1)} \quad (3)$$

Thus when a scrip issue occurs the exercise price is reduced by dividing by the correction factor, (B+1)/B, and the number of shares

in the contract is increased by multiplying by the same factor.⁵⁰

5.3 Adjustments for rights issues

The implied dilution in a rights issue can be measured by the equivalent scrip issue that would result in an identical fall in price from the current market value to the theoretical ex-rights price.⁵¹

A shareholder who follows a null cash change strategy in a rights issue, that is, sells sufficient rights to be able to subscribe to the remaining shares does not suffer a change in net wealth and, therefore, is only affected by the scrip issue effect.⁵² The perfect market approach predicts the ex-rights share price as $(S*R+P)/(R+1)$ where R is the rights ratio and P is the subscription price. Therefore the equivalent scrip issue of shares is given by the equation,

$$S*No = (No + Ns) * \frac{(S*R + P)}{(R + 1)} \quad (4)$$

where No represents the existing shares and Ns defines the inherent scrip issue of equity. Solving for Ns gives,

$$Ns = No * \frac{(S - P)}{(S*R + P)} \quad (5)$$

Since by definition, $B = No/Ns$, then

⁵⁰ As argued by Merton (1973, p.152).

⁵¹ See Levy & Sarnat (1971, p.841) or Keane (1972, p.40).

⁵² See Chapter 2.

$$\frac{B + 1}{B} = \frac{(S * R + S)}{(S * R + P)} \quad (6)$$

Following on from the logic developed earlier for the case of a scrip issue, the adjustments to be made to the terms of the option

Table 5.2 Adjustment to the terms of an option contract, rights issue

Procedure	Time	Number of options per contract	Value of exercise price
	Pre-rights issue	A	E
Theory	Post-rights issue	A* $\frac{(S * R + S)}{(S * R + P)}$	E* $\frac{(S * R + P)}{(S * R + S)}$
Stock Exchange	Post-rights issue	A	E - $\frac{(S - P)}{(R + 1)}$

contract due to a rights issue are shown in Table 5.2. We should note that when the issue price, P, is set to zero we arrive at the case of a pure scrip issue; in this situation the correction factor reduces to (R+1)/R, which since R will then be equal to B, is the correction factor developed earlier.

The current practice adopted by The Stock Exchange in their Traded Options market requires that only the exercise price is

adjusted in the case of a rights issue.⁵³ The exercise price, as is shown in Table 5.2, is reduced by the value of a right. The number of shares specified in the contract, normally one thousand, remains unaltered. It would appear at first sight, within the assumptions of a perfect market, that the net wealth of the option holder is not affected by this adjustment procedure, since the fall in the exercise price is equal to the drop in the price of the underlying security, viz,

$$\frac{(S \cdot R + P)}{(R + 1)} - E + \frac{(S - P)}{(R + 1)} = S - E. \quad (7)$$

Market		Adjusted		Original
price	-	exercise	=	intrinsic
ex-rights		price		value

Provided the wealth of the option holder is defined as the product of the intrinsic value and the number of shares per option contract, then there is no reason to believe that The Stock Exchange's procedure results in a change in the net wealth of an option holder. However, it would appear that the method contravenes the constraint associated with the constancy of a fixed proportion of the scrip adjusted equity. Brown and Shevlin (1982, p.5) raise the criticism relating to defects in the theoretical rights pricing model. Although such a comment is not without merit, we should note the following. First, stock markets have been shown to be efficient with respect to rights and scrip issues. Therefore, on average, the theoretical model will be a good estimate of the expected value.

⁵³ A similar procedure is adopted by the Australian Options Market, see, Sydney Stock Exchange (1980, p.29).

Second, the criticism could also be leveled at the adjustment required in the case of a scrip issue.

5.4 Relaxation of the perfect market assumption

Using the notion of stochastic dominance used by Merton (1973) and reviewed by Smith (1976) we can examine the values of two portfolios at the expiration date of the option. It should be noted that the argument, initially at least, does not rely either upon distributional assumptions or upon the process of generating share prices over time and, therefore, any conclusions reached can be considered completely general since it is not constrained by these assumptions. Initially we shall invest a fixed sum of money into two options, of the same underlying security, of different exercise prices but the same expiration date, such that the intrinsic value is used as the factor to determine the number of options purchased. Portfolio X, the theoretical model, contains x options $O(S, T, E_1)$ and Portfolio Y, The Stock Exchange's procedure, contains y options $O(S, T, E_2)$.⁵⁴ Then the relationship between the two portfolios can be written as,

$$x^* (S-E_1) = y^* (S-E_2) \quad (8)$$

Portfolio x, theoretical model	=	Portfolio y, Stock Exchange's procedure
--------------------------------------	---	---

⁵⁴ The notation $O(S, T, E)$ represents the value of an option with exercise price E at terminal date T when the current market price of the underlying security is S .

As shown in Table 5.2, the difference between the theoretical and practical ex-rights issue exercise prices is given by,

$$E1 - E2 = E * \frac{(S * R + P)}{(S * R + S)} - E + \frac{(S - P)}{(R + 1)}$$

$$= \frac{(S - E) * (S - P)}{S * (R + 1)} \quad (9)$$

For all conventional rights issues $S > P > 0$ and $R > 0$.

Thus $E1 - E2 = (S - E) * k$ where $k = (S - P) / (S * (R + 1)) > 0$.

Therefore

when $S > E$ then $E1 > E2$, an "in the money option"

when $S = E$ then $E1 = E2 = S$

when $S < E$ then $E2 > E1$, an "out of the money" option

The difference between the number of shares per option contract contrasting the theoretical model with The Stock Exchange's procedure is given by,

$$x - y = A * \frac{(S * R + S)}{(S * R + P)} - A = \frac{A * (S - P)}{(S * R + P)} \quad (10)$$

Since as discussed before, $S > P > 0$ and $R > 0$, then for all possible exercise prices it is necessary that $x > y$ as the exercise price is not a determinant of the difference. Thus for an "in the money" option $E1 > E2$ and $x > y$.

Table 5.3 presents the terminal values of the two portfolios for different share prices at the expiration date of the option. Having

Table 5.3 Terminal values (a) of portfolio X and Y at different share prices at the expiration date for the case where the option was "in the money" at the time of adjustment

Port- folio	Adjustment procedure	Current value	Share price at T = 0				
			$S \leq E2$	$E2 < S \leq E1$	$E1 < S^t < S$	$S^t = S$	$S < S^t$
X	Theory	$x * O(S, T, E1)$	0	0	$x * (S^t - E1)$	$x * (S^t - E1)$	$x * (S^t - E1)$
Y	Stock Exchange	$y * O(S, T, E2)$	0	$y * (S^t - E2)$	$y * (S^t - E2)$	$y * (S^t - E2)$	$y * (S^t - E2)$
	Relationship between terminal values of portfolios (c) X and Y				$V^t(X) < V^t(Y)$	$V^t(X) < V^t(Y)$	$V^t(X) = V^t(Y)$
					$V^t(X) > V^t(Y)$	$V^t(X) > V^t(Y)$	$V^t(X) > V^t(Y)$

Notes:

- (a) Terminal value of option $O(S, 0, E1)$ is $\text{Max}(0, S^t - E1)$.
- (b) Based on intrinsic value such that $x * (S - E1) = y * (S - E2)$.
- (c) When $S^t > E1$, let $S^t = S + D$. But since $x * (S - E1) = y * (S - E2)$, then $V^t(X) - V^t(Y) = D * (x - y)$ where $x > y$ for an "in the money option".
 When $D < 0$ then $V^t(X) < V^t(Y)$
 When $D = 0$ then $V^t(X) = V^t(Y)$
 When $D > 0$ then $V^t(X) > V^t(Y)$.

used the dominance approach we must come to the conclusion that neither portfolio is dominant over the other within the weak assumptions that were initially posited. It is necessary, therefore, to make specific assumptions concerning the distribution of the terminal share price, S^t , in order to be able to determine the comparative present values of the two portfolios.

First, it would appear reasonable to suggest that our best estimate of the terminal share price will be the current share price,⁵⁵ that is,

$$E(S^t) = S. \quad (11)$$

Second, without hypothesising the form of the distribution of the terminal share price, we shall assume that there is an equal probability that the terminal share price will be greater than the current share price, and vice versa. Thus,

$$\text{Probability } (S^t > S) = \text{Probability } (S^t < S) = 0.5. \quad (12)$$

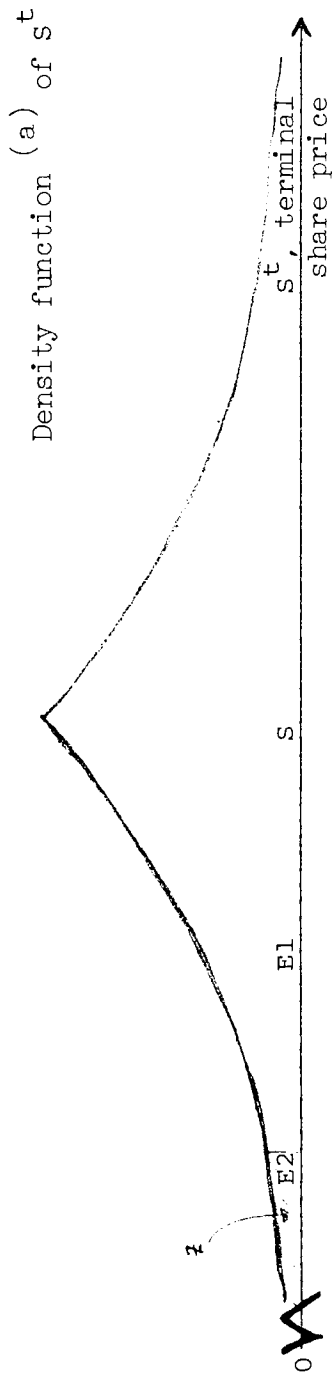
Thus, it is argued, this analysis is free of distributional assumptions and therefore the conclusions are completely general.

As illustrated in Table 5.4, simple probability theory shows that,

$$\begin{aligned} \text{Probability } V^t(X) > V^t(Y) &= 0.5 \\ \text{Probability } V^t(X) = V^t(Y) &= z \\ \text{Probability } V^t(X) < V^t(Y) &= 0.5 - z \end{aligned}$$

⁵⁵ Although this is a sound statistical assumption, the possibility of positive or negative drift should not be ignored. The former would appear to reinforce the current argument whereas the latter may tend to detract from it.

Table 5.4 Comparison of terminal values of Portfolios X and Y at different share prices at the expiration date for the case where the option was "in the money" at the time of adjustment



$$v^t(X) > v^t(Y)$$

$$v^t(X) = v^t(Y)$$

$$v^t(X) < v^t(Y)$$

Note: (a) The form of this distribution is non-specific.

where z represents the probability that the terminal share value will fall to, or below, The Stock Exchange's adjusted exercise price, that is, $S^t \leq E2$. A priori considerations would suggest that the only boundary constraint on the terminal share price is that it has a zero probability of becoming negative.⁵⁶ Since z cannot be negative we get,

$$E(V^t(X)) \geq E(V^t(Y)) \quad , \quad (13)$$

and since the expected terminal values can be discounted to a present value, then,

$$V(X) \geq V(Y) \quad . \quad (14)$$

Hence the present value of The Stock Exchange's procedure, Portfolio Y, is less than, or at best equal to, the present value of the theoretical model, Portfolio X. This conclusion is a direct consequence of the logic that investors prefer more to less. Given the choice between the two portfolios, they would show preference for Portfolio X. The direct implication of this analysis is that the procedure adopted by The Stock Exchange to adjust "in the money" options for rights issues, results in the option holder suffering a negative abnormal return.

So far the analysis has been concerned solely with "in the money" options. As shown in Table 5.4, the adjustments to "out of the money" options results in The Stock Exchange's producing a higher exercise price than that predicted by theory, that is, $E2 > E1$; yet the same relationship for the number of shares per option contract

⁵⁶ This limited liability argument is one of the reasons for postulating a log-normal distribution for the terminal share price, see, for example, the review by Smith (1976).

still holds, viz, $x > y$.

Repeating the analysis we arrive at the data presented in Table 5.5; where totally independent of all terminal price probability assumptions we find that Portfolio Y, The Stock Exchange's procedure, is always dominated by the theoretical approach, Portfolio X, that is,

$$V^t(X) \geq V^t(Y) \quad . \quad (15)$$

It should be noted that this is a powerful argument since it does not rely, explicitly or implicitly, on any assumptions concerning the distribution of the terminal share price.

Thus, no matter whether the option is "in the money" or "out of the money" The Stock Exchange's adjustment procedure produces a negative abnormal return to the option holder. Therefore, the option writer must benefit from a corresponding positive abnormal return. A well-known principle of option trading is that the premature exercise of an option should not occur except possibly just prior to certain events.⁵⁷ One such event is a change in the exercise price. The Stock Exchange's treatment of the adjustment to a traded call option when the underlying security is subjected to a rights issue would appear to be good reason for premature exercise.

⁵⁷ See Merton (1973).

Table 5.5 Terminal values of Portfolios X and Y at different share prices at the expiration date for the case where the option was "out of the money" at the time of adjustment

Portfolio	Adjustment Procedure	Current Value	Share price at T = 0		
			$0 \leq S^t \leq E1$	$E2 \geq S^t > E1$	$S^t > E2$
X	Theory	$x^* O(S, T, E1)$	0	$x^*(S^t - E1)$	$x^*(S^t - E1)$
Y	Stock Exchange Relationship between terminal values of portfolios (a) X and Y	$y^* O(S, T, E2)$	0	0	$y^*(S^t - E2)$
			$v^t(x) = v^t(y)$	$v^t(x) > v^t(y)$	$v^t(x) > v^t(y)$

Note:

(a) When $S^t > E2$ put $D = S^t - E2$, thus $v^t(x) - v^t(y) = x^*(E2 + D - E1) - y^*(E2 + D - E2) = (x - y) * D + x^*(E2 - E1)$.

But since $x > y$, $E2 > E1$ and $D > 0$ then $v^t(x) > v^t(y)$.

5.5 Concluding remarks

Having reviewed the theoretical and practical approach to the adjustment of the terms of an option contract when the underlying security is affected by a rights issue, we can arrive at the following conclusion. It would appear that The Stock Exchange is inconsistent in the treatment of rights issues and scrip issues. Assuming that the scrip issue approach is fundamentally correct, the a priori approach agrees with the procedure adopted by The Stock Exchange, then the specification for the adjustment required in the case of a rights issue is incorrect. We can arrive at no other conclusion.

If the stock market is efficient this observation should not be capable of being used profitably by traders. This would appear to be an area for further research.

Chapter 6 Research Methodology

6.1 Variables associated with the success of a rights issue

6.1.1 Introduction

In reviewing the factors that influence the success of a rights issue, Van Horne (1975) suggests that the size of the issue in relationship to the current capitalisation of the firm is important. He also indicates that the mix of shareholders, particularly the breakdown between private and institutional stockholders, may also have a bearing upon the success of the rights issue.⁵⁸ Finally, he acknowledges that the trend and tone of the market is important. Weston & Brigham (1979) in their British Edition are conspicuous by the absence of comment on the important determinants of a successful rights issue. Samuels & Wilkes (1971) agree that the size of the issue is important and infer that the issue price - a determinant of the size of the issue - and investors' expectations of the return on the new capital, should also be given consideration.

Empirical research by Bacon (1972) found that the discount, based on the share price seven days before the issue was announced, produced a correlation coefficient of 0.346 on 39 degrees of freedom

⁵⁸ The argument offered by Van Horne (1975, p.331) that "... there are times when the market is so unstable that an offering will have to be postponed." implied in the argument that the greater the underpricing that will be necessary, is considered to be poorly founded. Such an argument is a good reflection of a non-rights, new issue, but as will be argued later, there are sound reasons to believe that a rights issue should always be a total success even without recourse to an underwriting facility.

which is statistically significant at the 2.5 per cent level. He suggested that, p.61,

"... there is a strong theoretical basis for assuming a positive correlation between the relative size of the discount and the success of the issue."

and discussed the following three points. First, if the shareholder neither subscribes to the issue nor sells his rights, he will suffer a loss in wealth. Such an argument is correct in the situation where the unsubscribed shares are sold for the benefit of the company. But such a mechanism, which must be detailed in the Memorandum and Articles of Association of the company and mentioned in the circular/prospectus announcing the rights issue to shareholders, is uncommon in the UK. Almost invariably the unsubscribed shares are sold for the benefit of entitled shareholders.⁵⁹ It should be noted that Bacon's study relates to the USA where practice may well differ from the UK. Over forty years ago, Dewing (1941, p.1197) commented,

"One legal authority has contended that the corporation should sell unsubscribed stock and account to the shareholder for his lapsed premium."

and this may give an insight to the procedures normally adopted in the USA. The primary reason for marketing unsubscribed shares for the benefit of entitled shareholders centres around the possibility that some shareholders may not receive their allotment letters and thus the procedure provides a basic degree of shareholder protection. Smith (1977, p.275), more recently, has argued along similar lines when he stated,

⁵⁹ As would appear to be quite logical, fractional entitlements and net proceeds of less than one pound are often retained by the company since their distribution is not economical.

"If the shareholder does not exercise his rights ... , his wealth is reduced by the market value of the rights."

Second, and highly dependent upon the earlier argument, is the logic that the greater the discount the greater the loss the shareholder will suffer if he does not take a positive action. Finally, there is the trade-off between a high discount and the implied scrip issue effect. It is admitted that the implied dilution will effect the financial ratios of the company, for example, earnings per share, etc., but as is the case with scrip issues, it is normal for the financial ratios to be corrected for the implied scrip element.⁶⁰ Block (1965) suggests that such adjustments may not have been automatically accepted in the USA.

Briston & Cottam (1970) reported that there did not appear to be any correlation between either the discount or the reasons for the issue and the level of acceptances.⁶¹ Briston & Herbert (1972, p.91) stated that,

"... a rights issue of equities ought never to fail if it is priced correctly ...".

The argument for the automatic success of a rights issue, which we can define as the marketing of all of the shares at the issue price,⁶² hinges on the fact that provided the primary risk aspect is

⁶⁰ -----
As is recommended in SSAP 3.

⁶¹ Although it should be noted that they did not present data to confirm this conclusion.

⁶² More correctly we mean that the company receives all its expected subscription monies and the new shares are sold at a premium, if any, to the subscription price.

avoided, a right must always be a security of value. The primary risk encountered in a rights issue is that of the current market price of the shares falling below the issue price. Thus in the absence of speculative interest, making the right valueless. Hence if the new shares are rejected by the existing shareholders, then since the rights have a positive value, they can be sold in the market at a premium to their issue price.⁶³ The premium can be distributed as defined by the rules and regulations of the company. If this logic is correct, then the need for the underwriting of a rights issue has little obvious foundation as an insurance policy. This argument is substantially correct if the underwriting function is perceived to be an insurance against the rights becoming a worthless security, that is, the primary risk. Thus as argued by Briston (1972) and others,⁶⁴ the choice of a low issue price would deny the need to underwrite the rights issue.

The characterisation of the dividing line between a successful and a non-successful rights issue is not easy to define. It is generally accepted, see, for example, Briston & Cottam (1970) and Dewing (1941), that a company can never achieve a hundred per cent acceptance of the new shares offered. Possible reasons, other than the positive decision on the part of a shareholder to take no action, for non-subscription would include such aspects as the allotment letter may have been lost in the post, inadvertently destroyed, misinterpreted as not being of any importance, etc.. Dewing

⁶³ See Scholes (1972).

⁶⁴ See, for example, Newbould (1970).

(1941 p.1196-1197) cites the case of The American Telephone and Telegraph Company, who inspite of extraordinary efforts to acquaint their shareholders on the importance of the rights issue, found that approximately one half of one per cent of the issue was not subscribed. Although to suggest an acceptance rate of 99.5 per cent represents the dividing point between success and failure would appear to be somewhat extreme; Briston & Herbert (1972) suggest that a rate below 90 per cent can be considered a "total failure". However, the observation that the mean acceptance rate of the 108 rights issues investigated in this study was 89 per cent would indicate that such a criterion would result in approximately half of the issues being classified as failures. Therefore, it is considered prudent not to propose a boundary between success and failure. The Lex Column (1979b) provides an insight as to why rights issues apparently achieve a low subscription rate when it is suggested,

"... very often the underwriters are the same big funds which failed to take up the rights issue, and are prepared to get the shares as underwriters instead."

By accepting the shares as underwriters, rather than as pre-emptive shareholders, it would appear that the institutions would benefit from the discount implied by the delayed payment of the subscription monies.⁶⁵

The only empirical study that could be found was by Edge (1965b) who examined two groups of 17 rights issues in 1957/8 and 1959. The analysis was confined mainly to the reactions of small personal,

⁶⁵ Whatever their action, they would still benefit from the underwriting premium.

presumably private, shareholders whose holding was registered in the name of either one individual or the joint names of husband and wife. Her primary source of data was the relevant company share registers.

6.1.2 The variables

Chapter 7 presents the empirical results of a study which investigated the association of 38 variables on the success rate. The study sampled 108 of the 130⁶⁶ rights issues that were made on The London Stock Exchange during 1976. The issues investigated fell with the following classification:

- (i) the issue of Ordinary shares;
- (ii) the company had been in existence for three or more years;
- (iii) the company was based in the United Kingdom and the shares were denominated in sterling;
- (iv) due to problems associated with the measurement of their turnover, all companies that were classed in the Financial Times Newspaper as Banks, Hire Purchase and Insurance were excluded from the study.

18 issues were rejected since they did not meet the requirements listed above. This left 4 rights issues that could not be traced.

Correlation analysis, see Yeomans (1968a), was used to determine the association between the acceptance rate and seven transformations of each variable; the transformations investigated were sim-

⁶⁶ See Midland Bank Review (1977).

ple, logarithm to base 10, inverse, square, inverse square, square root and the inverse square root. Various transformations were investigated because the relationships may well be non-linear. At the outset of the study it was decided to seek a criterion of coefficient of determination greater or equal to 0.10, that is, the variable will explain 10 per cent, or more, of the variation in the acceptance rate distribution, before it would be classified as being important. For 106 degrees of freedom the implied correlation coefficient of 0.31 is statistically significant at the 0.1 per cent level for a double tailed test. The 'success' of the rights issue is defined as the ratio of shares subscribed to the number of shares offered, expressed as a percentage. The code ACC is used to represent this variable.

The variables fell into two categories, weighted and unweighted. Unweighted variables refer to the results available from the latest company Report and Accounts. The weighted and also the growth variables were generated from data obtained from the three annual report and accounts prior to the announcement of the issue. Thus due to the different financial calendars of the companies sampled, there is a small inherent error in the time basis on which the data was measured. The weighted variables were calculated using the equation,

$$F(w) = 0.7 * F(1) + 0.2 * F(2) + 0.1 * F(3) \quad (1)$$

where $F(w)$ = weighted variable

$F(x)$ = value of variable from the annual accounts for
x years prior to the announcement

and were used to determine whether the success of the rights issues studied were more dependent upon a medium term⁶⁷ view rather than on the latest results available. The weightings used can be criticised as being artificial, but in the absence of alternative information they are believed to be adequate.

In the next section we detail the reasons for the choice of the variables examined in the empirical analysis presented in Chapter 7. The major financial variables of the companies analysed fell into the following categories: size, growth, issue factors, discount and share price parameters, gearing and profitability. It should be noted that the majority of these variables were extracted from the Report and Accounts of the respective companies and so suffer from the inherent problems associated with historic accounting practice. These would include asset revaluations, depreciation policies etc., however, in spite of their defects accounting information represents the best available information. Market indicators were also used. In total 38 variables were examined.

(a) Size variables. Size can be considered to equate with safety. Since it is not obvious which size parameter would be of importance it was decided to use eight estimates in the analysis. The market capitalisation of the ordinary shares at the date the issue was announced (S1), the corrected market capitalisation⁶⁸

⁶⁷-----
⁶⁷ Singh (1971) used both a 3 and 6 year period.

⁶⁸ Market capitalisation (S1) divided by the Financial Times 30 share Index to attempt to account for changes in general price levels.

(S2), net assets⁶⁹ (S7) and weighted net assets (S4) from the latest balance sheet together with the turnover (S5) and weighted turnover (S6) from the latest accounts require little comment.

The valuation factor (S8) defined as the ratio of market capitalisation (S2) and net assets (S7) has been used by other researchers,⁷⁰ and is claimed to normalise share prices. Conceptually, it should include the true economic value of the company and the use of balance sheet figures as a proxy⁷¹ must be considered a little crude.

The geometric mean of assets, turnover and number of employees (S3) was included to see if it would capture, in one statistic, three important characteristics of the firm. We can criticise this parameter as being patently artificial and it is unlikely that it would be used in a formal sense by a potential participant to a rights issue. Nevertheless, it does seek to acknowledge the trade-off⁷² between capital intensive and labour intensive operations compounded with high margins versus high asset turnover.

(b) Growth variables. A three year period was used to calculate the growth characteristics and the model used was

⁶⁹ Used by Singh & Whittington (1968).

⁷⁰ Mainly in research into mergers, see, for example, Firth (1976), Singh (1971) and Singh & Whittington (1968). This parameter was corrected by the Financial Times 30 share Index.

⁷¹ Following the basis adopted by the researchers cited earlier.

⁷² Consider, for example, the Du Pont formula:
Profit/assets = turnover/assets x profit/turnover.

$$\text{Growth} = \frac{1}{2} * \left\{ \frac{\text{year (t-2)}}{\text{year (t-3)}} + \frac{\text{year (t-1)}}{\text{year (t-2)}} \right\},$$

where t-x represents the value of the parameter x years before the rights issue. Growth in turnover (GR1) and growth in assets⁷³ (GR2) were used to determine whether the persuance of growth at the sake of short term profits was important. Growth in earnings per share⁷⁴ (GR3) has frequently been used by other researchers.

(c) Return on investment. These variables sought to determine whether the dividend ratio⁷⁵ was important. The ratio of proposed dividend to either the issue price (R1) or the theoretical ex-rights price (R2) represent the marginal return to the investor. It was considered that the return on the ex-rights price (R2) should be superior to the return on the issue price (R1) since the latter represents a naive view of the market's treatment of rights issues.

During 1976 the Government's restraint on dividend increases was in force and a company had to seek Treasury permission to exceed the 10 per cent limit. Rights issues were, however, a bona fide reason to increase dividends in excess of this limit. The increase in dividends (R3) ratio was incorporated to determine whether the parameter was important. The argument being that firms are reluctant

⁷³-----
Used by Singh & Whittington (1968).

⁷⁴ The after tax parameter was used. Firth (1976) prefers earnings before tax since he claims taxation is outside the control of management. However, we could argue that management should consider taxation in seeking to maximise profits. Post-tax measures of profit are considered more relevant to the shareholder

⁷⁵ Modigliani & Miller (1961) argue that the value of the firm is unaffected by dividend policy.

to either reduce dividends or to increase dividends to a level that cannot be maintained. The prime reason being that investors use changes in dividends as indicators of future financial performance.

(d) Issue variables. The variables, value of the issue (V1), number of new shares (V4), issue price (V5), rights ratio (V6) and the value of a right (V3), were included to measure the basic characteristics of the rights issue. The ratio of capital raised to current market capitalisation⁷⁶ (V2) was used to test the hypothesis of liquidity pressure. That is, it was believed that the greater the proportionate size of the issue the greater the resistance to subscription.

(e) Discount and share price. Chapter 4 discusses the allowable range parameter (PR10) in contrast to the simple discount (PR7). The discount in monetary terms (PR1) can be considered naive and attempts to determine whether the difference between the current market price and the issue price is associated with the success of the rights issues. Ceteris paribus, we would not expect this variable to be of importance. If the discount, contrary to perfect market theory, were to be significantly associated with the success rate, then we would expect either the percentage discount with respect to the current market price (PR7) or the allowable range parameter (PR10) to be of importance. The share price (SP1) was measured at the close of business on The Stock Exchange the day before the rights issue was announced. Although it was required primarily to calculate other variables, such as, the discount,

⁷⁶ See Van Horne (1975, p.330) and Samuels & Wilkes (1971, p.91).

market capitalisation etc., it was decided to include it in the analysis. The share price seven days before the announcement of the issue (SP7) was used to test whether potential information leaks were a significant factor.

(f) Gearing variables. The traditional approach to the financial structure of the firm⁷⁷ suggests that there is an optimal gearing level at which the value of the firm is maximised and it would not be unreasonable to propose that a similar environment or relationship could be applicable for the success of a rights issue. In an attempt to determine if there were an optimal gearing level in a rights issue, a variable was generated which measured the deviation from an arbitrary gearing level (G3). An optimum of 30 per cent was chosen which compared to the average gearing of the 108 companies studies of 27.9 per cent. Growth in gearing, see Tzoannos & Samuels (1972), was rejected for the very reason that the rights issue would immediately improve the gearing ratio.

The gearing ratio was defined as the percentage of fixed interest capital in the total capital employed of the company. Besides using the latest gearing ratio⁷⁸ (G2) it was decided to use a weighted ratio (G1) which would indicate if a longer term view were important.

⁷⁷ See Van Horne (1975, p.228)

⁷⁸ See Firth (1976)

(g) Profitability measures. An important factor in any economic environment is profitability and this is why most studies have included a measure of this parameter in their analysis. The parameter can be measured in a number of ways. The latest earnings per share statistic (P4) together with the weighted form (P1) would indicate the importance of the current profitability of the firm.⁷⁹ Earnings per share, per se, can be criticised⁸⁰ as not being uniform in the context of interfirm comparison, thus the earnings yield⁸¹ (P7) and corrected earnings yield (P6) may be considered superior statistics in that they incorporate the stock market's valuation of the equity. The profit to assets⁸² (P2) ratio and the weighted parameter (P3) measure an important characteristic of the firm and has been used in many studies. Finally, the dividend payout ratio⁸³ (P5) was included to test the importance of this parameter which in a perfect market is deemed to be irrelevant.

(h) Market indicators. The market indicators used in this study were the Minimum Lending Rate (MLR) and the Financial Times 30 share Index (SE). They were used to determine whether the tone of the

⁷⁹ It could be compared with the growth in earnings per share (GR4).

⁸⁰ The empirical studies of Kaplan & Roll (1972) on investment grants and depreciation changes and Hong, Kaplan & Mandelker (1978) on merger accounting, have provided evidence that investors value the cash flows of the company rather than the reported earnings per share.

⁸¹ Inverse of the price earnings ratio. Used by Firth (1976) and Tzoannos & Samuels (1972).

⁸² Used by Singh & Whittington (1968) and Firth (1976). It has also been termed return on capital employed.

⁸³ Used by Singh & Whittington (1968) as a retention ratio.

market⁸⁴ or the economic environment was associated with the success of the rights issues studied.

Liquidity ratios, such as the acid test and the working capital ratio, etc., were not considered since the rights issue would guarantee more than adequate liquidity in the short term.

6.1.3 Concluding remarks

The empirical evidence is presented in Chapter 7. The results exhibited a marked deviation from that expected on theoretical grounds and this led to the development of the hypothesis that some shareholders may take a naive view of a rights issue. Consequently, it was decided to investigate, using a postal questionnaire, the importance attached by private shareholders to the subscription price in a rights issue. This is discussed in the following section.

6.2 Private shareholders' knowledge of rights issues

6.2.1 Introduction

Permission was obtained from two public companies which were based in the Midlands to peruse their current share register and to despatch a postal questionnaire, containing a reply-paid envelope, to a random sample of their private shareholders. The questionnaires were despatched in early 1978. The questionnaire and the attached

⁸⁴ See Van Horne (1975, p. 330).

letter are shown in Tables 6.1 and 6.2.

Table 6.1 The questionnaire

PLEASE CIRCLE APPROPRIATE ANSWER
QUESTIONNAIRE

Q1 How do you personally feel about being asked to provide more money for the company?

- a. very pleased
- b. pleased
- c. neutral
- d. not pleased
- e. upset

Q2 Have you read the Memorandum and Articles of Association of the company?

- a. yes
- b. no

Q3 Did you consult an adviser on the recent Rights Issue?

- a. yes
- b. no

If the answer is 'yes' please state the type of adviser you consulted

- a. Stockbroker
 - b. Merchant Banker
 - c. Accountant
 - d. Bank Manager
 - e. Solicitor
 - f. Other (please specify
- -----

Table 6.1 continued

Q4 Do you think that you are getting a bargain if the issue price in a Rights Issue is below the current market price of the shares?

- a. yes
- b. no

If the answer is 'yes' do you agree with the statement "the greater the discount the greater the bargain"?

- a. yes
- b. no

Q5 In a Rights Issue who can buy the new shares at the issue price?

- a. any person who wishes to subscribe to the shares
- b. existing shareholders only

Q6 Shortly after a Rights Issue is announced (when the shares go ex-rights) how do you think the share price reacts?

- a. normally increases
- b. normally remains constant
- c. normally decreases

Table 6.1 continued

Q7 If a shareholder does nothing about the shares allotted

(1) which would you expect to happen in the short-term?

- a. nothing
- b. he will receive some money from the company after the end of the subscription period

(2) how is the shareholder affected in this situation?

- e. increase in wealth
- f. no change in net wealth
- g. decrease in net wealth

Q8 If the shareholder accepts the shares allotted to him how would you expect his net wealth to be affected in the short term?

- a. increase in net wealth
- b. no change in net wealth
- c. decrease in net wealth

If the shareholder sells the rights to the new shares how do you think his net wealth will be affected in the short term?

- d. increase in net wealth
- e. no change in net wealth
- f. decrease in net wealth

Table 6.1 continued

Q9 Do you plan your tax affairs (investments in the main) in order to minimise your tax burden?

- a. yes
- b. no

Did you consider your tax situation before making the decision on this Rights Issue?

- c. yes
- d. no

Do you think you have a reasonable understanding of Capital Gains Tax on Rights Issues?

- e. yes
- f. no

Do you think that this type of information should be on the prospectus/circular

- g. yes
- h. no

Q10 Do you think that the information given on the prospectus/circular has given you sufficient information (for your personal needs) about the general mechanism of Rights Issues?

- a. too much
- b. just right
- c. too little

Q11 In the recent Rights Issue please indicate the action you took

- a. accepted all the shares
- b. accepted some and sold some of the shares
- c. sold all rights
- d. did nothing

Table 6.1 continued

Q12 In the management of your investments will you please indicate the degree to which you utilise an expert

- a. never
- b. occasionally
- c. more often than not
- d. always

Q13 Please indicate the size of your shareholding in the company at the time of the Rights Issue

- a. up to 1000 shares
- b. 1000 to 5000
- c. 5000 and above

Q14 Please indicate your perceived employment status or that of your spouse. (If retired or unemployed please indicate main career status)

- a. management
- b. supervisory
- c. blue/white collar

Table 6.1 continued

Q15 Do you have a portfolio of shares? (shares
in three or more companies)

- a. yes
- b. no

If the answer is 'yes' would you
please indicate the estimate current
value of the portfolio

- c. up to 500 pounds
- d. 500 pounds to 10000 pounds
- e. 10000 pounds and above

Please use this space for any comments you
may wish to make

Table 6.2 The text of the covering letter

MC/SK/JED

Dear Sir or Madam

I am currently engaged in a study into shareholders' attitudes and understanding of Rights Issues. Last year

Limited carried out a Rights Issue and I have inspected the list of shareholders deposited with their latest annual returns and randomly chosen your name as part of my sample.

I would be pleased if you could find time to complete the enclosed questionnaire and return it in the stamped addressed envelope provided.

All information provided is of course anonymous and only a summary of the aggregated results will be published. Individually the returns will be treated with the strictest confidence.

Any comments you may like to make concerning the questionnaire will be appreciated.

Yours faithfully

S P Keef

The definition of "private" within the context of this research is that it specifically excludes all corporate and quasi-corporate stockholders; thus all names and addresses that inferred the possibility of a corporate identity, for example, nominees, executors,

joint holdings, the addresses of banks, solicitors or lawyers, etc., were ignored. The sample only included private shareholders whose address patently indicated a private residence.

In general a stratified sample was obtained from the register by using the following simple rules. First determine the "skip number"; thus if there were 1000 shareholders on the register and the goal was to generate a sample of 100, then the skip number would be 9.⁸⁵ Secondly, starting with the first entry in the register, the appropriate number of holdings was skipped and the next name and address was recorded. If the indicator fell on a non-private shareholder, then the next entry in the register was sampled. This process was repeated until the required sample size of 150 was realised. In this manner a sample was obtained which, due to the peculiarities of peoples' names and the order in which they are presented in the register, is believed to be as near to random as is reasonably practical. The survey achieved a gross response rate of 44.33 per cent. Of the 133 replies, 23 were rejected since there was no obvious attempt to answer the questionnaire,⁸⁶ this left a net response of 36.66 per cent.

It has been decided to keep the identities of the two companies confidential. Both operate in what can be termed the engineering sector of UK industry; one is an international company with operations in the UK and the Old Commonwealth, whilst the other operates

⁸⁵ -----
Ten less one to take into account the possibility of encountering a non-private entry.

⁸⁶ 20 of these could be classified as being polite whereas the other 3 were deemed to be impolite.

predominantly from the West Midlands. Thus in loose terms the companies can be considered to represent the two extremes of the engineering industry sector with one being cosmopolitan and the other being local with respect to their strategic sphere of influence. Although the two companies differ radically in size, as is illus-

Table 6.3 Brief financial information

	Company M	Company P
Capital employed, million pounds	26.8	4.2
Turnover, million pounds	150.0	9.3
Earnings per share, pence	17.7	12.5
Dividend per share, pence	4.95	4.38

Sources: Respective companies' Reports and Accounts, 1977

trated by Table 6.3, their share prices, as supported by their earnings and dividend per share statistics, were not fundamentally different at the time the research was carried out.

We can claim that the results of this study are applicable to private shareholders of engineering sector companies but at first sight it would appear debateable whether they can be construed as being representative of the body of private shareholders as a whole. However, as will be shown later in Chapter 7, the observation that the greater majority of the respondents claimed to own a portfolio of shares would strongly suggest that such a claim can in fact be supported by the evidence.

Without discussing at any great length the conceptual problems associated with the responses of unsolicited and confidential postal questionnaires, the reader will be aware of the following problems. Firstly, there may be a bias due to the characteristics of the person who positively responds to a postal questionnaire; thus even though the respondents are believed to be reasonably representative of the original random sample, as shown later by their response to the size of their shareholdings, there still remains the possibility of a hidden bias. Secondly, there is the problem of "truthful" or accurate answers. In an anonymous questionnaire, there is no satisfactory method that confirms, beyond a shadow of doubt, that the respondents have replied truthfully to the questions. In this study there was a validation question which gave some measure of the degree of confidence in the replies. Thirdly, there is the communication problem; does the respondent understand the question and does he or she attribute to it the same meaning as does the researcher?

The straightforward nature of the questions in the questionnaire and discussions with colleagues on its appropriateness, indicated that a pilot study was not necessary. The respondents were given the opportunity to make comments where appropriate. Ignoring the facetious and rude replies, these comments proved to be reasonably helpful. They did not indicate that the respondents encountered problems with the questionnaire.

The success of a questionnaire hinges, to a great extent, upon the communication between the researcher and the respondent. The

three words "consult", "utilise" and "use" can be considered interchangeable and of very similar meaning. Thus the terminology of "utilise an expert" and "consult an adviser" should be perceived by the respondent to mean the seeking of an opinion by a person who they believe is better informed than themselves. The word "bargain" is defined⁸⁷ as "thing acquired or offered cheap" and it is contended that the word is commonly used in this context nowadays, particularly with respect to consumer purchases. We have used the respondents self definition of what is an expert/adviser, however, the questionnaire requested them to state the type of adviser they consulted.

The major statistical tool used in this study is chi-square analysis. The users of this test have normally supported the adage "the minimum expected cell size should exceed 5". However, Fienberg (1979) argues that this is a rather conservative approach based on the practical experience of eminent statisticians⁸⁸ in the pre-computer era. He states that Monte Carlo studies have indicated that goodness-of-fit statistics often achieve the desired result when minimum expected cell values are approximately unity. The analysis used in this study will follow the arguments of Fienberg and will tolerate contingency tables with a relatively high proportion of cells with expected values less than 5 but greater than unity.

⁸⁷-----
see Concise Oxford Dictionary (1961, p.92).

⁸⁸ Such as Fisher and Cochran.

⁸⁹ In hindsight, it may have been advantageous to have measured

It was decided not to seek the age and sex⁸⁹ of the respondents for two primary reasons. Firstly, such attributes have already been measured in both the UK and USA and, furthermore, there is considerable agreement between the two studies. Table 6.4 compares the findings of Lee & Tweedie (1975a) in the UK and Lease, Lewellen & Schlarbaum (1974) in the USA with respect to the gender of their

Table 6.4 Sex distribution of private shareholders

	Number of respondents		Total
	Lee and Tweedie (1975a)	Lease, Lewellen and Schlarbaum (1974)	
Male	301	792	1093
Female	63	198	261
Total	364	990	1354

Note:

(a) Calculated chi-square is 1.251 on 1 degree of freedom.

respondents. The low chi-square statistic of 1.25, which on 1 degree of freedom is not statistically significant at the 10 per cent level, illustrates the close agreement between the two studies. Similarly, when the age distributions of these two studies are compared, particularly when drawn as an ogive to overcome the problem associated with the choice of different class boundaries, we arrive at the same conclusion. Secondly, an unsolicited questionnaire pre-

these two attributes. It would have allowed a further comparison with the studies of Lee and Tweedie.

sents a trade-off to the researcher in that there is a limit to the number of questions that can be presented to the target. Although we can postulate a number of hypotheses relating to the age and sex of the private shareholder, for example, increased age should be associated with increased knowledge and, possibly with less confidence, that females are less knowledgeable on financial matters than males,⁹⁰ it was decided to accept the loss of such tests in order not to make the questionnaire overly long.

6.2.2 Representativeness of respondents to sample

When the random samples were being extracted from the register, the number of shares owned by each sample was recorded and this allowed the calculation of an estimate of the representativeness of the respondents to the original sample. Table 6.5 shows the distributions of the size of shareholding for the two sets of shareholders; contrasting the sample population with the respondents' answering the question,

"Please indicate the size of your shareholding in the company at the time of the rights issue."

When the "no reply" results are excluded, as was the practice throughout this study, the calculated chi-square statistics are below the critical value of 4.605 for a statistically significant association at the 10 per cent level on 2 degrees of freedom. Thus, we can reject the supposition that the respondents, taken as a whole, are a poor measure of the private shareholders sampled,

⁹⁰ See for example, Lee & Tweedie (1975b, p.12) with reference to understanding of financial reporting practice.

Table 6.5 Relationship between sample and respondents by size of shareholding

Size of shareholding in shares	Company M		Company P	
	Sample	Respondents	Sample	Respondents
No reply	-	3	-	3
Up to 1,000	104	34	71	25
1,000 to 5,000	41	18	65	22
5,000 and above	5	0	14	5
Total	150	55	150	55
Chi-square	2.526 on 2 df.		0.018 on 2 df.	

which, in turn, are a random sample of the private shareholders recorded in the share registers of the two companies.

The Report and Accounts, 1977, for Company M detail the various categories of shareholder and the size of their holding. The data for private individuals gives a good illustration of the Pareto Principle with 82 per cent of the holdings being classified as attributed to individuals who controlled, in aggregate, less than 7 per cent of the Ordinary equity. From this data we can estimate the average shareholding of a private individual, in Company M, as 1,477 shares. It is difficult to make a meaningful comparison with the aggregated data for the sample and respondents, as shown in Table 6.5, for obvious reasons. We can infer that the distribution of the size of private individuals' shareholding is positively skewed. This is confirmed in Table 6.6, which shows the distribu-

tion of shareholding size for Company M in a less aggregated form; the weighted mean shareholding for the sample was 2,386 which must be accepted as being radically different from the estimates calcu-

Table 6.6 Distribution of holding size of survey sample for Company M

Size of shareholding in shares	Frequency: number in sample
below 501	69
501 to 1,000	35
1,001 to 2,000	25
2,001 to 3,000	8
3,001 to 4,000	6
4,001 to 5,000	2
5,001 to 6,000	0
6,001 to 7,000	2
above 7,000	3 (a)
Total	150

Note:

(a) The three shareholdings in excess of 7,000 shares accounted for 55 per cent of the weighted total of shares.

lated by reference to the Report and Accounts. However, the occurrence of a single private shareholder who owned in excess of 40 per cent of the shares represented in Table 6.6 tends to cloud the result. The exclusion of this single piece of data results in a

weighted average shareholding of 1,242 which can be considered nearer the previously mentioned estimate. The Report and Accounts of Company P did not detail information on the size and characteristics of their shareholders, so a similar form of validation analysis could not be carried out.

6.2.3 Concluding remarks

Chapters 8, 9 and 11 present the empirical examination of the data generated by the postal questionnaire. Chapter 8 consists of a preliminary examination of the data and compares these results with other studies. Chapter 9 examines the importance the respondents attach to the subscription price in a rights issue and Chapter 10 discusses the argument that The Stock Exchange should provide more information on rights issues. In Chapter 11 we examine private shareholders' attitude towards rights issues.

6.3 Financial indifference during the subscription period of a rights issue

6.3.1 Introduction

Scholes (1972), Marsh (1979b) and White & Lusztig (1980) have not found sufficient evidence to deny the hypothesis that stock markets are efficient with respect to the announcement of rights issues, although the announcement does appear to carry a small degree of

negative information. A right, of a rights issue, exhibits all of the characteristics of a traded option. The introduction of the option time value premium suggests the perfect market model will underestimate the value of a right. However, when the inconvenience associated with equity purchase via rights is taken into account, we have reason to suspect that the value of a right will be depressed with respect to its theoretical value.

6.3.2 Theoretical considerations

If we invoke the assumptions of a perfect market the parameters of a rights issue, namely the issue price, the ex-rights price and the value of a right, are related by the equation⁹¹

$$\begin{aligned}
 R * \text{Rights} + \text{Issue price} &= \text{Ex-rights price} \\
 R * \frac{(C - P)}{(R + 1)} + P &= \frac{(C * R + P)}{(R + 1)} \quad . \quad (2)
 \end{aligned}$$

where

R = rights ratio

C = cum-rights share price

The inherent economic logic behind this relationship is that an external investor is financially indifferent between the two routes open to him. The direct route is to purchase the shares at their ex-rights price from existing shareholders. The alternative, or indirect route, is firstly to purchase rights from the market and then subscribe to the rights issue. In the absence of transaction costs, and assuming that the new shares rank pari passu with the

⁹¹ See, for example, Evans (1955), Archer (1956) and Beranek (1956).

existing equity, then the financial indifference is a direct consequence of arbitrage acting upon perfect substitutes.

But, an important constituent of a perfect market is free and reliable information; in the absence of this condition we encounter the uncertainty present in a real world stock market. A central tenet of business finance, implied in portfolio theory and the capital asset pricing model, is that risk and return are positively correlated. A good example of a marketable security that allows the investor to modify his portfolio risk is an economic option. Table 6.7 presents the important characteristics of an economic option and illustrates that a right, of a rights issue, clearly falls within this definition. This leads to the proposition that the theoretical model of a rights issue can be considered naive in that it does not take into account the option time value premium. The argument, as it were, is that characteristics (i) to (iv a) are manifestly present in the marketing of rights and therefore there would appear to be good reason to advocate that characteristic (iv b), the option time value premium, will also be present.

This section of the analysis is concerned with the manner in which a stock market adjusts share prices during the subscription period of a rights issue and concentrates mainly on the first day that rights are traded. Whether or not the net wealth of the shareholder is affected over the currency of the rights issue, that is, from the announcement day till the last day of renunciation, is not therefore considered to be an issue germane to this study. It

Table 6.7 The attributes of a right compared to the characteristics of an economic option

Economic Option	Right of a Rights Issue
(i) The buyer pays a sum of money for the option to purchase the specified security at a given price (the exercise or striking price).	Although this reflects the situation of an external investor, we should note that the shareholder has suffered from the drop in price associated with his shares becoming ex-rights. The new shares are issued at a fixed issue price.
(ii) There is a limited time period within which the option can be exercised, at the expiration date the option lapses and becomes worthless.	In a rights issue the offer is open for a specified subscription period. Although it is possible for a shareholder to suffer an economic loss if he does not exercise his pre-emptive right, the normal procedure of selling unsubscribed shares at the end of the rights issue for the benefit of entitled shareholders would appear to make rights somewhat more attractive than options.
(iii) Theoretically, an option can be transferred to a third party, in exchange for a sum of money, during its lifetime. The London Traded Options Market illustrates an official market for options which not only provides regulations but also guarantees the underlying security.	A fundamental attribute of a right is that it is a marketable security, which can be sold by the shareholder if he does not wish to exercise his pre-emptive right. The London Stock Exchange provides a regulated market for the rights of its listed companies.

Table 6.7 Continued

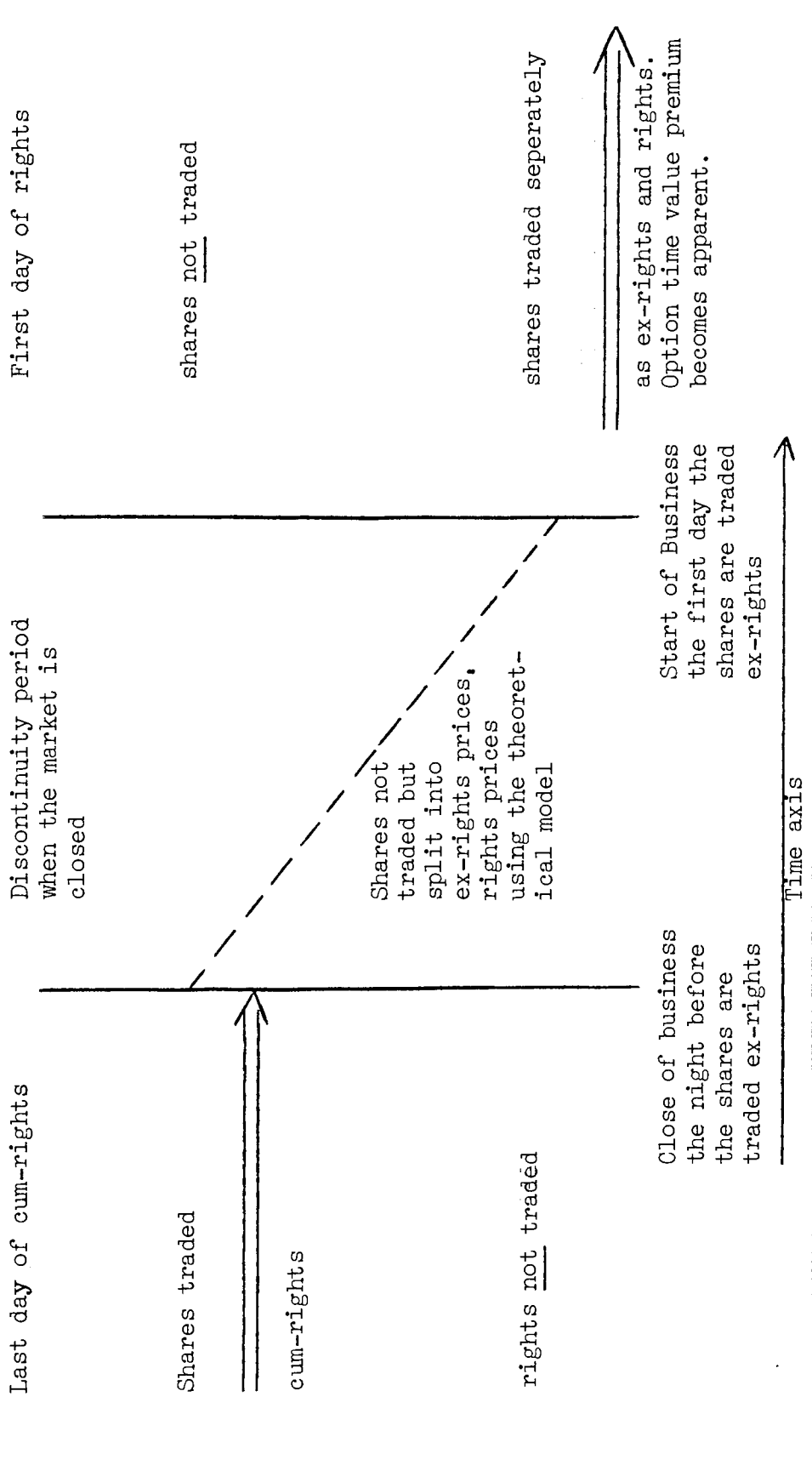
<p>(iv) The payment for an option consists of two parts;</p> <p>(a) the intrinsic value represents the difference between the current market price and the exercise price.</p> <p>(b) The option time value element is the premium over and above this basic value.</p>	<p>Theoretically, the value of a right is defined by;</p> <p>(a) The difference between the market price (ex-rights) and the issue price, corrected for the rights ratio.</p> <p>(b) The option time value premium is not acknowledged by the theoretical model.</p>
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Source: see Weston & Brigham (1979, Chapter 16) or The Stock Exchange (1978)

would, however, appear to be a fruitful area for speculation. We are concerned solely with predicting how the market sets the equilibrium between the ex-rights and rights prices.

A share price experiences a sharp discontinuity at the close of business on the stock market the day before the shares are first traded ex-rights. On this last day the share price is quoted cum-rights and the next day the share price quotation is split into the two components of the ex-rights price and the value of a right, as presented in Table 6.8. In a perfect market the sum of the ex-rights price and the value of a right will be equal to the cum-rights price and perfect information will deny the possibility of an option effect. However, in a real world stock market where behavioural and expectational influences are present the option time value premium is strongly indicated. Smith (1977, p.275) acknowledges, but does not pursue further, the option value of a right.

Table 6.8 Discontinuity of the share price in a rights issue



In facing the problem of how the option time value premium is distributed across the two securities, at the start of business on the first day of rights, it is necessary to explicitly assume that all other share price determinants, other than the option effect, are constant. That is, in the absence of the option time value premium the market reacts in a perfect manner. This assumption excludes the confounding effects associated with disequilibria of supply and demand, changes in the expectations of the market or the perceived risk of the firm, any potential wealth increment to be produced from investing the capital raised by the rights issue, etc.. Two scenarios can be examined; firstly, where the option time value premium does not produce an increase in the wealth of the shareholder and secondly, where it results in a positive value added to the shareholder. It should be noted that the change in net wealth is measured over the relatively short period between the close of business on the day before the first day of rights and the opening of business of the day that rights are first traded. As stated earlier, the fact that the stock market does not provide a direct cum-rights price when the shares are traded ex-rights mean that it is necessary to use the proxy of the sum of the ex-rights price and the value of a right to estimate the change in net wealth of the shareholder.

Where the shareholder's net wealth does not change over the transition period from cum-rights to ex-rights the two extreme models⁹²

⁹² Intuitively the model described by equation (4) would be preferred since the option time value premium is directly associated with the right.

to incorporate the option time value premium are presented by,

$$\text{Cum-} \begin{array}{l} \text{rights} \\ \text{price} \end{array} = \left\{ \begin{array}{l} \text{theoretical} \\ \text{ex-rights} \\ \text{price} \end{array} + \begin{array}{l} \text{option} \\ \text{time value} \\ \text{premium} \end{array} \right\} + \left\{ \begin{array}{l} \text{theoretical} \\ \text{value of a} \\ \text{right} \end{array} - \begin{array}{l} \text{option} \\ \text{time value} \\ \text{premium} \end{array} \right\} \quad (3)$$

$$\text{Cum-} \begin{array}{l} \text{rights} \\ \text{price} \end{array} = \left\{ \begin{array}{l} \text{theoretical} \\ \text{ex-rights} \\ \text{price} \end{array} - \begin{array}{l} \text{option} \\ \text{time value} \\ \text{premium} \end{array} \right\} + \left\{ \begin{array}{l} \text{theoretical} \\ \text{value of a} \\ \text{right} \end{array} + \begin{array}{l} \text{option} \\ \text{time value} \\ \text{premium} \end{array} \right\} \quad (4)$$

and any combination between these two extremes is possible. An objection to the argument that the short term wealth of the equity holder is unaffected by the rights issue is related to the observation that either of the above treatments, and hence any compromise on the two extremes, will result in a disequilibrium between the direct and indirect routes of equity purchase. Hence the forces of arbitrage will tend to eliminate the price differential. The end result, within all conditions of this unchanged wealth scenario is that the existence of the option time value premium is denied since the resultant equilibrium will produce a very close approximation to the perfect market treatment, that is,

$$\begin{array}{l} \text{Cum-rights} \\ \text{price} \end{array} = \begin{array}{l} \text{theoretical} \\ \text{ex-rights} \\ \text{price} \end{array} + \begin{array}{l} \text{theoretical} \\ \text{value of a} \\ \text{right} \end{array} \quad (5)$$

The argument for suggesting that the net wealth of the shareholder is increased⁹³ by the option time value premium can be explained by the fact that the option element represents a value greater than existed just before the rights could be marketed. During the discontinuity period shown in Table 6.8 the cum-rights price

⁹³ At the ex-rights date but not necessarily over the period of the rights issue.

is split into its two components and within the assumptions specified earlier such a division will be defined by theoretical considerations. As soon as the market for rights commences operations, the right increases in value due to the speculative effect and at this instant we have little reason to suspect that the fundamental value of the ex-rights share will change. Thus we have,

$$\begin{array}{l} \text{Cum-} \\ \text{rights} \\ \text{price} \end{array} = \begin{array}{l} \text{theoretical} \\ \text{ex-rights} \\ \text{price} \end{array} + \begin{array}{l} \text{market's} \\ \text{value of} \\ \text{a right} \end{array} \left\{ \begin{array}{l} \text{theoretical} \\ \text{value of a} \\ \text{right} \end{array} + \begin{array}{l} \text{option} \\ \text{time value} \\ \text{premium} \end{array} \right\}. \quad (6)$$

Whether equation (6) presents the full picture of the way the market values the two securities at the start of business on the first day of rights is uncertain. Through an imperfection in the market we can offer the following conjecture which suggests that some of the option time value premium is transferred to the ex-rights price. It is apparent that the equilibrium between the direct and indirect routes of equity purchase has been perturbed. Although we are dealing with "almost identical" securities there may well be some investors who will not fully acknowledge the legitimacy of the option time value premium and so the process of arbitrage may come into force. They will perceive that it is financially more attractive to purchase new shares through the direct route, via ex-rights, and thus the forces of supply and demand will marginally increase the ex-rights price. The study by Merrett, Howe & Newbould (1967, p.63) of 110 rights issues in 1963 found that the actual ex-rights price deviated marginally from that predicted by theory.

They found that the theoretical model, on average, understated the actual ex-rights price by 1.23 per cent; and furthermore, the deviation from the theoretical model was statistically significant at the 1 per cent level and thus demands a rational explanation. Having reviewed the option-arbitrage effect on rights we can advance the conjectural proposition that the deviation observed by Merrett, Howe & Newbould can be explained, in part at least, by the logical action of investors interacting in a stock market.

The indirect route of equity purchase is perceived by Archer (1956, p.364) and Dewing (1941, p.1209) to involve some additional effort by the investor in that he not only has to purchase the rights but also has to subscribe to the new shares, and thus experiences an extra procedure over and above the direct route via ex-rights. Dewing (1941, p.1209) suggested,

"Yet the purchase of the stock through the rights involves more trouble. ... In order to establish a free market for the rights, they would have to be offered at a slight concession under their theoretical value, even though there were no other reasons to depress the value of the rights".

and, in support, cited the work of Werly (1929)⁹⁴ who studied eighty rights issues in the USA, forty cases each of a rising and falling stock market, and reported that,

"... there was a divergence of on the average about half of 1% by which the market value fell below the theoretical value."

⁹⁴ Despite extensive efforts it proved impossible to trace a copy of this paper.

Although such a trouble argument is not implausible, a devil's advocate would suggest that there is very little difference in the actual physical effort required on the part of the potential investor to instruct a stockbroker to either purchase shares in their ex-rights state or to purchase rights in the market and then to subscribe to the new issue. Nevertheless, there are two points that would tend to repudiate this argument. Firstly, it is conceivable that the indirect route may result in greater mental effort for the investor since he not only has to understand the mechanism and implications of such an acquisition strategy but also has to arrive at a decision as to which is the more appropriate route. This, it should be noted, is an extra decision over and above the fundamental decision that he needs to acquire shares in the particular company under consideration. Secondly, the fact that brokerage commission is related to the value of the securities purchased, and since the subscription to the new shares is effectively free of transaction costs, results as would not be unexpected in stockbrokers showing a strong preference for their clients to purchase equity through the direct route. This will result in the brokers earning a higher commission. It must be remembered, however, that such interpretations may be relevant to the private shareholder, who for relatively small capital investments may also suffer from uneconomical minimum charge differentials if the indirect route is chosen. Institutions, on the other hand, not only have the capability of easily determining the correct route but also, through their large transactions, would not normally suffer from problems associated with differences in the transaction costs charged by their brokers.

During the major part of the subscription period it would appear reasonable to postulate that this trouble effect will be relatively constant, but as the end of the subscription period draws near it may well become of far more importance. The argument, as it were, is that the owner of a batch of rights has to arrange for the certificates and the subscription monies to reach the receiving bankers/registrars before the closing deadline. On the last few days of the subscription period the use of the postal system is strongly contraindicated and thus the services of a messenger would be required. There is a distinct possibility that this extra trouble effect may not be present in the data to be analysed since, as would appear a logical acknowledgement of this problem, a rights price was not quoted for the last two days of the subscription period; the new shares were quoted "fully paid".

6.3.3 Concluding remarks

Having proposed two potential and opposing influences which may affect the value of a right with respect to its theoretical value, it is necessary to consider how they will interact and to consider the net effect. The obvious hypothesis is that the option effect will be greatest at the start of the subscription period and will decay with time until it reaches a zero value at the close of the subscription period. As argued earlier, the trouble effect is predicted to remain relatively constant over the subscription period. However, it would appear impossible on a priori grounds to predict

which of these two effects will be the greater; this aspect will be examined in Chapter 12.

6.4 Conclusion

The greater majority of the statistical analysis was carried out using the Statistic Package for the Social Sciences (SPSS).⁹⁵ The statistical tests used in this study are described and documented in the relevant sections of the empirical analysis.

⁹⁵ The manual by Nie et al (1975) proved to be an absolute necessity.

7.1 Introduction

In this chapter we examine the association of 38 variables with the success of a large sample of rights issues on The Stock Exchange during 1976. The variables examined are discussed in Chapter 6.

7.2 Size variables

In general, size can be considered to equate with safety, e.g., risk of bankruptcy etc., and if we assume that the majority of investors are characterised by the risk aversion trait, then a size proxy could well be an important determinant in the success of a rights issue. Table 7.1 illustrates that three variables, namely market capitalisation (S1) at the time of the issue, corrected market capitalisation (S2) and the valuation factor (S3) produced results of interest.

It would appear that the success of a rights issue is not associated with either the turnover of the company or by its balance sheet asset base. This observation is probably not surprising since these two variables, either weighted or unweighted, do not in themselves convey a great deal of information about the nature of the firm. The geometric mean of assets, turnover and number of employees (S3) was generated in an attempt to overcome this drawback, but as

⁹⁶ This is an amended version of Keef (1981b).

Table 7.1 Correlation coefficients of size variables with the acceptance rate

Code	Transformations						
	x	log x	1/x	x ²	1/x ²	√x	1/√x
S1	-0.02	0.16	-0.40	-0.03	-0.50	0.04	-0.30
S2	-0.01	0.16	-0.39	-0.03	-0.51	0.04	-0.29
S3	-0.02	0.06	-0.13	-0.03	-0.06	0.00	-0.12
S4	-0.03	0.04	-0.11	-0.03	-0.08	-0.02	-0.09
S5	-0.02	0.07	-0.04	-0.03	0.05	0.00	-0.09
S6	-0.02	0.08	-0.08	-0.03	0.02	0.01	-0.12
S7	-0.03	0.04	-0.13	-0.03	-0.10	-0.01	-0.10
S8	0.29	0.36	-0.42	0.21	-0.47	0.33	-0.39

Code	Description
S1	Market capitalisation of ordinary shares at the date the issue was announced in pounds million
S2	Corrected market capitalisation (S1/SE) where SE is defined in Table 7.10
S3	Geometric mean of assets, turnover and number of employees
S4	Weighted net assets for the three years prior to the issue
S5	Turnover from the latest accounts in pounds million
S6	Weighted turnover for the three years prior to the issue
S7	Net assets from latest balance sheet, pounds million
S8	Valuation factor (S2/S7)

Table 7.1 shows, its explanatory power was very small.

The corrected market capitalisation (S2) is preferred to its uncorrected variant (S1) since it partially takes into account the variation in the level of confidence in The Stock Exchange over the year. It should be noted that as the share price and consequently the market capitalisation was measured on the day before the issue was announced there is an inherent error associated with the general movement in the level of confidence. However, the choice of the corrected version implicitly assumes that the share prices of the companies investigated show a perfect correlation with the Financial Times 30 Share Index (SE) which was used as the correction factor. It must be realised that this is not necessarily a true measure of the real world but it is believed to have a better foundation than the uncorrected variant. However the introduction of the correction factor does not materially improve the predictive ability of the market capitalisation factor.

The inverse square transformation of the corrected market capitalisation (S2) produced the highest degree of association with the dependent variable and the equation,

$$ACC = \frac{-5 \times 10^{-5}}{(S2)^2} + 90.47 \quad (2)$$

where

S2 = corrected market capitalisation

will explain 26 per cent of the variation in the acceptance rate.

It indicates that as the value of the variable increases there is a predicted increase in the acceptance rate; it also implies that the expected maximum acceptance rate will be 90.47 per cent which does

not compare favourably with the distribution that was found for the acceptance rate: this gave a maximum of 97.9 per cent, a minimum of 34.2 per cent and a mean value of 89.0 per cent.

The valuation factor (S8) produced a similar result with the inverse square transformation generating the greatest explanatory power of 22 per cent of the acceptance rate variation. Although the correlation coefficient of the two simple transformations of the valuation factor (S8) and the corrected market capitalisation (S2) variables was only -0.06 on 106 degrees of freedom there was a statistically significant association between the two inverse square transformations. The correlation coefficient was 0.40 on 106 degrees of freedom which is statistically significant at the 0.1 per cent level.

7.3 Growth variables

Table 7.2 shows the results of the correlation analysis. The evidence would suggest that only one variable, growth in earnings per share (GR4), was associated with the success of the rights issues studied. Although growth is perceived to be an important indicator and its virtues are frequently extolled by financial and business pundits, the lack of importance indicated for growth in turnover (GR1), growth in assets (GR2) and their composite geometric variant (GR3), is probably not that unexpected.

Table 7.2 Correlation coefficients of growth variables with the acceptance rate

Transformations	
Code	x log x 1/x x ² 1/x ² √x 1/√x
GR1	0.14 0.18 -0.22 0.11 -0.25 0.16 -0.20
GR2	0.13 0.14 -0.14 0.13 -0.14 0.14 -0.14
GR3	0.18 0.20 -0.21 0.16 -0.21 0.19 -0.20
GR4	0.04 0.08 0.34 -0.03 -0.29 0.06 -0.22
Code	Description
GR1	Growth in turnover
GR2	Growth in assets
GR3	Growth in geometric mean of assets and turnover
GR4	Growth in earnings per share

The result produced for the growth in earnings per share (GR4) variable can be considered rather startling. A perfect market approach would indicate that high growth in earnings per share, ceteris paribus, would be more attractive to an investor that would be a lower growth record. For this variable the highest degree of association with the dependent variable was produced by the inverse transformation which gave a positive correlation coefficient of 0.34 on 106 degrees of freedom which is statistically significant at the 0.1 per cent level. The equation,

$$\text{ACC} = \frac{7.54}{\text{GR4}} + 82.70 \quad (3)$$

where

GR4 = growth in earnings per share

will explain 12 per cent of the variation found in the acceptance rate distribution. It indicates that as the growth in earnings per share increases the predicted acceptance rate will decrease; this conclusion, it is argued, is contrary to the result expected. We can offer two possible explanations for this outcome but it must be noted that they are by their very nature conjectural.

The first is concerned with the nature of the stock market and the methods by which it values shares. Often a good growth record, particularly in the absence of other contra-indicators, will result in a higher price earnings ratio than the other financial indicators would warrant. Thus, in the high growth case, the investor may consider that the shares are over-priced and thus may not subscribe to the issue. However, this argument does not take into account the logic of the shareholder selling the over-valued rights to the new shares. If this argument is carried to its logical conclusion it does not explain this result for it would be reasonable to expect the shareholder to sell all his shares and the rights if he considers them to be over-valued, and this, of course, would tend to contribute to a higher success rate. The second hypothesis is based upon the volatility of the earnings per share variable over the

three-year period investigated. Table 7.3 shows that there has been a cyclical movement in the mean value of earnings per share for the

Table 7.3 Trend in earnings per share of 108 companies

Years before rights issue was announced	Average earnings per share in pence
1	10.71
2	8.93
3	9.05

108 companies sampled in the study. However, this observation in isolation does not adequately explain the results obtained.

7.4 Return on investment variables

The study did not reveal that any of the return on investment variables, see Table 7.4, were of any statistical importance in relation to the success of a rights issue.

The marginal return on the cost of the new shares (R1) is a variable that may impress the less sophisticated investor but its apparent unimportance can be interpreted as indicating that the shareholders are aware that it is counterbalanced, to a great extent, by the reduced return on the existing shares when they drop to their ex-rights price. The return on the ex-rights price (R2), which was

Table 7.4 Correlation coefficients of return on investment variables with the acceptance rate

Transformations	
Code	x log x 1/x x ² 1/x ² √x 1/√x
R1	0.12 0.06 -0.03 0.13 -0.01 0.10 -0.04
R2	-0.02 -0.05 0.04 -0.02 0.02 -0.02 0.04
R3	0.14 0.08 0.15 0.06 0.09 0.24 0.22
Code	Description
R1	Marginal return on new shares, ratio of current dividend to issue price per share
R2	Return on theoretical ex-rights price, ratio of current dividend to theoretical ex-rights price per share
R3	Increase in dividend, ratio of current dividend to penultimate dividend

the variable chosen to proxy the current return on the shares, similarly did not produce a significant result and this would suggest than in the risk to return trade-off that the former, which in the size proxy has already been shown to be of some importance, has the greater effect on the success of a rights issue.

7.5 Issue factors

Of the six issue variables that were evaluated, only the ratio of the capital raised to the current market capitalisation (V2) was found to be of any importance. Table 7.5 presents the correlation results with the acceptance rate.

Table 7.5 Correlation coefficients of issue variables with the acceptance rate

Transformations	
Code	x log x 1/x x ² 1/x ² \sqrt{x} 1/ \sqrt{x}
V1	0.00 0.09 -0.19 -0.02 -0.20 0.03 -0.15
V2	-0.40 -0.31 0.21 -0.45 0.12 -0.36 0.26
V3	0.16 0.31 -0.27 0.10 -0.21 0.25 -0.31
V4	-0.06 0.07 0.07 -0.04 0.09 -0.06 0.07
V5	0.14 0.24 -0.24 0.07 -0.19 0.20 -0.25
V6	0.09 0.11 -0.05 0.05 0.03 0.11 -0.19
Code	Description
V1	Value of issue in million pounds (V4*V5/100)
V2	Ratio of capital raised to current market capitalisation, (V1/S1)
V3	Value of a right in pence, (SP1 - V5)/(V6 + 1)
V4	Number of new shares, million
V5	Issue price in pence
V6	Rights ratio, proportion of new shares to existing shares

The square transformation of the ratio of the capital raised to the current market capitalisation (V2) produced the highest degree of association with the acceptance rate; the equation

$$\text{ACC} = -86.96 \times (\text{V2})^2 + 92.97 \quad (4)$$

where

V2 = ratio of the capital raised to the current market capitalisation

will explain 19 per cent of the variation in the acceptance rate distribution. The equation indicates that as the value of the ratio increases the predicted acceptance rate will decline. This is in general agreement with our understanding of the market since the higher the ratio, that is, the more the shareholder has to subscribe in relation to the current value of his shares in the company, the greater the strain on his cash liquidity. The study by Edge (1965b, p.271 and p.276) reported that a significant correlation was found when the logarithm transformation of the relative size of the issue was used. However, this significant result was only found for one of the two samples examined, the other produced an insignificant statistic. But again, this interpretation does not adequately explain why the hard-pressed shareholder does not sell his rights in this situation.

The apparent unimportance of the value of the issue (V1), the number of new shares issued (V4) and the rights ratio (V6) was not unexpected since they are not measured on a uniform interfirm basis. The value of a right (V3) also suffers from this problem and although the logarithm and inverse square root transformations produced a correlation coefficient that met the initial criterion, it was decided not to investigate this variable any further. It should be

noted that it is a variant of the monetary discount offered (PR1) variable which, as shown later, produced results of greater interest and significance. Edge (1965b, p.272, Table 11) found somewhat inconsistent results for the importance of the value of a right. Of the eight data subsets analysed - a permutation of small personal, large personal, insurance companies and unit trusts with two sample periods of 1957/8 and 1959, only one produced a statistically significant result, which was the small personal holder for the year 1959.

The issue price (V5) is an area where there is a measure of disagreement between and within academia and practitioners. The correlation analysis could be used as support by those who argue that the issue price is irrelevant and does not, in a perfect market environment, affect the net wealth of a shareholder. However, the opponents could well argue that as the issue price is a function of both the current share price (SP1) and the monetary discount (PR1), which, as shown later were both found to be important, the contrary is true.

Dipchand (1977, p.40) examined the association of the implied scrip issue, see Chapter 2, with the success rate and reported that "... success of rights issues is not likely to be influenced by higher quasi-splits."

7.6 Discount offered and share price variables

Table 7.6 Correlation coefficients of discount offered and share price with the acceptance rate

Code	Transformations						
	x	log x	1/x	x ²	1/x ²	\sqrt{x}	1/ \sqrt{x}
PR1	0.15	0.34	-0.36	0.09	-0.29	0.25	-0.37
PR7	0.13	0.15	-0.19	0.14	-0.23	0.14	-0.17
PR10	0.24	-0.02	0.05	0.24	0.04	0.24	0.12
SP1	0.20	0.31	-0.31	0.12	-0.24	0.26	-0.33
SP7	0.20	0.31	-0.31	0.12	-0.24	0.26	-0.33

Code	Description
PR1	Discount in monetary terms, (SP1 - V5), that is, current share price less issue price, in pence
PR7	Discount as a proportion of market price, (SP1 - V5)/SP1
PR10	Discount within allowable range (V5 - NSV)/(SP1 - NSV), where NSV = nominal share value
SP1	Current share price in pence at the close of business on The London Stock Exchange on the day before the issue was announced
SP7	Share price, as above, seven days before the issue was announced

Table 7.6 shows the results of the correlation analysis. The discount measured as a proportion of the current share price (PR7) was not found to be of any predictive importance. This result contrasts

with the study reported by Bacon (1972) who sampled 41 rights issues in the USA during the period 1965 - 1968. He found that the subscription discount measured as a percentage of the average market price, one week prior to the offering, produced a statistically significant relationship using linear regression analysis. It must be noted that this study used the share price the day before the issue was announced whereas Bacon used the share price one week prior to the offering, this difference is not believed to be the major determinant in the differences which are observed between the two studies, see Table 7.7. Dipchand (1977, p.40), using a natural logarithm model, did not find a statistically significant result for a

Table 7.7 Comparative data: the effect of the discount on the success of a rights issue

Author	Correlation coefficient	Coefficient of determination	Country	Year	Sample size
Bacon	0.35	0.12	USA	1965/68	41
Keef	0.13	0.02	UK	1976	108

sample of 323 Canadian rights issues in the period 1956-1974.

The more sophisticated variable (PR10), see Chapter 4 where this parameter is discussed in greater detail, which measures the position of the discount within its allowable range, similiary did not produce a statistically significant result.

The discount when measured in monetary terms (PR1) defined as the difference between the current share price (SP1) and the issue price (V5) was found to produce a statistically significant result with the inverse square root transformation showing the highest degree of association with the acceptance rate. The equation,

$$ACC = \frac{-29.61}{\sqrt{PR1}} + 96.83 \quad (5)$$

where

PR1 = current share price less issue price

will explain 14 per cent of the variation in the acceptance rate distribution. The equation predicts that the greater the monetary discount, then the greater the expected acceptance rate.

There are two opposing schools of thought on the importance of the discount, or its related variable, the issue price, in a rights issue. Theoretically it can be shown, in a perfect market, that the level of the discount is immaterial and does not affect the net worth of the shareholder.⁹⁷ The relative unimportance of the discount measured as a proportion of the current share price (PR7), or even the more sophisticated variable, the position within its allowable range (PR10) can be used as support for the view succinctly advanced by Merrett, Howe & Newbould (1967, p.51),

"... it must be obvious that in no sense can the shareholders be said to be offered rights on 'attractive terms', or in any way benefit from the terms of the rights issue. Despite this, it is frequently the case that some financial commentators refer to rights issues as being on attractive terms, and generally consider the terms of the issue to be of serious economic significance."

⁹⁷ See Chapter 2.

An example of this misconception⁹⁸ can be observed in the Midland Bank Review (1977, p.12) which stated,

"A second factor was that, as the year reached its middle, many of the best candidates for rights issues had already come to the market, and the spate of equity fund raising exerted a gradually dampening effect on the stock market. Rights issue announcements began to have quite a bearish impact on prices and in a number of instances sharp falls were recorded. Moreover, in order to arrange the underwriting of their issues, companies had to improve the terms on which they were offered and a successful issue was no longer a foregone conclusion."

and two paragraphs later went on to comment,

"With the market in a relatively depressed state, the scope for the corporate sector to raise cash through rights issues became more limited."

However, proponents⁹⁹ of the arguments that the discount or issue price may be of critical importance will point to the fact that the monetary discount (PR¹) produced a statistically significant result. Some commentators postulate that the discount should be set as low as possible, consistent with achieving the desired acceptance rate, so as not to result in too greater a dilution of the important financial ratios. Equation (5), shown earlier, will indicate the nature of the trade-off that is present in this argument. The dilution aspect in this latter argument, say, for the earnings per share variable, would appear to be poorly based. Normally in a scrip or bonus issue the analyst will make a correction to the historical earnings per share ratios to take account of the free shares issued.

⁹⁸ See also Manley (1976, p.38) who states that "The choice of discount is a crucial one for the company."

⁹⁹ See, for example, Jones-Lee (1971, 1972) and Keane (1972).

Thus it would appear to be reasonable to correct the earnings per share parameter for the scrip issue dilution inherent in a rights issue.¹⁰⁰

There would appear to be two possible interpretations to explain the importance of the monetary discount (PR1) variable. The first explanation implies that the shareholder has a naive approach to rights issues and does not fully understand the mechanisms involved. It argues that the shareholder is attracted by the marketing blurb or commendatory puff of "Ten pence off" which admittedly has proved to be legion, and hence assumed to be at least moderately successful, with housewives in supermarkets. There must be serious doubt, however, that shareholders would approach a rights issue in a similar manner to purchasing fast moving consumer goods. The large institutional involvement in the equity of companies quoted on The London Stock Exchange, more particularly the larger companies, does not add conviction to this argument.

The second hypothesis centres around the fact that the monetary discount offered (PR1) is related to the current share price, since the greater the current share price (SP1) then the greater the monetary discount for a single percentage point of discount measured as a proportion of the current share price. The correlation coefficient between these two linear variables (PR1 and SP1) of 0.784 on 106 degrees of freedom gives strong support for this explanation in that one will explain 61.5 per cent of the variation in the other.

¹⁰⁰ This is normally the case today, although just over a decade ago this may not always have been so since Block (1965) argued for such adjustments in the case of rights issues in the USA.

The correlation coefficient of the two inverse square root transformations was even larger at 0.9 on 106 degrees of freedom.

The current share price (SP1) measured at the close of business on The London Stock Exchange the day before the issue was announced was found to give a statistically significant correlation coefficient, the highest degree of association with the dependent variable was shown by the inverse square root transformation. The equation

$$\text{ACC} = \frac{-52.89}{\sqrt{\text{SP1}}} + 96.05 \quad (6)$$

where

SP1 = current share price

will explain 11 per cent of the variation in the acceptance rate distribution. The equation predicts that the greater the share price at the time of the issue then the greater the acceptance rate. In order to overcome any distortion in the share price due to information leaks prior to the announcement of the issue, the market price of the shares was also measured seven days before the announcement was made to The Stock Exchange. However, the two share price variables (SP1 and SP7) examined produced identical correlation coefficients.

The theoretical foundation for the importance of the current share price and its related monetary discount variable on the success of a rights issue is difficult to isolate. *Ceteris paribus*, the value per se of an Ordinary share has little meaning, particularly in an interfirm comparative situation. Share prices can be

judiciously manipulated downwards by the use of the scrip issue mechanism. Hence to equate share price with the degree of attraction to the shareholder at large would tend to lead to incorrect conclusions being reached. Bearing this fact in mind and realising that the stock market cannot be considered to be a truly perfect market, this study would tentatively suggest that the share price at the time of the issue would appear to be an important determinant in the success of a rights issue.

The importance of the current share price is a rather perplexing result and implies that the shareholder takes a rather naive approach which is inconsistent with the fact the institutions own over 50 per cent of the equity issued on The London Stock Exchange. A priori arguments would indicate that if the discount were important then the factor that measures the variable as a proportion of the current share price would have been found to be of significance. If we assume that the shareholder confronted with a rights issue takes an even more enlightened view than the discount with its allowable range, which is believed to be an absolute measure, would be more commendable. The relative unimportance of these two variables leads to two contradictory conclusions. First, if we assume that the shareholder takes a sophisticated view and is well-informed then the discount is unimportant in the success of a rights issue. The fact that the monetary discount produced a statistically significant result can be explained, albeit rather weakly although statistically possible, by stating that the study has isolated the one occasion in a thousand that the result is due solely to sampling errors. In all

honesty, this latter argument must be discounted as being highly improbable.

The second conclusion implies that the shareholder does not comprehend the sophisticated approach and therefore does not use it in the decision process. However, since he is not aware of the market mechanism of the drop to the ex-rights price which has been shown to conform very closely to the predicted model,¹⁰¹ he is attracted by the high monetary discount and the high share price due to his impression of getting a bargain by being able to buy new shares, for his portfolio, cheaper from the company than from The Stock Exchange. Again it must be admitted that this hypothesis has little to commend itself when one realises the institutional involvement in the equity of public companies. A later chapter, see chapter 9, reports a study which determines private shareholders' understanding of rights issues, a crucial part of which is the importance attached to the issue price.

7.7 Gearing variables

As Table 7.8 shows, there is evidence to support the argument that the greater the deviation from the arbitrary optimum gearing level, then the lower the acceptance rate. The linear transformation showed the highest degree of association with a correlation coefficient of -0.22 on 106 degrees of freedom which is statistically significant at the 1.2 per cent level. Although this result would

¹⁰¹ See Chapter 2.

indicate that there is a chance of one in just over eighty that the observed association is due to sampling errors, the predictive ability of 4.8 per cent must be considered rather poor. In the interpretation of this result one should give consideration to the following points. First, the gearing ratio was calculated from balance sheet data and thus the accounting framework or conventions adopted by the firms may tend to distort the data in an interfirm comparative situation; an example would be the revaluation of buildings which would result in an increase in the equities section of the balance sheet and thus reduce the gearing ratio.

Secondly, in the classical theory, there may be a singular optimum gearing ratio for each firm or even for each sector of industry rather than one all encompassing ratio for all firms. Thirdly, an arbitrary ratio of 30 per cent was chosen which was an approximate compromise between the actual mean ratio of the firms studied and the rather loose rule of thumb concept of optimum gearing being two parts equity to one part of debt.

Table 7.8 presents the results of the correlation analysis. It would appear that the gearing of the company at the time of the issue (G2) had a greater explanatory power than the weighted gearing variable (G1). This observation accords reasonably well with the expected outcome since it is plausible for the shareholder to be more concerned with the gearing ratio at the time of the issue rather than with past history which is inferred in the weighted factor. The square transformation of the current gearing level (G2)

Table 7.8 Correlation coefficients of gearing variables with the acceptance rate

Code	Transformations						
	x	log x	1/x	x ²	1/x ²	√x	1/√x
G1	-0.27	-0.16	0.11	-0.32	0.09	-0.21	0.16
G2	-0.28	-0.14	0.03	-0.35	-0.04	-0.21	0.09
G3	-0.22	-0.17	0.09	-0.21	0.06	-0.20	0.11

Code	Description
G1	Weighted gearing ratio for the three years prior to the issue
G2	Gearing ratio from the latest accounts. Ratio of debt funds to total funds as shown in the balance sheet
G3	Deviation from an arbitrary gearing level of 30 per cent, that is, modulus (G2 - 30)

showed the highest degree of association with the dependent variable and the equation

$$ACC = -0.0036 x (G2)^2 + 92.67 \quad (7)$$

where

G2 = latest gearing ratio

will explain 12 per cent of the variation in the acceptance rate distribution. It implies that as the level of gearing increases the predicted acceptance rate will decline; which would suggest that in the case of the success of a rights issue the shareholder takes an adverse view of gearing and that even a modest amount is seen as increasing the risk.

7.8 Profitability variables

Table 7.9 Correlation coefficients of profitability variables with the acceptance rate

Transformations	
Code	x log x 1/x x ² 1/x ² √x 1/√x
P1	0.19 0.25 -0.14 0.07 -0.13 0.18 -0.20
P2	0.31 0.21 -0.26 0.11 -0.22 0.23 -0.28
P3	0.07 0.08 -0.07 0.01 -0.04 0.03 -0.08
P4	0.19 0.24 -0.15 0.05 -0.13 0.16 -0.18
P5	0.14 0.03 -0.11 0.10 -0.22 0.21 0.02
P6	-0.06 -0.03 0.17 -0.27 0.10 -0.29 0.20
P7	-0.07 -0.27 0.16 -0.26 0.09 -0.30 0.20
Code	Description
P1	Weighted earnings per share, in pence, for the three years prior to the issue
P2	Profits to assets ratio from the latest accounts
P3	Weighted profit to assets ratio for the three years prior to the issue
P4	Earnings per share in pence from the latest accounts
P5	Dividend to earnings per share ratio
P6	Corrected earnings yield (P7*SE)
P7	Earnings yield (P4/SP1)

The correlation coefficients are shown in Table 7.9. Neither the weighted earnings per share (P1) nor the latest earnings per share (P4) parameters were found to be of statistical importance. This result is probably not that surprising when one considers that the earnings per share parameter is not measured in an absolute manner in terms of interfirm comparison. The dividend to earnings per share ratio (P5), also known as the dividend payout ratio, similiary did not produce a significant result.

The profits to assets ratio (P2) produced a statistically significant degree of association with the dependent variable and the equation

$$ACC = 43.69 \times P2 + 85.03 \quad (8)$$

where

P2 = ratio of profit attributable to ordinary shareholders
to net assets

will explain 10 per cent of the variation in the acceptance rate distribution. It predicts that the higher acceptance rate will be associated with a higher ratio of profitability to assets. Since both the profitability of the firm, defined as the profit attributable to ordinary shareholders, and the asset base as recorded in the balance sheet are dependent upon the accounting framework or conventions adopted by the companies, there is a margin of inherent inconsistency in the measurement of this parameter on an interfirm comparison. The weighted profit to assets ratio (P3), which measures the relative profitability of the company over a three-year period, produced an insignificant result and this would indicate that the

longer term view may not be an important determinant in the success of a rights issue.

The earnings yield, which is the inverse of the price earnings ratio, was not found to produce a result of interest. Two variants were examined, the first, (P6) was corrected by the current value of the Financial Times 30 Share Index in an attempt to remove the effects of the fluctuation in the level of confidence in the stock market over the year (see comments on market capitalisation factor). The second was the uncorrected variant (P7).

7.9 Market indicators

Two market indicators, namely the Minimum Lending Rate (MLR) and the Financial Times 30 Share Index (SE) at the time of the issue were investigated. As the results presented in Table 7.10 show, neither were found to be of any statistical interest. Thus we can offer little support for the argument of Van Horne (1975, p.330) that the tone of the market is an important factor.

7.10 Concluding remarks

In total 266 variables were used in the analysis; using a statistical significance criterion of 0.1 per cent we would expect less than one variable to show an important association due solely to random sampling errors. The results showed seven variables were important, of which four could not be adequately explained.

Table 7.10 Correlation coefficients of market indicators with the acceptance rate

Transformations	
Code	x log x 1/x x ² 1/x ² √x 1/√x
MLR	0.08 0.08 -0.07 0.09 -0.06 0.08 -0.07
SE	0.08 0.08 -0.07 0.09 -0.06 0.08 -0.07
Code	Description
MLR	Minimum Lending Rate as a percentage
SE	Financial Times 30 share index at the close of business on The London Stock Exchange on the day before the issue was announced

The importance of market capitalisation (S1), corrected market capitalisation (S2), the ratio of capital raised to market capitalisation (V2) and the profit to assets ratio (P2) in relation to the acceptance rate of as rights issue has been measured and the relationships are in general agreement with our understanding of the market. Although growth in earnings per share (GR4) produced a statistically significant correlation coefficient, the relationship indicated that the greater the growth in earnings per share the lower the predicted acceptance rate. Similarly it was found that as the level of gearing (G2) increased the expected acceptance rate decreased, this must be considered a perplexing result in the light of the theories and practices of capital structure.

The importance of the current share price (SP1) and the monetary discount offered (PR1) has little foundation from a theoretical

point of view; nevertheless these two variables, which are highly intercorrelated, were found to be of importance. These observations, in conjunction with the results found for the other discount variables, leads to the conclusion that the shareholder may take a rather naive view of a rights issue. The paradox is that since institutions own a relatively high proportion of the equity quoted on The Stock Exchange this supposition is not supported by the other evidence that is available. As a consequence of the findings of this study it was proposed to investigate, through the medium of a postal questionnaire, the importance attached by private shareholders to the issue price in a rights issue.

Chapter 8 Analysis of Shareholder Characteristics

8.1 Introduction

In this chapter an attempt is made to define the characteristics of the private shareholders who responded to the questionnaire. The analysis seeks to fulfil three ends. Firstly, are there any differences between the respondents of the two companies? Secondly, the results require to be compared against other studies in the UK, notably the research of Lee & Tweedie, to determine whether the data is consistent. Thirdly, the analysis is presented by examining the degree to which an expert is used in the management of their investments.

8.2 The hypotheses

The major factors used in this study of shareholder characteristics were:

- (a) frequency of use of expert and the type of expert consulted;
- (b) employment status of shareholder;
- (c) ownership of a portfolio and the size of portfolio (if such is owned).

Using our own singular experience of life we can postulate a series of hypotheses indicating the interrelationship between these factors. However, rather than relying on the intuitive expectation of the author, it was decided to seek, through a short survey, the

feelings on such relationships from a number of people. The survey was carried out among the MSc Operations Research and Systems Analysis class of 1979/80 at the University of Aston Management Centre. The data is presented in Appendix A to Chapter 8; Table 8.A.1 shows the survey and a summary of the results is presented in Tables 8.A.2 to 8.A.9. The general consensus from this survey is used to provide the basis for the hypotheses tested in this chapter and has been termed "the body of opinion".

8.3 The results

Table 8.1 shows the response of the two sets of shareholders to the question,

"In the management of your investments will you please indicate the degree to which you utilise an expert."

When the single no reply result is excluded, the calculated chi-square of 1.638 on 3 degrees of freedom, not statistically significant at the 10 per cent level, is not sufficient evidence to support the hypothesis that there is any difference in the distribution of replies between the shareholders of the two companies. Consequently the results can be combined without encountering any conceptual problems.

Although the data is self-explanatory, we can highlight the fact that 30 per cent claimed that they never consulted an expert in the management of their investments whilst approximately half that percentage suggested they always did.

Table 8.1 In the management of your investments will you please indicate the degree to which you utilise an expert

	Weighting number	Number responding		
		Company M	Company P	Total
No reply	-	1	0	1
Never	0	14	19	33
Occasionally	1	26	21	47
More often than not	2	6	8	14
Always	3	8	7	15
Total		55	55	110

Using an albeit artificial weighting system, we can calculate an estimate of the slack or unused market capacity for the use of expert advice in investment management. The weighting number so chosen is shown in Table 8.1 and the index is defined by the model,

$$\frac{(\text{weighting number} \times \text{frequency})}{(\text{frequency} \times \text{maximum weighting number})}$$

and generates a value of 37 per cent. We can interpret this parameter as indicating that just over one-third of investments are effected after consultation with an expert. The observant reader will note that we cannot infer whether the advice of the expert is followed or not, all we can state is that advice is sought in approximately just over one-third of the cases. Thus we can arrive

at the conclusion that there is a potential market twice the size of the current market for the provision of expert advice in the management of shareholders' investments.¹⁰²

For a variety of reasons, which included the problems associated with shareholders' interpretation of the graduated classes between the two extremes and for ease of presentation of the data, it was decided to aggregate the responses into two classes of "more often than not" and "less often than not". The former classification includes the replies 'always' and 'more often than not', whilst the latter combines the other two choices. This aggregated data is

Table 8.2 Aggregate response to the question concerning the use of an expert

	Number responding		
	Company M	Company P	Total
Less often than not	40	40	80
More often than not	14	15	29
Total	54	55	109

shown in Table 8.2. Visual inspection of the table would indicate that the aggregated replies between the two sets of shareholders are very similar; this is confirmed by the chi-square statistic of 0.026 on one degree of freedom, which is not statistically significant at

¹⁰² Whether or not this is a suitable market to exploit or stimulate as a business proposition is beyond the scope of this study.

the 10 per cent level.

A further validation or cross check question was inserted and it asked the question,

"Did you consult an adviser on the recent rights issue?"

Table 8.3 Did you consult an adviser on the recent Rights Issue?

	Number responding		
	Company M	Company P	Total
Yes	18	15	33
No	37	40	77
Total	55	55	110

Table 8.3 shows the replies from the respondents. The low chi-square of 0.390 on one degree of freedom which is not statistically significant at the 10 per cent level shows that there is no reason to suspect that the two groups of shareholders are not consistent. The aggregate "yes" response of 30 per cent adds a measure of confidence to the earlier analysis which concluded that an expert was used approximately one time in three. Lee & Tweedie (1977, p.20) in their survey of 301 private shareholders of a single large public company found,

"... in fact, almost seven out of every ten respondents (69%) stated they made their own investment decisions without help from experts, and a further 8

per cent made their own decisions supported by some advice."

Although we must be mindful that a direct comparison of the results is somewhat difficult; due not in the least to the problems associated with attempting to equate the answers to the questions, "Do you make your own investment decisions?" and "In the management of your investments will you please indicate the degree to which you utilise an expert.", there would appear to be agreement between the two studies.

Table 8.4 shows the cross-tabulation of the aggregated replies to the general question,

"In the management of your investments will you please indicate the degree to which you utilise an expert."

against the specific question,

"Did you consult an adviser on the recent rights issue?"

The high chi-square of 20.406 on 1 degree of freedom is statistically significant at the 0.1 per cent level. Thus with a confidence that the probability of the argument being incorrect due to sampling errors of less than one in a thousand, we can infer that there is a high degree of association between the replies to the two questions. Inspection of Table 8.4 confirms the expected relationship.

Table 8.5 shows the replies of the respondents who answered "yes" to the question, "Did you consult an adviser on the recent rights issue?" and details the type of adviser they consulted. The high proportion of low cell expected values precludes the satisfactory

Table 8.4 Cross-tabulation of the replies shown in Table 8.2 and Table 8.3

Did you consult an adviser on the recent Rights Issue?	Number of respondents		
	In the management of your investments will you please indicate the degree to which you utilise an expert		
	More often than not	Less often than not	Total
Yes	18	14	32
No	11	66	77
Total	29	80	109

use of chi-square analysis to determine if there is a statistical difference between the replies of the two sets of shareholders.

The use of a stockbroker is implied by the process of investing in stocks and shares and this suggests the hypothesis, supported by visual inspection of the information presented in Table 8.5, that the shareholders of Company M, when contrasted to Company P, made more use of a stockbroker than the other classes of adviser, termed non-stockbroker, aggregated together. The reclassification of the data on this basis is shown in Table 8.6, the chi-square of 2.522 on 1 degree of freedom is statistically significant at the 20 per cent level. Thus we do not have adequate support for the hypothesis and therefore the results can be examined in aggregate.

Table 8.5 Did you consult an adviser on the recent Rights Issue?
 If the answer is "yes", please state the type of adviser
 you consulted

Type of adviser	Number consulting		
	Company M	Company P	Total
Stockbroker	11	5	16
Merchant banker	0	0	0
Accountant	3	3	6
Bank manager	1	1	2
Solicitor	0	0	0
Other	3	6	9
Total	18	15	33

Table 8.6 Comparison of frequency of consultation with stockbroker
 and non-stockbroker between the two samples

Type of Adviser	Number of respondents		
	Company M	Company P	Total
Stockbroker	11	5	16
Non-stockbroker	7	10	17
Total	18	15	33

Almost half of the respondents who answered this question indicated that they consulted a stockbroker; this, of course, is not an unexpected result when one considers the role of the stockbroker. Lease, Lewellen & Schlarbaum (1974) in the USA surveyed 990 individual investors of a brokerage firm in the Summer of 1972 and requested their respondents to rate on a four point scale the usefulness of various sources of information. Brokerage Houses were found to be the most useful with a weighted mean response¹⁰³ of 2.78. This result is in general agreement with this study although the source of the Lease, Lewellen & Schlarbaum respondents should be noted. They were individual investors who had kept an account open with the firm for an entire seven-year period. As reported for the specific case of rights issues where only 6 per cent of the respondent who actually consulted an adviser sought information from their Bank Manager, we can suggest that the situation is the same as in the USA. The weighted mean response was 1.28 which Lease, Lewellen & Schlarbaum (1974, p.427) was interpreted as, "Banks clearly are thought of as unhelpful in rendering advice.". Chenhall & Juchau (1977) in their study of 476 Australian investors in the Autumn of 1975 also concur with this result. In a similar vein, a solicitor must have, in the minds of the general public, the least claim to competence in financial affairs when contrasted with the other financial advisers. Reference to the feelings of the body of opinion, see Table 8.A.2, confirms this view. It is probably not that unexpected that none of the respondents claimed to have consulted

¹⁰³ Where 4 = almost always useful, 3 = generally useful, 2 = occasionally useful and 1 = never useful or never used.

with a merchant banker, since their area of influence is primary concerned with corporate business matters. Again, the body of opinion supports this interpretation; we can suggest that they feel that both the merchant banker and the solicitor are the least likely adviser a shareholder will consult, particularly if we exclude the "other" class.

As stated earlier, each prospectus/circular concerning the announcement of a rights issue to stockholders carries a bold warning statement advising the shareholder to consult a professional adviser in cases of doubt. We can propose an hypothesis that the shareholders exhibited a preference in the type of expert they consulted on their rights issue and that the frequency of consultation with the four categories so recommended is not a random, uniform distribution. Table 8.7 illustrates the data matrix that tests this hypothesis, the chi-square of 12.546 on 3 degrees of freedom is statistically significant at the 1 per cent level. Thus the evidence supports the hypothesis and we can infer that there is a one in a hundred probability that an incorrect conclusion has been reached due to sampling errors.

Referring to the feelings of the body of opinion, cited above, we can use Spearman's coefficient of rank correlation to determine if there is agreement between the ranking implied by the frequency of response of the shareholders and the average ranking provided by the body of opinion. Table 8.8 presents the relevant data, Spearman's coefficient is +0.4, which is below the value of 0.829 sought for a

Table 8.7 Comparison of actual adviser compared to expected adviser assuming equal probability

	Number	
	Actual	Expected
Stockbroker	16	6
Accountant	6	6
Bank manager	2	6
Solicitor	0	6
Total	24	24

statistically significant association at the 5 per cent level. Thus we must conclude that there is no agreement between the respondents and the body of opinion as to the ranking of the frequency of use of each type of adviser.

Although not radically highlighted by the information provided by the body of opinion, see Tables 8.A.2 and 8.A.3, it was decided to postulate the possibility of an access barrier which would be manifested by the employment status of the respondent. The argument, as it were, is that both the accountant and the bank manager can be considered easier to consult, than say, the stockbroker and that this barrier would be magnified by contrast with shareholders' employment status¹⁰⁴ Table 8.9 shows the cross-tabulation of the reclassified information to test this argument and the occurrence of

¹⁰⁴ See Table 8.11 and related comments later.

Table 8.8 Ranking of frequency of use of type of expert, contrasting response by shareholders against body of opinion

	Rank by frequency of use	
	Aggregated response of shareholders	Body of opinion
Stockbroker	1	3
Accountant	2	1
Other	3	6
Bank manager	4	2
Merchant banker	5.5	4
Solicitor	5.5	5

Note:

- (a) Spearman's coefficient of rank correlation was calculated using the following formula, see Yeomans (1968, p.302),

$$R = 1 - \frac{6 \sum d^2}{n(n^2 - 1)}$$

where n = number of observations
d = difference in the ranks for each

two cells with low expected values in the contingency table makes the use of the chi-square analysis unsatisfactory. Thus the more specific Fisher Exact Probability Test was carried out. The exact statistical probabilities of the three possible outcomes, assuming that the two factors are independent, is shown in Table 8.10. The intuitive expectation, developed from the visual inspection of the data, that there is not a statistical association, is confirmed.

Table 8.9 Cross-tabulation of employment status against postulated ease of access

Access barrier	Number of respondents		
	Employment status of respondents		
	Management	Non-management	Total
Low (viz bank manager and accountant)	5	1	6
High (viz stockbroker)	13	1	14
Total	18	2	20

Thus we can conclude that there is not sufficient support for the hypothesis since the probability of the actual result observed, assuming that the two factors are not associated, is 0.44.

Table 8.11 shows the replies to the question,

"Please indicate your perceived employment status or that of your spouse (if retired or unemployed, please indicate main career status)."

The qualifications were added to the question for obvious reasons. The chi-square of 0.885 on 2 degrees of freedom is statistically significant at the 50 per cent level. Thus the apparent reversal in the frequencies of response between the two sets of shareholders that can be observed for the supervisory employment status has a one in two chance of being due solely to sampling errors. We can conclude that there is not sufficient evidence to support the hypothesis that the employment characteristics differ between the two sam-

Table 8.10 Fisher exact probabilities of the possible outcomes shown in Table 8.9

Possible outcomes	Exact probability assuming independence(b)
4 2	0.07895
14 0	
5 1	0.44221
13 1	
6 0	0.47895
12 2	
Total	1.00011 (a)

Notes:

- (a) The deviation from unity is a measure of the inherent error in the procedure used to calculate the exact probabilities
- (b) The statistic was calculated as follows, see Conover (1971, p.163),

	Class 1	Class 2	Total
Row 1	w	x	C
Row 2	y	z	D
Total	A	B	N

$$\text{Fisher exact probability} = \frac{A!.B!.C!.D!}{N!.w!.x!.y!.z!}$$

ples and thus the results can be aggregated without encountering problems.

Table 8.11 Please indicate your perceived employment status or that of your spouse (if retired or unemployed, please indicate main career status)

	Number responding		
	Company M	Company P	Total
No reply	2	8	10
Management	42	34	76
Supervisory	4	6	10
Blue/white collar	7	7	14
Total	55	55	110

It was decided to aggregate the classes of blue/white collar and supervisory to form a new class termed "non-management" (see

Table 8.12 Comparison of employment status reclassified into management and non-management between the two companies

	Number responding		
	Company M	Company P	Total
Management	42	34	76
Non-management	11	13	24
Total	53	47	100

Table 8.12). The dichotomy between management and blue/white collar needs very little comment but it accepted that there are arguments for and against the logic of grouping the supervisory class with the blue/white collar category.

One company claims to have an above average number of worker shareholders and if we assume that the other company is average with respect to this attribute, then the data presented in Table 8.12 does not obviously confirm this claim, particularly if the connotation "non-management" is given to the word worker.

In discussing the employment status of private shareholders as a population, the study of Chenhall & Juchau (1977) in Australia during August - October 1975 may not be that relevant since their respondents were drawn from two 'investor interest' groups who played an active role in evaluating company shares and participating in share trading activity. Although they reported that the dominant groupings in employment status were professional and managerial (84 per cent) they admitted that, p. 112,

"A criticism that may be offered of utilising such groups as a survey population is that they may be atypical and their position and attributes may not reflect those of the so-called average investor."

In their research into the characteristics of the private shareholder in the UK, Lee & Tweedie (1975a, p.289 and 1977, p.149) have on two occasions recorded the occupation of their respondents. Although they did not specifically use the management to non-management dichotomy it is possible to reclassify their two sets of data to

make it consistent with this study. Their abstracted data is shown in Table 8.13 and was achieved by the following rules. The categories of "retired", "Housewives" and "unknown" have been excluded since we cannot determine how they refer to employment status. The "others" category has been taken as being equivalent to non-management; the justification for this reclassification is that the remaining categories are professional occupations, such as engineers, architects and investment brokers, etc., which can reasonably equate with management status. Inspection of Table 8.13 shows that there is a high degree of agreement between the two Lee & Tweedie studies, both give an estimate that just over two-thirds of their respondents were of management status. This study, however, indicated that three-quarters of the respondents fell into this occupation category. The chi-square of 2.844 on 2 degrees of freedom, which is not statistically significant at the 10 per cent level, indicates that there is not sufficient evidence to support the argument that there is a significant difference between the results of these three studies.

There is evidence to suggest that the proportion of individual investors in the USA who claim to be of management employment status is greater than that reported by UK studies. Lease, Lewellen & Schlarbaum (1974, p.417) reported, "... that the greater majority of those employed work in professional and managerial occupations, ...". Since they surveyed the clients of a brokerage firm whose accounts had been open for an entire seven-year period there is a possibility that their respondents contained a hidden bias, and they acknowledged, p.420,

Table 8.13 Employment status: comparison with the results of Lee & Tweedie

Employment status	Number of respondents			Total
	Lee and Tweedie (1975a)	Lee and Tweedie (1977)	Keef	
Management (a)	144	181	76	401
Non-management (b)	70	87	24	181
Total (c)	214	268	100	582

Number of companies	Survey method		
	Lee and Tweedie (1975a)	Lee and Tweedie (1977)	Keef
	Postal questionnaire	Personal interview	Postal questionnaire
	1	1	2

Notes:

- (a) Aggregate of professional and management occupations in the Lee and Tweedie studies.
- (b) "others" category in the Lee and Tweedie studies.
- (c) Excludes categories of "retired", "housewives" and "unknown" in the Lee and Tweedie studies.

"The one real difference is the higher level of education within the control group, which clearly accounts for its heavier relative contingent of professional and managerial personnel ...".

The aggregated data suggests that three out of four private shareholders are managers or perceive themselves to be of equivalent to management status. This estimate does not differ significantly from that provided by the body of opinion, see Table 8.A.4. Assuming that the estimate from the body of opinion approximates to a normal distribution, then the estimate provided by this study is 0.8 standard deviations from the mean. Thus the area in the tail is 21.2 per cent, indicating that the deviation is not statistically significant.

The body of opinion does not provide a definite conclusion with respect to the relationship between shareholders' employment status and the frequency of use of expert (see Table 8.A.5). This cross-tabulation is shown in Table 8.14 which has a calculated chi-square of 0.197 on 1 degree of freedom which is not statistically significant.

Table 8.14 Cross-tabulation of employment status against the frequency of consulting an expert

Frequency of consulting an expert	Number of respondents		
	Employment status		
	Management	Non-management	Total
Less often than not	56	18	74
More often than not	20	5	25
Total	76	23	99

cant at the 10 per cent level. Thus any hypothesis of association

must be rejected and we can conclude that the results are in agreement with those solicited from the body of opinion.

Using an arbitrary criterion of defining the holding of shares in three or more different companies as a portfolio, Table 8.15 shows the responses to the question,

"Do you own a portfolio of shares?".

Table 8.15 Do you own a portfolio of shares? (shares in three or more companies)

	Number of respondents		
	Company M	Company P	Total
No reply	0	0	0
Yes	49	47	96
No	6	8	14
Total	55	55	110

The chi-square of the data presented in the table is 0.327 on 1 degree of freedom which is not statistically significant at the 10 per cent level. This is not sufficient evidence to allow the acceptance of the hypothesis that there is any significant difference between the shareholders of the two public companies investigated. Since 87 per cent of the respondents claimed to own a portfolio, we must infer that this is an important characteristic of a private shareholder. As a direct consequence of this result we can advocate

very strongly that the major findings of this study are applicable not only to the private shareholders of engineering based companies but of the population of private shareholders as a whole. The central point of this argument is that since less than 13 per cent of the respondents were not portfolio owners, then by far the greater majority also held shares in companies that are not in the engineering sector of the economy. Although such a diverse investment is implied by portfolio theory we are, unfortunately, unable to fully substantiate this argument. In their interview survey of 301 private shareholders, Lee & Tweedie (1977, p.17) found that over three quarters of their respondents held more than five shareholdings in their portfolios; their median shareholder held between 11 to 20 different investments. This is in agreement with the findings of Lease, Lewellen & Schlarbaum (1974) in the USA who reported a median which fell within the class boundary of 10 to 15. This data, however, supports the view advanced earlier concerning the applicability of the conclusions of this research to private shareholders in general, rather than just those that are members of the two engineering companies surveyed.

When the shareholders were further questioned about their estimate of the current value of their portfolio, only 6.25 per cent of those eligible to reply refused to do so. Table 8.16 shows their estimate of the current value of their portfolio. The class of "up to 500 pounds" was inserted in the questionnaire so as to isolate those shareholders who can be termed as "meddling in stocks and shares" rather than treating shareholding as a "serious proposi-

Table 8.16 Do you own a portfolio of shares? (shares in three or more companies). If the answer is "yes", would you please indicate the estimated current value of the portfolio

	Number of respondents		
	Company M	Company P	Total
No reply	2	4	6
Up to 500 pounds	0	0	0
500 pounds to 10,000 pounds	16	21	37
Above 10,000 pounds	31	22	53
Total	49	47	96

tion". The survey showed that none of the respondents claimed to fall within this category. The chi-square of the 2 x 2 table which tests whether there is a difference between the shareholders of the two companies with respect to the size of portfolio, see Table 8.16, is 2.027 on 1 degree of freedom which is statistically significant at the 20 per cent level. Thus, although visual inspection suggests that the current value of the portfolio of Company M's shareholders is greater than a similar estimate for Company P's shareholders, the low value of the chi-square statistic would suggest that the difference is not important when sampling errors are taken into account. Thus we can conclude that the shareholders of the two engineering companies investigated, and by strong implication through the portfolio argument, shareholders as a whole, are homogeneous with respect to their investment characteristics.

Almost half of the respondents owned a portfolio which they valued at over 10,000 pounds; since the average wage in the United Kingdom at the time was 4,633 pounds per annum¹⁰⁵ we can infer that a high proportion of private shareholders have more than a modest degree of savings behind them. Lee & Tweedie (1977, p.16) reported that their median shareholder owned 250 shares of the survey company and at the time of the research the equivalent market value was 668 pounds. Now, if we make the assumption that their median shareholder had invested equal sums, at current market capitalisations, in each of his investments, then the value of his portfolio would be just over 10,000 pounds. Although this must be accepted as a gross assumption it does indicate a high degree of agreement between the two studies.

The body of opinion, on average, believes (see Table 8.A.6) that managers are more likely to own a portfolio of shares than non-managers; this hypothesis is tested by the data presented in Table 8.17. This chi-square of 1.713 on 1 degree of freedom is statistically significant at the 20 per cent level and thus there is not sufficient evidence to support the hypothesis. When questioned on the relationship between employment status and the size of the portfolio, the body of opinion (see Table 8.A.7) favoured the association of management status with the large portfolio. Table 8.18 shows the data that tests this hypothesis. The chi-square of 2.429 on 1 degree of freedom is statistically significant at the 20 per cent level. Thus the observed, yet weak, association that manage-

¹⁰⁵ See New Earnings Survey (1978, Table 1).

Table 8.17 Cross-tabulation of ownership of portfolio with employment status

Do you own a portfolio	Number of respondents		
	Employment status		
	Management	Non-management	Total
Yes	68	19	87
No	8	5	13
Total	76	24	100

Table 8.18 Cross-tabulation of size of portfolio with employment status

Size of portfolio	Number of respondents		
	Employment status		
	Management	Non-management	Total
Medium (up to 10,000 pounds)	25	10	35
Large (above 10,000 pounds)	41	7	48
Total	66	17	83

ment status is related to the class of large portfolio has a high probability of being due to sampling errors and consequently the hypothesis must be rejected.

When we examine the frequency of use of an expert in relation to the ownership and size of portfolio, the body of opinion suggests that an owner of a portfolio would be more likely to use an expert more frequently than a shareholder who did not own a portfolio and that there would be a monotonic association between the size of the portfolio and the frequency of consultation (see Tables 8.A.8 and 8.A.9).

Table 8.19 presents the cross-tabulation of the degree to which the services of an expert are used against the answer to the ques-

Table 8.19 Cross-tabulation of the degree of use of an expert against ownership of a portfolio

Do you own a portfolio?	Number of respondents		Total
	Less often than not	More often than not	
Yes	66	29	95
No	14	0	14
Total	80	29	109

tion concerning ownership of a portfolio. The chi-square of 5.812 on 1 degree of freedom is statistically significant at the 2 per cent level. Thus we have support for the expected hypothesis that owners of portfolios consult more often with their advisers than do shareholders who do not own a portfolio of shares. The confidence

attached to this conclusion is that there is a 1 in 50 chance that the observed association is due to sampling errors.

When we investigate the relationship between the size of the portfolio and the frequency of use of an expert, we find an inconclusive result. Table 8.20 presents the cross-tabulation of these two factors and the chi-square is 1.495 on 1 degree of freedom which

Table 8.20 Cross-tabulation of size of portfolio against the degree of use of an expert

Size of portfolio	Number of respondents		
	Degree of use of expert		
	Less often than not	More often than not	Total
Medium	9	28	37
Large	19	33	52
Total	28	61	89

is statistically significant at the 25 per cent level. A criticism that can be levied at the classification of the size of the portfolio into medium and large at the 10,000 pounds interface is that associated with the perceived importance of the value of the portfolio. For one investor 10,000 pounds may well be a very significant amount of money, whereas to another it may well be less significant part of total wealth.

8.4 Concluding remarks

The characteristics of the private shareholders of two public companies have been compared and contrasted. Table 8.21 shows a summary of the five factors that were used to examine the differences bet-

Table 8.21 Summary of results, comparison of replies between companies

Factor	Chi-square	Degrees of freedom	Level of statistical significance (percentage)
Use of expert (general)	1.638	3	70
Use of expert (specific)	0.390	1	70
Employment status	0.885	2	70
Ownership of portfolio	0.327	1	70
Size of portfolio	2.027	1	20

ween the two sets of respondents. The median level of statistical significance is 70 per cent. This can be interpreted as not providing sufficient support for the hypothesis that the factors have illustrated a statistically significant difference between the two sets of shareholders.

The comparison of the size of shareholding of the individuals who were sent the questionnaire and the respondents, indicates that the results can be considered representative of the random sample of the population of private shareholders of each company. The results of

this study have been compared and contrasted with the findings of other researchers. Although a specific and direct comparison could not always be carried out, due to the differences in the questions put to the respective respondents, the general conclusion indicates that there was little evidence to indicate any radical differences.

The secondary analysis only isolated one cross-tabulation of statistical importance. This showed that owners of portfolios are associated with the above average use of an expert when contrasted with shareholders who do not own a portfolio. This result cannot be considered unusual.

Since over 85 per cent of the respondents claimed to own a portfolio of shares, a result confirmed by other researchers both in the UK and USA, we can make the claim that the respondents in this study are a random sample of the population of private shareholders. The argument being that if they follow the logic of diversification, implicit in portfolio theory, they will be members of other companies in different sectors of the economy.

Appendix A to Chapter 8

A survey entitled "An educated guess of shareholder characteristics" was used to estimate the intuitive feelings of a group of postgraduate students. It is not proposed to analyse this data with specific statistical tests, it is believed sufficient simply to inspect the data and then form a view as to the feelings expressed by the majority of the respondents. This will be called "the body of opinion".

Table 8.A.1 Survey: an educated guess of shareholder characteristics

1. Please rank (1 to 6 with 1 = highest) the order you would think that the average shareholder would consult the following in the management of his investments.

Class	Rank
Stockbroker	_____
Merchant banker	_____
Accountant	_____
Bank manager	_____
Solicitor	_____
Other (please define)	_____

- 1(a). Would you expect the employment status of the shareholder to have an effect on the above rankings? (tick)

yes _____

no _____

2. Please estimate (to nearest 10%) the employment status of private shareholders:

management	_____
non-management	_____
total	100%

3. Would you expect a manager to consult

more frequently _____

less frequently _____

same _____

with an adviser/expert than would a non-manager?

4. If we define a portfolio as the holding of shares in 3 or more companies, would you expect a manager to be

more _____ less _____ same _____

likely to own a portfolio than a non-manager?

5. If we define a medium portfolio as less than 10,000 pounds and a large portfolio as above 10,000 pounds, would you expect a manager to be

more _____ less _____ same _____

likely to own a large portfolio than a non-manager?

6. Would you expect an owner of a portfolio to use an expert

more _____ less _____ same _____

than a shareholder who does not own a portfolio?

7. Would you expect an owner of a large portfolio to use an expert

more _____ less _____ same _____

than the owner of a medium portfolio?

Table 8.A.2 Please rank (1 to 6 with 1 = highest) the order you would think that the average shareholder would consult the following in the management of his investments.

Class	Weighted average rank
Accountant	2.57
Bank manager	2.81
Stockbroker	2.90
Merchant banker	3.90
Solicitor	4.00
Other	5.10

Table 8.A.3 Would you expect the employment status of the shareholder to have an effect on the above rankings?

	Frequency of response
Yes	19
No	2
Total	21

Table 8.A.4 Please estimate (to nearest 10%) the employment status of private shareholders:

Percentage management	Frequency of response
100	-
90	1
80	1
70	5
60	5
50	1
40	-
30	1
20	1
10	-
0	-
Total	15
Summary statistics	Per cent
Median	60
Weighted mean	60
Standard deviation	20

Table 8.A.5 Would you expect a manager to consult MORE/LESS/SAME frequently with an adviser/expert than would a non-manager?

Class	Frequency of response
More	11
Less	9
Same	1
Total	21

Table 8.A.6 If we define a portfolio as the holding of shares in 3 or more companies, would you expect a manager to be MORE/LESS/SAME likely to own a portfolio than a non-manager?

Class	Frequency of response
More	16
Less	2
Same	3
Total	21

Table 8.A.7 If we define a medium portfolio as less than 10,000 pounds and a large portfolio as above 10,000 pounds, would you expect a manager to be MORE/LESS/SAME likely to own a large portfolio than a non-manager?

Class	Frequency of response
More	14
Less	3
Same	4
Total	21

Table 8.A.8 Would you expect an owner of a portfolio to use an expert MORE/LESS/SAME than a shareholder who does not own a portfolio?

Class	Frequency of response
More	18
Less	1
Same	2
Total	21

Table 8.A.9 Would you expect an owner of a large portfolio to use an expert MORE/LESS/SAME than the owner of a medium portfolio?

Class	Frequency of response
More	16
Less	3
Same	2
Total	21

Chapter 9 Importance of the Issue Price in a Rights Issue: a Survey of Private Shareholders.

9.1 Introduction

The objective of this chapter is to determine and characterise the views of private shareholders on the importance of the issue price in a rights issue and to attempt to analyse the underlying reasons for such convictions.

Many researchers, for example, Merrett, Howe & Newbould (1967) and Briston & Cottam (1970), argue that the issue price in a rights issue is irrelevant provided there is sufficient margin to guard against the natural movement in the share price caused by the volatility of the market and provided the market operates in a perfect manner. Other researchers, principally Jones-Lee (1971 and 1972) and Keane (1972) advance a slightly differing view under certain circumstances and argue that the issue price may be of some importance depending upon the degree of inefficiency in the market's treatment of the share price. In discussing the implications of the effect of rights issues on the net wealth of shareholders, care should be taken to differentiate between the two, potentially mutually exclusive, types of market inefficiencies. The first is the treatment of the short term dilution effect and the second is whether the current share price deviates from an intrinsic or fundamental value. These aspects have been fully discussed in Chapter 3.

In general we can advocate two interpretations to explain the importance or lack of importance of the issue price to a private shareholder. The first is that the shareholder understands the theoretical argument presented in most business finance text books; that is, *ceteris paribus*, the issue price is irrelevant. However, the articles of Jones-Lee and Keane mentioned above may tend to complicate this argument and following on from their work it would not be unreasonable to expect a mixture of "yes" and "no" answers if the relatively simple question, "Is the issue price irrelevant in a rights issue?" were put to a sample of informed people. Nevertheless, it would be reasonable to expect these respondents, if asked such a question, to reply in a qualified manner; such a qualification may well include the point made by Bacon (1972, p.64), viz;

"It does appear, however, that the financial manager is not facing a dilemma when he sets the subscription price. Rather, he can concentrate on minimizing his primary risk - the risk that the market price will fall below the subscription price during the offering period."

or they may mention whether the shares are temporarily over or under-valued at the time of the issue. Bearing these important points in mind, the question put to the sample of private shareholders in the postal questionnaire was, "Do you think you are getting a bargain if the issue price in a rights issue is below the current market price of the shares?" and they were given the forced choice of replying "yes" or "no". It is contended, and this may be an area of debate, that the informed shareholder who is cognisant of the normally accepted irrelevance of the issue price will respond in a negative manner; the even more knowledgeable shareholder, who may

have read the articles of Jones-Lee and Keane, would still be expected to answer in a similar fashion. As a safeguard against these subtle interpretation problems a supplementary question, "If the answer is "yes", do you agree with the statement, 'the greater the discount the greater the bargain'?" was asked.

The second interpretation postulates that the shareholder has a naive understanding of the market mechanism of rights issues and we could argue that such an ill-informed investor rationalises in the following manner. The current market price of the shares is C and the company is offering me a number of new shares, as a valued customer, at a price P ; hence since C is greater than P it would appear that I can purchase the new shares more cheaply from the company than from the stock market. The recent trends in marketing and advertising which extol the benefits to the consumer of buying direct from the manufacturer and so cut out the profit of the middle-man cannot but reinforce this falacious feeling. The ill-informed shareholder may therefore believe that the difference between the current market price and the issue price is in fact a measure of the turn or profit made by the stockbroker. So the argument proposes, they do not fully understand the true mechanism of a rights issue on the stock market and treat the stockbroker merely as a merchant of shares and stocks. The current trend of issuing shares in a rights issue at a small discount compared to the current market price must act as a positive support for their beliefs. As shown in Chapter 4, the mean discount of 108 rights issues in 1976 was 28 per

cent¹⁰⁶ which does not differ radically, so it would seem, from the margin typically made by the average white goods trader.

This explanation also requires that the shareholder is ignorant, or at least does not take great notice, of the fact that the price of the existing shares fall when they change from cum-rights to ex-rights. Assuming the shareholder observes this occurrence, there is a distinct possibility that he may miss it altogether, he may attribute it to normal share price movements; the caveat added to all offers for subscription to unit trusts, namely, "... the price of units and the income from them may go down as well as up.", is a good illustration. Again, on many occasions, the drop in price from the cum-rights price to the ex-rights price may be relatively small, due to the low discount offered, and invariably the shareholder will still show a profit on the new shares when he compares the difference between the issue price and the ex-rights price. Edge (1965b, p.266) agrees with this interpretation and suggests,

"Most small shareholders tend to ignore the temporary (sic) capital loss so think that the company is giving them something when it makes a rights issue. If they sold their original holdings, as well as their rights, at the time of the issue, they would soon realise their mistake."

Whether the incorporation of the word "temporary" is a simple slip or whether she is perpetuating the apparent belief that the share price will revert to its original level after the rights issue is a moot point. Dewing (1941, p.1211) discusses this adage and cites

¹⁰⁶ Defined as $(C - P)/C$. Manley (1976, p. 38, Table F) found a weighted average of 25.4 per cent for 133 rights issues of 1975. Due to the fact that the table excluded 'deep discount' issues the statistic will be understated.

the research of Beckman in 1925 and concluded that the evidence was inconclusive but seemed to indicate that the adage was false. The final point that must reinforce the attitude of the ill-informed shareholder is the dissemination of false information by financial commentators in the press¹⁰⁷ and on the radio; this aspect was highlighted by Merrett, Howe & Newbould (1967, p.51) when they commented,

"... it is frequently the case that some financial commentators refer to rights issues as being on attractive terms, and generally consider the terms of the issue to be of serious economic significance."

9.2 The prime question and its reclassification

The shareholders were presented with the question:

"Do you think that you are getting a bargain if the issue price in a rights issue is below the current market price of the shares?"

(a) yes

(b) no

"If the answer is "yes", do you agree with the statement 'the greater the discount the greater the bargain'?"

(c) yes

(d) no

¹⁰⁷ See also Business Week (1980, p.47).

Excluding the "no reply" cases we can reclassify the respondents

Table 9.1 Reclassification of replies to the prime question

Answer code		Interpretation	Include in analysis	Classification of the importance attached to the issue price
First part	Second part			
(a)	(c)	Issue price is important, theoretically incorrect	yes	naive
(a)	(d)	Inconsistent reply	no	-
(b)	-	Issue price is not important, theoretically correct	yes	informed

into three classes as shown in Table 9.1. The shareholders who responded positively to both parts of the question can be considered to truly believe that the issue price is of some importance. They not only indicated a rights issue represented a bargain but affirmed that the greater the discount then the greater the bargain. In this study this class of shareholder will be termed "naive". On the other hand, we can isolate those shareholders who believed a rights issue did not represent a bargain and that the issue price is, ceteris paribus, irrelevant. These we shall term "informed".¹⁰⁸ Having characterised the two extremes, we are left with the residual

¹⁰⁸ It should be noted that they were not asked to answer the second part of the question.

replies; these are the respondents who initially indicated that a rights issue represented a bargain but did not agree there was a monotonic relationship between the discount offered and the size of the bargain. One wonders if this class of shareholders contains the people who understand the theoretical arguments concerning the irrelevance of the issue price but support the views of Jones-Lee and Keane? Another explanation could lie in the fact that these are a measure of the inherent error in this study; that is, the respondents who have either guessed the answer or responded in an arbitrary or random manner. It has been decided to exclude this sub-set of respondents from the analysis and to concentrate on the radical dichotomy, between replies (b) and (c) above. This could be considered a contentious decision since the exclusion of data should not be undertaken lightly. However, there would appear to be sufficient justification for this action.

Table 9.2 shows the replies by the two sets of shareholders to the primary question. We can propose the hypothesis that there is a difference in the distribution between these two groups of shareholders. The chi-square of the replies to the first part of the question is 1.061 on 1 degree of freedom which is not statistically significant at the 10 per cent level. A similar result is found for the replies to the second part of the question where the chi-square is 0.479 on 1 degree of freedom. When the data is reclassified into the two extremes, along the lines mentioned earlier, we arrive at Table 9.3, the chi-square is 1.181 on 2 degrees of freedom which is not statistically significant at the 10 per cent level. Conse-

Table 9.2 Replies to the primary question - broken down by company

Question	Number of respondents		
	Company M	Company P	Total
Do you think you are getting a bargain if the issue price in a rights issue is below the current market price of the shares?			
yes	33	40	73
no	19	15	34
Total	55	55	107
If the answer is "yes", do you agree with the statement "the greater the discount the greater the bargain"?			
yes	27	28	55
no	5	8	13
Total	32	36	68

quently we do not have sufficient evidence to support an association hypothesis and thus it must be rejected in favour of the null hypothesis. This has been taken as sufficient evidence to not invalidate the discussion of the results in aggregated form.

Table 9.3 Reclassification of respondents to primary question - by company

Response to the primary questions	Number of respondents		
	Company M	Company P	Total
Naive	27	28	55
Mixed	5	8	13
Informed	19	15	34
Total	51	51	102

We can infer that one in three (33.3 per cent) private shareholders agree with the irrelevance of the issue price theory whereas just over one half (53.9 per cent) can be interpreted as supporting the naive approach. Approximately one-eighth (12.7 per cent) of the respondents replied in what has been deemed an inconsistent manner. To those who argue, that although there is a plethora of information on the prospectus/circular informing the shareholder of the rights issue, there should be a section advising the shareholder of the importance of the issue price, we can offer this result as strong evidence to support their case.

9.3 Examination of the shareholders' characteristics

The characteristics of the shareholder that were solicited in the questionnaire were employment status, frequency of use of expert in the management of their investments and whether or not they owned a

portfolio of shares. Previous examination of this data, see Chapter 8 has not shown sufficient evidence to support the hypothesis that there was a statistically significant difference between the characteristics of the shareholders of the two companies with respect to these attributes. Table 9.4 shows a summary of this information and is used to support the decision to analyse the data

Table 9.4 Comparison of replies between companies: shareholder characteristics

Factor	Chi-square	Degrees of freedom	Level of statistical significance (percentage)
Use of expert (specific)	1.638	3	70
Use of expert (general)	0.390	1	70
Employment status	0.885	2	70
Ownership of a portfolio	0.327	1	70
Size of portfolio	2.027	1	20

in aggregate form rather than by company.

We can propose, based on a value judgement, the hypothesis that non-managers are more likely to support the naive approach to the importance of the issue price in a rights issue than managers. Table 9.5 shows the cross-tabulation that tests this hypothesis and we can observe that 58 per cent of managers and 81 per cent of non-managers supported the naive approach. The calculated chi-square was 3.560 on 1 degree of freedom which is statistically significant

Table 9.5 Cross-tabulation of employment status against importance attached to the issue price

Response to the primary question on the importance of the issue price	Number of respondents		
	Employment status		
	Management	Non-management	Total
Naive	36	17	53
Informed	26	4	30
Total	62	21	83

Note:

(a) The phi statistic was calculated as follows, see Nie et al (1975, p.224),

$$\Phi_i = \text{square root} (\text{chi-square}/\text{sample size})$$

at the 10 per cent level but the calculated phi statistic of 0.207 would suggest that the degree of association is not potentially strong. Thus, although non-managers are estimated to support the naive approach some 1.4 times more frequently than managers, we must bear in mind the fact that this observed difference has a one in ten probability of being solely due to sampling errors. Possible explanations for the small difference observed for employment status are most probably related to socio-economic factors, examples could be education, social class, etc..

On a priori grounds it would appear reasonable to postulate the hypothesis that a shareholder who consults more frequently with his

adviser in the management of his investments is less likely to support the naive approach than a shareholder who does not utilise the services of an expert so often. Implicit in the hypothesis are two important aspects. The first is whether the expert supports the theoretical irrelevance argument concerning the importance of the issue price in a rights issue. If we make the assumption that he is aware of the debate in this subject area, we can suggest that he will satisfy by indicating to his client that in the short term the issue price is irrelevant in a perfect market and that in the case of rights issues the market appears to act in a near perfect manner. Nevertheless, one would expect the adviser, if asked, to negate any possibility that a low issue price represented any form of bargain and to stress that any such monotonic relationship is fallacious. The second aspect is whether the client asked his adviser about the importance of the issue price.

The cross-tabulation of the degree to which the shareholder used an expert against the importance attached to the issue price is shown in Table 9.6; this chi-square is 0.078 on 3 degrees of freedom which is not statistically significant at the 10 per cent level. Thus we must reject the hypothesis and conclude that the frequency with which the shareholder utilises the services of an expert in the general management of his investments is independent of the importance the shareholder attaches to the issue price in a rights issue.

It is not unreasonable to argue that this general question may not be an exact measure of the parameter inferred in the hypothesis,

Table 9.6 Cross-tabulation of frequency of use of expert against the importance attached to the issue price

Response to the primary question on the importance of the issue price	Number of respondents				Total
	Never	Occasionally	More often than not	Always	
Naive	18	23	7	6	54
Informed	12	13	5	4	34
Total	30	36	12	10	88

the specific question relating to whether they consulted an adviser on the recent rights issue may be more relevant. Table 9.7 presents the relevant cross-tabulation and the chi-square is 0.183 on 1 degree of freedom which is not statistically significant at the 10 per cent level. Thus the fact that the shareholder consulted an adviser on the recent rights issue apparently did not influence the importance he attaches to the issue price. In attempting to explain this result one should ask whether the client specifically asked the adviser about the importance of the issue price. In hindsight, this question should have been included in the questionnaire. Nevertheless, we can suggest the client may not raise this question very often; the shareholder who supports the naive approach may feel that the bargain aspect is so obvious that he would lose face if he were to ask his adviser such a simple question. In a similar vein, the expert may not bother to raise the matter since he believes the sha-

Table 9.7 Cross-tabulation of whether the shareholder consulted an adviser on the recent rights issue against the importance attached to the issue price

Response to the primary question on the importance of the issue price	Number of respondents		
	Did you consult an adviser on the recent rights issue?		
	Yes	No	Total
Naive	17	38	55
Informed	12	22	34
Total	29	60	89

reholder is already cognisant of the underlying theory of rights issues. The informed client, of course, would not need to enquire into such matters with his adviser. Thus we must come to the conclusion that there is a barrier in the communication process between the adviser or expert and the client when it comes to the dissemination of information on the understanding of the importance of the issue price in a rights issue.

We can postulate that the owner of a portfolio is less likely to support the naive approach that would a shareholder who did not own a portfolio. The bases for this hypothesis would include the greater probability of having had a previous experience of a rights issue that is associated with the ownership of a portfolio of shares, as well as the view that, per se, an owner of a portfolio is more likely to be interested and inquisitive about the workings of the stock market; of which rights issues are an integral part.

The cross-tabulation of the importance attached to the issue price against whether or not the shareholder owns a portfolio is presented in Table 9.8; the chi-square is 0.072 on 1 degree of free-

Table 9.8 Cross-tabulation of the importance attached to the issue price against whether or not the shareholder owns a portfolio of shares

Response to the primary question on the importance of the issue price	Number of respondents		
	Do you have a portfolio of shares?		
	Yes	No	Total
Naive	48	7	55
Informed	29	5	34
Total	77	12	89

dom and is not statistically significant at the 10 per cent level. Thus we must reject the hypothesis that the ownership of a portfolio influences the shareholders' opinion on the importance of the issue price in a rights issue.

The sub-set of shareholders who claimed to own a portfolio were further questioned on its current market value. Thus we can investigate whether the size of portfolio has any effect on the importance attached to the issue price. The relevant cross-tabulation is shown in Table 9.9 and the chi-square is 0.003 on 1 degree of freedom which is not statistically significant at the 10 per cent level. Thus for the sub-set of shareholders who claimed to own a portfolio

Table 9.9 Cross-tabulation of the importance attached to the issue price against the current market value of the portfolio for the sub-set of shareholders who claimed to own a portfolio

Response to the primary question on the importance of the issue price	Number of respondents		
	Please indicate the estimated current value of the portfolio		
	Between 500 and 10,000 pounds	Over 10,000 pounds	Total
Naive	19	26	45
Informed	12	16	28
Total	31	42	73

we must conclude that the size, measured as current market value, does not appear to influence the importance attached to the issue price.

The questionnaire was designed so that it contained a series of questions that can be used to estimate the shareholders' knowledge of four basic tenets of a rights issue. These were the drop in price when the shares go ex-rights, the treatment of unsubscribed shares (which was clearly specified in each prospectus/circular) and the effect on the shareholders' short term wealth if either the new shares were accepted or their rights were sold. The four questions are shown in Table 9.10 where the orthodox or correct answer is marked with an asterisk. The classification of the answers into "correct" and "not correct" allows the building of an aggregate

Table 9.10 The test questions

-
1. Shortly after a rights issue is announced (when the shares go ex-rights) how do you think the share price reacts?
 - (a) normally increases
 - (b) normally remains constant
 - *(c) normally decreases

 2. If the shareholder does nothing about the shares allotted, which would you expect to happen in the short term?
 - (a) nothing
 - *(b) he will receive some money from the company after the end of the subscription period

 3. If the shareholder accepts the shares allotted to him, how would you expect his net wealth to be affected in the short term?
 - (a) normally increases
 - (b) normally remains constant
 - *(c) normally decreases

 4. If the shareholder sells the rights to the new shares, how do you think his net wealth will be affected in the short term?
 - (a) normally increases
 - (b) normally remains constant
 - *(c) normally decreases
-

Note: * = orthodox or correct answer

score which can be used to test the hypothesis that the shareholders who support the naive approach will achieve a lower score than those who indicated the issue price was not important.

Table 9.11 Measure of association between the knowledge questions and the prime question

Phi value $\left(\frac{\chi^2}{N} \right)^{\frac{1}{2}}$ for 2 x 2 contingency table; correct versus not correct answer					
	Drop in price associated with shares going ex-rights	Treatment of unsubscribed shares	Effect on short term wealth by accepting shares	Effect on short term wealth by selling rights	Importance attached to issue price
Drop in price associated with shares going ex-rights	0.97***	0.05	0.06	0.01	0.31**
Treatment of unsubscribed shares	-	0.97***	0.20	0.04	0.11
Effect on short term net wealth by accepting shares	-	-	0.97***	0.31**	0.32**
Effect on short term net wealth by selling rights	-	-	-	0.97***	0.30**
Importance attached to issue price	-	-	-	-	0.97***

Notes: The level of statistical significance of implied chi-square statistic is given by * = 5 per cent; ** = 1 per cent; *** = 0.1 per cent.

The Phi statistic, as illustrated by the diagonal of the matrix, is slightly understated due to the use of Yates correction to calculate the chi-square statistic.

Table 9.11 presents the matrix of association, between the answers to these four questions and the importance attached to the issue price, measured by the phi statistic together with the statistical significance of the implied chi-square shown at the three commonly used criteria of 5, 1 and 0.1 per cent levels. It should be noted that the values of phi presented in this table have been marginally understated due to the use of the Yates corrected chi-square statistic; this is illustrated by the diagonal of the matrix which ideally should be unity.

It would appear that although the shareholders' knowledge of the treatment of unsubscribed shares is independent of his views on the importance of the issue price, his understanding, as illustrated by the three other questions, is significantly associated to this prime question. Earlier in this chapter it was suggested that the naive shareholder may not be as knowledgeable as the informed shareholder when it comes to the drop in price associated with the shares changing from cum-rights to ex-rights. Table 9.12 presents the cross-tabulation that tests this hypothesis where we can observe that the chi-square is 8.847 on 1 degree of freedom which is statistically significant at the 0.5 per cent level. This study would suggest that 47 per cent of naive shareholders compared to only 14 per cent of informed shareholders did not realise there is a drop in price associated with the shares going ex-rights; this difference is not only statistically significant but would also appear to be of some importance. Visual inspection of the raw data used to prepare the association matrix shown in Table 9.11 confirmed that, where statis-

Table 9.12 Cross-tabulation of the importance attached to the issue price against knowledge of drop in price when the shares go ex-rights

Response to the primary question on the importance of the issue price	Number of respondents		
	Correct answer	Not correct answer	Total
Naive	26	23	49
Informed	25	4	29
Total	51	27	78

tically significant, the naive shareholder was more associated with the incorrect answer than was the informed shareholder. We can also observe that the understanding of the effect on his short term net wealth of either accepting the new shares or selling the rights is, as would be expected, highly associated.

Table 9.13 presents the test score broken down by company; the observed weighted mean difference of 0.29 would not appear to be of any statistical importance since the calculated z-value of 1.2 is below the critical value of 1.64 required for a statistically significant result at the 10 per cent level for a double tailed test. Thus the typical private shareholder, as manifested by this study, has a weighted mean score of 2.0, equivalent to 50 per cent of maximum, and so we can suggest that he is not totally ignorant, yet we

Table 9.13 Test score by company

Number of correct answers	Number of respondents		
	Company M	Company P	Total
4	7	3	10
3	8	7	15
2	12	14	26
1	11	11	22
0	2	3	5
Total	40	38	78
Weighted average	2.18	1.89	2.04
Standard deviation	1.16	1.05	1.11

Note:

- (a) The procedure to calculate the z-value to test if there is a statistical difference between the means of the two samples is as follows, see Yecmans (1968b, p.82),

$$Z \text{ (calc)} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}} \quad \text{where } \begin{array}{l} \bar{x}_i = \text{means} \\ s_i = \text{standard deviations} \\ n_i = \text{sample sizes} \end{array}$$

cannot claim that he has an excellent understanding of the four aspects measured in this test.

A survey by Lyall (1975) to assess shop stewards' ability to understand financial data, in the context of pay bargaining, produced a mean score of 27 per cent of maximum for a five-question

test. Although for obvious reasons the results of these two studies cannot be directly compared, it would appear not unreasonable to suggest that private shareholders are more informed about rights issues than shop stewards are about the implications of the information disclosed in companies' Reports and Accounts.

Lee & Tweedie (1977, p.47) published an Index of Understanding based upon 34 questions to test shareholders' actual understanding of financial information. Their survey, based upon 301 respondents from a single large public company, produced a mean score of 15.17, equivalent to 44.6 per cent of maximum. Thus it would appear that there is a reasonable measure of agreement between the two studies which indicate that private shareholders perform equally well on tests concerning a wide spectrum of financial information related to corporate reports and on the slightly more specialist important aspects of a rights issue. In another study, Lee & Tweedie (1976) constructed "an approximate index of understanding" to four questions related to general knowledge of reporting practice. Their mean score of a sample of 374 respondents was 1.53 with a standard deviation of 1.079. The calculated z-value, to determine whether their results produced a different mean value to this study, was 3.17 which is statistically significant at the 0.1 per cent level. Thus the evidence would suggest that UK private shareholders are more knowledgeable about the mechanism of rights issues than they are concerning understanding of reporting practices.

Lease, Lewellen & Schlarbaum (1974, p.431) surveyed 990 individual investors in the USA during the Summer of 1972 and asked their respondents to indicate their reaction to the statement,

"I am substantially better informed than the average investor."

using a five point rating scale.¹⁰⁹ The mean response was 3.31 suggesting that the average private investor in the USA perceived himself to be marginally better informed than his peers.

A major problem associated with unsolicited postal questionnaires centres around whether the respondent has provided a considered opinion which reflects what he believes is true at the time or whether he is making a random guess. Although such a question cannot be answered with absolute certainty, the analysis of selected parts of the data will provide a valuable insight into this aspect.

Firstly, we can examine the replies to one of the test questions, for example, number 3 in Table 9.10, which asks the respondent how he would expect his net wealth to change if he accepted his allotted shares. As implied by the proposed hypothesis, we would expect that the naive shareholder would be strongly associated with the "increase in net wealth" response whilst the informed shareholder would show a strong preference for the "no change in net wealth" reply. *Ceteris paribus*, we would expect the "decrease in net wealth" category to show a small response by either class of shareholder. Inspection of the cross-tabulation shown in Table 9.14 con-

¹⁰⁹ Where 5 = strongly agree, 4 = moderately agree, 3 = neither agree nor disagree, 2 = moderately disagree and 1 = strongly disagree.

firms this argument since it is patently obvious that the

Table 9.14 Cross-tabulation of importance attached to issue price against response to test question number 3, see Table 9.10

Number of respondents				
If the shareholder accepts the shares allotted to him, how would you expect his net wealth to be affected in the short term?				
Response to the primary question on the importance of the issue price	Increase in net wealth	No change in net wealth	Decrease in net wealth	Total
Naive	36	16	1	53
Informed	9	20	2	31
Mixed	12	6	2	20
Total	57	42	5	104

distribution deviates from random.

Secondly, we can examine the score achieved on the four question test. Assuming that the respondents replied in a random manner their expected distribution would be as shown in Table 9.15. A z-test, comparing the means of the actual respondents and the random reply population, produced a statistic of 4.17 which is statistically significant at better than the 0.1 per cent level.

Table 9.16 shows the test score cross-tabulated against the importance attached to the issue price where we can observe that the

Table 9.15 Random reply and actual reply for the four-question test

Number of correct answers	Number of respondents	
	Actual result	Expected result assuming random reply
4	10	1
3	15	7
2	26	18
1	22	20
0	5	8
Total	78	54
Weighted average	2.04	1.50
Standard deviation	1.11	0.95

Notes:

- (a) The probabilities were calculated using a probability tree to determine the possible outcomes and their probabilities.
- (b) As shown in Table 9.10, one question contained two possible outcomes whereas the remaining three questions each contained three outcomes.

shareholders who supported the naive approach achieved a weighted mean score of 1.61 (= 40 per cent of total) compared to 2.76 (= 70 per cent of total) for the informed class of shareholders. The calculated z-value, comparing the means of the naive versus the informed shareholders, was -5.15 which for a single-tailed test is statistically significant at better than the 0.1 per cent level.

Table 9.16 Test score by the importance attached to the issue price

Number of correct answers	Number of respondents		
	Naive	Informed	Total
4	3	7	10
3	4	11	15
2	17	9	26
1	21	1	22
0	4	1	5
Total	49	29	78
Weighted average	1.61	2.76	2.04
Standard deviation	0.92	0.97	1.11

Thus the probability of obtaining a difference of this magnitude due solely to sampling errors is less than one in a thousand and consequently we must accept the hypothesis that informed shareholders achieved a better performance on the test than naive shareholders. The score of the informed shareholders, equivalent to 70 per cent, would suggest that they do not have an unacceptable knowledge of rights issues but it is a moot point whether this represents the degree of knowledge that is required for a reasonably perfect market. The naive shareholders, as would be expected, did not do particularly well, a score of 40 per cent of total would indicate

that they may well be at some disadvantage when they are involved in a rights issue. This disadvantage does not lie in the area of actual financial loss due to the action they take in the rights issue since they are adequately protected in this respect; it is more a matter of the implications of the strategies they believe are open to them. Thus they may go to great lengths to provide the monies required for the new issue if, as argued for the naive approach, they believe that a low issue price represents a significant bargain. It is in this area that their lack of knowledge may put them at some disadvantage to the informed shareholder.

9.4 Concluding remarks

The survey of the private shareholders of two public companies has shown that there was not a statistically significant difference between the responses, of the two groups, to the primary question concerning the importance of the issue price in a rights issue or in the results achieved in a simple four-question test. This can be used as evidence to support the argument that private shareholders are relatively homogenous in their understanding of the important aspects of rights issues.

If we take the irrelevance theory as being, *ceteris paribus*, the accepted norm, we find that only one-third of the respondents gave the correct reply. Half of the shareholders were of the opinion that a low issue price represented a bargain and furthermore accepted the argument that the greater the discount the greater the

bargain. Thus we must sadly come to the conclusion that the average private shareholder is not particularly well informed on the importance of the issue price nor, as the test score indicated, of the important aspects of a rights issue. It is beyond the scope of this study to suggest the reasons for this observed deficiency but it is pertinent to wonder whether a section of the prospectus/circular announcing a rights issue should be devoted to describing the important aspects of the issue would be of benefit to private shareholders. This aspect is discussed more fully in the next chapter.

In an attempt to differentiate between the naive and informed shareholders, the characteristic of employment status was indicated as being of potential importance although the statistical evidence was rather weak. The simple four-question test illustrated that the naive shareholders were less knowledgeable than the informed shareholders. This result is as would be expected. All the other characteristics were found to be independent of the shareholders' opinion of the importance of the issue price.

Chapter 10 Should the Stock Exchange Provide More Information on
Rights Issues?¹¹⁰

10.1 Introduction

The London Stock Exchange (1979, p.1) lays claim to the fact that their stock market is probably the only true economic market in this country when they state,

"Nothing that can properly be called a market has ever existed outside official listing on The Stock Exchange or on the individual stock exchanges before amalgamation."

A very important constituent of the economist's perfect market is free and reliable information and there is little doubt that the level of disclosure demanded by The Stock Exchange, for companies quoted on their listed and unlisted¹¹¹ securities markets, seeks to fulfil this fundamental requirement. We must also acknowledge that there will always be debate over the level of information that should be provided by companies, we can cite, for example, the all encompassing demands of the Corporate Report (1975). Nevertheless, the rules and regulations laid down by The Stock Exchange are perceived to be organic in that they are capable of being modified, from time to time, in order to meet the needs of a changing environment or an apparent weakness in the market. The purpose of this chapter is to stimulate the discussion on the need to provide greater details on the mechanism of rights issues in the circulars

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This is an amended version of Keef (1981c).

¹¹¹ See Keef (1981a) for a critique of the Unlisted Securities Market.

sent to shareholders.¹¹² A brief summary of the argument is that the previous chapter has shown that over 50 per cent of a sample of private shareholders¹¹³ are totally misinformed over the importance of the subscription price in a rights issue. This leads us to propose the motion,

"That the circular/prospectus sent to shareholders announcing a rights issue should provide adequate details on how the stock market reacts towards rights issues and the implications of the issue price."

10.2 Implications for the Efficient Market Hypothesis

Fama (1970, p.383), in his review of the theoretical and empirical literature on the efficient market hypothesis, states,

"A market in which prices always 'fully reflect' available information is called 'efficient'."

Thus, within the context of the efficient market hypothesis it is necessary to determine whether the naive shareholder can achieve an abnormal return, either positive or negative. Although not necessarily mutually exclusive we can approach the problem from two directions. The first asks whether the shareholder that always accepts the shares allotted will out-perform the market. The second enquires whether the implicit excess demand created by the naive shareholder will influence the share price.

¹¹² Keane (1972, p.44) urges that directors should communicate to shareholders the significance of the issue price.

¹¹³ We can infer that this statistic is applicable to the total population of private shareholders.

Firstly, it is necessary to acknowledge the point made by Fama (1970, p.388) when he states,

"... disagreement among investors about the implications of given information does not in itself imply market inefficiency unless there are investors who can consistently make better evaluations of available information than are implicit in market prices."

Research¹¹⁴ has shown that the UK stock market reacts efficiently with respect to rights issues and thus denies the possibility of achieving an abnormal return over and above the market return. Thus the naive shareholder who is driven, by his conviction on the importance of the issue price, to accept his allotment of new shares will, on average, achieve the market return.

The second area of interest, which to a certain extent is already negated by the evidence mentioned above, considers whether the actions of the naive shareholder can influence the share price. All things being considered, and provided the new shares rank *pari passu* with the existing equity, then the rights and the underlying security will be in equilibrium, or alternatively, the price relationship can be explained in a rational economic manner.¹¹⁵ As with any option, warrant or right, it is the value of the underlying security that provides the basis for determining the market price of the option. This relationship can only operate in one direction. Thus even in the extreme case where the rights issue is fully subscribed on the first day of the offer period, we have little reason to

¹¹⁴ See, Chapter 3.

¹¹⁵ See Chapter 12 where the option effect on the equilibrium is examined.

believe that the price of the underlying security will be affected. The pre-emptive characteristic of a rights issue also denies the possibility that one shareholder can make a rent at the cost of another shareholder in the company.

Within the context of the efficient market hypothesis we have little reason to believe that a naive view to the importance of the subscription price in a rights issue will result in the market being deemed inefficient. As has been shown, the participating shareholder cannot achieve an abnormal return, be it negative or positive; and there is not sufficient foundation to argue that the share price will be affected. However, the observation that over half of private shareholders support the naive view represents an important imperfection in the market, and moreover, since it is directly related to the investment decision, it can be considered much more important than other defects found in shareholders' understanding. The argument, as it were, is that the poor performance achieved by private shareholders on the important aspects of Report and Accounts, as illustrated by the Lee & Tweedie (1975a, 1975b and 1976) studies, can be considered a global effect. That is, when choosing between a number of investment opportunities, each analysis is constrained by the same knowledge defect. However, when the shareholder is confronted by a rights issue, and let us assume that the opportunity cost is manifest by investing in other securities, then it is reasonable to suggest that the imperfect information results in a bias towards the rights issue. Furthermore, the obviousness of the apparent bargain may drive the naive shareholder to seek expen-

sive sources of finance in order to be able to subscribe to the new issue.

10.3 Possible answers

The results of the questionnaire have highlighted a significant weakness in the market which would suggest that a large number of private shareholders may be at some disadvantage due to their naive approach to the importance of the issue price. Furthermore, this weakness, or information defect, was found to be independent of the company and the three characteristics used to measure the respondents.

We now need to discuss who is at fault for this imperfect understanding and how it can be best corrected. A devil's advocate would stress that we cannot legislate for the stupidity and laziness of individuals. After all, text books and the literature abound with articles on rights issues and these are readily available for any person to seek them out. Alternatively they may argue that the compulsory warning notice on the front of every circular/prospectus should be sufficient to direct shareholders to seek advice in cases of doubt. Although we cannot refute these arguments from a fundamental, or a priori, approach the evidence suggests that they are ineffectual and, therefore, greater efforts should be made to correct the defect.

Today the private shareholder is becoming a minority group and it would appear that he is slowly changing from direct investments in stocks and shares into indirect investment through the vicarious financial institutions, such as, Insurance Companies, Pension Funds, Unit Trusts, etc.. Briston and Dobbins (1978, p.116) concluded,¹¹⁶

"Combined institutional investors increased their equity market share from 26.6% in 1966 to 42.5% in 1975, and are acquiring about 2% of the UK equity market per annum."

Therefore we can argue that he should be given protection over and above that theoretically required for a fair or equitable basis. Such a concept is not new; labour and consumer legislation in the 1970's has come to recognise that certain sectors of the economy are not always equal and that protection in excess of that demanded by the laissez faire or caveat emptor philosophies is necessary. The Stock Exchange also acknowledges that minorities need to be protected by formal rules and regulations; we can refer to minority interests in public companies and the rules concerning 'Dawn Raids'.

There are two practical aspects which will need to be given consideration. Firstly, a decision will have to be taken on the substantive information concerning the market's treatment of rights issues. There is a distinct possibility that it may not be too easy to reach a consensus on this point since there would appear to be two opposing views. Empirical evidence¹¹⁷ has shown that stock

¹¹⁶ See Schlarbaum, Lewellen & Lease (1978, p.429) who reported a similar trend in the USA.

¹¹⁷ As discussed in Chapter 3, Merrett, Howe & Newbould (1967) found that the theoretical model would explain 99.56 per cent of the variation in the actual ex-rights prices of a sample of 110 rights issues on The Stock Exchange in 1963. This result is supported by

markets, the world over, appear to treat rights issues in a manner that is not inconsistent with the perfect market model. Secondly, at first sight, it would appear that the greater majority of the companies going to the market with a rights issue chose a high issue price strategy.¹¹⁸ Such a decision is presumably made on the recommendation of their financial advisers from the City. It would be unthinkable to suggest that such a strategy is advocated solely for the underwriting commission¹¹⁹ which it is accepted is a direct consequence of a high issue price and which according to Newbould (1970) is deemed "an expensive ex-gratia payment". Yet this provides strong, albeit circumstantial, evidence that they do not support the perfect market approach which argues that the issue price is irrelevant. Nevertheless, it can be suggested that The Stock Exchange has had to face far more difficult problems during its illustrious lifetime and that it has the ability and expertise to overcome this hurdle.

The second practical problem centres around the amount of space to be devoted to explaining the important aspects of a rights issue on the circular/prospectus. A personal value judgement would suggest that the increased administrative cost will be small, although it illustrates that the free information component of a perfect market is somewhat of a misnomer in the real world. Nevertheless, it would appear to be a very small price to pay in order to ensure

the research of Russell Nelson (1965) and Bacon (1972) in the USA and Weston (1974) in Australia.

¹¹⁸ As discussed in Chapter 4.

¹¹⁹ See Marsh (1980).

that private shareholders are not disadvantaged. An alternative approach would be to print, in bold type in a prominent position on the circular/prospectus, a note to the effect that a booklet detailing the important aspects of the mechanism of a rights issue can be purchased from The Stock Exchange. This latter procedure has the added advantage that the shareholders are not being spoon-fed,¹²⁰ and thus the very fact of having to react in a positive manner may motivate them to read the document more thoroughly.

10.4 Concluding remarks

As a regulatory body The Stock Exchange has a duty to provide protection for the shareholders of the companies quoted in its listed and unlisted securities markets. The previous chapter has illustrated that a large proportion of private shareholders are poorly informed on the importance of the issue price in a rights issue. It is apparent that the current warning notice, advising the shareholder to consult a professional adviser if they are in any doubt as to the course of action they should follow, has not been shown to be effective. Although such a warning would be considered more than adequate by the supporters of the *laissez faire* approach, we can suggest that The Stock Exchange has a strong moral responsibility to attempt to eliminate the weakness disclosed for the declining private shareholder minority.

¹²⁰ One can question whether they fully read the prospectus/circular.

Chapter 11 Private Shareholders' Attitude to Rights Issues

11.1 Introduction

Equity holders can, in an arbitrary manner, be divided into two classes: these are institutional and private shareholders. Briston & Dobbins (1979) have reported that the proportion of equity on The London Stock Exchange owned by institutional investors has been growing at 2 per cent per annum over the period 1966-1977. Lewellen, Lease & Schlarbaum (1977) reported that a similar, although possibly faster, trend had been amply documented in the USA. It should be noted, however, that the private investor is not being replaced by the institutions, rather he has decided to invest indirectly in the equity market through the intermediation of the institutions. This could well be a reflection of the private shareholder believing that he does not have the ability to successfully manage his own investments.

This chapter seeks to fill a gap in research into shareholders' knowledge, particularly of rights issues. It should be remembered that the only way a UK listed company, other than in exceptional circumstances, can issue further shares for cash is through a preemptive rights issue. The theoretical model, supported by the empirical evidence, suggests the hypothesis that a shareholder confronted with a rights issue will express a neutral or indifferent feeling when it came to the question of whether or not he was pleased with his company seeking further monies through this capital

raising technique. After all, the pre-emptive right implicit in a rights offering must make the shareholder financially indifferent to the various options open to him; this is the only corollary that can follow from the perfect market assumption. Furthermore, the empirical data does not provide sufficient evidence to deny the efficient market hypothesis with respect to rights issues. In discussing shareholders' feelings and attitudes towards rights issues it is necessary to examine the areas where economic theory and reality may deviate.

The first questions whether the shareholder has access to the perfect information which is implicit in the theoretical model. Obviously it is impossible for any investor to be fully cognizant of all the information relating to the true value of the firm as inferred in the economist's perfect knowledge dream. However, assuming that the stock market is efficient¹²¹ we can argue that the share prices already fully incorporate "all available information". Secondly, we need to examine whether private shareholders fully understand, let alone accept, the theoretical model. Chapter 9 has reported that over half of the respondents to this questionnaire truly believe that a low issue price represents a bargain in a rights issue. This, of course, denies a significant portion of the perfect market assumption for the greater majority of the respondents under investigation in this study.

¹²¹ At least in the weak and semi-strong forms.

In discussing attitudes one must always bear in mind the ubiquitous, and potentially powerful, behavioural influences. Although these cannot be characterised by this present study, we can suggest that there may well be strong psychological and sociological pressures on the shareholder. These may include, for example, the pride in being a member of the organisation and the associated feeling of belonging which must be reinforced by the pre-emptive¹²² right to participate in the new issue. These effects will be magnified if the issue is given a measure of good publicity by the media.¹²³ There is also the sociological pressure to conform to the group decision. The argument, as it were, is that the directors of the company, in conjunction with their corporate advisers, have arrived at the decision that the raising of further capital via rights will not only be beneficial to the company and shareholders, but it is also the correct source of funds at that particular point in time. So the shareholder is under strong stimuli to support the rights issue; after all, the directors represent the leaders of their company and have reached their position in the hierarchy due to meri-

¹²² Recognised as one of the shareholders' most valuable rights, see Berle & Means (1937, p. 145) or Smith (1977).

¹²³ Merrett, Howe & Newbould (1967, p. 51) pass the comment, on some financial commentators referring to rights issues "as being on attractive terms",

Lee & Tweedie (1975a, p. 286) reported that private shareholders appear to attach more importance to financial press reports than to company annual financial reports. This has also been confirmed by the Lease, Lewellen & Schlarbaum (1974) study in the USA. It has been suggested that Annual Reports and Accounts do not provide a great deal of new information, see, for example, Ball and Brown (1968) with respect to income numbers and share prices, whereas news reports may possibly do so. We can question whether the private shareholder accepts this argument; there is a strong possibility that it is merely fortuitous.

ocracy, and thus there is the expectation that they are skilled and knowledgeable in the field of corporate finance. Therefore, the shareholders would feel inclined to support their decision.¹²⁴

Finally, we need to briefly examine the significance of the 'trouble'¹²⁵ effect suggested by Archer (1956, p. 364) and Dewing (1941, p. 1209). Although the subscription to a rights issue involves effort on the part of the shareholder, we can cite for example, the reading of the circular/prospectus, sending off the subscription forms and monies, etc., we can argue that this effect may be negligible. The informed shareholder will acknowledge that he is financially indifferent to the various options open to him, but will accept that they all involve a similar degree of effort. He may feel a small degree of displeasure since the rights issue has forced him to make a decision which otherwise he would not need to have made. That is, it has disturbed his static inertia. The poorly informed shareholder, who naively believes he is being given the chance of a bargain, will consider that it is no trouble whatsoever to claim this apparent gift.

¹²⁴ Dewing (1941, p. 1199) argues that the loyalties of this world, of which the loyalty of a shareholder to his corporation is but one, if sufficiently entrenched, will endure much.

¹²⁵ Originally advocated for the case of indirect route of equity purchase via rights compared to the direct route via ex-rights, which is discussed in Chapter 12.

11.2 Results

In order to measure the private shareholders' feelings on the rights issue recently carried out by their company, the sample were asked the following question:

"How do you personally feel about being asked to provide more money for the company?"

- (a) very pleased
- (b) pleased
- (c) neutral
- (d) not pleased
- (e) upset

Table 11.1 shows the replies of the two sets of shareholders surveyed: the chi-square suggests there is not a statistically significant difference between the distribution of replies between the shareholders of the two companies. This would indicate support for the argument that private shareholders are relatively homogeneous in their feelings towards rights issues. Although 85 per cent of the respondents claimed to own a portfolio of shares we must realise that each rights issue must possibly be considered as a singular event.

The median result fell in the "neutral" class indicating, on average, the typical private shareholder is neither pleased nor displeased about being confronted with a rights issue. Thus there is some measure of support for the theoretical model. However, the aggregated distribution is skewed towards being "pleased" rather

Table 11.1 Response to the question "How do you personally feel about being asked to provide more money for the company?"

Response	Number of respondents		
	Company M	Company P	Total
Very pleased	1	5	6
Pleased	11	19	30
Neutral	40	30	70
Not pleased	1	1	2
Upset	0	0	0
Total	53	55	108

Note:

- (a) Chi-square is 6.18 on 3 degrees of freedom, not statistically significant at the 10 per cent level. The Upset response has been excluded.

than "not pleased"; we can observe that only two (1.8 per cent) respondents showed hostility towards the rights issue, whereas 36 (33.3 per cent) indicated they welcomed the opportunities offered by the new issue. Since none of the respondents showed an "upset" response, this category has been ignored in the analysis to follow.

The questionnaire measured four primary characteristics of the respondent, namely, employment status, the frequency with which an expert was consulted in the management of their investments, whether they consulted an adviser on their recent rights issue and whether they owned a portfolio of shares. These questions¹²⁶ and the manner

¹²⁶ Chapter 8 has not shown any differences of statistical signifi-

in which they have been re-classified are discussed in Chapter 8. The cross-tabulation of these primary attributes against the shareholders' feelings on their recent rights issue are presented in Table 11.2; since none of the chi-square statistics¹²⁷ are statistically significant we can conclude that, in isolation, neither of these characteristics are associated with the feelings shown by the private shareholder towards their rights issue.

In order to facilitate the analysis of the data in the determination of the influences of the interactions of these primary characteristics, it was decided to re-classify the feeling responses into binary categories.¹²⁸ This allowed the aggregated response of "very pleased" and "pleased" to be contrasted against "neutral" and "not pleased". In analysing the data there are two main procedures that can be adopted. The first is to breakdown the data into the subsidiary contingency tables by controlling for the other attributes. This procedure has the severe drawback that sample sizes, so achieved, are very small and this often makes it impossible to adequately analyse the data. The alternative method is to use the statistical breakdown technique of partial correlation analysis¹²⁹ where the effects of the controlled variable(s) are taken into

cance between the shareholders of the two companies surveyed with respect to these characteristics.

¹²⁷ The statistics need to be treated with care since some of the expected cell frequencies are small. The arguments of Fienberg (1979), see Chapter 6, should be noted.

¹²⁸ The other attributes have also been re-classified into binary categories, see Chapter 8.

¹²⁹ See, for example, Nie et al (1975, pp.302-305).

Table 11.2 Cross-tabulation of feelings on their recent rights issue against primary characteristics

Primary Characteristics	Feelings on their recent rights issue				Chi-square
	Very pleased	Pleased	Neutral	Not pleased	
Consult with adviser on recent rights issue?					
Yes	1	9	23	0	4.925 on 3 df
No	5	21	47	2	
Degree of use of expert					
never	3	6	23	1	11.090 on 9 df
occasionally	1	17	26	1	
more often than not	0	4	10	0	
always	2	3	10	0	
Employment status					
Management	5	16	52	1	3.194 on 6 df
Supervisory	1	2	7	0	
Blue/white collar	0	6	8	0	
Portfolio owner					
Yes	6	24	62	2	2.655 on 3 df
No	0	6	8	0	

account in a statistical rather than literal manner. This technique has the advantage that the calculated statistics are based upon a much larger sample size with a resultant increase in the degree of resolution that can be achieved.¹³⁰ The drawback with this method, however, is that the current data has to be aggregated into binary

¹³⁰ Statisticians would also claim that correlation analysis is more powerful than chi-square analysis in that the sign of the correlation coefficient defines the direction of the association.

categories since it is the form of attributes.

The partial correlation analysis, see Table 11.3 shows similar results to the earlier analysis and confirms that the degree of pleasure expressed by the respondents is independent of their pri-

Table 11.3 Partial correlation analysis: Feelings against primary attributes

Correlation coefficient	df	ss	Variable	Controlling for the effects of variables
-0.0769	90	23.3	Employment status	None
-0.0837	87	21.8		All others
0.0606	90	28.3	Portfolio owner	None
0.0350	87	37.2		All others
-0.0135	90	44.9	Degree of use of expert	None
0.0530	87	31.1		All others
-0.1141	90	13.9	Consult with adviser on recent rights issue?	None
-0.1244	87	12.3		All others

Notes:

df = degrees of freedom

ss = level of statistical significance, per cent

mary characteristics.

The irrelevance of the effect of the adviser consulted about the rights issue is a little surprising. All things being considered, we would expect the adviser to be associated with less pleasure. The argument being that the adviser, accepting that the decision facing the shareholder will have little affect on his short term wealth,

would pass on this information to his client. The mooted communication failure, implied by these results, could be attributed to a number of factors. Assuming we can discount the argument that the adviser has a naive approach, then we could suggest that either the adviser was an exceptionally poor communicator or that the question of the importance of the rights issue was not mentioned during the consultation. After all, the importance of the issue price is so obvious to the naive shareholder that to all extents and purposes the question is redundant. Inspection of Table 11.4, which shows the type of adviser consulted, indicates that one category cannot be singled out for comment, since the median result fell in the "neu-

Table 11.4 Cross-tabulation of whether the respondent consulted with an adviser (and type) on their recent rights issue against feelings on the rights issue

Feelings on their rights issue	Did you consult an adviser on your recent rights issue?					
	No	Yes (by type)				Total
		Stock-broker	Accountant	Bank manager	Other	
Very pleased	5	1	0	0	0	6
Pleased	21	4	2	0	3	30
Neutral	47	11	4	2	5	69
Not pleased	2	0	0	0	0	2
Total	75	16	6	2	8	107

tral" response on all occasions.

Scholes (1972) and Marsh (1979b) have shown significant abnormal returns in the period prior to the announcement followed by a small negative information effect. However, since the period of abnormal return had passed, and with it the small negative information effect, and since a stable return was expected in the future an informed adviser can only point towards the financial indifference of the decision facing the shareholder. There is of course the possibility that the shareholder may have been informed of the indifference aspect but that the behavioural aspects, discussed earlier, were masking the effects of the adviser.

The theoretical model of a rights issue requires that the shareholder has perfect information and neutral feelings towards the new issue. The questionnaire was designed so that a measure of the shareholder's knowledge can be estimated in two ways; the importance attached to the issue price and the score achieved on a battery of questions concerning the general mechanism of rights issues.

The importance attached to the issue price was discussed in Chapter 9. The replies can be used to separate the respondents into three categories; namely, informed, naive and mixed.¹³¹

The hypothesis argues that the naive shareholder will express a greater degree of pleasure towards the rights issue since he truly believes he has been given the opportunity to benefit from a bar-

¹³¹-----
This latter class has been excluded from this section of the analysis since we wish to concentrate on the radical dichotomy between a naive and informed understanding of the importance of the issue price.

gain.¹³² The cross-tabulation of the respondents' feelings on their recent rights issue against the importance they attach to the issue

Table 11.5 Cross-tabulation of feelings on their recent rights issue against importance attached to issue price

Feelings on their recent rights issue	Number of respondents		
	Importance attached to the issue price		
	Informed	Naive	Total
Very pleased	1	3	4
Pleased	4	16	20
Neutral	27	36	63
Not pleased	2	0	2
Total	34	55	89

Note: Chi-square is 6.94 on 3 degrees of freedom

price is presented in Table 11.5. Inspection of the median responses and the chi-square statistic does not provide strong support for the association hypothesis. However, just over one-third (34.5 per cent) of the naive shareholders indicated they were "pleased" or "very pleased" compared to approximately one-sixth (14.7 per cent) of the informed shareholders.

¹³² There may be understandable reasons why the naive shareholder should support his view, these are discussed in Chapter 9.

Reverting to the binary classification of the feeling response, a proportions test to determine if the 19 (out of 55) naive shareholders who expressed greater than neutral pleasure differed from the 5 (out of 35) informed shareholders produced a z-value of 2.05. This is statistically significant at the 2 per cent level. Partial correlation analysis¹³³ generated, as would be expected, a similar result. When the effects of the primary characteristics are controlled, we observe little change in the level of statistical significance.

The questionnaire contained a series of questions which can be used to calculate a knowledge index based upon the respondents' understanding of seven important aspects of a rights issue. These questions are presented in Table 11.6, where the orthodox answer, based upon the perfect market approach, is coded with an asterisk. Using the score on this test we can further examine the knowledge versus feelings hypothesis, the argument being that the lower the score on the test then the greater the degree of pleasure expected to be indicated towards the rights issue. Table 11.7 presents the cross-tabulation of the score on the seven-question test against the respondents' feeling towards their recent rights issue. Inspection of the median scores by response provides support for the association hypothesis: we can observe a relationship between attitude and knowledge score with the trend indicating that the greater the

¹³³-----
The zero-order correlation coefficient was -0.2462 on 73 degrees of freedom [statistically significant at the 1.7 per cent level] and the partial correlation coefficient controlling for the effects of the four primary characteristics was -0.2359 on 69 degrees of freedom [statistically significant at the 2.4 per cent level].

Table 11.6 Test questions used to determine the respondents' knowledge of rights issues

In a rights issue who can buy the new shares at the issue price?

- (a) any person who wishes to subscribe to the shares
- * (b) existing shareholders only

If a shareholder does nothing about the shares allotted:

(1) which would you expect to happen in the short-term?

- (a) nothing
- * (b) he will receive some money from the company after the end of the subscription period.

(2) how is the shareholder affected in this situation?

- (a) increase in net wealth
- * (b) no change in net wealth
- (c) decrease in net wealth

Do you think you are getting a bargain if the issue price in a rights issue is below the current market price of the shares?

- (a) yes
- * (b) no

If the shareholder accepts the shares allotted to him how would you expect his net wealth to be affected in the short-term?

- (a) increase in net wealth
- * (b) no change in net wealth
- (c) decrease in net wealth

If the shareholder sells the rights to the new shares how do you think his net wealth will be affected in the short term?

- (a) increase in net wealth
- * (b) no change in net wealth
- (c) decrease in net wealth

Shortly after a rights issue is announced (when the shares go ex-rights) how do you think the share price reacts?

- (a) normally increases
 - (b) normally remains constant
 - * (c) normally decreases
-

Note: the orthodox answer is coded with an asterisk

Table 11.7 Cross-tabulation of respondents' feelings on their recent rights issue against score on a seven-question knowledge test

Number of correct answers	Number of respondents				
	Feelings on their recent rights issue				
	Very pleased	Pleased	Neutral	Not pleased	Total
0	0	0	0	0	0
1	0	0	1	0	1
2	4	8	9	0	21
3	0	7	18	0	25
4	0	5	12	1	18
5	1	1	4	0	6
6	0	2	8	0	10
7	1	0	4	1	6
Total	6	23	56	2	87
Summary statistics					
Weighted mean	3.33	3.23	3.86	5.5	3.70
Median	2	3	3	5.5	3
Ratio of number of respondents greater than total median compared to less than total median	0.33	0.50	0.74	1.00	0.46

degree of pleasure reported, the lower the score achieved by the

respondent on the test. The relationship is, perhaps, better illustrated by the ratio of the respondents that achieved a score in excess of the total median compared to those with a below median performance. Reverting to the binary classification of attitude we find that the association is statistically significant at the 5 per cent level¹³⁴ and is stable when the effects of the primary variables are controlled.

11.3 Concluding Remarks

The main conclusion that can be drawn from this chapter is that the responses of the private shareholders accord reasonably well with the perfect market model. Although the response distribution showed a skewness towards being pleased rather than not pleased, we can explain this tendency by reference to the perfect knowledge component of the model. We should be aware of the behavioural influences on the shareholder, which it is argued, will increase the degree of pleasure reported.

¹³⁴-----
The zero-order correlation coefficient was -0.2226 on 74 degrees of freedom [statistically significant at the 2.7 per cent level] and the partial correlation coefficient controlling for the effects of the four primary characteristics was -0.2120 on 70 degrees of freedom [statistically significant at the 3.7 per cent level].

Chapter 12 Financial Indifference during the Subscription Period of a Rights Issue

12.1 Introduction

Perfect market theory predicts that the potential investor should be financially indifferent between the direct and indirect routes of equity purchase during the subscription period of a rights issue. The alternative theory postulates that there are two opposing influences operating on the value of a right which may influence the equilibrium during the subscription period. These are, firstly, the option characteristic which is expected to increase the value of the right and secondly, the trouble effect which is predicted to have an opposite influence.

12.2 Empirical evidence.

On the 16th December 1980, Royal Insurance Company Limited announced a proposed rights issue of 37.7 million shares at 320 pence each, in the ratio of one new share for every four held, to raise a sum of 120.5 million pounds. Technically the new shares did not rank pari passu in all respects with the existing equity since they would not receive the interim dividend of 9.25 pence to be paid on the 5th January 1981. But since the first day of rights was on the same day it is reasonable to argue that this differential dividend had been discounted at the ex-dividend date by the market and

therefore the two securities, or more correctly their end products, were economically indistinguishable. The subscription period closed at 3.00 p.m. on the 23rd January 1981, giving 13 days on which the rights were traded on the stock market. The ex-rights share price and the value of four rights, the number required to subscribe for one new share, were abstracted from the Financial Times newspaper and thus presented the valuations at the close of business each trading day.

In studying a single company, rather than an across time and across securities model, care must be exercised to ensure that spurious effects do not confound the empirical evidence. The major requirements of a perfect market are homogeneous securities, many buyers and sellers, freedom of entry and exit, an unlimited supply of securities and finally perfect knowledge. Ceteris paribus, the rights issue of Royal Insurance Company Limited in January 1981 should adequately meet the first four requirements. On the last day of cum-rights there were 151 million shares issued with a market capitalisation in excess of 550 million pounds. Whether the securities were operating within the context of perfect information, or whether the securities fully reflected all relevant information¹³⁵ as required by an efficient market may not be that critical. The argument is that there is very little reason, other than the hypotheses being tested in this study, to expect the values of the two securities, that is, the ex-rights and rights prices, to get out

¹³⁵ The results presented in Chapter 9 would indicate that the majority of private shareholders illustrated imperfect knowledge on the importance of the issue price in a rights issue.

of step since the forces of arbitrage will eliminate any singular disequilibrium. Thus the caveat relating to market efficiency can be relaxed to the statement that spurious results will not be encountered provided both securities react in an analogous and similar manner to new information, be this in an efficient or inefficient manner is not important. Furthermore, it is not inconceivable that the company would not release new information during the subscription period and thus any increment in the share price could be attributable to general price changes in the market.

Perfect market theory would predict the following equilibrium between the ex-rights share price (SP) and the value of four rights (VR),

$$SP = VR + I \quad (1)$$

where I is the issue price, 320 pence, of the new shares. Linear regression analysis produced the line of best fit equation,

$$SP = \begin{matrix} 0.7343 & * & VR & + & 323.967 \\ (0.1698) & & & & (3.115) \end{matrix} \quad (2)$$

with a correlation coefficient of 0.793, which on 11 degrees of freedom is statistically significant at the 0.1 per cent level. In interpreting this data there are a number of points that need to be examined. Firstly, when account is taken of the standard errors of the coefficients, presented in brackets below the equation, there is little reason to accept the hypothesis that the empirical data deviates significantly from the theoretical model at the 95 per cent (+ or -2.20 standard errors) confidence level.¹³⁶ Although this evi-

¹³⁶ The corresponding t-statistic has been used to acknowledge the small sample size.

dence must be considered compelling, the coefficient of determination of 0.63 implies that there is a residual variation of 37 per cent that is not explained by the model. This indicates there may be other determinants in the relationship that have not been taken into account. Implied in the hypothesis being tested in this study is a temporal effect and the above simple model can be criticised since it does not take into account transaction costs.

12.3 Transaction cost adjusted model

The purchase of shares through the medium of a stock exchange normally incurs two sets of transaction costs. In the UK these are transfer stamp duty (2 per cent) and brokerage commission (1.5 per cent plus 15 per cent VAT). It is acknowledged that brokerage fees are proportionately less expensive for large transactions and that there are minimum commissions for small transactions, thus the model will represent what can be considered an average level of activity. The purchase of rights, unlike shares, does not attract transfer stamp duty but is still liable to the stockbroker's commission. The subscription to the new shares is effectively free of all transaction costs to the subscribing investor. Taking these factors into account the model would be stated as:¹³⁷

$$SP(1 + SD + BF) = VR(1 + BF) + I \quad (3)$$

¹³⁷ Contract stamp duty, maximum 60 pence per transaction, has been ignored since its effect will be negligible.

where

SD = transfer stamp duty, 2 per cent

BF = brokerage fees, 1.5 per cent plus 15 per cent VAT.

Another transaction cost differential inherent in the direct and indirect routes of equity purchase during a rights issue is associated with the settlement day for each security. Shares purchased through the services of a stockbroker have to be paid for on, or before, the next relevant Stock Exchange settlement or account day. Whereas rights have to be paid in cash on the day they are purchased. The subscription monies, on the other hand, have to be received before the closing deadline of the rights issue. Assuming that the investor reacts in a logical manner and thus benefits from the discount gained by delaying payment until the very last moment, the model will be represented by,

$$SP(1 + SD + BF)(1 - D) = VR(1 + BF) + I(1 - D') \quad (4)$$

adjusted	adjusted	adjusted
ex-rights	cost of	subscription
price	rights	price

where D and D' = $\frac{(X - Y)*K}{365}$

and where X represents the appropriate Stock Exchange settlement day; Y is the day the investment is effected and K is a time preference rate of money. For this latter parameter the current (January 1981) Minimum Lending Rate, 14 per cent per annum, was chosen as a suitable proxy. It was decided to use a simple, rather than dis-

counted, approach to determine the savings related to the delayed payment schedules; the difference between these two methods over a relatively short period is not considered to be of any significance.¹³⁸

Linear regression analysis on the transaction cost adjusted data produced the equation,

$$SP' = 0.8799 VR' + 51.23 \quad (5)$$

(0.1652) (55.64)

where SP' is the adjusted direct cost and VR' is the corrected indirect cost of equity purchase, that is, the adjusted cost of rights plus subscription. The correlation coefficient, 0.849, is statistically significant at the 0.1 per cent level on 11 degrees of freedom. It would appear that the adjusted model is a better representation of the theoretical model than the earlier, unadjusted model. However, Fisher's Z-transformation, see Yecmans (1968b, pp.212-214), was used to test if the increase in the correlation coefficient, from 0.793 to 0.849, was important. It produced a statistic of 0.3875 which is not statistically significant.

In the analysis to follow the ratio of corrected indirect cost (VR') to corrected direct cost (SP') will be examined. The naive model would predict the equation,

$$\frac{\text{Indirect cost (VR')}}{\text{Direct cost (SP')}} = 1 + e \quad (6)$$

¹³⁸ A practical complication that was incorporated into the model was that the subscription period of Royal Insurance Company Limited's rights issue, as would invariably be the case, was spread over two Stock Exchange account periods.

where e is a random error term with an expected value of zero. The empirical data showed $e = +0.031$ with a standard deviation of 0.009. Using the appropriate t-statistic we are confident at the 99.5 per cent level that the mean of the error term deviates from zero. Implied in the hypotheses being tested in this study is a temporal effect which will cause the ratio of the indirect to direct cost of equity purchase to alter over the subscription period. It is proposed to use three statistical techniques to investigate the influences of the temporal effect.

Firstly, partial correlation analysis on the relationship between the adjusted direct (SP') and indirect (VR') costs of equity purchase

Table 12.1 Correlation coefficients(a)

	Direct cost	Indirect cost	Day number
Direct cost (SP')	1.0000	-	-
Indirect cost (VR')	0.8487(c)	1.000	-
Day number (D)	0.0044(b)	-0.3891(b)	1.0000

Notes:

- (a) Transaction cost adjusted variables, see equation (4).
- (b) Not statistically significant at the 10 per cent level
- (c) Partial correlation coefficient of direct cost (SP') versus indirect cost (VR') controlling for the effects of day number was 0.9223 on 10 degrees of freedom.

chase produced the results presented in Table 12.1. The observation

that the correlation coefficient is increased from 0.8487 to 0.9223 when the effects of time are controlled in a statistical manner, suggests the presence of a temporal influence.¹³⁹

Secondly, the original hypothesis would suggest that the indirect to direct cost ratio would be of an implosive or reverse exponential form over time, that is, a linear relationship may not provide the greatest explanatory power if the option effect decays with time and the trouble effect is relatively constant. However, linear regression analysis of a number of common transformations, namely square root, square, inverse square, inverse, exponential and the non-transformed variable when regressed against the day number all produced very similar values for the correlation coefficient of 0.704 + or -0.008, suggesting that whatever transformation is used the temporal effect will only explain just under half of the observed variability. Since there does not appear to be of any benefit in the choice of any one of these transformations it has been decided to examine the data within the confines of a linear model. Whether the poor conformation of the data to an implosive relationship can be attributed to the incorrect specification of the fundamental model or whether it is a direct consequence of the unavoidable small sample size can not be satisfactorily resolved.

¹³⁹ Provided the status quo were to be maintained, the expected increase in the correlation coefficient associated with a drop in the degrees of freedom, from 11 to 10, would be 0.02. The observed increase was 0.0736.

Thirdly, linear regression analysis of the ratio against day number produced the line of best fit equation,

$$\text{Ratio of } \frac{\text{indirect cost (VR')}}{\text{direct cost (SP')}} = -0.00155 D + 0.97818 \quad (7)$$

(0.00047) (0.00333)

where D is the day number. The correlation coefficient, -0.704, is statistically significant at the 0.4 per cent level on 11 degrees of freedom.¹⁴⁰ Perfect market theory would predict that the slope would be zero but when the standard error of the coefficient of the slope is taken into account we can be confident at the 99 per cent level (+ or -3.1 standard errors) that the empirical evidence deviates from that expected. Thus over the 13 day trading period the ratio falls by 0.0186 indicating that the indirect route becomes some 1.86 per cent cheaper at the end of the subscription period when compared against the cost of the first day of rights. Assuming the trouble effect to remain constant over time, we can advance the argument that this drop in ratio is not inconsistent with the option time value premium hypothesis.

¹⁴⁰-----
 In order to test whether serial correlation was a significant factor in the importance of the day number, it was decided to repeat the regression analysis using the Durbin two-step procedure. Johnson (1972, p.265) reports that this method is probably better than other procedures. The analysis produced the equation,

$$\text{Ratio of VR'/SP'} = -0.00168 D + 0.9791$$

(0.00034) (0.0035)

with a correlation coefficient of -0.841 on 10 degrees of freedom. These results do not appear to differ significantly from those found using the OLS regression analysis.

There is strong evidence to believe that the intercept deviates significantly from the expected value of unity, the statistics show that the deviation represents 6.55 standard errors. Thus at the start of the subscription period the indirect route, via rights, is 2.18 per cent cheaper; this observation is consistent with the arguments of Archer (1956) and Dewing (1941) and is in agreement, although apparently somewhat greater, than the empirical evidence of Werly (1929).

It is possible to arrive at an estimate for the values of the option and trouble effects providing the following assumptions are acceptable. First, the trouble effect is constant throughout the period under consideration. Second, the drop in the ratio of indirect to direct cost over the subscription period is solely due to the option effect. Using the data from equation (7) the estimates of the parameters are;

Maximum option effect at the start of the subscription period	= 1.86 per cent
Trouble effect	= 4.04 per cent .

The evidence would suggest that at the start of the subscription period, when the option effect is noted to be at its greatest, that the trouble effect exceeds the option time value premium.

Soldofsky & Johnson (1967) examined the old Wall Street adage that "stockholders should sell their rights early" and concluded that the maxim should be taken with "a grain of salt" since a considerable number of their sample showed the rights to reach a peak

in the final period of the subscription period. However, since the methodology adopted by these researchers apparently did not take into account movements in the general price levels of securities, vide, for example, p.104,

"Probably the most important advice for selling rights would be to analyse the current market trends."

doubt must remain as to the validity of their results. Dewing (1941, pp.1209-1210) cites three careful studies¹⁴¹ which are claimed to give some support for the adage, but again we should note the caveat added to his comments, namely,

"... although some account has to be taken of the general trend of the investment market."

Thus it would appear that this study offers support for the adage, both from a theoretical and empirical standpoint. Furthermore, the observation that the indirect route is cheaper for the new investor would suggest that the existing shareholder is disadvantaged if he adopts the strategy of selling his rights. Whether this is a good reason to adopt a high issue price strategy in a rights issue as theoretically postulated by Jones-Lee (1971 and 1972) cannot be directly investigated by this study but would appear to be a fruitful area for further research.

¹⁴¹ These are also discussed briefly by Seldofsky & Johnson (1967). See also Chapter 2.

12.4 Concluding remarks

The data is consistent with the expected option effect in that the ratio of the indirect to direct cost decreases during the subscription period. However, it is necessary to assume that the trouble effect is relatively constant throughout time, which would not appear unreasonable. The postulated sharp increase in the trouble effect at the end of the subscription period may be denied by the stock market's practice of only quoting the new securities as "fully paid" during the last two days of the subscription period. The fact that the decay in the ratio over time did not correspond better to an impulsive relationship, compared to a linear form, must be considered a little disappointing. Nevertheless, there is a possibility that this may be a reflection of the unavoidable small sample size.

Viewing an efficient market as one where an investor cannot make an unwarranted gain by the use of a mechanical trading rule and within the fundamental assumption that the market is basically efficient in that the return on the underlying security reflects the movement in the market as well as the level of risk, we can consider the following trading rules. In a semi-strong context it would appear that a new investor can save approximately 4 per cent by following the strategy of purchasing through the indirect route on the last day rights are quoted. This saving, which is net of transaction costs, would appear to be of some significance but we must bear in mind the extra trouble that may be involved. It should be noted

that this saving will only be apparent for large transactions, for the small investor there is the distinct possibility that minimum brokerage fees may well swamp this potential advantage. A strong-form test would suggest that an investor with inside knowledge of the announcement of the rights issue could benefit not only from the drop in price on the announcement day, of approximately 0.6 per cent, but also the lower cost of reinvesting through the indirect route. However, we should note that the typical sell and buy transaction costs are estimated at approximately 5.5 per cent.

Chapter 13 Summary and Conclusions

This chapter provides a summary of the research results reported in this study and seeks to tie these up with the overall objectives. The main aims of the thesis were, firstly, to determine the financial ratios that are associated with the success of a rights issue and secondly, to measure private shareholders' knowledge, understanding and attitude towards rights issues. The supplementary topics included a method to measure the discount offered in a rights issue, an evaluation of The Stock Exchange's procedure to adjust traded call option contracts when the underlying security is affected by a rights issue and a study into the equilibrium between the ex-rights and rights security prices during the subscription period.

In summary, the results of the variables associated with the success of a rights issue produced somewhat inconsistent results. Of the seven variables that were found to be important there were three, namely, market capitalisation, relative size of the new issue and the profits to assets ratio, that produced results that were in agreement with our understanding of the market.

On the other hand, we isolated four variables that, although achieving a statistically significant association with the acceptance rate, could not be adequately explained. Growth in earnings per share and level of gearing both showed a reverse relationship to that expected. The monetary discount and pre-issue share price

exhibited a statistically significant association which was contrary to the theoretical model. Theory, supported by other empirical evidence would indicate that these two latter parameters should be irrelevant to the success rate.

The responses to the questionnaire did not highlight a statistically significant difference between the two groups of shareholders surveyed. This would strongly suggest that private shareholders are relatively uniform in terms of both their characteristics and their knowledge of rights issues. Although these research results apply directly to the private shareholders of the two engineering companies surveyed, we have strong evidence to believe that they are applicable to the total population of private shareholders. This important conclusion is based on the diversification argument implied in portfolio theory. The fact that over 85 per cent of the respondents claimed to own a portfolio of shares, a statistic supported by other researchers in the UK, leads to the conclusion that they are also shareholders in other, non-engineering sector, companies.

The observation that over 50 per cent of the respondents were poorly informed on the signal manifest by the issue price must be considered an important result. It illustrates that there is a significant weakness in the market and we have argued that The Stock Exchange should seek to remedy this defect. Furthermore, this naive approach to the issue price was found to be independent of the characteristics of the private shareholder and independent of the com-

pany to which they belonged. This, again, adds support to the claim that this knowledge defect can be attributed to over 50 per cent of the total population of private shareholders.

Private shareholders' feelings towards their rights issues were found to accord reasonably well with the perfect market model. The skewness towards being pleased rather than not pleased was attributed to behavioural aspects.

The allowable range estimate of the position of the issue price in a rights issue can be claimed to be superior for two reasons. First, in direct contrast to the existing procedure, it is a consistent and uniform measure of the discount offered in the rights issue. Second, as shown by the empirical evidence it produces a result that is in agreement with the published evidence on the treatment of rights issue by stock markets. The existing parameter, we should note, strongly indicated that the sample of companies in 1976 chose a high issue price strategy.

The examination of the manner in which The Stock Exchange adjusts the terms of traded call options when the underlying security is affected by a rights issue showed that the procedure was fundamentally inconsistent with the theoretical approach. It should be noted that the adjustment for scrip issues, a very similar process, was in agreement with theory. Although the study indicated, in a perfect market, that the adjustment would result in an abnormal loss for the option holder it is necessary for this hypothesis to be examined empirically. The efficient market hypothesis would suggest that traders should not be able to use this knowledge profitably.

The acknowledgement that a right exhibits all of the attributes of an economic option lead to the hypothesis of the competing trouble and option effects. Although the analysis was carried out on the security prices of a single company, and therefore, must be considered a pilot study, we should note that there were no obvious reasons to believe that the prices would react abnormally. The small sample size is a direct consequence of the number of trading days during the subscription period and is a practical constraint that cannot be easily overcome. Furthermore, the comparison of the two, supposedly equivalent, routes of equity purchase would suggest that any abnormality would cancel out. The study claims to have characterised the option effect in that the ratio of the indirect to indirect cost of equity purchase decays over the subscription period. The use of an assumption, that the trouble effect would remain constant, allows an estimate of the relative sizes of the option and trouble effects.

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