

5 The market for sub-underwriting of share issues

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Introduction

5.1. An important aspect of the share-issuing process in the UK is that lead underwriters are able to lay off their underwriting risk to institutional and other investors through the process known as sub-underwriting. The sub-underwriters assume the commitment to take up any shares that are not subscribed for in the offer and that are not subsequently placed by the broker. Sub-underwriting is not provided in conjunction with other services such as financial advice and this distinguishes it from primary underwriting.

Sub-underwriting procedure

5.2. Sub-underwriting an equity issue on a fixed fee basis traditionally includes the following steps:

- (a) The issue is frequently discussed on a confidential basis with the largest shareholders (this is known as pre-marketing).¹
- (b) Following the announcement of the issue (at or before 8.30 am), the broker to the issue offers a participation in the sub-underwriting to selected sub-underwriters for a fee. For instance, an investor may be offered the opportunity to sub-underwrite 500,000 shares at the issue price for a fee of 1.25 per cent of commitment for up to 30 days' commitment.
- (c) Those offered the sub-underwriting accept or reject it or they may ask for an increased or reduced participation. An institutional investor not offered sub-underwriting may contact the broker to ask for a participation but this is unusual. If the net effect is that total acceptances fall short of the amount offered, the broker may seek to place the sub-underwriting either with existing or additional sub-underwriters.
- (d) The broker reports to the lead underwriter whether or not the sub-underwriting has been completed. If it has not been completed, the lead underwriter remains at risk (for that proportion of the sub-underwriting). In practice the broker may also accept a participation if unable to complete the sub-underwriting. The sub-underwriting is normally completed by 3.00 pm on the day of announcement.
- (e) Shortly after the closing date the sub-underwriters are informed of the results of the issue and either subscribe for new shares at the issue price or, if there is no stick, receive their fees. The circumstances in which sub-underwriters are required to purchase shares are different for different types of issue: in rights issues sub-underwriters subscribe when the broker is unable to place the rump; in open offers when take-up of the offer is less than 100 per cent; and in cash underpinnings when sufficient shareholders opt for the cash alternative (the underwriting agreement may provide for the underwriters to purchase shares only when the number of shares elected for under the cash alternative exceeds a certain threshold).

There is usually provision for sub-underwriters to receive a reduced fee if the issue does not proceed and the underwriting agreement does not become unconditional.

5.3. A recent innovation in some equity issues is that sub-underwriters have been able to tender for an increased participation at a lower fee than that offered in the initial allocation.² In most of these cases, a proportion of the sub-underwriting has been tendered: the initial offer (see paragraph 5.2(b)) is then subject to recall to meet the results of the tender. In a small number of cases, all of the sub-underwriting has been tendered. In one of these (the issue by Berkeley on 14 October 1997), the offer price was at a larger than usual discount to the pre-announcement share price; no initial allocation was offered and there was no maximum fee.³

5.4. The advantage of tendering is that it potentially reduces the fees paid. The disadvantage is that there is an increased risk of not completing the sub-underwriting at the cost envisaged: this results in increased risk for the lead underwriter since the underwriting agreement (finalized prior to issue announcement) includes a fee for all underwriting services (reduced according to the results of the tender⁴). There is an increased risk of not completing the sub-underwriting in a partial tender because each sub-underwriter has a reduced incentive to accept the initial offer (compared with the situation with no tender). The reason is that the participation ultimately obtained at the offered fee by each sub-underwriter is lower the higher the quality of the sub-underwriting⁵ and this reduces the attractiveness of sub-underwriting at the offered fee. Risk is further increased with a full tender (without an initial allocation) to the extent that institutions are unwilling to incur the additional costs of tendering at a specific price compared with simply accepting/rejecting a participation at the offered fee.

¹Institutions participating in such discussions become insiders and are unable to trade in the shares.

²Only rights issues have been tendered.

³There was a further similar issue by Pressac on 15 July 1998, although this was subject to a maximum fee.

⁴The sub-underwriting fee is reduced and additionally, in many cases, the 0.5 per cent fee retained by the lead underwriter has been reduced pro rata with the results of the sub-underwriting tender.

⁵Where quality is measured by the amount tendered at below the fee offered by other sub-underwriters.

5.5. The details of the tendering procedure (percentage tendered, maximum permitted bid, whether tendered sub-underwriting allocated at strike rate or rate actually bid) have varied between issues. The results of tendering are discussed in paragraphs 5.23 to 5.28.

5.6. The procedure for small companies (broadly those with a market capitalization of less than £100 million) with a relatively small number of shareholders is similar to that described in paragraph 5.2. The sub-underwriting would usually be offered only to shareholders and the pre-marketing exercise would be more extensive. Often the issue would be pre-marketed to all those offered sub-underwriting, given that small companies have fewer shareholders. Issues by small companies have seldom included a tendered element. Figure 5.1 shows that there were only two tendered issues by companies with a market capitalization of less than £100 million.

Requirements to be a sub-underwriter

5.7. The most important requirements are creditworthiness (since the lead underwriter relies on the sub-underwriter to pay for any shares that are ultimately taken up) and the ability to respond to the offer of sub-underwriting within the timescale of a few hours. A sub-underwriter must take a large enough participation for the administration costs (as a percentage of commitment) to be acceptable.

5.8. Brokers, acting on behalf of the lead underwriter, have complete discretion regarding who is offered sub-underwriting. One broker told us (in the context of an issue that was fully tendered) that it reserved the right to refuse bids, primarily to guard against short-selling by arbitrageurs trying to secure large blocks of shares by tendering aggressively, with the intention of selling shares short in the market towards the end of the issue period, thus depressing the share price and ensuring that there was a stick. If successful, such a strategy could result in an arbitrageur acquiring shares cheaply to the detriment of non-sub-underwriting shareholders and the issuing company. Another concern was that shares of the issuing company would ultimately be acquired by another company contemplating a hostile takeover bid. These considerations lead many parties to favour sub-underwriting by 'natural holders' of shares.

Participants in sub-underwriting and market shares

5.9. Sub-underwriters can be divided into the following main categories:

- (a) UK pension funds;
- (b) UK life and general insurance funds;
- (c) UK unit trusts, open-ended investment companies and investment trust companies;
- (d) UK charities;
- (e) foreign financial institutions (with an interest in UK quoted companies); and
- (f) other, including investment banks, brokers and individuals.

The first two categories account for the bulk of sub-underwriting. Participation by foreign institutions is limited by legal constraints (especially for US funds) and lack of familiarity with the UK system.

5.10. Fund managers normally exercise delegated authority to take decisions on sub-underwriting and other day-to-day investment matters on behalf of the beneficiaries and policy-holders of the funds they manage. There are three main categories of fund manager:

- (a) specialist fund managers, which are now often part of commercial or investment banking groups. Examples are MAM (part of Merrill Lynch), Schroder Investment Management UK Ltd (SIM) and Barclays Global Investors. Some smaller fund managers (such as M&G Group PLC) are independent and started as unit trust and investment trust managers;

- (b) fund managers which are part of life assurance groups and in which the main life fund forms a core to the assets under management, although they will also manage third party funds. Examples include PPM, Legal and General Investment Management and Standard Life Investment Management; and
- (c) fund managers which are associated with particular large pension funds, including Hermes Pensions Management (which manages the British Telecommunications and Post Office pension schemes), Shell Pensions Management Services and BG Pension Funds Management.

5.11. Table 5.1 shows a breakdown of UK equity assets by class of owner, and also shows the funds managed by the largest fund managers based on the results of our survey of fund managers (see Appendix 2.4). Institutional shareholders held just under 60 per cent of UK equities at the end of 1997 and the largest three fund managers each managed between 3 and 4 per cent of total UK equities.

TABLE 5.1 UK equity assets and fund managers, 31 December 1997

	£ billion	% of total
<i>Types of investor</i>		
Life assurance and pension funds	585.3	46.1
Remaining financial institutions (excluding banks)	141.7	11.2
Personal sector	315.4	24.8
Overseas sector	201.6	15.9
Other*	26.0	2.0
Total	<u>1,270.0</u>	<u>100.0</u>
<i>Fund managers responding to our survey</i>		
PPM	48.0	3.8
MAM	44.0	3.5
SIM	40.3	3.2
Hill Samuel Asset Management	35.3	2.8
Barclays Global Investors	28.7	2.3
Legal and General Investment Management	26.7	2.1
PDFM†	24.9	2.0
Standard Life Investment Management	23.6	1.9
Gartmore Investment Management	23.6	1.9
Norwich Union Investment Management	16.5	1.3
Hermes Investment Management	16.3	1.3
Royal Sun Alliance Investment Management	16.2	1.3
AXA Sun Life Investment Management	15.5	1.2
AMP Asset Management	14.1	1.1
Threadneedle Asset Management	13.7	1.1
Morgan Grenfell Asset Management	13.5	1.1
SWIM	12.9	1.0
Other respondents	<u>239.6</u>	<u>18.9</u>
Total of above	653.5	51.5

Source: Financial Statistics, MMC survey of fund managers.

*Banks, industrial and commercial companies and Government.

†Phillips and Drew from 6 July 1998.

5.12. Table 5.2 shows that the supply of sub-underwriting is unconcentrated: no fund manager has as much as 10 per cent of the market and the ten largest fund managers together account for about 40 per cent of total sub-underwriting. In 1997 sub-underwriting fees on average represented about £35 per million pounds (0.0035 per cent) of fund managers' UK equity assets at the end of the year; the comparable figure for 1995 and 1996 was about £160 per million pounds. Consequently it would appear that sub-underwriting fees account for a small proportion of fund managers' expected real return: about 0.05 per cent on the basis of 1997 sub-underwriting activity and 0.2 per cent on the basis of the 1995/96 activity level (assuming an expected real return of about 7 per cent a year).

TABLE 5.2 Market shares of sub-underwriting, 1995 to 1997

<i>Fund managers' share of fees</i>	<i>Number of fund managers</i>	<i>Share of respondents' sub-underwriting fees %</i>	<i>Share of all sub-underwriting fees %</i>
5% to 10%	2	16	12
2% to 5%	8	34	25
1% to 2%	12	24	18
Less than 1%	<u>46</u>	<u>26</u>	<u>20</u>
Total respondents	68	100	75
Others			<u>25</u>
Total			100

Source: MMC analysis.

Note: Sub-underwriting fees were unavailable for some fund managers. In these cases we calculated fees by estimating the fund manager's UK equity assets from the average fee to assets ratio for all fund managers. The resulting estimates may be on the low side as the 25 per cent of sub-underwriting attributed to others (other fund managers, lead underwriters, shareholders other than institutional shareholders) is surprisingly high given that respondents accounted for 90 per cent of institutional shareholding of UK equities (see Table 5.1).

5.13. The FSA told us that it was possible for authorized fund managers to have regulatory permission to sub-underwrite on their own account, rather than for the account of the funds: if sub-underwriting on its own account, the fund manager takes both fees and risk. On 7 October 1998 there were 14 firms regulated by IMRO which had such permission. Of those responding to our questionnaire, only three fund managers said that they had such regulatory permission and two of these three said that they did not in fact sub-underwrite on their own account. A number of people told us that in the past it had been more common for fund managers to sub-underwrite on their own account but this was less the case now due to the wish to avoid any apparent conflict of interest.

5.14. During our inquiry (which received considerable publicity in the financial press) no evidence came to light of fund managers that wished to be involved in sub-underwriting but had been excluded. Two of the respondents to our questionnaire said that they had not sub-underwritten in the last three years but neither of these had apparently wished to sub-underwrite. One of the respondents to our questionnaire was a US fund management company, whose London office competes for UK clients. This company said that, when it began to develop a UK client base, it contacted brokers to tell them it wished to sub-underwrite for its clients. The company subsequently participated in sub-underwriting for its clients and did not appear to believe it had been discriminated against.

Working of the sub-underwriting market

5.15. An important feature of this market is that the purchasers of sub-underwriting (the broker acting as agent for the lead underwriter) make offers to, and/or invite tenders from, prospective suppliers (the fund managers who act on behalf of their clients). There are thus two main aspects to the working of the market:

- (a) the basis of the initial allocation and/or the invitations to tender (discussed in paragraphs 5.16 to 5.21); and
- (b) the level of fees offered in the initial allocation and/or the way of determining the fee received by successful bidders in the tender (paragraphs 5.22 to 5.29).

Allocation of sub-underwriting

5.16. As indicated above (paragraph 5.3), in a small number of recent issues all the sub-underwriting was tendered. In the Berkeley issue, the broker simply contacted selected fund managers

to ask them to tender. The tender was also announced to the market so that any other financial institutions could request the opportunity to tender.

5.17. The position is more complicated in the great majority of sub-underwritten issues, where the broker offers a sub-underwriting participation. In deciding on the amount offered, the broker will attempt to predict the level of participation that each fund manager desires. It appears that the main factors taken into account by brokers are:

- (a) the size of total funds managed;
- (b) the size of funds managed in the issuing company and recent investment history (more sub-underwriting may be offered to a recent buyer than seller);
- (c) the fund manager's propensity to sub-underwrite: some are known to be keener than others. Additionally, some fund managers have a policy of only sub-underwriting issues by companies in which their funds are already shareholders; and
- (d) the results of pre-marketing discussions.

Other factors that may be relevant include the issue method (it was suggested to us that some fund managers were less willing to participate in cash underpinnings of hostile takeovers) and the total amount of sub-underwriting already committed at the time participation is sought (most funds have a maximum commitment). This latter aspect has not been a constraint recently due to the low level of sub-underwriting activity.

5.18. It is possible that no offer is made to a fund manager that wishes to participate in sub-underwriting a particular issue. Just over three-quarters of those responding to a question about this in our survey said that they would take steps to indicate their wish to sub-underwrite. In such circumstances, a fund manager could only obtain a participation by acting quickly and to the extent that those initially offered sub-underwriting declined or accepted a lower amount than the initial offer. Only one-quarter of respondents to our questionnaire said that they had not been offered sub-underwriting in circumstances where they would have expected it.

5.19. We also asked about the extent to which fund managers had declined sub-underwriting offers. Of those providing an unambiguous response to this question (two-thirds of total respondents), all had declined at least one offer. Some brokers provided us with information on the percentage of sub-underwriting offers declined for each issue. In just over half of the 187 issues for which we have information, none of the sub-underwriting offers were declined. In the remaining issues up to 45 per cent of offered shares were declined. The percentage exceeded 10 per cent in 13 (7 per cent) of issues. The percentage declining presumably depends on the perceived riskiness of the sub-underwriting at the time the decision is made (around midday, after the initial market reaction to the announcement). On average the percentage declined was 3.4 per cent.

5.20. As mentioned above, different fund managers have different policies towards sub-underwriting. One fund manager told us that the vast bulk of its funds were index funds which replicated the FTSE All-Share Index and that, for these funds, sub-underwriting in line with its proportion of the index was routine and virtually automatic. A consequence of this policy is that, as long as its sub-underwriting percentage is the same as its shareholding percentage, fees received (as sub-underwriter) are balanced by fees implicitly paid out (as shareholder). Moreover, the fund retains its percentage ownership of the issuing company as long as it either takes up its rights or receives stick as a sub-underwriter.¹

¹It will, however, only retain its precise percentage ownership if the stick is 100 per cent.

5.21. More generally, it was suggested to us that the economic cost of sub-underwriting fees paid was reduced to the extent that the fees were received by sub-underwriting shareholders. However, the economic cost to non-sub-underwriting shareholders is unchanged in that they still pay the full percentage fee. In practice, it seems impossible to establish the extent to which sub-underwriting fees are received by shareholders as responses to our questionnaire suggested that fund managers do not allocate sub-underwriting to funds strictly pro rata with shareholdings. Practice also varied regarding whether fund managers specified the funds which would sub-underwrite when accepting a broker's offer of sub-underwriting: some fund managers made decisions as to which funds would sub-underwrite before accepting the broker's offer and also informed the broker accordingly, while others accepted the sub-underwriting but did not necessarily tell the broker the names of the sub-underwriting funds.

Sub-underwriting fees

5.22. In the traditional procedure the broker offers sub-underwriting at a fixed commission rate. Although the amount of sub-underwriting is to some extent negotiable up or down,¹ the commission rate offered is non-negotiable. An important feature of the market is that there has traditionally been a standard fee rate for sub-underwriting of 1.25 per cent of sub-underwriting commitment plus 0.125 per cent for each seven days (or part thereof) that the commitment period exceeds 30 days. Of this, 0.75 per cent is only payable if the lead underwriter's obligations under the underwriting agreement became unconditional in all respects. Hence if the issue is withdrawn or the takeover bid lapses, the fee paid is 0.5 per cent plus 0.125 per cent for each extra seven days that the period up to the point of withdrawal or lapse exceeds 30.

5.23. Table 5.3 shows the percentage of total sub-underwriting commitment and fees over the period 1995 to 1997 that was accounted for by issues at standard fees. The source of these data was our questionnaire to investment banks (see Appendix 2.3), which included a question for each issue asking whether standard fees were paid to sub-underwriters. Thus, an issue is shown as non-standard whenever there was a non-standard commission element (such as partial tendering) to the sub-underwriting. The period is divided at 31 October 1996 as this was the date of the first tendered rights issue (Stakis). The sub-underwriting of cash underpinnings and open offers has not yet been tendered and therefore no reductions in standard commission rates occur for these types of issue.

¹Any negotiations are obviously subject to the constraint that the broker cannot offer sub-underwriting on more shares than are in the sub-underwritten offer. Thus, if all funds want an increased participation, none can have it.

TABLE 5.3 Analysis of sub-underwriting, 1995 to 1997

	Standard commission rate	Non- standard commission rate	No answer	Total	Standard commission rate	Non- standard commission rate	No answer
	<i>Amount underwritten, £ billion</i>				<i>% of amount underwritten</i>		
<i>Rights issues</i>							
Pre-31.10.96	5.5	1.5	0.1	7.1	78	21	1
Post-31.10.96	<u>0.6</u>	<u>2.3</u>	<u>0.0</u>	<u>2.9</u>	21	78	1
Whole period	6.1	3.8	0.1	10.0	61	38	1
<i>Cash underpinnings</i>							
Pre-31.10.96	6.5	2.7	0.0	9.2	70	30	0
Post-31.10.96	<u>0.2</u>	<u>0.0</u>	<u>0.0</u>	<u>0.3</u>	74	13	13
Whole period	6.7	2.8	0.0	9.5	70	29	1
<i>Open offers</i>							
Pre-31.10.96	1.4	0.5	0.1	2.0	70	25	5
Post-31.10.96	<u>1.0</u>	<u>0.2</u>	<u>0.1</u>	<u>1.3</u>	78	13	9
Whole period	2.4	0.7	0.2	3.3	73	20	7
<i>All issues</i>							
Pre-31.10.96	13.3	4.7	0.2	18.3	73	26	1
Post-31.10.96	<u>1.8</u>	<u>2.5</u>	<u>0.2</u>	<u>4.5</u>	41	55	4
Whole period	15.2	7.2	0.4	22.8	67	32	2
	<i>Fees paid, £ million</i>				<i>% of fees paid</i>		
<i>Rights issues</i>							
Pre-31.10.96	80	17	0	97	82	18	0
Post-31.10.96	<u>9</u>	<u>26</u>	<u>0</u>	<u>35</u>	24	75	0
Whole period	88	43	0	132	67	33	0
<i>Cash underpinnings</i>							
Pre-31.10.96	65	30	0	95	68	32	0
Post-31.10.96	<u>2</u>	<u>0</u>	<u>0</u>	<u>2</u>	93	7	0
Whole period	67	30	0	97	69	31	0
<i>Open offers</i>							
Pre-31.10.96	15	1	0	16	93	5	2
Post-31.10.96	<u>12</u>	<u>1</u>	<u>0</u>	<u>13</u>	90	7	2
Whole period	27	2	1	29	92	6	2
<i>All issues</i>							
Pre-31.10.96	160	48	1	208	77	23	0
Post-31.10.96	<u>23</u>	<u>28</u>	<u>0</u>	<u>51</u>	45	55	1
Whole period	183	75	1	259	71	29	0
	<i>Number of offers</i>						
<i>Rights issues</i>							
Pre-31.10.96	106	14	17	137			
Post-31.10.96	<u>31</u>	<u>31</u>	<u>6</u>	<u>68</u>			
Whole period	137	45	23	205			
<i>Cash underpinnings</i>							
Pre-31.10.96	23	2	15	40			
Post-31.10.96	<u>5</u>	<u>1</u>	<u>6</u>	<u>12</u>			
Whole period	28	3	21	52			
<i>Open offers</i>							
Pre-31.10.96	58	28	27	113			
Post-31.10.96	<u>51</u>	<u>18</u>	<u>20</u>	<u>89</u>			
Whole period	109	46	47	202			
<i>All issues</i>							
Pre-31.10.96	187	44	59	290			
Post-31.10.96	<u>87</u>	<u>50</u>	<u>32</u>	<u>169</u>			
Whole period	274	94	91	459			

Source: MMC.

Note: Information on fees and amount underwritten was not available for all offers. Totals and percentages do not necessarily reflect constituent figures shown due to rounding errors.

5.24. An issue may be shown as non-standard for one of two reasons:

- (a) Sub-underwriting was offered at a fixed commission rate different from the standard. The fixed commission rate chosen may reflect pre-marketing discussions, but once formally offered will still be non-negotiable. In some cases, one or more shareholders have offered to sub-underwrite at below standard rates: an example was the rights issue by Cairn Energy on 25 July 1996, which was sub-underwritten at 0.5 per cent.
- (b) The sub-underwriting was partially or fully tendered. The tender provides an opportunity for sub-underwriters to obtain a higher participation in exchange for a lower commission rate.

5.25. Appendix 5.1 provides further details of tendered issues between 31 October 1996 and the end of 1997. The main points emerging are:

- (a) There were three fully tendered issues and 25 partially tendered.
- (b) In total, just over half of the sub-underwriting commitment in these issues was put out to tender.
- (c) In most partially tendered cases, bids were received at below standard rates for less than the amount put out to tender.
- (d) As a consequence, in aggregate one-third of the total commitment in these issues was sub-underwritten at below standard fees.
- (e) Total savings over standard fees amounted to 0.21 per cent of total commitment or £4.5 million. Savings in individual cases ranged from 0.01 to 0.95 per cent.

In the partial tenders, the broker initially allocated sub-underwriting at standard rates (subject to recall) and invited bids for additional sub-underwriting at below standard rate: successful bidders received additional sub-underwriting at the commission rate they bid or at a strike commission rate. As shown in Figure 5.1, the tendered issues tended to be made by larger companies.

5.26. Of the partially tendered issues, in 18 cases¹ bids were received at below standard rates for less than the amount put out to tender while in the other seven cases bids were received for at least the amount put out to tender. The total amount of sub-underwriting not tendered in the seven issues represented about 7.5 per cent of the total commitment on all issues in the period after 31 October 1996. If, hypothetically, all of the sub-underwriting in these issues had been tendered at a rate equal to the highest rate successfully bid in the actual tender, savings over standard fees would have increased from 0.21 per cent of total commitment to 0.25 per cent.

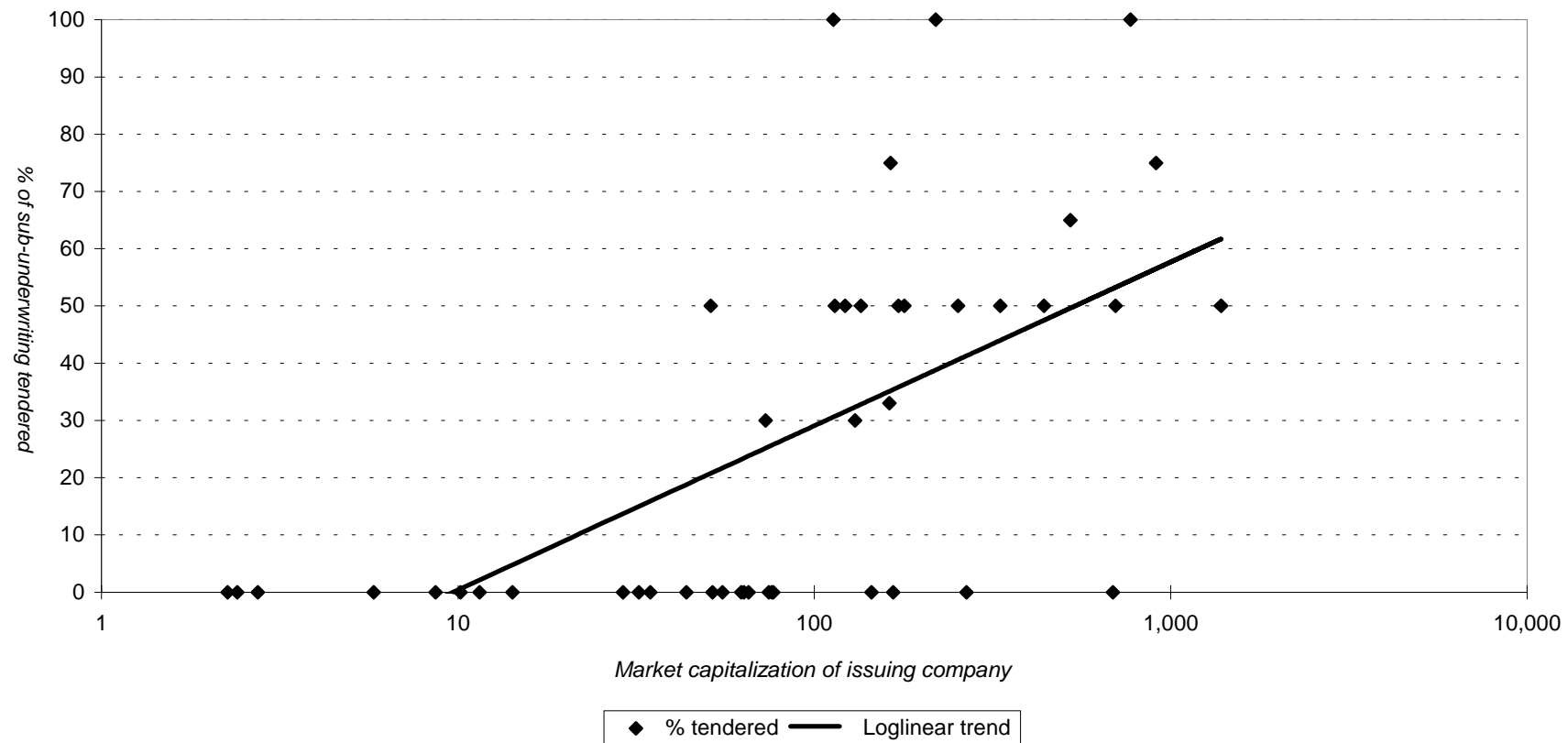
5.27. A further feature of most of the tenders is that a maximum allocation has been placed on each bidding fund manager. In the most recent tenders, this was 20 per cent of the total number of shares being underwritten. It was suggested to us that this reflected the wish of management for the new shares to be dispersed among a number of owners. In the earlier tenders, maximum allocations were more restrictive—between twice and four times the fund managers' initial allocation.

5.28. At a later stage in the inquiry, we obtained information about the sub-underwriting of rights issues in the first six months of 1998. As shown in Table 5.4, half of the amount raised in rights issues during this period was raised in issues where the sub-underwriting included a tendered element or there were other unconventional features (Appendix 5.2 provides further details of these issues). This compares to 78 per cent of the amount raised between the first tendered issue (Stakis) on 31 October 1996 and the end of 1997 (see Table 5.3).

¹One of these did not proceed as the acquisition which was to be financed did not proceed and the underwriting agreement did not become unconditional.

FIGURE 5.1

Sub-underwriting percentage tendered: 31 October 1996 to 31 December 1997



Source: MMC.

TABLE 5.4 Rights issues, January to June 1998

	<i>Number of rights issues</i>	<i>Total amount raised, £m</i>
Tendered sub-underwriting	5	261
Not sub-underwritten*	<u>2</u>	<u>114</u>
Total non-conventional	7	375
Standard sub-underwriting fees	<u>14</u>	<u>383</u>
Total: all rights issues†	21	757

Source: MMC.

*See Appendix 5.2.

†Does not reflect sum of constituent figures due to rounding errors.

5.29. Our survey of fund managers suggested that 40 out of 65 (62 per cent of those responding or 77 per cent by UK equity funds managed) had participated in at least one sub-underwriting tender.

Costs of sub-underwriting

5.30. The main costs incurred by a sub-underwriter may be divided into three categories:

- (a) operational costs, including the cost of deciding whether to participate in sub-underwriting an issue and the administration costs involved;
- (b) losses incurred on shares taken up (losses are incurred in the sense that sub-underwriters are allotted shares at a higher price than would be paid at that time in the market); and
- (c) the cost of taking on the risk of sub-underwriting: that is the recompense required for sub-underwriting rather than making less risky investments.

The cost of risk (c) for any issue is likely to be associated with the expected loss (b) but it is useful to distinguish between the two concepts.

5.31. Each of the above cost categories is now considered in turn.

Operational costs

5.32. Sub-underwriting is one of the activities that fund managers carry out in order to obtain a return for their clients. However, fund managers do not account separately for sub-underwriting costs and there is very little information available on the costs incurred. In our questionnaire to fund managers, we asked about the operating costs and non-financial capital employed in sub-underwriting. The majority of respondents to the questionnaire indicated that this information was not available. Table 5.5 summarizes responses from those fund managers that were prepared to attempt to estimate the cost. Table 5.5 shows a variety of responses. Most fund managers indicated that costs varied very little between issues. Since the sub-underwriting commitment, and hence commission received by any one fund manager, varies enormously between issues, cost in relation to income also varies enormously. The largest fund managers tend to have the highest commission per issue, as illustrated in Table 5.5.

TABLE 5.5 Information from fund managers about operational costs per issue of sub-underwriting

Respondent	Fund management employees		Administration and other costs		Associated capital costs†	Total	Average commission (1997)
	Time hrs*	Cost £	Time hrs*	Cost £			
Alliance Trust	3.7–7‡						2,189
AMP Asset Management	3	96	3	96	73	266	10,204
Barclays Global Investors							
—large cap (not tendered)	2	50	4	58	18	126	
—large cap (tendered)	3	75	4	58	21	154	
—small cap (not tendered)	4	100	6	108	30	238	
—small cap (tendered)	5	125	7	133	36	294	
Clerical Medical						500–1,000	6,854
Friends Ivory & Sime	1–2§					N/A	
Guinness Flight Hambro	Up to 1			75–125		N/A	
Hill Samuel	3 days	945	3 days	255		1,200	19,477
Legal & General	3	500	3	250		750	
NPI	3¶	171¶	1½	37	201¶	409	
PDFM	2	300					44,865
Royal London	2	100	3	90	200	390	8,277
SIM:							
—Up to £0.5m commitment						994⊞	
—£0.5m to £1m						1,060⊞	
—£1m to £10m						1,323⊞	
—Over £10m commitment						4,314⊞	
Scottish Life	1.25		2				

Source: MMC.

*Person hours.

†Non-financial capital employed multiplied by cost of capital. May also include staff overheads.

‡Of this, 3 hours was of an analyst's time and 0.5 to 4 hours was of a more senior fund manager's or director's time. In addition, this company suggested that up to 18 hours of analyst's time and 2.5 to 34 hours of a fund manager's time could be required while on risk. The company suggested that work was particularly high for long-running contested takeovers.

§1 hour for tendered issues and 2 hours for non-tendered issues.

¶For non-tendered issues, costs were £80 lower.

⊞This company said that, in addition to these costs, it would attribute an unquantifiable and significant amount of senior management time.

Note: Table excludes cost of financial capital.

5.33. In addition to the responses shown in Table 5.5, 14 fund managers described the operational costs as 'insignificant', 'not significant', 'negligible', 'immaterial' or 'minimal' without providing figures. These fund managers represented 22 per cent of respondents and accounted for 16 per cent of UK equity managed by respondents. Additionally, two fund managers said that there were no avoidable costs to sub-underwriting and one said that sub-underwriting costs were absorbed within normal operating costs.

5.34. There were, however, indications from a number of respondents that the figures did not adequately reflect the opportunity costs of sub-underwriting. One fund manager pointed out that the sub-underwriting decision 'relies on many thousands of pounds expended over months and years analysing the background, the industry and also perhaps the company, as part of the Fund's investment activity'. Another fund manager said that 'sub-underwriting related matters are always of pressing importance to the companies concerned. Initial decisions may be required from our senior executives, who are then obliged to deal with the issue as a matter of urgent priority. The opportunity costs can be considerable'.

Underwriting losses on allotted shares

5.35. In a rights issue, underwriters are only allotted the new shares when the broker is unable to place unsubscribed-for shares at a price above the issue price. Consequently, the underwriters will almost always incur a loss in the sense that the price they pay (the issue price) is above the market price at the time the new shares are acquired.

5.36. Table 5.6 summarizes the results of research by Professor Marsh, showing the extent of underwriting losses.¹ About 5 per cent of issues failed, apart from issues that straddled the crash of October 1987, almost all of which failed. If the crash period is included, 6.6 per cent of issues between 1986 and October 1996 failed, accounting for 5.0 per cent of money raised from rights issues during this period.² Total losses on rights issues during this period (based on the difference between issue price and closing mid-market price the day after the issue closed) were 0.53 per cent of money raised.

TABLE 5.6 Estimated underwriting losses on allotted rights issue shares

	1986 to Oct 1996 including 1987 crash	1986 to Oct 1996 excluding 1987 crash	July 1962 to December 1975
Number of issues	671	946	926
Number of failed issues	62	44	35
Percentage of issues that failed:			
—by number	6.6	4.8	5.2
—by amount raised	5.0	2.9	N/A
Underwriting loss as percentage of amount raised:			
—total for all issues*	0.53	0.15	N/A
—average per issue*	0.70	0.31	0.29

Source: Marsh (1997) and Marsh (1980).

*Including issues that did not fail. The weighted average fee for all issues 1986 to Oct 1996 was 1.43 per cent. The unweighted average fee was 1.46 per cent for 1986 to Oct 1996 and 1.40 per cent for 1962 to 1975.

5.37. The research thus suggests that a sub-underwriter who underwrote a given percentage of each rights issue would have incurred losses of 0.53 per cent over the period 1986 to October 1996. The figure is highly sensitive to the inclusion or exclusion of the crash period: the loss on this basis falls to 0.15 per cent if the crash period is excluded. Professor Marsh also carried out research for an earlier period (1962 to 1975)³ but results on a comparable basis are not available. Results for the earlier period (see Table 5.6) show that the average loss per issue was about 0.3 per cent, similar to results on this basis for the later period excluding the 1987 crash issues. The average loss per issue would reflect the experience of a fund that had the same absolute commitment in each sub-underwriting. The average loss per issue is larger, as a percentage of commitment, than the aggregate loss because smaller issues were more likely to fail and/or incurred larger losses.

5.38. Our analysis of rights issues during 1995 to 1997, based on information supplied by lead underwriters, showed 18 failed issues out of a total of 205 (9 per cent) which accounted for 4 per cent of money raised in rights issues during the period. We calculated losses using the closing mid-market price on acceptance day, the only figure readily available. In most failed issues on our database this was only slightly below the issue price, and consequently the losses were very small (less than 0.1 per cent of the amount raised in rights issues during the period).

5.39. The ABI suggested to us that Professor Marsh's methodology understated the losses because the share price of a company which had recently undertaken a failed rights issue was likely to be held back, with underwriters selling into any rally which subsequently occurred. There was no specific evidence either for or against this suggestion. The ABI also suggested to us that the period 1986 to 1996 was atypical and that losses had been biased downwards as a result of a long 'bull run'.

5.40. One fund manager very helpfully supplied us with details of its aggregate underwriting commission and losses, which are summarized in Table 5.7. The losses on rights issues over the period 1987 to 1997 were 0.48 per cent, comparable with the 0.53 per cent shown in Professor Marsh's work for the broadly similar period 1986 to October 1996. Aggregate losses for 1988 to 1997 (0.13 per cent) were similar to those shown in Professor Marsh's study excluding the 1987 crash issues (0.15 per cent). Table 5.7 also shows this fund manager's experience on cash underpinnings,

¹Marsh, P R, 'Sub-underwriting of rights issues: a failure of competition?', unpublished paper, June 1997.

²The percentage of money raised is lower than the percentage of issues as smaller issues were more likely to fail.

³Marsh, P R, 'Valuation of underwriting agreements for UK rights issues', *The Journal of Finance*, 1980, 334, 693-716.

open offers and other issues. In cash underpinning and open offers there is no equivalent of the rump placing in a rights issue. The take-up in share offers is usually less than 100 per cent; hence, the underwriters may experience either a profit or a loss on allotted shares in a cash underpinning or open offer. Table 5.7 indicates that the fund manager's position for cash underpinnings was approximately break-even but profits of about 0.5 per cent were shown on open offers. Other issues showed large losses; it is likely that this reflects mainly the very large BP secondary issue in 1987. Over the period 1986 to 1996, rights issues contributed about 60 per cent of commission, cash underpinnings 20 per cent and open offers under 10 per cent. Over the period 1987 to 1997, aggregate underwriting losses on all types of issue were 0.8 per cent of commitment. The comparable figure for 1972 to 1997 was lower at 0.5 per cent, reflecting the absence during 1972 to 1986 of a very bad year such as 1987.

TABLE 5.7 Underwriting commission and aggregate losses/(profits) on allotted shares of a fund manager

	<i>per cent of commitment*</i>				
	<i>1972 to 1986</i>	<i>1987</i>	<i>1988 to 1997</i>	<i>1987 to 1997</i>	<i>1972 to 1997</i>
Rights issues:					
Commission		1.58	1.40	1.41	
Loss on allotted shares†		5.44	0.13	0.48	
Cash underpinning:					
Commission		1.00	1.02	1.02	
Loss/(profit) on allotted shares†		0.45	(0.13)	(0.04)	
Open offers:‡					
Commission		1.29	1.25	1.26	
Profit on allotted shares†		(0.27)	(0.59)	(0.52)	
Other (mainly offers for sale):‡					
Commission		1.24	1.23	1.24	
Loss/(profit) on allotted shares†		8.05	(0.06)	3.59	
All issues:					
Commission	1.24	1.25	1.28	1.27	1.26
Loss on allotted shares†	0.05	4.81	0.01	0.80	0.52

Source: MMC calculations based on data provided by a fund manager.

*Commission and loss figures for each year were adjusted to 1997 prices using the retail price index.
†Losses/(profits) on allotted shares are based on the price of the share at the end of the month in which it was allotted.
‡The split between open offers and other may not be fully reliable.
Note: Data for individual issue types not available for 1972 to 1986.

5.41. Figure 5.2 shows an index of the annual level of commission and underwriting loss of the fund manager (after adjusting for inflation).

Cost of risk

5.42. When a fund manager takes on a sub-underwriting commitment on behalf of its client funds, the riskiness of the funds' portfolios is increased. Investors will require some recompense for taking on this risk. Since there is increased risk from sub-underwriting it would not be rational to sub-underwrite for a commission equal to the operational costs plus the expected loss.

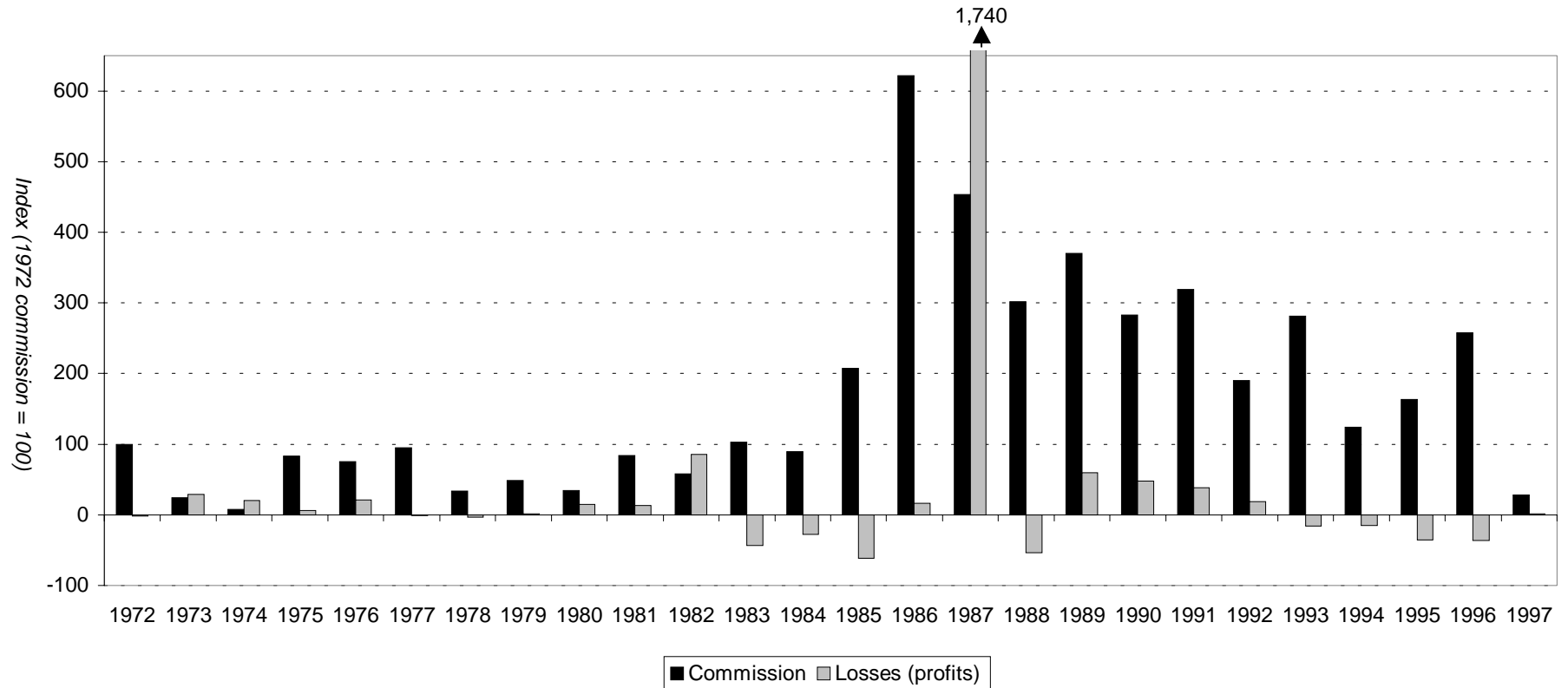
5.43. A number of fund managers argued that they were required by their clients to hold sufficient cash¹ to meet any underwriting commitment; that this cash would otherwise be invested in equities and hence that the risk premium for sub-underwriting could be measured by the risk premium on equities over the sub-underwriting period. The average risk period for sub-underwriting is about five weeks: if the risk premium on equities² is 3.5 to 5 per cent a year, this implies a premium of about 0.3 to 0.5 per

¹Cash in this context should be taken to mean any security which was certain or near certain to repay the principal at the end of the underwriting period.

²Return on equities less return on cash.

FIGURE 5.2

Index of annual returns of a fund manager (inflation-adjusted with 1972 commission= 100)



Source: A fund manager.

Note: The return consists of two elements: underwriting commission and losses on shared allotted. Negative losses (profits) can arise on shares allotted in cash underpinnings and open offers (see paragraph 5.40).

cent for a five-week sub-underwriting.¹ There is uncertainty about the risk premium on equities which may vary over time and this would affect the computed risk of sub-underwriting.

5.44. Early in the inquiry it was suggested to us that any requirement to take up shares by funds could be met without difficulty from the normal cash flow or cash balances of the fund. We therefore asked fund managers to what extent this was true in their case. Answers were difficult to interpret in some cases, but 36 fund managers (54 per cent), accounting for 36 per cent of funds managed, expressed some measure of agreement with the statement. Five fund managers (7 per cent), accounting for 11 per cent of funds managed, disagreed with the statement.

5.45. This approach to the risk of sub-underwriting does not explicitly measure the cost of risk to the funds and their beneficiaries. Instead, it measures the impact on the funds' returns under the behavioural assumption that cash balances are always increased by the full extent of the sub-underwriting commitment over the whole sub-underwriting period (compared with the level that would otherwise have been held). The impact on total returns may be particularly relevant since fund managers' performance is often compared on the basis of total returns. An alternative approach to measuring the cost of risk is to use the Black-Scholes option valuation model: this is discussed below.

Profitability of sub-underwriting

5.46. A number of estimates of the profitability of sub-underwriting have been made and these can be divided into two categories:

- (a) *ex-post* returns, based on actual underwriting losses incurred over some past period; and
- (b) *ex-ante* returns, based on the estimated value of the sub-underwriting using information available at the time the decision was made. The value of the sub-underwriting has been estimated using the Black-Scholes option valuation model.

Ex-post returns

5.47. Professor Marsh calculated *ex-post* returns by subtracting the average underwriting loss from the average fee charged (Table 5.6), giving a margin of 0.90 per cent for 1986 to October 1996 and 1.31 per cent excluding the 1987 crash period. Professor Marsh accepted that this did not allow for the cost of risk or operational costs and saw it as mainly useful for assessing the impact of the 1987 crash on returns.

5.48. A number of fund managers argued that returns from sub-underwriting were barely adequate to compensate for the costs, including risk. AXA Sun Life Investment Management Ltd (AXA SLIM) put forward a quantitative argument using the illustrative breakdown of fees shown in Table 5.8. It may be noted that the illustrative breakdown is based on the average commission and loss per issue from Table 5.6. Use of the total loss for all issues (0.53 per cent), which would be reflective of the experience of all underwriters, would show a net profit of 0.09 per cent rather than loss of 0.08 per cent. AXA SLIM accepted this but pointed out that a net profit of 0.09 per cent was well within the margins of error, particularly concerning the expected loss and the equity risk premium. The illustrative breakdown also includes tax which has been paid by life funds but not hitherto by most pension funds. However, the Inland Revenue has raised assessments for tax on sub-underwriting commission against the clients of Hermes Pensions Management, the Trustees of the British Telecommunications and Post Office Pension Schemes, covering the years 1981/82 to 1995/96: on 14 October 1998, the High Court decided in favour of the Inland Revenue but we understand that a reference to the Court of Appeal is being considered.

¹The risk premium would be slightly lower for a net fund which has to pay tax on income and capital gains than for a gross fund.

TABLE 5.8 Illustrative breakdown of fees

	<i>Percentage of commitment</i>
Gross fee	1.43
Expected loss	0.70
Tax	0.18
Cost*	0.20
Equity risk premium†	0.43
Total cost	1.51
Net profit	(0.08)

Source: AXA SLIM.

*Administration and management and trading costs.

†See paragraph 5.42.

Estimates of sub-underwriting profitability based on Black-Scholes option valuation

5.49. In this approach, the Black-Scholes option valuation model¹ is used to estimate the value of the sub-underwriting. The sub-underwriting of a rights issue is analogous to writing a put option with an exercise price (per share) equal to the issue price and an expiry date equal to the date when the underwriting period ends. The purchaser of a put option (the issuing company in the case of an underwritten rights issue) buys the right to sell (put) a security at the exercise price on the expiry date. The supplier of the put option (the underwriter in the case of an underwritten rights issue) makes a loss on the expiry date if the exercise price is above the market price. The Black-Scholes option value represents the risk-adjusted present value of this expected loss under certain assumptions. These are, principally, that markets are frictionless (ie there are no transactions costs) and continuous and that asset prices follow certain dynamics (loosely that, over the relevant period, returns on the share fluctuate randomly around the mean return and that the fluctuations follow a normal distribution with a known volatility).

5.50. The Black-Scholes value of the sub-underwriting depends on the following:

- (a) the share price at the time the sub-underwriting is agreed (less the present value of any dividends for which the new shares do not rank);
- (b) the issue price of the new shares (the higher the issue price relative to the share price the greater the risk of the issue failing and the higher the Black-Scholes option value);
- (c) the interest rate over the underwriting period (the higher the interest rate the lower the Black-Scholes option value);
- (d) the length of the underwriting period (the longer the period the higher the Black-Scholes option value); and
- (e) the volatility (standard deviation)² of returns on the share (the higher the volatility the higher the Black-Scholes option value). In the typical circumstances of underwriting a rights issue (writing a put option with an exercise price well below the current share price), the Black-Scholes option value is highly sensitive to changes in volatility.

5.51. Paragraphs 5.52 to 5.58 report estimates of Black-Scholes option values of sub-underwriting based on historical volatility (estimates of volatility from a period before the rights issue announcement). Paragraphs 5.59 to 5.64 compare historical volatility with actual volatility during the period of

¹Black, F and M Scholes, 'The Pricing of Options and Corporate Liabilities', *Journal of Political Economy*, 81, 1973, 637-54.

²All volatility figures in this chapter are adjusted to an annual basis: the figures reflect the volatility of returns over a year.

the underwriting commitment. Paragraphs 5.65 to 5.68 report criticisms that have been made of the use of Black-Scholes option valuation to measure the profitability of sub-underwriting.

Application of Black-Scholes option valuation model to underwriting

5.52. The application of Black-Scholes option valuation to underwriting a rights issue is not straightforward since the number of shares is increased by the rights issue. In the literature, this has been dealt with in one of two ways:

- (a) The share price has been adjusted for the bonus element of the rights issues: thus the TERP has been used instead of the cum-rights share price to compute the Black-Scholes value at the time of the rights issue announcement. This method was used by Professor Marsh in his first study.
- (b) The option value has been calculated by applying put-call parity to the formula suggested in Smith (1978)¹ for the value of the rights in a non-underwritten rights issue. Smith formalized a suggestion of Black and Scholes (1973) concerning the valuation of warrants: we have therefore called this the warrant pricing method. This was the method used by Professor Marsh in his later work for the OFT and his 1997 research paper. Professor Marsh's view was that this was the better approach: he had done the work for his 1980 paper before Smith's 1978 paper had been published and at that time had not been aware of the warrant pricing approach.

It should be stressed that, if used consistently, the two methods deliver similar results. Potential differences arise because the TERP method takes the volatility in the Black-Scholes formula to be the volatility of returns on the ex-rights share price, while the warrant pricing method takes the volatility in the formula to be the volatility of returns on the cum-rights share price less the option value of the underwriting per share. This will always be greater than the volatility of returns on the ex-rights price as both the rights and the underwriting are options which are more volatile than the underlying share price.

5.53. Table 5.9 summarizes estimates, based on historical volatility,² of Black-Scholes option values for the sub-underwriting of rights issues. Estimated returns are calculated by subtracting the sub-underwriting option value from the fee received: the calculated returns do not allow for operational costs or tax.

5.54. Table 5.9 shows results from a number of studies:

- (a) Professor Marsh's original study which was published in 1980;
- (b) Professor Marsh's (1994) study for the OFT³ and his updated research paper (1997);
- (c) a study by Breedon and Twinn (1995)⁴ of issues by companies with options traded on LIFFE: this included further sensitivity analyses (see paragraphs 5.59 and 5.66 below); and
- (d) our analysis of completed rights issues during 1995 to 1997 by companies with a market capitalization of over £50 million (details of the calculations are given in Appendix 5.3). Issues by these companies accounted for about 90 per cent of money raised in completed rights issues.⁵ Reasons for excluding the smallest companies include: underwriting decisions for these companies tend to be made before announcement of the rights issue during the pre-marketing

¹Smith, C W, 'Alternative Methods for Raising Capital: Rights versus Underwritten Offerings', *Journal of Financial Economics*, 5, 1978, 273-307.

²The standard deviation estimated from continuously compounded returns over the 60 months immediately prior to the issue announcement and published by the London Business School's Risk Measurement Service.

³Marsh, P R, 'Underwriting of Rights Issues: A Study of the Returns Earned by Sub-underwriters from UK Rights Issues'; Office of Fair Trading Research Paper No 6, 1994.

⁴Breedon, F and Twinn, I, 'Valuation of underwriting agreements for UK rights issues, evidence from the traded option market', Bank of England Working Paper 39, September 1995.

⁵The issue of CULS by British Aerospace in March 1995 was treated as an uncompleted rights issue and excluded (the first instalment was repaid and subsequent instalments were not called). In a few cases we were unable to obtain volatility data: this reduced the coverage of successful rights issues to slightly less than 90 per cent.

stage; it may be misleading to calculate Black-Scholes option values for companies in which trading is illiquid.

5.55. Table 5.9 shows results which have been calculated on different bases:

- (a) Results are shown using the closing share price on the day before the rights issue was announced and the closing share price on the day of the announcement. Decisions on sub-underwriting are typically taken around midday on the day of announcement. The argument for using the closing price on the day of announcement is that this reflects the initial announcement effect which would usually occur before noon and thus be known to the sub-underwriters. However, if the time of price movements on the day of announcement is not known, there is merit in considering also the closing price on the day before announcement.
- (b) Results are shown based on aggregate fees, Black-Scholes values and returns for all issues (equivalent to a weighted average of each issue where the weights are the total underwriting commitments per issue) and also based on the simple average of each issue, in all cases as a percentage of underwriting commitment. The simple average per issue is shown as this is the only basis on which results from Professor Marsh's 1980 study are available. Smaller issues tend to be made by smaller companies with higher historical volatility—hence Black-Scholes values on this basis are larger and returns smaller.

5.56. Results for the period up to 1995 suggest that Black-Scholes option values based on the closing price on the day before announcement were lower than those based on the closing day of announcement price. This is likely to reflect exceptional price movements immediately following the announcement. Our study for 1995 to 1997 showed higher Black-Scholes values using day-before-announcement prices than Professor Marsh's 1986 to 1993 study, probably reflecting lower discounts to the pre-announcement prices during 1995 to 1997. On the other hand our study showed similar Black-Scholes values to Marsh's 1986 to 1996 study (which largely covered the same issues as his 1986 to 1993 study) using day of announcement prices. Given that Black-Scholes values based on day-before-announcement prices were higher in 1995 to 1997, this appears to reflect more favourable average price movements on the day of announcement during 1995 to 1997 than occurred on average during the whole of 1986 to 1996.

TABLE 5.9 Sub-underwriting fees, estimated Black-Scholes values and returns based on historical (60-month) volatilities

	<i>Period covered</i>				
	<i>Marsh (1980) 1962–1975</i>	<i>Marsh (1994) Jan 1986–Dec 1993</i>	<i>Marsh (1997) Jan 1986–Oct 1996</i>	<i>Breedon and Twinn (1995) Jan 1986–Nov 1994</i>	<i>MMC Jan 1995–Dec 1997</i>
Number of issues	539	691	946	31	113
<i>Aggregates for all issues as percentage of underwriting commitment</i>					
Fees		1.43	1.43	1.25	1.41
Black-Scholes value:					
–Day before's price		0.20		0.11	0.41
–Day-of-announcement price			0.37	0.32	0.38
Estimated returns:					
–Day before's price		1.23		1.14	1.00
–Day-of-announcement price			1.06	0.93	1.03
<i>Simple average (arithmetic mean) per issue as percentage of underwriting commitment</i>					
Fees	1.40	1.45	1.46		1.38
Black-Scholes value:					
–Day before's price	0.73*	0.47			0.69
–Day-of-announcement price			0.73		0.62
Estimated returns:					
–Day before's price	0.67*	0.98			0.69
–Day-of-announcement price			0.73		0.76

Source: MMC (based on studies shown).

*Calculated using the TERP method and hence based on a different underlying assumption regarding volatility to the other studies which used the warrant pricing method.

Note: Black-Scholes values were calculated using the warrant pricing method (except where stated otherwise). Estimated returns = Fees less Black-Scholes value.

5.57. As noted above, the returns in Table 5.9 do not allow for operational costs or tax. Additionally, Professor Marsh pointed out that very large movements in share prices occur more frequently than assumed in the Black-Scholes model. As shown in Table 5.6, the October 1987 crash had a substantial effect on *ex-post* sub-underwriting profits and the *ex-ante* Black-Scholes values in Table 5.9 did not allow adequately for the possibility of crashes like that in October 1987. Professor Marsh said that the quantitative effect of this bias was difficult to assess as it depended on the frequency of crashes and the likelihood that exceptionally large amounts of sub-underwriting were outstanding at such times (as was the case in October 1987). Nevertheless Professor Marsh thought it was not large enough to offset the excess returns he had found.

5.58. Table 5.10 shows further results from our study of underwritten rights issues, distinguishing between issues at standard fees and those not at standard fees.

TABLE 5.10 Sub-underwriting fees, estimated Black-Scholes value and returns based on historical (60-month) volatilities: MMC estimates for 1995 to 1997

	<i>Issues before 31 October 1996</i>			<i>Issues after 31 October 1996</i>		
	<i>Standard fees</i>	<i>Non-standard fees</i>	<i>All issues*</i>	<i>Standard fees</i>	<i>Non-standard fees</i>	<i>All issues*</i>
Number of issues	65	4	73	12	27	40
<i>Aggregates for all issues as percentage of underwriting commitment</i>						
Fees	1.46	1.66	1.48	1.53	1.19	1.25
Black-Scholes:						
–Day before’s price	0.32	0.92	0.43	1.24	0.18	0.38
–Day of announcement price	0.30	0.49	0.36	1.07	0.28	0.43
Estimated returns:						
–Day before’s price	1.14	0.74	1.05	0.29	1.01	0.87
–Day of announcement price	1.16	1.17	1.12	0.46	0.91	0.82
Other information (weighted averages)						
Percentage volatility (weighted average)	31.2	27.2	31.5	51.6	29.5	33.6
% discount to TERP on day before announcement	12.7	12.7	12.1	12.1	12.2	12.2
% change in TERP on day of announcement	1.0	1.9	1.0	1.3	(1.7)	(1.1)
Total underwriting commitment (£m)	5,183	830	6,124	488	2,145	2,652

Source: MMC.

*Includes issues where there is no information regarding whether or not standard fees were paid. In calculating fees for these issues, it was assumed that standard fees were paid.

Note: Based on warrant pricing method.

Estimates of volatility during rights issues

5.59. Table 5.10 is based on the assumption that historical volatility can be a proxy for some measure of volatility during the underwriting period (as noted above, the TERP method assumes the historical volatility proxies for the volatility of returns on the ex-rights price). Breedon and Twinn looked at implied volatilities for the first LIFFE traded put option to expire after the end of the underwriting period.¹ As the options all expired after the ex-rights date and the exercise price of traded options is adjusted by LIFFE when the issue goes ex-rights, the implied volatilities seem to relate to the ex-rights rather than the cum-rights price.² Results are shown in Table 5.11 and suggest that

¹The implied volatility is the volatility from which the market price of the traded option would be derived using an appropriate option pricing model. Breedon and Twinn used the Cox, Ross and Rubinstein model which is appropriate to options, such as those traded on LIFFE, that can be exercised at any time (US-type options).

²The possibility of exercising during the cum-rights trading period would be likely to be very small and thus would have little impact on implied volatility.

implied volatilities, both before and after the issue announcement, are similar to historical volatilities, at least for the large companies on which options are traded on LIFFE. Breedon and Twinn used the implied volatility from Table 5.11 to estimate sub-underwriting returns: using the put option with exercise price nearest to the offer price, returns were 0.87 per cent, compared with 0.93 per cent using historical volatilities (see Table 5.9). Options are traded on LIFFE only in certain of the shares of the largest companies and thus the sample of issues was only 31 over the period 1986 to end-November 1994.

TABLE 5.11 Comparison of historical and implied volatility (weighted averages for 31 issues, 1986 to 1994)

	<i>per cent</i>		
	<i>Historical volatility</i>	<i>Implied at-the-money volatility</i>	<i>Implied volatility for put option with exercise price similar to offer price</i>
Day before announcement	31.25	32.29	31.81
Day of announcement	31.25	31.67	31.91

Source: Breedon and Twinn, Table C.

5.60. Table 5.12 shows our estimates of the actual average volatility of daily returns on completed rights issues during 1995 to 1997. The estimated raw volatility is based on the actual returns on the share (allowing for a dividend adjustment on ex-dividend dates) during the underwriting period. However, this reflects both cum-rights and ex-rights trading, and we therefore estimated an adjusted volatility based on the TERP during the cum-rights trading period and the ex-rights share price for the remainder of the underwriting period.¹

5.61. As shown in Table 5.12, the resulting estimated volatility is on average slightly less than the volatility estimated for the period of ex-rights trading only. Estimated volatility is greater if returns on the day of announcement are included: this reflects the exceptional price movements on that day. We have not attempted to compute the volatility of returns based on the cum-rights price or based on the cum-rights price less the underwriting value per share (relevant to the warrant pricing method): this will obviously be greater than the raw actual volatility shown in the table.

TABLE 5.12 Comparison of historical volatility and estimated actual volatility (107 issues, 1995 to 1997)

	<i>per cent</i>			
	<i>Historical volatility</i>	<i>Raw actual volatility</i>	<i>Adjusted actual volatility</i>	<i>Actual volatility during ex-rights trading</i>
<i>Weighted average for period starting with closing prices on:</i>				
Day before announcement	32.5	29.4	23.7	
Day of announcement	32.5	25.7	20.9	22.5
<i>Unweighted average for period starting with closing prices on:</i>				
Day before announcement	37.1	30.2	24.9	
Day of announcement	37.1	25.4	21.0	22.0

Source: MMC based on FT data.

Note: Our data source included share prices for all Mondays to Fridays including public holidays. This leads to some downward bias in estimated actual volatility for underwriting periods including public holidays.

¹Use of the conventional TERP assumes that the rights price is equal to the notional ex-rights share price less the offer price. The Black-Scholes value of the rights tends to be greater than this and the difference moves in the opposite direction to the share price. Consequently our estimated actual volatility is likely to be subject to downward bias. We carried out some simulations to investigate this: the simulations suggested that the bias was small over the relevant volatility range.

5.62. Figure 5.3 shows the relationship between adjusted actual volatility during the underwriting period (starting on the day of announcement) and historical volatility. Two main points emerge from Table 5.12 and Figure 5.3:

- (a) Actual volatility during the underwriting period tends to be lower than historical volatility: this is true for over 80 per cent of the issues shown in Figure 5.3. The weighted average adjusted actual volatility is about two-thirds of historical volatility. Reasons why volatility might be lower include: the proceeds of the issue are used to reduce gearing or overall gearing falls due to the gearing of the acquisition being lower than the gearing of the existing company; the proceeds are used to fund future acquisitions at yet-to-be decided prices; returns on the acquired assets are either less volatile than or not perfectly correlated with returns on the existing assets (or both); there is less chance of price-influencing events occurring during a rights issue as management tries to announce everything beforehand; and liquidity is higher during the period of the rights issue, greater liquidity being associated with lower volatility.
- (b) There is little correlation between actual volatility and historical volatility. The regression line in Figure 5.3 has an R^2 of 0.027, equivalent to a correlation coefficient of 0.16. The 95 per cent confidence limit for the correlation coefficient is -0.03 to 0.34 , indicating that our data do not enable us to reject the hypothesis of no correlation (represented by a correlation coefficient of 0). The correlation appears to have fallen over time as Professor Marsh told us that he had estimated a correlation coefficient of 0.56 from data for issues during the whole period 1986 to 1996.

5.63. Table 5.13 shows revised Black-Scholes estimates based on our estimated actual volatilities.

TABLE 5.13 Estimated Black-Scholes values and returns based on actual volatility during underwriting period

	Issues before 31.10.96	Issues after 31.10.96	All issues
Number of issues	70	37	107
<i>Aggregates for all issues as percentage of underwriting commitment</i>			
Fees	1.47	1.24	1.40
Black-Scholes value:			
–Day before's price	0.34	0.33	0.33
–Day of announcement price	0.14 [0.21]*	0.31 [0.43]	0.19 [0.28]
Estimated returns			
–Day before's price	1.13	0.91	1.07
–Day of announcement price	1.33 [1.26]	0.93 [0.81]	1.21 [1.12]
<i>Other information (weighted averages)</i>			
Percentage volatility for period starting:			
–Day before announcement	22.5	26.4	23.7
–Day of announcement	19.8 [21.2]	23.5 [25.4]	20.9 [22.5]
% discount to TERP on day before announcement	11.9	12.0	11.9
% change in TERP on day of announcement	1.2	(1.2)	0.5
Total underwriting commitment £m	5,680	2,483	8,163

Source: MMC.

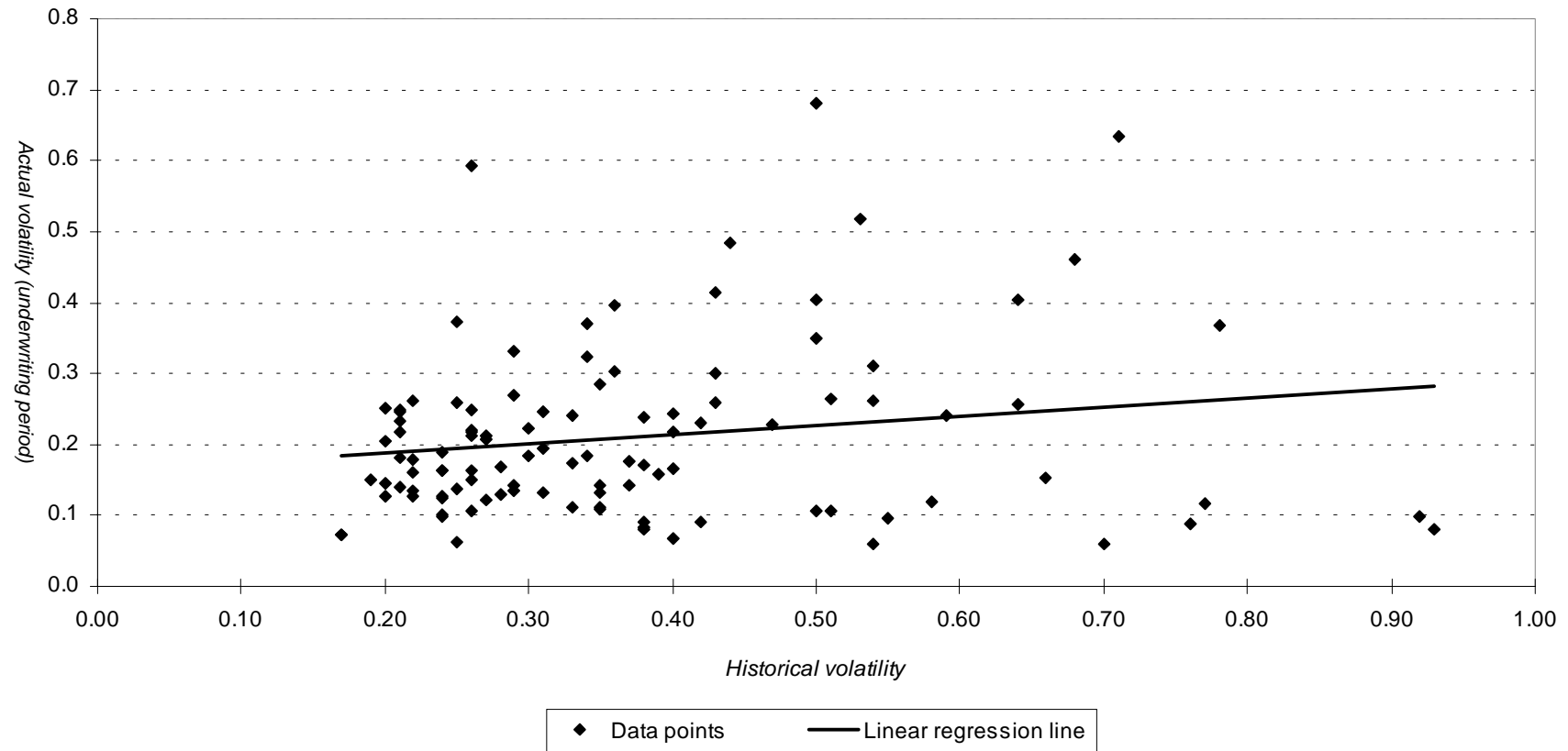
*Figures in square brackets are estimated using the volatility for the ex-rights trading period only which was higher (see Table 5.12).

Note: Black-Scholes values were calculated using the TERP method based on volatilities shown in Figure 5.5. Black-Scholes values calculated using the warrant pricing method would be similar: the effect of the different method would be offset by the adjustments required to the volatilities.

5.64. The Black-Scholes values in Table 5.13 would be applicable to underwriters who had perfect foresight of the volatility during the underwriting period. An alternative approach would be to assume that volatility was uncertain but that underwriters knew the probability distribution of the volatility. We have not attempted to implement such an approach which would involve calculating Black-Scholes values over the whole assumed probability distribution for each issue. The assumed probability

FIGURE 5.3

Actual volatility versus historical volatility



Source: MMC.

distribution of volatilities would have to be based on evidence of actual volatilities. The results might not be dissimilar to those shown in Table 5.13, since issues where *ex-post* volatility was below the expected value from the probability distribution might be offset by issues where the *ex-post* volatility was above the expected value from the probability distribution. Taking this view, however, it would be necessary to take into account uncertainties regarding the actual probability distribution of volatilities for each issue and the impact of such uncertainty on the overall results for all issues. In particular it should be noted that the sample size of issues after 31 October 1986 (37) is not large.

Criticisms of the use of Black-Scholes to value sub-underwriting

5.65. The bulk of both investment banks and fund managers who gave evidence suggested that it was inappropriate to use the Black-Scholes option valuation model to calculate the excess profits of sub-underwriters (see paragraphs 6.4, 6.26 and 6.27, 6.68, 6.120, 6.165, 6.194, 6.214, 6.238, 6.343, 6.375, 6.381 and 6.479 to 6.482). A number of specific criticisms of the claim that sub-underwriters earn excess returns, and the reasoning underlying it, have been put to the MMC in particular by the ABI, and by LIBA in relation to point (b):

- (a) It was wrong to calculate the value for the sub-underwriting period (typically three to six weeks) using a historical volatility from the previous 60 months. A number of different points were made including that, in pricing options, the market paid more attention to short-run volatilities which were often higher; that the issue period was unusual; and that the issue might well represent a company-transforming event, rendering suspect the use of historical volatilities. In addition it was pointed out that implied volatilities for out-of-the-money traded options (similar to sub-underwriting) tended to be higher than for nearer-to-the-money options and that any writer of a put option seeking to hedge by selling shares short would incur particular costs, including stock-borrowing fees.
- (b) The derivation of the model assumed that those holding options could hedge their exposure costlessly but in practice it would be costly for sub-underwriters to hedge. A further point made was that the required hedging transactions would affect the share price itself; if all the sub-underwriters hedged their exposure the required transactions would be very large and, it was suggested, would tend to force the share price down towards the issue price of the new shares. Substantial transactions could also be required to maintain any hedge and it was argued also that these could increase volatility during the sub-underwriting period. It was also pointed out that complete hedging was impossible, for instance because markets were closed overnight, and that options traders required a margin to compensate for the resulting risk. The critics accepted that sub-underwriters did not actually hedge their exposure: the argument was that the model required hedging, that this was not possible in practice and hence that the mechanism did not exist to crystallize the *ex-ante* returns suggested by the model.
- (c) More generally it was argued that sub-underwriters incurred costs that were not included in the excess returns calculations. It was argued that the calculations did not allow for the administrative and managerial costs of sub-underwriting (see paragraphs 5.32 to 5.34) or for a return on any capital at risk.

5.66. Breedon and Twinn suggested in their study that the bid-ask spread on traded options might be used as a proxy for the costs incurred by sub-underwriters (see paragraph 5.65 (b) and (c) above). They measured closing spreads during October 1994 for the nearest to expiry put option with an exercise price as close as possible to the discount in the rights issue: the imputed average for the companies in their sample was 1.57p. Allowing for this reduced the returns from 0.87¹ to 0.49 per cent of the amount underwritten. Their paper includes a discussion of some problems with their approach, including: the large size of the total sub-underwriting transaction compared with trades on options exchanges; the fact that trades are often within quoted spreads; and the better information available to sub-underwriters than market makers about the reasons for the deal. The MMC received different views about Breedon and Twinn's adjustments: those advancing the views set out in paragraph 5.65 (b) above argued that Breedon and Twinn had taken inadequate account of the large

¹Using implied volatilities (see paragraph 5.59).

size of sub-underwriters' commitments compared with option trades and thus had understated the necessary adjustment; the opposite view was also put to us (see paragraph 5.67(d)). LIBA suggested that the MMC should assess the cost of sub-underwriting by seeking quotes from over-the-counter (OTC) option writers for offer prices for options with the same strike price and underlying size as a range of typical rights issues (see LIBA note 4 in Appendix 6.2). We did not do this as it would be difficult to know how much weight to place on such simulated offer prices and it would not help resolve the issue since those advocating the use of Black-Scholes option values to assess the cost of underwriting argued that hedging costs were not relevant (see paragraph 5.67(b) below). Moreover, lead underwriters have had the opportunity to hedge their risk in the OTC options market rather than by sub-underwriting; the fact that they have not taken advantage of this opportunity suggests that the cost of the OTC option has been above the average sub-underwriting fee paid and the proposed study would add little to this evidence which is already available.

5.67. In defence of the use of Black-Scholes option values, the following counter-arguments were put to the MMC:

- (a) Professor Marsh said that his data showed on average that volatility was lower during the sub-underwriting period than he had assumed on the basis of historical volatility over the previous 60 months (36.0 per cent compared with 41.7 per cent). Paragraphs 5.59 to 5.62 discuss volatility during rights issues in the period 1995 to 1997. Professor Marsh told us that he had recalculated the Black-Scholes option values using the actual daily volatility during the sub-underwriting period (rather than the historical volatility): for 1986 to 1996, he had found a higher Black-Scholes value for all issues but the effect was only to reduce excess returns from 1.06 to 0.99 per cent. Table 5.13 provides MMC estimates of Black-Scholes values for 1995 to 1997 rights issues based on actual volatility. Professor Marsh also said that there was some evidence to suggest that volatility figures based on a long run of data (for example, 60 months) produced more accurate estimates for short-run as well as long-run forecasts. The evidence was mixed as to whether historical volatilities or implied volatilities on traded options produced better forecasts but implied volatilities were unavailable for most companies involved in rights issues and thus historical volatilities had to be used. Moreover, Breedon and Twinn's study suggested that using implied volatilities made only a small difference to the estimated excess returns.
- (b) Professor Marsh pointed out that the Black-Scholes model did not depend on the notion that traders can actually hedge. The model could be regarded purely as a valuation model in which the value of an option was assessed by summing the probability of each outcome at option expiry multiplied by that outcome, discounted to the present at a rate that depends on the share price as well as time. In this context, Black and Scholes (1973) had shown how the beta of the stock price could be derived from the beta of the option and thus that the Black-Scholes formula could be derived from the capital asset pricing model.¹ Professor Marsh further suggested that the role of the Black-Scholes formula as a valuation model was similar to that of discounted cash flow: there was no notion of an arbitrage or hedging mechanism underlying discounted cash flow and there did not need to be one underlying the use of Black-Scholes. In practice, Black-Scholes was used frequently where hedging was not possible.
- (c) It was argued that administrative and managerial costs were very small in relation to the estimated excess returns—a decision had to be taken very quickly, while capital requirements were negligible as payment for any shares that had to be taken up could be made out of the normal cash balances that funds would have available or be selling other assets. Professor Marsh said that even if sub-underwriters were required to hold cash, they could invest it at the going rate: sub-underwriting for a fee equal to the Black-Scholes option value would compensate them for the risk and consequently was a zero net present value transaction.
- (d) Professor Marsh argued that since it was not necessary to invoke actual hedging in order to use Black-Scholes, and since, in practice, sub-underwriters did not hedge, the debate about what it would cost to hedge was irrelevant. However, in relation to the use of quoted bid-ask spreads by Breedon and Twinn, Professor Marsh also said that spreads on out-of-the-money put

¹In the capital asset pricing model, a security's beta reflects its market risk.

options were very wide in relation to the price of the option, possibly because of infrequent trading in these options, and that actual trading would be well within the quoted spread. More generally he argued that it was inappropriate to apply the spreads from traded options to sub-underwriting since sub-underwriters did not face the same sort of information asymmetry as a market maker in traded options.

5.68. The ABI also made the following other points:

- (a) Under the capital asset pricing model, it was assumed that company-specific risk was costless since it could be diversified away while under the Black-Scholes option pricing model it was assumed that it could be hedged away. In the context of sub-underwriting, neither of these assumptions held. Institutional investors required compensation for exposure to the resultant company-specific risk as they were naturally averse to significant over-weightings in shares of companies, the more so in what would be the aftermath of a failed rights issue.
- (b) The share price volatility of companies undertaking rights issues was quite likely to be highest at times when their share prices were subject to downward pressure, whether for company-specific reasons or as a result of general market weakness. Since it was the outlook for the company's shares in a falling market that was of much greater concern to the underwriter of a new share issue, the relevant *ex-ante* volatility may be greater than the average apparent volatility recorded from a large sample of individual share price records during rights issue periods, calculated on an *ex-post* basis.
- (c) The tendency Professor Marsh had found for returns to be positively correlated with issue size and issuing company market capitalization may in part be a reflection of the greater risk involved in larger rights issues by major companies that absorbed a high proportion of available market liquidity. There was moreover likely to be some causal connection between market stress and the volume of new issues in progress: it was unlikely to be a coincidence that a disproportionately large volume of new issues straddled the October 1987 crash period.
- (d) It took the market a few days to absorb the information in a rights issue announcement and hence it was not necessarily appropriate to use the share price on the day of announcement to compute the option value.

Fund managers' decisions about sub-underwriting

5.69. In our questionnaire, we asked fund managers about how they decided whether to sub-underwrite an individual equity offering and the amount of sub-underwriting to take. The point that emerged most clearly was that the majority of fund managers treated the decision on whether or not to sub-underwrite in a similar way to a decision whether or not to invest in the shares at the issue price. Around 60 per cent of fund managers, accounting for 56 per cent of funds managed, said this while no fund managers said explicitly that they used the Black-Scholes model to help decide whether or not to sub-underwrite.¹ One fund manager did say that, although it did not look formally at Black-Scholes, it did consider the risk/reward equation in the manner of a put option sale and combined this with a qualitative judgment on the company and any deal it was funding. Two other fund managers mentioned the near term volatility of the shares as an important factor. Other comments by fund managers included the following:

- (a) 'The level of the underwriting fee is largely irrelevant to the decision as to whether we should participate.'
- (b) 'We do not sub-underwrite as a risk reward exercise but more as fulfilling our role as a major institutional investor.'

5.70. Table 5.14 shows responses by fund managers to a question asking them about the factors that affected the decision to sub-underwrite an equity offering. It should be noted that the interpretation of fund managers' answers is to some extent subjective.

¹In a few cases it was unclear whether or not Black-Scholes was used.

TABLE 5.14 Fund managers indicating that specified factors were important

<i>Factor</i>	<i>% of fund managers</i>	<i>% of funds managed</i>
Scrutiny of prospectus and other documents	76	77
In-house knowledge of the issuing company	87	93
Existing holdings of issuing company's shares	64	66
Use of Black-Scholes or other models for risk assessment	0	0
Identity of sponsor/lead underwriter	28	34
Identity of broker	33	40
Impact of taxation	7	13

Source: MMC survey of fund managers.

5.71. We also asked fund managers about the relative importance of market risk and company-specific risk for sub-underwriting. The responses are summarized in Table 5.15.

TABLE 5.15 Fund managers' responses to question about market risk and company-specific risk

<i>Response</i>	<i>% of fund managers</i>	<i>% of funds managed</i>
Market risk only	4	1
Market risk more important	7	12
Both of equal importance	15	13
Company-specific risk more important	19	15
Company-specific risk only	4	7
No clear response	50	50

Source: MMC survey of fund managers.