

June 1999

**The Short-Run Price Performance of Investment Trust IPOs on
the UK Main Market**

Arif Khurshed

ISMA Centre, University of Reading

Ram Mudambi

Case Western Reserve University and University of Reading

The short run underpricing of initial public offerings (IPOs) is one of the best documented anomalies in finance. The Rock model explains this anomaly in terms of horizontal information asymmetry amongst investors. In this paper we use a comprehensive IPO data from the UK main market for the period 1989-96 to test the Rock model against several other alternatives. We propose that horizontal information asymmetry should be smaller for investment trust IPOs as compared to conventional issuing companies. The Rock model then predicts that investment trust IPOs should display less underpricing than conventional issuing companies. Our findings support the Rock model and are consistent with previous studies of investment trust IPOs.

Address for correspondence: Arif Khurshed
ISMA Centre
University of Reading
Reading **RG6 6BA**
United Kingdom

Phone: 0118 9316655
Fax: 0118 9314741
email: A.Khurshed@ismacentre.rdg.ac.uk

1. Introduction

One of the most researched anomalies in finance is that the initial public offerings (IPOs) provide significant abnormal returns in the initial days of trading. This anomaly has been well documented in almost all the financial markets of the world (for a review on international evidence see Jenkinson and Ljungqvist (1996)). While a number of theories have been put forward to explain this anomaly, the academics are unanimous in their conclusions that the presence of abnormal returns shows evidence of deliberate underpricing.

Most previous studies on IPOs have reported differences in under-pricing by looking at the different characteristics of the offerings. For example, they report differences in underpricing by offering type, by country, by underwriter reputation, by industry type, in hot and cold markets, to name a few. The literature dealing with under-pricing is rich with theories that have been put forward to explain this anomaly. In this paper we seek to test the information asymmetry theory of underpricing proposed by Rock (1986). We do this by drawing implications from the theory regarding performance differences between investment trust IPOs and those of conventional operating companies. In addition, we are able to accomplish two other objectives. First, we provide additional evidence supporting the general robustness of the prior finding with regard to the short run underpricing of IPOs. Second, we are able to examine the various hypotheses of short run IPO underpricing, such as those proposed by Tinic (1988) and Baron (1982), in the context of investment trust IPOs.

The remainder of the paper has been structured in the following way. Section 2 presents a brief survey of the literature, highlighting the various theories advanced to explain the phenomenon of short run IPO underpricing. The nature and characteristics of investment trusts are discussed in Section 3. The methodology adopted is described in Section 4, along with the data used in the study. The empirical results are presented and discussed in Section 5, while some concluding comments appear in Section 6.

2. Theories of Short Run IPO Underpricing

Companies can be floated in a variety of ways. The choice tends to be influenced by the size of the company, its riskiness and the institutional and regulatory arrangements in each particular country. The most widely observed methods in the UK are: an offer for subscription, a placing, a public issue by tender and a stock exchange introduction. There are other methods, but these are generally hybrids and are rarely used in the UK. Further details are available in Jenkinson and Ljungqvist (1996) and Khurshed and Mudambi (1998).

Empirical Evidence: Short run underpricing refers to the widespread observation that regardless of the method of coming to market, IPOs tend to yield substantial returns in the days (and sometimes weeks) immediately following issue. Ritter (1987), Welch (1989), Ibbotson *et al.* (1994) and Rajan and Servaes (1997) among others provide evidence suggesting that the existence of average initial returns of up to 16% has been a regular feature of the US new issue market. Lee *et al.* (1994), Jacquillat (1986), Kaneko and Pettway (1994) and Ljungqvist (1997) among others provide evidence of abnormal returns of up to 14% in the developed markets of the world such as Australia, France, Japan and Germany. For British IPOs, the studies of Dimson (1979), Buckland *et al.* (1981), the Bank of England (1990), Jenkinson and Mayer (1988) and Levis (1993) indicate average first day returns ranging from 8.6% to 17%.

Several studies have examined returns on investment trust IPOs (closed-end funds). Weiss (1989), using a sample of 64 US IPOs of closed-end funds during 1985-1987 found that the initial-day returns were not significantly different from zero. Peavy (1990), using a subset of Weiss's sample arrived at a similar finding. Wang *et al.* (1992), using a sample of 87 IPOs of real estate investment trusts (REITs) in the US found a statistically significant average return of -2.82% on the first trading day. On the UK market Levis and Thomas (1995) found a statistically significant average first day return of 1.91% for the population of 105 investment trust IPOs during the years 1984-1992. This was the first study that found evidence of significant first day returns for a sample of closed-end funds.

A summary of the findings of recent empirical IPO studies is provided in Table 1. While this summary is quite comprehensive, we focus in particular on the UK and the US and on investment trust IPOs.

Theories: In attempting to explain the puzzle of underpricing, academic researchers have come up with many different explanations. These explanations are based on the economic realities of the IPO marketplace. We will briefly review some of these theories below.

Traditionally, IPO underpricing was explained on the basis of risk aversion on the part of underwriters. Underpricing new issues greatly reduces the chances that the underwriter (usually, an investment bank) will end up with an under-subscribed issue with the associated losses. Later researchers focused on market structure and suggested that gross underpricing may be a result of the monopsony power of investment bankers in underwriting the common stocks of small speculative firms (for example, Ritter (1984), Chalk and Peavy (1987)).

Investment bankers possess a substantial information advantage over IPO issuers (typically small firms) and can use this to lower their own risk of loss. Baron (1982) suggests that underpricing results from such *vertical* information asymmetry and serves to compensate the underwriter for the use of his superior information. A corollary of these arguments is that investment banks can use under-priced IPOs as a competitive instrument. That is, under-priced issues would only be allocated to favoured customers who regularly do business with the investment bank.

Tinic (1988) suggests that IPO underpricing serves as a form of insurance. He demonstrates that gross underpricing serves as an efficient form of protection against legal liabilities and the associated damages to the reputations of both the investment bankers and the issuers. In other words, this hypothesis posits an implicit contract between issuers, underwriters and investors. Under this implicit contract, the investors are provided with excess returns as an ‘insurance premium’

in return for which they are willing to overlook small errors (e.g., related to the disclosure requirements of the securities regulations) without taking recourse to the courts.

The Rock Model: One of the most convincing models is due to Rock (1986), who applies the concept of the winner's curse to the new issues market. It is based on a *horizontal* asymmetry of information, specified to exist between different groups of investors. He specifies that there are two groups of potential investors in the market, called 'informed' and 'uninformed'. In this model, the true value of the IPO share, 'v', is unknown. The issuer pre-selects an offer price 'p' and an offer quantity, 'Z'. There are two states of the world, i.e., $p < v$ (underpricing) and $p > v$ (overpricing).

The model is based on the four key assumptions:

- (1) The informed investors have perfect information about the realised value of the new issue.
- (2) Informed investors cannot borrow securities or short-sell, since to sell shares short, informed investors must physically borrow them, which is impossible before the issue date, since the issuing firm cannot legally pre-issue the share. Thus, they cannot sell their private information.
- (3) The total value of Informed demand, I, is no greater than the mean value of the shares offered, vZ .
- (4) Uninformed investors have homogeneous expectations about the distribution of v.

Informed investors are those who are prepared to incur evaluation costs to access the after market performance of the offering. Such investors would only apply for the IPOs they expect to be traded at a premium over the offer price. It follows that informed demand is I if $p < v$ and 0 if $p > v$.

Uninformed investors, with wealth N, do not commit resources to acquire information. They indiscriminately commit a fraction T^* of their wealth to every

new issue coming on the market. Depending on their expectations, the uninformed investors may consistently commit a positive fraction of their wealth ($T^*=T>0$) or withdraw from the market ($T^*=0$).

Overall market demand for the issued share is therefore $NT^* + I$ if $p < v$ and NT^* if $p > v$. Since demand depends on the state of the world ($p < v$ or $p > v$), the issuer must face excess demand or excess supply in one of these states. The probability that an order is filled in the state $p < v$ is denoted by 'b' and the probability that an order is filled in the state $p > v$ by 'B'. The relationship between these probabilities and the underlying values in the model depends on the rationing rule adopted in the case of undersubscribed offers.

If the share of uninformed orders filled is denoted by N_u and the share of informed order filled by N_i , then in the state $p < v$, $N_u T^* + N_i = pZ$, with $b < 1$. If the underwriter is unbiased, in the sense that informed and uninformed investors have the same probability of getting their orders filled, then, $bNT^* + bI = pZ$, and

$$b = \min [pZ / (NT^* + I), 1]$$

In the UK, the underwriter *must* allocate shares in such an unbiased fashion. In the US, underwriters have more latitude so they can choose to favour either the informed or the uninformed investors.

Similarly, in the state $p > v$, informed investors withdraw from the market and

$$B = \min [pZ / NT^*, 1]$$

Thus, $b \leq B$ and while all investors typically receive only a fraction of their ordered number of shares in under-priced issues, if any at all, a poor market response to an IPO effectively guarantees allocation of the full amount of the application. Such issues, however, are likely to start trading below the offer price.

Consequently, uninformed investors face a winner's curse – they end up holding a disproportionately large amount of overpriced IPOs.

If IPOs are priced at the underlying economic value, then uninformed investors make systematic losses, revise their valuation of the new shares downward and eventually leave the market ($T^*=0$), resulting in a shortage of liquidity. With systematic underpricing, the informed investors earn a return on their information, while uninformed investors earn a normal expected rate of return on the securities allocated to them. That is, their losses from the overpriced allocations are compensated by the abnormal returns on the under-priced issues that are allocated to them.

The Rock model does not address the question of why investment banks might want to tempt uninformed investors to remain in the market. Beatty and Ritter (1986) show that this can be understood by examining the incentives of the investment banks. Investment banks are repeat players in the IPO market. Further, the investment banking industry is oligopolistic and each knows that it can significantly affect the IPO market through its actions. If IPOs are not underpriced, uninformed investors make systematic losses and eventually leave the IPO market. In this situation, only informed investors remain in the market.

As pointed out by Jenkinson and Ljungqvist (1996), this is a variation of Akerlof's (1970) lemons problem. Informed investors are likely to constitute a minority of all investors (perhaps representing as little as a quarter or less of the capital that is currently invested in IPOs). As noted above, Rock himself assumes that informed demand is insufficient to take up all shares on offer, even in lucrative flotations. As such investors will not apply for IPOs that are not expected to trade at a premium, the IPO market shrinks drastically. This has immediate adverse consequences for investment bank profits. Thus, IPO underpricing in the Rock model can be explained as a profit maximising policy adopted by investment banks.

Underpricing persists if underwriters can discriminate between informed and uninformed investors in their allocation of shares, but its nature is affected. If the underwriting investment bank favours established clients who are better informed, then the level of underpricing must increase to keep uninformed investors in the market. Similarly, if the underwriter discriminates against informed investors who buy and immediately trade to realise profits (stags) then the required level of underpricing will be lower.

IPO underpricing can be considered valuable from a normative viewpoint as well. The liquidity of IPO markets is a means of creating value in the economy as a whole. This is because the majority of firms are entrepreneurial in the sense of Casson (1990). Thus, the investment bank's profit maximising behaviour creates even greater value for the economy in the spirit of Adam Smith's invisible hand.

The Rock model, supported by the work of Beatty and Ritter regarding investment bank profit maximising behaviour, points to the central importance of information in IPO underpricing. Comparing investment trust IPOs with conventional non-derivative IPOs gives us a means of carrying out a further test of the model. We discuss our hypothesis tests in Section 3 below.

3. The Structure and Characteristics of Investment Trusts

There are several types of investment trusts and we will not be concerned with all of them. At the most general level, an investment trust can be a company set up for the purpose of agglomerating small blocks of capital and seeking the maximum possible rate of return on this agglomerated block. It can also be a trust in the legal sense of the term, i.e., a corporate entity set up to disburse funds to particular individuals or endeavours. We are concerned with the investment trust of the former type. Further, such investment trusts can be quoted or unquoted (on the stock exchange). We focus on officially quoted trusts.

Investment trusts provide the opportunity of following a focused investment strategy, while retaining the advantages of diversification and the possibility of

capital growth without a large capital requirement. They are therefore attractive to small investors. However, economies of scale in research and portfolio management mean that even large institutions such as insurance companies and pension funds are also attracted to investment trusts.

At this point, it is important to distinguish between investment trusts and unit trusts. Investment trusts are closed-end funds whereas unit trusts are open-ended funds. An open-ended fund is an investment company in which units may be purchased from or sold to the fund manager. The fund is open in the sense that its size depends upon its success in selling units. In a closed-end fund like an investment trust, the supply of shares is *fixed* at issue and the price is a function of the supply of and the demand for the shares.

As a public company, an investment trust cannot promote the sale of its own shares. The shares of an investment trust are traded on the Stock Exchange, whose responsibility it is to provide a market (this is in contrast to a unit trust, whose shares are marketed directly by its own managers). The share capital of an investment trust can only be increased with a new issue of shares by the company and reduced by a reduction of its capital authorised by the court or by a purchase of its own shares. While the value of the underlying assets of the investment trust has an effect on its share price, in practice this relationship tends to be a weak one and share prices usually stand below net asset value. According to sources in the Association of Investment Trust Companies (UK), the UK investment trust industry is one of the largest in the world.

The trust deed may provide for the holdings of the investment trust to be sold at a certain date and the proceeds distributed to the shareholders. Such an investment trust is said to have a *limited life*. In some investment trusts with a limited life there are two types of shares: income shares and capital shares. Holders of income shares receive all or most of the income from the assets of the trust, while holders of the capital shares receive all or most of the capital value of the assets of the trust on liquidation. Such trusts are known as split-level trusts and allow

shareholders to choose to receive their returns in the form of income or capital gains.

The objectives as well as the composition of investment trusts vary considerably (in this respect they are similar to unit trusts). Some investment trusts dedicate themselves to a search for capital growth, while others are income conscious. Some look for 'total returns', or a mixture of the two. They are typically grouped into sectors, which are made up of trusts with roughly similar objectives and compositions. The sector-wise distribution of UK investment trust IPOs for the years 1990 through 1996 is provided in Table 2.

The basic structure of an investment trust consists typically of loan capital, preference capital and equity capital. Some investment trusts may issue convertible loan stocks while others may issue options or warrants. Some have a geographical specialisation by investing to a great extent in one particular area. Thus, some trusts concentrate on America, Europe, Japan or Australia, while others invest in emerging markets such as China and India. Last but not least, some investment trusts may specialise in particular industry groups. While major investment in a particular industry is rare, there are nevertheless degrees of emphasis placed on the broader categories.

Testing the Hypotheses: The characteristics of investment trusts enable us to use them as a means of setting up a hypothesis test of the Rock model of IPO short run underpricing. In particular, the following characteristics of investment trust IPOs are relevant. First, unlike conventional (non-derivative) issuing firms, investment trusts have no business history before the offering. There may be some reputation effects if a large house is launching the trust, but these are common knowledge. Second, investment trusts have a fixed stock of capital out of which they must pay for all the costs involved with the issue. According to Association of Investment Trust Companies researchers, along with other expenses associated with listing, up to 3 percent of capital raised is deducted to pay advisors. This too is common knowledge. Further, the bulk of their assets are made up of securities, which are

frequently traded and whose price is publicly quoted. All this implies that the scope for creating an information advantage is smaller in the case of investment trusts than in the case of conventional issuing firms. As the *horizontal* information asymmetry amongst investors disappears, $b = B$, i.e., the probability of obtaining an allocation of an underpriced issue ($p < v$) becomes the same as the probability of obtaining an allocation of an overpriced one ($p > v$). Thus, the Rock model predicts that investment trust IPOs should be characterised by much less underpricing than those of conventional issuing firms.

However, there is no reason for investment banks to have a systematically different pattern of risk aversion regarding investment trusts. There is also no reason to suppose that there is a different probability of legal liability and associated damage in the IPOs of such trusts. Thus, both the traditional risk aversion hypothesis and Tinic's (1988) insurance hypothesis predict no systematic difference between IPO underpricing of conventional issuing firms and investment trusts.

The monopsony hypothesis is based on a vertical inequity of market power and Baron's hypothesis is based on a vertical asymmetry of information. Thus, both these hypotheses predict that underpricing should be greater when underwriting investment banks are involved in the issue, i.e., they both predict that underpricing should be greater in the case of placings than in the case of offers for subscription.

4. Methodology and Data

Methodology: To facilitate direct comparison with existing empirical evidence, the measures of performance for each IPO and for groups of IPOs were calculated using the methodology used by Aggarwal, Leal and Hernandez (1993). For simplicity, we describe the methodology below.

The total return for stock 'i' at the end of the first trading day is calculated as:

$$R_{i1} = (P_{i1} / P_{i0}) - 1$$

where P_{i1} is the price stock 'i' at the close of the first trading day, P_{i0} is the offer price and R_{i1} is the total first-day return on the stock.

The return on the market index during the same time period is:

$$R_{m1} = (P_{m1} / P_{m0}) - 1$$

where P_{m1} is the market index value at the close of first trading and P_{m0} is the market index value on the offer day of the appropriate stock, while R_{m1} is the first day's comparable market return.

Using these two returns, the market adjusted abnormal return for each IPO on the first day of trading is computed as:

$$MAAR_{i1} = 100 \times \{[(1 + R_{i1}) / (1 + R_{m1})] - 1\} \quad (1)$$

The value of $MAAR_{it}$, i.e., the market adjusted abnormal return for IPO 'i' on the t^{th} day of trading can be computed in an analogous manner.

This measure of the abnormal returns does not take into account the systematic risk associated with each issue. When $MAAR_{i1}$ is interpreted as an abnormal return, the assumption is that the systematic risk of the IPOs under consideration is the same as that of the index, i.e., the betas of the IPOs average to unity. A number of studies, both in the US (Ibbotson 1975, Affleck *et. al* 1991) and the UK (Sudarsanam (1992)), have demonstrated that the average beta of newly listed firms is higher than one. Thus, the abnormal return $MAAR_{i1}$ calculated in (1) provides a somewhat upward-biased estimate of the initial performance of the IPO relative to the market. However, the assumption that the beta coefficients average to one is unlikely to affect the essence of our results.

UK studies often use the Financial Times Actuaries All Share Index (FTA) to compute abnormal returns. This is a capitalisation-weighted index, analogous to the S&P 500 Index and embraces about 90% of the UK stock market by value.

Dimson and Marsh (1986) demonstrated that the use of FTA may lead to misleading assessments of abnormal performance when the composition of the sample of companies under investigation differs from the FTA in terms of company size. They argue that this result derives from the significant difference in the performance of small and large firms. A sample of IPOs is almost certain to include a markedly higher proportion of smaller companies than the FTA Index.

The performance of smaller companies in the UK, for both the main market and the Alternative Investment Market (AIM) where listing requirements are less stringent, is usually measured using the Extended Hoare Govett Smaller Companies (HGSC) Index. Like the FTA, this is a value-weighted index, but it was phased out in 1996. Since our sample only contains companies listed on the main market, we have used the HGSC Index and not the Extended HGSC Index. The HGSC Index measures the performance of companies in the lowest decile by market capitalisation on the main UK equity market. The index is re-balanced annually. By the end of 1996, the HGSC Index had around 1550 constituent companies. At the start of 1996, all HGSC constituents had a market capitalisation of £291 million or less. The average capitalisation of the HGSC Index constituents was £59 million. In terms of sector constitution, the Hoare Govett indices are most overweight in investment trusts and general industrials and are most underweight in utilities, mineral extraction and consumer goods.

Another index, the FT Small Capitalisation Index (FT Small Cap) was also used as a benchmark. This index consists of those companies too small to be constituents of the FT Actuaries 350 Index, but which are constituents of the FTA. The FT Small Cap is made up of between 500 and 600 companies and is calculated at the end of each business day. In 1994, 71.9% of these companies had a capitalisation of less than £40 million. The companies make up about 10% of the market capitalisation of the main market.

Performance measurement for a group of IPOs is assessed by the wealth relative, defined as:

$$WR_1 = [1 + 1/N \sum_{i=1}^N R_{i1}] / [1 + 1/N \sum_{i=1}^N R_{m1}] \quad (2)$$

where WR_1 is the Wealth Relative for the first day's trading and N is the total number of IPOs in the sample. A wealth relative above one implies that the IPOs outperform the market in that period. A wealth relative below one indicates underperformance.

The sample mean abnormal return for the first trading day, \underline{MAAR}_{i1} , may be viewed as a performance index which reflects the return, in excess of the market return, on a sterling of investment divided equally among N new issues in a sample:

$$\underline{MAAR}_{i1} = 1/N \sum_{i=1}^N MAAR_{i1} \quad (3)$$

To test the hypothesis that \underline{MAAR}_{i1} equals zero, we compute the associated t statistic:

$$t = [\underline{MAAR}_{i1}] / [S_t / \sqrt{N}] \quad (4)$$

where S_t is the standard deviation of \underline{MAAR}_{i1} . If underpricing of new issues exists, one would expect a positive value of the \underline{MAAR}_{i1} .

Note that WR_t and \underline{MAAR}_{it} , respectively the wealth relative and sample mean abnormal return for the t^{th} day's trading are computed in an analogous manner. These measures have been used by Ritter (1991), Levis (1993) and Ljungqvist (1997).

Data: The sample used in this study comprises of 575 IPOs (offers and placements) listed in the UK Main Market from January 1989 through December 1996. The primary sources of data are the KPMG *New Issue Statistics*, the *Extel*

Book of Take-overs, New issues and Offers and annual issues of the *Association of Investment Trust Companies Yearbook*.

The prices of the new issues at their launch and their respective prices at the end of first day, the fifth day and the twenty-first day of trading are recorded. The daily prices were obtained from the *Datastream* on-line service. A total of 81 IPOs were excluded from the sample because of one or more of the following problems: missing issue price, missing first day of trading price, unidentified company name in the *Datastream* or the *Extel* sources. These *Datastream* first trading day prices were checked against those obtained from the *Extel* book. Table 3 shows the distribution of IPOs by the year of issue.

The sample of 575 IPOs includes 190 investment trusts and 385 conventional issuing companies. The sample is made up of 301 placings (70 investment trusts) and 274 offers (120 investment trusts) and the sample coverage in the two categories is almost identical. The average number of new issues was 82 per year during the sample period, with a relatively high standard deviation of almost 50 (see Tables 2 and 3). Other details about the individual characteristics of the new issues (market value, amount raised and proportion of equity offered) were also obtained from the KPMG source.

5. Results

We now proceed to apply the methodology outlined above to estimate the returns on the IPOs in our sample. We compute WR_t , \underline{MAAR}_{it} , and the associated t statistic. We choose to look for underpricing at the end of the first day's trading ($t=1$) and follow Brennan and Franks (1997) in examining the situation at the end of five days of trading ($t=5$). To try and capture the end of the 'short run', so to speak, we also examine the situation at the end of twenty-one days of trading ($t=21$).

The results of our analysis using the HGSC Index as the market benchmark are presented in Table 4. We report our results for the entire sample of 575 IPOs and

also report results separately for investment trusts and conventional issuing companies. Following Jenkinson and Mayer (1988) and Levis (1993), we also report results for investment trusts separately for placings and offers.

Results: The average returns on the first day of trading are 6.56 percent for the entire sample. These returns increase up to 10.11 percent if investment trusts are excluded from the sample. The returns on the fifth day of trading (from the offer day to the 5th day of trading) increase to 7.21 percent and further to 7.36 percent on the 21st trading day. For conventional issuing companies (the sample without the investment trusts) the returns increase from 10.11 percent to 10.58 percent from the 1st trading day to the 21st day of trading. All these abnormal returns are statistically significant at the 99 percent level. It should be noted, however, that the *t*-statistics associated with these returns should be read with caution since the distributions are positively skewed.

In contrast, returns for investment trust IPOs as a whole were -0.88 percent at the end of the 1st trading day and -0.87 percent on the 21st trading day. For investment trust placements the returns fell from -1.05 percent to -2.37 percent from the 1st trading day to the 21st trading day and for the investment trust offers the returns went up from -0.78 percent to -0.09 percent during the same period. However, none of these abnormal returns is significantly different from the zero at either the 95 percent or at the 99 percent level. The positive skewness in the returns distribution would generally lead to upward bias in the mean return. Since the point estimates for the mean returns are negative, the power of the hypothesis tests based on the reported *t*-statistics is likely to increase.

We also disaggregate the investment trusts by size (as measured by market capitalisation) to examine our contention that all investment trusts are informed market participants. This implies that there should be no difference between the underpricing performance of small and large investment trusts. We divide the trusts into three sub-samples, those with market capitalisation of less than £20 million ($n=62$), those with £20 to £ 40 million ($n=82$) and those with more than

£40 million ($n=76$). Once we adjust for the anomalous returns in the period 1994-96, we find that there is no statistical difference between the abnormal returns for the three groups.

Results using the FT Small Cap Index are qualitatively identical and the numerical agreement between the two sets of results is extremely close. Therefore these results are not explicitly presented in interests of brevity. They are available from the authors. Thus, the use of different benchmarks does not lead to significant differences in returns. We conclude that in the short run (up to 21 days of trading in our case), our estimated returns are robust to the choice of index.

We now proceed to test whether the observed differences in abnormal returns between the investment trusts and conventional companies are statistically significant. While individual returns distributions are positively skewed, this tendency is alleviated in the distributions of differences. Further, our sample sizes are large enough to invoke the Central Limit Theorem and apply a standard difference-of-means test. These results are presented in Table 5.

Finally, we estimate abnormal returns separately for UK investment trusts (those limited to investing in UK securities) and international investment trusts (those which invest in world wide securities). These results are presented in Table 6.

We begin by noting that we are able to replicate the results of Jenkinson and Mayer (1988) and Levis (1993) in our full sample, i.e., the abnormal returns associated with placings are significantly greater than those associated with offers. This result is robust in that it persists over all three short run time horizons and regardless of the market benchmark used. The t -statistic associated with a difference of means test is always extremely significant. This both buttresses the earlier findings and supports the representative validity of our sample and sample period.

We proceed to examine the difference between investment trusts and conventional issuing companies. We find that while conventional issuing companies display extremely significant underpricing, there is no underpricing associated with investment trusts. This finding holds for all three short run time horizons and for both market benchmarks and the statistical significance of the results is extremely strong (Table 4). We also find that the difference between the abnormal returns of conventional issuing companies and investment trusts is strongly statistically significant. The persistence of the results allied with their significance presents a compelling piece of evidence.

In this context, it is also interesting to compare our estimates quantitatively with those of Jenkinson and Mayer (1988) and Levis (1993) who find abnormal returns of 10.7% and 14.3% respectively for the 1980s. The results for our overall sample indicate a lower level of underpricing (Table 4). However, when we exclude investment trusts and examine only conventional issuing companies, our estimates of underpricing are very comparable with the earlier findings for the UK main market. This is interesting in the light of the different benchmarks used. For example, in estimating short run underpricing, Levis uses the FTA index, as compared to our use of the HGSC and FT Small Cap indices.

Discussion: The Rock model is based on horizontal information asymmetry. We have argued above that such asymmetry should be minimal in the case of investment trusts, but significant in the case of conventional issuing companies. Thus, the Rock model implies that there should be significant underpricing in the IPOs of conventional issuing companies, but little or none in the case of investment trust IPOs. Thus, our findings provide strong evidence in favour of the Rock model.

In contrast, the Tinic (1988) insurance hypothesis and the risk aversion hypothesis predict no difference in the performance of investment trust IPOs and those of conventional issuing companies. Therefore our findings do not support these hypotheses.

The Baron hypothesis is based on a vertical asymmetry of information and the monopsony hypothesis is based on a vertical inequity of market power. Both these hypotheses therefore predict that the involvement of investment banks as underwriters increases the degree of underpricing. However, we find no statistically significant underpricing for investment trusts, either for placings (where financial intermediaries are involved in marketing and distributing the issue) or for offers (where they are not). Further, there is no statistically significant difference in the level of underpricing for placings and offers. (It is important to note that all the offers in our sample were offers for subscription, where financial intermediaries have a limited role. None were offers for sale, where such intermediaries have a major role.) Thus, we do not find evidence in favour of either the Baron hypothesis or the monopsony hypothesis in the case of investment trust IPOs.

At this point we relate our findings to some closely related studies. Koh and Walter (1989) carry out a detailed study of Singapore IPOs with the objective of testing the Rock model (see Table 1). They find that share allocation patterns are consistent with the Rock model, in that rationing is much more prevalent in underpriced than in overpriced issues. The Koh and Walter study presents a direct test of the Rock model, while our study presents an indirect test in that we test its implications. Nonetheless, our findings are in agreement with Koh and Walter in that we also find support for the Rock model.

Weiss (1989) focuses on investment trust IPOs in the US. In a sample of 67 such IPOs over the period 1985-87, she seeks to document the post-offering performance of and the nature of the clientele for these IPOs. She finds no evidence of short run underpricing in the one-day, ten-day and twenty-day returns. Peavy (1990) also studies US investment trust IPOs. He examines a sample of 46 investment trust IPOs over the period 1986-87. He finds no evidence of underpricing in one-day and twenty-day returns. These findings are consistent with our results of no significant underpricing up to the 21st trading day. In the

light of the differences in the UK and US markets and the different sample periods, this consistency suggests that the result is quite robust.

Levis and Thomas (1995) study 105 UK investment trust IPOs for the period 1984-92. They report a very low (1.91%) but statistically significant level of short run underpricing of these IPOs in first day *raw* returns. They also report that these significant returns can be traced to placings, since offers for subscription display no significant underpricing. However, when they examine twenty-five day market adjusted returns, the underpricing disappears.

With the exception of the first day returns on placings, our findings are consistent with those of Levis and Thomas. We find that the statistical significance of market adjusted returns on placings is considerably higher than that for offers for subscription, even though neither is significant even at the 5% level. It is possible that the discrepancy is due to our use of market adjusted first day returns, rather than raw returns. This conjecture is reinforced by the consistency of their findings using twenty-five market adjusted returns with our findings using twenty-one day market adjusted returns.

6. Concluding Remarks

Our objective in this paper is to examine empirically the Rock model of short run IPO underpricing. We have noted that since IPO underpricing has been discovered in virtually all markets of the world, it is the cause rather than the presence of the phenomenon that is of interest. We have noted that investment trusts differ from conventional issuing companies in ways that are relevant for IPO pricing. This difference is used to conclude that the Rock model predicts that investment trust IPOs should exhibit significantly less underpricing than those of conventional issuing companies. However, several other theories of IPO underpricing do not imply such a prediction. Comparing the underpricing of investment trust IPOs with those of conventional issuing companies thus provides a test of the Rock model against several other theories.

We argue that both the traditional risk aversion hypothesis and the insurance hypothesis predict that investment trust IPOs should behave no differently from those of conventional issuing companies. Further, Baron's model based on vertical asymmetric information and the monopsony hypothesis based on vertical market power, predict that the major involvement of financial intermediaries should increase the incidence of IPO underpricing. Thus, they predict that placings, in which financial intermediaries have a greater role, should exhibit more underpricing than offers for subscription, in which they have a smaller role.

We find that the IPOs of conventional firms display significant underpricing, in line with the vast IPO literature. However, investment trust IPOs do not display any statistically significant underpricing at all. Thus, our findings support Rock's winner's curse model. However, we are unable to support the risk aversion and insurance hypotheses. Further, we find no discrepancy between the returns on placings and offers for subscription, indicating a lack of support for both the Baron model and the monopsony hypothesis.

An immediate implication of our results is that investors looking for extremely short run profits (the so-called stags) should avoid investment trust IPOs and focus on the IPOs of conventional issuing companies. Investment trust IPOs should be of interest to investors with relatively low individual rates of time discount.

**Table 1: Summary of previous studies on the short-run performance of IPOs in Developed/
Developing Markets**

Country	Study	Period	Sample Size	Short-run Excess Return (%)
UK	Buckland et. al. (1981)	1965-75	297	9.7
UK	Jenkinson & Mayer (1988)	1983-86	68	4.7 (Fixed price)
UK	Jenkinson & Mayer (1988)	1983-86	143	10.7 (Placings)
UK	Levis (1990)	1985-88	123	8.64
UK	Sudarsanam (1992)	1981-86	70	15
UK	Levis(1993)	1980-88	712	14.3
UK	Levis and Thomas (1995)	1984-92	105	1.91 (ITs)*
USA	Weiss (1989)	1985-87	64	Nil (ITs)*
USA	Peavy (1990)	1986-87	41	Nil (ITs)*
USA	Wang <i>et al</i> (1992)	1971-88	87	-2.82 (REITs)**
USA	Ritter (1987)	1977-82	664	14.8
USA	Aggarwal & Rivoli (1990)	1977-87	1598	10.67
USA	Ibbotson et. al. (1994)	1960-92	10626	15.3
USA	Rajan & Servaes (1997)	1975-87	2725	10.03
Australia	Lee et. al. (1994)	1976-89	266	11.9
Brazil	Leal et. al. (1993)	1979-90	62	78.5
Canada	Jog & Srivastava (1996)	1971-92	254	7.4
Finland	Keloharju (1993)	1984-92	91	14.4
France	Jacquillat (1986)	1972-86	87	4.8
Germany	Ljungqvist (1996)	1970-93	180	9.2
Hong Kong	McGuinness (1992)	1980-90	80	17.6
Japan	Kaneko & Pettway (1994)	1989-93	37	12
Korea	Dhatt et.al. (1993)	1980-90	347	78.1
Malaysia	Dawson (1987)	1978-83	21	166.6
Singapore	Koh and Walter (1989)	1973-87	66	27
Switzerland	Kunz & Aggarwal (1994)	1983-89	42	35.8
Taiwan	Chen (1992)	1971-90	168	45

* Investment Trusts

** Real Estate Investment Trusts

Table 2: Investment Trust IPOs By Sector

Sub Sector	Total Issues	1996	1995	1994	1993	1992	1991	1990
UK	10	1		4	1	3		1
UK Income Growth	5	1	1	2			1	
UK High Income	6			1		1	2	2
UK Convertible	3		1		1			1
UK Smaller Cos.	24	3	2	4	5	4	3	3
UK Quasi Split	13		2	1	4	1	5	
UK Split	14	3	1		2	2	5	1
Internat'l	1	1						
Internat'l High Income	1				1			
Internat'l Smaller Cos	1			1				
Internat'l Quasi Split	2			1		1		
Internat'l Split	1	1						
Europe	9			3	1	1	1	3
Pan European	3			2				1
European Smaller Cos.	4			1	1			2
Pan Europe Smaller Cos.	1					1		
Europe- Single C'try	5		1				1	3
US Smaller Cos.	3	1			1		1	
Far East	5	2	2			1		
Far East Smaller Cos.	5		2	2	1			
Far East -Single C'try	9		1	1	1		2	4
Japan	7	2	1	1	2	1		
Japan Smaller Cos.	3			2	1			
Emerging Markets	8	1		2	3		1	1
Latin American	6			5				1
Emer'g Mkts.- Europe	3			3				
Emer'g Mkts.- Single C'try	7		1	4	1	1		
Venture & Developm't Cap.	9	1	1	4			1	2
Venture Capital Trusts	13	10	3					
Indexation	5			2	2	1		
Trust of Trusts	8		1	2		1	2	2
Sector Specialists	28	6	5	5	9	2		1
Total	222	33	25	53	37	21	25	28
Total ex Double Counting	194	32	24	45	30	16	22	25

SOURCE: *The Natwest Markets Year Book on Investment Trusts 1997*

Table 3: IPOs on the UK Main Market by the year of issue

Year	ALL IPOs			SAMPLE			SAMPLE COVERAGE		
	Placings (No.)	Offers (No.)	Total (No.)	Placings (No.)	Offers (No.)	Total (No.)	Placings %	Offers %	Total %
1989	21	25	46	16	23	39	76.2	92	84.8
1990	30	23	53	24	22	46	80.0	95.7	86.8
1991	13	25	38	10	22	32	76.9	88.0	84.2
1992	24	18	42	22	15	37	91.7	83.3	88.1
1993	45	72	117	42	66	108	93.3	91.7	92.3
1994	95	84	179	86	71	157	90.5	84.5	87.7
1995	49	27	76	40	25	65	81.6	92.6	85.5
1996	69	36	105	61	30	91	88.4	83.3	86.7
Total	346	310	656	301	274	575	86.994	88.387	87.652
Mean	43.25	38.75	82	37.625	34.25	71.875	84.825	88.887	87.012
S.D.	27.603	24.944	49.0945	25.556	21.579	43.949	6.9174	4.7849	2.5312

NOTE: Initial Public Offerings include offers for sale at fixed price and placements only.

Table 4: Returns on IPOs (HGSC Benchmark)

	FULL SAMPLE			INVESTMENT TRUSTS	
	All n=575	Conv. Issuing Cos. n=385	Inv.Trusts n=190	Placings n=70	Offers n=120
<i>1st Trading Day</i>					
MAAR ₁ (%)	6.56	10.11	-0.88	-1.05	-0.78
WR ₁	1.07	1.10	0.99	0.99	1.00
Std. Deviation	13.20	13.92	7.58	5.88	8.31
<i>t</i> - statistic	<i>11.88</i>	<i>14.19</i>	-1.59	-1.49	-1.03
Median	3.64	7.51	-0.92	-0.80	-0.28
<i>5th Trading Day</i>					
MAAR ₅ (%)	7.21	10.51	-1.35	-2.07	-0.97
WR ₅	1.07	1.08	0.98	0.96	1.00
Std. Deviation	17.06	17.96	10.99	7.28	12.29
<i>t</i> - statistic	<i>9.09</i>	<i>12.27</i>	-1.40	-1.91	-0.74
Median	3.91	7.94	-2.41	-0.22	-0.60
<i>21st Trading Day</i>					
MAAR ₂₁ (%)	7.36	10.58	-0.87	-2.37	-0.09
WR ₂₁	1.09	1.09	0.99	0.97	1.01
Std. Deviation	17.06	16.96	14.80	9.12	16.78
<i>t</i> - statistic	<i>9.27</i>	<i>13.09</i>	<i>0.67</i>	-1.75	-0.05
Median	4.19	7.93	-1.68	-1.68	-0.51

NOTES:

(1) *t*- statistics significant at the 99% level are printed in *italics*.

(2) Results using the FT Small Cap. index benchmark are qualitatively identical.

Table 5: Testing for Differences in Excess Returns (HGSC Benchmark)

	PLACINGS		OFFERS	
	Conv. Issuing Cos. n=231	Inv.Trusts n=70	Conv. Issuing Cos. n=154	Inv.Trusts n=120
	<i>1st Trading Day</i>			
<u>MAAR</u> _{i1} (%)	11.05	-1.05	8.66	-0.78
<i>t</i> - statistic*	6.559		7.375	
	<i>5th Trading Day</i>			
<u>MAAR</u> _{i1} (%)	12.02	-2.07	7.95	-0.97
<i>t</i> - statistic*	5.700		5.747	
	<i>21st Trading Day</i>			
<u>MAAR</u> _{i1} (%)	12.18	-2.37	7.84	-0.09
<i>t</i> - statistic*	6.513		4.132	

Notes: (1) * Difference-of-means *t*-statistics.

(2) Results using the FT Small Cap. index benchmark are qualitatively identical.

**Table 6: Returns on Investment Trust IPOs: UK Trusts vs. International Trusts
(HGSC Benchmark)**

	UK TRUSTS			INTERNATIONAL TRUSTS		
	All	Placings	Offers	All	Placings	Offers
	<i>1st Trading Day</i>					
<u>MAAR</u> ₁ (%)	-0.38	-1.96	0.15	-1.20	-0.77	-1.51
<u>WR</u> ₁	0.99	0.98	1.00	0.99	0.99	1.00
Std. Deviation	8.70	9.10	8.58	6.81	4.33	8.25
<i>t</i> - statistic	-0.37	-0.91	0.13	-1.89	-1.26	-1.17
Median	-0.26	0.00	-0.28	-1.44	-0.93	-2.55
n	72	18	54	115	50	65
	<i>5th Trading Day</i>					
<u>MAAR</u> ₅ (%)	-1.02	-3.10	-0.25	-1.58	-1.80	-1.44
<u>WR</u> ₅	0.99	0.97	0.99	0.98	0.94	1.00
Std. Deviation	9.02	10.84	8.28	12.18	5.08	15.06
<i>t</i> - statistic	-0.82	-1.07	-0.19	-1.15	-1.94	-0.66
Median	-0.56	-1.54	-0.56	-2.82	-0.53	-4.17
n	52	15	38	78	30	48
	<i>21st Trading Day</i>					
<u>MAAR</u> ₂₁ (%)	-0.21	-2.53	0.64	-1.31	-2.66	-0.50
<u>WR</u> ₂₁	0.99	0.97	1.00	1.00	0.97	1.00
Std. Deviation	13.12	10.55	13.99	15.91	8.48	19.10
<i>t</i> - statistic	-0.12	-0.9	0.28	-0.72	-1.69	-0.18
Median	-0.84	-1.91	-0.53	-1.79	-1.67	-2.79
n	52	14	38	71	29	48

Note: Results using the FT Small Cap. benchmark are qualitatively identical.

REFERENCES:

Affleck, G.J., Hegde, S. and Miller, R.E. (1991) The Relationship between the First day Return and the After-market performance of Initial Public Offerings, unpublished manuscript, Northern Illinois University, October.

Aggarwal, R., Leal, R. and Hernandez, L. (1993) The After-Market Performance of Initial Public Offerings in Latin America, *Financial Management*, **22**, 42-53.

Aggarwal, R. and Rivoli, P. (1990) Fads in the Initial Public Offering Market, *Financial Management*, **19**, 45-57.

Akerlof, G. (1970). The Market for 'Lemons': Quality Uncertainty and the Market Mechanism, *Quarterly Journal of Economics*, **84**, 488-500.

Association of Investment Trust Companies (1997). *Service Directory and Yearbook*, 52-59.

Ayling, D. (1989) An Exploratory Analysis of New Issue Discounts on the UK's Official List, USM and 3M, *Institute of European Finance Papers*.

Bank of England (1990) New Equity Issues in the UK, *Bank of England Quarterly Bulletin*, **May**, 343-352.

Baron, D. (1982) A Model of the Demand for Investment Banking Advice and Distribution Services for New Issues, *Journal of Finance*, **37**, 955-976.

Beatty, R.P. and Ritter, J.R. (1986) Investment Banking, Reputation, and Underpricing of Initial Public Offerings, *Journal of Financial Economics*, **15**, 213-32.

Brennan, M.J. and Franks, J. (1997) Underpricing, Ownership and Control in Initial Public Offerings of Equity Securities in the UK, *Journal of Financial Economics*, **45**, 391-413.

Buckland, R., Herbert, P.J. and Yeomans, K.A. (1981) Price Discount on New Equity Issues in the UK and their Relationship to Investor Subscription in the Period 1965-75, *Journal of Business Finance and Accounting*, **8**, 79-95.

Casson, M. (1990) *Enterprise and Competitiveness: A Systems View of International Business*, Oxford: Clarendon Press.

Chalk, A.J. and Peavy, J.W. (1987) Initial Public Offerings: Daily Returns, Offering Types and the Price Effect, *Financial Analysts Journal*, 65-69.

Chen, H. L. (1992) The Price Behaviour of IPOs in Taiwan, mimeo, University of Illinois.

Dawson, S.M. (1987) Secondary Stock Market Performance of Initial Public Offers, Hong Kong, Singapore, and Malaysia: 1978-1984, *Journal of Business Finance and Accounting*, **14**, 65-76.

Dhatt, M.S., Kim, Y.H. and Lim, U. (1993) The Short Run and Long Run Performance of Korean IPOs: 1980-90, mimeo, University of Cincinnati.

Dimson, E. (1979) The Efficiency of the British New Issue Market for Ordinary Shares, Doctoral Thesis, London Business School.

Dimson, E. and Marsh, P. (1986) Event Study Methodologies and the Size Effect: The Case of UK Recommendations, *Journal of Financial Economics*, **17**, 113-142.

Dimson, E. and Marsh, P. (1989-96) *The Hoare Govett Smaller Companies Index*.

Extel Book of Take-overs, New issues and Offers (1989-96).

Fama, E. and French, K. (1996) Multifactor Explanations of Asset Pricing Anomalies, *Journal of Finance*, **50**, 131-155.

Gregory, A., Matatko, J., Tonks, I. and Purkis, R. (1994) UK Directors' Trading: The Impact of Dealings in Smaller Firms, *Economic Journal*, **104**, 37-53.

Ibbotson, R. (1975) Price Performance of Common Stock New Issues, *Journal of Financial Economics*, **2**, 235-272.

Ibbotson, R., Sindelar, J. and Ritter, J. (1994) The Market's Problems with the Pricing of Initial Public Offerings, *Journal of Applied Corporate Finance*, **7**, 66-74.

Jacquillat, B. C. (1986) French Auctions of Common Stock: Methods and Techniques of New Issues, 1966-86, *Going Public: An International Overview*, Euromobilaire Occasional Paper 2.

Jenkinson, T. and Mayer, C. (1988) The Privatisation Process in France and UK, *European Economic Review*, **32**, 482-490.

Jenkinson, T. and Ljungqvist, A. P. (1996) *Going Public: Theory and Evidence on How Companies Raise Equity Finance*, Oxford: Oxford University Press.

Jog, V.M. and Srivastava, A.K. (1996) The Canadian Environment for Initial Public Offerings: Underpricing, Long Term Performance and the Process of Going Public, Mimeo, Carleton University, Ottawa.

Kaneko, T. and Pettway, R.H. (1994) The Effects of Removing Price Limits and Introducing Auctions upon Short-term IPO Returns: The Case of Japanese IPOs, Working Paper No. 52794, Financial Research Institute, University of Missouri.

Keloharju, M. (1993) The Winners' Curse, Legal Liability and the Long Run Price Performance of Initial Public Offerings in Finland, *Journal of Financial Economics*, **34**, 251-277.

Khurshed, A. and Mudambi, R. (1998) The Short Run Price Performance of Investment Trust IPOs on the UK Main Market, Discussion Papers in Economics and Management, Series A, Vol.XI, No.388, Department of Economics, University of Reading.

K.P.M.G. New Issue Statistics (1989-96).

Koh, F. and Walter, T. (1989) A Direct Test of the Rock Model of the Pricing of Unseasoned Issues, *Journal of Financial Economics*, **23**, 251-272.

Kunz, R.M. and Aggarwal, R. (1994) Why Initial Public offerings are Underpriced: Evidence from Switzerland, *Journal of Banking and Finance*, **18**, 705-724.

Ljungqvist, A. P. (1997) Pricing Initial Public Offerings: Further Evidence from Germany, *European Economic Review*, **41**, 1309-1320.

Lee, P.J., Taylor, S. L. and Walter, T.S. (1994) Australian IPO Pricing in the Short and Long Run, mimeo, University of Sydney.

Levis, M. (1990) The Winner's Curse Problem, Interest Costs and the Underpricing of the Initial Public Offerings, *Economic Journal*, **100**, 76-89.

Levis, M. (1993) The Long-run Performance of Initial Public Offerings: The UK Experience 1980-1988, *Financial Management*, **22**, 28-41.

Levis, M. and Thomas, D. C. (1995) Investment Trust IPOs: Issuing Behaviour and Price Performance Evidence form the London Stock Exchange, *Journal of Banking and Finance*, **19**, 1437-1458.

McGuinness, P. (1992) An Examination of the Underpricing of Initial Public Offerings in Hong Kong, *Journal of Business Finance and Accounting*, **19**, 165-186.

Muscarella, C. and Vetsuypens, M. (1989) A Simple Test of Baron's Model of IPO Underpricing, *Journal of Financial Economics*, **24**, 125-135.

Peavy III, J.W. (1990) Returns on Initial Public Offerings of Closed-End Funds, *The Review of Financial Studies*, **3**, 695-708.

- Rajan, R. and Servaes, H. (1997) Analyst Following of Initial Public Offerings, *Journal of Finance*, **52**, 507-529.
- Ritter, J.R. (1984) The Hot Issue Market of 1980, *Journal of Business*, **57**, 215-240.
- Ritter, J.R. (1987) The Costs of Going Public, *Journal of Financial Economics*, **19**, 269-282.
- Ritter, J.R. (1991) The Long Run Performance of Initial Public Offerings, *Journal of Finance*, **46**, 3-27.
- Rock, K. (1986) Why New Issues are Under-priced, *Journal of Financial Economics*, **15**, 187-212.
- Sudarsanam, S. (1992) Initial Public Offerings in the UK Unlisted Securities Market, Unpublished manuscript, City University Business School, London.
- Tinic, S. (1988) Anatomy of the IPOs of Common Stock, *Journal of Finance*, **43**, 789-822.
- Wang, K., Chan, S.H. and Gau, G.W. (1992) Initial Public Offerings of equity securities - Anomalous evidence using REITs, *Journal of Financial Economics*, **31**, 381-410.
- Weiss, K. (1989) The Post-Offering Price Performance of Closed-End Funds, *Financial Management*, **Autumn**, 57-67.
- Welch, I. (1989) Seasoned Offerings, Imitation Costs and the Underwriting of the IPOs, *Journal of Finance*, **44**, 421-449.