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On the Long-Run Performance of IPOs [1]

Arif Khurshed
ISMA Centre, University of Reading

Ram Mudambi
ISMA Centre, University of Reading and *Case Western Reserve University*

Marc Goergen
Manchester School of Management, UMIST

Abstract

We propose that the long-run performance of IPOs is a function of pre-IPO factors, including managerial decisions and the firm's performance prior to going public. We relate long-run performance to a much richer set of explanatory factors than in the previous literature. Using a number of variables, we provide empirical evidence in support of this proposition. The manner in which a company is run before it is listed on the stock exchange gives a strong signal of how its shares will perform in its first few years of coming to the market. Using a UK data set, we find that the percentage of equity issued and the degree of multinationality are key predictors of IPO performance.

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Address for correspondence:
Dr Ram Mudambi
Weatherhead School of Management
Case Western Reserve University
10900 Euclid Avenue
Cleveland **OH 444106**, USA
Phone: 44-216-368-8845
FAX: 44-216-368-5039
Email: rxm76@po.cwru.edu

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I. Introduction:

The academic community understands IPOs as synonymous with high initial returns and long-run loss. Considerable work has been done on short run under-pricing (for a review see Jenkinson and Ljungqvist (1996)) and lately, long-run under-performance has been the subject of focused research (Ritter (1991)). The conclusion from past research is that IPO firms subsequently experience stock price under-performance relative to non IPO control firms in the long-run. This period is typically defined to be in the region of three years.

Some of the previous studies on the long-run performance of UK IPOs by Levis (1993) and Espenlaub *et al.* (1998) have documented the existence of long-run overpricing but have only provided limited explanations for the existence of this phenomenon. Using the IPOs on the London Main Market from 1991-95 (so that the effective period of study is from 1991-98), we document a long-run under-performance of 17.81%. We then explore the relationship between pre-IPO factors and its price performance in the long-run. We find that the pre-IPO performance of a firm has a significant effect on long-run performance. We document that long-run performance is related to a richer set of factors than previously posited in the literature. Factors previously identified in this connection include the underwriters' reputation, ownership structure and bad luck (Carter *et al* (1998), Michaely and Shaw (1994), Brav and Gompers (1996) Jain and Kini (1994), Fields (1995)). In addition to these we also show that long-run performance is positively related to the degree of multinationality of a firm. We find a significant negative relationship between the long-run performance and first day returns. The quality of a firm at the time of the IPO also explains long-run performance. The better the quality the less is the under-

performance. In addition to these, we have three more interesting results. First, the more profitable the company is before flotation, the worse is its long-run performance. Second, the larger the size of the firm the better is the long-run performance. Third, the greater the change in the ownership structure at the time of offering (i.e., the greater the extent of original shareholders' dilution of ownership at the time of offering), the worse is the long-run performance. Interestingly, unlike previous research, we do not find a statistically significant direct relationship between the age of a firm and its long-run performance. This is also the case with the reputation of the underwriter.

The paper is organised as follows: In Section II we discuss the previous literature on long-run IPO under-performance and the various theoretical explanations for the anomaly. In Section III we describe our data, while in Section IV we describe our methodology. In Section V we present the hypotheses we wish to test and in Section VI we report our results. Conclusions and recommendations for future research appear in section VII.

II. Evidence on long-run under-performance:

A seminal article by Ibbotson (1975) reported a negative relation between initial returns at the IPO and long-run share price performance for a sample of US IPOs issued during the period 1960-69. He reported that there was a general positive performance in the first year, negative performance in the next three years and a general positive performance in the fifth year. Ritter (1991) analysed the performance of US IPOs issued between 1975-84 and reported that they underperformed the benchmark (NASDAQ and AMEX-NYSE) by about 29% in the three year period

after their launch. Rajan and Servaes (1997) showed that over a five-year period following their IPO, companies underperform the market benchmarks (NYSE/AMEX) by 17% to 47.1 %. More recently Carter *et al*. (1998) showed that over a three-year period after the IPO, the US firms underperformed the market (NYSE/AMEX/NASDAQ) by 19.92 %. Work in other countries has shown that long-run market adjusted returns are negative with the notable exceptions of Korea (Kim *et al.* (1995)) and Sweden (Loughran *et al.* (1994)) where IPO companies outperformed the market by 91.6 % and 1.2 % respectively. The degree of under-performance has been highest in Australia (51.0 %, Lee *et al.* (1994)) followed by Brazil (47.0 %, Aggarwal *et al.* (1993)). Lower, nonetheless significant under-performance has been documented in Canada, Chile, Finland, Germany and Switzerland to name a few.

In the UK, Levis (1993) investigated the long-run performance of a sample of 712 UK IPOs issued during 1980-88. He reported long-run returns based on three alternative benchmarks: the Financial Times Actuaries All share (FTA) Index, the Hoare Govett Small Companies (HGSC) Index and the All Share Equally Weighted (ASEW) Index. His work confirmed the findings of long-run under-performance in the UK market. While, for the US market, Ritter (1991) reported under-performance of up to 29 % over the first three years after the IPO, for the UK market, Levis found under-performance between 8 % to 23 % depending on the benchmark used.

More recently Espenlaub *et al*. (1998) re-examined the evidence on the long-run returns of IPOs in the UK over the period 1985-95. Like Levis, they compared abnormal returns using a number of alternative benchmarks and confirmed that in the long-run the IPO firms under-perform the market. They found that typically a one

pound investment after the IPO was worth less than 85 pence after three years. This finding was remarkably similar across four of the five alternative methods that they used to calculate abnormal returns.

Theoretical explanations for the long-run under-performance of IPOs are less than abundant. The explanations put forward can mainly be placed into three groups. The first group identifies the existence of under-performance and provides behavioural and expectations-based explanations for the phenomenon. A sub group within this group tries to explain long-run under-performance using under-pricing models. A number of hypotheses have been put forward and have been extensively tested. Weiss (1993) tested the hypothesis that companies priced at the upper end of the initial price range should perform better than those priced at the lower end, but found no support for it. Hughes and Thakor (1992) proposed that the under-performance is due to failure to include value of legal damages in performance evaluation, but Alexander (1993) pointed out that the risk of litigation in not significant in most of the developed countries. Some researchers have put forward the price support hypothesis for explaining the long-run under-performance. The hypothesis is based on the assumption that underwriters keep the initial trading prices artificially high and once the price support has been withdrawn the prices will adjust downwards to their true market value. Following the approach advocated by Rudd (1993), Ljungqvist (1996) tested implications of this hypothesis and found that the evidence was partly inconclusive.

Miller (1977) suggested that the marginal, most optimistic investor sets share prices. As information flows increase with time, the divergence of expectations decreases and

thus the prices are adjusted downwards, i.e. long-run performance is negatively related to the extent of divergence of opinion. It is difficult to test this hypothesis because it is difficult to measure the divergence of opinion. Ritter (1991) and Rajan and Servaes (1994) among others argued that firms go public when investors are over-optimistic about the growth prospects of IPO companies. Investors overpay initially but mark prices down as more information becomes available hence expected long-run returns therefore decrease with the decrease in initial investor sentiment.

The second group provides explanation for the poor long-run performance using the agency costs hypothesis. Jain and Kini (1994) and Mikkelson *et al*.(1997) investigated if there is a relation between long-run performance and ownership. Using data from the US market, they found different results. Mikkelson *et al*. found that in general, the long-run performance both within one year of offering and during the first ten years of public trading is unrelated to the ownership structure. However, Jain and Kini found a significant positive relation between post-IPO operating performance and equity retention by the original shareholders.

The third group explains under-performance as a mis-measurement. Thus, it appears either because we fail to control properly for risk or due to the problems related to measurement of returns over long horizons. Under-performance could also be because of the wrong choice of benchmark. The risk mis-measurement hypothesis proposes that the long-run under-performance may be due to a failure to adjust returns for time-varying systematic risk. No empirical evidence has been found for this hypothesis by Ritter (1991), Keloharju (1993) and Ljungqvist (1995). They tried to adjust for risk but still found that the newly listed firms under-perform. The literature on the

problems related to measurement of returns over long horizons is not recent. Sefcik and Thompson (1986), Brav (1997), Barber and Lyon (1997) and Kothari and Warner (1997) among others argue that several aspects of the long-run event study create serious statistical difficulties. Statistical inference conducted using traditional testing methods, such as t-tests is mis-specified because of potentially important violations of the underlying statistical assumptions. Recently Eckbo *et al*. (1998) showed that for SEOs, there is no under-performance when using multi-factor return benchmarks. Brav *et al*. (1998) also question the under-performance of IPOs and find that IPO firms perform similarly to non-issuing firms matched on the basis firm size and book-to-market ratios.

Dimson and Marsh (1986), Ritter (1991), Gregory *et al*. (1994) and Fama and French (1996) and Fama (1998) among others demonstrated that the measurement of the long-run performance of the IPOs is sensitive to the benchmark employed. So the possibility remains that imperfect benchmarking lies behind the poor long-run returns.

In our study we are not directly interested in explaining long-run underperformance. Rather, we are interested in identifying measurable firm characteristics at the time of IPO that are related to long-run performance in a systematic way. The characteristics that we examine are based on theoretical considerations, based on the previous research on IPOs as well as the more general theory of the firm.

III. Data:

The sample used in the study comprises 240 IPOs of non-investment trust companies floated on the UK Official List from January 1991 through June 1995 and covers 95%

of the total number of new issues (placements and offers for sale at fixed price only)[2]. Our sample also includes those IPOs that were delisted before their three-year anniversary. For the study of long-run performance a total of 12 IPOs were excluded from the sample because of missing data or because they were unidentified companies in the London Share Price Database (LSPD). One unique characteristic of the listing methods was only that 9 listings were pure offers while 98 listings were a mixture of placings and offers (out of a sample of 240). More companies (134) chose to list through placement than offers. In the late 80s placements became the favoured method to bring a company to the market partly due to a relaxation of the placing rules[3]. In the sample, out of the bottom 100 companies in order of the size of funds raised 92 chose to list through placement only. This shows that most of the small and medium sized companies in the UK choose placement for listing. Offers for sale tend to be used in the case of large issues. Out of the top 100 companies (in order of the size of funds raised) in our sample, 87 chose to list via a mixture of placement and offer. Similar findings were reported by Levis (1993).

Table 1 gives the IPOs on the UK Official List by the year of issue from January 1991 to June 1995. In the table the column 'Offers' includes pure offers and mixtures of placements and offers.

[2] We only include IPOs up to June 1995 because we examine the subsequent performance of IPO stocks over a three-year period. So the accumulation period in this study is from January 1991 through June 1998.

[3] The trend to use placings as a method of listing picked up from 1986 onwards, when the London Stock Exchange increased the limit on the size of the placings from £3 million to £15 million. For example the number of placings on the LSE increased from 3 in 1985 to 17 in 1986 to 46 in 1987.

The year 1991 did not see many new companies coming to the market. New issues in 1991 reached their lowest level since 1980. Only 15 non-investment trust companies were listed on the official list through placements and offers. In 1992 the number of companies joining the Official List increased to 26. The flotation market picked up in 1993 with 66 companies coming to the market. The year 1994 was a record year for flotations on the London Stock Exchange. More companies joined the market than ever before. A total of 119 companies were listed on the Official List, which was a two-fold increase over the previous year. The listing figures for the first and second quarter of 1995 show 26 companies came to the market. The number of IPOs listing on the Official List including the investment trust companies is reported in the appendix. Figure1 shows the number of companies coming to the Official List during the period 1991 to mid 1995.

Information concerning the particulars of each offering[4] was obtained from the Extel Book of take-overs, new issues and offers, the KPMG New Issue Statistics, the Extel Company Research, the Extel Handbook of Smaller Companies, London Stock Exchange and Hamilton Scott Smaller Companies Guide. These sources were also helpful in cross checking if there were any discrepancies in the data.

The age of the issuing firm at the time of the offering was obtained from the Stock Exchange Yearbooks. The time period between the date of registration and the first

[4] Includes the document date, first dealing date, type of flotation, date of registration, costs of flotation, turnover before flotation, pre-tax profits before flotation, number of employees before flotation, geographical diversification etc.

day of trading was used to calculate the age of the issuing company. Twelve companies in the sample were incorporated before 1950. Excluding these firms the average age of the issuing firms in the sample was found to be 5.94 years (including them the average age was found to be 8.97 years).

Initial trading prices (first day of trading) and initial returns were determined using Datastream's UK Equity Database and monthly returns over three years were obtained from the London Share Price Database (LSPD).

IV. Methodology:

For the initial after market (close of the first day of trading), we computed the market adjusted abnormal returns ($MAAR_0$) for each firm using the HGSC index. For simplicity, we describe the methodology below.

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

$$R_{i,1} = \ln(P_{i,1} / P_{i,0}) \qquad (1)$$

where $P_{i,1}$ is the price of stock 'i' at the close of the first trading day, $P_{i,0}$ is the offer price and $R_{i,1}$ is the total first-day return on the stock.

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

$$R_{m,1} = \ln(I_{m,1} / I_{m,0}) \qquad (2)$$

where $I_{m,1}$ is the market index value at the close of first trading and $I_{m,0}$ is the market index value on the offer day of the appropriate stock, while $R_{m,1}$ 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:

$$MAAR_{i,0} = 100 \times \{[(1 + R_{i,1}) / (1 + R_{m,1})] - 1\} \quad (3)$$

Table 2 gives the average first day returns for the IPOs for the entire sample and for offers and placements separately.

For the sample the average $MAAR_0$ was found to be 9.74% with an associated t-statistic of 8.54 (the t-statistics on initial returns must be interpreted with caution since the distribution of initial returns is positively skewed). The $MAAR_0$ has a median of 6.30 and a standard deviation of 17.21. The initial return for placements (11.77%) is significantly higher (at 5% level) than that for offers for sale (7.05%). This result is in line with previous research (Levis (1993)). However, it is still rather surprising, since placements are usually available to institutional investors who are more likely to be better informed about the true value of an issue. Thus, Rock's (1986) model of the winner's curse suggests that there should be less need for underpricing placement issues. It is not clear why institutional investors need a higher first day return incentive to encourage them to participate in the new issues' market. Levis (1993) argued that the differences in average initial returns between offers and placements might be related to the degree of uncertainty about the true value of an issue. Since the

placement is usually the method of issuance used by smaller companies, we can argue that the differences in initial returns between the two methods are related to the market value of the offerings. Using gross proceeds for the issue as a proxy for the size of the company that in turn can be used as a proxy for the uncertainty about the true value of an issue, i.e., the smaller the size of the company the higher the uncertainty. We did not find any significant relationship between the gross proceeds from the issue and the initial returns (the Pearson product moment correlation coefficient was found to be -0.03). Only 11% of the total number of placements started trading below their offer price as compared to 19% of the offers for sale. This provides further evidence for the asymmetric information model in that the placements are usually available to institutional investors who are believed to be better informed about the true value of the issue. Though the presence of some overpricing is surprising.

The market adjusted long-run after-market returns were calculated for a period of 36 months following the first month of trading using the LSPD, which reports the monthly return, measured on the last day of the month on which the stock is traded. These returns incorporate dividend payments and are adjusted for rights and scrip issues. Allowing for the initial underpricing and the possibility of price support in the first few trading days, the first month of trading was excluded from the study of long-run returns. It is expected that this month would allow prices to adjust downwards towards the true market equilibrium after the support has been withdrawn, The following methodology, as used by Ritter (1991) was used to calculate the long-run returns:

$$MABHR_i = \sum_{t=2}^{t=37} [\ln (P_{i,t} / P_{i,t-1}) - \ln (I_{m,t} / I_{m,t-1})] \quad (4)$$

where $MABHR_i$ denotes the market adjusted buy and hold return for a firm i over a 37 month period (for the purpose of the study this constitutes only 36 monthly readings since the first month of trading is excluded from the data) and $P_{i,t}$ and $I_{m,t}$ denote the end of the t month share price for the firm i and the corresponding end of the month index respectively. These returns exclude initial underpricing. Buy and hold returns were preferred to Cumulative Average Abnormal Returns (CAARs). Conrad and Kaul (1993) showed that cumulative abnormal returns are biased because they not only process true returns but also the upward bias in single period returns induced by errors in measurement. In contrast buy and hold returns do not suffer from this bias. Moreover CAARs implicitly assume frequent and thus costly portfolio rebalancing. Barber and Lyon (1997) also argued that the abnormal returns should be calculated as the simple buy and hold return on the sample firm less the simple buy and hold return on the benchmark.

In this study, we have not adjusted the monthly abnormal returns for systematic risk. Ibbotson (1975), Ritter (1991) and Clarkson and Thompson (1990) among others demonstrated that the average betas decline with the length of time after the IPO and the average difference in betas between the IPOs and matching firms becomes too small to have any significant effect on the results. Ritter noted that "To the degree that the IPO betas are higher than the betas of control portfolios, computing adjusted returns without explicitly adjusting for beta differences results in conservative estimates of IPO underperformance when the market risk premium is positive" (pp.9).

In our sample the average raw total return (exclusive of the first month of trading) was positive (11.32%).

Past studies on the UK have used Financial Times Actuaries All Share Index (FTA) and the HGSC Index as the bench marks. Since our sample includes a markedly higher proportion of smaller companies than the FTA Index[5], the Hoare Govett Smaller Companies Index was used as a benchmark.

Table 3 gives the average monthly MABHR returns with the associated *t*-statistics for the 37 months after going public.

Of the 240 IPOs, 2 were delisted in their first year of trading because of acquisition/takeover/merger while another 11 were delisted in the second year (one company was declared bankrupt while the other 10 were delisted due to acquisition/takeover/merger). The third year saw a similar fall with only 10 firms getting delisted (all of them were delisted because of acquisition/takeover/merger). So over the three-year period 23 firms were delisted which is about 10% of the total sample. 25 of the 36 monthly average market adjusted returns were found to be negative with 7 of them having t-statistics lower than -2.0.

The average MABHR for the sample period as a whole was found to be -17.81% with a t-statistic of -3.68. The under-performance of the IPOs is both statistically and economically significant. We believe that our results are free from any significant survivorship bias because only 23 firms were delisted in the 36 month period. We also calculated the long-run performance for small and large firms, profitable and loss-

making firms, firms with assets and liabilities and firms with different turnovers. Table 4 gives the average MABHR returns of the cross sectional study.

Our results confirm those of Brav *et al*. (1998) that under-performance is largely concentrated in the smallest issuing firms. The large firms in the sample, in fact, do not show a statistically significant underperformance. The cross sectional study also exhibits some interesting results. Firms which earned profits in the last three years before they were listed show more underperformance than the firms that were running losses before their listing (for three years before listing). This indicates that listing provides an efficient monitoring for badly performing firms while firms with healthy profits in the pre IPO period suffer from a management slack. As expected, firms with net liabilities perform worse than firms with net assets before the IPO. Firms with large turnover in the year before flotation perform better than small turnover firms.

Figure 2 shows the plot of market adjusted (HGSC adjusted) monthly returns for the sample. The returns vary between 1% and -2.7% over the study period. The returns peak at 1% in the 18th month of trading. A minimum return of -2.7% is recorded in the 36th month.

Figure 3 gives the plot for the cumulative raw returns and also the cumulative HGSC Index adjusted monthly returns. The cumulative raw returns are positive and are stable around 2.5% for the first 15 months and peak at 16.28% in the 28th month. They fall to 10.07% by the 37th month. The cumulative HGSC Adjusted monthly returns are negative and suffer a continuous decline. A sharp fall starts after the 28th month and

[5] 178 firms had market capitalisation of less than 75 million at the time of their IPO.

continues till the end of our period of study (37th month). At the end of the 37th month the cumulative HGSC adjusted monthly returns were -24.57%.

V. Explaining the Long-run Under-Performance:

Recently Carter *et al*. (1998) have documented the relation between the long-run performance of IPOs and the choice of the underwriter. However, no prior academic work has documented the relation between the long-run performance and the strategic decisions taken by a firm before its listing. Decisions such as when to go public i.e. after how many years of operating history the management decides to go public, percentage of equity issued, product diversification and multinationality, among others, could have an effect on the long-run performance.

In this study we hypothesise that the long-run performance of the IPOs is a function of the managerial decisions and performance of the firm prior to going public. To test this proposition, we have used a number of characteristics of the firms in our sample. These characteristics have been used as proxies for quality and reputation of the firms, proxy for agency costs after the IPO and proxy for size. The following tables 5 and 6 give the names, definitions and characteristics of the variables used in our study:

Table 6 reports the characteristic values of the above mentioned variables. It is interesting to note that 26% of the companies in our sample come to listing with a history of losses in the last three years before flotation while 12% of the sample companies had net liabilities before the offering. These statistics suggest that not all companies go public at the height of their performance and some of them come to the

market to improve their balance sheets, a feature quite common in the US markets and quite rare in the German markets.

As documented in the cross sectional study of long-run returns (Table 4) the larger firms perform better in the long run. This result is similar to Levis (1993) conclusions. While Levis used the gross proceeds from the offering as a proxy for size, we use two other variables (ASSFLOAT and MCAPFLOT) and expect them to have positive coefficients.

Hypothesis 1: *There is a positive relationship between the size of a firm at the time of its going public and its long-run share price performance after the IPO.*

As a proxy for quality of a firm, the variable COST has been used. It represents the total direct costs of going public expressed as a percentage of the funds raised by an IPO. The costs of flotation include under-writer commissions, legal, printing and auditing. Table 7 reports the average direct costs of going public as well as the costs of flotation as a percentage of the funds raised at the time of offer.

Of all the elements that add up to make the costs of flotation, the underwriter's commission component is expected to vary according to the quality of the firm. The other components are expected to depend on the size of the offer (Merrett et al. (1967)). By dividing the total cost by the size of the offer, we eliminated the components which vary with the offer size but retain the ones that vary with the

quality of the firm whose shares are on offer. We make the following four assumptions before formulating a hypothesis on COST.

(1) bigger firms are better quality firms

(2) bigger firms raise larger amounts of capital from their listing

(3) bad quality firms are bad long term performers

(4) Assumption (3) is known to the underwriter and hence this information is reflected in the cost of underwriting.

Based on these assumptions, we hypothesise that as the size of the funds raised increases, the quality of the firm becomes better (because larger IPOs are often made by more established firms and so there is less risk about the true quality of the firm) and hence the proportion of costs of the funds raised decreases (underwriters charge a relatively smaller commission for underwriting bigger firms). So we expect a negative coefficient for COST. The following hypothesis is considered for COST:

Hypothesis 2*: The higher the cost of flotation expressed as a percentage of the fund raised, the worse is the quality of the firm and the worse is the long-run performance.*

The other variables used as a proxy for quality, risk and reputation of a firm are: DURATION, PROFLOAT and MSHARE. While the variable DURATION gives the age of a firm (in days) from the date of incorporation to the day of listing, the variable PROFLOAT gives the average profits (or losses) for the last three years before the firm's listing. The market share of the underwriter is expressed as variable MSHARE. The mean age of the firm in the sample was around 9 years. Some companies were

formed to takeover others and hence the DURATION for some of them is as less as 50 days. The age of the firm has been suggested as a proxy for the risk (i.e. quality) of the IPO firm (Ritter (1984), Carter et al. (1998)). Ritter (1991) documented a more pronounced long-run under-performance for younger IPOs and interpreted his evidence as being consistent with the over-optimism explanation. As documented by Michaely and Shaw (1994) and Carter et al. (1998), we also anticipate the coefficient for age (DURATION) and underwriter reputation (MSHARE) to be positive for the long-run return analysis. A firm which is profitable before flotation should continue to be so after the IPO. This is based on the empirical results on profit consistency found by Singh and Whittington (1968), Geroski and Jacquemin (1988) Machin and Van Reenen (1993). These authors found that profit in period t is normally highly correlated with profit in t-1 period. This suggests that the more profitable a company is before its listing, the better is its long-run performance. So we expect a positive coefficient for PROFLOAT. We consider the following hypotheses for the variables used as a proxy for quality and reputation of a firm.

Hypothesis 3:*The older the firm, the better is the long-run performance after the IPO.*

Hypothesis 4:*The better is the underwriter reputation, the better is the long-run performance after the IPO.*

Hypothesis 5:*The more profitable a company is before its listing, the better is its long-run performance after the IPO.*

We use industry dummies based on the industry groups the sample firms belong to. These codes are the primary Standard Industrial Classification (SIC) codes assigned to

each company to indicate its primary activities. Research by Levis (1993) has shown that there are marked differences in the long-run performance of individual industries. Industry code dummies have been used to capture this difference. Indirectly, they also help to adjust for differences in business cycles between industries. Year dummies are also added which correspond to the year of the IPO. 4 yearly dummies are used for the sample period and they adjust for business cycles in that they allow for the fact that the IPOs are taking place at different stages of a business cycle.

Proxies for multi-nationality and diversity of products for a firm have also been used. This study is the first attempt to address long-run under-performance using the nature of a firm. DIVERPRD gives the number of two digit standard industrial classification codes for the firm. This is used to show how diverse the company is in its products. There are 106 firms in the sample that have a DIVERPRD of greater than 1. GSCOPE shows the multinational character of a firm. The digit 1 is assigned if a subsidiary of the firm is present in a particular continent (the subsidiaries have been assigned a continent depending upon their location) and zero if it is not. The score is then summed to give GSCOPE. The higher GSCOPE the more multinational is the firm.

Hypothesis 6: *The more multinational a firm is, in its geographical scope and its sales, the better is the long-run performance.*

EQUISSUE gives the percentage of equity issued at the time of the offering. To check for the presence of outliers in our data we used the technique of ‘winsorising’ as used by Mikkelson et al. (1997). This technique did not improve the regression results (in that the significance of the coefficients did not improve) and hence we did not adjust

for outliers[6]. Mikkelson et al. (1997) used a similar variable (proportion of secondary shares sold in the IPO) and found it to be positively related to the post-IPO performance. They explain this relationship by saying that the original shareholders time the IPO to coincide with the period of high profitability of their firm. This result was contradictory to evidence provided by Jain and Kini (1994), who found a significant positive relation between post-IPO operating performance and equity retention by the original shareholders. In our study the variable EQUISSUE involves a mixture of primary and secondary shares sold at the IPO. The higher the dilution of the original shareholders' stake at the time of the IPO the worse is the agency problem for the firm. Therefore EQUISSUE is a measure of the agency costs in the post-IPO scenario. Since we are looking at the equity issued (opposite of equity retention) we expect a negative relationship between equity issued and post-IPO performance of a firm. So we expect a negative coefficient of EQUISSUE.

Hypothesis 7: *The higher the dilution of the original share holding* (*the higher the percentage of equity sold) in the IPO , the worse is the long-run performance.*

The estimation method is ordinary least squares. We use the market-adjusted buy and hold return after three years (MABHR36) as the dependent variable in the regression analysis.

[6] The minimum equity issued was 7% while the maximum was 100%. Expecting the presence of outliers we winsorised the data on equity issued. Examination of the data showed that there was a gradual increase in the percentage of equity issued.

The empirical model is displayed as follows:

$$MABHR36_i = \alpha_0 + \alpha_1(\text{proxy for quality, risk and reputation})_i + \alpha_2(\text{proxies for size of the firm})_i + \alpha_3(\text{proxy for multi-nationality and diversity of products})_i + \alpha_4(\text{proxy for ownership dilution})_i + u_i$$

VI. Results :

An examination of the distribution of the long-run returns (MABHR36) and the independent variables shows that most of them are positively skewed but are not significantly non-normal. Only MABHR36 and FLOAT are negatively skewed but are also not significantly non-normal. The regression results are presented in Table 8[7]. The results are presented for small firms, large firms and the full sample. As shown earlier, the small firms drive the long-run under-pricing where as the share price performance of large firms is driven by the managerial decisions and the firm's financial performance before the IPO.

As expected, we find a positive relationship between the size of a firm and its long-run performance. The larger the size of a firm (in terms of the assets at the time of

[7] In some of the models, we used the natural logarithm of the observations for some of the variables, but found no significant differences in the regression results. All the variables were tried in a non-linear specification but most of these models were insignificant.

flotation) the better is the long-run performance. This result is stronger for the smaller firms as compared to the larger[8] ones. Thus the evidence from the London market is consistent with the findings reported by Ritter (1991) and Carter et al. (1998). The results on the size variables suggest that hypothesis1cannot be rejected and the size of a firm prior to its going public has a positive impact on the long-run performance of the firm in the post-IPO period.

Of the quality, risk and reputation variables used, COST and PROFLOAT show significance. The underwriter's reputation and the age of the firm fail to explain the long-run under-performance. For small firms the higher the costs (as a percentage of funds raised) of flotation, the more is the under-performance. This lends support our earlier proposition that underwriters know of the risk involved with an IPO firm (especially if it is a small firm) and hence charge higher underwriting costs to risky firms. For large firms this effect is absent (though it is significant for the full sample) thereby indicating the underwriters' perception of firms. They categorise small firms as risky and large firms comparatively less risky though it is difficult to comment on an underwriter's definition of small and large firms. These findings validate hypothesis 2 and signal that the ratio of the cost of flotation to the funds raised explains the long-run performance of an IPO firm.

Contrary to the findings of Ritter (1991) and Carter et al. (1998), we do not find any significant relationship between the age of the firm and its long-term performance.

[8] These results were arrived at, after an exhaustive model building exercise, where we tested a range of non-liner models along with linear ones. The non-linear models did not improve the regression results.

Hence hypothesis 3 stands invalid. This is a surprising result and indicates that the US and the UK markets view the importance of the age of the firm differently.

Contrary to the findings of Carter et al. (1998), we do not find that the under-performance of IPO shares relative to the market is less severe for IPOs handled by more prestigious underwriters. Hypothesis 4 thus stands invalid.

We document three other variables that have an effect on the long-run performance of IPO firms. One of these is a performance variable (PROFLOAT) and the other two are nature of the firm variables (GSCOPE and DIVERPRD). Ownership structure (EQUISSUE) and initial underpricing ($MAAR_0$) also explain long-run under-pricing.

We find a negative relationship between the profitability of a firm prior to going public and its long-run performance. The result is stronger for larger firms. The more profitable a firm is prior to going public, the worse is the long-run performance. This result is surprising and contradicts our hypothesis 5. It suggests that firms go public at the height of their performance thus seizing their window of opportunity. Similar conclusions were reported by Mikkelson and Shah (1994) who showed that long-run share price performance and the change in operating performance from before to after flotation are negatively related: when operating performance fails to sustain pre-listing levels of profitability, share prices fall, indicating that investors were surprised by the change in operating performance.

We also find a significant relationship between the degree of multi-nationality of a firm and its long-run performance. This effect was strong for both the small and large

firms alike. The more multinational a firm (in terms of subsidiaries in different countries) the better is the long-run performance. This could be the result of diversification of the risk of a firm and the positive effect this has on investors' sentiments. This result validates hypothesis 6 and suggests that investors value multinational firms more than domestic firms. Multi-nationality signals quality and reputation of a firm.

We also document a relationship between ownership change at the time of IPO and long-run performance. We find that the higher the proportion of equity sold at the time of offering (i.e. the higher the dilution of original share holdings) the worse is the long-run performance. The result is stronger for large firms. These results are consistent with the predictions of Jensen and Meckling (1976) who argued that incentives of an owner/manager change when shares are issued to another party[9]. Mikkelson and Partch (1985) provide evidence that a decrease in ownership concentration of publicly traded firms lowers share value. Jain and Kini (1994) also find a significant positive relation between post-IPO operating performance and equity retention by original shareholders. Hence hypothesis 7 cannot be rejected.

The results for the relation between initial and long-run performance are stronger than those from the previous research. We find a negative relation between initial returns and long-run returns for large firms. The higher the return on the first trading day the worse is the performance in the long-run. These results are consistent with those of Ritter (1991) and Levis (1993).

VII. Conclusions

This study attempts to fulfil the great need for the UK evidence on long-run performance of IPOs. We have found relationships between pre-IPO management decisions and long-run performance that have not been documented before. Keeping in mind the crude proxy for ownership that we have used in our study, we feel that there is a greater need for future research to focus on ownership structure and long-run returns. Further, a lack of focus on decisions such as the level of debt and venture capital financing in the pre-IPO scenario may mask important relationships with the long-run performance of a firm.

The results obtained from this study provide important information for the prospective investors in new issues. While, pre-IPO performance of a firm cannot predict the post-IPO performance with certainty, nevertheless the results of this study suggest that long-term investors should show caution while analysing IPO firms. Firms with high costs of flotation (as a % of the funds raised), high profits before listing, high initial returns and high equity offers, should be viewed with suspicion. Large multinational firms hiring high reputation underwriters are a good long-term investment.

[9] This prediction was for seasoned firms.

Table 1 : IPOs on the UK Official List by the year of issue (excluding Investment Trusts)

	All IPOs			*Sample*			*Sample Coverage*		
Year	*Placings*	*Offers*	*Total*	*Placings*	*Offers*	*Total*	*Placings(%)*	*Offers(%)*	*Total(%)*
1991	2	13	15	1	11	12	50.00	84.62	80.00
1992	13	13	26	13	12	25	100.00	92.31	96.15
1993	29	37	66	28	36	64	96.96	97.30	96.96
1994	72	47	119	71	44	114	98.61	95.79	95.79
1995	22	4	26	21	4	25	95.45	100.00	96.15
Total	138	114	252	134	107	240	95.00	93.04	95.23
Mean	28.2	23.6	51.8	26.6	21.4	48.00	86.64	92.10	91.81
S.D.	28.05	19.62	45.81	26.66	17.49	42.04	20.65	6.70	6.91

Note : IPOs include offers for sale at fixed price and placements only. For the year 1995, IPOs listed up till June were included.
Source : KPMG New Issue Statistics

Table2: First day market adjusted returns (in %) for the IPOs (1991- mid 1995)

	Placements	*Offers for sale*	*All Issues*
Mean	11.77	7.05	9.74
t-statistic	6.90	5.24	8.54
Standard Deviation	19.43	13.30	17.21
Median	7.51	4.10	6.30
% issues with negative rtns	10.76	20.40	14.91
Total number of issues	130	98	228

Note: **(1)** From a sample of 240 companies a sub-sample of 228 was considered for short run performance since there was missing data on closing price after the first day of trading for 12 companies.
(2) The *t*-statistic for the significance of the difference of the means of the first day market adjusted returns for placements and offers was found to be 2.17 (significant at 5%).

Table 3: The average monthly MABHR returns for the 37 months after going public.

Month of Seasoning	*MABHR*	*No. of cos trading*	*Stdev of MABHR*	*t- stat*	*Month of Seasoning*	*MABHR*	*No. of cos trading*	*Stdev of MABHR*	*t- stat*
2*	0.000	240	0.087	0.051	**20**	0.003	233	0.124	0.381
3	0.000	240	0.082	-0.083	**21**	-0.008	230	0.145	-0.783
4	-0.005	240	0.102	-0.810	**22**	0.000	230	0.119	0.000
5	-0.004	240	0.119	-0.504	**23**	-0.001	227	0.142	-0.127
6	-0.009	240	0.127	-1.077	**24**	0.007	227	0.126	0.756
7	-0.005	240	0.103	-0.761	**25**	-0.017	225	0.110	-2.179
8	-0.012	240	0.085	-2.123	**26**	0.000	224	0.098	0.037
9	-0.009	240	0.083	-1.748	**27**	0.001	223	0.133	0.150
10	-0.003	240	0.102	-0.470	**28**	0.008	223	0.130	0.780
11	0.000	240	0.104	0.054	**29**	-0.018	223	0.119	-2.027
12	-0.006	238	0.090	-0.989	**30**	-0.011	221	0.138	-1.059
13	-0.014	238	0.106	-2.043	**31**	-0.001	221	0.091	-0.086
14	-0.007	237	0.090	-1.107	**32**	-0.012	219	0.101	-1.384
15	-0.018	236	0.129	-2.103	**33**	-0.022	218	0.127	-2.024
16	0.003	236	0.122	0.375	**34**	-0.019	217	0.136	-1.547
17	-0.011	236	0.122	-1.331	**35**	-0.021	217	0.135	-1.579
18	0.010	235	0.142	1.064	**36**	-0.027	217	0.113	-2.339
19	-0.005	234	0.122	-0.623	**37**	-0.015	217	0.093	-1.370

* The first month of seasoning was not included in the study to ignore the initial underpricing.

Table 4: Cross sectional long-run returns for the IPOs

Firms	Sample size	Average long-run returns MABHR36 (*t statistic)*
Market capitalization < 30million	94	-31.1% (-3.71)
Market capitalization > 30million	146	-9.2% (-1.59)
Average losses for the last three years before the IPO	62	-15.7% (-1.88)
Average profits for the last three years before the IPO	178	-18.5% (-3.16)
Net liabilities before the IPO	28	-35.6% (-2.50)
Net Assets before the IPO	212	-15.5% (-3.01)
Turnover in the year before listing < 30 million	124	-21.3% (-3.01)
Turnover in the year before listing > 30 million	116	-14.1% (-2.15)

Table 5: Description of the variables used in the study

Industry Dummies:	The dummies are based on different industry categories. [10]
Year Dummies:	These are based on the 5 different years of the initial public offering.

Proxies for quality, risk and reputation of the firm

DURATION:	The age of the issuing firm. The age has been calculated as the difference between the date of registration and the date of listing.
MSHARE:	Gives the % share for an underwriter of the total underwriting (by value) in the year of flotation.
PROFLOAT:	The average pre tax profits (or losses) for the last three years before the listing.
COST:	The total direct costs (expressed as a percentage of the total funds raised), incurred for listing- for example underwriting fees, legal expenses, accountancy and audit fees. This variable acts as a proxy for quality of a firm.

Proxy for size of the firm

ASSFLOAT:	The net assets of the firm in the year before the listing.
MCAPFLOT:	Gives the market capitalisation of the firm at the time of the prospectus.
FUNDS:	The money raised from the public offering. It is used as a proxy to measure the size of the offering.

Proxies for multinationality and diversity of products

DIVERPRD:	Gives the number of two digit standard industrial classification codes for the firm. This is used to show how diverse the company is in its products.
GSCOPE:	Shows how multinational a firm is. The digit 1 is assigned if at least 1 subsidiary of the firm is present in a particular continent (the subsidiaries have been assigned a continent depending upon their location) and 0 if there are none. The score is then summed to give GSCOPE. The higher the GSCOPE the more multinational the firm is. The minimum value of GSCOPE is one (i.e. the firm is based in the UK and has no subsidiaries based outside the UK) and the maximum value is 7 (i.e. a firm with a GSCOPE of 7 has at least 1 subsidiary in all the geographic areas considered in this study). The geographical areas considered are UK, Europe, North America, South America, Africa, Australia and Asia.

Proxy for Agency Costs after the IPO

EQUISSUE:	Gives the percentage of equity issued at the offering, thus gives the extent of original shareholders' dilution of ownership due to the offering.

[10] Industry category is the one digit code (used by the London Stock Exchange) indicating the main industry a firm belongs to. A list of industry codes is given in the appendix.

Table6: Characteristics of sample variables

Variable	Mean	Median	Min	Max	Sample	% -ve obs
DURATION (days)	3403.80	1475.00	50.00	34487.00	229	--
COST	0.062	0.050	0.002	0.303	224	--
PROFLOAT(£'000)	5635.60	1289.30	-56910.70	427000.00	252	26.35
ASSFLOAT(£'000)	40501.80	8057.50	-889000.00	2181000.00	239	11.71
MCAPFLOT (£'000)	133375.10	42842.50	1280.00	4502478.00	239	
DIVERPRD	1.63	1.00	1.00	6.00	239	--
GSCOPE	1.93	1.00	1.00	6.00	238	--
FUNDS(£'000)	71572.50	17750.00	290.00	2230698.00	239	--
EQUISSUE	0.48	0.45	0.07	1.00	230	--
MSHARE	0.06500	0.04200	0.00004	0.44790	225	--

Table7 : Costs of going public as a % of gross proceeds 1991-95

Funds raised from flotation (£,000)	No. of Firms	Total funds Raised (£'000)	Total costs (Flotation) (£'000)	Total costs as % of total funds raised
1000-5,000	28	96875	11171	11.53
5,001-8500	29	189906	15184	8.00
8501-12600	29	310009	16169	5.22
12601-16500	28	413139	23207	5.62
16501-24000	29	596586	28220	4.73
24001-35000	26	760290	33410	4.39
35001-66000	29	1418968	67720	4.77
66001-above	26	8063625	199400	2.47

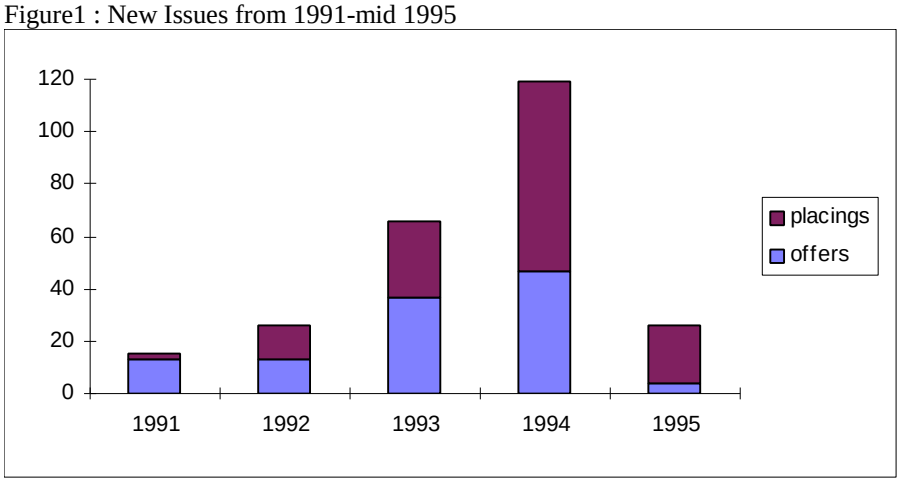
Note: Funds raised categories are nominal; no price level adjustments have been made

Table 8: Estimating long run returns
OLS results for small and large firms (Dependent Variable: MAAR36)

Regressor	Coefficient (*t* statistic)		
	OLS (small firms)	OLS (large firms)	OLS (All firms)
Constant	-0.127 (-0.303)	-0.571 (-2.050)**	-0.712 (-2.530)**
YEAR 92	-	0.645 (1.851)*	0.949 (3.747)***
YEAR 93	-	0.619 (1.969)*	0.794 (3.425)***
YEAR 94	0.214 (1.153)	0.556 (1.965)*	0.895 (3.817)***
YEAR 95	-	0.754 (2.000)**	0.981 (3.632)***
MSHARE	-0.432 (-0.477)	-0.204 (-0.194)	0.026 (0.030)
COST	-3.685 (-2.111)**	2.445 (0.751)	-2.532 (-1.834)*
FUNDS	-0.015 (-0.687)	5.611×10^{-4} (0.806)	2.059×10^{-4} (0.350)
DURATION	-1.190×10^{-5} (-0.937)	2.462×10^{-6} (0.112)	7.203×10^{-6} (0.691)
DIVERPRD	0.030 (0.320)	-0.192 (-1.742)*	-0.071 (-0.912)
PROFLOAT	-0.030 (-0.437)	-0.0216 (-3.503)***	-0.0213 (-3.227)***
ASSFLOAT	0.043 (2.876)***	9.652×10^{-4} (1.068)	1.543×10^{-3} (1.842)*
GSCOPE	0.184 (2.194)**	0.940 (2.255)**	0.097 (2.436)**
MAAR0	-0.003(-1.027)	-0.013 (-3.701)***	-0.006 (-2.297)**
EQUISSUE	-0.543 (-1.108)	-0.576 (-1.669)*	-0.635 (-2.365)**
ID1	-	1.157 (4.066)***	0.789 (2.935)***
ID 2	-0.497 (-1.976)*	0.369 (1.444)	0.014 (0.064)
ID 3	-0.618 (-2.386)**	0.107 (0.539)	-0.229 (-1.481)
ID 4	0.192 (1.017)	0.184 (0.925)	0.052 (0.386)
ID 5	-1.718 (-7.018)***	0.295 (1.435)	-0.097 (-0.473)
ID 6	0.212 (0.875)	0.648 (2.749)***	0.361 (2.315)**
ID 7	-	0.676 (3.180)***	0.516 (2.514)**
DIAGNOSTICS			
Adj.R^2	0.06259	0.13817	0.08456
F stat.	1.31**	1.89**	1.85**
Log-likelihood	-72.8753	-109.5321	-196.1679
Restrd. Log-likeh'd	-84.4497	-129.9772	-215.9118
Sample	76	118	194

* Estimate significant at the 10% level.
** Estimate significant at the 5% level.
*** Estimate significant at the 1% level.

Figure1 : New Issues from 1991-mid 1995



Includes all the listings on the Official List (placements and offers) excluding Investment Trusts.
For the year 1995 , listings till the month of June have been shown.
Source : KPMG New Issue Statistics

Figure2: Monthly MABHR Returns for the year 1991-1995

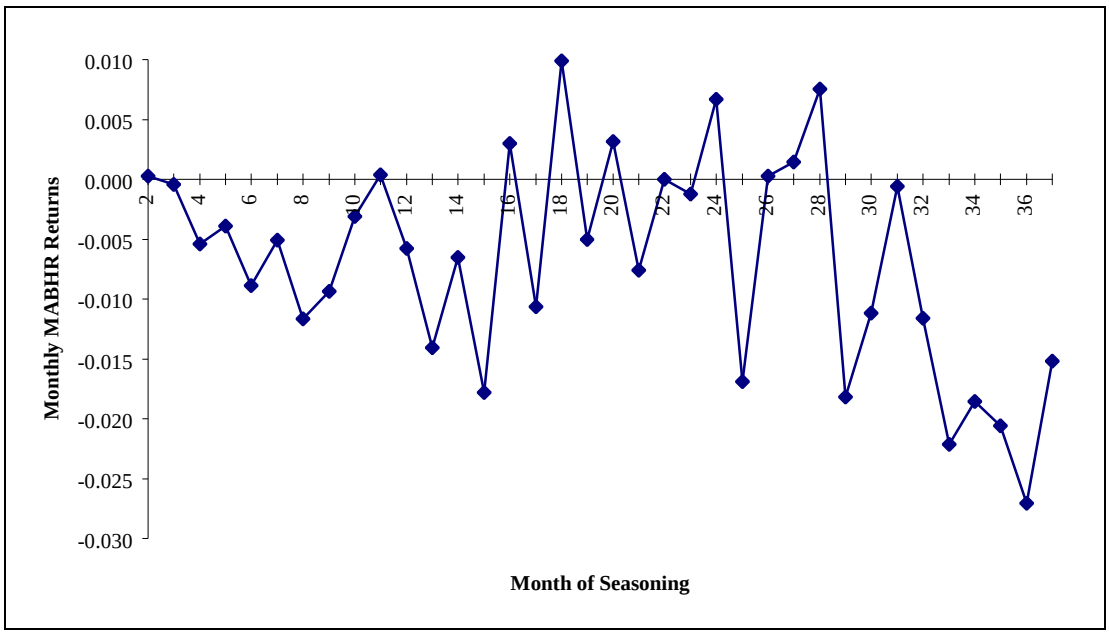
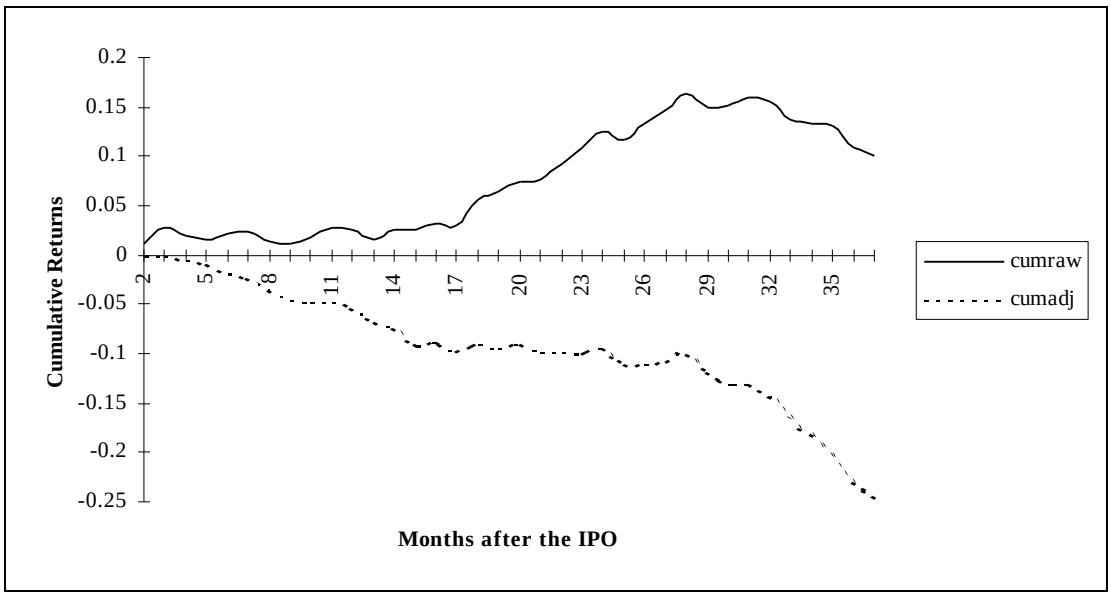


Figure 3: Long-run performance of the IPOs 1991-95



Appendix:

(1) New Issues from 1991 till June 1995

Year	Placings	Offers	Total
1991	25	21	46
1992	36	12	48
1993	52	72	124
1994	106	84	190
1995*	52	8	60

(1)Offers and Placings and include the investment trust companies.
(2) For 1995, IPOs till the month of June are reported.

(2) Industry Dummies

ID1	Extraction of minerals, mineral products and ores and chemicals
ID2	Metal goods, engineering and vehicle industries
ID3	Other manufacturing industries
ID4	Construction
ID5	Distribution, hotels and catering
ID6	Transport and communication
ID7	Banking, finance, insurance, business services and leasing

(3) Descriptive statistics of the variables

Variables	Skewness	Kurtosis
FLOAT	-0.2	1
COST	2.3	10.4
DURATION	3.2	13.8
PROFLOAT	9.8	117
ASSFLOAT	6.7	70.6
FUNDS	6.7	53.7
EQUISSUE	0.9	3.6
MSHARE	6.1	61.1
GSCOPE	1.5	4.3
MAAR0	4.1	27.7
MCAPFLOT	7.3	67.3
DIVERPRD	1.6	6.4

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