

# **The Performance of Private Equity Backed IPOs**

**Mario Levis\***

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Cass Business School  
City University, London  
Cass Private Equity Centre (CPEC)  
106 Bunhill Row  
London EC1Y 8TZ

email: [m.levis@city.ac.uk](mailto:m.levis@city.ac.uk)

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### **Abstract**

The paper analyzes the characteristics and aftermarket performance of private equity-backed IPOs and compares them with equivalent samples of venture capital-backed and other non-backed issues during the period 1992-2005. The results suggest marked differences across the three groups in terms of market size, industry classification and key operating characteristics at the time of flotation. Private equity-backed IPOs outperform their counterparts throughout the 3-years period; the evidence of outperformance is robust across different benchmarks and estimation procedures. Their aftermarket performance is positively related to their level of leverage immediately after flotation; the equivalent returns of venture capital-backed and non-backed issues are related to measures of operating efficiency, size and the timing of their offerings.

# The Performance of Private Equity Backed IPOs

## 1. Introduction

In sharp contrast to the widespread evidence of IPOs underperformance in the aftermarket, flotations backed by private equity investors appear to defy the norm. Early studies by DeGeorge and Zeckhouser (1993), Holthausen and Larcker (1996) and Cao and Lerner (2009) more recently show that IPOs returning to public status after a period as private companies, usually referred as reverse leveraged buyouts (RLBOs), outperform other IPOs.

Given the general public interest in private equity, it is not surprising that the performance of such private equity-backed issues has attracted considerable media attention. The Financial News (2008 and 2009), for example, reported that such IPOs have outperformed other issues both in US and Europe in recent years; the equally strong outperformance of their UK counterparts has been described as “*A Rare Tribute to Private Equity*” (Evening Standard 2008).

The debate about private equity often focuses on its potential sources of added value. In a seminal paper, Jensen (1989) has argued that operational efficiencies, achieved by closer monitoring, management expertise, and higher levels of leverage are the key value drivers for the private equity model. Although it is often assumed that such benefits normally accrue during the period that a company is under private equity control it is also reasonable to expect that management and financial practices put in place at the time under private equity ownership will be maintained at least for some time after the exit. This is particularly the case since private equity sponsors are entirely responsible for the structure, terms and timing of the float. Furthermore, the involvement of the private equity sponsors is not completely terminated at the time of IPO; lock-up agreements, performance incentives and liquidity considerations often result to private equity original sponsors retaining significant albeit reduced holdings with significant wealth and reputational implications. Thus, it could be argued that private equity-backed IPOs provide a fertile ground for assessing the impact of private equity in general as they offer a more complete view of the contribution made by the private equity sponsor through the full length of their involvement with the company. Moreover, a direct comparison with venture capital-backed and other non-backed issues offers a unique opportunity to re-assess the aftermarket performance of IPOs in general and explore possible differences that may relate to any emerging performance differences.

Surprisingly comparative evidence on the performance of sponsored, both venture capital and private equity backed, and non-sponsored IPOs is relatively sparse. Cao and Lerner (2009) is the only recent study that offers a direct comparison between the aftermarket outperformance of RLBOs and other non-sponsored IPOs. Outside the US the evidence is even thinner. There is, for

example, sporadic evidence across different countries assessing independently the performances of VC-backed IPOs, and buyouts with or without private equity backing.

To gain some further understanding into the implications of private equity involvement with their floated portfolio companies this paper addresses three main questions. First, it uses a hand collected sample of private equity-backed (PE), venture capital-backed (VC) and other non-backed (NB) IPOs to analyze the typical profiles of such firms across the three groups. The findings reveal significant differences in the composition of the three samples in terms of size, maturity, profitability and industry structure. PE-backed IPOs at the time of flotation are larger in terms of market capitalisation, total assets and sales, more profitable and maintain higher levels of debt and they are less underpriced than their other non-sponsored counterparts.

Second, the paper examines the aftermarket performance of each of the three groups of IPOs and documents significant differences among them. While abnormal buy-and-hold returns of PE-backed IPOs remain positive and significant during the entire period under consideration, the performance of the VC-backed and their other IPO counterparts is consistently poorer or negative. The positive and significant intercepts in the Fama-French regressions for PE-backed IPOs also confirm that their outperformance is not due to size or book-to-market effects; furthermore, in spite some sizeable differences in cohort and calendar performances the evidence also suggests that the differences are not due to timing of the different IPO groups or the result of some extreme performances of a very small group of IPOs.

Third, in a preliminary attempt to shed some light into the possible underlying sources of added value by private equity the paper examines the pattern of relations between the 3-years performance and various aspects of firms' characteristics immediately after the IPO. The results of the cross sectional analysis suggest marked differences across the three groups of IPOs. The level of leverage immediately after flotation emerges as the sole factor to have a positive and significant relation with the 3-years return for the group of PE-backed IPOs.

Finally, the findings of this paper, also offer an important new dimension on the general IPOs' aftermarket underperformance reported by numerous studies during the last twenty years. Performance may indeed differ across time and countries, depending on the composition of the overall IPO sample in terms of private equity, venture capital and other IPOs.

The paper is organised as follows. Section I provides a brief literature review of aftermarket performance for PE and VC-backed IPOs while section II, describes the unique sample and methodology used in this study. Section III, highlights the key differences across the three groups of IPOs in terms of timing, size, industry composition, first day performance and operational characteristics. Section IV, outlines the evidence of aftermarket performance while Section V,

explores performance differences across IPOs. Finally, Section VI outlines the main conclusions of the paper and offers suggestions for future research.

## **I. Related Literature**

The weight of international evidence on IPOs in general suggests sizeable positive returns on the first day of trading and significant underperformance in the aftermarket. The positive first day returns are often related to the characteristics of the IPOs themselves or their sponsors, various types of information asymmetry or just market overreaction while the long run underperformance is linked to windows of opportunity enticing companies to go public when investors are overly optimistic about the market and/or the industry that such companies operate.

It is important to note that the available evidence on first day returns and aftermarket underperformance differs across types of IPOs and performance estimation methodologies. Megginson and Weiss (1991), for example, show VC-backed IPOs to have relatively lower first day returns which they attribute to venture capital certification reducing information asymmetry between investors and issuing firms. They also find that VC-backed IPOs are younger relative to their non-backed counterparts. as the certification provided by VCs allows them to come to market sooner. The rationale for bringing portfolio companies early to the market is consistent with Gompers' (1996) grandstanding hypothesis. He argues that less-established VC firms need to signal quality by taking portfolio companies public; consistent with this argument he finds that younger VC firms take younger companies public and allow greater underpricing. Lee and Wahal (2004) and Hogan, Olson and Kish (2001) document a similar pattern of lower average first day for a sample of reverse LBOs during the period 1988 to 1998.

The differences across the three groups are even more striking in the aftermarket performance. Brav and Compers (1997), for example, using a sample of 934 US VC-backed IPOs during the period 1972-1992, they find that they outperform non-venture-backed IPOs, at least in equal weighted returns. Such superior performance by VC-backed IPOs is often attributed to the set up of better management teams and corporate governance structures that help such companies perform better in the long-run and possible less exposure to bouts of investor sentiment. Krishnan et al (2009) provide further support to this view by showing that venture capital firms with better reputations invest in portfolio companies with better long-run post-IPO performance.

Outside the US the evidence is also mixed. Rinderman (2003), for example, using a rather small sample of VC-backed IPOs in Germany, UK and France find some evidence of underperformance for VC-backed IPOs in Germany and UK but such differences were not statistically significant; instead, they find that just a subgroup of internationally operating venture capitalists has a positive effect on both the operating and market performance of portfolio firms.

Coakley et al (2008) using a sample of 571 venture and non-venture backed IPOs in UK during the period 1985-2000 also find no evidence of significant differences in long run performance between VC-backed and other IPOs during the entire period; their evidence, however, tends to suggest outperformance of venture backed IPOs during normal market conditions. Hamao, Packer and Ritter (2000) using a sample of 355 Japanese IPO firms between 1989-1994, also find the long-run performance of venture capital-backed IPOs to be no better than that of other IPOs, with the exception of firms backed by foreign owned or independent venture capitalists.

There is also evidence referring to the long-run performance of Reverse Leveraged Buyouts (RLBOs) and buyouts. Early studies by, DeGeorge and Zackhauser (1993), Holthausen and Larcker (1996) find evidence of better accounting performance by RLBOs before flotation, in comparison with their peers, and no evidence of market underperformance, or at least no worse accounting performance in comparison with their peers. Mian and Rosenfeld (1993) in their study of 85 RLBOs also report better aftermarket performance that appears to be driven by takeover activity; such activity occurs during the second year, the time period in which the RLBOs appear to perform the best. More recently Cao and Lerner (2009) using a large sample of RLBOs during the period 1980-2002 provide evidence of outperformance in the 5 years after the IPO in comparison both to other IPOs and various market benchmarks. The outperformance appears to be consistent across different benchmarks but high leverage is not affecting performance. Ritter (2009) in a recent factoids report for the period 1980-2006 shows an average 3-year buy-and-hold market adjusted return for VC-backed IPOs of -12.9%, and an equivalent return of 7.1% for their private equity (buyout) counterparts.

Cao (2009) in an effort to shed light to such patterns of performance shows that the length of the private equity involvement before the IPO is negatively related to the hot IPO market proxy and industry valuation, suggesting that sponsors spend less time in LBOs under favourable external market conditions. RLBOs with shorter LBO duration experience greater deterioration of performance after listing of immature LBOs. Cao (2008) also finds that that buyout sponsors take LBOs public when they has achieved the most improvement. RLBOs do not experience operating performance deterioration after going public. Katz (2009) offers further insights into the role of the private equity sponsors on the aftermarket performance of private equity-backed IPOs. He shows that firms with majority ownership by private equity sponsors experience better long-term stock price performance. Moreover, also firms run by larger sponsors also exhibit better long term financial and stock price performance when they go public. His findings are consistent with tighter monitoring by larger PE sponsors with higher ownership stakes.

The evidence on the performance of PE-backed IPOs outside the US is sparse and inconclusive. Jelik, Saadouni and Wright (2005) focus on the performance of management buyouts

exiting through an IPO but they find no evidence of significant differences in the long-run performance between PE-backed MBOs and their non-PE-backed counterparts. Bergstrom et al (2006) also examine the performance of a sample of PE-backed IPOs in London and Paris. Although they do find PE-backed IPOs to outperform other IPOs, both groups exhibit strong negative abnormal returns for periods up to 5 years in the aftermarket.

The growing evidence on the positive aftermarket performance of PE-backed IPOs is entirely consistent with a separate but interrelated stream of literature documenting positive performance for LBOs in the period following the transaction. Acharya and Kehoe (2009), for example, find that the difference in performance between buyouts and other similar firms is related to operational strategies and governance changes. More specifically, they find that these two factors account for an average 20-30% of average deal IRR, another 25-35% is due to financial leverage and the remaining relates to the exposure to the quoted sector. Guo et al (2007) using a sample of 94 leveraged buyouts completed by 2005 show that cash flow gains are greater for firms with higher pre-buyout leverage and greater increases in leverage as a result of the buyout. Cash flow improvements are also linked to operating performance improvements and changes in key management (SEO) after the buyout.

In short, while there is still disagreement about the performance of VC-backed IPOs in US and other countries, the weight of the evidence in the US points to consistently positive excess returns for IPOs backed by private equity investors. Although it is often assumed that such superior performance is related to agency issues, closer monitoring and possibly leverage, the extant evidence remains both limited and inconclusive.

## **II. Sample and Methodology**

The study uses a sample of 1,595 IPOs listed on the Main and Alternative Investment (AIM) markets of the London Stock Exchange during the period January 1992 to September 2005. The sample excludes Investment Trusts, re-listings and transfers across the markets. The full schedule of IPOs listed in UK markets originates from the London Stock Exchange statistics; this covers details for industry classification, market capitalisation, amount raised and issue price.

The identification of VC and PE-backed IPOs remains a challenge. This is due to the combined effect of limited publicly available information for private companies and the overlapping nature of the sponsors involved in VC and PE activities. The majority of US studies are based on sample of firms that return to public markets as an IPO after a period of restructuring under private ownership; these are usually referred as RLBOs.

For the purpose of this study, a PE-backed IPO is defined as a company where the private equity investor(s) has a controlling interest acquired at the stage of a management buyout or a

management buy in. The sample also includes companies returning to public ownership following a public to private (PTP) leveraged buyout and a period of private ownership, i.e. RLBOs. They often have a highly leveraged capital structure but this is not a criterion for defining an IPO as private equity backed.

VC-backed IPOs are companies that have received venture capital funding at some point before going public as a start-up, development or expansion or for a secondary purchase. The funding for such purposes could take place only once or in several rounds. In contrast, to the PE-backed group, VC sponsors usually have a minority interest and are prepared to invest for longer periods. It is also worth noting that in the UK there is a significant overlap among the sponsors in venture capital and private equity backed IPOs. About 40% of the total 118 sponsors, have been involved in both types of transactions during the sample period 1992-2005. The 3i Group, for example, as the largest UK sponsor has been involved as a single backer or as a member of a syndicate in 84 VC-backed and 61 PE-backed IPOs; thus, in total the 3i Group has been involved in 32 percent of the total 454 VC and PE-backed IPOs.

A number of different sources were used to identify VC-backed and PE-backed IPOs; Unquote for example, a trade publication provides regular details on individual transactions both VCs and buyouts; Thomson Venture Expert also provides coverage on the various types of exits by private equity firms. Additional information on the nature of the individual IPOs was obtained from Factiva searches on individual companies. The final classification of VCs and PE-backed was completed on the basis of information from the individual company prospectuses obtained through the Perfect Filings database and the help of the British Venture Capital Association (BVCA). The prospectuses also provided the information on other characteristics of all IPOs including the identity of underwriters, and the venture capital and private equity sponsors. They also provided some information on the private equity and venture capital ownership stakes before and after flotation; such information, however, is not complete particularly for the pre-flotation period. The sample comprises 1,595 non-PE backed (NB), 250 Venture Capital backed (VC) and 204 private equity-backed (PE) IPOs.<sup>1</sup> This final sample provides a widespread representation of the population of venture and private equity backed IPOs in the UK.

Aftermarket performance is measured by buy-and-hold abnormal returns (BHARs); they are computed as:

$$BHAR_{it} = R_{it} = \prod_{t=1}^T (1 + r_{it}) - \prod_{t=1}^T (1 + r_{mt}) \quad (1)$$

where  $r_{it}$  is the raw return on company  $i$  in event month  $t$ . This measures the total return from a buy and hold strategy where an IPO is held from the end of the first day trading until the earlier of either its third-year anniversary or its delisting. Thus, BHARs include a maximum of 36 month in addition



to the first partial month after the first day of trading. When a firm in portfolio is delisted from the database, the portfolio return for the next month is an equally weighted average of the remaining firms in the portfolio. Thus, the estimation of buy-and-hold returns involves monthly rebalancing, with the proceeds of the delisted firm equally allocated among the surviving members of the portfolio in each subsequent month. The monthly returns data, including capital appreciation and dividends, as well the first partial month of trading for the individual IPOs was obtained from *Datastream*. To test the null hypothesis that the mean *BHARs* are equal to zero we use both the conventional *t*-statistic and a skewness-adjusted *t*-statistic with bootstrapped *p*-values as suggested by Lyon, Barber and Tsai (1999) and adapted by Jelic, Saadouni and Wright (2005).

BHARs are reported for three benchmarks. The FTSE All Share Index, Size-adjusted benchmarks reflecting the market capitalization of individual companies and Industry benchmarks reflecting the broad industry classification of each IPO. The FTSE All Share Index consists of three sub-indices. First, the FTSE 100 comprises the 100 largest companies on the London Stock Exchange, representing approximately 80% of the UK market. Second, the FTSE 250 includes the mid-capitalised companies, not covered by the FTSE 100 and representing approximately 17% of UK market capitalisation. Third, the FTSE SmallCap comprises companies outside the FTSE100 and FTSE250 and represents approximately 2% of the total market capitalisation. The size-adjusted benchmark used in this study assigns IPOs to one of these three benchmarks according to the market value of the IPO at the date of the offer. Given the predominance of small companies in sample only 3% of the IPOs are assessed against the FTSE100, 17% on the FTSE250 and the remaining 70% on the FTSE SmallCap index. Industry adjusted BHARs are based on the 10 broad FTSE sector indices.<sup>2</sup> BHARs are reported both on equally and value weighted basis; weights are based at market values at offer for each of the three groups, adjusted for inflation and the actual number of IPOs included in the BHAR estimates for each of the 36 months.

Aftermarket performance is also assessed using the Fama and French (1996) three-factor model; this is based on equal and value weighted of the following equation:

$$R_{pt} - R_{ft} = a_i + b_i(R_{mt} - R_{ft}) + s SMB_t + h HML_t + \varepsilon_t \quad (7)$$

Where *SMB* is the return on small firms minus the return on large firms, and *HML* is the return on high book-to-market return minus the return of the low book-to-market portfolio and *R<sub>f</sub>* the 90-days Treasury bill rate. The *SMB* and *HML* portfolios are formed on a 2x3 basis by sorting companies at June each year by BMV and market capitalisation; portfolios are constructed on both equal and value weighted basis.

To assess the possible impact of underwriters and private equity firms reputation on performance, a number of separate measures are developed for the purpose of this study based IPO market share of the lead underwriter in each year. The majority of IPOs in the UK use a single underwriter, or a nominated advisor for AIM listings, in placements and fixed offers for sale. Syndicates are the norm for larger issues on the Main market using the book building mechanism. This study uses a simple a three level ranking classification system to define reputation of underwriters and venture capital/private equity groups. The top rank (3) includes all underwriters that make up 50% of the IPO market share during the whole sample; rank 2 includes the next 35% of market share while rank includes all others that have 15% of market share. A total of 163 underwriters involved in all 1,595 IPOs. It is important to note that this type of classification results to inevitable link between the size of the issue and sponsors' reputation.

A similar measure, based on market share is used to define reputation of the 119 sponsors involved in the venture capital and private equity backed IPOs. To account for the limited market share of a number of some large non-UK private equity groups the original list of top ranked groups was augmented by adding four US private equity groups with some activity in UK. The top 17 sponsors, as single or joint backers, account for 64% of the total value of the 454 VC and PE-backed IPOs. The majority – 52% - of the PE-backed IPOs involved only a single sponsor while the remaining included more than one PE group. In some cases a total of six sponsors were involved in the same IPO. A total of 67.8% of the PE-backed IPOs were listed with the backing of top rated sponsors; on the other hand, only 52.4% of the VC-backed counterparts had the backing of top rated sponsors. The involvement of top ranking underwriters and sponsors across the three groups reflects to a certain extent the market capitalisation of the corresponding IPOs. Market size differences are also reflected in the size of the sponsor syndicates for VC and PE-backed IPOs. The average size, for example, of the syndicate for VCs is 1.5 sponsors while the equivalent size for buyouts is 2. In total, 14.2% of all PE-backed IPOs have more three sponsors in comparison to 6% only for VC-backed IPOs.

### **III. Comparative statistics across the three IPO groups**

Table I, provides details of the annual composition for the whole sample (ALL) of 1,595 UK IPOs included in this study during the period January 1992 to September 2005; 250 of them were venture capital backed (VC), 204 had private equity-backing (PE) and the other 1,141 were ordinary IPOs without any VC or PE backing (NB). A total of £63.1 billion has been raised by the entire sample of IPOs during the sample period; PE-backed buyouts account for 12.8% in terms of volume and 21.7% in terms of the amount raised. On the other hand, VC-backed IPOs account for 15.7 percent in terms of volume but only 9.9 percent of the total amount raised. The table also shows significant

variations and cycles of IPO activity during the sample period. More than 50%, for example, of the total number PE-backed IPOs were listed during the 4-year period 1993 to 1996 representing exits from the previous buyout wave in the late 1980s. The technology IPO boom peaked in 2000, with 183 non-PE backed IPOs coming to the London markets but only 33 and 8 VC and PE-backed respectively.

Both the relative size of the PE-backed IPOs and the surge of such activity in the 1990s are broadly consistent with the US pattern described in Cao and Lerner (2009). In US, however, VC-backed offerings account for a considerably larger proportion of the total IPO market than in UK. This could be due to the apparent differences in the size of the two markets but of course also due to possible data collection limitations.

*Insert Table I here*

PE-backed IPOs are on average larger companies in terms of market capitalisation (£125 million) than VC-backed counterparts (£84 million) and other IPOs (£100 million). The average statistics, however, for the amounts raised and market capitalisation mask significant differences in the size distribution of the three groups. Closer examination reveals that almost 60% of the non-backed IPOs joined the markets at market capitalisation below £20 million, in comparison to the just 38% and 17% of IPOs in this size bracket for VC and PE-backed respectively. In total, across the three groups, there are 28 IPOs with a market valuation larger than a £1 billion at the offer price; they account for almost half (46%) of the total market value of all IPOs in the sample. Interestingly, 25 of them are non-backed, three are VC-backed and only one is a PE-backed IPO. In fact, the three VC-backed issues account for 19% of the total market value of this particular group.

The three groups of IPOs also differ in terms of the industrial distribution. Table II, shows the number and total amount raised by industry and highlights some significant differences among the three groups of IPOs. While for example, 60% of the amount raised for PE-backed IPOs relates to Consumer Goods and Services, VC-backed issues are more involved in Health Care and Technology sectors (45%) particularly during the dotcom boom. Financials account for about 24% of the non-backed IPOs. The differences in industrial distribution across the three groups, are also important as they may have implications for the aftermarket performance comparisons.

*Insert Table II here*

Table III (panel A) presents summary statistics for the size and operating performance of the three groups of IPOs. More specifically, it shows the median values of the number of employees, market capitalisation, total assets, net sales, EBITDA, sales to total assets (asset turnover), EBITDA to sales (operating margin) and total debt to total assets (leverage) for each of the three groups of IPOs. All estimates are computed during or at the end of the fiscal year of the IPO.

The table clearly indicates that PE-backed IPOs are not only larger in comparison to their counterparts in terms of market capitalisation, but they are also differ across a number of other operational characteristics. For example, in terms of net sales and total assets they are about 4 to 7 times larger than non-backed and VC-backed IPOs. They also have a record of solid positive earnings in contrast to their counterparts who are only marginally profitable; the last EBITDA estimate, for example, for the typical PE-backed IPO was £5.2 million while the equivalent estimates for VC-backed and other IPOs are well below the £1 million mark. Such differences are not totally surprising given that private equity and venture capital investors apply very different criteria in their selection of their portfolio. They may also reflect, however, the timing of their exits and of course the actual impact such investors had and may continue having on their portfolio companies. Cao (1998), for example, suggests that the timing of the exits by PE sponsors is planned to occur when their portfolio companies have reached a level of growth and maturity to make them attractive for market flotation.

Despite, however, of differences in size and profitability the relative valuations of PE-backed issues at the time of flotation, both in terms of market capitalisation to EBITDA and sales, are relatively modest in comparison to their VC and NB counterparts. Such differences in valuations may of course reflect the timing of their respective flotations, their industry composition, the perceived riskiness of such IPOs and the need to protect the reputation of PE sponsors who need to manage a stream of continuous of divestments. In terms of timing, for example, we show in Table I that the majority (55%) of the total number of PE-backed IPOs were floated during the period 1993 to 1996; in sharp contrast, only 18% and 39% of the NB and VC issues went public during the same period. In contrast, a relatively large number of small VC-backed and other non-backed IPOs dominated the technology bubble of 1999-2000.

PE-backed IPOs are also more effective in terms of asset turnover with a ratio of 1.48 in comparison to 1.05 for their VC counterparts; their operating margin of 15% is almost twice (7.7%) the equivalent of non-backed and about 3 times (5.4%) of non-backed and VC-backed issues. Given the nature of the private equity model it is also not surprising, that the debt to total assets ratio for PE-backed IPOs is 44.2 percent, twice the equivalent levels of their NB and VC counterparts. The average leverage estimates reported in Table III are consistent with Brav's (2009) findings on the debt utilisation by private firms in UK but higher than the equivalent leverage ratio for RLBOs in US reported by Cao and Lerner (2009). It is worth noting, however, that the exact debt ratio is sensitive to the exact timing of the flotation in the relation to the fiscal year-end; the last available accounts for some companies, for example, refer to the situation just before flotation while for others it is soon afterwards.

Table III, panel B, shows summary statistics for number of years of venture capital and private equity investment before the IPO and their respective percentage ownership before and after the IPO. Venture capital sponsors are involved with their portfolios companies for an average of 4.5 years before flotation; the equivalent investment by private equity investors is just 3.7 years. There are also marked differences in the ownership structures, before and after IPO, among VC and buyout transactions. In a typical buyout the private equity group(s) will normally maintain significant ownership holdings in their portfolio companies; private equity investors hold an average 55.9 percent of the company's equity just before the IPO; the equivalent proportion for VC-backed companies is only 33.9. Immediately after flotation, both VC and PE sponsors reduce their percent ownership to 23% and 26% respectively of the expanded equity basis.

Thus, PE-backed IPOs in UK are markedly larger in terms of assets than RLBOs in US (Cao and Lerner 2009) but they are almost identical in terms of length of investment and ownership by the private equity groups before the IPO. US private equity investors, however, appear to retain a larger proportion of their floated companies immediately after the IPO (39.9%) in comparison to their UK counterparts (23.6%).

*Insert Table III (A, and B) here*

Table IV reports summary statistics for first day returns for each of the three groups of IPOs and the sample as a whole. The average first day return across all IPOs during the period 1992 to September 2005 was 18.6%, a level somewhat higher than the equivalent estimates reported in previous UK studies. The 1999-2000 dotcom bubble had a striking effect on first day returns for VC-backed and other IPOs; they reached average levels of 83.5% and 39.5% respectively during this period while the equivalent average returns for the PE-backed IPOs were practically unaffected. This is the combined result of the relatively few PE-backed IPOs floated in the London markets during the bubble period and the small number of such issues in the technology sector. In general, however, average first day return are driven by the strong performance of smaller IPOs; the value weighted return across all IPOs is just 9.9%.

There are also marked differences in average equal weighted first day returns among the three groups of IPOs; while, for example, the average first day returns for non-sponsored IPOs is 21.1%, their VC and PE-backed counterparts end their first day of trading at equivalent returns of 14.1 and 9.1% respectively. The lower underpricing of PE-backed IPOs both in equal and value weighted terms is probably the combined result of lower risk, more aggressive pricing and private equity group certification. A similar picture emerges from the average money left on the table by each of the three IPO groups. PE-backed IPOs leave only £7.3 million on the table while the equivalent amounts for their VC and NB counterparts are £16.9 and £12.4 million respectively.

*Insert Table IV here*

#### **IV. Long-run performance**

Table V reports buy and hold abnormal returns (BHARs) for the entire sample of IPOs during the period January 1992 to September 2005; they are calculated until the earlier of the three-year anniversary or the delisting date; the latest date for returns data is September 2008. They are reported for 12-month intervals, excluding first day returns, for each of the three groups and the whole sample of IPOs using three alternative benchmarks, the FTSE All Share index, the FTSE size-matched benchmark and the FTSE sector indices described in section 2. The number of IPOs included in the calculation of returns declines with the month of seasoning; the 36-month estimates are based on an average of 83% of the original sample of IPOs with only marginal variations across the three groups; the reduction in the samples are due to the combined effect of delistings following mergers, suspensions and bankruptcies.

The results for the entire sample of IPOs in Table V(A) are consistent with the early US and UK evidence, by Ritter (1991) and Levis (1993) respectively, and numerous other studies. The 36-month BHARs are negative and statistically significant confirming once again the established pattern of average long-term underperformance. The results, however, also reveal striking differences in long-term performance across the three groups of IPOs. The negative average returns for the entire sample are predominantly due to the poor performance of non-backed IPOs; the equivalent performance of VC-backed issues is not statistically significant from zero while PE-backed IPOs outperform all three benchmarks in the aftermarket. BHARs, for example, based on the size adjusted benchmark rise from a significant 6.32% at the end of the first year of trading, to 14.92% at the second, and 22.4% at the end of the third year in the aftermarket.

Panel B shows the equivalent value weighted BHARs for the three groups of IPOs and the whole sample. It is interesting to note the sharp contrast in the 36-month performance between the non-backed and VC-backed IPOs; while large non-backed IPOs perform better than their smaller counterparts reducing the abnormal return from a significant -20.2% to just the same level as the FTA benchmark, the performance of the large VC-backed IPOs is much worse. The equivalent returns drop to -22% but remain non-significant. In fact, the significant drop in the value-weighted returns is largely due to the very poor performance of the three billion-plus issues in this group.<sup>3</sup> Market capitalisation has a marginal positive impact on the performance of the PE-backed buyouts; thus, the value weighting scheme provides some further support to the emerging positive performance of this group of IPOs.

Given the evidence by Brav and Gompers (1997) and others, the value-weighted underperformance of VC-backed IPOs shown in Table V may be somewhat surprising. Although, this reflects, to a certain extent, the particular characteristics of the type of issues that are included

in the respective sample, it is still worth noting the remarkable similarities between the aftermarket performance of VC and PE-backed IPOs and the performance of equivalent venture capital and buyout funds. The BVCA (2007) report suggests that while large MBO funds generated a 23.7% return since 1996, small MBOs generated a modest 7.3% IRR while the venture funds had a negative IRR of 1.6% during the same period.

It is also worth noting that the outperformance of PE-backed IPOs for all three alternative benchmarks is stronger than the equivalent returns reported by Cao and Lerner (2009) for the US. Furthermore, their performance continues to improve over the three-year period against in contrast to US where there is almost no further increase in excess returns after the first year.

*Insert Table V*

Table VI, panels A and B, present the Fama and French (1996) three-factor model results based on monthly returns. The three factors are RMRF, the excess return on the value-weighted market portfolio; SMB, the return on a zero investment portfolio formed by subtracting the return of a large firm portfolio from the return on a small firm portfolio; and HML, the return on a high book-to-market portfolio minus the return on a portfolio of low book-to-market stocks. The intercept of the time series regressions is an indicator of risk-adjusted performance on each of the three groups of IPOs

Consistent with the findings of the previous table the equal and value weighted alphas for the Fama-French PE-backed IPOs are 0.8 per cent per month and statistically significant. The beta coefficients on market premium RMF are positive and significant with an average coefficient of 1.0. Only the VC-backed IPOs have positive exposure to size (SMB) while all three groups have negative and significant exposure to price-to-book (HML).

*Insert Table VI here*

Empirical evidence and conventional wisdom suggest clear patterns in the long-run performance of IPOs; more specifically years of heavy issuing activity are associated with the most severe underperformance in the aftermarket. The inclusion of the technology bubble in this study's sample period is bound to have a significant impact on the average estimates of long-term performance. Table VII provides a vivid illustration of such patterns by examining the 3-year performance of annual IPO cohorts in equal and value weighted terms. PE-backed IPOs outperform the FTSE All index in 10 out of the 14 years and appear particularly strong for the cohorts of 1995, 1997 and 2002. In fact, all IPOs launched in 1997 appear to have benefited from the rise in the market as a whole in the subsequent 3 years. On the other hand, VC-backed IPOs floated during 1999-2000 suffered in the following 3 years both in equal and value weighted terms. Thus, although the positive aftermarket performance of PE-backed IPOs appears to be somewhat related to their timing, it is also clear that the overall positive performance is not due to a very small number of

exceptional cohorts. A broadly similar picture emerges from the value weighted results in the same table.

It is also interesting to note the marked variations in performance documented by that the BVCA (2007) annual performance report. The 1994 vintage continued to be the best performer from inception to 2007 but investors were disappointed with the performance of 1997-2000 vintages.

*Insert Table VII here*

Brav and Gompers (1997) point out that the annual cohort results in the previous table may be misleading on the extent and magnitude of underperformance because the returns of recent IPOs firms may be correlated. This may be particularly pronounced in years of exceptional events and IPO activity like the technology bubble in 1999-2000 that included in this study. Thus, Table VIII reports equal and value weighted calendar time returns for the three groups of IPOs. Each month, the return on all IPOs that went public within the past three years is calculated. The annual return in each year is the compound return from January through December of these average monthly returns.

The value weighted BAHRs suggest that PE-backed IPOs had a continuous run of positive performance in every single year during the 6-year post bubble period (2001-06) that came to an end in 2007. The relatively few issues listed since September 2004 outperformed the FTA benchmark during the 12-month period to September 2008, at a time when the market had already entered into a deep downward slide.

*Insert Table VIII here*

Given the marked differences in size and other operating characteristics across the three groups of IPOs reported in Table III, it is reasonable to suspect that the differences in aftermarket performance are just a reflection of these features. Thus, following Cao and Lerner (2009), Table IX reports a number of performance robustness checks. Panels A and B examine the aftermarket performance differences across the three groups by restricting the size of assets to more than £40 million (panel A) and sales to more than £10 million (panel B). The top 45.2% PE-backed IPOs in terms of assets continue to outperform their counterparts but the relatively small proportions of VC-backed and other non-backed IPOs in this size bracket, perform markedly better than the average in the equivalent groups. The buy-and-hold returns, for example, for the 24.7% of VC-backed IPOs that exceed the threshold is 15.6%, while the equivalent return for NB IPOs increases from an average of -12.1% in Table VI to 1.8%.

The performance profile for the three IPO groups is even more striking when the comparison is restricted to issues with sales greater than £10 million. While 87.3% of the PE-backed IPOs in this bracket generate a 36-month buy-and-hold return almost identical to the



average of the whole group, the 39% of the VC-backed IPOs with sales more than £10 million generate an abnormal cumulative return of 30.9%, thus effectively outperforming their PE counterparts. Marked performance improvements are also evident for the non-backed IPOs.

The third robustness check in Panel C relates to financial leverage and restricts the comparison across IPOs with a total debt to total assets higher than 10%. The contrast across the three groups becomes even sharper than in panels A and B and the average buy-and-hold returns reported in Table V; the 76.6% of the PE-backed IPOs exceeding this threshold outperform markedly their counterparts with similar levels of debt in their capital structure.

In short, the evidence suggests that while the positive performance of PE-backed IPOs is very consistent across different dimensions of operational characteristics, it is important to note that the underperformance of their counterparts is, to a certain extent, related to their size at the time of flotation. Other firms of the same size and maturity in terms of size and turnover at the time of flotation may perform equally well as their PE-counterparts. Private equity-backed IPOs, however, appear to differ from their counterparts in respect to the implications of debt utilisation on long-run performance.

*Insert Table IX here*

## **V. Performance differences across IPOs**

The marked differences in the 36-month returns across the three groups of IPO may reflect both the type of companies that private equity investors invest in and subsequently bring to the markets and the potential impact such investors may eventually have on their subsequent operating performance. A full analysis of the relative contribution of each of these two underlying aspects of performance requires assessment of both before and after-IPO operating performance which is outside the scope of this paper. However, in a preliminary attempt to shed some light into this issue, Table X reports multivariate regression results for each of the three groups of IPOs where the dependent variable is the natural logarithm of the equally weighted 36-month wealth relative. This is defined as the buy-and-hold cumulative return for each of the groups of IPOs divided equivalent buy-and-hold return of the FTA All Share index.

The set of eight independent variables included in the equations are in three groups. The first represents IPO characteristics at the time of the offer, i.e. the first day return, the logarithm of market value at the offer, the proportion of equity retained, the underwriter's reputation and a dummy variable for the dotcom bubble. Previous research suggests that long run underperformance is more prevalent among smaller issues with buoyant high first day returns, high proportions of equity retention; there is also evidence by Carter et al (1998) and others suggesting better long-run performance by more reputable lead underwriters. The second group of variables represents

operating characteristics and includes leverage (total debt to total assets) and assets turnover (sales to total assets) at the first fiscal year after flotation. Although there are changes in both of these variables for all three groups of IPOs before and after flotation, these are particularly pronounced for the leverage ratios of PE-backed IPOs; this is reduced from a median of 44.2% to just 20.6% after the flotation. Even at this level, however, PE-backed IPOs hold twice the level of total debt in comparison to non-sponsored IPOs. The third, group of variables applies to VC and PE-backed IPOs only and includes the sponsor's reputation ranking and the number of years of sponsors' investment before the IPO. All the eight regressions control for industry fixed effects.<sup>4</sup>

Table X shows the regression results for the three groups of IPOs. Equations 1, 3 and 6 focus on the first set of independent variables, i.e. issue characteristics at the time of the offer. The coefficient for the first day return is negative for both non-backed and VC-backed IPOs but only significant for the former group; in sharp contrast the equivalent coefficient for PE-backed IPOs is positive and significant (equation 6). We show in table IV, that the average first day return for the non-sponsored IPOs is more than twice (21.1%) the equivalent level of return for their PE-backed counterparts (9.1%). These findings are consistent with the notion that high first day returns, for whatever reason, are gradually corrected and result to long term underperformance from the price levels at the end of the first day of trading. On the other hand, the positive and significant coefficient in equation 6 suggests that the relatively modest returns emerging on the first day of trading are indicative of the quality of the issue and its long run performance. Market capitalisation and proportion of equity retained are only significant with the expected positive and negative signs respectively, for the group of non-backed IPOs. The positive and significant coefficient for the non-backed IPOs is consistent with the marked differences in the results for equal and value weighted returns we show in table IV. While underwriter's reputation is not significant for any of the three groups in this set of equations, the coefficient for the bubble period dummy (July 1999 to June 2000) is negative and significant confirming that all IPOs floated during this period have experienced considerable underperformance during the next 36 months.

The results related to the two operating performance indicators are also of interest as each of the three groups of IPOs emerges with a distinct pattern (equations 2, 4 and 7). The aftermarket performance of non-backed IPOs is positively and significantly related both to asset turnover and leverage while VC-backed IPOs are related to asset turnover only. In contrast to Cao and Lerner (2009) for their US sample of RLBOs, but broadly consistent with evidence related to the performance of LBOs, there is a positive and significant relation between leverage and 36-months aftermarket performance. The positive and significant leverage coefficient is also consistent with Jensen (1989) and the widely held view that high utilisation of debt is potentially one of the key value drivers for the private equity model. Sponsors' reputation is positive and significant only for

the VC-backed issues while the length of the prior sponsors' (venture capital or private equity groups) is not significant for any of the groups.

*Insert Table X here*

## **VI. Conclusions**

Using a unique sample of IPOs consisting of venture-backed, private equity-backed and other non-backed issues during the period January 1992 to September 2005, the paper presents evidence on the key differences in the characteristics across the three groups at the time of flotation and their 3-year aftermarket performance. More specifically, the results show that PE-backed IPOs are on average larger, in terms of amount raised, market capitalization, sales and assets and tend to concentrate on certain industries predominantly related to consumer services and consumer goods. At the same time, PE-backed IPOs are considerably less underpriced than their NB and VC counterparts and their first day returns were not affected by the hot market conditions in 1999-2000.

Using different measures and benchmarks for long run performance, PE-backed IPOs achieve positive and significant performance, both in equal and value weighted terms, thorough the entire 36-month period in the aftermarket. On the other VC-backed IPOs emerge as poor performers during the same time period particularly on a value weighted basis. The strong aftermarket performance PE-backed IPOs is positively related to high levels of leverage associated with these companies before and even after their flotation. Larger non-backed IPOs with higher levels of leverage and better asset turnover also demonstrate better long term performance; the latter is also important for the VC-backed group.

It is also worth noting that the pattern of performance documented in this paper for VC and PE-backed IPOs is consistent with the average poor performance of venture capital funds and the strong performance of their buyout counterparts documented by BVCA annual performance measurement reports.<sup>5</sup> Finally, given the marked differences in the aftermarket performance across the three groups of IPOs and the increasing number of sponsored IPOs floated worldwide, it would be valuable if future studies of IPOs in general, account for the relative composition of venture and private equity IPOs included in their overall sample.

The paper leaves the fundamental question related to the underlying drivers of the marked performance differences between VC and PE-backed IPOs still wide open. This remains the subject of further research that focuses, both on the underlying characteristics of the three groups of IPOs before and after flotation and the changes in operating performance implemented by venture capital and private equity sponsors. Furthermore, the level of engagement of such sponsors in the management of their portfolio companies are likely to shed valuable light to the differences in aftermarket performance reported in this paper.

## ENDNOTES

1. The Alternative Investment Market (AIM) started operations only in 1995 but attracted 65% of the total number of issues across the three groups; about three quarters of non-backed and just 16% of the PE-backed were listed in this market.
2. The robustness of the results has also been tested using the Hoare Govett Smaller Companies (HGSC) index which represent the bottom 10% of the UK equity market excluding AIM.
3. Excluding the three billion-plus VC-backed IPOs from the sample reduces the 36-month BAHR from -22.15% to -10.82%.
4. I have also included two additional explanatory variables the proportion of sponsors' ownership before and after flotation. These results are not reported in this paper since such data is only available for a considerably smaller sample set.
5. See, for example, BVCA Performance Measurement Survey.

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**Table I. Annual Distribution of IPOs by Number, Amount Raised and Average Market Value**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs, from January 1992 to September 2005. The total amount raised is the number of shares offered by the offer price. Average market capitalisation is the offer price by the number of shares outstanding.

	Number				Total Amount Raised (£m)				Average Market Cap (£m)			
	ALL	NB	VC	BO	ALL	NB	VC	BO	ALL	NB	VC	BO
1992	26	11	5	10	1,735	606	128	1,001	173	230	125	134
1993	72	26	19	27	2,054	597	392	1,065	67	58	58	81
1994	111	54	19	38	5,238	3,592	411	1,235	123	188	60	63
1995	78	37	22	19	1,744	775	362	607	47	36	48	67
1996	157	92	37	28	8,697	7,353	588	755	98	135	35	58
1997	123	77	32	14	6,193	5,191	578	424	139	186	57	72
1998	70	41	19	10	5,599	4,454	717	428	122	127	125	94
1999	78	67	5	6	3,953	3,153	130	670	176	173	88	282
2000	224	183	33	8	8,146	5,572	2,230	344	159	142	263	108
2001	88	77	7	4	3,843	3,265	159	419	76	73	81	124
2002	53	41	6	6	4,239	2,103	94	2,041	162	129	55	496
2003	58	49	6	3	2,826	1,337	77	1,412	102	67	60	755
2004	224	176	23	25	4,490	1,823	244	2,423	47	29	34	185
2005	233	210	17	6	4,320	3,314	162	843	45	39	29	290
<b>Total</b>	<b>1,595</b>	<b>1,141</b>	<b>250</b>	<b>204</b>	<b>63,077</b>	<b>43,136</b>	<b>6,273</b>	<b>13,666</b>	<b>100</b>	<b>99</b>	<b>84</b>	<b>125</b>

**Table II. Industry composition of IPOs by number of issues and amount raised for NB, VC and PE IPOs**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs. Percentage of IPOs by volume and amount raised for each of the 10 FTSE industry classifications for all IPOs (ALL), non private equity backed (NB), venture capital backed (VC) and Private equity-backed (PE).

	% Number				% Amount Raised			
	ALL	NB	VC	PE	ALL	NB	VC	PE
Oil & Gas	3.4	4.2	1.2	1.5	2.2	2.7	0.9	1.2
Basic Materials	7.0	8.8	1.6	3.9	6.1	8.4	0.7	1.4
Industrials	16.6	15.0	17.2	24.5	12.5	10.3	17.4	19.3
Consumer Goods	6.8	5.1	6.4	16.7	10.6	7.2	2.4	25.1
Health Care	5.6	3.5	16.8	3.4	2.4	0.9	13.9	1.7
Consumer Services	24.2	22.8	24.8	31.4	28.6	27.2	21.5	36.4
Telecomms	2.2	2.5	2.0	1.0	5.4	6.6	5.2	1.7
Utilities	0.8	1.1	0.0	0.5	3.2	4.5	0.0	0.6
Financials	18.1	23.0	5.6	6.3	18.5	23.9	6.6	6.6
Technology	15.4	14.1	24.4	11.3	10.0	8.1	31.4	6.2
<b>Total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>



**Table III. Summary statistics for each of the three groups of IPOs**

The number of observations shown for each item varies depending on data availability. Accounting items in Panel A are from the last accounts before the IPO. The data in panel B on the ownership of VC and PE firms before and immediately after the IPO, the number of years investment by VC/PE and the number of sponsors involved are from the IPO prospectuses.

		<b>NB</b>	<b>VC</b>	<b>BO</b>
<b>Panel A: Operational Characteristics</b>				
Number of employees	Median	54	105	425
	No. obs.	(576)	(163)	(127)
Market Capitalisation (£ml)	Median	16.5	30.2	56.2
	No. obs.	(1,141)	(250)	(204)
Total Assets (£ml)	Median	4.3	7.1	26.4
	No. obs.	(844)	(217)	(199)
Net Sales (£ml)	Median	6.2	4.8	36.0
	No. obs.	(712)	(206)	(198)
EBITDA (£ml)	Median	0.3	0.2	5.2
	No. obs.	(828)	(226)	(200)
Total Debt to Total Assets (%)	Median	20.9	20.8	44.2
	No. obs.	(625)	(188)	(188)
Asset Turnover (Sales to Total Assets)	Median	1.19	1.05	1.48
	No. obs.	(708)	(198)	(197)
Operating Margin (EBITDA to Sales)	Median	7.7	5.4	15.0
	No. obs.	(867)	(234)	(201)
<b>Panel B: Venture Capital/Private Equity involvement</b>				
Number of years of venture capital/private equity group investment before IPO	Mean	NA	4.5	3.7
	Median		4.0	3.0
	No. obs.		(231)	(203)
Venture capital/private equity group ownership before IPO (%)	Mean	NA	33.9	55.9
	Median		32.4	58.8
	No. obs.		(77)	(75)
Venture capital/private equity group ownership after IPO (%)	Mean	NA	23.1	26.1
	Median		19.6	23.6
	No. obs.		(135)	(145)
Average number of sponsors in the VC/PE syndicate	Mean	NA	1.7	2.1
	Median		1.0	2.0
	No. obs.		(251)	(198)

**Table IV. First Day Returns for the Three Groups of IPOs**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs.

	ALL	NB	VC	BO
Average (equal weighted) (%)	18.6	21.1	14.9	9.1
Average (value weighted) (%)	9.9	9.8	8.5	5.7
Median (%)	7.3	7.4	8.8	6.3
Normal period average (equal weighted) (%)	13.8	14.7	13.8	9.2
Bubble period average (equal weighted) (%)	75.1	83.5	39.5	7.3
Standard deviation (%)	53.7	61.9	23.1	15.9
Proportion starting below offer price (%)	13.0	12.7	14.0	13.7
Average money left on the table (£m)	12.4	12.4	16.9	7.3
Total number of issues	1,595	1,141	250	204

\* Bubble period: July 1999 to June 2000

**Table V. Buy-and-Hold Abnormal Returns**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs. Three-Year Post Initial Public Offering (IPO) Buy and Hold Abnormal Returns (BHARs) against the Financial Times All Share index (FTA), size adjusted index (SIZE) and FTSE 10 group industry classification (IND).

Panel A shows equal weighted abnormal but-and-hold returns using three alternative benchmarks; the FTSE All-Share index, three size related FTSE indices and industry adjusted FTSE indices. Panel B shows equivalent buy-and-hold abnormal returns on value weighted basis.

**A. Equal weighted**

	ALL			NB			VC			BO		
	FTA	SIZE	IND	FTA	SIZE	IND	FTA	SIZE	IND	FTA	SIZE	IND
12	-7.34	-5.20	-4.64	-7.29	-5.68	-5.14	-16.09	-12.51	-10.12	2.96	6.32	4.77
	(-2.35)	(-1.84)	(-1.66)	(-1.82)	(-1.52)	(-1.38)	(-3.71)	(-3.00)	(-2.62)	(0.90)	(2.10)	(1.50)
24	-13.44	-10.15	-11.70	-17.41	-15.22	-15.91	-13.55	-6.85	-12.59	9.29	14.92	13.85
	(-3.83)	(-2.99)	(-3.42)	(-3.75)	(-3.38)	(-3.61)	(-1.30)	(-0.70)	(-1.25)	(1.53)	(2.63)	(2.18)
36	-13.46	-6.95	-13.67	-20.20	-14.23	-21.67	-3.92	-3.42	-4.83	13.84	22.48	21.75
	(-3.10)	(-1.76)	(-3.18)	(-3.61)	(-2.69)	(-3.89)	(-0.32)	(-0.34)	(-0.44)	(1.75)	(2.33)	(2.21)

**B. Value weighted**

	ALL			NB			VC			BO		
	FTA	SIZE	IND	FTA	SIZE	IND	FTA	SIZE	IND	FTA	SIZE	IND
12	-12.24	-13.20	-3.86	-11.19	-12.23	-4.42	-39.20	-39.86	-24.24	5.27	4.88	4.69
	(3.69)	(-3.94)	(-1.15)	(-2.42)	(-2.60)	(-1.20)	(-5.64)	(-5.58)	(-4.05)	(1.35)	(1.26)	(1.09)
24	-0.06	-2.18	5.69	-0.04	-1.73	5.52	-24.50	-25.10	-13.81	18.43	15.43	22.47
	(-0.08)	(-0.32)	(1.16)	(-0.03)	(-0.18)	(0.92)	(-1.62)	(-1.65)	(-0.96)	(2.11)	(1.76)	(2.62)
36	-0.00	-1.36	9.22	-0.01	-0.01	7.44	-22.15	-22.84	-6.15	20.01	16.60	29.48
	(0.01)	(-0.14)	(1.56)	(-0.01)	(-0.08)	(0.98)	(-1.49)	(-1.53)	(-0.44)	(1.92)	(1.64)	(2.83)

**Table VI. Fama-French Three-Factor Regressions on Calendar-Time Portfolio Returns of the three Groups of IPOs**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs. Portfolios of IPOs are formed by including all issues that were listed within the previous three years. RMRF is value weighted market return on FTA All Share index minus the risk free rate which is the UK one-month Treasury bill rate. SMB is the difference each month between the return on small firms and big firms. HML is the difference each month between the return the return on a portfolio of high book-to-market stocks and the return on a portfolio of low book-to-market stocks.

<b>A. Equal weighted</b>				
	All	NB	VC	BO
Intercept	0.003 (1.05)	0.003 (1.00)	0.004 (0.87)	0.008 (2.46)
RMRF	0.969 (16.48)	1.010 (12.90)	0.878 (10.74)	0.864 (8.78)
SMB	0.023 (0.52)	-0.050 (-1.06)	0.407 (5.88)	0.067 (1.04)
HML	-0.791 (-12.30)	-0.808 (-10.58)	-0.798 (-10.76)	-0.522 (-8.81)
Adjusted $R^2$	0.746	0.723	0.670	0.486
<b>B. Value weighted</b>				
	All	NB	VC	BO
Intercept	-0.013 (-2.25)	-0.002 (-0.60)	0.004 (1.25)	0.007 (2.20)
RMRF	12.98 (14.40)	1.451 (10.37)	0.969 (16.48)	0.930 (8.44)
SMB	0.267 (4.64)	0.083 (1.01)	1.023 (22.70)	0.153 (1.55)
HML	-0.506 (-3.48)	-0.530 (-6.62)	-0.791 (-12.30)	-0.470 (-5.77)
Adjusted $R^2$	0.629	0.629	0.813	0.451

**Table VII. Three-Year Buy and Hold Abnormal Returns by Cohort Year of Issue (FTA Benchmark)**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs during the period January 1992 to September 2005. For each cohort of IPOs that were floated in a given year, the returns are calculated by compounding monthly returns for 36 months using the FTA All Share index as the market benchmark.

	Equal Weighted					Value Weighted			
	ALL	NB	VC	BO		ALL	NB	VC	BO
1992	9.12	-4.33	-51.92	48.34		-56.28	-86.48	-17.79	-17.00
1993	-5.47	-24.21	27.46	-10.26		11.55	0.08	59.77	-6.24
1994	-2.13	-7.70	67.28	-27.97		-21.26	-22.10	49.29	-54.49
1995	-4.87	16.53	-45.30	3.01		-7.44	62.42	-70.04	-37.10
1996	-25.33	-22.73	-34.77	-23.59		56.11	74.24	-37.84	-44.52
1997	79.43	54.62	100.55	250.28		10.75	-5.93	66.92	372.52
1998	40.44	34.78	57.70	32.19		39.98	48.66	52.19	-20.30
1999	-26.76	-22.92	-48.48	-46.00		-15.68	-9.81	-61.32	-46.11
2000	-38.97	-38.66	-61.44	24.95		-46.10	-43.76	-87.72	45.67
2001	-11.26	-12.50	-11.62	19.39		-17.48	-18.83	-35.30	21.65
2002	25.21	12.32	8.37	114.49		73.05	60.04	38.05	98.66
2003	-31.75	-24.97	-111.45	54.76		68.03	118.82	-67.56	28.72
2004	-28.82	-37.34	-47.64	40.98		-4.94	-56.45	-57.48	55.03
2005	-45.87	-45.13	-63.50	5.24		-17.08	-22.65	-71.17	82.06

**Table VIII. Three-Year Buy and Hold Abnormal Returns, Calendar Time Performance of Initial Public Offerings (IPOs)**

The total sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs. Monthly portfolios for each of the groups of IPOs include all issues that were floated in the three years previous to the observation month. Average monthly abnormal buy-and-hold returns are calculated for each calendar year, using the FTSE All Share index. Both equal and value weighted calendar time portfolios are rebalanced each month; value weights are based

	Equal Weighted Returns				Value Weighted Returns			
	ALL	NB	VC	BO	ALL	NB	VC	BO
1993	3.92	3.73	-10.46	20.29	-19.69	-34.46	-6.08	-1.61
1994	-1.54	-1.64	-3.49	-0.55	-7.36	-11.86	-1.16	-5.52
1995	-1.46	-9.15	35.08	-12.61	0.00	2.56	33.28	-16.37
1996	-2.37	-2.89	-6.44	1.65	2.33	5.42	-4.19	-7.29
1997	-18.59	-16.24	-23.14	-19.32	-22.65	-17.28	-44.13	-18.92
1998	-20.66	-21.74	-18.36	-20.57	-2.78	5.22	-36.57	-15.23
1999	91.49	101.03	82.14	52.73	54.61	43.73	131.17	72.61
2000	-11.10	-15.08	3.21	-6.67	-27.20	-24.87	-25.04	-44.77
2001	-31.10	-30.97	-39.80	-8.90	-31.23	-28.97	-48.31	14.74
2002	-17.22	-16.72	-26.97	-0.72	-20.84	-23.65	-22.82	10.72
2003	33.20	29.59	64.77	35.19	37.09	21.94	87.85	37.47
2004	-4.44	-5.17	-22.13	29.12	22.92	23.11	-15.19	30.90
2005	-19.24	-21.61	-18.17	-6.60	3.69	3.64	1.92	5.60
2006	-16.05	-19.73	-7.33	18.54	-6.47	-16.99	-15.12	23.31
2007	-13.45	-11.17	-25.56	-26.78	-11.24	-7.33	-22.75	-18.01
2008 (Sep)	-13.07	-17.07	-13.70	-9.86	-10.87	-35.26	-11.07	17.83

**Table IX: Robustness Checks of Sponsored and Non-Sponsored IPO Performance**

The sample of 1,595 IPOs consists of 1,141 Non-Sponsored (NB), 250 Venture Capital-backed (VC) and 204 private equity-backed (PE) IPOs. Buy and hold abnormal returns are relative to FTA All Share index. The results are restricted for each of the three groups and the entire sample for IPOs with market capitalisation of £50 million or greater, total assets of £40 million or greater, total sales of £10 million or greater and a book leverage (total debt-to-assets) ratio of 10% or greater. Buy and hold abnormal returns are computed for 36 months after the offering. Market capitalisation is at the offer price and all accounting values are computed during or at the end of the year of the IPO.

	ALL	NB	VC	BO
<b>Panel A: Assets &gt; £40 million</b>				
Total Assets (£mil)	715	1,086	122	237
36-month BHAR relative to FTA (%)	11.3	1.84	15.6	31.2
No. of IPOs included	305	180	50	75
Percentage of IPOs included	23.0	18.8	24.7	45.2
<b>Panel B: Total Sales &gt; £10 million</b>				
Sales (£mil)	852	1,455	96	211
36-month BHAR relative to FTA (%)	18.8	13.9	30.9	22.1
No. of IPOs included	519	295	79	145
Percentage of IPOs included	39.2	30.8	39.1	87.3
<b>Panel C: Total Debt to Total Assets &gt; 0.10</b>				
Total Debt to Total Assets (%)	29.2	25.9	29.0	38.5
36-month BHAR relative to FTA (%)	-3.65	-14.72	-7.93	30.38
No. of IPOs included	482	251	87	144
Percentage of IPOs included	50.0	43.0	46.0	76.6

**Table X. Multivariate Cross-Sectional Regressions Explaining 36-Months Aftermarket Performance for the three Groups of IPOs**

The dependent variable is the natural logarithm of the wealth relative with the FTSE All Share index as the market benchmark. The independent variables are the logarithm of market capitalisation at the IPO, the logarithm of first day return, the proportion of equity retained, underwriters reputation, a dummy for the bubble period (July 1999-June 2000), the VC/PE sponsor reputation, the years' of sponsors' investment before the IPO, the total debt to total assets, and the asset turnover at the first fiscal year after the IPO.

	NB		VC			PE		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
First day return	-0.287 (-2.50)	-0.144 (-0.87)	-0.545 (-1.44)	-0.453 (-1.27)	-0.539 (-1.38)	1.019 (2.07)	0.905 (1.85)	0.943 (1.87)
Logarithm of market Capitalisation	0.056 (1.98)	0.071 (1.96)	-0.067 (-0.81)	-0.067 (-0.85)	-0.045 (-0.61)	0.015 (0.22)	0.020 (0.29)	0.027 (0.34)
Proportion of equity retained	-0.534 (-3.54)	-0.363 (1.75)	0.660 (1.16)	1.094 (1.38)	1.821 (2.58)	-0.215 (-0.56)	0.011 (0.03)	-0.100 (-0.23)
Underwriter reputation	0.148 (0.76)	-0.106 (-0.56)	-0.200 (-0.58)	-0.735 (-2.31)	-1.060 (-3.18)	0.243 (1.38)	0.176 (0.99)	0.169 (0.91)
Bubble period dummy	-0.919 (-5.17)	-0.568 (-2.48)	-1.686 (-3.75)	-1.388 (-3.13)	-1.298 (-2.95)	-1.42 (-2.30)	-1.437 (-2.16)	-1.38 (-1.96)
Debt to Total Assets		0.604 (2.33)		-0.121 (-0.25)	-0.716 (-1.015)		0.859 (2.51)	0.992 (2.72)
Asset Turnover (Sales to Total Assets)		0.274 (4.41)		0.537 (3.65)	0.525 (3.60)		-0.046 (-0.60)	-0.002 (-0.03)
VC/PE Sponsor reputation					0.291 (2.29)			-0.052 (-0.43)
Years of VC/PE involvement prior to IPO					0.031 (1.09)			0.021 (0.50)
Intercept	-0.481 (-2.26)	-0.756 (-2.59)	-0.123 (-0.21)	-0.326 (-0.41)	-1.928 (-2.17)	0.070 (0.21)	-0.132 (-0.41)	-0.211 (-0.52)
Adjusted R <sup>2</sup>	0.099	0.082	0.150	0.290	0.391	0.055	0.071	0.064
Observations	954	546	194	152	129	161	147	139