

Why do PE and VC Firms Retain Ownership after the Initial Public Offering?

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Abstract

The purpose of the paper is to assess the determinants of PE and VC investors' decision to continue holding shares in the post-IPO period. We distinguish between compulsory ownership which arise as a result of the lockup commitments and voluntary holdings which occur when there is no lockup or ownership in the post-lockup expiry dates. We find support that voluntary ownership is driven by signalling and commitment hypotheses. PE/VC investors' compulsory holdings are driven only by the signalling hypothesis in the US, while in the UK, the compulsory ownership is consistent the commitment hypotheses. We find significant differences across US and UK PE/VC firms in terms of their investment, divestment dynamics, ownership retention three years post-flotation, and the terms of lock-up agreements. We also report statistically significant relationships between PE/VC *fund*'s ownership and *fund*'s characteristics such as age, location and bank affiliation.

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1. Introduction

Venture capital (VC) and private equity (PE) firms are known to invest in firms in order to conduct various restructuring and value adding activities. They often choose to bring companies to the stock market in the form of initial public offerings (IPO) to realize their returns, as this method is the most preferred (Giot and Schwienbacher, 2007), and profitable exit route (Brau *et al*, 2003).² Moreover, an initial public offering not only allows PE and VC investors to realize returns, but it also provides an opportunity to build a track record, establish reputation, which in turn facilitates future fund raising (Gompers, 1996).

However, in practice PE and VC investors do not exit fully at the IPO date (Barry *et al*, 1990; Lin and Smith, 1998; Megginson and Weiss, 1991; Cao, 2011). For example, Cao (2011) reports that PE sponsors retain a significant equity stakes three years post-flotation. The study by Barry *et al* (1990) concentrates on the VC IPOs, and reports that venture capital investors maintain their ownership after the initial public offering. The purpose of this paper is to examine the fundamental question of what determines PE and VC firms' ownership retention in the post-flotation period. We distinguish between two main possibilities: compulsory and voluntary retentions. The first is through lock-up agreements which limit the initial shareholders' ability to sell a certain percentage of shares during a pre-specified time period post-flotation, probably to mitigate the moral hazard potentials (Brav and Gompers, 2003). The second is the voluntary ownership, which occurs under the following three cases: holdings which were not subject to lockup agreement, those above the specified lockup restrictions and holdings in the post-lockup expiration date. We test whether compulsory ownership in the post-IPO period is impacted by commitment, while voluntary ownership is driven by potential higher returns PE and VC investors expect to realise in the future, and whether differences in institutional settings between the US and the UK affect such strategies. We use a sample of 136 PE-backed and 191 VC-backed IPOs in U.K, as well as 446 PE- and 900 VC-backed IPOs floated in the U.S. in 1997-2010 to test our hypotheses.

² According to the "European Private Equity and Venture Capital Association 2010 Yearbook," an IPO represented the second most frequently used exit route in 2008-2009.

We find that PE and VC sponsors pursue similar retention dynamics, even though, as expected, their IPOs differ significantly in their fundamental characteristics as PE backed IPOs are larger, have longer lockups, prestigious underwriters, smaller syndicates and lower geographic proximity, and less likely to be from the high tech sector and to be quoted on junior markets. We find strong differences across the UK and US markets. While in the US the financial sponsors' compulsory holdings are driven only by the signalling hypothesis, in the UK, the compulsory ownership is consistent the commitment hypotheses. We also find that the voluntary holdings in both countries are consistent with signalling and commitment hypotheses. Additionally, we report that voluntary ownership in the post-lockup expiration date is significantly higher than voluntary holdings in UK companies PE/VC syndicate was not subject to lock-up restrictions.

We present evidence that PE/VC investors reduce their voluntary ownership in companies which perform well operationally and financially after the offering, while chose to retain a higher ownership in underperforming companies. We find strong differences across the US and UK in terms of PE and VC investors investments criteria and divestment dynamics. We show that the investment and divestment dynamics of *different groups of shareholders* around the IPO date in the U.S. and U.K. are very diverse, partly because of the majority (or at least significant) voting power in the US. We find that, although past studies have demonstrated that lock-up agreements are more standardized in the US in terms of duration, these agreements tend to be more heterogeneous with respect to locked-up ownership percentages. We show that low proximity of the PE/VC fund to the IPO and fund's bank affiliation has a significant impact on the individual fund's quarterly ownership evolution post-IPO. Finally, we report that PE and VC funds retain a significantly more in companies, throughout three years post-flotation, which are quoted on the U.S. stock market.

Our study differs from previous studies in the following two respects. Firstly, contrary to previous studies which have mainly considered insiders and initial shareholders as one broad class (Brav and Gompers, 2003), we concentrate exclusively on the lock-up restrictions applicable to PE and VC investors, who were responsible for backing a particular UK IPO. Secondly, while previous studies focus on PE/VC overall ownership, we present a separate analysis for compulsory and voluntary PE/VC holdings. Previous studies have considered market conditions (Cao, 2011) and the level of asymmetric information between firm's insiders and outsiders (Cumming and MacIntosh, 2003) to have an impact on financial sponsors decision whether to conduct a full or partial exit at the IPO, and to adopt a quick

exit strategy post-flotation. We contribute to the existing literature by identifying a new set of variables, namely PE and VC fund's characteristics, which have a significant impact on the extent of ownership retention. We shed light on whether compulsory ownership is driven by commitment or signalling, and find that the terms³ of lock-up provision are used as a commitment device to alleviate moral hazard concerns.

Previous studies show that PE and VC investors remain actively involved even in the post-admission period by means of holding seats on company board of directors (Celikyurt *et al.*, 2012) and retain significant ownership holdings (Cao, 2011). Studies which concentrate on the lock-up agreements have documented that at expiration date VC investors tend to sell company's shares more actively than any other type of shareholders (Field and Hanka, 2001). In line with Furth and Rauch (2012), who report that in only 9% of the UK sample with lock-up provision buyout sponsors made a sale at the lock-up expiration date or within four weeks thereafter, we find a significant block holding by PE and VC investors post the lock-up expiration date.

The rest of the paper is structured as follows. Section 2 presents the theoretical background and development of testable hypotheses. Section 3 describes the data and methodology. The empirical results are presented in section 4, and the conclusions are in Section 5.

2. Literature Review and Testable Hypotheses

2.1. Compulsory Ownership

Previous studies show that VC firms do not always sell their whole stake in the company at the IPO (Barry *et al.*, 1990). Lead (Lin and Smith, 1998) and more reputable (Krishnan *et al.*, 2011) VCs tend to hold significantly higher shareholdings and directorships even three years post flotation. Additionally, Cao (2011) reports significant ownership retention by buyout sponsors in backed-IPOs in the U.S.

Gale and Stiglitz (1989) argue that insiders of low quality firms can fool the market by retaining shares at the IPO date, and sell overvalued stock soon after the flotation. In addition to Leland and Pyle's (1977) proposition that the fraction of shares retained by insiders serves as a signal, lock-up agreements can also increase the credibility of the signal.

³ The percentage of company's shares locked which are held by PE and VC investors.

These contractual obligations usually specify the number of shares locked as well as the lockup period. Brau *et al* (2003b) argue that “Insiders cannot just *put* their money where their mouth is; rather, they must commit to *keep* it there if the signal is to be credible”.

These agreements, specified in prospectuses, can also apply to PE and VC sponsors, although the terms may differ across directors and other initial (institutional) shareholders. They may contribute to the PE and/or VC ownership retention in the post-admission period. The lock-up provisions are solely governed by the agreement with the underwriter, and are not mandated by any insider trading laws. The lead underwriter is the only party which has the right and the ability to release locked investors early.⁴ The lockup terms are not homogeneous across the U.S. and U.K. In particular, while in the U.S. the average lockup period is 180 days (Brav and Gompers, 2003), in the U.K. it ranges from 6 to 36 months⁵ (Hoque and Lasfer, 2009). Espenlaub *et al* (2003) concentrates on the UK VC-backed IPOs and documents the average lock-up length to be 561 days. Additionally, in the U.K it is common to relate the expiry date of a lock-up agreement to some corporate event (e.g. publication of preliminary or annual report) as opposed to providing a specific calendar date (Hoque and Lasfer, 2009). Thus, an examination of PE and VC investors’ ownership evolution post-flotation requires a careful consideration of the lock-up provision, which significantly affects ownership holdings. We contribute to the existing literature by differentiating and separately analyzing PE and VC investors’ *voluntary* and *compulsory* ownership in post-IPO period.

Brav and Gompers (2003) propose three potential explanations for the existence of IPO lock-ups: a signal of firm quality, a commitment device, or a mechanism to extract additional compensation from the issuing firm. The signalling hypothesis suggests that lock-ups can be used to signal the firm’s quality which cannot be observed by investors. Leland and Pyle (1977) argue that when an insider sells a significant percentage of shares at the IPO it could signal that the firm is overvalued. Whereas insiders who retain shares for longer and endure the cost of remaining undiversified, signal superior quality of the company. Courteau (1995) suggests that higher quality firms could signal their superior quality by means of longer lock-up duration.

⁴ Sometimes the lead underwriter allows locked investors to sell some or all of their shares prior to the expiration of lock-up agreement; this is referred to as “early sell” transactions. See Hoque and Lasfer (2013) for details.

⁵ The average lock-up duration in the U.K. is 365 days (Hoque and Lasfer, 2009).

Brav and Gompers (2003) emphasize that the signalling hypothesis is highly interrelated with the motivation of the signal. They consider the following two motivations: to obtain a higher offering price at the IPO or in future secondary equity offerings (SEOs). Once the IPO prospectus becomes available, potential investors will be able to separate higher and lower quality firms. They hypothesize that higher quality firms will use longer lock-ups as a signalling device, and they are likely to revise the offering price upwards. In case the motivation of the signal is to get a higher price at future SEOs, then higher quality IPOs are expected to conduct a higher number of SEOs and dividend initiations (Michaely and Shaw, 1994). Contrary to their expectations, Brav and Gompers (2003) find that companies with shorter lock-up periods increased their IPO offering price and are more likely to conduct SEOs post admission. Brau *et al* (2005) re-examine the results of Brav and Gompers (2003) and find support for lock-up signalling. Moreover, Brau and Fawcett (2006) survey a sample of Chief Financial Officers' (CFOs) perceptions regarding the lock-up agreement and directors' trades at the IPO. They show that the vast majority of CFOs regard selling insider shares in the IPO as a negative signal, while imposing insiders' lock-ups and having VC-backing convey a positive signal.

The commitment hypothesis deals with managers' potential to take advantage of shareholders by means of shirking, perks consumption, and avoidance of risky yet profitable investment project. The commitment hypothesis states that lock-up provisions exist in order to alleviate outside investors' concerns regarding moral hazard issues. According to this hypothesis, reputation and certification are viewed as alternative commitment devices and expected to be negatively associated with lock-up duration. Consistent with these predictions, Brav and Gompers (2003) find that investment banks impose *longer* lock-ups for companies with higher moral hazard in the aftermarket. They also tested the rent seeking hypothesis which states that lock-up agreements could be used to extract additional fees from the issuing firm. Without a permission to sell locked shares before lock-up expiration date the issuing firm might be forced to either perform a secondary equity offering or a block sale. Both activities would have to be conducted through the lead underwriter, which will result in additional fees. Their results do not provide support for this hypothesis.

An underwriter could be aiming to decrease the moral hazard concern and reduce information asymmetry between the firm's insiders and outside investors. In order to eliminate investors' concerns in IPOs which have greater uncertainty regarding insider's actions post-flotation, an underwriter could require PE and VC investors to retain a higher

percentage of shares. This retention can reduce the moral hazard concerns because given their need to successfully exit the company, and large stakes in the company PE and VC investors will be motivated to closely examine management's actions and performance, and if necessary to exert institutional activism. The recent move towards binding votes on executive pay in the U.K. demonstrates that shareholders are becoming more active and could have a major impact on various aspects of the company's operations and management.⁶ PE and VC firms, as any other shareholder, will benefit from directors' not taking advantage of shareholders by getting involved in shirking and perks consumption but solely focusing on firm value maximization. Thus, if the existence of lock-up agreements applicable to PE/VC investors is driven by commitment, then we expect compulsory ownership during the lock-up period to be driven by the same considerations. This hypothesis yields the following expectations:

H₁. PE and VC investors are required to hold a higher percentage of shares in smaller companies, and in those with lower institutional ownership.

The commitment hypothesis also yields predictions regarding alternative forms of certifications such as having a venture capitalist backing and underwriter's reputation. Brav and Gompers (2003) consider the mere existence of a VC firm as one of initial investors to be an alternative form of certification. Previous studies have demonstrated that favourable PE and VC firm's reputation enhances access to stream of deal flows (Hsu, 2004), facilitates the ease of syndication (Hochberg *et al*, 2007), and allows to act as a lead syndicate member. As a result, more reputable PE and VC firms will not risk their reputation by being involved in companies where insiders are likely to take advantage of shareholders. Similarly, a global investment bank would try to avoid any reputational damage. If the size of PE/VC compulsory ownership retention is used as a commitment device then the following additional expectation emerges: PE and VC investors' compulsory ownership is lower for more reputable PE/VC investors and in IPOs backed by more reputable underwriters.

Alternatively, compulsory ownership could be used to signal company's superior quality to the market. For PE and VC firms to agree to a lock-up provision by itself is a major undertaking, since they operate under the approach of fund's termination date and longer

⁶ Anonymous, 2012. Vince Cable forces binding executive pay votes, *BBC*, [online] Available at: <<http://www.bbc.co.uk/news/business-18514396>> [Accessed: 10th July, 2012].

holding period results in negative impact on the IRR⁷. High IRR is extremely important for PE and VC firms since prospective limited partners use it as a criterion to assess PE manager's performance (Fleming, 2010) and take it into consideration when deciding whether to commit capital to a particular PE/VC firm. Thus, consenting to retain shares post-IPO in low quality firms will be too costly of a signal for PE and VC firms, and thus they are likely to refrain from selling shares for some time post-IPO only in high quality firms.

Nevertheless, one cannot ignore the possibility that PE and VC investors could try to fool the market by consenting to be locked while planning to sell shares prior to the expiration of the lock-up agreement. Using a unique data set Hoque and Lasfer (2009) examine the insider trading transactions prior to the lock-up expiration date in the U.K. Their results provide support for the commitment and signalling hypothesis since early sell transactions, which happened in 14% of the sample, were allowed in companies which have performed well since the offering and those with VC-backing. Overall, we expect PE/VC investors' compulsory ownership to be driven by the commitment hypothesis. These arguments suggest the following hypothesis:

H₂. PE and VC investors will hold some shares in the post-IPO period to signal their commitment.

2.2. *Voluntary Ownership*

PE and VC investors bring companies to the market in order to exit (at least partially), realize returns and make distributions to limited partners. By listing the company and holding shares post-IPO, PE and VC investors maintain the flexibility to sell shares whenever possible, and are in position to assess and carefully time their full exit post-flotation more favourably in terms of prevailing market conditions and share price. We hypothesize that voluntary ownership by PE and VC investors are driven by high returns they expect in the future. Only in case PE and VC investors expect future returns to outweigh the negative impact of prolonged holding period, they are likely to retain shares voluntarily.

It is important to note that voluntary ownership post-IPO (%) definition encompasses the following three scenarios: these are holdings which PE and VC firms choose to retain without any requirement (i.e. PE and VC investors are not locked-up), those above what is

⁷ Robbie, Wright, and Chiplin (1997) report that independent VC funds' performance is more likely to be assessed on the basis of the internal rate of return.

required in the lock-up agreement, or their holdings in the post-lock-up expiration period. The third case is particularly interesting, since once PE and VC funds are no longer constrained by the lock-up provision in their exiting behaviour, the question remains as to whether they regard it as an opportunity to conduct a full exit (i.e. reduce their ownership to zero), or do they choose to maintain their ownership. Thus, we propose that by voluntarily retaining shares in the post-IPO period, PE and VC investors signal superior quality of the company to potential investors and the market. We consider that PE and VC investors voluntarily retain shares post the expiration of lock-up, during which PE and VC investors are restricted in their unwinding decisions and postpone making distributions to limited partners, indicates the PE/VC investors' expectations regarding company's future performance. Field and Hanka (2001) report that at the expiration of lock-ups there is a substantial long-term increase of 40% in trading volume; sub-sample of VC-backed IPOs experience persistently higher volume of trading throughout 50 days post lock-up expiration date. Furthermore, they document that VC investors tend to sell more after the lock-up expiration than any other pre-IPO shareholder. Gompers and Lerner (1998) consider an alternative exit route of VC firms post-flotation: share distribution to limited partners (as opposed to sale of shares in the open market).⁸ They find that VC firms tend to make the majority of share distributions to their limited partners twenty months after the IPO; however the median is one year post flotation. However, Furth and Rauch (2012) report that buyout sponsors made a sale at the lock-up expiration date or within four weeks thereafter in only 9% of the sample with lock-up provision. They argue that buyouts managers do not use the lock-up expiration date for exit purposes. Thus, previous studies provide conflicting views regarding PE and VC firms' exit dynamics soon after the lock-up expiration date.

In general the lock-up expiration date is characterized by a high degree of information asymmetry. Brau *et al* (2004) argue that information asymmetries between firm's insiders and outsiders are not fully mitigated by the use of lock-up agreement since not a vast majority of mandated information is revealed between the initial public offering and the lock-up expiration date. At the lock-up expiration date, information asymmetries between company's insiders and outsiders are particularly high since insiders (including PE/VC firms) are

⁸ VCs could exit their investments post-flotation by either selling shares in the open market or distributing them to limited partners, who in turn will decide when and how many shares to sell (Gompers and Lerner, 1998). The latter method is used more frequently by VC firms in the U.S. for four primary reasons: there are no restrictions on how much could be distributed, tax liability could be postponed, avoidance of possible downwards price pressure associated with the sale of shares, and positive impact of distributions on VC firms' compensation.

allowed to sell their whole stake without the need to inform other investors regarding the magnitude of planned ownership adjustment. As Brau *et al* (2004, p.77) argue “Insiders planning or considering the sale of personal shares at lockup expiration have incentives to withhold information strategically, and it is reasonable to assume that general investors are aware of this moral hazard potential.” PE and VC investors could voluntarily retain shares post the unlock day in order to convince outside investors of company insiders’ reduced ability to take advantage of them. Thus, if PE and VC funds use voluntary holdings post the unlock day as a commitment device, then one should expect to find PE/VC investors retaining more shares in companies with higher moral hazard i.e. smaller companies (Barry and Brown, 1984), underwritten by lower-quality sponsor (Carter and Manaster, 1990), and with low institutional ownership.

Courteau (1995) argues that high quality firms could signal their superior quality by means of longer lock-up agreements. However, PE and VC firms may choose not to signal the IPO’s quality by means of the lock-up provision in order to retain their flexibility in selling their holdings any time after the flotation. This flexibility could be highly important for funds which are approaching their termination date, and it also gives them an opportunity to time their exit at the highest price in the post-flotation period as well as to take advantage of any industry and market overvaluation. Thus, PE and VC firms could signal the IPO’s quality by *voluntary* retaining shares after the flotation.

Leland and Pyle (1977) argue that the fraction of holdings retained by company’s insiders serves as a signal of the IPO’s quality. Ritter (1984) reports a positive relationship between insiders’ holdings at the time of flotation and firm value. Hence, by voluntarily retaining shares in the post-flotation period, PE/VC firms are signalling to the market the IPO’s high quality. From PE/VC perspective, they would only be willing to retain shares in IPOs they believe will do well in the future and allow them to realize higher returns. However, by postponing their full exit, PE and VC investors are bearing the following costs: negative impact on the IRR, possibility of a bear market in the future, and general firm’ risk. Additionally, PE and VC firm’s managers are constrained in their ability to support new ventures since many of them remain on the board of IPO companies. Furth and Rauch (2012) report that US financial sponsors do not give up their board of directors’ seats at the IPO date. They start reducing their representativeness on the IPOs’ boards only two years post flotation. These arguments suggest the following hypothesis for PE and VC firms to be willing to commit their funds in the post flotation period and to signal IPO’s favourable prospects:

H_3 : PE and VC investors' *voluntary* ownership retention is driven by potentially higher expected returns.

2.3. *Individual PE/VC Fund Ownership post-IPO*

It is a widespread practise for PE and VC investing to take place in syndicates. Within each syndicate there could be a great degree of heterogeneity in terms of funds' characteristics. A more diverse syndicate could be beneficial for its members because it allows to invest in companies which are located in other countries (Sorenson and Stuart, 2001), gain access to deal flows by means of reciprocity (Hochberg *et al*, 2007), share complementary knowledge (Brander *et al*, 2003) and attain another fund's credible opinion regarding valuation and prospects of venture (Lerner, 1994). Thus, in order to capture great degree of funds' heterogeneity this analysis incorporates *individual fund's* characteristics in PE and VC *funds'* post-flotation ownership retention analysis, particularly the fund's location and bank affiliation. The ownership retention on a syndicate level is likely to limit our analysis because only lead fund's characteristics would be considered.

Since cross border investing is widely spread for PE and VC funds, proximity of PE/VC fund and its portfolio companies could differ considerably. One of defining features of private equity industry is the active involvement, management and monitoring conducted by PE and VC funds, which have a crucial impact on the success of funds' investments. By examining Western Europe PE transactions conducted by mature PE houses, Acharya *et al* (2010) conclude that the magnitude of performance improvements heavily depend on PE management expertise. For instance, only PE firm's industry specialization adds 8.5% to firm's performance three years post-buyout (Cressy *et al*, 2007). Given the importance of PE/VC management's niche expertise and specialized knowledge, the number of managers with relevant experience and specialization is relatively limited at any given point in time.

Krishnan *et al* (2009) argue that the location should be considered since close proximity of a fund and its portfolio company could result in reduction of travel time. Additionally, location proximity results in greater venture capitalists' representation on firm's board (Lerner, 1995), and facilitation of monitoring activities conducted by PE funds (Sorenson and Stuart, 2001). Contrary to Lerner (1995), Wong (2010) reports geographic proximity to negatively impact the probability of VC's representation on the board, and explains this finding by proposing that close geographic proximity results in reduced need for contractual monitoring such as board representation.

At the initial public offering PE and VC funds tend to reduce their holdings considerably. According to Levis (2011), private equity syndicates decrease their pre-IPO ownership from 55.9% to 26.1%, while VC syndicates make a less drastic reduction from 33.9% to 23.1%. As the result of reduced ownership, the presence of other blockholders and the IPO's public status, reduce the PE/VC funds' ability to continue monitoring and exerting their pressure on every aspect of the IPO's operations. This effect could be even more pronounced for funds which are located in another country (than its venture) as fund's monitoring abilities could be constrained by distance. Funds could find more economically beneficial to allocate its managers to monitoring new and existing investments which are geographically closer. This in turn reduces the travel needs and results in better utilisation of managers' time. Thus, we expect PE/VC fund retaining fewer shares post flotation in case the location (in terms of country) of PE/VC fund and the IPO differs.

Private equity funds operate under various organizational structures. The two most commonly found are independent and "captive". "Captive" funds are those which are either corporate, bank or government-owned. Past studies (Hellmann, 2002; Hellmann *et al*, 2004) demonstrate that independent and captive PE/VC funds have various financial and strategic goals. Botazzi *et al* (2008) concludes that various organizational structures and GP's experience have an impact on PE investors' activism, which in turn positively affects the success of portfolio companies. They show that independent organizational structure and prior partners' business are two major determinants of an active investment style. Caselli *et al* (2010) document PE funds' ownership structure having an influence on the performance of ventures.⁹ They consider five types of PE funds' ownership structures (corporate-owned, bank-owned, government-owned, other–entity-owned and independent funds) which are characterized by different amount of monitoring conducted. Although bank-owned funds on average have longer holding periods (2.99 years) than funds with other affiliations, bank-owned funds tend to conduct less monitoring of their portfolio companies because their representatives hold seats on several boards at once. Caselli *et al* (2010) report that during the holding period bank-owned representatives on average sit on 8.19 boards of backed and non-backed companies, in contrast to independent fund's managers who sit on only 6.11 boards. Consequently, the amount of monitoring and supervision conducted is much lower, which in turn leads to company's lower revenue growth and IRRs.

⁹ The analysis focuses on the universe of PE investments made by Italian closed-end funds from 1999 to 2005.

Also, bank-owned funds have strategically different goals, which impact their investment and exiting activities. Hellmann *et al* (2004) propose and find support for the hypothesis that bank-affiliated funds invest in ventures with the aim of establishing relationships in order to expand its lending activities. Tykvova (2007) reports that investment patterns of corporate-owned and independent funds are different from government and bank-affiliated funds involved in German PE-backed companies. Tykvova (2007) finds that government-owned and bank-affiliated take smaller equity stakes, involve less in firm's corporate governance, and thus act as bridge investors. Also, bank-affiliated funds tend to invest in companies soon before the flotation, and sell a great fraction of its pre-IPO holdings at the IPO date. These arguments lead to the following hypothesis:

H₄: bank-owned funds will retain lower percentage of shares post-flotation than any other type of fund.

This hypothesis is also motivated by two facts. Firstly, in contrast to other type of funds, bank-affiliated funds need to realize returns soon after the IPO in order to invest in as many new ventures as possible in order to build relationships with clients who could potentially need loan facilities in the near future. Secondly, it is reasonable to expect that after the company goes public, the bank representatives will be as devoted to a high number of investment IPOs' boards as before the flotation. Thus, in order to free up already preoccupied fund's resources (i.e. managers) bank-affiliated fund will retain considerably less shares than other type of fund. We contribute to the existing literature by conducting an analysis with PE and VC *fund's* ownership level data in U.K. and U.S. backed IPOs as opposed to past studies which have mainly concentrated on PE and VC syndicate level data.

2.4. *UK and US institutional settings*

Previous studies mainly focused on the US VC/PE-backed IPOs. However, the U.K. market is of paramount importance to the private equity industry. In 2009, U.K. received 21% of all private equity investments in Europe, which is the highest percentage than in any other European country (EVCA, 2010). UK PE and VC-backed companies accounted for 23.8% of all European divestments in 2009. Deeper understanding of divestment and ownership retention is highly warranted since as a result of the recent financial crisis which resulted in closed IPO market and almost complete absence of trade buyers there is robust pipeline of exits in the near future. Also, VC financing in the U.S. differs considerably from the U.K. in three respects. Firstly, seed-stage financing is more widely spread in the U.S., which allows

financial sponsors to achieve a higher money multiple (Fraser-Sampson, 2010). Secondly, U.S. VC industry returns are primarily dominated by home runs¹⁰. In contrast, very few seed-stage financing is offered in the U.K., and fund's returns are more evenly spread across the whole portfolio. Lastly, U.K. venture capitalists tend to be more reluctant to discontinue their financing support as opposed to the U.S. peers (Fraser-Sampson, 2010). Thus, we compare US and UK IPOs to assess whether the institutional settings and the differences in investment and monitoring strategies pursued in these two countries affect the ownership retention dynamics in these two major markets.

3. Data and Methodology

The sample used in this study is non-financial PE- and VC-backed IPOs floated in the U.S. and U.K. between 1997 and 2010. This specific time frame was chosen due to the following two reasons: Thomson One Banker provides ownership data only starting from 1997, and this study examines 3-year post flotation window. The LSE database was used to collect the following information: IPO name, date of admission, and its industry.

We identify VC-backed and PE-backed IPOs from several sources. We first use the British Venture Capital Association classification of UK IPOs into PE and VC-backed from January 1997 - September 2005. We then use IPO prospectuses for the remaining period. Additionally, we use an online trade publication *Unquote*, which provides regular details on individual VC and buyout transactions. For the U.S. sample, the names of PE and VC-backed IPOs were taken from the study by Liu and Ritter (2011). Names of backed IPOs, which took place during 2008-2010, were taken from SDC Platinum Database.

Table 1 presents the annual distribution of PE and VC backed IPOs between 1997 and 2010. Just prior to the dotcom bubble, there was a relatively high number of both PE and VC-backed IPOs on both markets. The highest number of VC-backed IPOs took place during the dot com bubble and 2004-2007 time period, which was followed by very few IPOs as a result of a crash in 2000 and financial crisis in 2008.

The final annual distribution of VC and PE-backed IPOs in U.K. is different from Levis (2011), because we include any additional backed-IPOs that floated since September 2005. We also exclude a number of IPOs, although they were classified as PE- or VC- backed by BVCA or Liu and Ritter (2011), as we are unable to find their post-IPO ownership data in

¹⁰ These are investments that return a 25x multiple and the whole capital of the fund at least once (Fraser-Sampson, 2010).

Thomson One Banker. Additionally, there were cases when an IPO prospectus could not be found. The final sample consists of 327 U.K. IPOs, split into 136 PE-backed and 191 VC-backed. While in the U.S., we obtain 1673 IPOs; 446 PE-backed and 900 VC-backed IPOs.

We download IPO prospectuses from Perfect Filings database and collect by hand the names of PE and VC firms, dates of PE and VC financing, offer price, market of quotation, underwriter name, management's, block holders' and PE/VC firms' ownership immediately prior to and post admission. We also collect lockup data (duration and percentage of locked shares) applicable to company's directors, institutional and PE/VC investors. Compustat database was used to collect pre- and post-IPO accounting data. Names of lead underwriters were downloaded from SDC database for the U.S. sample. For the U.K., we collect this data from prospectuses. Since it is common in the U.K. to relate the date of lock-up agreement expiry to some corporate event, Perfect Filings Database was used to extract relevant calendar dates of these events. Daily stock prices, FTSE All-Share, S&P 500, AIM All-Share and NASDAQ price indices were collected from the DataStream database.

For each company in the sample, post-IPO quarterly ownership data was gathered from Thomson One Banker. Then names of directors, initial shareholders and PE/VC firms gathered from IPO prospectuses were matched with the ownership data from Thomson One Banker. In some instances, PE and VC investors' ownership data contained some blanks. For example, in twelve quarters post-IPO a number of consecutive quarters of PE/VC investors' ownership would contain missing data, which was always followed by some declared ownership stake.¹¹

PE and VC firms invest in companies to restructure, add value, and conduct an exit via an IPO (or any other divestment route). Their business model does not entail heavy trading of company's shares post-IPO, as opposed to other type of shareholders such as hedge funds. Thus, for PE and VC investors, who backed particular IPO and held shares in a number of quarters post-flotation, missing data should not be interpreted as zero ownership holdings since these information gaps always have declared ownership prior to and immediately after the gap. In order to deal with this matter and make reasonable assumptions regarding what happened in quarters of missing data two complementing approaches were used. Firstly, ownership section of annual companies' reports was used to fill in the gaps. For

¹¹ Upon contacting the data provider, it was advised that ownership data is collected from primary four sources: investor's filings, regulatory agencies, publicly available websites, and third party providers. The position is dropped in case there was no filing from the investor.

the rest, missing data was filled with an ownership stake reported immediately after the quarter of missing data. Overall, these two complementing approaches used are reasonable and consistent with the PE and VC business model. Quarterly ownership data from Thomson One Banker was also used to confirm whether investors specified in the *Major Shareholders* section of prospectus are individual or institutional investors. Additionally, detailed IPO, PE/VC fund and PE/VC house reports were gathered from Thomson One Banker.

For the purpose of this paper PE and VC firms' ownership post-flotation was classified as compulsory and voluntary, and determinants of each are analyzed. Compulsory ownership post-IPO (%) is defined as holdings which PE and VC investors are required to hold as specified in the lock-up agreement. Whereas, voluntary ownership post-IPO (%) definition encompasses the following three scenarios: these are holdings which PE and VC firms choose to retain although they are not required to hold it (i.e. PE and VC investors are not locked), holdings PE/VC investors retain above what is required in the lock-up agreement, and holdings PE/VC firms retain after the lock-up expiration date. Table 2 reports the proxy variables used to test the commitment and signalling hypotheses, as well as the impact of individual fund's characteristics on PE and VC ownership retention post-IPO. For the purpose of this analysis the following variables will be used in order to test the commitment hypothesis: company's size (Brau *et al*, 2004), underwriter reputation and institutional¹² ownership (Hoque and Lasfer, 2009). Larger firms tend to have more information available to investors/markets (Barry and Brown, 1984), and are followed by more analysts, which lead to less uncertainty regarding insiders' actions. Carter and Manaster (1990) argue that more reputable underwriters are associated with backing lower risk companies or those with lower (*ex ante*) uncertainty.

Additionally, there is a stream of literature which provides conflicting results regarding institutional investors' ability and extent of monitoring activities conducted. On one hand, Chen *et al* (2000) found that institutions are involved in active monitoring of companies in the U.S., and companies' performance and institutional ownership are positively related. Cronqvist and Fahlenbrach (2009) report that large blockholders¹³ have a significant impact on US firms' corporate policies and performance. However, studies in the U.K. provide conflicting evidence by reporting that institutional investors do not conduct monitoring activities, and moreover their ownership does not reduce asymmetric information

¹² Institutional holding refers to any institutional investors who hold more than 3% share at the time of IPO (Hoque and Lasfer, 2009).

¹³ Cronqvist and Fahlenbrach (2009) also consider private equity firms, as one type of block holders.

between company's insiders and outsiders (Faccio and Lasfer, 2002). Thus, this paper will shed light on whether institutional shareholders monitor PE and VC-backed companies in U.K., and thereby reduce information asymmetries.

The following proxies are used in the study in order to test for the signalling hypothesis: management or directors' ownership, and the pre-IPO return on assets. Jain and Kini (1994) document positive relationship between how much ownership pre-IPO shareholders retain and firm's operating performance post-flotation. Their finding is consistent with two other earlier studies by Leland and Pyle (1977) and Jensen and Meckling (1976). The agency cost hypothesis, developed by Jensen and Meckling (1976), predicts that lower ownership by management results in increasing agency costs i.e. managers have less incentive to undertake value maximizing projects which leads to conflicts of interest between managers and outside investors. Additionally, the finding by Jain and Kini (1994) is consistent with the following argument presented by Leland and Pyle (1977): higher fraction of ownership retained by insiders serve as a signalling device of firm's quality. Thus, both of these studies suggest that companies with higher insider ownership post flotation are likely to perform well post flotation relative to companies in which insiders retain little ownership.

Additionally it is important to control for several factors which could have an impact on PE and VC firms' decision to retain shares post flotation. Firstly, the age of the fund at the time of the IPO should be considered. During the first half of ten year life, PE and VC funds make the majority of their investments, whereas the second half is attributed to restructuring, providing hands-on support, preparing, and realizing returns by means of divestment. Thus, as the fund approaches its 'maturity', the general partner will be under pressure to start exiting fund's investments and making distributions to limited partners. In order to control for this, lead syndicate fund's age at the IPO date is included in the regression. For the purpose of testing the impact of various funds' characteristics on the ownership retention, low proximity dummy is constructed, as well as the age of the PE/VC house is used as a proxy for reputation (Gompers, 1996).

Prevailing market conditions could also impact PE and VC firms' decision to retain shares. Cao (2011) finds that IPO market conditions have an impact on LBO restructuring duration, IPO listing timing, buyout sponsor's ownership retention, and the ultimate exit route post-flotation. When favourable market conditions prevail, PE sponsors tend to: shorten the amount of time they devote to restructuring firms, list the company, conduct full exit post-flotation quicker, and use share distribution as its ultimate exit route post-IPO. Furth and

Rauch (2012) document the speed of buyout sponsors' exits post-IPO in the U.S. from 1999 to 2008. They find that PE buyouts have different divestments patters in bull and bear markets: during bull market PE funds exit their portfolio companies more quickly by selling larger stakes in fewer transactions soon after the flotation. In order to control for this, the following periods with high number of initial public offerings were classified as "Hot IPO Market": January 1999 – March 2001, and January 2004-December 2006 (Levis, 2011). Also, consistent with previous literature we control for IPO's affiliation to high-tech industries, and quotation on the AIM market.

4. Empirical Results

Descriptive statistics of PE- and VC-backed IPOs are presented in table 3. Consistent with previous studies (Levis, 2011), PE-backed companies floated in the U.K. are on average larger in terms of total assets (£241.31 million) than their VC-backed counterparts (£18 mil) as demonstrated in Table 3 Panel A. PE-backed IPOs in the U.K. differ from VC peers with respect to several other characteristics. Prior to flotation, PE-backed companies are more efficient in using its assets in generating earnings; its average return on assets is about 21.79% as opposed to VC's average of 3.22%. This difference is not surprising given that PE and VC investors initially invest in different type of companies, and thus use various investment criteria. VC firms tend to invest in young companies, without prior commercial sale and many of which are still at development stage. Also, VC investors tend to have a preference for high-tech companies, and as a result 47.08% of VC sample used in this study are concentrated in these industries. Additionally, PE-backed companies are more levered (total debt to total assets ratio of 51.40%) than their VC-backed counterparts with a median leverage of 13.08%.

PE sponsors in the U.K. are able to attract more reputable underwriters more often than venture capitalists; 36.76% (24.86%) of PE (VC) deals are underwritten by a global underwriter. The terms of the lock-up agreement, which an underwriter imposes on PE and VC investors, are different in PE and VC-backed IPOs. On average, financial sponsors are required to hold a specified percentage of shares for a longer period of time in VC-backed IPOs (226 days) than in PE-backed ones (188 days). Whereas the terms of management lock-up agreement seem to be more homogeneous across two types of IPOs, and constitute on average 407-486 days.

As expected the majority (60%) of PE-backed IPOs is listed on the Main market, whereas VC-backed IPOs are mainly quoted on the AIM market (68.42% of VC-backed sample). This is consistent with what type of companies PE and VC firms invest in and subsequently list on the relevant stock exchanges. Buyout deals primary focus on mature, and often public companies in ‘conservative’ industries such as consumer goods and retail, business and industrial products, business and industrial services. In contrast, venture capitalists tend to focus on young and high-tech firms, which do not have three years of pre-IPO trading statements, and therefore could only be quoted on the AIM market.

Panel B (Table 3) presents descriptive statistics of backed IPOs in the U.S. Similar to the U.K results, PE-backed IPOs are larger (783.86 \$mil) and more levered (68.85%) than its VC counterparts (69.78 \$mil and 54.39%, respectively). VC-backed IPOs are predominantly high-tech companies, which have a clear preference to list on the Nasdaq market. Unlike the U.K results but consistent with previous studies, the terms of lock-up agreement in the U.S. are more standardized; on average PE/VC investors and management teams are required to retain shares for 180 days after the flotation.

Differences in what type of companies PE and VC investors invest in the U.K. and U.S. are presented in Panel C (Table 3). PE-backed companies in the U.S. appear to have a higher pre-IPO ROA than in U.K. companies, whereas VC companies in the U.S. have a significantly lower pre-IPO ROA than in U.K. Interestingly, a significantly higher fraction of U.S. IPOs are high-tech companies which could be partly explained by the existence of Nasdaq market since 1971, whereas AIM market has started operating in 1995. Also, a significantly higher percentage of U.K. sample is underwritten by a global underwriter (36.76%). Overall, investment criteria, and thus IPO characteristics are significantly different in the U.K and U.S.

Panel D (Table 3) presents PE and VC investors’ descriptive statistics, which correspond to the U.K. sample, at the house and fund level. PE funds are considerably larger and on average £838.45 million are committed to PE funds, whereas only £380.38 million to VC funds. Fund’s ten year fixed life exerts pressure on GPs to exit investments in their portfolio and return committed capital to limited partners, and as a result PE and VC investors both tend to quote companies when the fund is approaching its termination date: average PE fund age at the IPO is 7.11 years, and 6.34 years for VC fund.

On average VC deals are backed by two different VC investors, whereas PE-IPOs are backed by one. This could be explained by the fact it is common to have several financing

rounds in VC deals, and as the result a higher number of financial sponsors list the company. Interestingly, PE sponsors seem to have a preference to invest in companies which are located closer to its headquarters. Only 5.33% of PE-backed IPOs were backed by a PE house which is located in another country than its venture as opposed to almost a quarter of VC-deals.

Panel E (table 3) presents characteristic of funds involved in U.S. sample. PE houses are larger and have been around for a longer period of time on average (1645.71\$mil and 21.99 years) than VC houses (369.23 \$mil and 19.24 years). Different dynamics in terms of cross border investing emerges with respect to the U.S. sample. In line with the U.K. results, VC investors are more keen on investing in companies which are located in a different country than PE investors. Additionally, a significantly higher proportion of PE funds are affiliated to a bank (15.87%); contrary to only 7.06% of VC sample.

At the time companies are floated, PE funds involved in U.S. flotation are closer to the termination of its fixed ten-year life (8.1 years) than its UK peers (7.11 years). All sample results in Panel F reveal that on average more capital is committed to funds involved in backing and consequently floating companies on the U.S market. This result is driven by the PE sub-sample: an average 838.45\$mil (1645.71\$mil) are committed to PE fund involved in UK (US) IPO. Two additional distinctions emerge with respect to PE funds involved in U.S. and U.K. IPOs. Firstly, a higher proportion of U.S. PE funds are affiliated to a bank (15.87% vs. 8.08%). Also, a significantly higher proportion of U.S. IPOs have been backed by PE investors located in another country when compared to the U.K. sample.

Table 4 (panel A) provides descriptive statistics of ownership adjustments around the flotation date in PE- and VC-backed U.K IPOs. Consistent with PE investment and monitoring methodology, PE sponsors take a significant interest in companies they invest, and maintain an average ownership of 56.70% just prior to flotation. VC investors hold a slightly lower yet significant ownership of 40.09%. On average VC syndicates sell 36.29% of their pre-IPO holdings, as opposed to PE sponsors who sell the majority, 57.72%, of their initial ownership. This result is consistent with previous studies (e.g. Celikyurt *et al*, 2012) which report that venture capitalists are committed to IPO companies even post flotation. For instance, Celikyurt *et al* (2012) reports a great presence of VCs on the boards of S&P 1500 mature companies.

Management pre-IPO ownership in VC-backed companies is on average 29.20%, as opposed to 18.12% in PE deals. Post-IPO management in VC deals maintains a significantly higher ownership of 19.59% than in PE deals (15.45%).

In terms of ownership adjustments around the IPO date of US sample (Table 4 panel b), PE investors maintain a significantly higher pre- and post-IPO (69.81% and 47.20%) holdings than VC investors (50.68 % and 39.04%). Similar ownership adjustments take place in U.S. RLBOs as reported by Cao (2011). On average, institutional investors maintain higher ownership (pre and post-IPO) in PE-backed IPOs than in VC ones. Similarly to the U.K. results, management ownership (pre- and post-IPO) in VC deals is significantly higher than in PE deals.

Panel C (table 4) reveal significant differences in investment and divestment dynamics of different groups of shareholders around the IPO date in the U.S. and U.K. In both types of U.S. deals (PE and VC) financial sponsors take a significantly higher ownership stakes and maintain higher holdings than in U.K. deals. Thus, there is a clear preference of having the majority (or at least significant) voting power in the U.S deals when compared to U.K. ones. Similarly, management ownership pre-IPO is significantly higher in U.S. deals, where financial sponsors align the interests of the management team with those of shareholders more closely. However, immediately post-flotation management ownership in PE deals are similar in the US and UK (amount to around 15-18%), whereas management ownership in VC deals is significantly higher in the U.S. with an average ownership of 25.02% (versus 19.59% in U.K. deals). Initial institutional shareholders' dynamics differ in two major markets (US and UK); in PE deals this group of shareholders maintains a higher block holding of 5.2% post flotation in the U.S., as opposed to 4.47% in U.K. Overall, PE and VC investors, many of which are international/cross border investors, appear to adopt different investment and divestment strategies with a clear preference of more power in U.S. deals.

Table 5 reports descriptive statistics for U.K. IPOs in which PE/VC investors were subject to lock-up agreement (compulsory) and free to distribute shares immediately post-flotation (voluntary)¹⁴. Pre-IPO ownership in companies where PE and VC investors were required to retain shares is significantly higher (51.77%) than in cases when PE/VC investors

¹⁴ Since the vast majority of PE and VC investors involved in U.S. IPOs are locked-in, this kind of analysis for the U.S. sample is not viable at the moment.

are not subject to lock-up agreement (34.08%). Same dynamics remain post-flotation: an average compulsory ownership post-IPO is 29.27%, while an average voluntary holding amounts to 13.55%. Average first day return is 10.49-14.05%. Companies in which PE and VC investors were subject to lock-up agreement were inefficiently using its assets in generating earnings (pre-IPO ROA of -14.31%), whereas PE and VC investors which were free to distribute shares post-flotation had an average pre-IPO ROA of 76.37%.

Additionally, compulsory and voluntary sub-samples differ with respect to management ownership and size. Pre-IPO management ownership (21.81%) in compulsory sub-sample is significantly lower than ownership of 30.83% in voluntary sub-sample. Companies in which PE/VC investors are required to retain shares tend to be in high-tech industries (42.36% vs. 28.28%), larger in terms of total assets (£127.03 vs. £28.85 million), and backed by a bank affiliated fund. Moreover, 64.60% of compulsory sample conducted an initial public offering in hot IPO period, as opposed to only 46.46% of voluntary sub-sample.

In order to analyze post-IPO ownership retention by financial sponsors in PE and VC-backed IPOs we use quarterly ownership data (%) gathered from Thomson One Banker. Panel A (Table 6) reports that on average financial sponsors retain a significant voluntary block ownership three years post-flotation; in quarter 12 post-IPO VC and PE syndicate's ownership is around 8.73-9.70% and 7.57-13.20%, correspondingly. Last two rows of panel A (table 6) reveal that PE investors involved in U.S. IPO prefer to maintain a significantly higher ownership throughout 3 years post-flotation than in UK deals.

In terms of compulsory ownership (Table 6 panel B), underwriters require financial sponsors in PE- and VC-backed IPOs to retain a holding of around 18.76%-31.30% immediately post-flotation. With respect to the U.K. sample, where the duration of lock-up period extends to 730 days, there is a substantial reduction in locked shares between Q5 and Q6. This could be explained by the fact that in some IPOs underwriters allow locked investors to sell portion of locked shares after the publication of first accounts. U.S. deals, which have more standardized lock-up agreements in terms of duration (panel D), appear to be more heterogeneous with respect to locked-up ownership percentages. In U.S. PE deals financial sponsors are required to hold a significantly higher ownership (31.30%) than in U.S. VC deals (22.62%). Comparison of locked-up ownership in PE deals reveal that in the U.S. private equity investors are obliged to hold a higher percentage stake (31.30%) for a specified period of time post-flotation than in UK (18.76%).

In order to identify whether PE and VC investors retain shares post lock-up expiration date (or unlock day), one has to examine what happens to PE and VC investors' holdings at lock-up expiration date.¹⁵ PE/VC investors in 226 UK IPO companies (69.54% of total sample) were subject to post-IPO selling restrictions. A closer examination of this sub-sample post the unlock day reveals the following: in 187 IPO companies PE/VC syndicates chose to retain some ownership post the lock-up expiration date, and only in 39 cases PE/VC investors made a full exit shortly after the lock-up expiration date¹⁶.

Panel C (table 6) analyzes further voluntary ownership by dividing it into the following sub-groups: voluntary ownership by PE/VC investors who were not subject to lock-up restrictions, and voluntary ownership post the lock-up expiration date¹⁷. Interestingly, voluntary holdings post lock-up expiration dates are significantly higher than voluntary holdings of the sub-sample where financial sponsors were not locked. This average ownership holdings three years post flotation provide PE and VC firms with considerable ability to influence and monitor certain decisions post-flotation. Therefore, presented evidences suggest that PE and VC investors do not view the lock-up expiration date as an opportunity to fully realize their returns or completely exit. Rather they maintain a block ownership, and thereby retain the ability to exert a great influence as a block holder. This finding is consistent with the study by Furth and Rauch (2012) who report that in only 9% of the sample with lock-up provision buyout sponsors made a sale at the lock-up expiration date or within four weeks thereafter.

Table 7 presents results of a logit model where the dependent variable equals to one if PE/VC investors were required to retain shares (i.e. subject to lock-up agreement), and zero otherwise. Consistent with results in table 5, PE/VC investors are more likely to be required to retain shares post-flotation in high-tech companies, and those with lower pre-IPO management and PE/VC syndicate ownership. The latter result is consistent with the notion

¹⁵ Thomson One Banker only provides quarterly ownership data. A more comprehensive ownership data (in terms of frequency) would allow to examine PE and VC firms' ownership adjustments made on exact date of lock-up agreement expiration. In this analysis, an examination of ownership adjustments made in first ownership quarter post the unlock day is considered as opposed to an exact expiration date. However, this should not have a material impact on the results presented since this would only overstate PE/VC firms' tendency to exit at the or soon after unlock day. A more frequent ownership dataset would allow to examine to what extent presented results will alter or strengthen.

¹⁶ Since the vast majority of PE and VC investors involved in U.S. IPOs are locked-in, this kind of analysis for the U.S. sample is not viable at the moment.

¹⁷ Difference-in-means were also conducted between PE compulsory and VC compulsory, PE voluntary and VC voluntary sub-samples. Differences are insignificant.

that an underwriter is concerned with sending a negative signal by allowing a majority owner (i.e. PE/VC syndicate) to sell a large part of its holdings, which could potentially signal firm's overvaluation (Leland and Pyle, 1977), and thus contractually oblige to retain shares for certain time post-IPO. An underwriter could require PE/VC investors to retain shares in companies with low pre-IPO management ownership since shareholders and the management team are more likely to exhibit divergent interests in these companies. Also, underwriters are more likely to lock PE/VC investors in companies with high degree of information asymmetry (i.e. high tech companies). This result is consistent with the argument by Cumming and MacIntosh (2003) who note that these companies have very niche products and services which the market might not fully appreciate at the time of flotation.

Results in table 7 also reveal that more reputable PE and VC houses are less likely to be locked post-IPO since information asymmetry is likely to be reduced by the presence of a reputable third party as an initial shareholder, which has a considerable reputational capital at stake. This could also be partially explained by the long lasting relationship between a particular underwriter and PE/VC house. In the lock-up bargaining process the age of the PE/VC fund is considered; a PE/VC fund which is closer to its termination date is less likely to be required to retain shares.

Table 8 presents OLS multivariate analysis of PE/VC syndicate's *voluntary* holdings in post-IPO period.¹⁸ Results in Panel A and B (Table 8) reveal that PE/VC investors' lock-up duration in U.K. deals has a significantly positive impact on three years' annual post-IPO ownership retention; thus, PE/VC investors voluntarily retain more in companies in which they were subject to longer selling restrictions. Courteau (1995) predicts that if the lock-up length is used as a signal device, then high quality firms would agree to longer lock-up period and bear the associated cost (i.e. being undiversified). Thus, PE and VC investors indeed voluntarily retain ownership in high quality companies which they expect to do well in the future, which in turn will guarantee PE/VC investors high exit share price and a successful exit. This result is also consistent with the commitment hypothesis, since if lock-up length is used as a commitment device (Brav and Gompers, 2003), then PE and VC investors voluntarily retain more shares in U.K. companies with greater potential for moral hazard, and by doing so they reduce investors' concerns.

¹⁸ Panel B reports results of the same models but with *lagged* CARs as independent variable.

ROA and CARs have a statistically significant negative impact on PE/VC syndicate's voluntary ownership post-IPO (table 8, panel A and B). Thus, financing sponsors reduce ownership in companies which perform strongly operationally and in terms of share price, whereas they retain ownership in companies which underperform post admission. Two years post flotation ROA has a statistically negative impact on voluntary ownership. After the company remained public for two years, published its annual reports, demonstrated that PE/VC investors didn't opportunistically quote the company at the peak of its operating performance PE and VC investors reduce their ownership in well performing firms. PE and VC investors could be willing to retain shares in underperforming companies in order to make further changes and improve operations, as well as demonstrate to the market their commitment to companies they have backed.

Additionally, PE and VC investors are cautious with reducing their voluntary ownership in companies in which PE/VC syndicates held a majority ownership stake pre-IPO as it could send a signal of firm's overvaluation to the market (Leland and Pyle, 1977). Moreover, PE/VC investors voluntarily retain more in companies which were listed during hot IPO periods in order to convey to the market that they are not simply quoting the company in order to take advantage of prevailing market conditions. Moreover, two fund characteristics have an impact on voluntary ownership retention. In quarter 4 post flotation (i.e. as soon as the vast majority of PE/VC syndicates are no longer obliged to hold shares) bank-affiliated funds retain a significantly lower percentage of shares, which is consistent with Tykvova (2007) and Hellmann et al (2004) studies. Additionally, funds whose headquarters are located in another country than IPO company, retain significantly less shares. Thus, these funds could find it more economically beneficial to free up their resources, reduce costs associated with time spent by their managers travelling, and concentrate fully on managing and providing hands-on support other ventures. Overall, results based on the U.K. sample in table 8 (panel A and B) are in line with both signalling and commitment hypotheses.¹⁹

Table 8 (Panel C and D) presents the OLS analysis of *voluntary* holdings in U.S. deals. Financial sponsors choose to retain a higher ownership in U.S. companies which are larger and backed by more reputable underwriters. Presented results suggest that voluntary holdings in U.S. deals are driven by the commitment hypothesis as a negative institutional ownership coefficient demonstrates.

¹⁹ Panel B (table 8), which uses *lagged* CARs as one of independent variables, reports similar results.

In line with U.K. results, financial sponsors reduce voluntary ownership in companies which perform strongly (as captured by a statistically significant negative ROA and CAR coefficient) and in case PE/VC fund is bank-affiliated. Also, financial sponsors are cautious with sending a negative signal and chose to voluntarily retain more shares in companies which were floated during a hot market period, and in deals where PE/VC syndicate was the majority owner pre-IPO. Financial sponsors retain a significantly higher voluntary ownership in buyouts floated on the U.S. markets (as demonstrated by statistically significant PE dummy coefficient), which is consistent with earlier presented results in table 6 (panel A).

Consistent with Tykvova (2007), results in table 8 (panel C) reveal that one year post-flotation bank affiliated PE/VC funds retain significantly less ownership. Also, more reputable PE/VC houses voluntarily retain more shares in the first year post-flotation. As expected, financial sponsors who have been limited in their ability to sell shares for longer retain less, as indicated by a negative PE/VC LOCK-UP DUR coefficient. Additionally, financial sponsors voluntarily retain more in U.S. floated high-tech companies, and those with low geographic proximity. Overall, presented results suggest that *voluntary* holdings in UK and US backed-IPOs are driven by both signalling and commitment hypothesis.

An interesting difference with respects to low proximity dummy emerges between U.S. and U.K. samples. UK results reveal that lead PE/VC funds voluntarily retain less in companies with low geographic proximity (table 8, panel A and B). This is in contrast with the U.S. results (table 8, panel C and D) where PE/VC funds retain more in IPOs located in another country than its headquarters. Thus, financial sponsors prefer to maintain a more significant influence (in terms of equity stakes) in U.S. IPOs when PE/VC investors will not be able to visit the company as often due to distance. While in the U.K., financial sponsors find it more economically beneficial to reduce ownership in these companies and rather free managers to devote more time to new ventures.

Table 9 presents results of a multivariate OLS analysis of PE/VC quarterly syndicate *compulsory* holdings post admission in UK IPOs.²⁰ Table 9 reports that PE/VC investors are required to retain less shares in companies with higher institutional ownership, who actively monitor companies they invest in, and thereby reduce the need for PE/VC investors to retain shares in order to monitor insiders' actions. This finding is consistent with commitment

²⁰ For the U.K. sample the analysis is done for quarters 1, 2, 3, and 4 post-flotation (Panel A). Although a number of lock-up agreements are longer than 365 days, the analysis for Q5 and Q6 post-flotation are not reported as the majority of lock-up agreements expire, and the sample size is reduced significantly in these quarters. The analysis of U.S. deals is conducted for quarters 1 and 2 post-flotation as the vast majority of lock-up agreements last for 180 days.

hypothesis proposed by Brav and Gompers (2003). Similar to voluntary holdings results (table 8) an underwriter is concerned with sending a negative signal by allowing PE/VC investors to reduce their ownership in companies in which PE/VC syndicate held a majority stake pre-IPO, and in companies which were floated during a hot IPO period.

In quarter 4 post-flotation, new set of variables have an impact on the size of compulsory ownership.²¹ More reputable, those which have been around for a longer period of time, PE and VC houses are required to retain more in companies. This finding is contrary to our initial expectation since long lasting relationship between underwriters and reputable PE/VC investors could have been formed, and PE/VC houses had enough time to demonstrate their integrity. This finding could be explained by the fact that reputable PE and VC houses demonstrate their commitment to ventures they back by agreeing to lock a higher percentage of shares. Consistent with Tykvova (2007), bank affiliated funds are required to retain considerably less. Moreover, in IPOs with longer management lock-up period, PE/VC syndicates are required to retain less in quarter 4 post-flotation. This could be attributed to the fact that longer management lock-up period ensures an alignment of interest between the management team and shareholders, and thus there is less need for monitoring conducted by a block holder such as PE/C syndicate. Overall, presented evidences suggest that compulsory holdings in U.K. IPOs are driven by the commitment hypothesis.

Results based on the U.S. IPOs, presented in table 9 (panel B), demonstrate that lagged management ownership has a statistically positive impact on PE/VC syndicate's compulsory ownership, which is in line with the signaling hypothesis. Most likely in order to avoid sending a negative signal by allowing PE/VC investors to reduce significantly their ownership in companies, underwriters require financial sponsors which held a majority stakes pre-IPO to retain more shares. During hot IPO markets underwriters lock-in a higher PE/VC ownership. Additionally, underwriters require financial investors to retain more post-flotation in PE-backed IPOs, and those with low geographic proximity. Overall, underwriter's decision regarding what percentage of shares PE/VC syndicate is required to hold post-IPO appear to be driven by signaling rationales in U.S. IPOs.

In order to capture great degree of heterogeneity in funds' characteristics and examine whether they have an impact on post-IPO ownership evolution, *individual fund's* ownership

²¹ However, this result should be considered with cautious because of the reduced sample size.

holdings are considered.²² Phalippou (2007) observes that private equity houses conduct both types of deals: venture capital and buyout transactions. However, they are done through separate funds, and each fund has its own clear investment strategy, deal focus, stage, and industry specialisation. Immediately post flotation, PE and VC syndicates retain some ownership holdings in 293 U.K. IPOs (90.15% of total U.K. sample) and 839 U.S. deals (62.33% of total U.S. sample). However, Thomson One Banker does not provide detailed fund report for all VC and PE funds in the sample. Therefore, this analysis consists of 1727 PE/VC fund detailed reports, which provide coverage of U.K. 157 IPOs and 869 US IPOs.

Table 10 presents results of analysis of individual funds' *compulsory* ownership. Panel A confirms earlier presented results in table 9 (panel A) that PE/VC investors compulsory ownership is driven by the commitment. Lead funds and those involved in PE deals are required to hold a significantly higher ownership for a certain period post-IPO. Also, funds are required to hold more shares in companies quoted on the Nasdaq market. This could be attributed to the fact that the underwriter wants to ensure that ventures receives support from financing sponsors during the first few months of public trading. Interestingly, funds whose headquarters which are located in another country than UK IPO company are required to retain a significantly lower percentage of shares. Thus, evidence seems to suggest that underwriters are aware that PE/VC investors find it more economically beneficial to exit the existing publicly trading company and focus on other companies still in their portfolio.

Contrary to earlier presented results (table 9 panel B), table 10 presents support for the commitment hypothesis; lagged institutional ownership has a statistically negative coefficient in quarters 1 and 2. Interestingly, underwriters require financing sponsors to retain a higher ownership in companies which subsequently do well (in terms of CARs) during the first three months of trading, and align their interests with those of management (as a positive management ownership coefficient demonstrates). Additionally, financial sponsors are allowed to retain less shares in companies with higher ROA. Panel A sheds further light on the determinants of PE/VC *fund's* compulsory ownership in US IPOs by reporting that funds with the following characteristics are required to retain a higher ownership: lead funds and those affiliated to a more reputable PE/VC house. Additionally, PE/VC investors' compulsory ownership is higher in larger IPOs. Although, the size variable is used as a proxy for potential moral hazard, it could also capture another aspect. If the size variable is regarded

²² As opposed to previous analysis which considered PE/VC *syndicate* ownership and focused on the *lead* fund's characteristics.

as a proxy for how much restructuring had to be done pre-IPO, an underwriter could feel that financial sponsors have to be more committed to larger companies post-flotation in order to finalize their restructuring activities or ensure that operations run smoothly. Thus, financial sponsors are required to retain a higher ownership in larger U.S. companies. Consistent with U.K. results, PE and VC funds who are lead investors in a syndicate and those involved in PE deals²³ are obliged to hold more shares post-flotation.

Table 10 (panel B) presents an OLS analysis of individual fund *voluntary* ownership post-IPO. U.K. sample results support the commitment hypothesis as a significantly negative underwriter reputation coefficient demonstrates. As previously reported, PE/VC funds tend to reduce ownership in companies with strong post-IPO operations. U.K. based results indicate that voluntary ownership in quarter 4 are also driven by the signalling motives as statistically positive lagged management ownership coefficient of 0.13 indicate. Moreover, the length of PE/VC investors' lock up agreement has a positive impact, which supports both commitment and voluntary hypotheses. As expected, the termination of the fund's life has a negative impact on the voluntary retention (comes into play in Q8) since general partners need to make distributions to its limited partners.

U.S. results reveal that funds retain a significant voluntary ownership post flotation, as significantly positive intercept coefficient reveals. Lagged intuitional ownership has a statistically negative impact on PE/VC fund's voluntary holdings, which is consistent with the commitment hypothesis. Bank affiliated funds retain significantly less in US IPOs, which is consistent with Hellmann *et al* (2004), however it does not apply to U.K. results. More reputable financial sponsors choose to retain significantly more shares. Overall, individual fund's voluntary ownership is driven by the commitment hypothesis in U.S. deals.

In both countries of flotation, funds retain less in high-tech companies, and retain significantly more in PE-backed deals, IPOs floated during hot IPO period, and by funds which were part of a syndicate which owned a majority stake in the company pre-IPO. Funds retain significantly less in high-tech companies. At the time of flotation, it is challenging for potential investors and the market to carefully value and appreciate the goods and services provided by these high-tech companies (Cumming and MacIntosh, 2003). However, after the public offering and start of trading, the market had an opportunity to re-evaluate high-tech

²³ PE investors who specialize in investing in mature businesses, and are in position to add a considerable amount of value to companies even post-flotation.

companies, and PE/VC investors find it more economically beneficial to allocate its managers to monitoring new ventures. In line with Lin and Smith (1998), lead funds retain considerably more than non-lead PE/VC funds in both UK and US IPOs. Thus, funds' voluntary ownership is driven by both the signalling and commitment motives in U.K. IPOs, while voluntary ownership in U.S. IPOs is driven by the latter.

Table 11 presents results of individual funds' voluntary ownership, where U.S. and U.K. samples have been combined. Results confirm earlier presented findings (table 6, panel A) that individual PE/VC funds chose to retain significantly more in companies floated on the U.S. stock market, as opposed to U.K. stock market, throughout three years post-flotation.

5. Conclusion

Private equity and venture capital investors realize returns by means of conducting an initial public offering (or any other divestment route) after several years of various extensive restructuring and value adding activities. Jensen (1986, 1989) has identified the following three value drivers in private equity model: management expertise, close monitoring and higher levels of debt. Among other changes, PE and VC investors introduce compensation linkage to performance, decentralisation of the decision making, alteration of board's composition and functionality (Baker and Wruck, 1989; Baker and Gompers, 2003; Hochberg, 2003; Acharya *et al*, 2009).

Previous studies have documented PE and VC investors' continued involvement in companies post-flotation in terms of ownership, and representation on the board of directors (Cao, 2011; Krishnan *et al*, 2011). Lock-up agreements partially explain this ownership retention during the lock-up period, which is on average 365 days in the U.K. (Hoque and Lasfer, 2009), whereas 180 days in the U.S. This paper analyzes the fundamental question of what determines PE/VC compulsory and voluntary ownership retention three years post-flotation in UK and US backed IPOs. Results presented reveal that PE and VC investors have different investments criteria depending on IPO companies' location (US vs. UK). Moreover, we find that investment and divestment dynamics of different groups of shareholders around the IPO date in the U.S. and U.K. are very diverse. In U.S. deals (particularly PE ones) financial sponsors take a significantly higher ownership stakes, maintain higher holdings immediately post-IPO and twelve quarters post flotation than in U.K. deals. This paper further sheds some light on the fact that although past studies have demonstrated that the U.S.

more standardized lock-up agreements in terms of duration, we find that these agreements tend to be more heterogeneous with respect to locked-up ownership percentages. Moreover, cross country comparison reveals that private equity investors in the U.S. are obliged to hold a higher percentage stake (30.30%) for specified period of time post-flotation than in UK (18.76%).

We find support for the hypothesis that PE and VC *compulsory* holdings are used to alleviate moral hazard concerns in UK companies, while it is used for signaling purposes in the U.S. The analyses of voluntary holdings finds support for both signaling and commitment hypotheses in UK and US IPOs. We present evidence that PE/VC investors reduce their voluntary ownership in companies which perform well operationally and financially after the offering, while chose to retain a higher ownership in underperforming companies. Additionally, PE and VC funds retain a significantly higher ownership in companies which are quoted on the U.S. stock market.

Moreover, this paper reports that voluntary holdings in UK IPOs post the expiration of the lock-up agreement are higher than voluntary ownership in UK companies where PE and VC investors were never restricted in their post-IPO selling transactions. Additionally, this paper contributes to literature to-date by specifically relating, analyzing and reporting a statistically significant relationship between PE and VC *fund's* ownership to *fund's* characteristics such as age, location and bank affiliation.

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Table 1. Annual PE/VC-backed IPO Distribution. For the U.K. sample, classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). For the U.S. sample, the names of PE and VC-backed IPOs were taken from the study by Liu and Ritter (2011). Names of backed IPOs, which took place during 2008-2010, were taken from SDC Platinum Database.

Year	UK		US	
	PE-backed IPOs	VC-backed IPOs	PE-backed IPOs	VC-backed IPOs
1997	13	25	28	105
1998	10	14	27	54
1999	5	4	35	201
2000	8	29	32	183
2001	4	8	22	22
2002	7	6	22	12
2003	4	4	21	19
2004	26	18	47	58
2005	17	29	60	46
2006	21	31	66	53
2007	20	22	31	71
2008	0	0	6	9
2009	0	0	15	13
2010	1	1	34	54
Total	136	191	446	900

Table 2. Description of proxy variables.

Variables	Definition	Proxying for (Hypotheses)	Esign
LOCK-UP DUMMY	The dummy equals to 1 if PE/VC investors are locked-up post flotation, 0 otherwise.	Signalling Commitment	+ +
LOCK-UP DUR.	Number of days post-flotation during which PE/ VC investors or management are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares.	Signalling Commitment	+
UND. REP	Underwriter Reputation: Dummy variable equals to 1 if the underwriter is the global underwriter, 0 otherwise as defined in Derrien and Kecskes (2007).	Commitment	-
ROA	Return on Assets: The ratio of earnings before interest and tax over total assets (%).	Signalling	+
MGT_OWN	Management Ownership: The percentage of outstanding shares held by the management/directors as a group at time t (t = one day pre and post IPO, quarterly ownership post-flotation).	Signalling	+
SIZE	The natural logarithm of company's total assets at time t (t= last accounts pre-IPO, published annual accounts one/two/three years post-flotation).	Commitment	-
INST_OWN	Institutional Ownership: The percentage of outstanding shares held by institutional investors as a group at time t (t = one day pre and post IPO, quarterly ownership post-flotation).	Commitment	-
BANK_AFF	Bank Affiliation: Dummy variable which equals to 1 if fund investor type is an Investment Bank or Other Banking/ Financial Institution, and 0 otherwise (Corporate PE/Venture Fund, Evergreen, Independent Private Partnership, and Investment Advisory Affiliate).	Fund's Characteris.	-
LOW PROXIMITY DUMMY	Dummy variable which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy).	Fund's Characteris.	-
CARs	Cumulative abnormal returns (CARs) are calculated between the IPO date and time t. For companies listed on the AIM or NASDAQ (MAIN or NYSE) market AIM All-Share or NASDAQ All-Share price index (FTSE All-Share or S&P 500 price index) was used correspondingly in order to calculate the market model abnormal returns (t = Q4, Q8, Q12 and first Q post the unlock day).		
AIM DUMMY	Dummy variable equals to 1 if the company is listed on the Alternative Investment Market (AIM), and 0 otherwise.		
NASDAQ DUMMY	Dummy variable equals to 1 if the company is listed on the Nasdaq, and 0 otherwise.		
PE DUMMY	Dummy variable equals to 1 if the IPO was classified as Private-Equity Backed. For the U.K. sample, classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). For the U.S. sample, the names of PE and VC-backed IPOs were taken from the study by Liu and Ritter (2011). Names of backed IPOs, which took place during 2008-2010, were taken from		

	SDC Platinum Database.
Hot IPO PERIOD	Dummy variable which equals to 1 if the IPO takes place in periods of high IPO volume (Jan 1999 – Mar 2001, Jan 2004-Dec 2006), and 0 otherwise.
PE/VC FUND AGE	The difference between time t and PE/VC fund vintage year (t = IPO year, Q4, Q8, Q12 post-IPO).
PE/VC HOUSE AGE	The difference between time t and PE/VC house founding year (t = IPO year, Q4, Q8, Q12 post-IPO).
PE/VC SYND. MAJ. OWNER	Dummy variable which equals to one if PE/VC syndicate's ownership pre-IPO exceed 50% or 30%, respectively, and 0 otherwise.
HIGH-TECH DUMMY	Dummy variable which equals to 1 if the company belongs to the following industries: technology, health care, and telecommunications, and 0 otherwise.
LEAD FUND DUMMY	Dummy variable equals to one if PE/VC fund is a lead member of a syndicate, and 0 otherwise. A fund was defined as lead in case it held the highest ownership stake pre-IPO within the PE/VC syndicate.
US MARKET FLOTATION DUMMY	Dummy variable which equals to 1 if the company is floated on the U.S. stock market, and 0 otherwise.

Table 3. The sample consists of 327 UK IPOs and 1346 US-backed IPOs from January 1997 through December 2010. Total sample was divided into sub-groups depending on whether an IPO is private equity (PE) or venture capital (VC)-backed. For the U.K. sample, classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). For the U.S. sample, the names of PE and VC-backed IPOs were taken from the study by Liu and Ritter (2011). Names of backed IPOs, which took place during 2008-2010, were taken from SDC Platinum Database. In *Panel A and B* IPO Characteristics are reported. All accounting figures are the last annual accounts pre-IPO. In order to eliminate the possible effect of outliers, all accounting observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the corresponding sample median. In *Panel C*, difference in means and medians between UK and US samples are reported. In *Panel D* PE/VC investors' and syndicate's characteristics are reported. T-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

IPO Characteristics

Panel A.UK Sample	All Sample		PE-backed IPOs		VC-backed IPOs		Difference-in-means/medians	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW
No. of IPOs.	327		136		191		(PE – VC)	
Total Assets (£mil)	100.53	12.07	214.31	33.73	18	6.1	4.79***	[0.04]
Leverage (%)	58.47	23.16	56.1	52.4	60.15	13.08	-0.27	[0.00]
ROA (%)	13.96	4.39	3.12	9.17	21.79	-15.81	-0.25	[0.00]
PE/VC lock-up duration (no. of days)	210.57	360	187.73	180	226.89	180	-2.10**	[0.03]
MGT lock-up duration (no. of days)	440.09	180	407.21	360	486.31	360	-1.13	[0.41]
Global Underwriter dummy	29.84%		36.76%		24.86%		2.32**	
High-tech dummy	38.77%		27.20%		47.08%		-3.69***	
AIM dummy	56.92%		40.44%		68.42%		-5.23***	

Panel B. US Sample No. of IPOs.	All Sample 1346		PE-backed IPOs 446		VC-backed IPOs 900		Difference-in-means/medians (PE – VC)	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW
	Total Assets (\$mil)	292.5703	44.939	783.86	305.99	69.78	27.121	12.38***
Leverage (%)	71.15	60.65	72.9	68.85	70.36	54.392	0.4211	[0.00]
ROA (%)	-29.66	-2.66	7.16	7.29	-46.16	-30.209	10.97***	[0.00]
PE/VC lock-up duration (no. of days)	182.18	180	183.55	180	181.5	180	1.13	[0.75]
MGT lock-up duration (no. of days)	181.56	180	182.28	180	181.2	180	0.7518	[0.54]
Global Underwriter dummy	14.33%		10.76%		16.11%		-2.64***	[0.00]
High-tech dummy	71.02%		37.07%		87.59%		-22.37***	[0.00]
NASDAQ dummy	78.52%		50.45%		92.32%		-19.98***	[0.00]

Panel C. Differences in means and medians between UK and US samples.						
	All Sample		PE-backed IPOs		VC-backed IPOs	
	Mean	Median	Mean	Median	Mean	Median
ROA (UK-US)	2.04**	[0.00]	-1.70*	[0.19]	2.01**	[0.03]
PE/VC lock-up duration	5.86***	[0.00]	0.5113	[0.08]	7.58***	[0.00]
MGT lock-up duration	15.39***	[0.00]	6.88***	[0.00]	40.57***	[0.00]
Global Underwriter dummy	6.71***		7.40***		2.88***	
High-tech dummy	-11.31***		-2.11**		-13.85***	
AIM or NASDAQ dummy	-8.14***		-2.04**		-9.49***	

Panel D, E, F: PE and VC Lead Syndicate Fund Characteristics

Panel D.UK Sample	All Sample		PE-backed IPOs		VC-backed IPOs		Difference-in-means/medians	
No. of funds	171		26		145		(PE – VC)	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW
PE/VC House's Age at IPO	22.18	20	22.39	17	21.92	22	0.17	[0.65]
PE/VC Fund Age at IPO	6.77	5	7.11	5	6.34	5	0.91	[0.53]
Capital Committed to PE/VC Fund (\$mil)	588.32	180.84	838.45	484.56	380.38	96.56	3.08***	[0.00]
Location (low proximity dummy)	15.20%		5.33%		22.91%		-3.26***	[0.00]
Bank Affiliated Fund	7.38%		8.08%		6.87%		0.41	[0.68]
Investment Period at IPO (no. of years)	3.22	3.22	3.06	2	3.39	3	-0.95	[0.53]
Syndicate size (no.)	2.1	1	1.83	1	2.29	2	-2.58***	[0.04]

Panel E. US Sample	All Sample		PE-backed IPOs		VC-backed IPOs		Difference-in-means/medians	
No. of funds	787		235		552		(PE – VC)	
	Mean	Median	Mean	Median	Mean	Median	t-stat	MW
PE/VC House's Age at IPO	20.23	17	21.99	19	19.24	16	1.92*	[0.00]
PE/VC Fund Age at IPO	8.32	17	8.1	6	8.43	6	-0.41	[0.12]
Capital Committed to PE/VC Fund (\$mil)	791.23	252.53	1645.71	1020	369.23	153.88	10.60***	[0.00]
Location (low proximity dummy)	23.29%		17.87%		26.29%		-2.45***	[0.01]
Bank Affiliated Fund	9.68%		15.87%		7.06%		3.84***	[0.00]
Investment Period at IPO (no. of years)	°[²⁴]	°	°	°	°	°	°	°
Syndicate size (no.)	°	°	°	°	°	°	°	°

²⁴ Results of investment period duration and syndicate size for the U.S. sample are in progress.

Panel F. Differences in means and medians between UK and US samples.

	All Sample		PE-backed IPOs		VC-backed IPOs	
	Mean	Median	Mean	Median	Mean	Median
PE/VC House's Age at IPO (UK-US)	0.68	[0.72]	-0.41	[0.78]	1.09	[0.62]
PE/VC Fund Age at IPO	-2.07**	[0.18]	-1.95*	[0.04]	-1.20	[0.83]
Capital Committed to PE/VC Fund	-1.68*	[0.02]	-3.37***	[0.00]	0.11	[0.02]
Location	-2.30**	[0.02]	-2.68***	[0.00]	-0.68	[0.49]
Bank Affiliated Fund	-1.21	[0.22]	-2.15**	[0.03]	-0.08	[0.93]
Investment Period at IPO	o	o	o	o	o	o
Syndicate size	o	o	o	o	o	o

Table 4. Ownership Adjustments Around the IPO Date. The following table reports ownership (%) of PE/VC syndicate, institutional initial shareholders and management immediately before and after the IPO. The data was manually collected from “Major Shareholders” section of IPO prospectuses. T-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

Panel A.UK IPOs	All Sample		PE-backed IPOs		VC-backed IPOs		Difference-in-means/medians	
	Mean	Median	Mean	Median	Mean	Median	(PE – VC)	
No. of IPOs.	325		135		190		t-stat	MW
PE/VC group ownership before IPO	46.87	43.3	56.7	58.27	40.09	37.95	4.75***	[0.00]
PE/VC group ownership after IPO	24.87	21.05	23.97	20.29	25.54	22.12	-0.71	[0.36]
Institutional ownership before IPO	5.61	0	4.54	0	6.37	0	-1.19	[0.05]
Institutional ownership after IPO	3.71	0	4.47	0	2.65	0	1.59	[0.03]
Management ownership before IPO	24.56	16	18.12	10.55	29.2	22.9	-3.99***	[0.00]
Management ownership after IPO	18.26	13.2	15.45	10.66	19.59	17.08	-2.38***	[0.03]

Panel B. US IPOs	All Sample		PE-backed IPOs		VC-backed IPOs		Difference-in-means/medians	
	1346		446		900		t-stat	MW
No. of IPOs.	1346		446		900			
PE/VC group ownership before IPO	56.79	58.29	69.81	78.4	50.68	37.95	12.42***	[0.00]
PE/VC group ownership after IPO	41.65	43.05	47.2	50.2	39.04	22.115	6.74***	[0.00]
Institutional ownership before IPO	5.26	0	6.86	0	4.46	0	2.85***	[0.00]
Institutional ownership after IPO	3.90	0	5.2	0	3.25	0	2.93***	[0.01]
Management ownership before IPO	31.69	23.4	27.49	13.85	33.67	22.9	-3.64***	[0.00]
Management ownership after IPO	22.89	17	18.43	8.6	25.02	17.08	-5.20***	[0.00]

Panel C. Difference in means and medians between UK and US IPOs.	All Sample		PE-backed IPOs		VC-backed IPOs	
	t-stat	MW	t-stat	MW	t-stat	MW
PE/VC group ownership before IPO	-5.39***	[0.00]	-4.33***	[0.00]	-4.95***	[0.00]
PE/VC group ownership after IPO	-13.10***	[0.00]	-11.21***	[0.00]	-8.30***	[0.00]
Institutional ownership before IPO	0.394	[0.40]	-1.46	[0.07]	1.80*	[0.01]
Institutional ownership after IPO	-0.27	[0.25]	-2.03**	[0.09]	1.48	[0.00]
Management ownership before IPO	-4.12***	[0.00]	-3.13***	[0.00]	-2.13**	[0.00]
Management ownership after IPO	-3.61***	[0.00]	-1.34	[0.54]	-3.04***	[0.00]

Table 5. Descriptive Statistics for Compulsory and Voluntary sub-sample.²⁵

	Compulsory		Voluntary		Difference-in-means/medians	
	Mean	Median	Mean	Median	(Comp. – Vol.)	
No. of IPOs.	226		99		t-stat	MW
Ownership:						
PE/VC ownership pre-IPO (%)	51.77	48.8	34.08	30.75	4.59***	[0.00]
PE/VC ownership post-IPO (%)	29.27	26.21	13.55	9.66	7.02***	[0.00]
Signalling:						
Underpricing (%)	14.05	6.40	10.94	8.49	0.75	[0.38]
Management ownership before IPO	21.81	13.56	30.83	26.9	-3.00***	[0.00]
Management ownership after IPO	16.66	10.13	21.88	18.08	-2.41***	[0.01]
ROA (%)	-14.31	-0.12	76.37	9.89	-1.15	[0.00]
CARs (t+3)	0.10	-0.05	0.37	-0.01	-1.01	[0.17]
Commitment:						
Total Assets (£mil)	127.03	12.23	28.85	9.96	2.24**	[0.06]
Institutional own. before IPO (%)	5.99	0	4.72	0	0.76	[0.13]
Institutional own. after IPO (%)	4.08	0	2.84	0	1.01	[0.02]
Global underwriter	30.08%		29.29%		0.14	
Other:						
Leverage (%)	66.35%	26.84%	39.89%	20.33%	1.63	[0.29]
Bank Affiliated Fund	9.29%		3.03%		1.99**	
Hot IPO period dummy	64.60%		46.46%		3.09***	
High-tech dummy	42.36%		28.28%		2.59***	
PE dummy	40.70%		44.44%		-0.62	
AIM dummy	57.96%		54.54%		0.57	

An IPO is classified as compulsory if PE/VC investors were locked-up, and voluntary if they were free to sell all of their shares immediately post-IPO. T-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

²⁵ Since the vast majority of PE and VC investors involved in U.S. IPOs are locked-in, this kind of analysis for the U.S. sample is not viable at the moment.

Table 6. Quarterly PE and VC Syndicates' Ownership post-IPO. The following table reports quarterly ownership by syndicates in PE and VC-backed companies. T-statistics for difference-in-means. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

Panel A. Mean Voluntary Holdings of VC and PE Syndicates

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
UK VC Syndicate Voluntary Hold.	8.01	8.98	13.28	12.75	16.39	15.13	16.05	15.06	12.96	11.5	10.76	9.7
UK PE Syndicate Voluntary Hold.	7.81	6.62	11.02	12.17	12.72	11.81	11.44	11.11	10.31	9.05	8.07	7.57
t-stats (VC-PE)	0.09	1.1	0.99	0.27	1.86*	1.74*	1.69*	1.53	1.49	1.4	1.62	1.32
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
US VC Syndicate Voluntary Hold.	11.44	20.53	21.06	19.46	17.5	17.19	16.82	14.96	12.69	11.32	9.89	8.73
US PE Syndicate Voluntary Hold.	38.87	29.18	28.53	26.31	23.59	23.26	21.96	20.58	18.33	16	14.51	13.19
t-stats (VC-PE)	-3.26***	-3.28***	-3.33***	-3.16***	-3.74***	-3.75***	-2.79***	-3.29***	-3.42***	-2.88***	-2.87***	-2.93***
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
t-stats: VC Vol Hold.(UK-US)	-1.00	-1.90*	-1.83*	-1.66*	-0.47	-0.91	-0.28	0.04	0.11	0.07	0.38	0.45
t-stats: PE Vol Hold. (UK-US)	-6.13***	-6.26***	-6.39***	-5.51***	-4.94***	-5.27***	-4.89***	-4.49***	-3.96***	-3.59***	-3.40***	-3.08***

Panel B. VC and PE Compulsory Ownership (%) post-IPO

	Q1	Q2	Q3	Q4	Q5	Q6
UK VC Comp. Ownership	21.62	22.33	22.26	23.68	24.2	13.45
UK PE Comp. Ownership	18.76	19.43	19.07	18.19	19.22	9.48
t-stats (VC-PE)	1.06	1.07	1.16	1.55	1.2	0.39
[No.of Obs.]	[221]	[216]	[209]	[134]	[107]	[19]
	Q1	Q2	Q3	Q4	Q5	Q6
US VC Comp. Ownership	22.62	21.61	8.80	2.56	NA	NA
US PE Comp. Ownership	31.30	30.20	27.85	12.15	NA	NA
t-stats (VC-PE)	-4.93***	-5.05***	-1.95***	-1.16	NA	NA
[No.of Obs.]	1282	1279	19	15	NA	NA
				Q5	Q6	
t-stats: VC Compul. Holdings (UK-US)	-0.36	0.26	1.98**	2.50***	NA	NA
t-stats: PE Compul. Holdings (UK-US)	-4.32***	-3.80***	-1.38	0.90	NA	NA

Panel C. UK VC Voluntary Holdings post-IPO (%)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Voluntary holdings (no lock-up)	8.01	8.66	8.53	8.23	8.22	6.67	6.03	5.42	4.99	4.8	4.45	3.86
Voluntary holdings (subject to lock-up)	N/a	N/a	18.84	17.61	20.1	18.76	20.18	19.05	16.23	14.24	13.35	12.1
t-stats (no lock-up - s.t.lock-up)	N/a	N/a	-3.52***	-3.46***	-4.38***	-4.66***	-3.15***	-3.23***	-4.57***	-4.00***	-3.77***	-3.67***

UK PE Voluntary Holdings post-IPO (%)

	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
Voluntary holdings (no lock-up)	7.81	6.93	6.46	6.67	6.31	5.59	5.45	5.64	4.58	3.98	3.89	3.73
Voluntary holdings (subject to lock-up)	N/A	N/A	16.04	16.73	15.89	14.85	14.3	13.72	13.05	11.47	10.07	9.4
t-stats (no lock-up - s.t.lock-up)	N/A	N/A	-3.04***	-3.32***	-3.21***	-3.17***	-3.11***	-2.91***	-3.13***	-2.96***	-2.41***	-2.22**

Panel D. Lock-Up Duration applicable to PE and VC Syndicates

	10th percentile	Median	Mean	90th percentile
UK PE-backed IPOs	0	180	187.79	365
US PE-backed IPOs	180	180	183.55	180
UK VC-backed IPOs	0	180	226.88	365
US VC-backed IPOs	180	180	181.5	180

Table 7. Logit Regression of Compulsory Ownership.

	1	2
INTERCEPT	2.00	1.74
	[0.17]	[0.19]
FDR	0.01	0.02
	[0.59]	[0.33]
MGT_OWN (pre-IPO)	-0.02*	-0.02*
	[0.06]	[0.09]
ROA (pre-IPO)	0.00	0.00
	[0.90]	[0.90]
UND. REP	-0.09	0.38
	[0.89]	[0.58]
SIZE	0.24	
	[0.34]	
INST_OWN (pre-IPO)	0.01	0.01
	[0.67]	[0.60]
PE/VC HOUSE AGE	-0.05***	-0.04**
	[0.00]	[0.02]
BANK_AFF	0.05	0.08
	[0.95]	[0.92]
PE/VC SYND. MAJ. OWNER	1.24*	1.60**
	[0.07]	[0.02]
PE/VC FUND AGE	-0.11**	-0.10**
	[0.04]	[0.04]
HIGH-TECH DUMMY	1.33*	1.43**
	[0.05]	[0.04]
HOT IPO MARKET	-0.22	-0.51
	[0.73]	[0.45]
PE DUMMY	-0.19	0.53
	[0.78]	[0.45]
AIM DUMMY		1.16
		[0.10]
No. of Obs.	131	141
Pseudo R ²	29.12%	30.96%

The sample consists of 325 PE- and VC-backed IPOs from January 1997 through December 2010. The dependant variable =1 if PE/VC syndicate retains shares compulsory immediately post-IPO, and 0 otherwise (i.e. voluntary). *FDR (%)* is the first day return calculated as the ratio of the difference between the closing price at the end of first trading day and the offer price divided by the offer price. *MGT_OWN (pre-IPO)* is the percentage of outstanding shares held by the management/ directors one day pre-IPO. All accounting figures are the last annual accounts pre-IPO specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. *Size* is defined as the natural logarithm of company's total assets. *INST_OWN (pre-IPO)* is the percentage of outstanding shares held by institutional investors as a group pre-IPO. *PE/VC HOUSE AGE* is the difference between IPO year and PE/VC house founding year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE/VC FUND AGE* is the difference between IPO year and PE/VC fund vintage year. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004-Dec 2006. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. P-values are reported in brackets. ***, **, *, * represents significant at 1, 5, and 10 percent level respectively.

TABLE 8. OLS Multivariate Analysis of *Voluntary* PE/VC Syndicate Ownership Post-Flotation.

UK Results	Panel A						Panel B			
	Q4	Q4	Q8	Q8	Q12	Q12	Q8	Q8	Q12	Q12
INTERCEPT	1.60 [0.22]	-0.91 [-0.12]	0.65 [0.05]	2.58 [0.41]	9.56 [0.87]	0.54 [0.09]	1.27 [0.10]	-1.93 [0.47]	9.17 [0.83]	0.40 [0.07]
UND. REP	-4.20 [-1.15]	-2.98 [-0.79]	-3.74 [-1.30]	-3.22 [-1.11]	0.69 [0.27]	0.66 [0.26]	-3.71 [-1.29]	-3.13 [-1.09]	0.61 [0.24]	0.61 [0.24]
SIZE (t-1)	0.26 [0.21]		0.29 [0.27]		-0.70 [-0.76]		0.28 [0.26]		-0.67 [-0.73]	
INST_OWN (t-1)	-0.16 [-1.03]	-0.17 [-1.02]	-0.07 [-0.55]	-0.08 [-0.62]	-0.17 [-1.34]	-0.16 [-1.26]	-0.08 [-0.58]	-0.09 [-0.66]	-0.18 [-1.34]	-0.16 [-1.28]
PE/VC LOCK-UP DUR.	0.04* [1.95]	0.03 [1.58]	0.02** [2.28]	0.02* [1.80]	0.03*** [2.96]	0.02** [2.27]	0.02** [2.25]	0.02* [1.76]	0.03*** [2.94]	0.02** [2.23]
ROA (t-1)	-0.05 [-1.60]	-0.05* [-1.80]	-0.17*** [-3.98]	-0.17*** [-4.02]	0.02 [0.74]	0.02 [0.61]	-0.17*** [-3.90]	-0.17*** [-4.06]	0.02 [0.73]	0.02 [0.62]
MGT_OWN (t-1)	0.06 [0.59]	0.03 [0.25]	0.05 [0.45]	0.05 [0.46]	-0.01 [-0.05]	0.02 [0.25]	0.04 [0.39]	0.05 [0.41]	0.00 [-0.03]	0.03 [0.26]
CARs	0.43 [0.48]	0.63 [0.68]	-0.21 [-1.24]	-0.18 [-1.11]	-1.03* [-1.76]	-1.02* [-1.78]				
LAGGED CARs							-0.23 [-1.42]	-0.21 [-1.30]	-0.97* [-1.70]	-1.00* [-1.77]
PE/VC HOUSE AGE (t-1)	-0.05 [-0.49]	0.01 [0.06]	-0.04 [-0.44]	-0.02 [-0.28]	-0.08 [-1.04]	-0.07 [-0.96]	-0.04 [-0.47]	-0.03 [-0.31]	-0.08 [-1.02]	-0.07 [-0.93]
PE/VC FUND AGE (t-1)	0.22 [0.85]	0.24 [0.91]	-0.17 [-0.66]	-0.17 [-0.68]	-0.08 [-0.38]	-0.96 [-0.35]	-0.17 [-0.69]	-0.17 [-0.69]	-0.09 [-0.41]	-0.08 [-0.37]
BANK_AFF	-11.40** [-2.31]	-11.68** [-2.26]	-3.45 [-0.85]	-3.89 [-0.97]	-4.05 [-1.24]	-3.95 [-1.22]	-3.15 [-0.78]	-3.72 [-0.92]	-4.00 [-1.22]	-3.89 [-1.20]
HIGH-TECH DUMMY	-1.36 [-0.37]	-0.10 [-0.03]	0.05 [0.02]	0.05 [0.02]	-0.69 [-0.28]	-0.19 [-0.08]	0.21 [0.07]	0.20 [0.07]	-0.57 [-0.23]	-0.09 [-0.04]
HOT IPO MARKET	8.94***	9.68***	2.96	2.79	5.12*	4.18	2.79	2.64	5.01*	4.08

	[2.42]	[2.53]	[0.96]	[0.90]	[1.91]	[1.58]	[0.91]	[0.86]	[1.87]	[1.55]
PE/VC SYND. MAJ. OWNER	6.22	8.15**	8.50***	8.46***	4.33	4.14	8.35**	8.23***	4.42	4.27
	[1.60]	[2.02]	[2.54]	[2.54]	[1.52]	[1.48]	[2.51]	[2.48]	[1.55]	[1.52]
PE DUMMY	-4.17	-3.68	1.52	2.43	-3.13	-2.52	1.35	2.30	-3.14	-2.48
	[-0.95]	[-0.86]	[0.45]	[0.74]	[-1.09]	[-0.90]	[0.41]	[0.70]	[-1.09]	[-0.88]
AIM DUMMY		3.28		2.67		3.98		2.67		4.12
		[0.76]		[0.77]		[1.35]		[0.78]		[1.40]
LOW PROXIMITY DUMMY	-2.55	-4.33	-7.49**	-7.67**	-2.83	-4.07	-7.14*	-7.28*	-2.89	-4.19
	[-0.47]	[-0.73]	[-1.98]	[-2.03]	[-0.90]	[-1.29]	[-1.89]	[-1.93]	[-0.92]	[-1.33]
No. of Obs.	80	81	132	132	127	127	132	132	127	127
Adj. R ²	17.89%	19.96%	22.81%	23.45%	15.51%	15.07%	22.91%	21.33%	15.24%	15.07%

The dependent variable is voluntary holdings (%) by PE/VC syndicates in various quarters (t) post-IPO. Panel A and B present analysis of UK deals. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *SIZE* is defined as the natural logarithm of company's total assets. *INST_OWN* is the percentage of outstanding shares held by initial institutional investors as a group. *PE/VC LOCK-UP DUR.* is number of days post-flotation during which PE/ VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *MGT_OWN* is the percentage of outstanding shares held by the management/ director as a group. *CARs* are Cumulative abnormal returns which are calculated between the IPO date and the beginning of the relevant quarter post-flotation. For companies listed on the AIM (MAIN) market AIM All-Share price index (FTSE All-Share price index) was used to calculate the market model abnormal returns. *LAGGED CARs* are Cumulative abnormal returns which are calculated between beginning of previous quarter and the beginning of the relevant quarter post-flotation. For companies listed on the AIM or NASDAQ(MAIN or NYSE) market AIM or NASDAQ All-Share price index (FTSE All-Share or S&P 500 price index) was used to calculate the market model abnormal returns. *PE/VC HOUSE AGE* is the difference between relevant quarter year and PE/VC house founding year. *PE/VC FUND AGE* is the difference between relevant quarter year and PE/VC fund vintage year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004-Dec 2006. *MGT LOCK-UP DUR.* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

US Voluntary Syndicate Ownership Post-Flotation.

	Panel C						Panel D			
	Q4	Q4	Q8	Q8	Q12	Q12	Q8	Q8	Q12	Q12
INTERCEPT	-2.64	17.39*	11.01	23.24**	-3.96	2.69	10.97	23.24**	-3.88	2.72
	[-0.26]	[1.75]	[0.95]	[2.27]	[-0.41]	[0.31]	[0.94]	[2.28]	[-0.40]	[0.31]
UND. REP	4.07*	4.37*	4.09	4.04	5.03**	5.19**	4.08	4.03	4.99**	5.16**
	[1.65]	[1.76]	[1.50]	[1.56]	[2.09]	[2.15]	[1.50]	[1.56]	[2.08]	[2.14]
SIZE (t-1)	3.29		1.16		0.22		1.17		0.21	
	[4.22]		[1.43]		[0.31]		[1.44]		[0.30]	
INST_OWN (t-1)	-0.23***	-0.22***	-0.11	-0.10	-0.09	-0.11	-0.11	-0.10	-0.09	-0.11
	[-2.52]	[-2.38]	[-0.57]	[-0.55]	[-0.40]	[-0.48]	[-0.57]	[-0.55]	[-0.41]	[-0.48]
PE/VC LOCK-UP DUR.	-0.03	-0.05	-0.09	-0.10*	0.00	-0.01	-0.09	-0.10*	0.00	-0.01
	[-0.70]	[-0.91]	[-1.62]	[-1.89]	[-0.07]	[-0.24]	[-1.62]	[-1.90]	[-0.08]	[-0.24]
ROA (t-1)	-0.04***	-0.02*	-0.03***	-0.02**	0.00	0.00	-0.03**	-0.02**	0.00	0.00
	[-3.53]	[-1.80]	[-2.31]	[-2.14]	[-0.78]	[-0.76]	[-2.32]	[-2.14]	[-0.77]	[-0.75]
MGT_OWN (t-1)	-0.01	-0.05	-0.01	-0.03	0.03	0.03	-0.01	-0.03	0.03	0.03
	[-0.17]	[-1.23]	[-0.13]	[-0.42]	[0.45]	[0.42]	[-0.14]	[-0.42]	[0.44]	[0.41]
CARs	-0.22**	-0.22**	0.02	0.03	-0.05	-0.06				
	[-2.00]	[-2.03]	[0.14]	[0.27]	[-0.43]	[-0.47]				
LAGGED CARs							0.02	0.03	-0.04	-0.05
							[0.20]	[0.26]	[-0.38]	[-0.42]
PE/VC HOUSE AGE (t-1)	0.11*	0.14***	0.06	0.06	0.02	0.01	0.06	0.06	0.02	0.01
	[1.85]	[2.33]	[1.00]	[0.99]	[0.43]	[0.28]	[1.00]	[0.99]	[0.44]	[0.29]
PE/VC FUND AGE (t-1)	-0.01	-0.05	0.05	0.09	0.06	0.07	0.05	0.09	0.06	0.07
	[-0.09]	[-0.48]	[0.38]	[0.75]	[0.59]	[0.66]	[0.38]	[0.75]	[0.59]	[0.65]
BANK_AFF	-5.84**	-4.65*	-3.34	-2.82	-0.03	0.30	-3.32	-2.83	-0.03	0.30
	[-2.08]	[-1.64]	[-1.08]	[-0.96]	[-0.01]	[0.12]	[-1.07]	[-0.96]	[-0.01]	[0.12]
HIGH-TECH DUMMY	0.75	-0.59	-0.56	-1.02	4.50*	4.64**	-0.55	-1.02	4.46*	4.64**
	[0.33]	[-0.26]	[-0.23]	[-0.43]	[1.94]	[2.02]	[-0.23]	[-0.43]	[1.95]	[2.02]
HOT IPO MARKET	5.06***	5.31***	1.50	1.81	0.36	0.61	1.50	1.81	0.36	0.60
	[2.87]	[2.99]	[0.78]	[0.98]	[0.22]	[0.37]	[0.78]	[0.98]	[0.22]	[0.36]

PE/VC SYND. MAJ. OWNER	11.26***	11.84***	12.22***	10.78***	7.82***	7.68***	12.20***	10.79***	7.81***	7.68***
	[5.38]	[5.66]	[5.31]	[4.98]	[3.88]	[3.80]	[5.30]	[4.98]	[3.87]	[3.80]
PE DUMMY	8.32***	11.43***	11.85***	9.53***	6.98***	6.05***	11.84***	9.54***	6.97***	6.04***
	[3.17]	[4.69]	[4.36]	[3.77]	[2.81]	[2.49]	[4.36]	[3.77]	[2.80]	[2.48]
NASDAQ Dummy		-5.78**		-4.54*		-4.72*		-4.54*		-4.72*
		[-2.25]		[-1.72]		[-1.91]		[-1.72]		[-1.91]
LOW PROXIMITY DUMMY	11.97***	13.16***	8.28***	8.60***	4.02**	4.02**	8.28***	8.59***	4.01**	4.01**
	[5.78]	[6.40]	[3.82]	[4.10]	[2.00]	[2.00]	[3.82]	[4.10]	[2.00]	[2.00]
No. of Obs.	443	443	409	453	322	322	409	453	322	322
Adj. R ²	33.04%	31.26%	21.98%	19.49%	9.42%	10.90%	21.99%	19.50%	9.39%	10.88%

The dependent variable is voluntary holdings (%) by PE/VC syndicates in various quarters (t) post-IPO. Panel C and D present analysis of US deals. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *SIZE* is defined as the natural logarithm of company's total assets. *INST_OWN* is the percentage of outstanding shares held by initial institutional investors as a group. *PE/VC LOCK-UP DUR.* is number of days post-flotation during which PE/ VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *MGT_OWN* is the percentage of outstanding shares held by the management/ director as a group. *CARs* are Cumulative abnormal returns which are calculated between the IPO date and the beginning of the relevant quarter post-flotation. or companies listed on the AIM or NASDAQ(MAIN or NYSE) market AIM or NASDAQ All-Share price index (FTSE All-Share or S&P 500 price index) was used to calculate the market model abnormal returns. *LAGGED CARs* are Cumulative abnormal returns which are calculated between beginning of previous quarter and the beginning of the relevant quarter post-flotation. For companies listed on the AIM (MAIN) market AIM All-Share price index (FTSE All-Share price index) was used to calculate the market model abnormal returns. *PE/VC HOUSE AGE* is the difference between relevant quarter year and PE/VC house founding year. *PE/VC FUND AGE* is the difference between relevant quarter year and PE/VC fund vintage year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004– Dec 2006. *MGT LOCK-UP DUR.* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005–Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively

TABLE 9. OLS Multivariate Analysis of *Compulsory* PE/VC Syndicate Ownership.

Panel A. UK Sample	Q1	Q1	Q2	Q2	Q3	Q3	Q4	Q4
INTERCEPT	11.75	7.82	8.22	3.70	10.96	3.47	19.39	8.64
	[1.16]	[0.81]	[0.84]	[0.38]	[1.12]	[0.35]	[0.88]	[0.38]
UND. REP	-3.08	-2.60	-4.54	-3.56	-1.97	-1.20	-6.30	-4.44
	[-0.76]	[-0.63]	[-1.15]	[-0.87]	[-0.49]	[-0.29]	[-1.11]	[-0.69]
SIZE (t-1)	-0.98		-0.85		-1.78		-2.52	
	[-0.82]		[-0.74]		[-1.57]		[-1.52]	
INST_OWN (t-1)	-0.33*	-0.36**	-0.10	-0.12	-0.17	-0.18	-0.34	-0.30
	[-1.83]	[-1.97]	[-0.57]	[-0.67]	[-0.97]	[-1.03]	[-1.19]	[-1.03]
PE/VC LOCK-UP DUR.	0.01	0.01	0.00	-0.01	0.00	0.00	0.01	0.01
	[0.56]	[0.29]	[-0.03]	[-0.33]	[0.06]	[-0.22]	[0.25]	[0.18]
ROA (t-1)	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01
	[-0.77]	[-1.00]	[-0.87]	[-1.09]	[-0.61]	[-0.99]	[-0.78]	[-1.57]
MGT_OWN (t-1)	-0.10	-0.09	-0.05	-0.04	-0.15	-0.13	-0.09	-0.03
	[-0.88]	[-0.79]	[-0.29]	[-0.21]	[-0.88]	[-0.77]	[-0.42]	[-0.13]
CARs	0.02	-0.07	-0.50	-0.29	-0.23	-0.35	0.15	0.55
	[0.02]	[-0.09]	[-0.62]	[-0.35]	[-0.41]	[-0.61]	[0.11]	[0.40]
PE/VC HOUSE AGE (t-1)	-0.11	-0.10	-0.07	-0.04	0.02	0.04	0.49**	0.47*
	[-0.82]	[-0.69]	[-0.53]	[-0.30]	[0.12]	[0.29]	[1.97]	[1.84]
PE/VC FUND AGE (t-1)	0.32	0.29	0.16	0.12	0.13	0.06	-0.75	-0.72
	[0.85]	[0.77]	[0.43]	[0.34]	[0.37]	[0.17]	[-0.89]	[-0.84]
BANK_AFF	-5.50	-4.92	-1.91	-1.65	-7.73	-6.86	-18.67***	-18.00**
	[-1.03]	[-0.93]	[-0.36]	[-0.32]	[-1.49]	[-1.33]	[-2.40]	[-2.28]
HIGH-TECH DUMMY	-0.52	0.10	1.76	2.57	2.07	3.45	-1.94	-0.54
	[-0.13]	[0.03]	[0.45]	[0.65]	[0.52]	[0.86]	[-0.36]	[-0.10]
HOT IPO MARKET	10.45***	10.12***	11.66***	11.09***	10.02**	9.60**	9.80	9.57
	[2.40]	[2.31]	[2.70]	[2.56]	[2.32]	[2.21]	[1.39]	[1.32]
MGT LOCK-UP DUR.	0.00	0.00	0.00	0.00	0.00	0.00	-0.03**	-0.03*
	[-0.07]	[0.01]	[-0.67]	[-0.56]	[-1.03]	[-0.92]	[-1.99]	[-1.76]
PE/VC SYND.MAJ.OWNER	14.62***	14.15***	18.89***	18.73***	17.46***	16.93***	19.18***	17.81***

	[3.04]	[2.99]	[4.01]	[4.02]	[3.64]	[3.56]	[2.82]	[2.59]
PE DUMMY	-1.26	-2.27	0.02	-0.03	0.97	-0.65	1.17	-1.50
	[-0.25]	[-0.52]	[0.00]	[-0.01]	[0.20]	[-0.15]	[0.17]	[-0.22]
AIM DUMMY		5.48		6.24		8.30		6.13
		[1.08]		[1.21]		[1.62]		[0.74]
LOW PROXIMITY DUMMY	-4.49	-6.38	-5.70	-7.43	-4.50	-7.24	2.99	2.48
	[-0.92]	[-1.30]	[-1.21]	[-1.58]	[-0.96]	[-1.55]	[0.45]	[0.37]
No. of Obs.	117	117	113	113	111	111	61	61
Adj. R ²	16.01%	16.43%	19.36%	20.11%	20.34%	20.46%	27.47%	24.59%

The dependent variable is compulsory holdings (%) by PE/VC syndicates in various quarters (t) post-IPO. Panel A presents analysis of UK deals, whereas panel B concentrates on the US deals. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *SIZE* is defined as the natural logarithm of company's total assets. *INST_OWN* is the percentage of outstanding shares held by initial institutional investors as a group. *PE/VC LOCK-UP DUR.* is number of days post-flotation during which PE/ VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *MGT_OWN* is the percentage of outstanding shares held by the management/ director as a group. *CARs* are Cumulative abnormal returns which are calculated between the IPO date and the beginning of the relevant quarter post-flotation. For companies listed on the AIM or NASDAQ (MAIN or NYSE) market AIM All-Share or NASDAQ price index (FTSE All-Share or S&P500 price index) was used to calculate the market model abnormal returns. *PE/VC HOUSE AGE* is the difference between relevant quarter year and PE/VC house founding year. *PE/VC FUND AGE* is the difference between relevant quarter year and PE/VC fund vintage year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004-Dec 2006. *MGT LOCK-UP DUR.* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

Panel B. US Sample	Q1	Q1	Q2	Q2
INTERCEPT	3.32	27.69	-0.27	16.65
	[0.13]	[1.22]	[-0.01]	[0.76]
UND. REP	0.57	0.84	-0.38	0.53
	[0.10]	[0.15]	[-0.07]	[0.10]
SIZE (t-1)	2.51		2.26	
	[1.42]		[1.38]	
INST_OWN (t-1)	-0.27	-0.29	-0.23	-0.21
	[-1.26]	[-1.40]	[-0.63]	[-0.62]
PE/VC LOCK-UP DUR.	0.01	-0.01	0.01	0.00
	[0.03]	[-0.03]	[0.02]	[-0.01]
ROA (t-1)	-0.01	0.00	-0.02	-0.01
	[-0.31]	[0.06]	[-0.77]	[-0.37]
MGT_OWN (t-1)	-0.08	-0.09	0.12	0.42***
	[-0.82]	[-0.89]	[0.66]	[3.86]
CARs	0.22	0.27	0.09	0.07
	[0.76]	[1.02]	[0.35]	[0.29]
PE/VC HOUSE AGE (t-1)	-0.06	-0.03	-0.04	-0.05
	[-0.50]	[-0.24]	[-0.31]	[-0.44]
PE/VC FUND AGE (t-1)	-0.12	-0.20	-0.08	-0.11
	[-0.46]	[-0.79]	[-0.31]	[-0.46]
BANK_AFF	-5.66	-4.23	-4.12	-1.98
	[-0.84]	[-0.66]	[-0.64]	[-0.33]
HIGH-TECH DUMMY	6.41	5.87	4.94	4.23
	[1.20]	[1.13]	[0.98]	[0.89]
HOT IPO MARKET	7.93*	8.92**	7.77*	6.68*
	[1.86]	[2.19]	[1.90]	[1.76]
MGT LOCK-UP DUR.	-0.06	-0.05	-0.07	-0.07
	[-0.13]	[-0.11]	[-0.16]	[-0.17]
PE/VC SYND. MAJ. OWNER	19.44***	16.92***	22.20***	23.41***
	[3.87]	[3.55]	[4.84]	[5.58]
PE DUMMY	12.58**	11.91**	13.28***	12.38***
	[2.15]	[2.16]	[2.39]	[2.43]
NASDAQ Dummy		-7.07		-5.23
		[-1.20]		[-0.99]
LOW PROXIMITY DUMMY	9.93**	9.39**	10.09**	9.011**
	[2.03]	[1.99]	[2.25]	[2.14]
No. of Obs.	384	425	402	443
Adj. R ²	9.45%	8.34%	9.73%	11.53%

The dependent variable is compulsory holdings (%) by PE/VC syndicates in various quarters (t) post-IPO. Panel A presents analysis of UK deals, whereas panel B concentrates on the US deals. UND.REP is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. SIZE is defined as the natural logarithm of company's total assets. INST_OWN is the percentage of outstanding shares held by initial institutional investors as a group. PE/VC LOCK-UP DUR. is number of days post-flotation during which PE/VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. ROA (%) is defined as the earnings before interest and tax divided by total assets. MGT_OWN is the percentage of outstanding shares held by the management/ director as a group. CARs are Cumulative abnormal returns which are calculated between the IPO date and the beginning of the relevant quarter post-flotation. For companies listed on the AIM or NASDAQ (MAIN or NYSE) market AIM All-Share or NASDAQ price index (FTSE All-Share or S&P500 price index) was used to calculate the market model abnormal returns. PE/VC HOUSE AGE is the difference between relevant quarter year and PE/VC house founding year. PE/VC FUND AGE is the difference between relevant quarter year and PE/VC fund vintage year. BANK_AFF is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. HIGH-TECH DUMMY is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. HOT IPO MARKET is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar

2001, and Jan 2004-Dec 2006. *MGT LOCK-UP DUR* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

Table 10. OLS Multivariate Analysis of *Individual PE/VC Fund* Ownership Post-Flotation.

Panel A. Compulsory Ownership by Individual Funds

	UK IPO Sample						US IPO Sample			
	Q1	Q1	Q2	Q2	Q3	Q3	Q1	Q1	Q2	Q2
INTERCEPT	2.73	-0.44	1.01	-1.63	1.21	-3.17	11.70	15.11*	-0.55	3.25
	[0.45]	[-0.08]	[0.17]	[-0.28]	[0.24]	[-0.64]	[1.39]	[1.81]	[-0.06]	[0.33]
UND. REP	-3.02	-1.71	-4.25*	-3.49	-3.46*	-3.02	-0.22	-0.35	-0.51	-0.71
	[-1.37]	[-0.77]	[-1.94]	[-1.57]	[-1.79]	[-1.57]	[-0.22]	[-0.35]	[-0.57]	[-0.79]
SIZE (t-1)	-0.25		-0.32		-0.73		0.73**		0.94***	
	[-0.40]		[-0.52]		[-1.32]		[1.97]		[2.87]	
INST_OWN (t-1)	-0.17*	-0.19*	-0.03	-0.05	-0.08	-0.07	-0.17***	-0.17***	-0.07	-0.07
	[-1.68]	[-1.91]	[-0.33]	[-0.43]	[-0.85]	[-0.77]	[-3.87]	[-3.79]	[-0.90]	[-0.94]
PE/VC LOCK-UP DUR.	0.00	-0.01	0.00	-0.01	0.00	0.00	0.03	0.01	0.04	0.03
	[0.36]	[-0.86]	[0.12]	[-0.60]	[0.51]	[-0.38]	[0.21]	[0.10]	[0.38]	[0.21]
ROA (t-1)	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	0.00	-0.01***	-0.01*
	[-0.50]	[-0.74]	[-0.38]	[-0.59]	[-0.11]	[-0.43]	[-1.22]	[-0.38]	[-3.04]	[-1.87]
MGT_OWN (t-1)	0.04	0.06	0.02	0.05	-0.02	0.02	0.00	0.00	0.16***	0.16***
	[0.68]	[1.12]	[0.19]	[0.51]	[-0.26]	[0.25]	[-0.20]	[-0.28]	[7.71]	[7.63]
CARs	-0.06	-0.19	-0.53	-0.39	-0.41	-0.43	0.13***	0.13***	0.01	0.00
	[-0.13]	[-0.41]	[-1.40]	[-1.01]	[-1.35]	[-1.44]	[2.41]	[2.54]	[0.14]	[0.08]
PE/VC HOUSE AGE (t-1)	-0.06	-0.01	-0.01	0.03	0.02	0.04	0.06**	0.06***	0.05***	0.05***
	[-0.71]	[-0.12]	[-0.08]	[0.32]	[0.33]	[0.59]	[2.26]	[2.38]	[2.34]	[2.34]
PE/VC FUND AGE (t-1)	-0.14	-0.22	-0.11	-0.19	-0.12	-0.22	0.00	-0.01	0.01	0.01
	[-0.70]	[-1.09]	[-0.53]	[-0.91]	[-0.66]	[-1.19]	[-0.04]	[-0.11]	[0.31]	[0.32]
BANK_AFF	-5.17*	-4.18	-2.36	-1.86	-4.58	-3.40	-1.72	-1.60	-1.71	-1.59
	[-1.74]	[-1.44]	[-0.77]	[-0.61]	[-1.63]	[-1.22]	[-1.30]	[-1.22]	[-1.47]	[-1.37]
HIGH-TECH DUMMY	-3.18	-2.85	-2.44	-2.20	-0.87	-0.60	-3.91***	-3.97***	-3.63***	-3.86***
	[-1.47]	[-1.34]	[-1.11]	[-1.02]	[-0.43]	[-0.30]	[-3.40]	[-3.44]	[-3.46]	[-3.67]
HOT IPO MARKET	4.77*	4.05	3.29	2.68	2.77	2.31	1.73**	1.66**	1.87***	1.71***
	[1.68]	[1.45]	[1.14]	[0.93]	[1.13]	[0.94]	[2.13]	[2.06]	[2.56]	[2.34]
MGT LOCK-UP DUR.	0.00	0.00	0.00	0.00	-0.01*	-0.01*	-0.06	-0.04	-0.04	-0.01
	[-0.60]	[-0.69]	[-1.54]	[-1.47]	[-1.97]	[-1.74]	[-0.47]	[-0.32]	[-0.32]	[-0.10]

PE/VC SYND.MAJ.OWNER	7.81***	8.70***	9.88***	10.48***	8.99***	9.82***	2.10**	2.41***	4.44***	4.76***
	[2.69]	[3.05]	[3.26]	[3.46]	[3.36]	[3.66]	[2.05]	[2.40]	[4.82]	[5.20]
PE DUMMY	2.74	5.04**	4.07	5.50**	4.16*	4.94**	12.17***	12.63***	10.71***	11.46***
	[1.02]	[2.07]	[1.51]	[2.14]	[1.66]	[2.12]	[9.57]	[10.45]	[9.35]	[10.33]
NASDAQ/AIM DUMMY		7.11		4.73		5.34**		-2.04*		-1.81*
		[2.60]		[1.63]		[2.25]		[-1.66]		[-1.64]
LOW PROXIMITY DUMMY	-3.89*	-4.20**	-2.82	-3.09	-3.24*	-3.75**	-2.78***	-2.93***	-3.56***	-3.61***
	[-1.94]	[-2.17]	[-1.40]	[-1.58]	[-1.75]	[-2.07]	[-2.33]	[-2.45]	[-3.35]	[-3.38]
LEAD FUND DUMMY	11.17***	11.27***	10.67***	10.87***	10.95***	11.26***	8.57***	8.50***	8.19***	8.10***
	[5.35]	[5.54]	[5.12]	[5.28]	[5.72]	[5.95]	[10.24]	[10.18]	[10.91]	[10.78]
No. of Obs.	170	170	172	172	185	185	886	886	1020	1020
Adj. R^2	21.94%	25.20%	20.92%	22.13%	23.09%	24.58%	34.91%	34.82%	36.11%	35.76%

Panel B. Voluntary Ownership by Individual Funds

	UK IPO Sample						US IPO Sample					
	Q4	Q4	Q8	Q8	Q12	Q12	Q4	Q4	Q8	Q8	Q12	Q12
INTERCEPT	-3.37	-7.76	12.44	5.23	4.98	0.96	9.94	13.43	18.63*	25.19***	15.89	16.32
	[-0.50]	[-1.10]	[1.46]	[1.07]	[0.61]	[0.19]	[1.09]	[1.47]	[1.91]	[2.74]	[1.26]	[1.29]
UND. REP	-0.33	-0.44	-5.60***	-5.27***	-2.15	-2.01	0.18	0.11	0.56	0.64	1.27	1.41
	[-0.13]	[-0.17]	[-3.08]	[-2.89]	[-1.18]	[-1.09]	[0.23]	[0.14]	[0.66]	[0.81]	[1.29]	[1.44]
SIZE (t-1)	-0.42		-0.53		-0.32		0.52*		0.00		-0.29	
	[-0.53]		[-0.79]		[-0.51]		[1.80]		[-0.01]		[-0.85]	
INST_OWN (t-1)	-0.07	-0.07	-0.05	-0.04	-0.10	-0.10	-0.12***	-0.11***	-0.07	-0.05	-0.06	-0.05
	[-0.58]	[-0.63]	[-0.54]	[-0.48]	[-1.06]	[-1.01]	[-3.17]	[-3.11]	[-0.84]	[-0.71]	[-0.48]	[-0.46]
PE/VC LOCK-UP DUR.	0.00	0.00	0.00	-0.01	0.01*	0.01	-0.02	-0.02	-0.08	-0.10**	-0.07	-0.07
	[-0.04]	[-0.07]	[-0.33]	[-0.77]	[1.80]	[1.57]	[-0.44]	[-0.43]	[-1.41]	[-1.96]	[-0.96]	[-1.01]
ROA (t-1)	0.00	0.00	-0.04	-0.04	-0.01	-0.01*	-0.01	0.00	-0.01	-0.01	0.00	0.00
	[-1.21]	[-1.33]	[-1.55]	[-1.62]	[-1.47]	[-1.67]	[-1.26]	[-0.49]	[-1.24]	[-1.36]	[-0.83]	[-1.27]
MGT_OWN (t-1)	0.10	0.13*	0.09	0.11	0.02	0.03	0.00	0.00	0.00	-0.01	0.02	0.02
	[1.43]	[1.81]	[1.16]	[1.39]	[0.28]	[0.36]	[-0.05]	[-0.12]	[-0.10]	[-0.47]	[0.75]	[0.73]
CARs	0.73	0.62	-0.17	-0.18	-0.31	-0.32	-0.03	-0.03	-0.01	0.01	0.04	0.03
	[1.17]	[0.99]	[-1.42]	[-1.46]	[-0.78]	[-0.79]	[-0.77]	[-0.83]	[-0.15]	[0.23]	[0.55]	[0.51]
PE/VC HOUSE AGE (t-1)	-0.03	-0.01	-0.05	-0.03	-0.05	-0.05	0.06***	0.06***	0.05**	0.03*	0.04	0.03
	[-0.38]	[-0.19]	[-0.90]	[-0.62]	[-1.03]	[-0.93]	[3.01]	[3.09]	[2.32]	[1.86]	[1.62]	[1.52]
PE/VC FUND AGE (t-1)	-0.07	-0.11	-0.41**	-0.46***	-0.23	-0.25	-0.04	-0.04	-0.03	0.00	-0.04	-0.04
	[-0.32]	[-0.56]	[-2.25]	[-2.54]	[-1.28]	[-1.42]	[-1.11]	[-1.18]	[-0.79]	[-0.06]	[-0.91]	[-1.04]
BANK_AFF	-3.39	-2.51	-1.83	-1.30	-3.44	-3.36	-4.01***	-3.94***	-2.58***	-2.58***	-1.60	-1.61
	[-0.92]	[-0.68]	[-0.66]	[-0.47]	[-1.30]	[-1.27]	[-3.95]	[-3.88]	[-2.38]	[-2.52]	[-1.35]	[-1.36]
HIGH-TECH DUMMY	-3.76	-3.19	-5.79***	-5.52***	-3.51*	-3.25*	-4.82***	-4.86***	-4.22***	-4.24***	-2.69**	-2.19*
	[-1.29]	[-1.10]	[-2.89]	[-2.78]	[-1.83]	[-1.74]	[-5.14]	[-5.20]	[-4.36]	[-4.54]	[-2.15]	[-1.74]
HOT IPO MARKET	5.39*	5.34*	0.34	-0.12	2.41	2.21	1.47***	1.49***	0.53	0.36	0.06	0.18
	[1.67]	[1.71]	[0.14]	[-0.05]	[1.02]	[0.93]	[2.34]	[2.36]	[0.79]	[0.56]	[0.07]	[0.23]
PE/VC SYND.MAJ.OWNER	9.73***	10.01***	7.91***	8.37***	4.06	4.19*	2.48***	2.64***	3.47***	2.68***	3.13***	3.06***

PE DUMMY	[3.15]	[3.27]	[3.13]	[3.29]	[1.61]	[1.65]	[3.26]	[3.52]	[4.15]	[3.38]	[3.27]	[3.20]
	2.42	3.97	4.19*	5.09**	1.89	1.99	10.04***	10.22***	9.14***	7.61***	6.83***	5.90***
	[0.76]	[1.26]	[1.86]	[2.19]	[0.88]	[0.90]	[9.84]	[10.40]	[8.69]	[7.69]	[5.23]	[4.57]
NASDAQ/AIM DUMMY		4.53		3.34		1.18		-1.80*		-1.78*		-1.70
		[1.57]		[1.46]		[0.53]		[-1.78]		[-1.75]		[-1.30]
LOW PROXIMITY DUMMY	0.69	-0.11	-1.91	-2.18	-1.72	-1.90	-1.50	-1.57	-2.11**	-2.03**	-0.64	-0.74
	[0.28]	[-0.05]	[-1.08]	[-1.25]	[-1.00]	[-1.11]	[-1.53]	[-1.59]	[-2.13]	[-2.11]	[-0.53]	[-0.61]
LEAD FUND DUMMY	11.08***	11.17***	8.10***	8.12***	5.09***	5.10***	6.69***	6.63***	5.18***	4.68***	5.44***	5.51***
	[4.41]	[4.52]	[4.31]	[4.35]	[2.83]	[2.83]	[10.23]	[10.17]	[7.40]	[7.14]	[6.56]	[6.66]
No. of Obs.	106	106	177	177	177	177	1212	1212	1106	1223	830	830
Adj. R ²	19.83%	21.74%	23.51%	24.22%	14.65%	14.65%	31.05%	31.04%	23.33%	21.16%	16.54%	16.64%

The dependent variable is holdings (%) by individual PE/VC funds in various quarters (t) post-IPO. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *SIZE* is defined as the natural logarithm of company's total assets. *INST_OWN* is the percentage of outstanding shares held by initial institutional investors as a group. *PE/VC LOCK-UP DUR.* is number of days post-flotation during which PE/VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *MGT_OWN* is the percentage of outstanding shares held by the management/ director as a group. *CARs (3 yrs post-IPO)* are Cumulative abnormal returns which are calculated between the IPO date and end of quarter 12 post-flotation. For companies listed on the AIM (MAIN) market AIM All-Share price index (FTSE All-Share price index) was used to calculate the market model abnormal returns. *CARs* are Cumulative abnormal returns which are calculated between the IPO date and the beginning of relevant quarter post-flotation. For companies listed on the AIM (MAIN) market AIM All-Share price index (FTSE All-Share price index) was used to calculate the market model abnormal returns. *PE/VC HOUSE AGE* is the difference between relevant quarter year and PE/VC house founding year. *PE/VC FUND AGE* is the difference between relevant quarter year and PE/VC fund vintage year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004-Dec 2006. *MGT LOCK-UP DUR.* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005-Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* equals to 1 if PE or VC fund's headquarters are located not in the U.K., and 0 otherwise. *LEAD FUND DUMMY* equals to one if PE/VC fund is a lead member of a syndicate, and 0 otherwise. A fund was defined as lead in case it held the highest ownership stake pre-IPO within the PE/VC syndicate. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively.

Table 11. OLS Multivariate Analysis of *Individual PE/VC Fund Ownership Post-Flotation.*

	Q4	Q4	Q8	Q8	Q12	Q12
INTERCEPT	4.88* [1.68]	5.82** [2.02]	-0.70 [-0.28]	0.37 [0.15]	-4.71* [-1.77]	-4.65* [-1.82]
UND. REP	-0.39 [-0.52]	-0.43 [-0.57]	-0.61 [-0.80]	-0.73 [-0.97]	0.27 [0.32]	0.28 [0.33]
SIZE (t-1)	0.26 [1.09]		0.45 [1.45]		-0.02 [-0.05]	
INST_OWN (t-1)	-0.12*** [-3.47]	-0.12*** [-3.40]	-0.06 [-1.10]	-0.06 [-1.08]	-0.06 [-0.91]	-0.06 [-0.88]
PE/VC LOCK-UP DUR.	-0.01 [-0.89]	-0.01 [-0.82]	0.01 [1.46]	0.01 [1.49]	0.02*** [3.16]	0.02*** [3.15]
ROA (t-1)	-0.01 [-0.66]	-0.01 [-0.47]	-0.03*** [-3.07]	-0.02*** [-2.71]	-0.01 [-1.52]	-0.01* [-1.66]
MGT_OWN (t-1)	0.00 [0.12]	0.00 [0.09]	0.03 [1.22]	0.03 [1.25]	0.02 [0.93]	0.02 [0.93]
CARs	-0.02 [-0.53]	-0.02 [-0.53]	-0.02 [-0.63]	-0.03 [-0.72]	0.00 [-0.07]	0.00 [-0.07]
PE/VC HOUSE AGE (t-1)	0.04** [2.22]	0.04** [2.25]	0.02 [1.25]	0.02 [1.27]	0.02 [0.84]	0.02 [0.81]
PE/VC FUND AGE (t-1)	-0.02 [-0.55]	-0.02 [-0.53]	-0.02 [-0.52]	-0.02 [-0.47]	-0.03 [-0.78]	-0.03 [-0.79]
BANK_AFF	-3.59*** [-3.70]	-3.62*** [-3.73]	-2.39*** [-2.39]	-2.35*** [-2.35]	-1.81* [-1.69]	-1.82* [-1.70]
HIGH-TECH DUMMY	-4.89*** [-5.53]	-4.99*** [-5.70]	-4.32*** [-5.01]	-4.44*** [-5.13]	-2.94*** [-2.89]	-2.89*** [-2.87]
HOT IPO MARKET	1.69*** [2.73]	1.65*** [2.68]	0.26 [0.41]	0.30 [0.46]	0.30 [0.41]	0.32 [0.44]
US MARKET FLOTATION DUMMY	3.98*** [3.47]	4.58*** [3.89]	1.18 [0.84]	2.59*** [2.34]	3.77*** [2.56]	3.85*** [3.31]
PE/VC SYND.MAJ.OWNER	3.28***	3.35***	4.19***	4.23***	3.81***	3.79***

	[4.52]	[4.64]	[5.32]	[5.37]	[4.34]	[4.33]
PE DUMMY	8.86***	9.07***	7.47***	7.71***	4.76***	4.59***
	[9.26]	[9.95]	[8.26]	[8.16]	[4.61]	[4.27]
NASDAQ DUMMY		-0.78		-0.18		-0.38
		[-0.83]		[-0.19]		[-0.34]
LOW PROXIMITY DUMMY	-1.13	-1.11	-1.92**	-1.89**	-0.62	-0.62
	[-1.26]	[-1.24]	[-2.26]	[-2.23]	[-0.64]	[-0.64]
LEAD FUND DUMMY	7.03***	6.99***	5.91***	5.87***	5.57***	5.58***
	[11.11]	[11.08]	[9.02]	[8.96]	[7.46]	[7.48]
No. of Obs.	1318	1318	1288	1288	1007	1007
Adj. R ²	29.07%	29.04%	21.81%	21.69%	15.39%	15.40%

The dependent variable is voluntary holdings (%) by individual PE and VC funds in various quarters (t) post-IPO. *UND.REP* is a dummy variable which equals to one if the underwriter is the global underwriter as defined in Derrien and Kecskes (2007), and 0 otherwise. All accounting figures are specified in mil GBP. In order to eliminate the possible effect of outliers all observations whose values are lower (higher) than the 1st (99th) percentiles were replaced by the sample PE (or VC) median. *SIZE* is defined as the natural logarithm of company's total assets. *INST_OWN* is the percentage of outstanding shares held by initial institutional investors as a group. *PE/VC LOCK-UP DUR.* is number of days post-flotation during which PE/ VC investors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *ROA (%)* is defined as the earnings before interest and tax divided by total assets. *MGT_OWN* is the percentage of outstanding shares held by the management/ director as a group. *CARs* are Cumulative abnormal returns which are calculated between the IPO date and the beginning of the relevant quarter post-flotation. or companies listed on the AIM or NASDAQ(MAIN or NYSE) market AIM or NASDAQ All-Share price index (FTSE All-Share or S&P 500 price index) was used to calculate the market model abnormal returns. *LAGGED CARs* are Cumulative abnormal returns which are calculated between beginning of previous quarter and the beginning of the relevant quarter post-flotation. For companies listed on the AIM (MAIN) market AIM All-Share price index (FTSE All-Share price index) was used to calculate the market model abnormal returns. *PE/VC HOUSE AGE* is the difference between relevant quarter year and PE/VC house founding year. *PE/VC FUND AGE* is the difference between relevant quarter year and PE/VC fund vintage year. *BANK_AFF* is a dummy which equals to one if fund investor type is either an Investment Bank or Other Banking/Financial Institution, and 0 otherwise. *HIGH-TECH DUMMY* is a dummy variable which equals to one if the company belongs to the following industries: technology, health care, and telecommunications. *HOT IPO MARKET* is a dummy variable which equals to one if the IPO takes place in the following periods of high IPO volume: Jan 1999 – Mar 2001, and Jan 2004– Dec 2006. *US MARKET FLOTATION DUMMY* is equal to one if an IPO was quoted on the U.S. stock market, and 0 otherwise. *MGT LOCK-UP DUR.* is number of days post-flotation during which management/directors are not allowed to offer, issue, sell, contract to sell, or dispose of ordinary shares. *PE/VC SYND. MAJ. OWNER (pre-IPO)* is the dummy variable which equals to one if PE (VC) syndicate owned more than 50% (30%) of shares right before the flotation. *PE DUMMY* equals to one if the initial public offering was classified as Private-Equity Backed. Classification of IPOs into PE and VC-backed was done either according to BVCA (for IPO sample Jan 1997 – Dec 2004), or by examining each prospectus separately and checking Unquote, an online trade publication which provides regular details on individual VC and buyout transactions (for IPO Sample Jan 2005–Dec 2007). *AIM DUMMY* equals to 1 if the company is listed on the Alternative Investment Market, and 0 otherwise. *LOW PROXIMITY DUMMY* which equals to 1 if PE or VC fund's headquarters and IPO company are located in different countries (i.e. low geographic proximity dummy), and 0 otherwise. *LEAD FUND DUMMY* equals to one if PE/VC fund is a lead member of a syndicate, and 0 otherwise. A fund was defined as lead in case it held the highest ownership stake pre-IPO within the PE/VC syndicate. T-statistics are reported in brackets. ***, **, * represents significant at 1, 5, and 10 percent level respectively.