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

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Abstract

The paper assesses the determinants of private equity (PE) and venture capital (VC) investors' ownership in the post-initial public offering (IPO) period. We show that these investors retain shares to mitigate potential managerial expropriation of outside shareholders, but their retention propensity depends significantly on the fundamental characteristics of IPO companies, PE and VC firms, investment and divestment intensity of different pre-IPO shareholders. We find that the financial sponsors' compulsory holding is significantly larger in US than in UK IPOs, which is driven by different institutional and corporate governance practices in these two countries. The analysis of the aftermarket performance, based on the calendar-time approach, reveals strong negative average monthly abnormal returns for portfolios of backed IPOs over various holding periods, but the relationship between PE/VC voluntary ownership and the long-run performance is convex, suggesting that only large holdings create value.

Keywords: Private Equity, Venture Capital, IPO, Ownership Structure, Lockup, After market Performance.

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1. Introduction

Venture capital (VC) and private equity (PE) firms are known to invest in companies to complete intensive restructuring, provide funding, certification, monitoring and value-adding activities (Jensen, 1986, 1989; Gompers et al., 2016b; Megginson and Weiss, 1991; Celikyurt et al., 2014; Gompers et al., 2016). They tend to bring successful investments to the stock market in the form of initial public offerings (IPOs) to realize their returns, as this method is the most preferred (Giot and Schwienbacher, 2007), profitable exit route (Brau et al., 2003)[1], which allows to build a track record and establish reputation for financial sponsors for future fund raising (Gompers, 1996). Previous studies focus mainly on the impact of these financial sponsors on the first day returns assuming that they sell all their holdings at the IPO date. The analysis of their holdings in the post-IPO period is relatively limited, even though in practice these institutional investors do not exit fully at the IPO date (Barry et al., 1990; Lin and Smith, 1998; Megginson and Weiss, 1991; Cao, 2011).

We contribute to the literature by investigating the fundamental reason behind PE/VC investors' rationale to retain equity holdings in IPO firms post-flotation, and the impact of institutional environment on this decision. In addition, we provide a comparative analysis of post-IPO exit dynamics conducted by PE and VC investors. Hence, the purpose of this paper is two-fold. First, we assess the determinants of PE and VC investors' ownership retention in the *post-flotation* period. To shed light on the fundamental reason behind PE/VC syndicates' decision to retain shares post-flotation, we test the following two hypotheses: commitment and signaling. The commitment hypothesis suggests that PE and VC investors' post-IPO shares are used to mitigate outside shareholders' concern of managerial expropriation of private benefits. We examine compulsory and voluntary ownership by PE and VC investors to shed light on this issue.

The signaling hypothesis states that in financial markets with imperfections (e.g. information asymmetries), financial sponsors use post-IPO voluntary ownership as a signal of the firm's future great prospects, thereby conveying to the market the firm's true value (Leland and Pyle, 1977). We expect VC and PE investors to retain equity holdings in the post-IPO period in firms, which are likely to generate higher long-run returns, for at least two reasons. First, given that these funds are professional investors who require a high rate of return, which will be used to attract new capital commitments from limited partners (LPs), their equity holdings could be viewed within their overall investment strategy. Therefore, they are likely to carry on holding stakes in IPOs with good growth opportunities. Second, as the result of insider knowledge gained by financial sponsors (by investing in firms pre-flotation, taking under private ownership and restructuring

[1] According to the "2016 European Private Equity Activity" Report an IPO is the third most frequently used exit route in 2016 accounting for 17% of all exits by total amount divested at cost. Sale to another private equity firm represented 29% of exits, while trade sale accounted for 27%.

them) they are likely to know true firm value, its prospects and to be effective monitors.

Second, we sled light on whether institutional and corporate governance differences in two main markets of flotation (US and UK) have an impact on the fundamental rationale for financial sponsors to voluntary retain equity holdings and exit dynamics post-IPO. According to the "Venture Capital & Private Equity Country Attractiveness Index"[2], US and UK are ranked first and second in 2016, respectively. Moreover, NYSE and Nasdaq were the largest stock exchanges in 2016[3], whereas Euronex ranked fifth.[4] Despite the common 'Anglo-Saxon' model of corporate governance, US and UK markets operate under different set of rules and regulations, as well as there are important differences with respect to the corporate governance practices, level of information asymmetry, ownership structure, stock exchanges and development of VC industry, which are likely to impact the extent of financial sponsors' exit at the IPO date and thereafter. As a result of a higher possibility of agency conflicts, focus on external monitoring, lesser prevalence of block holders and more dispersed ownership structure in US market (than in the UK), we expect the commitment motive to have a greater impact on financial sponsors' ownership in the US than in the UK. In addition, we expect financial sponsors to exhibit different exit dynamics (in terms of shares sold and speed) post-flotation in the US and UK.

To test these hypotheses, we use a sample of 1673 IPOs, split into 136 PE-backed and 191 VC-backed IPOs in the UK, and 446 PE- and 900 VC-backed firms floated on the US stock markets. We classify these IPOs into the following three main groups depending on PE/VC post-IPO equity holdings: (i) IPOs with PE/VC *voluntary* equity holding, which represents any ownership which is not subject to lockup agreement, is above the specified lockup restrictions, or held after the post-lockup expiration date;[5] (ii) IPOs with PE/VC *compulsory* equity holding, which denotes any ownership held through lockup agreements, and (iii) IPOs with no holdings if the sponsors have sold all their shares at the IPO date.

We find strong support for the commitment hypothesis. The results suggest that the terms[6] of PE/VC lockup provision are used to alleviate moral hazard concerns. We document a significant negative relationship between PE/VC holdings and the proxy variables used to measure agency conflicts, including lagged institutional ownership and market-to-book (M/B) ratio. Compared to lockup agreements applicable to all pre-IPO investors, the terms of lockups applied to PE and VC investors are more informative to

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[2] Source: http://blog.iese.edu/vcpeindex/ranking/ [Accessed May 29, 2017]
[3] Source: WFE Annual Statistics Guide 2016. https://www.world-exchanges.org/home/index.php/statistics/annual-statistics [Accessed May 29, 2017]
[4] Japan Exchange Group ranked 3rd and Shanghai Stock exchange ranked 4th. World Federation of exchanges does not provide statistics for UK separately. Starting from 2001, Euronex statistics includes Netherlands, France, England, Belgium and Portugal.
[5] Lockup expiration date is also referred to as the unlock day.
[6] The percentage of company's shares locked, which are held by PE and VC investors.

the market participants since these financial sponsors have voluntarily initiated financing and subsequent restructuring of the firm via large equity holdings and board representation. In contrast to Brav and Gompers (2003), who concentrate on duration of lockups for all pre-IPO insiders, we contribute to the literature by presenting evidence that underwriters *use the percentage of equity holdings locked* for commitment purposes.

We present evidence that determinants of *compulsory* ownership for VC-backed IPOs are different from those for PE-backed IPOs. For example, in the VC-backed IPOs, we find significant positive relationship between VC syndicate's post-IPO compulsory ownership and syndicate size as well as low proximity dummy. Hence, these investors are obliged to retain ownership in more risky firms and those, which are more geographically distant and are more likely to need continued VC investors' support in the aftermarket. In contrast, underwriters impose less strict lockup restrictions (in terms of compulsory ownership) in VC-backed firms, which are backed by more reputable banks as well as in those firms which have demonstrated better operating performance pre-flotation. Our analysis of *voluntary* ownership reveals that PE investors reduce their voluntary ownership in companies, which perform well. VC investors prefer to voluntarily maintain higher ownership in more risky firms and in those which are located in another country. Overall, we present evidences that post-IPO (compulsory and voluntary) ownership of PE and VC investors are driven by the commitment rationale.

We report support of the signaling hypothesis, however rejection of the expected sign: financial sponsors' post-IPO ownership is negatively related to the aftermarket stock performance. We document a convex relationship between long-run performance and financial sponsors' holdings in the post-IPO period suggesting that only large post-IPO equity holdings by PE and VC investors create value. The results of the four-factor model suggest that backed IPOs underperform in the long-run, irrespective of whether financial sponsors choose to retain ownership in the post-IPO period. We find that momentum does not explain excess returns of backed IPOs. We run some robustness tests (instrumental variable approach) and find similar results.

Overall, our results are not consistent with previous evidence as they suggest that PE and VC firms do not necessarily lead all portfolio companies to create value in the post- IPO period. Celikyurt et al. (2014) argue that VC firms create value by sitting on the board of mature firms and bringing particular expertise to help firms undertake more efficiently their investment policies, particularly those that are knowledge-specific and related to intangible assets. They show that firms where VC directors sit on the board are more innovative as measured by R&D expenditure, number of patents and their citation counts. Such firms are also more likely to acquire a VC backed firm, establish strategic alliances with other VC backed firms, and undertake a corporate venture capital (CVC) investment in VC backed entrepreneurial start-ups. These investments and alliances are considered to be important sources of innovation (Chesbrough, 2002; Dushnitsky and Lenox, 2005, 2006; Chemmanur et al., 2012; Robinson, 2008). We consider that such VC impact may be observable in the pre-IPO period when the sponsors sit on the board,

rather than by just carrying on holding stakes in the post-IPO period. Moreover, the findings of Celikyurt et al. (2014) are more likely to apply to firms in which VC investors were not pre-IPO shareholders, which is our focus. In addition, since our examined sample is not limited to only VC- backed firms, any increase in efficiency observed in VC boards is not likely to apply to PE-backed IPOs.

We present evidence that institutional and regulatory differences between US and UK have a significant impact PE/VC investors' ownership retention post-IPO and the firm aftermarket performance. The analysis of our sample firms shows strong differences across the US and UK markets. First, throughout the sample period, around 50% of UK backed IPOs are VC sponsored. In contrast, in the US, the importance of VC funding in comparison to PE financing changes substantially during the sample period. For example, in 1999 85% of backed IPOs were VC sponsored, while in 2002 only 35%. Hence, in contrast to UK, where both type of financing play an equally important and prominent role in bringing companies to the stock market, the relative importance of VC-backed IPOs in the US is time dependent. Second, we also report strong industry differences in two markets. In particular, the VC-backed IPOs in the UK are equally distributed across difference industries: on average, 50% of IPOs in any of the ten industries are VC-backed.[7] In contrast, there are several clearly evident industries in which VC financing is more (less) prominent in the US such as high-tech, telecommunications and healthcare (non-durables and energy). Hence, the significant differences in the relative importance of VC sponsored IPOs and VC financing concentration in some industries in the two markets of flotation provide strong incentives to examine financially sponsored IPOs in the US and UK, as well as to analyze the divestment trends of financial sponsors in these firms.

Third, as expected and consistent with previous studies (Levis, 2011), we find that PE and VC sponsored firms differ significantly with respect to IPO firm characteristics, which is explained by the nature of the firms the two types of financial sponsors invest in. However, we also show significant differences across the two markets. More specifically, in contrast to UK peers, PE-backed IPOs in the US are significantly larger, more profitable, and backed by larger, bank-affiliated and older PE funds with close proximity to IPO firm headquarters. They are also more likely to be high-tech affiliated and underwritten by global underwriters. Similarly, VC-backed differ significantly in two countries. Relative to the UK, the US VC-backed IPOs are significantly larger (in terms of total assets), more profitable, high-tech affiliated, and less likely to be underwritten by global underwriters or to be listed on the main NYSE market. They also exhibit lower leverage, shorter lockup period and they are backed by larger VC syndicates.

[7] Except for firms in the healthcare industry: 76% of them are VC sponsored.

Fourth, we find that divestment dynamics of different groups of pre-public shareholders around the flotation date also differ in the UK and US quoted VC firms. For example, US quoted VC firms exhibit statistically higher (lower) sponsors and management equity ownership (institutional investors) than in VC firms floated on the UK stock markets. Fifth, PE/VC investors' compulsory and voluntary ownership in two markets also show strong differences. The terms of the lock-up agreements applicable to financial investors in the UK are more strict in terms of duration, whereas PE/VC investors are obliged to hold on to a higher proportion of shares in US flotations than in UK ones. Hence, presented evidence suggest that underwriters use different aspects of lockup agreements for commitment purposes in the examined two markets. Sixth, we show that backed IPOs in the US and UK differ significantly across a number of other characteristics such as financial sponsors' syndicate and ownership structure. For example, financial sponsors' ownership is significantly higher in the pre- and post-IPO period in the US than in the UK. Seventh, we report that financial sponsors' voluntary holdings are driven by different set of variables, which are related to differences in institutional settings. Lastly, we show that US backed IPOs underperform their UK peers in the aftermarket.

Overall, this paper contributes to the existing literature by presenting evidences that PE and VC investors retain ownership (compulsory and voluntary) in the post-flotation period to alleviate moral hazard problems. In addition, institutional, regulatory differences between UK and US markets impact PE/VC investors' ownership retention post-flotation and have an impact on the firm aftermarket performance. 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 reported in Section 5.

2. Literature Review and Testable Hypotheses

Previous studies report that VC firms do not sell their whole equity stake at the IPO. Barry et al. (1990) find that venture capital investors retain 24.6% of outstanding shares immediately after the flotation. Lead (Lin and Smith, 1998) and more reputable (Krishnan *et al*, 2011) VC investors tend to hold significantly higher shareholdings and directorships. Similarly, Cao (2011) finds significant ownership retention by PE sponsors in US IPOs: one year after the flotation buyout sponsors hold, on average, an equity ownership of 32.36%. Furth and Rauch (2015) report that, on average, PE investors stay involved in portfolio companies for 2.8 years after the initial public offering. As Jenkinson and Sousa (2015 p. 407) state "From the perspective of the GP[8] and their investors, an IPO is not an exit *per se*; it is a *route* to an exit." However, such post-IPO ownership can be compulsory when it is under the lockup agreement, or voluntary if the

[8] General partners or GPs.

holding is not subject to lockup constraints. In the following section, we will distinguish between these two holding mechanisms, PE and VC holdings, as well as US and UK institutional settings, and derive the relevant hypotheses.

In recent years, several papers have examined VC investors' exit drivers. In their survey, Cumming and MacIntosh (2003) investigate the determinants of a full and partial exit by VC investors via five exit routes (IPO, acquisition or trade sale, secondary sale, buyback and write-off) in US and Canada. The authors find that the likelihood of a partial exit by VC investors increases with the degree of information asymmetry between the selling VC and the buyer. Paeglis and Veeren (2013) investigate the speed of VC investors' exits post-IPO and find that it to be related to the level of founder ownership. More specifically, VC investors conduct the fastest exit in firms with intermediate levels of founder ownership and these firms experience the largest decrease in firm value, which is driven by the highest potential for entrenchment in these firms. In contrast, Iliev and Lowry (2017) focus on VC investments made in firms after the IPO. The authors find that these investments primarily take place in firms, which face high costs to raise equity capital. In addition, they present evidences that in case a pre-IPO VC offers additional post-IPO capital, it has a positive impact on the firm's survival and post-IPO returns. However, no paper to date has examined whether the commitment or signaling hypotheses are the drivers of the fundamental reason behind PE and VC investors' decision to retain shares post-flotation. This paper fills in this existing literature gap.

Previous studies focus mainly on the post-IPO holdings through lockup agreements with the underwriter, which specify the number of shares locked and the lockup duration. Their provisions are solely governed by the agreement, and not a legal obligation. The lead underwriter is the only party which has the right and the ability to release locked investors early.[9] Brav and Gompers (2003) propose three explanations for the existence of lockup agreements: a signal of firm quality, a commitment device, and a mechanism to extract additional compensation from the issuing firm. Several past studies examine the signaling aspect of lockups. Leland and Pyle (1977) consider ownership retention by insiders, and argue that when an insider sells a significant percentage of shares at the IPO it signals the firm's overvaluation. In contrast, insiders who retain shares for longer and endure the cost of remaining undiversified signal superior quality of the company. Courteau (1995) examines another aspect of lockup agreement, i.e. its length, and argues that firms signal their superior quality by means of longer lockup duration. In their empirical study, Brav and Gompers (2003) propose that lockups can be used to signal firm's quality which cannot be observed by investors. While their results do not support this hypothesis, they were contradicted by Brau et al. (2005) who find that lockups do signal firm's quality. Brau and Fawcett (2006) report that the vast majority of Chief Financial Officers (CFOs) consider that insiders' divestment at the IPO date as a

[9] In some circumstances, the lead underwriter allows locked investors to sell some or all of their shares prior to the lockup expiration; this is referred to as an 'early sell' transactions. See Hoque and Lasfer (2013) for details.

negative signal, compared to the positive signal conveyed by insiders' lockups and VC-backing.

Jensen and Meckling (1976) argue that agency conflicts exist between managers and outside shareholders. The commitment hypothesis deals with managers' potential to take advantage of shareholders by means of shirking and perks consumption. The commitment hypothesis states that lockup provisions exist to alleviate outside investors' concerns regarding moral hazard issues. Consistent with these predictions, Brav and Gompers (2003) find that investment banks impose longer lockups for companies with higher moral hazard in the aftermarket. According to the commitment hypothesis, reputation and certification are viewed as alternative commitment devices. These arguments are based on previous literature which considers that block shareholders can provide monitoring, thereby mitigate any potential agency conflict between managers and shareholders. Cronqvist and Fahlenbrach (2009) demonstrate that large blockholders and institutional investors are active monitors, who have significant impact on US firms' corporate policies and performance. Chen et al. (2000) report that institutional shareholders' ownership is positively related to performance of US firms, thereby demonstrating the monitoring effectiveness of institutional shareholders. The potential monitoring can also be provided by other market participants such as equity analysts (Chen et al., 2015).

The question, however, remains as to whether such hypotheses apply also to voluntary holdings which arise when pre-IPO investors, particularly VC and PE funds, retain their holdings without lockup constraints. Given that lockup ups are driven by the agreements with the underwriters, they would not necessarily emanate from the willingness of the PE and VC funds. In this section, we argue that their impact to be stronger in the case of voluntary ownership.

2.1 Commitment Hypothesis: PE and VC Investors

Lockups can apply to all pre-IPO investors. However, the terms may differ for directors, PE/VC sponsors and other initial (institutional) shareholders. PE and VC investors represent a special class of block holders, who have industry-specific knowledge and specialize in restructuring and value-adding activities. These financial sponsors are known to initiate intense restructuring of portfolio firms (Jensen, 1986, 1989; Baker and Gompers, 2003; Lerner, 1995) and to be effective monitoring agents (Krishnan et al., 2011; Celikyurt et al., 2014). In this paper, we argue that financial sponsors' continued (compulsory and voluntary) ownership in the post-IPO period reduces information asymmetries, mitigates any potential agency conflict between managers and shareholders, as well as uncertainty regarding insiders' actions. For PE and VC firms, a lockup provision is a major undertaking. These investors operate under the approach of a fund's termination date, and a longer holding period has a negative effect

on the internal rate of return (IRR).[10] A track record of high IRRs is extremely important for PE and VC firms because prospective limited partners (LPs) use it as a criterion to assess PE managers' performance (Fleming, 2010), and take it into consideration in their decision to commit capital to a particular PE/VC house. Sorensen et al. (2014) examine whether PE investments' performance is sufficient to compensate investors for the costs they face such as long-term illiquidity, risk and fees. They find that LPs break even, net of costs. This finding provides an even greater incentive for LPs to choose carefully the PE/VC houses to which they commit capital. Therefore, PE and VC sponsors (as any other type of investor) benefit from managers' focus on value maximization, which ensures a favorable track record for financial sponsors.

High proportion of unrealized returns at the IPO date incentivizes and motivates PE and VC investors to closely examine management's actions, performance, and if necessary, to exert institutional activism. The recent move towards binding votes on executive pay in the UK demonstrates that shareholders are becoming more active and could have a major impact on various aspects of the company's operations and management.[11]

Hence, financial sponsors with continued ownership in the post-flotation period are expected to carry on monitoring their portfolio firms to reduce information asymmetries, mitigate any potential agency conflict between managers and shareholders, as well as uncertainty regarding insiders' actions. Such role is likely to also apply to the voluntary holdings which encompass the following three scenarios: holdings without any lockup requirement, those above what is required in the lockup agreement, or holdings after the post-lockup expiration period. The third case is particularly interesting since it could shed light on whether PE and VC investors consider lockup agreements to be a major constraint, and thus, use it as an opportunity to conduct a full exit or whether they retain their holdings regardless of associated costs.

The lockup expiration date is characterized by a high degree of information asymmetries. Brau et al. (2004) argue that information asymmetries between firm's insiders and outsiders are not fully mitigated by the use of a lockup agreement because not a vast majority of mandated information is revealed between the initial public offering and the lockup expiration date. Information asymmetries between company's insiders and outsiders are particularly high at the lockup expiration date, which is driven by insiders' (including PE/VC firms') ability to fully divest 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

[10] Robbie et al. (1997) report that independent VC funds' performance is more likely to be assessed on the basis of the internal rate of return.
[11] Anonymous, 2012. Vince Cable forces binding executive pay votes, BBC, [online] Available at: <http://www.bbc.co.uk/news/business-18514396> [Accessed: June 2, 2017].

assume that general investors are aware of this moral hazard potential." Therefore, we argue that PE and VC investors voluntary retain shares post the unlock day to mitigate outside shareholders' concern of managerial expropriation of private benefits. Hence, we expect PE and VC funds to hold high stakes (both, compulsory and voluntary) in firms with higher agency conflict, information asymmetry, moral hazard and greater need of monitoring.

Field and Hanka (2001) find a substantial long-term increase (of 40%) in trading volume at the lockup expiration, and VC investors' selling intensity is higher than the ones demonstrated by other pre-IPO shareholders. Gompers and Lerner (1998) examine share distributions made to LPs post-flotation,[12] and find that, on average, VC firms make the majority of share distributions twenty months after the IPO date. In contrast, Furth and Rauch (2015) report that in only 9% of their sample with lockup provisions PE sponsors sell shares at the lockup expiration date or within four weeks thereafter. Moreover, US buyout sponsors reduce their representativeness on portfolio firms' boards of directors only two years post flotation. Overall, previous studies suggest that PE and VC firms' divestment strategies (after the unlock day) differ with respect to the timing and selling intensity, however their continued post-IPO presence is undeniable.

The commitment hypothesis also yields predictions regarding alternative forms of certification. Brav and Gompers (2003) consider the mere existence of a VC investor pre-flotation to be an alternative form of certification. In this paper, we propose that PE/VC house's reputation should be considered and that there is less need for continued financial sponsors' ownership in the post-IPO period. Previous studies report that favorable 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 financial investors to act as a lead syndicate member. Gompers et al. (2016) report that more than 30% of VC deals come from VCs' networks. In addition, PE and VC houses operate in an environment of repeat investing, where every few years they seek the same type of investors for capital. As a result, more reputable PE and VC firms would not risk their reputation by being involved in companies where insiders are likely to take advantage of shareholders. Similarly, a global investment bank would aim to avoid any reputational damage. For example, Hanley and Hoberg (2012) find that underwriters have a strong incentive to deter the likelihood of an IPO firm facing Section 11 lawsuit because of significant potential economical losses. The authors find that in the year following a lawsuit, the lead underwriter's dollar loss in proceeds is $131 mil. The commitment hypothesis is

[12] VCs can 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 US for four primarily 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 a positive impact on distributions of VC houses' compensation.

likely to suggest that PE and VC investors' ownership is lower in IPOs backed by reputable PE/VC investors and underwritten by reputable investment banks. Overall, these commitment arguments lead to the following hypothesis:

Hypothesis 1 ("Commitment"): The compulsory and voluntary ownership of PE and VC investors is used to mitigate any potential agency conflicts between managers and shareholders.

2.2 Signaling Hypothesis: PE and VC Investors

PE and VC holdings can also be used to signal firm quality. By listing the company, PE and VC investors gain the ability and flexibility to sell shares any time[13] post-flotation, to carefully assess, as well as time their full exit more favorably in terms of prevailing market conditions and share price. Courteau (1995) argues that firms could signal their superior quality by means of longer lockup agreements. However, PE and VC firms may choose not to signal firm's quality by means of longer lockups to retain their flexibility in divestments' timing after the flotation. For example, Cao (2011) reports that the decision to list a PE-backed firm is significantly influenced by prevailing market conditions. Similarly, Gompers et al. (2016b) report that almost 60% of surveyed PE investors regard facilitation of a high-value exit to be a post-investment source of value. PE investors regard achievement of operational plan by investment companies and capital market conditions to the most important factors in exit timing. Jenkinson and Sousa (2015) find that the prevailing market conditions and portfolio company characteristics have a significant impact on the ultimate exit route choice (IPO, trade sale and secondary sale) used by European PE investors. By taking advantage of prevailing windows of opportunity, PE investors choose the exit route which maximizes its financial return. Hence, it's reasonable to expect these financial sponsors (in case they choose to exit a firm through an IPO) to prefer to retain flexibility also in their post-IPO exit dynamics for value maximization.

Alternatively, PE and VC firms could signal the IPO's quality by voluntarily 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 retaining shares in the post-flotation period PE and VC firms could signal to the market the portfolio firm's high quality.

Chemmanur et al. (2010) find that institutional investors, who participated in IPO allocations, significantly outperform nonparticipating investors in post-IPO trading,

[13] Any time after the lockup expiration date.

especially if there is higher level of information asymmetry about the IPO firm. The authors conclude that (p. 4501): "This is consistent with the information advantage of institutional investors arising primarily from their participation in the IPO allocation process." We argue that PE and VC investors are likely to have even higher information advantage than IPO investors since they typically spend years with companies prior to bringing them to the public market. For example, Cao (2011) reports that the average buyout restructuring duration in the US (between 1997 and 2006) fluctuated between 1.39 and 6.74 years. Levis (2011) documents that on average VC (PE) investors spend 4.5 (3.7) years restructuring investment companies. In addition, these financial sponsors tend to sit on the board of directors (Lerner, 1995; Celikyurt et al., 2014; Furth and Rauch, 2015).

By postponing their full exit, PE and VC investors are bearing the following costs: negative impact on the IRR, tied up capital, market 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 firms' boards of directors (Furth and Rauch, 2015). Hence, PE and VC investors would only be willing to retain shares in IPOs which are likely to perform well post-flotation, and in those where expected future returns would overweight expected costs. Overall, these arguments yield the following signaling hypothesis:

Hypothesis 2 ("Signaling"): The ownership of PE and VC investors in the post-IPO period signals firm's quality, leading to potentially higher expected returns.

2.3 US versus UK Stock Markets

The US and UK markets both have the 'Anglo-Saxon' model of corporate governance, which primarily focuses on shareholders' interests. Pinkowitz et al. (2006) report that these markets are similar along the following country-level characteristics: the protection of shareholder rights, the overall political risk climate, the level of government corruption, the law-and-order tradition, government centralization and the risk of outright confiscation. Despite these commonalities, we believe there are some important differences in US and UK markets, which will have an impact of financial sponsors' exit dynamics, related to i) corporate governance practices and structures ii) level of information symmetry iii) ownership structure iv) stock exchanges and v) development of VC industry. These differences and implications are summarized in Appendix 1.

First, the two countries are governed by different set of corporate governance rules and practices. Firms in the UK pay particular attention the original Cadbury Code recommendations of 1992, which puts forward corporate governance recommendations and it's on voluntary basis for firms to comply with it. In contrast, companies located in the US rely on detailed regulations listed in the Sarbanes-Oxley Act (SOX) of 2002,

which are enforced by law and subject to penalties for non-compliance. The focus the 1992 Cadbury Report is on *internal* monitoring, which recommends UK companies to split the roles of the CEO and Chairman, thereby empowering boards and limiting CEO's influence. However, there is no such legal requirement in the US. Moreover, the SOX focuses on *external* monitoring by enforcing US public firms to comply with increased audit requirements, and provide more disclosure on remuneration.

While reforms in the UK are on voluntary basis, still (Zalewska, 2014 p. 6): "In the UK companies accepted the separation as advised by the Cadbury Report (1992), and in no time, the separation was so deeply enrooted in corporate practices and culture that any attempt to combine the positions was taken with great hostility." Consequently, in 2010, 94% of UK FTSE 100 companies split the CEO-Chairman role, in contrast to 40% of S&P 500 firms in the US (Davis, 2011). The separation of the two roles not only avoids the CEO entrancement, but it also boosts monitoring ability and independence of the board. Hence, as a result of this, it could be argued that, overall, there is a higher possibility of agency conflicts in the US companies than in the UK ones. Overall, corporate governance reforms in the UK made boards active and powerful monitors. In contrast, in the US the vast majority of power is in the hands of a CEO. Therefore, given these differences, auditing role by PE and VC investors is especially more important in the US market in informing shareholders about the state of operations. We expect the *commitment* motive to have a greater impact on financial sponsors' ownership in US flotations

Second, firms in US and UK operate under different levels of information asymmetry. In the US, it's mandatory for firms to issue earnings reports every quarter, while it's done semi-annually in UK. Arif and De George (2015) show that when investors are deprived of quarterly reports, they are forced to rely heavily on news about global industry earnings to value firms. Hence, even the frequency of earnings' reports has great implications for the degree of information asymmetry in two developed markets. In addition, the distribution of corporate announcements are made via different routes in two markets. Firms in the US enjoy great flexibility in making a public disclosure, which allows them to take advantage of current technology to ensure a quick public disclosure with broad public access. Hence, this disclosure route in the US allows all market participants to have access to new information at the same time. In contrast, firms in the UK must make announcements via Primary Information Provider, which in turn passes these announcements to information intermediaries. Since there is a time gap between receiving announcements and briefing research analysts, who choose subsets of press releases to deliver and re-write them, stock market observers identify an unequal information access by private and institutional investors in the UK (Stokopedia, 2011). Blankespoor et al. (2014) show that it's vital for price sensitive information to be readily disclosed to a broad set of investors to reduce information asymmetry. Hence, overall, there is a (relatively) higher level of information asymmetry in the UK market in

comparison to the US. As a result, we expect the *signaling* motive to have a greater impact on financial sponsors' ownership in UK flotations.

Third, the ownership structure and concentration differ significantly in the two markets. In the US, the threshold to disclosure a major block holding is 5% of shares, whereas 3% in the UK. 13D filing requirements in the US result in higher legal barriers against activism (Faccio and Lasfer, 1999). On average, US firms have more dispersed ownership within medium-sized traded firms in comparison to UK (La Porta et al., 1999). Institutional (individual) investors is the largest shareholder type in the UK (US). Prowse (1994 p.33) highlights the importance of major shareholder type identity by arguing that "The identity of a firm's large shareholders may also have implications for governance. Individuals (or families), financial institutions and non-financial corporations may have different monitoring skills, a greater or lesser incentive to monitor and even different objectives." Prior studies show that institutional investors have a significant impact on various corporate policies (Cronqvist and Fahlenbrach, 2009). Hence, the US market is defined by more dispersed ownership, lower prevalence of institutional investors and activism, which calls for higher PE/VC investors' monitoring of firms post-flotation. Therefore, we expect the *commitment* motive to have a greater impact on financial sponsors' ownership in US flotations.

The fourth set of differences between US and UK markets is related to the stock exchanges. Since our focus is financial sponsors' exit conducted via IPOs, it's important to consider the state of development of stock exchanges in these two markets as well as their characteristics. Many countries around the world have opened secondary markets, where predominantly young and high-tech firms can get a quotation and institutional buyers represent target investors (Vismara et al. 2012). In the US, such stock exchange (NASDAQ) started operating in 1971, whereas the UK's Alternative Investment Market (AIM) launched only in 1995. Vismara et al. (2012) argue that European secondary stock exchanges markets have been successful in hot periods, however, they have collapsed in cold periods. In contrast, the authors point out that Nasdaq has not followed this pattern of collapsing during cold markets; thereby providing a more stable exit route and conditions for financial sponsors' return realization. Further, US stock exchanges exhibit significantly higher liquidity compared to UK peers (World Federation of Exchanges Annual Statistics, 2016). Overall, lower liquidity and the launch of secondary market relatively recently in the UK contribute to a more challenging environment for financial sponsors to quickly sell shares in their portfolio companies on UK stock exchanges. Hence, we expect (all things being equal) for financial sponsors to pursue a slower exit strategy after the IPO in the UK than in the US.

Lastly, the state of VC industry is more developed in the US, which is the result of Silicon Valley. Ernst and Young's 'Venture Capital Insights Report' (2015) demonstrates that the US dominated venture capital investments. Market participants observe the UK's relative lack of exit opportunities for investors compared to the US

(Groom, 2013). In the debate regarding which venture market (UK or US) is better, Ben Holmes, partner at Index Ventures summed the debate by stating that: "The game is only half played in the UK." (Dunsby, 2013). Given the different states of the VC industry and exit opportunities in two markets, we would expect financial sponsors to pursue different exit dynamics in terms of shares sold and speed) post-flotation in the US and UK. Overall, we expect the institutional differences between UK and US to affect financial sponsors' extent of exit at the IPO date, as well as the post-IPO ownership concentration.

It is also important to consider the different firm characteristics of PE- and VC-backed companies, which are likely to impact their relative information asymmetries and agency conflicts. For example, PE-backed firms are known to be larger, more mature, with high leverage and low growth opportunities, whereas VC-backed firms are characterized by high growth stage, young age and low leverage. Larger firms tend to have more information available to investors/markets (Barry and Brown, 1984), and are covered by more business press. At the same time, the market and investors are likely to be more concerned with potential misuse of resources in firms with lower growth opportunities. This, in turn, results in PE-backed IPOs' relative lower information asymmetry and higher agency conflict in comparison to VC IPOs in both countries. As the result of identified differences, we expect the commitment motive to have a greater impact on financial sponsors' ownership in PE-backed IPOs than on VC IPOs.

Although this paper is partly related to the study by Brav and Gompers (2003), it differs in five major respects. Firstly, we exclusively concentrate on the lockup restrictions applicable to PE and VC investors, in contrast to Brav and Gompers (2003), who consider all insiders as one broad class.[14] Second, we provide an analysis of another aspect of lockup agreements (i.e. equity holdings locked), as opposed to lockup duration. Brav and Gompers' (2003) study is based on the 1988-1996 time period, whereas we use a more updated and recent sample of IPOs (1997-2010) in two countries. During our examined sample period, the industry has experienced two additional boom and busts (the dotcom bubble and 2007 financial crisis), which could have altered previously reported relationships. Additionally, we contribute by analyzing PE-backed IPOs, in contrast to the study by Brav and Gompers (2003), which only considers VC and non-backed IPOs. Finally, our analysis includes IPOs floated on UK stock markets, which is considered to be the second most significant after the US.[15]

3. Data and Methodology

[14] It is important to note that in many cases the terms of lockup agreement applicable to prepublic shareholders (i.e. managers, PE/VC firms, and other institutional investors) are different in IPOs floated on UK stock markets.

[15] In 2009, UK 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 account for 23.8% of all European divestments in 2009.

3.1 Data Sources and Sample

The sample used in this study includes all non-financial PE- and VC-backed IPOs floated in the US and UK markets between 1997 and 2010.[16] We use LSE for UK and SDC database for US to collect IPO names and dates of admission. Financial IPOs are excluded from the final sample because of their specific characteristics, particularly their capital structure and regulations. We identify financially sponsored IPOs from several sources. For UK IPOs, we first use the British Venture Capital Association classification of PE- and VC-backed IPOs, which have been floated between January 1997 and September 2005. For the remaining period, we use individual IPO prospectuses and Unquote, an online trade publication which provides regular details on individual VC and buyout transactions. For the US sample, names of PE and VC-backed IPOs, which have been quoted between 1997 and 2007, are taken from the study by Liu and Ritter (2011). For the rest of the sample (2008-2010), SDC Platinum Database is used to gather the names of backed IPOs. The final sample consists of 327 UK and 1346 US financially sponsored IPOs.

We download IPO prospectuses from Perfect Filings database and manually collect names of PE and VC firms, dates of PE and VC financing, offer price, market of quotation, underwriter names, management's, block holders', PE investors' and venture capitalists' equity holdings immediately prior to and post admission. We use COMPUSTAT database to collect the pre- and post-IPO accounting data. The names of lead underwriters are gathered from SDC database for the US sample. For the UK, we collect this data from IPO prospectuses. It is common in the UK to relate lockup expiry date to some corporate event. Hence, Perfect Filings Database is used to extract relevant calendar dates. Daily stock prices and various[17] price indices are collected from DataStream.

For each company in the sample, post-IPO quarterly ownership data is gathered from Thomson One Banker. We gather the names of directors, initial shareholders and PE/VC firms from IPO prospectuses which we then match individually with the ownership data provided by Thomson One Banker. We use also quarterly ownership data to confirm whether investors specified in the 'major shareholders' section of IPO prospectuses are individuals or institutional investors. Finally, we collect PE and VC house and fund reports from Thomson One Banker.

We collect details of the lockup agreement (duration and percentage of locked shares) applicable to directors, institutional and PE/VC investors from IPO prospectuses. There are several important differences between the two countries with respect to lockup duration and its specification. For example, the lockup terms are not homogeneous, as the average lockup period in US IPOs is 180 days (Brav and Gompers, 2003), while in the

[16] Thomson One Banker's ownership data coverage starts in 1997.
[17] FTSE All-Share, S&P 500, AIM All-Share and NASDAQ price indices are used in this study.

UK it ranges from 6 to 36 months[18] (Hoque and Lasfer, 2013). The specification of lockup expiration is also different across the two markets, as in the UK, it is common to relate the expiry date of a lockup agreement to some corporate event such as the publication of a preliminary or annual report, as opposed to providing a specific calendar date in the US (Hoque and Lasfer, 2013). Hence, examination of PE and VC investors' ownership post-flotation requires a careful consideration of lockup provisions, which we collect from IPO prospectuses.

The total sample is divided into two groups depending on whether PE and VC syndicates conducted a full exit, or retained some ownership at first ownership quarter post lockup expiration date. Thomson One Banker provides ownership data in March, June, September and December. In this analysis, an examination of ownership adjustments made in first ownership quarter post the unlock day is considered, as opposed to an exact lockup 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 or soon after the unlock day.

It is common for financial sponsors to invest in groups or syndicates. For each IPO firm in the sample, we sum up individual PE/VC investors' equity holdings, and analyze PE/VC *syndicates*' equity stakes in this paper. Upon reviewing twelve quarters of post-IPO ownership data for each company in the sample, we identified cases where for a number of consecutive quarters PE/VC investors' ownership data contains blanks, which are always followed by some declared ownership stake.[19] PE and VC firms invest in companies to restructure, add value, conduct an exit via an IPO (or any other divestment route) to realize returns and make distributions to limited partners (LPs). Their business model does not entail heavy trading of company's shares post-IPO, as opposed to other types of shareholders such as hedge funds. Thus, for PE and VC investors, who backed an IPO and held shares for a number of quarters post- flotation, missing data should not be interpreted as zero equity holdings because these data gaps are followed by some declared ownership stake. In order to deal with this matter and make reasonable assumptions regarding what happened in quarters of missing data, two complementing approaches are used. First, the ownership section of annual company reports is used to fill in the gaps. For the rest, missing data is filled with an ownership stake reported immediately after the quarter of missing data. Overall, we believe that these two complementing approaches are reasonable and consistent with the PE and VC business models.

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[18] The average lockup duration in the UK is 365 days (Hoque and Lasfer, 2009). Espenlaub et al. (2003) concentrate exclusively on VC-backed IPOs floated on UK markets, and report the average lockup length of 561 days.

[19] 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.

3.2 Baseline Model Specification: Commitment Hypothesis

To investigate the commitment hypothesis, we use the following Model (1) where the dependent variable is compulsory or voluntary PE/VC syndicate ownership in various quarters post-flotation:

$$\textit{Post-IPO Ownership}_t = \beta_0 + \beta_1 \textit{US Dummy} + \beta_2 \textit{Proportion of PE/VC Ownership sold at IPO} + \beta_3 \textit{Syndicate Size} + \beta_4 \textit{Low Proximity Dummy} + \beta_5 \textit{Bank Affiliated Dummy} + \beta_6 \textit{House Age} + \beta_7 \textit{Underwriter Reputation} + \beta_8 \textit{Institutional Ownership}_{t-1} + \beta_9 \textit{Size}_{t-1} + \beta_{10} M/B_{t-1} + \beta_{11} ROA_{t-1} + \beta_{12} CARs_{t-1} + \textit{Industry Dummies} + \textit{Year Dummies} + \varepsilon \quad (1)$$

Post-IPO ownership is the proportion of shares held by PE or VC investors as a group or syndicate. The independent variables include some proxy variables for the severity of the agency conflicts. Consistent with prior literature, we use a number of other proxy variables to test the commitment hypothesis. Following Brau et al. (2004), we include company's size as larger firms have more information available to investors/markets (Barry and Brown, 1984) and are followed by more analysts, which lead to less scope for moral hazard. Jensen (1986) argues that large firms are more likely to be mature, and, thus, subject to the free cash flow problem. To control for firms' growth opportunities, we use market-to-book ratio. The commitment hypothesis (H1) predicts that the coefficient estimates IPO firm's size (β_9) and market-to-book ratio (β_{10}) are significantly negative.

We follow Hoque and Lasfer (2013) and include institutional ownership.[20] However, the previous literature provides conflicting results regarding institutional investors' ability, extent and effectiveness of monitoring. On the one hand, Chen et al. (2000) report that institutional investors provide active, effective monitoring of companies and their ownership is positively related to performance. Cronqvist and Fahlenbrach (2009) also find that large block holders[21] have significant impact on US firms' corporate policies and performance. However, Faccio and Lasfer (2000) show that, in the UK, institutional investors do not monitor efficiently, and their ownership does not reduce asymmetric information between company's insiders and outsiders. We contribute to the literature by examining whether institutional shareholders monitor financially sponsored IPOs, where PE and VC syndicates represent an additional monitoring party. According to the commitment hypothesis, we expect firms with higher institutional ownership to face lower need for financial sponsors to retain shares for monitoring purposes, resulting in the coefficient estimate of institutional ownership β_8 to be negative and statistically significant.

[20] Hoque and Lasfer (2009) consider holdings above 3% of firm's shares at the time of IPO.
[21] Cronqvist and Fahlenbrach (2009) consider private equity firms as one type of block holders.

The commitment hypothesis also yields predictions regarding alternative forms of certification: IPOs backed (underwritten) by more reputable PE/VC houses (investments banks) require less monitoring by PE and VC investors. In this paper, we use PE/VC house age at the IPO year as a proxy for financial sponsors' reputation, whereas global underwriters are classified as more reputable than their peers (Derrien and Kecskes, 2007). Hence, we expect to find the coefficient estimate of PE/VC firm age (β_6) and underwriter reputation (β_7) negative and statistically significant. Further, the institutional differences between the US and UK imply the coefficient of US Dummy (β_1) to be positive and statistically significant to reflect the relatively higher agency costs in the US, particularly given the likely combination of the chairman and the CEO as well as more widespread corporate ownership structure. In addition, Model 1 is run separately for UK and US financially sponsored IPOs to shed light on whether institutional differences in these two markets have an impact on the drivers of financial sponsors' equity ownership.

3.2.1 PE and VC Syndicate Size

We use a number of PE/VC fund and syndicate characteristics as proxy variables in this paper. It is common for PE and VC investing to take place in a syndicate. In this paper, we use syndicate size as a proxy variable for firms' moral hazard and riskiness. More specifically, larger syndicates are associated with more risky firms and those with higher moral hazard potential. A larger and more diverse syndicate is beneficial for its members because it allows investments in ventures which are located in other countries (Sorenson and Stuart, 2001). Also, syndicate members benefit from complementary knowledge sharing (Brandler et al., 2002), gain access to deal flows by means of reciprocity (Hochberg et al., 2007), as well as attain another fund's credible opinion regarding valuation and prospects of a venture (Lerner, 1994).

However, previous studies have reported that larger syndicates are subject to free-riding problem (Chemmanur and Tian, 2011), inefficient communication as well as a slow decision-making process (Wright and Lockett, 2003). Moreover, within a syndicate there could be a great degree of heterogeneity in terms of funds' characteristics (e.g. fund age, affiliation and location), which ultimately imposes divergent liquidity needs, financial and strategic goals (Hellmann, 2002; Hellmann et al., 2008). As De Vries and Block (2010) remark "Agency problems among syndication partners may arise (Fried and Hisrich, 1995). These agency problems increase when the syndication partners have different investment objectives and time horizons." Wright and Lockett (2003, p. 2083) argue that "The origins of the agency (management) cost imposed by the syndicate may be created by the diverse objectives of members, which may become more apparent with larger numbers of partners."

In addition, portfolio firms backed by larger syndicates are also viewed as more risky investments. For example, VC financing takes place at early stages in technology

companies, which are characterized by high probability of failing. Therefore, in order to reduce VC investors' exposure and risk, venture capitalists provide funding in several rounds and co-invest with other VC firms.

Hence, IPOs backed by larger PE/VC syndicates have higher potential for moral hazard due to the syndicate's diminished degree and effectiveness of monitoring, as well as considered to be more risky companies. In contrast, firms backed by smaller syndicates are associated with less moral hazard potential because smaller syndicates are more efficient and exhibit faster decision making (Wright and Lockett, 2003). Better coordination of actions within the syndicate limits managers' ability to engage in actions which solely benefit them at the expense of other shareholders. Therefore, according to the commitment hypothesis, we expect to find the syndicate size dummy coefficient (β_3) positive and statistically significant.

3.2.2 PE and VC Fund Location

Cross border investing is common in PE and VC financing. According to Chemmanur and Fulghieri (2014, p.2): "Foreign or cross-border investment in venture capital markets has increased from 10% of all venture capital investments in 1991 to 22.7% in 2008." Hence, the proximity of PE/VC fund and its portfolio companies needs to be considered. Location proximity results in a reduction of travel time, greater venture capitalists' representation on the board of directors (Lerner, 1995), and facilitation of monitoring activities (Sorenson and Stuart, 2001). In contrast, Wong (2010) finds geographic proximity to have a negative impact on the probability of venture capitalists' representation on the board. Wong (2010) argues that close geographic proximity results in reduced need for contractual monitoring such as board representation.

At the IPO date, PE and VC investors make considerable adjustments to their holdings. 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%. Thus, immediately post-flotation, PE/VC investors' abilities to continue monitoring and having an impact on corporate policies are considerably reduced due to financial sponsors' lower equity holdings, emergence of other block holders post-flotation and the company's public status. This effect is especially pronounced for PE/VC funds located in another country than its venture because the funds' monitoring abilities are constrained by distance. Lerner (1995) finds that the geographic proximity of a VC fund and portfolio company has a significant positive effect on the VC representation on the board of directors, which the author explains by lower costs associated with monitoring local firms. PE/VC investors' close proximity to the venture improves due diligence (Cumming and Johan, 2009) and enhances monitoring activities.

In this paper, we use the low proximity of IPO firm and PE/VC lead investors'

headquarters as a proxy variable for monitoring. Thus, when a PE/VC investor is geographically close to a venture, managers of this IPO firm have less opportunity to shirk, consume perks, and reject risky yet profitable projects. Hence, according to the commitment hypothesis, we expect to find the lox proximity dummy coefficient (β_4) positive and statistically significant.

3.2.3 Bank Affiliation of PE and VC Fund

PE and VC funds operate under various organizational structures (such as captive[22] and independent), which have different financial and strategic goals (Hellmann, 2002; Hellmann et al., 2008). Botazzi et al. (2008) report that financial sponsors' organizational structure and general partners' (GPs) business experience are major determinants of an active investment style imposed by PE investors, which in turn, positively affects the success of portfolio companies.

Caselli et al. (2010) consider five types[23] of ownership structures, which are characterized by different levels of conducted monitoring, and conclude that it has a significant influence on the performance of ventures. They report that bank-owned funds conduct less monitoring of portfolio firms due to general partners' representation on a high number of portfolio firms' boards simultaneously: on average, bank-owned PE representatives sit on 8.19 boards. In contrast, independent fund managers sit on 6.11 boards. Consequently, the amount of monitoring and supervision conducted by bank-affiliated fund is considerably lower, which in turn, leads to portfolio company's lower revenue growth and IRRs.

Moreover, bank-owned funds have different strategic goals, which impact their investment and exiting activities. Hellmann et al. (2008) argue that bank-affiliated funds invest in ventures with the aim of establishing new relationships for future lending. Tykvova (2006) demonstrates that bank-affiliated funds have different investment patterns in comparison to funds with other structures. More specifically, they invest in companies just before the flotation, take smaller pre-IPO equity holdings, sell a great fraction of its pre-IPO holdings at the IPO date, exert less involvement in corporate governance and act as bridge investors.

Hence, holding constant IPO company's characteristics, insiders of IPOs backed by bank-affiliated PE/VC funds are more prone to moral hazard issues and lower level of conducted monitoring by PE/VC investors. In case PE/VC syndicates' ownership is driven by the commitment hypothesis, we would expect the bank-affiliation dummy coefficient (β_5) to be positive.

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[22] "Captive" funds are those which are either corporate-, bank- or government-owned.

[23] Caselli et al. (2010) classify PE ownership structures according to the following five categories: corporate-owned, bank-owned, government-owned, other entity-owned and independent funds. Their analysis focuses on the universe of PE investments made by Italian closed-end funds from 1999 to 2005.

3.3 Baseline Model Specification: Signaling Hypothesis

We test the signaling hypothesis by means of the following OLS multivariate regression (2), where the dependent variable is equal to the market-adjusted[24] buy-and-hold abnormal returns (BHARs) of financially sponsored IPOs:

$$\textit{Three-Year Market-Adjusted BHARs} = \beta_0 + \beta_1 \textit{US Dummy} + \beta_2 \textit{PE Dummy} + \beta_3 \textit{PE/VC Ownership}_{t-1} + \beta_4 \textit{Underpricing} + \beta_5 \textit{Size}_{t-1} + \beta_6 \textit{M/B}_{t-1} + \beta_7 \textit{Leverage}_{t-1} + \beta_8 \textit{Lock-Up Duration} + \beta_9 \textit{Underwriter Reputation} + \beta_{10} \textit{Management Ownership}_{t-1} + \beta_{11} \textit{Institutional Ownership}_{t-1} + \textit{Industry Dummies} + \textit{Year Dummies} + \varepsilon \quad (2)$$

We expect β_1 (US Dummy) and β_2 (PE Dummy) to be negative if the holdings of UK sponsors and in VC-backed firms are more likely to signal the IPO future prospects. In case financial sponsors retain equity ownership post-flotation to signal to the market the firm's future great prospects, then we expect to find the coefficient estimate of PE/VC Ownership$_{t-1}$ (β_3) statistically positive. In addition, we also expect to find a non-linear relationship between PE/VC ownership and aftermarket performance of backed IPOs. Previous studies show that the impact of managerial ownership on firm value is non-linear (e.g. Faccio and Lasfer, 1999). In general, as managerial ownership increases, firm value increases in line with the alignment hypothesis, but after a certain level (e.g. 19.68% in UK), the impact is reversed, consistent with the entrenchment hypothesis. In addition, Morck et al. (1988) document that the relationship between firm value and insiders' ownership is not linear. Hence, we examine whether the relationship between financial sponsors' ownership and firm value is non-linear by using PE/VC ownership and its squared value to capture this effect and to calculate the inflection point, the derivative with respect to PE/VC Ownership$_{t-1}$. We also control for other factors documented in the previous literature to affect the long-run IPO performance (Levis, 2011).

In addition to these regressions, we use the calendar-time portfolio approach proposed by Mitchell and Stafford (2000) to calculate the average alpha. Each month (starting from January 1997), we form a portfolio of IPO companies. We rebalance this portfolio every month in order to add companies which had a flotation, and drop IPOs that reach the end of a holding period. We use the following holding periods: 12, 24 and 36 months. Then, we compute the portfolio monthly excess returns (equally-weighted) and regress it against the four factors (i.e. SML, HML, MOM, and $R_{m,t} - rf_{,t}$), which we obtain from Kenneth French's website.[25] Table 1 provides the definitions of the variables

[24] Given the two markets and the differences in characteristics between PE and VC-backed IPOs, we use the S&P 500 index and NASDAQ index for US PE-backed and VC-backed IPOs, respectively. Further, FTSE All-Share index and FTSE AIM index for UK PE- and VC-backed IPOs, respectively.

[25] For the US (UK) sample, we use US (European) factors provided by Kenneth French.

used in this paper, the hypotheses they proxy and their expected sign.

[Insert Table 1 here]

4. Empirical Results

Table 2 shows the annual (Panel A) and industry distributions (Panel B) of financially sponsored IPOs. Presented fluctuations in the number of IPOs resemble the trends documented by Ritter et al. (2013)[26] who argue that they reflect the market timing considerations (Ritter, 2003). As expected, Figure 1 shows that the total number of backed IPOs is significantly higher in the US than the UK. On average and excluding 2008 and 2009, where there are no single UK backed IPO, US backed IPOs are about 3.98 times those in the UK (Panel A). The major difference in IPO activity between the two markets are concentrated in 1999 with 26.22 times and 2010 with 44 times US backed IPOs. The distribution of backed IPOs quoted in the UK is relatively more stable during the sample, as their standard deviation is 17.74, compared to 66.24 in the US. Significant increase in IPO activity in UK took place between 1999 and 2000, when the IPO growth rate totaled 311%, and between 1998 and 1999 in the US with 191% growth rate.

Over the sample period, VC-backed IPOs went through two noticeable peaks: the dotcom bubble of 1999 in the US and 2000 in the UK, with a growth rate in VC IPOs reaching 272% and 625%, respectively. The peaks of activity are followed by very few IPOs as a result of the dotcom bubble burst. Throughout the examined period the number of US PE IPOs is about 3.28 times the number of UK peers. The annual distribution of PE-backed IPOs is more evenly spread, with an increased activity in 2004, when PE-backed IPOs' activity increased by 550% in the UK and 123% in the US in comparison to 2003.

Overall, in contrast to UK, the US IPO market had a quicker 'recovery' and financial sponsors continued to bring portfolio companies to the stock market to realize returns between 2008 and 2010. Panel A demonstrates that both types of financing contribute equally to IPO activity in the UK throughout the sample period. In contrast, the main driver of financially sponsored IPOs' activity is time variant in the US. For example, between 1999 and 2000 VC IPOs represented the prominent drivers of backed IPOs' activity, while in 2002 and 2005 PE-backed firms were the driving force.

Panel B and Figure 2 provide the industry distribution of the sample firms.[27] In

[26] Our reported annual distribution of backed IPOs in the UK is different from the one presented by Levis (2011). We exclude a number of IPOs, which are classified as PE- or VC- backed by BVCA or Liu and Ritter (2011), because we were unable to find post-IPO ownership data in Thomson One Banker. We also exclude some firms because electronic copies of IPO prospectuses are not available on Perfect Filings database. In addition, we include any additional backed-IPOs, which were floated after September 2005.

[27] The total number of IPOs presented in Panel A and B do not match up because the SIC code is not available for 66 UK and 4 US backed IPOs.

the UK, about half of financially sponsored IPOs in any industry are backed by venture capitalists. However, VC investors invest more heavily in high-tech, healthcare, and telecommunication industries in the US. Consistent with PE and VC investment criteria, PE firms' investments are predominantly concentrated in energy, non-durables and manufacturing sectors in the US. Presented different trends in the driving force of financially sponsored IPOs' activity and VC financing industry concentration between UK and US provide a strong incentive to compare the two major geographic stock markets.

[Insert Figure 1 and 2 here]

[Insert Table 2]

Descriptive statistics of PE- and VC-backed IPOs are presented in Table 3. The total sample is divided into two groups depending on whether PE and VC syndicates conducted a full exit ("Exited"), or retained some ownership at first ownership quarter post lockup expiration date ("Retained"). In our US sample, 318 IPOs are classified as exited and 1032 are retained by financial sponsors. Hence, PE and VC investors choose to fully exit 30.81% of IPOs. In the UK, 26.05% of IPO firms are exited: 68 exited IPOs and 261 retained ones. Panel A presents descriptive statistics of the PE sample. Retained and exited PE-backed IPOs in the US differ across a number of IPO firm and syndicate characteristics (*difference [1]-[2]*). Exited PE-backed IPOs have longer financial sponsors' and managerial lockup durations, and a higher proportion is backed by PE sponsored with low proximity in comparison to retained peers. Further, consistent with our predictions, a higher proportion of more risky firms (i.e. financed by larger syndicates) and those backed by financial sponsors which tend to induce low level of monitoring (bank-affiliated funds) are retained by financial sponsors after the IPO. These findings are in line with the commitment hypothesis. In the UK, the comparison of retained and exited PE-backed IPOs reveals that these firms differ with respect to the syndicate size: the median number of sponsors is one for exited firms compared to two members for retained PE-backed IPOs (*difference [3]-[4]*).

In addition, Panel A provides statistical significance of the difference in means and medians between US and UK firms.[28] A number of interesting differences between US and UK samples emerge. In particular, US IPOs are significantly larger, more profitable, and most are high-tech affiliated, but less likely to be underwritten by a global underwriter. In line with previous evidence (Brav and Gompers, 2003; Hoque and Lasfer, 2013), we find that lockup duration applicable to managers is significantly longer in the

[28] These are represented in column [1] and [2]. In column [1], [a, b] and [c] refer to the statistical difference between *retained* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [1]-[3]). In column [2], [a, b] and [c] refer to the statistical difference between *exited* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [2]-[4]).

UK than in the US. We contribute to the literature by reporting that this trend also applies to the duration of lockup agreements applied to PE and VC investors, which are longer in US IPOs in comparison to those imposed in UK IPOs; these differences are significant at 1 percent level.[29] Moreover, retained samples in the US and UK differ along several syndicate characteristics. For example, PE funds involved in US quotations are significantly closer to their fund termination date (8.20 years) than their UK peers (6.40 years). It is likely that PE houses involved in US IPOs quote companies only when other divestment routes have proven to be unavailable (such as trade sale and secondary buyout). Alternatively, PE houses engaged in UK IPOs could be making distributions to LPs much sooner.

In addition, US retained IPOs are backed by larger funds (in term of the amount of capital committed), deals are done in larger syndicates, and a higher proportion of these IPOs are backed by bank-affiliated funds with low proximity to portfolio company's headquarters in comparison to retained UK sample. These differences indicate that PE investors involved in US flotations are more inclined to make cross-border investments (and to remain committed to these firms post-flotation), and they do so in larger syndicates in order to reduce risk and/or get access to investment opportunities in other geographic regions (Lockett and Wright, 1999, 2001). Overall, these results imply that PE investors target different types of firms in the two markets, and the differences in syndicate characteristics suggest that they conduct their investments via divergent mechanisms.

Panel B presents descriptive statistics of VC-backed companies. A number of characteristics seem to drive venture capitalists' decision to fully exit a US quoted portfolio company at the lockup expiration date. VC investors fully exit IPOs which use assets more efficiently in generating earnings (pre-IPO), and those with longer managerial and PE/VC investors' lockup durations (*difference [5]-[6]*). A higher proportion of high-tech and Nasdaq quoted firms are retained by financial sponsors, which are likely to need VC investors' expertise and continuous support post-IPO. In addition, syndicates led by a larger VC fund (in terms of capital committed) retain ownership in the post-IPO period, which could be the result of more available resources in these funds, and hence, greater ability to devote their time and effort to recently quoted companies for longer post-flotation. In terms of cross border investing, 29% (14%) of US retained (exited) sample is backed by a lead PE/VC fund located in another country than its portfolio firm. Lastly, a significantly higher proportion of retained US IPOs have been backed by larger syndicates (4.10 and 2.98 members, respectively). Overall, VC investors in US IPOs seem to be willing to commit their resources and continue to conduct post-IPO monitoring of more risky firms and those which are likely to have higher moral hazard. As before, the comparison of UK VC-backed IPOs (retained and exited) reveals that IPOs with longer managerial lockup agreements and those backed by

[29] Except for the difference between US exited and UK exited PE-IPOs. In these firms, PE investors in UK flotations are actually imposed shorter lockups.

smaller syndicates are exited fully (*difference [7]-[8]*).

VC investors provide financing to different types of firms in the UK and US.[30] For example, US financial sponsors target a higher proportion of high-tech affiliated firms, which are subsequently quoted on the junior/secondary market. This difference could be explained by the fact that financial sponsors in the US have developed expertise in 'nurturing' high-tech companies, as a result of well-established Silicon Valley and existence of the NASDAQ market since 1971.[31] In contrast, the Alternative Investment Market (AIM) in the UK, which is the equivalent to NASDAQ market, only started operating in 1995 where small and young firms with less than 3 years of trading statements can get a quotation. In UK deals, VC investors and managers are obliged to hold equity ownership for a longer time period than in US. Moreover, VC-backed IPOs are usually backed by significantly larger syndicates.

Panel C provides differences in means and medians between PE and VC deals. Consistent with the prior studies (Levis, 2011), we present evidences that PE and VC investors target different type of firms for their investments. We find that in both geographic markets PE-backed IPOs are significantly larger, exhibit higher return on assets, more concentrated in non-high-tech industries, and more likely to be quoted on the main market in comparison to VC IPOs. Moreover, PE IPOs are backed by funds with higher capital commitments, which allows them to invest in mature publicly quoted companies, and deals are done in smaller syndicates.

[Insert Table 3]

Table 4 provides descriptive statistics of ownership adjustments around the IPO date. Panel A provides statistics for the PE-backed IPOs and the results are relatively in line with Cao (2011). Retained and exited IPOs floated on the US stock markets (*difference [1]-[2]*) significantly differ with respect to financial sponsors' equity stakes around the corporate event. More specifically, in comparison to exited deals, PE sponsors hold a significantly higher proportion of the IPO firm's shares in retained companies prior and after the IPO than in exited peers. PE sponsors sell a considerable proportion of their pre-IPO equity stake at the IPO date as demonstrated by *t-stat* row differences. For example, PE syndicate's ownership is reduced from the average holding of 71.99% (62.68%) to 48.62% (41.23%) in retained (exited) IPOs.

In addition, retained IPOs have significantly lower institutional and management ownership around the IPO than exited peers. Hence, PE investors voluntary retain

[30] These are represented in column [5] and [6]. In column [5], [a, b] and [c] refer to the statistical difference between *retained* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [5]-[7]). In column [6], [a, b] and [c] refer to the statistical difference between *exited* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [6]-[8]).

[31] Young firms predominantly quote on this market, where target investors are institutional buyers (Ritter, 2013).

ownership in those US companies, which have worse alignment of interests (between managers and shareholders) as well as in those where less monitoring is conducted by other institutional investors (*difference [1]-[2]*). Significantly lower institutional ownership in retained IPOs (in comparison to exited peers) also captures financial sponsors' preference to be the sole major block holder, which facilitates the implementation of various corporate policy changes proposed by PE investors. Cumming and MacIntosh (2003) argue that compared to other exits (acquisition, secondary dale and buybacks), an IPO represents a divestment route which entails free rider problem of post-IPO monitoring of recently public firms. Hence, it's especially important for financial sponsors to retain significant equity holdings (conditional on non-full exit at lockup expiration) to have the financial incentive to monitor as well as enough power to have an impact on corporate policies.

Panel A shows that in UK PE-backed IPOs the ownership concentrations by various shareholders in retained and exited deals are very similar (*difference [3]-[4]*). Lastly, all the three types of shareholders take significantly higher ownership concentrations in US, than in UK, IPOs[32] The differences are especially large for financial sponsors. For example, in retained (exited) US IPOs, PE investors retain 48.62% (41.23%) of the firm's outstanding shares in comparison to 27.23% (13.79%) in UK deals.

Panel B reports similar ownership adjustments in VC-backed IPOs. VC syndicates' pre-flotation equity ownership fluctuates between 39.10% and 53.81% (28.13%-41.75%) in US (UK) IPOs, which is reduced to 28.13%-41.75% after the admission (17.37%-27.13%). In the US, equity holdings of investors differ significantly in retained and exited VC IPOs (*difference [5]-[6]*), while this trend does not apply to UK IPOs (*difference [7]-[8]*).

Panel C reports some differences between PE- and VC-backed IPOs. In particular, there is a clear preference for maintaining a significantly higher voting power by PE investors before and after the flotation, especially in the US. In general, other institutional investors prefer to take higher equity stakes in PE rather than in VC IPOs. Lastly, in comparison to PE IPOs, managers are given a significantly higher ownership holdings in VC IPOs in order to align their interests with those of shareholders in more risky, high-tech and young companies.

Overall, the ownership concentration of various groups of shareholders is significantly different in US retained and exited IPOs, while it's more homogeneous in UK IPOs. In line with previous studies (Cao, 2011; Levis, 2011; Barry et al., 1990) financial sponsors realize only a part of their returns at the IPO date, while they still

[32] These are represented in column [1] and [2]. In column [1], [a, b] and [c] refer to the statistical difference between *retained* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [1]-[3]). In column [2], [a, b] and [c] refer to the statistical difference between *exited* US and UK IPOs at the 1, 5, and 10 percent levels, respectively (diff [2]-[4]).

maintain a block ownership in the post-IPO period. PE investors have a distinctive investment style: in comparison to venture capitalists, they prefer to hold a higher voting power in their portfolio companies. In sum, the results in Table 3 and 4 highlight significant differences between UK and US samples with respect to IPO firm and syndicate characteristics, as well as PE and VC investors' exiting intensity at the first opportunity (i.e. lockup expiration).

[Insert Table 4]

Table 5 presents results of a logit regression, where the dependent variable is equal to one if PE/VC syndicate retained some ownership after lockup expiration, and zero if financial sponsors sold all of the firm's shares. Thomson One Banker does not provide detailed fund reports for all VC and PE funds in our sample. Consequently, we could only find data on 1727 PE/VC funds covering 157 UK and 869 US IPOs. In our analysis, we analyze the lead syndicate's fund characteristics. In case the data for a lead syndicate member is not available, we use the characteristics of the syndicate member with the second largest equity holding. We introduce syndicate/fund characteristics in a separate regression. Due to data availability, for some regressions the number of observations with the inclusion of fund characteristics' variables is too low to obtain results (e.g. Model [4] and [10]).

Models [1] and [2] include all financially backed UK and US IPOs. We find that financial sponsors involved in US quotations are significantly less likely to retain ownership immediately after the lockup expiration date than in UK IPOs. PE and VC investors exhibit similar propensity to conduct a full divestment. Results of Model [1] and [2] suggest that financial sponsors are more likely to retain shares in IPOs which are larger, high-tech affiliated and backed by larger syndicates. Hence, PE and VC investors tend to maintain some ownership in firms which are more complex, risky, those which operate in fast-paced and niche industries, where continued involvement by financial sponsors is particularly valuable. We find that financial sponsors are less likely to retain equity holdings in case they were subject to longer lockup restrictions (and hence were unable to realize returns for longer), as well as in firms which have demonstrated stronger operating performance prior to flotation (return on assets, ROA) and those with higher underpricing. Further, financial sponsors are less likely to retain ownership in firms which have higher institutional ownership (aka a monitoring agent). Hence, there is some preliminary evidence that the commitment motive is driving financial sponsors' ownership in the post-flotation period.

Model [3] indicates that PE investors' exit propensity at the unlock day is significantly affected by leverage and syndicate size: PE funds are more likely to retain ownership in more levered IPOs and those backed by larger syndicates, which is consistent with our prediction. This finding suggests that PE sponsors do not simply amplify the firm's debt and divest with the first opportunity, but rather they stay committed and ensure that companies are able to meet their financial obligations as

public companies. In contrast, Models [5] and [6] show that VC funds are less likely to voluntarily retain their holdings in companies floated on US stock exchanges, as well as when institutional ownership, first day returns, lockup duration, leverage, syndicate size and geographic proximity are low. In contrast, they are more likely to retain voluntarily ownership when their pre-flotation holding is high, and in larger, high-tech IPOs. The inclusion of fund specific variables in a separate regression substantially increases the explanatory power of the model from 27.47% to 40.10%.[33]

In line with our expectation, models [7] to [9] show that the drivers of ownership retention are not homogeneous across the US and UK markets. In the UK, the decision to retain shares is negatively affected by lockup duration, but positively related to first day returns and syndicate size. These results suggest that financial sponsors with longer lockup duration are eager to realize returns and sell all of their equity stake at the unlock day, whereas financial investors in more underpriced and more risky IPOs, as captured by the syndicate size, are likely to retain shares in the post-flotation period, implying the IPOs' riskiness and the need to make distributions to LPs affect financial sponsors' selling intensity at the IPO or lockup expiry dates.

In contrast, a wider spectrum of factors affects PE and VC investors' equity retention in US IPOs. Institutional differences between the two markets are important. In the US, where block ownership is less wide spread and individuals represent the largest type of shareholder, we find that financial sponsors in IPOs with higher institutional ownership concentration are less likely to retain the firm's shares. Also, in IPOs with higher ROA and in those with an additional monitoring/disciplinary mechanism in place (i.e. higher leverage), financial sponsors are less likely to maintain an equity ownership. Moreover, financial sponsors continue to be committed to firms in which they held higher pre-IPO equity holdings, as well as to larger, high-tech firms.

[Insert Table 5]

There are three major time events when pre-IPO shareholders can fully or partially divest their equity holdings: IPO date, lockup expiration date, and thereafter. So far, we have presented descriptive statistics and multivariate analysis of the first two cases. Figures 3 through 6 demonstrate divestment dynamics of financial sponsors with a clear differentiation between compulsory and voluntary equity holdings post-flotation in US and UK markets.[34]

Figure 3 shows evolution of *voluntary* equity holdings by PE investors in IPO firms they brought to the two geographic markets. We find that, on average, PE sponsors

[33] We include the fund specific variables in separate models because it reduces the sample size.
[34] On Figures 3 though 6, statistical significance of the difference in means between UK and US samples are denoted by ***, **, * which represent significance at 1, 5, and 10 percent levels, respectively. Information depicted in the four graphs is also available in a table format in Appendix 2. t-stats of the difference-in-means are presented in Appendix 3.

hold 38.87% of US quoted firm's outstanding shares in the first quarter post-flotation, significantly higher than the 7.81% observed in the UK sample. Unlike the UK where the ownership remains relatively stable, in the US it decreases steady though time reaching 13.19% in the twelfth quarter post-flotation. Nevertheless, PE investors voluntary maintain a significantly higher ownership in US deals than in UK ones, which is consistent with our prediction, thereby confirming that different institutional frameworks in US and UK have a material impact on the post-IPO involvement of financial sponsors.

Figure 4 illustrates the average VC groups' *voluntary* holdings in portfolio firms. On average, VC sponsors retain 15% of firms' shares post-quotation.[35]In the first four quarters, VC sponsors retain more in the US than in the UK. In quarter 5 to 7, the ownership is relatively similar across the two countries, as US sponsors appear to have divested while their UK counterparts accumulated ownership. In quarters 8 to 12, both sponsors appear to have divested progressively their holdings. Differences-in-means suggest that VC investors in UK and US pursue similar divestment strategies of their voluntary holdings starting from the 5th quarter post-flotation.

Figure 5 presents summary statistics of *compulsory* holdings in PE deals.[36] On average, underwriters require PE sponsors to retain 31.30% of US and 18.76% of UK backed firm's shares. In line with our predictions, underwriters require financial sponsors to retain higher equity in US markets, which are characterized by more dispersed ownership base without a clear block holder, which calls for higher need of monitoring to be conducted by PE and VC investors. In contrast, Figure 6 shows that VC sponsors hold 22.62% in US IPOs, and 21.62% in UK deals in the first two quarters. However, in quarter 3 and 4, the VC ownership is significantly lower in the US, suggesting that in unusually long lockups in the US[37] financial sponsors are required to hold significantly less shares than in UK IPOs.

Overall, presented results in Table 5 and Figures 3-6 suggest that, in line with our expectation, financial sponsors pursue different exit dynamics in the US and UK. This finding is especially driven by the PE sample, which in comparison to VC peers is more prone to relatively higher agency conflicts. Further, we present evidences that financial sponsors are more likely to exit fully at the lockup expiration (Table 5). However, conditional on equity retention, financial sponsors in US IPOs choose to voluntarily hold significantly higher ownership holdings (Figures 3-6) than in UK IPOs. Hence, the

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[35] Initially, we expected to find a smooth divestment dynamic by venture capitalists in the post-flotation period. However, as illustrated in Figure 4, the average voluntary holdings in the first two quarters post-flotation are lower than the subsequent ones. This is explained by the fact the vast majority of venture capitalists are locked-up for 180 days post-flotation. Hence, what we are capturing in the first 2 quarters of voluntary data is only a small, unique number of firms in which financial sponsors were not obliged to hold shares, and they chose to hold relatively small block holdings. But as the lockup agreements expire (quarter 3), more VCs voluntary retain shares.

[36] For US deals, there are no observations in quarter 5 and 6 because by that time all lockup agreements applicable to financial sponsors in the US expire.

[37] The average lockup period in US sample is 180 days (i.e. two quarters post-flotation).

corporate governance and institutional differences between the two countries have an impact on exit dynamics of financial sponsors.

Table 6 presents differences-in-means between PE and VC ownership. The results indicate that, unlike the UK where PE and VC funds retain relatively similar holdings, in the US PE investors are likely to retain significantly higher ownership than VC funds. These results apply to both voluntary and compulsory ownership and can be explained by three factors. First, VCs primarily maintain and exert control by means of their representation on the board of directors (Celikyurt et al., 2014), whereas PE investors demonstrate their control via block holdings. In addition, PE firms' expertise in supporting and monitoring mature firms lead to value creation even post-flotation. Therefore, PE investors' expected benefits associated with continued post-IPO monitoring potentially outweigh the costs; as opposed to VC houses, which specialize in pre-IPO financing. Third, consistent with our initial expectation, since PE-backed IPOs are more prone to agency conflicts, PE investors voluntarily choose to retain higher equity holdings in the post-flotation period. These factors do not, however, apply to UK IPOs, where PE and VC investors choose similar divestment strategies.

[Insert Table 6 here]

We also examine PE/VC syndicates' voluntary ownership evolution of two distinctive groups of IPOs: those in which PE/VC syndicates are subject to and free of lockup agreement. Table 7 presents summary statistics of voluntary ownership of these two groups in UK IPOs.[38]In spite of the negative impact on IRR (as a result of a longer holding period), both PE and VC investors voluntary retain significantly higher ownership in IPOs where they have been subject to some selling restrictions. This could partially be explained by the fact that PE/VC syndicates avoid sending a negative signal to the market by making dramatic ownership reductions soon after the lockup expiration. Overall, these results suggest that PE and VC investors in UK IPOs do not view lockup expiration as an opportunity to fully realize their returns, but rather they only make partial adjustments to their holdings, while maintaining their ability to exert a great influence on the firm's policies as a major post-IPO block holder. Our findings are consistent with Furth and Rauch (2015), who report that it is very rare for buyout sponsors to sell shares at or within four weeks of the lockup expiration date.

[Insert Table 7]

Table 8 presents results of the multivariate analysis of financial sponsors' compulsory equity holdings (Panel A). We investigate whether PE/VC investors' ownership is driven by the same explanatory variables as the IPO firm matures by

[38] For Table 7, only UK flotations are considered because almost in all US backed IPOs financial sponsors are subject to lockup agreement. For IPOs with no PE/VC lockups, all twelve quarters of ownership evolution is considered as voluntary. However, for IPOs with PE/VC lockup, only ownership holdings post lockup expiration are regarded as voluntary.

examining ownership in various quarters post-flotation. The results show that, in line with our prediction, the underwriters require PE investors in the US to hold significantly higher compulsory ownership, compared to the UK (model [1]-[2]). This cross-country difference can be related to the dispersed US ownership structures, and hence, in order to have a significant impact on corporate policies and to reduce moral hazard, PE sponsors are required to maintain a significantly higher block ownership.

The presented results indicate that financial sponsors retain less shares in IPOs in which they sold a higher proportion of their pre-IPO equity. Compulsory holdings in PE and VC IPOs are negatively affected by lagged institutional ownership, who can actively monitor insiders' actions. This finding supports the commitment hypothesis and is in line with past studies, which document institutional investors' active and effective monitoring investment style (Chen et al., 2010). In line with the commitment hypothesis, we find that financial sponsors' firms with higher market-to-book ratio are required to retain less shares in the post-flotation period.

In contrast to our initial expectation, we find that that size is positively related to PE compulsory ownership. This finding could be drive by the fact that the size variable is partially capturing the complexity of the firm's operations and the managers' ability to take advantage of it for their own benefit.

The results indicate that the underwriter's reputation does not have an impact on compulsory ownership of PE sponsors, in contrast to Brav and Gompers (2003) who find that IPOs underwritten by more reputable sponsors have shorter lockup duration and are more likely to be released from lockup restrictions early. We believe this difference can be attributed to a number of factors. First, we use an updated time period[39] during which the industry has experienced two boom and busts, which potentially diminished the effect of the underwriter reputation on terms of lockup agreements and forced all underwriters (of various reputations) to impose more homogeneous lockup restrictions. For example, Leone et al. (2013) document that the behavior of intermediaries such as auditors change during the periods of euphoric markets. Second, Brav and Gomper (2003) consider firms' insiders as one class, without differentiating between the lockup terms applicable to managers and other pre-IPO major institutional shareholders. Our analysis focuses exclusively on the sub-set of insiders, as we analyze the terms of financial sponsors' lockups. Lastly, although Brav and Gompers (2003) find that the underwriter reputation has an impact on some aspects of lockup agreements, namely the likelihood of early release from lockup agreements and duration of lockup length, their study does not shed light on the relationship between underwriter reputation and initial PE/VC investors' ownership retention post-flotation.

[39] The study by Brav and Gompers (2003) is based on 1988-1996 time period, whereas we examine the financial sponsors' divestments via an IPO route during 1997 and 2010.

In addition, we find that VC compulsory ownership is positively affected by several other variables such as syndicate size and low proximity. These findings imply that underwriters lock-in financial sponsors in more risky firms, and those whose monitoring abilities are constrained by distance, in line with our initial predictions. Also, underwriters impose less strict lockup clauses on VC-backed IPOs, those underwriter by a global investment bank, and those which higher pre-IPO return on assets.

Panel B resents results on the multivariate analysis of voluntary ownership. We find that the market of quotation only matters for compulsory ownership, and hence, financial sponsors pursue similar divestment strategies of voluntary holdings in UK and US IPOs. The results indicate that bank-affiliated PE investors voluntarily retain significantly less equity in the post-IPO period than their peers with other ownership structures (model [5]-[6]). These findings are consistent with previous studies which show that these financial sponsors are bridge-investors who invest in portfolio firms to primarily form relationships for future debt facilities (Tykvova, 2006; Hellmann et al., 2008). The fact that bank-affiliation dummy is only significant in PE deals reinforces this argument since PE-backed IPOs use leverage to a greater extent than VC-IPOs (Levis, 2011). We find that PE investors reduce their voluntary holdings at times subsequent to strong portfolio firm's performance, as the coefficient of $CARs_{t-1}$ is statistically significant at 5% (10%) level in Model [5](6).

The results also indicate that VC funds tend to hold higher voluntary holdings in more risky firms, which are backed by larger syndicates (model [7]-[8]). We present evidence that VC investors retain lower equity holdings in IPOs firms with low proximity. However, in the third year post-flotation VCs tend to retain significantly less shares in firms located in remote areas. This could be driven by the fact that venture capitalists have limited resources, and after two years of continuous post-IPO support, they find it too costly to remain involved in firms, and hence, free up their managers for new ventures. Further, we find that VCs retain less shares in larger IPOs and in those with higher institutional ownership, which is consistent with our initial expectations. Overall, the results reported in Table 8 suggest that compulsory and voluntary holdings of financial sponsors are driven by the commitment hypothesis.

[Insert Table 8]

In Table 9, we further analyze financial sponsors' holdings in US and UK IPOs separately in order to shed light on whether institutional differences have an impact on the ownership concentration. The dependent variable in Model [1]-[3] is financial sponsors' compulsory ownership, and voluntary ownership in Models [4]-[6]. We demonstrate that drivers of compulsory ownership in these two countries are different. For example, in Model [2] and [3], PE dummy and size have statistically significant positive effects on compulsory ownership in US quotations, whereas there is no impact on ownership evolution in UK firms. Since the US market is defined by higher need for auditing and monitoring role by PE and VC investors (Appendix 1), it is especially

important for PE investors to retain higher equity stakes in companies, which are inherently more subject to higher agency conflicts in comparison to VC IPOs.

We find that underwriters impose tighter lockup restrictions on financial sponsors in US IPOs with lower post-IPO institutional ownership; the $INST\_OWN_{t-1}$ coefficient is significantly negative at 1 percent level. Hence, in US market defined by individual investors being the main shareholder type, there is less need for financial sponsors' monitoring in companies with higher institutional block holders. In these cases, underwriters require financial sponsors to retain less shares in US backed IPOs. In contrast, there is lack of such relationship in UK firms; the coefficient of $INST\_OWN_{t-1}$ is not significant (model [3]). In the UK, where corporate government practices are focused on *internal* monitoring via empowered boards and limited CEO's influence, there is less need for monitoring to be conducted by shareholders. Therefore, in line with our expectation, we find that institutional ownership does not impact the terms of lockup agreements applicable to PE/VC investors in UK backed IPOs. Similarly, we also report that low proximity has a statistically significant positive (negative) impact on financial sponsors' compulsory ownership in US (UK) IPOs.

Our cross-country analysis of voluntary ownership drivers (Model [4] to [6]) reveals that financial sponsors involved in US (UK) IPOs which are underwritten by more reputable investment banks voluntarily retain higher (lower) equity holdings post-flotation. This finding coupled with negative PE/VC reputation (PE/VC HOUSE AGE) coefficient in Model [6] supports the commitment hypothesis, and suggests that other forms of certification and reputation are viewed as alternative commitment devices in the UK, but not in the US.

We find institutional ownership to have a significant negative impact on financial sponsors' voluntary ownership in both countries of quotations, which provides support for the commitment hypothesis. In addition, our results show that ROA_{t-1}, $SIZE_{t-1}$ and PE/VC fund's bank affiliation only have significant negative effects on financial sponsors' voluntary ownership evolution in the UK. In sum, we find that different institutional frameworks in the US and UK have significant implications for financial sponsors' compulsory and voluntary post-IPO ownership evolutions.

[Insert Table 9]

The signaling hypothesis is tested by means of a multivariate analysis of the market-adjusted buy and hold abnormal returns (BHARs). The results are presented in Table 10. On average, US backed IPOs underperformed UK peers during the examined sample period as suggested by the statistically negative US DUMMY coefficient at 1 percent level.[40] We find that PE-backed IPOs' aftermarket performance is superior to the one demonstrated by VC companies (Model [1]-[2]), in line with Ritter (2014) who

[40] Except for Model [6], where the coefficient is significant at 10 percent level.

reports US PE (VC)-backed IPOs' average market-adjusted 3-year BHARs to be 5.7% (-11.4%).

More importantly, Model [3] indicates that the coefficient of interest, lagged PE group ownership (PE/VC_OWN_{t-1}), is negatively related to long-run performance, which is significant at 1 percent level. This results suggests that PE sponsors' retention does not signal portfolio firm's future great prospects to the market, but rather it is indicative of future performance deterioration. Hence, this finding provides weak support of the signaling hypothesis, however rejection of the expected sign. In separate regressions (Model [2], [4] and [6]), we add an additional squared variable to examine the relationship between firm performance and financial sponsors' voluntary ownership. We find that our coefficients of interest (PE/VC_OWN_{t-1} and $PE/VC\_OWN_{t-1}^2$) are significant in Model [2], which uses pooled data for UK and US IPOs. By taking the derivative with respect to PE/VC_OWN_{t-1}, we are able to calculate the inflection point which equal to 1.83% for all backed IPOs,[41] and the relationship between BHARs and financial sponsors' voluntary ownership is convex. These results are consistent with previous studies which report that the relationship between firm value and insiders' ownership is not linear (Morck et al., 1988). For example, the relationship between firm value and managerial ownership is a concave shape and the inflection point is about 40%. Our finding, the U-shaped relationship, suggests that PE/VC group's voluntary ownership is positively related to corporate value when financial sponsors' equity holding exceeds 2%, while it is negative when they hold less than 2% of the firm's shares. In other words, when interests of PE and VC firms are more closely aligned with those of other shareholders by means of higher equity holding (as well as higher proportion of unrealized returns), financial sponsors are motivated to monitor, support and create value post-flotation. The continued PE/VC involvement is associated with higher BHARs. In contrast, by realizing a significant part of PE/VC investors' returns and retaining a small equity holding (below 2%) post lockup expiration,[42]PE and VC firms do not benefit as much from costly monitoring, since they will only capture the wealth gains on a small portion of their initial ownership. Hence, in contrast to managers who become entrenched and their higher (above certain level) ownership results in firm value deterioration, higher equity financial sponsors' ownership is positively associated with firm performance.

Our results are related to several studies (Pound, 1988; McConnell and Servaes; 1990), which find a significant positive relationship between firm value and fraction of

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[41] The inflection points are calculated as a solution to the following equation in Table 10:
$BHARs = -0.44*(PE/VC\_OWN_{t-1}) + 0.12*(PE/VC\_OWN_{t-1})^2$
I differentiate BHARs with respect to PE/VC_OWN_{t-1},
$\delta BHARs / \delta\ PE/VC\_OWN_{t-1} = -0.44 + 0.12*(PE/VC\_OWN_{t-1})$
We let the above equation equal to zero and solve for PE/VC_OWN_{t-1}.

[42] In this case, only a small portion of initial ownership is dependent on the share price at the time of PE/VC investors' full exit after the flotation.

shares held by institutional investors, however non-existence of a significant relationship between firm value and ownership by block holders. This is consistent with our results because PE and VC firms represent a special type of institutional investors with specialized knowledge, active, hands-on investment style and monitoring abilities. In contrast to other institutional block holders, who vote with their feet and implement a passive monitoring style, PE and VC investors have reputational capital at stake which they aim to preserve. Overall, our paper contributes to the existing literature by reporting that the ownership structure of backed IPOs has an important influence on corporate value regardless of managers' ownership position.

In addition, we find that financially sponsored IPOs' performance is negatively related to lockup duration, while positively affected by lagged management ownership, which is consistent with the alignment of interest argument. Also, size coefficient is positive and statistically significant at 1% level in all models.

[Insert Table 10]

Table 11 reports results of the four-factor model. The coefficient of interest is the intercept (alpha), which represents the average monthly abnormal return for portfolio of backed IPOs. After controlling for market, size, book-to-market and momentum we find that financially sponsored IPOs have performed worse than expected. For example, the alpha for PE (VC) sample is -1.09% (-2.67%) per month and statistically significant. This finding is consistent with previous empirical studies (Ritter, 1991; Levis, 1993) which demonstrate clear patterns of long-run underperformance of IPOs (including financially sponsored firms). We report that the loadings of four factors partially explain backed IPOs' performance: SMB, HML, R_m-r_f have significant positive relationships with excess returns. The results also indicate that PE-backed IPOs seem to have higher exposure to HML factor than VC IPOs.

Models [4] to [7] show that alpha is negative independently of whether financial sponsors exited or retained their holdings. For the exited sample, the alpha for PE (VC) sample is -1.36% (-2.60%) per month and statistically significant, while the average alpha for retained PE (VC) is -1.10% (-2.85%) per month. We also replicated the analysis using 12 and 24 months' holding periods (Appendix 4), and results remain unchanged. Hence, PE and VC investors' ownership concentration immediately post lockup expiration *per se* does not seem to lead to firms' long-run outperformance in the aftermarket. However, one should interpret this finding carefully and not assume that financial sponsors' ownership is not beneficial for firm value in the long-run. It is not the mere PE and VC investors' equity holding which could create value, but rather financial sponsors could use their equity ownership as a lever to shape various corporate policies and create value for shareholders in the post-flotation period.

In addition, we present results of the four-factor model for backed IPOs in which financial sponsors voluntary retained some equity stake throughout 36 months post-

flotation. Results suggest that HML and momentum factors are not statistically significant explanatory variables for these firms. Overall, backed-IPOs underperform in the long-run, and momentum does not explain their excess returns.

[Insert Table 11]

To deal with the endogeneity concern, we use an instrumental variable approach. In line with Bruton et al. (2010), we instrument financial sponsors' syndicate ownership by syndicate size, which presumably affects the financial sponsors' equity ownership without depending on the firm's aftermarket performance. The results are presented in Table 12. The choice of instrumental variable is judicious since it is strongly associated with PE/VC post-IPO equity ownership (Model [1] and [3]). The two-stage least-squares estimation results provide support for earlier presented findings.

[Insert Table 12]

5. Conclusion

Private equity and venture capital investors realize returns by bringing their portfolio companies to the stock market (or any other divestment route) after several years of extensive restructuring, supporting, monitoring and value creation. Previous studies have documented PE and VC investors' continued involvement in companies post-flotation in terms of equity ownership and representation on the board of directors (Cao, 2011; Krishnan et al., 2011). This paper sheds lights on the fundamental question of what determines PE/VC compulsory and voluntary ownership retention, and its effect on the long-run performance of UK and US backed IPOs. The extent of exit post the lockup expiration date is of particular interest, since it is the first opportunity for PE and VC syndicates to voluntarily decide on their divestment strategy.[43]

Traditionally, an IPO has been viewed as an exit route for financial sponsors to realize their returns. However, presented results in our paper reinforce the fact that when financial sponsors bring firms to the stock market, it does not immediately result in realizations of all returns and cash distributions to LPs. We find that only about a quarter of backed IPOs are fully exited by financial sponsors soon after the lockup expiration. We report that many PE and VC investors choose to voluntary retain significant equity holdings in the post-flotation period. This is an additional proof that an IPO is not an ultimate exit by financial sponsors, but rather it represents the beginning of the divestment, which sometimes takes years. We find that at the end of the third year post-flotation, financial sponsors still maintain some equity holdings in 53.74% (52.37%) of

[43] Although PE and VC investors sell some shares at the IPO date, this decision is heavily influenced by the underwriter. In contrast, following the lockup expiration date PE and VC investors are no longer obliged to hold shares and are free to decide whether to sell all or some of the company's shares.

PE (VC)-backed IPO samples. Therefore, our paper is in line with more recent studies, which show that VC investors are becoming more active investors in public companies (Celikyurt et al., 2014; Iliev and Lowry, 2017).

We document that the importance of VC-backed IPOs varies through time in the US, while the both types of financially sponsored IPOs (VC- and PE-backed) play a stable role in IPO activity in the UK. The comparison of exited and retained backed IPOs reveals different ownership structures and adjustment dynamics conducted by various pre-public investors around the US quotations: on average, retained IPOs have higher (lower) PE/VC (managerial and institutional) ownership than exited peers. In contrast, ownership structure of retained and exited UK companies is more homogeneous.

We present evidences that financial sponsors' compulsory and voluntary holdings are driven by the commitment hypothesis. Hence, PE and VC post-IPO ownership is used to alleviate moral hazard concerns in recently public companies. We differentiate between two events at which financial sponsors can adjust their voluntary equity holdings: at the lockup expiration date and thereafter. We find that strong pre-IPO operating performance of firms enables PE and VC investors to exit fully US firms at the lockup expiration. Hence, financial sponsors commit their resources and retain ownership in underperforming firms. Moreover, financial sponsors involved in US flotations are more likely to sell their entire equity stake at the unlock day. However, conditional on ownership retention at the lockup, PE investors hold higher ownership in US IPOs in comparison to UK flotations.

Using the calendar-time approach, we report negative average monthly abnormal returns for a portfolio of backed IPOs over various holding periods. Presented results provide weak support of the signaling hypothesis, however rejection of the expected sign. Continued financial sponsors' signals future firm performance, however, in contrast to our initial expectation it is indicative of poor future performance. We find that PE-backed companies with higher PE ownership in the post-IPO period underperform in the aftermarket. We demonstrate that backed IPOs underperform the market in the long-run, which is heavily driven by the VC and US sub-samples. Lagged management ownership and size have a positive effect on backed IPOs' long-run performance, while lockup duration has a significant negative effect. We report a convex relationship between financial sponsors' ownership and buy-and-hold returns suggesting that financial sponsors can add value to their investment firms even in the post-flotation period in case they hold equity holdings of more than 2%. Finally, our study contributes to the existing literature by reporting that the ownership structure of backed IPOs has an important influence on corporate value regardless of managers' ownership position, which is used to align the interest of shareholders and managers.

We present evidences that the country of quotation and its institutional differences have important implications for financial sponsors' ownership. Cross-country comparison suggests that underwriters require PE investors involved in US flotations to

hold a significantly higher equity holdings than in UK IPOs, which is explained by the US markets' lesser prevalence of block holders, dispersed ownership structure, institutional investors, and corporate governance's lack of focus on internal monitoring via stronger boards and less powerful CEOs. Further, we find that underwriter and PE/VC house reputations are considered to be alternative commitment devices only in the UK.

The results have several important implications for investors in private equity, general partners, shareholders, and other market participants. Investors, who are considering committing some funds to private equity and venture capital industry, should be aware that following an IPO of a portfolio firm, it will take longer for some types of financial sponsors to start making cash distributions (i.e. in case a company is floated in the US). This provides an even greater incentive for LPs to choose carefully the PE/VC houses they commit funds to based not only on their track record but also on how long they are willing to wait to start realizing returns. Also, general partners of funds which are close to the termination date should consider the market of flotation carefully because it affects the strictness of lockup restrictions applicable to PE/VC investors. For example, investment banks require financial sponsors to retain more shares in companies floated on the US stock markets in case it is located in another country than PE/VC investors' headquarters; in the UK, it's the opposite. However, we show that financial sponsors could lighten (to an extent) their lockup agreement by bringing in more institutional shareholders pre-flotation in US quotations.

As all research, this paper has several limitations. The fact that some of our results are consistent with the commitment hypothesis while the excess returns indicate that voluntary retention does not create value calls for further research. The results suggest that PE and VC funds are not very effective monitors as they do not necessarily lead companies in which they hold large stakes into higher performance. Presented results could suggest that while they retain their holdings in IPOs that originally need monitoring, they are not able to derive shareholder value partly because these IPOs are relatively similar to other non-backed IPOs, and their underperformance could be due to other factors, such as their relative risk. Further research could exploit the relationship between monitoring and signaling. In addition, presented findings do not imply that financial sponsors are completely unable to add value in the long-run since it's not necessarily the financial sponsors' ownership per se which affects the portfolio firms' performance, but rather corporate policies which they shape by means of continued equity holdings.

Our analysis concentrates on two 'Anglo-Saxon' markets of quotation. A further examination of whether documented PE and VC firms' retention dynamics and drivers are wide-spread in other Western European counties (characterized by different institutional frameworks, more concentrated ownership and various level of activism for corporate control) could prove to be fruitful. Also, a more comprehensive ownership dataset (in terms of frequency) would allow to examine to what extent presented results

alter or strengthen. We believe that this would not have a material impact on results because our examination is based on ownership adjustments made in first ownership quarter post the unlock day (as opposed to an exact lockup expiration date), which would only overstate PE/VC firms' propensity to conduct an exit.

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Table 1. Description of Variables.

Variables	Definition	Proxying for (Hypotheses)	Esign
PE/VC OWN	PE/VC syndicate's ownership: The percentage of outstanding shares held by financial sponsors as a group at time t (t = one day pre- and post-IPO, quarterly ownership post-flotation for three years).		
SIZE	The natural logarithm of market value of equity is calculated at the first day post-IPO, and quarterly for 12 quarters post-IPO.	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 for three years).	Commitment	-
UND. REP	Underwriter Reputation: Dummy variable equals 1 if the underwriter is the global underwriter, 0 otherwise as defined in Derrien and Kecskes (2007).	Commitment	-
PE/VC HOUSE AGE	The natural logarithm of one plus the difference between time t and PE/VC firm founding year (t = IPO year, quarter 4, 8 and 12 post-IPO).	Commitment	-
BANK_AFF	Bank Affiliation: Dummy variable equals 1 if PE/VC 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).	Moral hazard and level of monitoring	+
LOW PROXIMITY DUMMY	Dummy variable equals 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.	Level of monitoring	+
SYND. SIZE	Syndicate Size is calculated as the natural logarithm of one plus the number of PE/VC investors pre-IPO. 'Major Shareholders' section of prospectuses was examined in order to identify the number of different PE/VC investors who held a block ownership immediately prior to an IPO.	Firms' moral hazard and riskiness	+
PE/VC FUND AGE	The natural logarithm of one plus the difference between time t and PE/VC fund founding year (t = IPO year, quarter 4, 8 and 12 post-IPO).		
ROA	Return on Assets: The ratio of earnings before interest and tax over total assets (%).		
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 for three years).		
CARs	Cumulative abnormal returns are calculated between the IPO date and time t. For companies listed on the MAIN or		

	NYSE (AIM or NASDAQ) markets, FTSE All-Share or S&P 500 price index (AIM All-Share or NASDAQ All-Share) are used correspondingly in order to calculate the market model abnormal returns (t = first quarter post the unlock day, quarter 4, 8 and 12 post-IPO).
LEV	Leverage is calculated as total debt divided by total assets.
FDR	First day Return (Underpricing) is calculated as the ratio of the difference between closing price at the first day of trading and offer price, divided by the offer price.
M/B	Market-to-Book Ratio is calculated as the market value of equity divided by book value.
US DUMMY	Dummy variable equals 1 if the company is floated on the US stock markets, and 0 otherwise.
PE DUMMY	Dummy variable equals 1 if the IPO is classified as Private-Equity Backed, and 0 if VC-backed.
HIGH-TECH DUMMY	Dummy variable equals 1 if the company belongs to one of the following industries: technology, health care, and telecommunications, and 0 otherwise. For industry dummies in regressions, Fama-French industry classification is used.
PE/VC_OWN_POST_LUED	PE/VC syndicate's ownership in first quarter post lock-up expiration date. The duration of lock-up agreements is either gathered from prospectuses or SDC Platinum.
PROP_INIT_PEVC_OWN_SOLD	Proportion of initial PE/VC Ownership sold at IPO is calculated as the ratio of the difference between post-IPO PE/VC syndicate ownership and syndicate ownership pre-IPO, divided by pre-IPO syndicate's ownership.
BHARs	Market-adjusted buy and hold abnormal returns: we compute IPO company's one, two, three year buy-and-hold return and subtract one, two, three year market buy-and-hold return. For companies listed on the AIM and NASDAQ (MAIN and NYSE) markets, AIM All-Share and NASDAQ All-Share price index (FTSE All-Share and S&P 500 price index) are used to calculate market buy-and-hold return, correspondingly.
JUNIOR MARKET DUMMY	Dummy variable equals 1 if the company is quoted on the Nasdaq or AIM market, and 0 otherwise.

Table 2. Annual and Industry Distributions of PE- and VC-backed IPOs.
For the UK sample, classification of IPOs which are quoted between Jan 1997 and Dec 2004 i backed samples is done according to the British Private Equity & Venture Capital Association cl IPOs quoted between Jan 2005 and Dec 2010, we examine each prospectus separately and che online trade publication which provides regular details on individual VC and buyout transactic sample, the names of PE and VC-backed IPOs which are quoted between Jan 1997 and Dec 20 from Liu and Ritter (2011). The names of backed IPOs, which are quoted between 2008 and 201 from SDC Platinum Database. *Panel A* reports annual distribution of backed IPOs in the US a reports industry distribution based on Kenneth-French industry classification. In Panel A calculated as the number of VC-backed firms in a particular year (industry) divided by the nu VC IPOs in that year (industry). US/UK is calculated as the ratio of US and UK IPOs in a pa industry.

Panel A. Annual Distribution

	UK Backed IPOs			US Backed IPOs			
Year	PE	VC	% VC UK	PE	VC	%VC US	PE US/UK
1997	13	25	66%	28	105	79%	2.15
1998	10	14	58%	27	54	67%	2.70
1999	5	4	44%	35	201	85%	7.00
2000	8	29	78%	32	183	85%	4.00
2001	4	8	67%	22	22	50%	5.50
2002	7	6	46%	22	12	35%	3.14
2003	4	4	50%	21	19	48%	5.25
2004	26	18	41%	47	58	55%	1.81
2005	17	29	63%	60	46	43%	3.53
2006	21	31	60%	66	53	45%	3.14
2007	20	22	52%	31	71	70%	1.55
2008				6	9	60%	
2009				15	13	46%	
2010	1	1	50%	34	54	61%	34.00
Total	136	191	58%	446	900	67%	3.28
Average	11.33	15.92	56%	31.86	64.29	59%	6.15
St. dev.	8	11.14	0.11	16.42	60.42	0.16	8.92

Panel B. Industry Distribution

Non-Durables	9	6	40%	22	6	21%	2.44
Durables	1	1	50%	10	4	29%	10.00
Manufacturing	10	14	58%	49	15	23%	4.90
Energy	7	5	42%	20	4	17%	2.86
Hi-Tech	31	57	65%	88	463	84%	2.84
Telecommunications	4	3	43%	25	46	65%	6.25
Shops	14	9	39%	60	42	41%	4.29
Healthcare	10	31	76%	29	202	87%	2.90
Other	27	20	43%	141	114	45%	5.22

Table 3. IPO and Syndicate Characteristics.

The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. All accounting figures are gathered from the last annual accounts pre-IPO. *Panel A* (*B*) presents summary statistics of PE- (VC-) backed IPOs in US and UK, divided into whether financial investors' syndicate has fully exited ("Exited") or retained some ownership ("Retained") in the first quarter post lockup expiration date. Statistical significance of the difference in means and medians between US and UK backed IPOs are reported in the first four columns by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between retained US and UK IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between exited US and UK IPOs ([2]-[4]). The same applies to Panel B. *Panel C* presents difference-in-means and medians between US and UK samples. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. PE-Backed IPOs												
	Retained [1]		Exited [2]		Difference [1]-[2]		Retained [3]		Exited [4]		Difference [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
IPO Characteristics:												
No. of IPOs.	339		109				106		32			
Total Assets ($mil)	856.32[a]	349.9[a]	551.61[c]	244.72[a]	1.56	[0.19]	247.39	31.59	149.06	33.24	0.59	[0.41]
Leverage (%)	0.75	0.69	0.67[a]	0.69[a]	1.42	[0.50]	0.85	0.79	0.88	0.92	-0.20	[0.29]
ROA (%)	0.07[a]	0.07[c]	0.07	0.69	0.06	[0.55]	-0.01	0.05	0.08	0.10	-1.21	[0.18]
PE/VC lock-up duration (no. of days)	180.51[a]	180[a]	193.06[b]	180[a]	-2.43***	[0.17]	199.99	180.00	146.61	90.00	1.75*	[0.08]
MGT lock-up duration (no. of days)	180.75[a]	180[a]	187.08[a]	180[a]	-1.65*	[0.23]	509.46	360.00	410.13	360.00	0.52	[0.88]
Global Underwriter dummy	0.10[a]		0.12[a]		-0.49		0.34		0.45		-1.10	
High-tech dummy	0.39[c]		0.31		1.45		0.29		0.23		0.65	
Junior Market dummy	0.50		0.50		0.00		0.42		0.35		0.64	
Syndicate Characteristics:												
No. of funds	228		25				60		31			
PE/VC House's Age at IPO	21.84	18.00	26.38	22.00	-0.72	[0.34]	19.67	19.50	25.17	21.50	-1.32	[0.65]
PE/VC Fund Age at IPO	8.20[c]	8.00[c]	5.43	5.00	0.97	[0.34]	6.40	5.00	6.16	5.00	0.19	[0.50]
Capital Committed to PE/VC Fund ($mil)	1684.89[a]	1050[a]	633.63[a]	667.50[b]	1.36	[0.08]	858.52	484.56	772.02	459.28	0.29	[0.65]
Low proximity dummy	0.17[b]		0.43		-1.76*		0.05		0.06		-0.05	
Bank Affiliated Fund	0.17[a]		0.04		1.72**		0.08		0.10		-0.37	
Syndicate Size	2.56[a]	2.00[a]	1.55	1.00	4.99***	[0.00]	1.96	2.00	1.42	1.00	2.08**	[0.01]

Panel B. VC-Backed IPOs												
	Retained [5]		Exited [6]		Difference [5]-[6]		Retained [7]		Exited [8]		Difference [7]-[8]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
IPO Characteristics:												
No. of IPOs.	693		209				155		36			
Total Assets ($mil)	73.09[c]	27.58[a]	56.14	24.77[a]	0.74	[0.42]	23.65	5.47	28.81	12.10	-0.33	[0.04]
Leverage (%)	0.70[c]	0.52	0.73	0.59	-0.27	[0.09]	0.93	0.50	0.72	0.68	0.49	[0.37]
ROA (%)	-0.50[a]	-0.35	-0.29	-0.02[c]	-2.59***	[0.00]	-0.88	-0.32	-0.04	0.08	-1.13	[0.00]
PE/VC lock-up duration (no. of days)	180.03[a]	180.00[a]	186.43[a]	180.00[b]	-4.22***	[0.00]	226.14	180.00	230.20	365.00	-0.12	[0.67]
MGT lock-up duration (no. of days)	179.64[a]	180.00[a]	186.43[a]	180.00[a]	-4.79***	[0.00]	397.25	360.00	453.73	364.00	-1.82*	[0.02]
Global Underwriter dummy	0.17[a]		0.13		1.62		0.25		0.23		0.30	
High-tech dummy	0.91[a]		0.77[a]		5.45***		0.48		0.43		0.55	
Junior Market dummy	0.95[a]		0.84[b]		5.13***		0.69		0.69		0.03	
Syndicate Characteristics:												
No. of funds	427		125				85		35			
PE/VC House's Age at IPO	19.53	16.50	17.97	14.00	0.71	[0.11]	21.21	15.50	23.00	21.50	-0.33	[0.76]
PE/VC Fund Age at IPO	8.51	6.00	8.10	5.00	0.31	[0.41]	6.90	5.00	8.67	5.50	-0.94	[0.65]
Capital Committed to PE/VC Fund ($mil)	411.87	175.00	191.22	90.00	2.01**	[0.00]	378.97	96.56	393.69	119.23	-0.05	[0.41]
Low proximity dummy	0.29		0.14		2.60***		0.24		0.18		0.39	
Bank Affiliated Fund	0.08		0.05		1.12		0.07		0.06		0.30	
Syndicate Size	4.10[a]	4.00[a]	2.98[a]	2.00[a]	6.82***	[0.00]	2.43	2.00	1.71	1.00	2.19**	[0.02]

	Panel C. Differences between PE- and VC-Backed IPOs							
	US				UK			
	Retained [1]-[5]		Exited [2]-[6]		Retained [3]-[7]		Exited [4]-[8]	
	t-stat	MW	t-stat	MW	t-stat	MW	t-stat	MW
IPO Characteristics:								
Total Assets ($mil)	11.11***	[0.00]	6.67***	[0.00]	2.96***	[0.00]	1.99**	[0.10]
Leverage (%)	0.67	[0.00]	-0.70	[0.48]	-0.38	[0.01]	1.08	[0.04]
ROA (%)	10.04***	[0.00]	4.25***	[0.00]	2.30**	[0.00]	1.39	[0.55]
PE/VC lock-up duration (no. of days)	0.38	[0.76]	1.03	[0.85]	-1.29	[0.18]	-1.84*	[0.08]
MGT lock-up duration (no. of days)	1.16	[0.72]	0.13	[0.55]	1.30	[0.88]	-0.76	[0.08]
Global Underwriter dummy	-2.90***		-0.12		1.56		1.94*	
High-tech dummy	-21.21***		-8.74***		-3.19***		-1.76*	
Junior Market dummy	-19.63***		-6.78***		-4.46***		-2.81***	
Syndicate Characteristics:								
PE/VC House's Age at IPO	1.56	[0.03]	1.20	[0.07]	-0.55	[0.79]	0.29	[0.98]
PE/VC Fund Age at IPO	-0.36	[0.15]	-0.80	[0.92]	-0.56	[0.81]	1.94*	[0.35]
Capital Committed to PE/VC Fund ($mil)	9.43***	[0.00]	2.75***	[0.04]	2.93***	[0.00]	0.94	[0.40]
Low proximity dummy	-3.25***		1.94*		-2.96***		-1.07	
Bank Affiliated Fund	3.67***		-0.17		0.14		0.60	
Syndicate Size	-11.32***	[0.00]	-6.59***	[0.00]	-2.22**	[0.08]	-1.12	[0.37]

Table 4. Ownership Adjustments Around the IPO Date.

The sample consists of 327 UK and 1346 US backed IPOs from January 1997 thought December 2010. *Panel A* (*B*) reports ownership of financial sponsors, institutional initial shareholders and managers immediately before and after the flotation of PE (VC)-backed IPOs. Ownership is specified in percentage (%) of the firm's outstanding shares. Each panel presents data for two different geographic markets of quotation, which are divided into sub-groups depending on whether financial investors' syndicate has fully exited ("Exited") or retained some ownership ("Retained") at first quarter post lockup expiration date. Statistical significance of the difference in means and medians between US and UK backed IPOs are reported in the first four columns by [a], [b] and [c], which denote statistical significance at the 1, 5, and 10 percent levels, respectively. In column [1], [a], [b] and [c], refer to the statistical difference between retained US and UK IPOs ([1]-[3]). In column [2], [a], [b] and [c], refer to the statistical difference between exited US and UK IPOs ([2]-[4]). The same applies to Panel B. *Panel C* presents difference-in-means and medians between US and UK samples. t-statistics for difference-in-means and p-values for difference-in-medians (Mann-Whitney rank-sum test) are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. PE-Backed IPOs

	Retained [1]		Exited [2]		Diff [1]-[2]		Retained [3]		Exited [4]		Diff [3]-[4]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
Sponsor Ownership												
Before IPO	71.99[a]	80.87[a]	62.68[c]	73.00[b]	2.80***	[0.01]	56.09	59.33	49.40	49.50	1.12	[0.27]
After IPO	48.62[a]	52.10[a]	41.23[a]	40.30[a]	2.81***	[0.00]	27.23	23.70	13.79	5.60	3.55***	[0.00]
Diff.	*12.87****	*[0.00]*	*4.89****	*[0.00]*			*8.86****	*[0.00]*	*5.44****	*[0.00]*		
Institutional Ownership												
Before IPO	5.17	0.00	12.15[b]	0.00[a]	-3.72***	[0.01]	5.22	0.00	2.26	0.00	1.19	[0.09]
After IPO	4.02	0.00	8.89[b]	0.00[b]	-3.19***	[0.02]	2.99	0.00	1.51	0.00	0.94	[0.12]
Diff.	*1.26*	*[0.39]*	*1.02*	*[0.39]*			*1.50*	*[0.64]*	*0.36*	*[0.94]*		
Management Ownership												
Before IPO	23.53[b]	12.00[b]	29.79	17.60	-1.88*	[0.09]	17.32	9.90	20.84	15.50	-0.83	[0.30]
After IPO	16.98	7.83	20.39	10.90	-1.33	[0.12]	15.33	9.70	15.89	14.71	-0.17	[0.53]
Diff.	*3.31****	*[0.00]*	*2.38****	*[0.07]*			*0.74*	*[0.49]*	*1.14*	*[0.68]*		

	Panel B. VC-Backed IPOs											
	Retained [5]		Exited [6]		Difference [5]-[6]		Retained [7]		Exited [8]		Difference [7]-[8]	
	Mean	Median	Mean	Median	t-stat	MW	Mean	Median	Mean	Median	t-stat	MW
	US						**UK**					
Sponsor Ownership												
Before IPO	53.81[a]	55.11[a]	39.10	34.25	7.15***	[0.00]	41.78	39.70	32.27	31.75	1.77*	[0.11]
After IPO	41.76[a]	42.85[a]	28.13[a]	25.32[b]	8.38***	[0.00]	27.13	23.59	17.37	16.05	2.60***	[0.00]
Diff.	*10.52****	*[0.00]*	*4.39****	*[0.00]*			*5.26****	*[0.00]*	*3.28****	*[0.00]*		
Institutional Ownership												
Before IPO	3.32[a]	0.00[a]	8.25[c]	0.00[b]	-4.87***	[0.01]	7.33	0.00	2.20	0.00	1.88*	[0.00]
After IPO	2.41[a]	0.00[a]	6.06	0.00[c]	-4.69***	[0.01]	5.10	0.00	1.68	0.00	1.59	[0.00]
Diff.	*2.00***	*[0.23]*	*1.24*	*[0.47]*			*1.39*	*[0.47]*	*0.29*	*[0.97]*		
Management Ownership												
Before IPO	30.07[c]	23.90[b]	43.14[a]	38.07[b]	-6.37***	[0.00]	26.40	19.85	31.16	28.14	-1.02	[0.34]
After IPO	23.04[b]	18.35[a]	32.33[b]	28.70[b]	-5.75***	[0.00]	19.49	14.85	23.69	19.76	-1.19	[0.23]
Diff.	*6.18****	*[0.00]*	*4.15****	*[0.00]*			*2.78****	*[0.07]*	*1.34*	*[0.24]*		

	Panel C. Differences between PE- and VC-Backed IPOs							
	US				UK			
	Retained [1]-[5]		Exited [2]-[6]		Retained [3]-[7]		Exited [4]-[8]	
	t-stat	MW	t-stat	MW	t-stat	MW	t-stat	MW
Sponsor Ownership								
Before IPO	11.05***	[0.00]	6.44***	[0.00]	3.81***	[0.00]	2.64***	[0.02]
After IPO	5.37***	[0.00]	4.47***	[0.00]	0.04	[0.76]	-0.75	[0.05]
Institutional Ownership								
Before IPO	2.63***	[0.04]	1.46	[0.06]	-1.15	[0.07]	2.19**	[0.85]
After IPO	2.78***	[0.04]	1.39	[0.11]	-1.54	[0.04]	-0.11	[0.86]
Management Ownership								
Before IPO	-3.85***	[0.00]	-3.68***	[0.00]	-3.08***	[0.00]	-1.78*	[0.09]
After IPO	-4.59***	[0.00]	-4.27***	[0.00]	-1.82*	[0.10]	-1.80*	[0.13]

Table 5. Logit Model of Financial Sponsors' Equity Retention in Various IPO Samples.

This table presents results of logit regressions, where the dependent variable is equal to one if financial sponsors' syndicate retains some ownership in the first quarter post lockup expiration date, and 0 if the syndicate fully exits. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 to December 2010. The variables are defined in Table 1. 'o' indicates that for a particular sub-sample of IPOs a specified model is not available due to a low number of observations, which is caused by the fact that Thomson One Banker does not provide fund specific variables (e.g. geographic location, bank affiliation, house and fund founding years) for all the funds in the sample. p-values are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Logit Model of Financial Sponsors' Equity Retention in Various IPO Samples										
	All Backed IPOs		**PE-Backed IPOs**		**VC-Backed IPO**		**US IPOs**		**UK IPOs**	
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
INTERCEPT	-0.87	-5.96**	-2.43*	o	1.09	-3.63	-3.19**	-5.80**	14.13	o
	[0.309]	[0.001]	[0.099]	o	[0.457]	[0.152]	[0.008]	[0.012]	[0.96]	o
US DUMMY	-1.34**	0.65	-0.41	o	-2.54**	-1.75				
	[0.002]	[0.346]	[0.501]	o	[0.005]	[0.196]				
PE DUMMY	-0.19	0.03					-0.15	0.88	-1.12	o
	[0.503]	[0.952]					[0.641]	[0.212]	[0.325]	o
PE/VC LOCKUP DUR	-0.01**	0.00	0.00	o	-0.01**	-0.01	0.00	0.00	-0.01**	o
	[0.013]	[0.732]	[0.237]	o	[0.008]	[0.403]	[0.252]	[0.596]	[0.025]	o
PE/VC $OWN_{pre\text{-}ipo}$	0.74	2.58**	0.17	o	2.01**	5.33**	0.76	3.29**	3.14	o
	[0.138]	[0.011]	[0.814]	o	[0.011]	[0.001]	[0.159]	[0.010]	[0.114]	o
$INST\_OWN_{post\text{-}ipo}$	-1.62**	-2.73	-0.26	o	-2.46**	-3.82**	-2.02**	-3.24*	15.43	o
	[0.041]	[0.111]	[0.877]	o	[0.015]	[0.064]	[0.019]	[0.078]	[0.129]	o
$MGT\_OWN_{post\text{-}ipo}$	0.17	-0.43	0.48	o	-0.28	0.16	0.25	-0.50	2.70	o
	[0.758]	[0.642]	[0.587]	o	[0.725]	[0.907]	[0.675]	[0.657]	[0.447]	o
UND. REP	0.33	0.55	0.41	o	0.29	0.15	0.41	1.27	0.45	o
	[0.298]	[0.349]	[0.456]	o	[0.490]	[0.849]	[0.254]	[0.148]	[0.701]	o
$ROA_{pre\text{-}ipo}$	-0.43*	-0.42	-1.55	o	-0.40	-0.43	-0.47**	-0.53	-0.06	o
	[0.054]	[0.224]	[0.206]	o	[0.103]	[0.185]	[0.048]	[0.196]	[0.931]	o
$LEV_{pre\text{-}ipo}$	-0.05	-0.18	0.80*	o	-0.18	-0.42**	-0.04	-0.34**	0.01	o
	[0.706]	[0.221]	[0.099]	o	[0.137]	[0.013]	[0.814]	[0.041]	[0.984]	o
SIZE	0.27**	0.49**	0.25	o	0.30**	0.49**	0.42***	0.75***	-0.38	o
	[0.007]	[0.003]	[0.182]	o	[0.033]	[0.032]	[0.001]	[0.002]	[0.328]	o
FDR	-0.26	-0.54**	-0.04	o	-0.39*	-0.51*	-0.39*	-0.61*	11.25*	o

	[0.175]	[0.040]	[0.928]	o	[0.081]	[0.079]	[0.045]	[0.034]	[0.033]	o
HIGHTECH DUMMY	0.33	0.94**	-0.15	o	0.90**	2.34***	0.39	1.33**	0.44	o
	[0.188]	[0.031]	[0.679]	o	[0.012]	[0.000]	[0.152]	[0.014]	[0.683]	o
SYND. SIZE	0.85**	-0.42	2.10***	o	-0.02	-1.39**	0.84***	-0.85	2.77*	o
	[0.002]	[0.347]	[0.000]	o	[0.963]	[0.034]	[0.003]	[0.109]	[0.060]	o
LOW PROXIMITY DUMMY		-0.74		o		-1.80*		-0.28		o
		[0.253]		o		[0.061]		[0.722]		o
BANK AFF. DUMMY		0.22		o		-0.21		0.29		o
		[0.719]		o		[0.796]		[0.712]		o
PE/VC HOUSE AGE		0.24		o		0.31		0.30		o
		[0.306]		o		[0.305]		[0.293]		o
PE/VC FUND AGE		0.26		o		0.24		0.26		o
		[0.365]		o		[0.477]		[0.388]		o
YEAR DUMMIES	YES	YES	YES	o	YES	YES	YES	YES	YES	o
No. of Obs.	939	497	290	o	647	325	820	405	86	o
Pseudo R^2	19.69%	30.31%	18.40%	o	27.47%	40.10%	21.66%	37.01%	38.04%	o

Table 6. Voluntary and Compulsory Ownership Evolutions post-IPO.

The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. The table reports difference-in-means of the average financial sponsors' holdings between PE and VC samples. Q' refers to the number of quarters after the initial public offering. t-statistics for difference-in-means are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Differences-in-means between PE and VC Samples											
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**
Voluntary Ownership:												
US	3.26***	3.28***	3.33***	3.16***	3.74***	3.75***	2.79***	3.29***	3.42***	2.88***	2.87***	2.93***
UK	0.09	1.10	0.99	0.27	1.86*	1.74*	1.69*	1.53	1.49	1.40	1.62	1.32
Compulsory Ownership:												
US	4.93***	5.05***	1.95***	1.16								
UK	-1.06	-1.07	-1.16	-1.55	-1.20	-0.39						

Table 7. Voluntary Ownership (%) in UK IPOs Sub-Samples.[44]

The sample consists of 327 UK IPOs from January 1997 thought December 2010. This table presents the average percentage of the firm's outstanding shares held by financial sponsors as a group in PE- and VC-backed IPOs. Summary statistics are presented for two types of UK companies: those in which PE/VC syndicates are subject to lockup agreement ('Lock-up Sample' consists of 229 firms) and those in which PE/VC investors are free to sell shares immediately post-flotation ('No Lock-up Sample' consists of 98 firms). For IPOs with PE/VC lockups, only ownership holdings post lockup expiration are regarded as voluntary. For IPOs with no PE/VC lockup, the ownership during all the quarters is considered to be voluntary. 'Q' refers to the number of quarters after the initial public offering. t-statistics for difference-in-means are reported. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Average Voluntary Holdings (%) by Financial Sponsors in UK Backed IPOs											
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PE-Backed IPOs:												
No Lock-up Sample	8.45	7.58	7.09	7.29	6.94	6.24	6.09	6.28	5.39	4.80	4.71	4.56
Lock-up Sample	39.05	29.00	27.41	25.22	22.27	21.80	20.60	19.36	17.38	15.16	13.68	12.47
Diff.	*-5.70****	*-5.85****	*-5.63****	*-5.02****	*-4.42****	*-4.53****	*-4.25****	*-3.91****	*-3.73****	*-3.38****	*-2.99****	*-2.74****
VC-Backed IPOs:												
No Lock-up Sample	8.01	8.66	8.53	8.23	8.22	6.67	6.03	5.43	4.99	4.80	4.45	3.86
Lock-up Sample	11.44	20.47	20.94	19.36	17.82	17.39	17.26	15.50	13.16	11.71	10.36	9.18
Diff.	*-1.00*	*-1.86**	*-2.21***	*-2.04***	*-2.46****	*-2.79****	*-2.41****	*-2.36****	*-2.06***	*-1.76**	*-1.52*	*-1.46*
Differences between VC and PE Samples: (t-stat)												
No Lock-up Sample	*0.19*	*-0.47*	*-0.63*	*-0.43*	*-0.59*	*-0.22*	*0.03*	*0.48*	*0.23*	*-0.01*	*0.15*	*0.44*
Lock-up Sample	*3.21****	*3.25****	*3.07****	*2.92****	*3.09****	*3.08****	*2.00***	*2.50****	*2.92****	*2.43****	*2.36****	*2.47****

[44] Please note that by 'No lockup' we only refer to lockup restrictions applicable to PE/VC investors, and not all insiders.

Table 8. OLS Multivariate Analysis of Compulsory and Voluntary Ownership by Financial Sponsors' Syndicates Post-Flotation.

Table 8 presents results of OLS analysis of compulsory (Panel A) and voluntary (Panel B) ownership by PE and VC syndicates post-flotation. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. In *Panel A*, the dependent variable is the percentage of outstanding shares held by PE or VC investors as a group at first quarter (Model [1] and [3]) and second quarter post-flotation (Model [2] and [4]) as dictated by the lockup agreement. In *Panel B*, the dependent variable is the percentage of outstanding shares held voluntarily by PE or VC investors as a group in quarter 4 (Model [5] and [7]) and 12 (Model [6] and [8]) post-flotation. All other variables are defined in Table 1. Fama-French industry classification is used. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

Panel A. Financial Sponsors' Compulsory Ownership				
	PE-Backed IPOs		**VC-Backed IPOs**	
	Q1	Q2	Q1	Q2
	[1]	[2]	[3]	[4]
INTERCEPT	0.12	0.24	0.03	-0.06
	[0.64]	[1.09]	[0.24]	[-0.53]
US DUMMY	0.14***	0.09*	-0.01	-0.05
	[3.06]	[1.75]	[-0.36]	[-1.43]
PROP_INIT_PEVC_OWN_SOLD	-0.55***	-0.50***	-0.15*	-0.11
	[-5.81]	[-4.62]	[-1.95]	[-1.41]
SYND. SIZE	-0.01	0.03	0.07***	0.09***
	[-0.25]	[0.58]	[3.07]	[4.19]
LOW PROXIMITY DUMMY	-0.05	0.09	0.06	0.07*
	[-0.65]	[1.05]	[1.62]	[1.83]
BANK_AFF	-0.03	0.00	-0.04	-0.04
	[-0.56]	[-0.05]	[-1.24]	[-1.16]
PE/VC HOUSE AGE	-0.02	-0.03	0.01	0.01
	[-0.73]	[-0.83]	[0.45]	[0.67]
UND. REP	0.04	0.00	-0.06**	-0.04
	[0.85]	[-0.07]	[-2.18]	[-1.47]
$INST\_OWN_{t-1}$	-0.43**	-0.61**	-0.50***	-0.46**
	[-2.12]	[-2.11]	[-4.54]	[-2.15]
$SIZE_{t-1}$	0.06***	0.07***	0.00	-0.01
	[3.28]	[3.56]	[-0.45]	[-0.76]
M/B_{t-1}	-0.01**	0.00	0.00	-0.01*
	[-2.17]	[-0.66]	[-1.18]	[-1.78]
ROA_{t-1}	0.02	0.05	-0.01*	-0.01**
	[0.27]	[0.50]	[-1.82]	[-2.20]
$CARs_{t-1}$	-0.11	0.08	-0.04	-0.01
	[-0.33]	[0.18]	[-0.37]	[-0.09]
INDUSTRY DUMMIES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES
No. Of Obs.	143	142	310	310
R^2	0.4954	0.4392	0.35823	0.3353

Panel B. Financial Sponsors' Voluntary Ownership				
	PE-Backed IPOs		**VC-Backed IPOs**	
	Q4	Q12	Q4	Q12
	[5]	[6]	[7]	[8]
INTERCEPT	0.75***	0.70**	0.02	0.11*
	[2.39]	[2.22]	[0.20]	[1.92]
US DUMMY	-0.02	-0.01	-0.04	-0.01
	[-0.36]	[-0.21]	[-1.16]	[-0.65]
PROP_INIT_PEVC_OWN_SOLD	-0.66***	-0.37***	-0.14**	-0.04
	[-6.43]	[-3.58]	[-2.08]	[-1.17]
SYND. SIZE	0.02	0.01	0.07***	0.02*
	[0.49]	[0.10]	[3.45]	[1.93]
LOW PROXIMITY DUMMY	-0.03	-0.02	0.08**	-0.05**
	[-0.36]	[-0.24]	[2.27]	[-2.09]
BANK_AFF	-0.11**	-0.02	-0.03	-0.01
	[-2.02]	[-0.41]	[-1.17]	[-0.91]
PE/VC HOUSE AGE	-0.04	-0.05	0.01	0.00
	[-1.28]	[-1.24]	[1.06]	[-0.12]
UND. REP	0.02	0.01	-0.02	-0.02
	[0.42]	[0.14]	[-0.88]	[-1.39]
$INST\_OWN_{t-1}$	-0.51	-0.43	-0.25	-0.22**
	[-1.37]	[-0.94]	[-1.61]	[-2.24]
$SIZE_{t-1}$	0.01	0.01	-0.02**	-0.01***
	[0.45]	[0.34]	[-2.06]	[-3.70]
M/B_{t-1}	0.00	-0.01*	0.00	0.00
	[0.20]	[-1.79]	[1.32]	[1.20]
ROA_{t-1}	-0.21	-0.03	0.01	0.00
	[-1.22]	[-0.26]	[0.21]	[0.28]
$CARs_{t-1}$	-1.70**	-1.28*	-0.12	0.03
	[-2.20]	[-1.64]	[-1.37]	[0.39]
INDUSTRY DUMMIES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES
No. Of Obs.	141	119	320	249
R^2	0.4645	0.4353	0.3032	0.2146

Table 9. Financial Sponsors' Ownership Drivers in US and UK Stock Markets.

This table presents results of OLS analysis of compulsory and voluntary ownership by financial sponsors' syndicates in the post-flotation period. Specified regressions use pooled data from 327 UK and 1346 US-backed IPOs for quarter 1 and 2 (Models [1] to [3]), and quarter 4, 8, 12 after the firms' IPOs (Models [4] to [6]). In Models [1] to [3], the dependent variable is the percentage of outstanding shares held by financial sponsors as a group as dictated by the lockup agreement. In Models [4] to [6], the dependent variable is the percentage of outstanding shares held voluntarily by financial sponsors as a group post-flotation. All other variables are defined in Table 1. Fama-French industry classification is used. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Financial Sponsors' Compulsory Ownership in Quarter 1 & 2 post-IPO			**Financial Sponsors' Voluntary Ownership in Quarter 4, 8 and 12 post-IPO**		
	ALL IPOs	**US IPOs**	**UK IPOs**	**ALL IPOs**	**US IPOs**	**UK IPOs**
	[1]	[2]	[3]	[4]	[5]	[6]
INTERCEPT	0.05	-0.02	0.17	0.30***	0.28***	0.25*
	[0.85]	[-0.23]	[1.44]	[3.99]	[3.56]	[1.64]
PE DUMMY	0.24***	0.29***	0.04	0.15***	0.23***	0.05**
	[14.65]	[16.17]	[1.30]	[10.15]	[13.11]	[2.31]
US DUMMY	0.01			-0.01		
	[0.03]			[-0.59]		
PROP_INIT_PEVC_OWN_SOLD	-0.28***	-0.26***	-0.13**	-0.31***	-0.32***	-0.09***
	[-6.74]	[-4.68]	[-2.06]	[-9.58]	[-6.89]	[-2.67]
SYND. SIZE	0.07***	0.08***	0.10***	0.04***	0.03**	0.07***
	[5.09]	[5.06]	[3.11]	[3.17]	[2.24]	[3.46]
LOW PROXIMITY DUMMY	0.11***	0.12***	-0.16***	0.06***	0.12***	-0.18***
	[5.30]	[6.02]	[-2.42]	[3.49]	[6.16]	[-4.36]
BANK AFF. DUMMY	-0.02	-0.03	0.02	-0.01	-0.01	-0.05**
	[-0.96]	[-1.53]	[0.41]	[-0.94]	[-0.77]	[-2.28]
PE/VC HOUSE AGE	0.01	0.01	-0.01	-0.01	-0.01	-0.03*
	[1.16]	[1.03]	[-0.38]	[-1.18]	[-0.22]	[-1.84]
UND. REP	-0.02	0.01	-0.01	-0.01	0.04**	-0.04*
	[-1.02]	[0.32]	[-0.34]	[-0.33]	[2.33]	[-1.96]
$INST\_OWN_{t-1}$	-0.41***	-0.48***	0.06	-0.32***	-0.56***	-0.21**
	[-4.84]	[-5.33]	[0.35]	[-3.75]	[-3.90]	[-2.28]
$SIZE_{t-1}$	0.02***	0.04***	0.01	-0.01***	-0.01	-0.02**
	[4.02]	[5.43]	[0.38]	[-3.53]	[-1.49]	[-2.32]
M/B_{t-1}	-0.01***	-0.01*	-0.01***	0.01	0.01	0.01
	[-4.28]	[-1.91]	[-3.61]	[0.11]	[0.77]	[1.15]
ROA_{t-1}	-0.02***	-0.02***	-0.02***	0.01	0.01	-0.09***
	[-4.69]	[-2.41]	[-3.68]	[0.60]	[0.41]	[-3.12]
$CARs_{t-1}$	0.01	-0.02	0.20	-0.05	-0.05	-0.12
	[0.18]	[-0.20]	[0.40]	[-0.76]	[-0.68]	[-0.84]
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
No. Of Obs.	900	766	134	1276	1031	245
R^2	0.3041	0.3719	0.3316	0.1790	0.2252	0.3075

Table 10. Test of the Signaling Hypothesis.

Table 10 presents results of a multivariate analysis of three-year market-adjusted buy and hold abnormal returns. The sample consists of 327 UK and 1346 US-backed IPOs. The dependent variable is three-year market-adjusted buy-and-hold abnormal returns. All other variables are defined in Table 1. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	Market-Adjusted 3-year BHARs					
	ALL		**PE**		**VC**	
	[1]	[2]	[3]	[4]	[5]	[6]
CONSTANT	-1.06***	-1.44***	-0.99***	-2.07***	-1.01***	-1.44***
	[-8.25]	[-10.31]	[-4.30]	[-4.42]	[-6.11]	[-10.86]
US DUMMY	-0.27***	-0.17***	-0.37***	-0.33***	-0.17***	-0.08*
	[-6.05]	[-4.45]	[-4.48]	[-3.96]	[-3.26]	[-1.90]
PE DUMMY	0.15***	0.11***				
	[3.52]	[2.99]				
PE/VC_OWN_{t-1}	-0.15*	-0.44***	-0.54***	-0.54	0.04	-0.20*
	[-1.87]	[-4.30]	[-3.49]	[-1.22]	[0.38]	[-1.70]
$(PE/VC\_OWN_{t-1})^2$		0.12**		0.11		0.03
		[2.12]		[0.16]		[0.65]
FDR	-0.04	-0.05**	-0.03	0.01	-0.03	-0.03
	[-1.38]	[-2.02]	[-0.26]	[0.07]	[-1.14]	[-1.59]
$SIZE_{t-1}$	0.12***	0.08***	0.17***	0.15***	0.08***	0.05***
	[9.91]	[8.60]	[6.92]	[5.95]	[6.45]	[5.83]
M/B_{t-1}	-0.01	-0.01	-0.01	-0.01	-0.01	0.01
	[-0.62]	[-0.85]	[-1.07]	[-0.92]	[-0.63]	[0.05]
LEV_{t-1}	0.01	-0.01	-0.15	-0.12	0.00	0.00
	[0.01]	[-0.82]	[-1.28]	[-1.04]	[-0.24]	[-0.91]
LOCK-UP DUR.	0.00	-0.01***	0.00	-0.01	0.00	-0.01***
	[-1.11]	[-2.95]	[-0.60]	[-0.64]	[-1.01]	[-2.41]
UND. REP	0.00	-0.04	-0.09	-0.13	0.05	-0.01
	[-0.05]	[-0.98]	[-1.00]	[-1.53]	[1.06]	[-0.13]
MGT_OWN_{t-1}	0.25*	-0.07	0.45	0.34	0.19	-0.07
	[1.81]	[-0.62]	[1.49]	[1.17]	[1.31]	[-0.69]
$INST\_OWN_{t-1}$	0.25	0.03	-0.11	0.13	0.52	0.02
	[0.91]	[0.15]	[-0.23]	[0.29]	[1.55]	[0.08]
YEAR DUMMIES	YES	YES	YES	YES	YES	YES
INDUSTRY DUMMIES	YES	YES	YES	YES	YES	YES
No. of Obs	799	781	288	280	511	501
R^2	0.13	0.24	0.18	0.24	0.07	0.27

Table 11. Fama and French 4 Factor Model.

The sample consists of backed and non-backed IPOs, which were quoted on US and UK stock markets between January 1997 and December 2010. The calendar-time portfolio approach proposed by Mitchell and Stafford (2000) is used to calculate the average alpha. Each month (starting from January 1997), we form a portfolio of IPO companies and rebalance this portfolio every month in order to add companies which had a flotation, and drop IPOs that reach the end of a holding period. We then compute the portfolio monthly excess returns (equally-weighted) and regress it against the four factors (i.e. SML, HML, MOM, and $R_{m,t}–R_{f,t}$), which we obtain from Kenneth French's website. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

36 months Holding Period									
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
Alpha	-0.0267***	-0.0109**	-0.0267***	-0.0136***	-0.0260***	-0.0110**	-0.0285***	-0.0128**	-0.0302***
	[-5.00]	[-2.20]	[-3.70]	[-2.45]	[-3.74]	[-2.14]	[-3.78]	[-2.22]	[-3.76]
SMB	0.0047***	0.0038***	0.0037*	0.0046***	0.0042**	0.0038***	0.0040*	0.0082***	0.0124***
	[2.82]	[2.50]	[1.77]	[2.80]	[2.03]	[2.36]	[1.76]	[3.55]	[3.96]
HML	0.0033*	0.0040***	0.0022	0.0052***	0.0038*	0.0040**	0.0040*	0.0022	-0.0018
	[1.86]	[2.42]	[1.01]	[2.89]	[1.70]	[2.25]	[1.67]	[0.97]	[-0.60]
R_m-R_f	0.0022**	0.0021**	0.0043***	0.0013	0.0029**	0.0024**	0.0046***	0.0028***	0.0053***
	[2.07]	[1.98]	[2.85]	[1.14]	[2.04]	[2.13]	[2.86]	[2.49]	[3.52]
MOM	0.0017	0.0003	0.0016	0.0003	0.0019	0.0004	0.0018	0.0012	0.0020
	[1.62]	[0.33]	[1.21]	[0.27]	[1.46]	[0.37]	[1.32]	[0.94]	[1.16]
No. of Obs.	219	219	194	194	194	219	194	219	194
Adj R^2	0.0394	0.0405	0.0405	0.0445	0.0292	0.0403	0.0385	0.0606	0.1078

Table 12. Endogeneity Tests

This table reports the results of endogeneity tests. We use instrumental variables approach. The sample consists of 327 UK and 1346 US-backed IPOs from January 1997 thought December 2010. The dependent variable is equal to PE/VC syndicate ownership in Model [1] and [3], whereas the dependent variable is one, two, and three-year market-adjusted buy-and-hold abnormal returns. In Model [2] and [4], the equation is estimated with syndicate size as an instrument for syndicate ownership retention. t-statistics are reported in parentheses. ***, **, * represent significance at 1, 5, and 10 percent levels, respectively.

	VC-Backed IPOs		**PE-Backed IPOs**	
	First Stage	2SLS	First Stage	2SLS
	[1]	[2]	[3]	[4]
CONSTANT	0.04	-0.55	0.12	-0.18
	[0.29]	[-1.55]	[0.67]	[-0.34]
PE/VC POST-IPO OWN IV:				
SYNDICATE SIZE	0.03***	0.38	0.02***	-1.94*
	[5.26]	[0.81]	[2.90]	[-1.87]
FDR	0.00	-0.12***	-0.01	-0.14*
	[-0.31]	[-3.37]	[-0.33]	[-1.95]
$SIZE_{t-1}$	-0.02***	0.17***	-0.01	0.15***
	[-3.21]	[9.48]	[-0.83]	[8.46]
M/B_{t-1}	0.01	0.01	-0.01	-0.01**
	[0.50]	[0.56]	[-0.98]	[-2.14]
LEV_{t-1}	-0.01	0.00	0.08***	0.08
	[-0.10]	[0.31]	[3.46]	[0.75]
LOCK-UP DUR.	-0.01	-0.01	-0.01	-0.01**
	[-0.72]	[-0.35]	[-0.21]	[-2.21]
UND. REP	-0.02	-0.02	0.01	-0.16***
	[-0.82]	[-0.27]	[0.00]	[-2.40]
MGT_OWN_{t-1}	0.01	0.01	-0.08*	0.25
	[0.10]	[0.11]	[-1.85]	[1.55]
$INST\_OWN_{t-1}$	-0.32***	0.31	-0.15*	-0.36
	[-2.45]	[0.83]	[-1.70]	[-1.16]
US DUMMY	0.01	-0.27***	0.10***	-0.20*

	[0.12]	[-3.37]	[4.53]	[-1.67]
YEAR DUMMIES	YES	YES	YES	YES
INDUSTRY DUMMIES	YES	YES	YES	YES
No. of Obs	1682	1682	852	852
Adjusted R^2	6.33%	8.16%	7.37%	.

Figure 1. Annual distribution of the PE and VC-backed IPOs in UK and US.

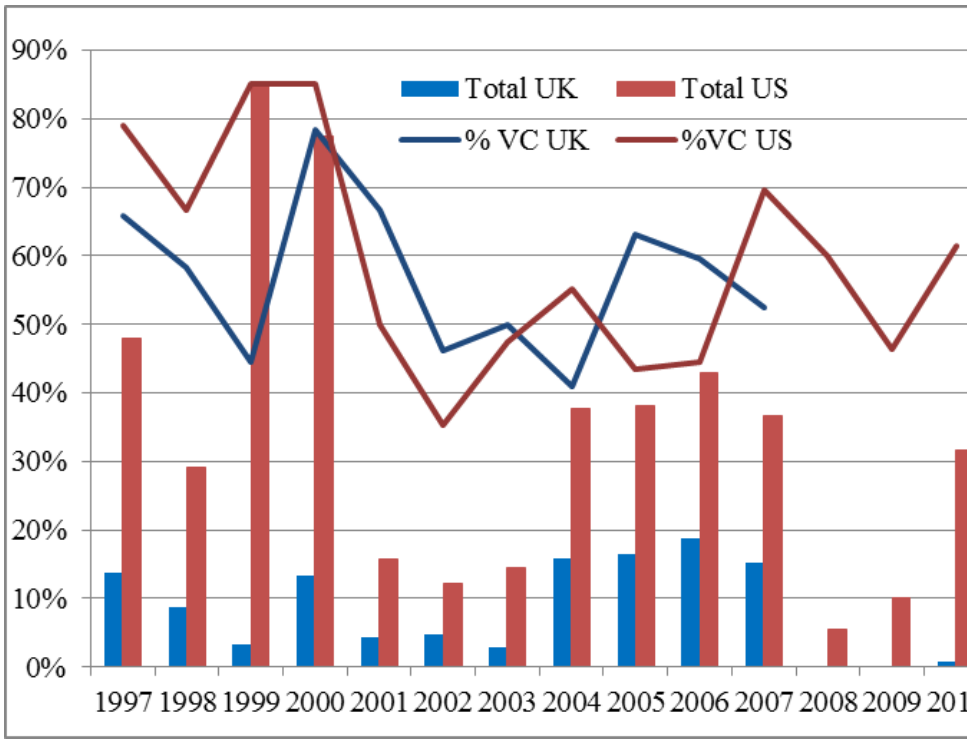


Figure 2. Industry distribution of the PE and VC-backed IPOs in UK and US

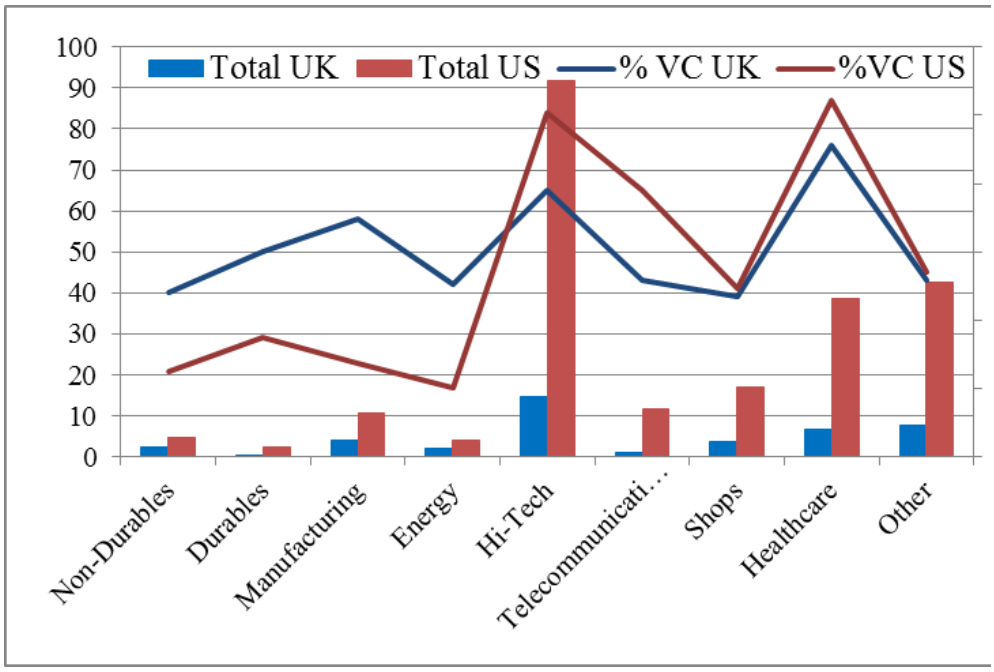


Figure 3. Average PE Voluntary Ownership (%) in UK and US IPOs.

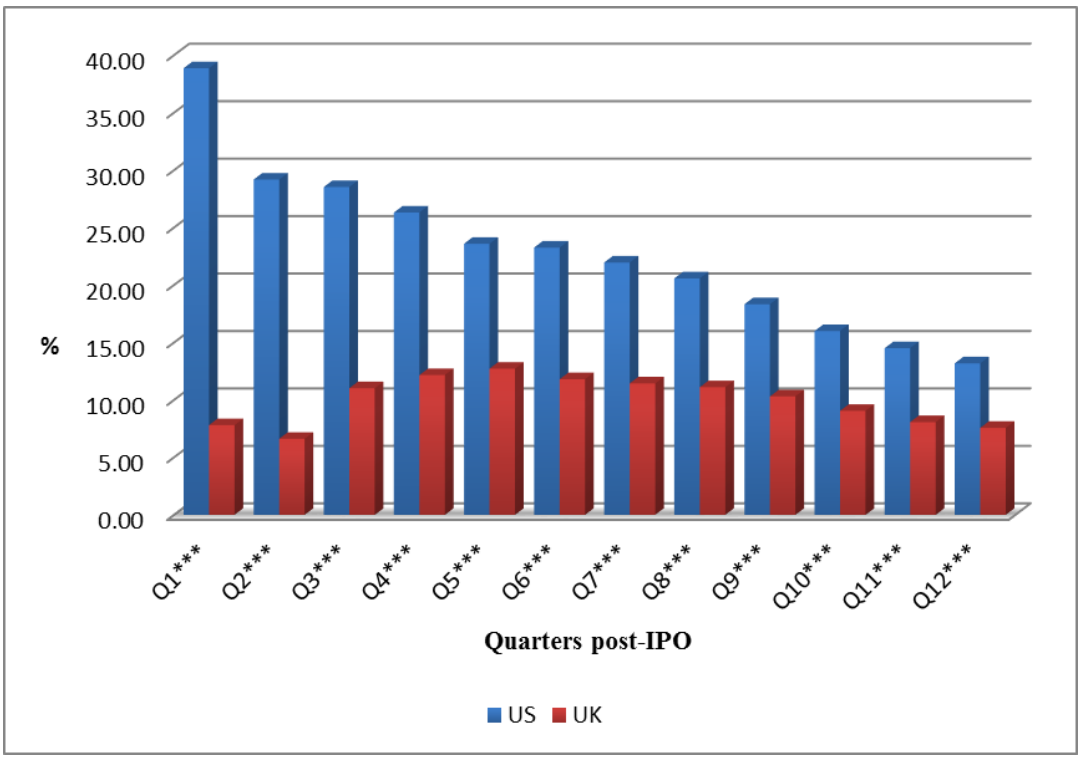


Figure 4. Average VC Voluntary Ownership (%) in UK and US IPOs.

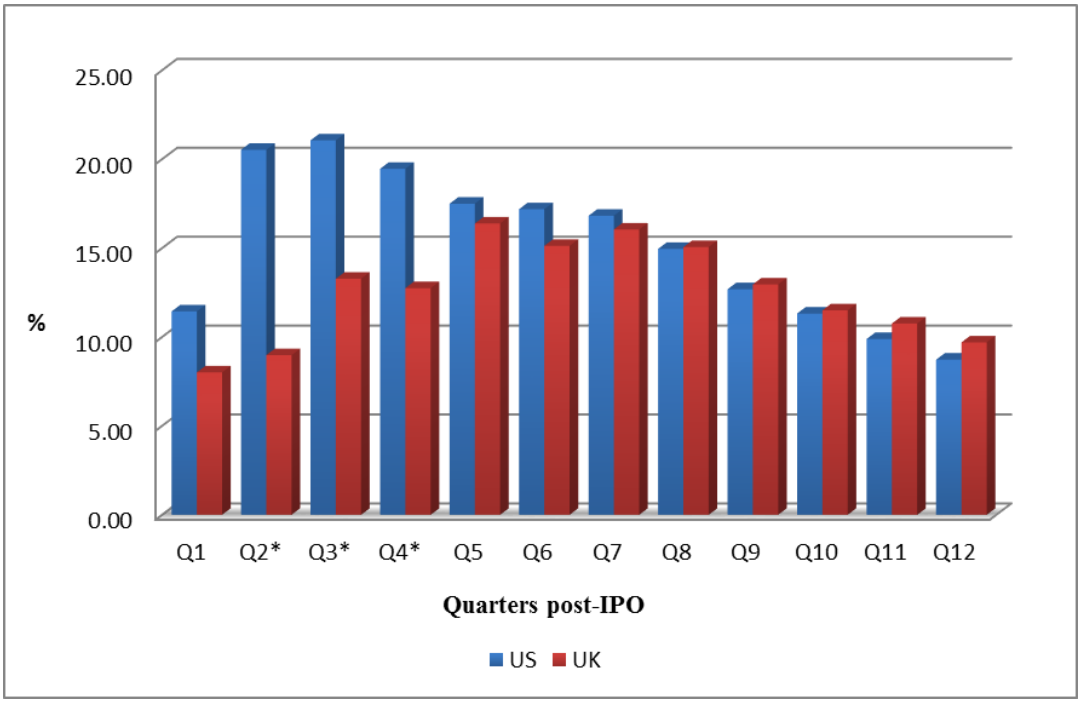


Figure 5. Average PE Compulsory Ownership (%) in UK and US IPOs.

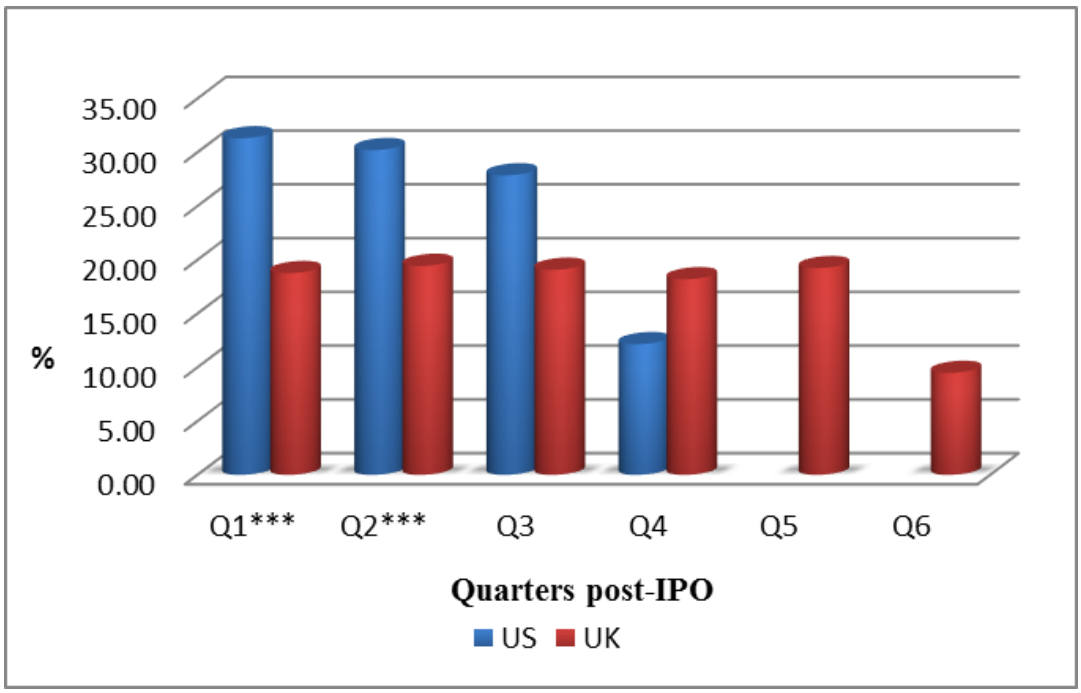
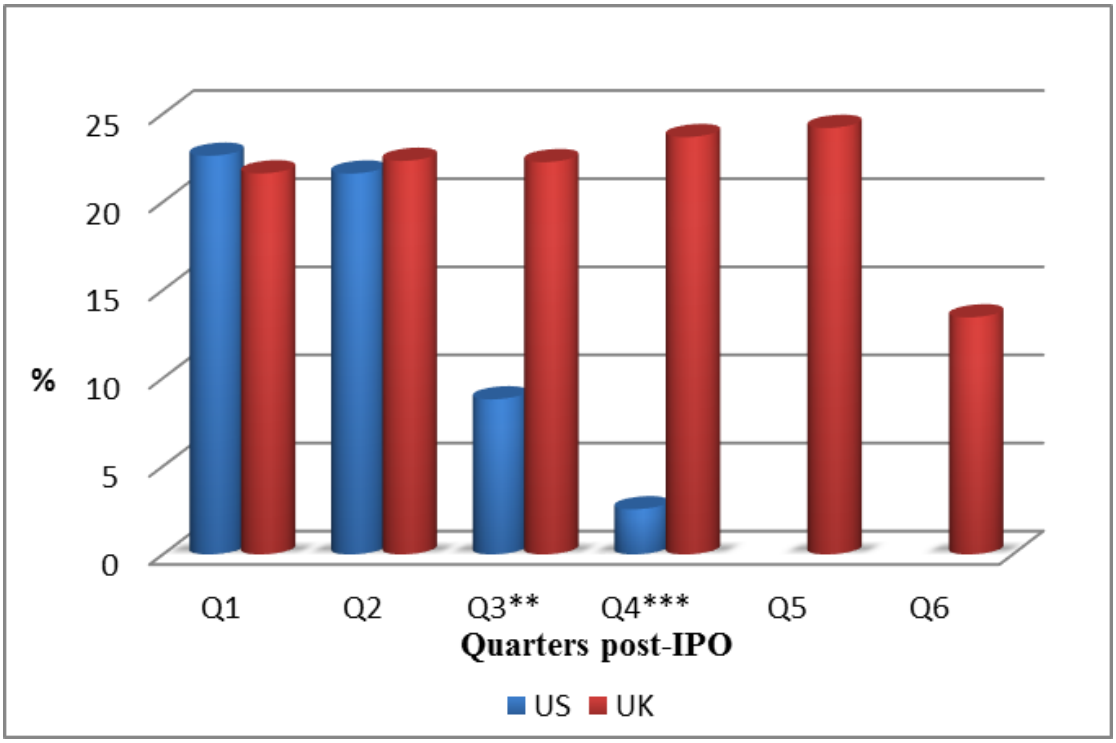


Figure 6. Average VC Compulsory Ownership (%) in UK and US IPOs.



Appendix 1. Differences between the UK and US Markets.

Differences		UK	US	Implication	Expectation
I. Corporate governance practices and structures	***Implementation:***	Voluntarily basis (the 'comply and explain' principle)	Compulsory basis (enforced by law and subject to penalties for non-compliance)	Higher possibility of agency conflicts in US companies than in UK peers. Auditing and monitoring role by PE and VC investors are especially more important in the US market in informing shareholders about the state of operations.	We expect the *commitment* motive to have a greater impact on financial sponsors' ownership in US flotations.
	Major Corporate Governance Reforms:	Cadbury Report (1992) focused on empowering boards and limiting CEO's influence via: - separation of CEO and Chairman - balance between executive and nonexecutive directors - introduction of various internal committees (Zalewska, 2014)	The Sarbanes-Oxley Act (SOX) of 2002 increased audit requirements, demanded more disclosure on remuneration and introduced penalties (Zalewska, 2014)		
	Focus of Reforms:	Focus on *internal* monitoring: solutions have focus on strengthening internal control mechanisms Zalewska (2014)	Focus on *external* monitoring: reforms' focus on monetary incentives and external audit (Zalewska, 2014)		
	Frequency of Earnings' Reports:	Semi-annual frequency. The consequences of low financial reporting frequency in the world (compared to the US) is demonstrated in the study	Mandatory quarterly reporting		

II. Level of Information Asymmetry		by Arif and De George, (2015). The authors show that in case investors lack interim financial information they rely heavily on news about global industry earnings to value firms.		There is a higher level of **information asymmetry** in the UK market in comparison to the US.	We expect the *signaling* motive to have a greater impact on financial sponsors' ownership in UK flotations.
	Disclosure of information:	In the UK, all announcements must be made via the Company Announcements Office (CAO), which "..operates the London Stock Exchange's Regulatory News Service, an electronic information dissemination service for publishing announcements required under the Listing Rules."[45] Stock market observers identify an unequal information access by private and institutional investors (Stokopedia, 2011).	Regulation Fair Disclosure' states that public firms must disclose information to all investors at the same time. There is great flexibility for firms to take advantage of existing current technologies to make a public disclosure. "The proposal stated that issuers could meet Regulation FD's "public disclosure" requirement by filing a Form 8-K, by distributing a press release through a widely disseminated news or wire service, or by any other non-exclusionary method of disclosure that is reasonably designed to provide broad public access". [46]		

[45] Source: https://www.sec.gov/rules/proposed/s73199/ukla1.htm. Accessed 6 July, 2017.
[46] Source: https://www.sec.gov/rules/final/33-7881.htm. Accessed 7 July, 2017.

III. Ownership Structure	***Disclosure of Major Shareholders' transactions:***	3% (FSA's Transparency Directive)[47]	5% (Rule 13D of the Securities Exchange Act 1934)[48]	The lesser prevalence of block holders and more dispersed ownership structure in the US calls for higher PE/VC investors' monitoring.	We expect the *commitment* motive to have a greater impact on financial sponsors' ownership in US flotations.
	Ownership Dispersion:	US firms have more (less) dispersed ownership within medium-sized traded firms (large publicly traded firms) in comparison to UK (La Porta et al., 1999)			
	Identity of the largest shareholders	Institutional investors (Faccio and Lasfer, 1999)	Individual investors (Faccio and Lasfer, 1999)		
IV. Stock Exchanges	***Secondary market's launch date:***	Alternative Investment Market (AIM) started operating only in 1995.	The NASDAQ market exists since 1971, where predominantly young firms quote on this market and target investors are institutional buyers (Vismara et al., 2012).	Lower liquidity and the launch of secondary market relatively recently in the UK contribute to a more challenging environment for financial sponsors to quickly sell shares in their portfolio	Hence, we would expect (all things being equal) for financial sponsors to pursue a slower exit strategy after the IPO in the UK than in the US.
	Success/ performance of secondary markets:	European secondary stock exchanges markets have been successful in hot periods. However, they have collapsed in cold periods (Vismara et al., 2012)	"In the US, Nasdaq has not followed this pattern of collapsing during cold markets, at least partly because of its lack of ties with what had once been the main market, the New York Stock Exchange (NYSE)." (Vismara et al., 2012 p. 352)		
	Liquidity of	The average daily turnover value, value of trades, number			

[47] Source: http://www.lseg.com/markets-products-and-services/post-trade-services/unavista/regulation/transparency-directive-review-tdr . Accessed 7 July, 2017
[48] Source: https://www.sec.gov/fast-answers/answersshed13htm.html . Accessed 7 July, 2017.

	Financial Markets	of trades in equity shares are significantly higher in the US than in Europe, including UK.[49] (World Federation of Exchanges, 2016)[50]	companies	
V. Development of VC Industry	***Emergence and conditions***	The US, with the emergence of Silicon Valley, has long established itself as the leader in VC industry. The Venture Capital Insights Report by Ernst and Young (2015) demonstrates that the US dominated venture capital investments between 2011-2014 based on the number of rounds and amount invested. Research by Nesta, the innovation body, which compared the performance of venture capital funds in the UK and US, '..said the UK's *relative lack of exit opportunities* for investors contributed to the gap. Slower, less profitable UK exits drove down the performance of UK funds and persuaded the best UK companies to incorporate in the US, to take advantage of better markets for initial public offerings." (Groom, 2013) In the debate regarding which venture market (UK or US) is better, Ben Holmes, partner at Index Ventures summed the debate by stating that: "The game is only half played in the UK." (Dunsby, 2013).	Given the different state of VC industries and exit opportunities in two markets, we would expect financial sponsors to pursue different exit dynamics post-flotation.	Financial sponsors are likely to exhibit different exit dynamics (in terms of shares sold and speed) post-flotation in the US and UK.

[49] Starting from 2001, WFE reports aggregate statistics for Euronext exchange, which includes Netherlands, France, England, Belgium and Portugal. Even the comparison between the US (Nasdaq and NYSE) and Euronext reveals significant differences in liquidity.
[50] Source: https://www.world-exchanges.org/home/index.php/statistics/annual-statistics . Accessed 6 July, 2017.

Appendix 2. Average Financial Sponsors' Ownership in UK and US IPOs.

Panel A. Average Financial Sponsors' Group Voluntary Ownership (%) in UK and US IPOs.												
	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12
PE Syndicate Ownership												
US	38.87	29.18	28.53	26.31	23.59	23.26	21.96	20.58	18.33	16.00	14.51	13.19
UK	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-stat: US-UK	*6.13****	*6.26****	*6.39****	*5.51****	*4.94****	*5.27****	*4.89****	*4.49****	*3.96****	*3.59****	*3.40****	*3.08****
VC Syndicate Ownership												
US	11.44	20.53	21.06	19.46	17.50	17.19	16.82	14.96	12.69	11.32	9.89	8.73
UK	8.01	8.98	13.28	12.75	16.39	15.13	16.05	15.06	12.96	11.50	10.76	9.70
t-stat: US-UK	*1.00*	*1.90**	*1.83**	*1.66**	*0.47*	*0.91*	*0.28*	*-0.04*	*-0.11*	*-0.07*	*-0.38*	*-0.45*

Panel B. Average Financial Sponsors' Group Compulsory Ownership (%) in UK and US IPOs.						
	Q1	Q2	Q3	Q4	Q5	Q6
PE Syndicate Ownership						
US	31.30	30.20	27.85	12.15		
UK	18.76	19.43	19.07	18.19	19.22	9.48
t-stat: US-UK	*4.32****	*3.80****	*1.38*	*-0.90*		
VC Syndicate Ownership						
US	22.62	21.61	8.80	2.56		
UK	21.62	22.33	22.26	23.68	24.20	13.45
t-stat: US-UK	*0.36*	*-0.26*	*-1.98***	*-2.50****		

Appendix 3. Differences-in-means between US and UK Sample.

	Differences-in-means between US and UK Sample											
	Q1	**Q2**	**Q3**	**Q4**	**Q5**	**Q6**	**Q7**	**Q8**	**Q9**	**Q10**	**Q11**	**Q12**
Voluntary Ownership:												
PE	-6.13***	-6.26***	-6.39***	-5.51***	-4.94***	-5.27***	-4.89***	-4.49***	-3.96***	-3.59***	-3.40***	-3.08***
VC	-1.00	-1.90*	-1.83*	-1.66*	-0.47	-0.91	-0.28	0.04	0.11	0.07	0.38	0.45
Compulsory Ownership:												
PE	4.32***	3.80***	1.38	-0.90								
VC	0.36	-0.26	-1.98**	-2.50***								

Appendix 4. Alphas for Various Holding Periods.

	Panel A. 12 months Holding Period								
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
alpha	-0.0253***	-0.0130**	-0.0320***	-0.0141	-0.0396***	-0.0101*	-0.0282***	-0.0130	-0.0253***
	[-4.60]	[-1.97]	[-3.68]	[-1.05]	[-2.83]	[-1.68]	[-3.13]	[-1.64]	[-2.84]
SMB	0.0067***	0.0032	0.0054**	0.0023	0.0076*	0.0041**	0.0070***	0.0048	0.0104***
	[3.77]	[1.64]	[2.18]	[0.61]	[1.87]	[2.30]	[2.77]	[1.64]	[3.23]
HML	0.0009	0.0033	0.0001	-0.0033	-0.0020	0.0024	0.0003	0.0031	-0.0040
	[0.51]	[1.50]	[0.02]	[-0.80]	[-0.49]	[1.26]	[0.10]	[1.08]	[-1.27]
R_m-R_f	0.0014	0.0031**	0.0039**	-0.0013	0.0027	0.0032***	0.0024	0.0041***	0.0055***
	[1.23]	[2.27]	[2.15]	[-0.46]	[0.97]	[2.46]	[1.31]	[2.53]	[3.23]
MOM	0.0017*	0.0021*	0.0024	0.0044*	0.0084***	0.0010	0.0013	0.0003	0.0009
	[1.71]	[1.67]	[1.58]	[1.92]	[3.27]	[0.92]	[0.85]	[0.19]	[0.54]
No. of Obs.	219	200	179	176	178	199	179	190	173
Adj R^2	0.058	0.0282	0.0388	0.0076	0.0521	0.0395	0.0385	0.0342	0.0969

Panel B. 24 months Holding Period									
	Non-Backed IPOs	**PE-Backed IPOs**	**VC-Backed IPOs**	**Exited Backed IPOs**		**Retained Backed IPOs**		**Retained IPOs (at Q12 post-IPO)**	
				PE	**VC**	**PE**	**VC**	**PE**	**VC**
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
alpha	-0.0280***	-0.0103*	-0.0305***	-0.0156**	-0.0329***	-0.0101*	-0.0303***	-0.0121**	-0.0338***
	[-4.98]	[-1.93]	[-3.93]	[-2.16]	[-4.00]	[-1.82]	[-3.93]	[-1.99]	[-4.06]
SMB	0.0047***	0.0033**	0.0046**	0.0090***	0.0008	0.0038**	0.0063***	0.0088***	0.0112***
	[2.75]	[2.01]	[2.03]	[3.38]	[0.30]	[2.24]	[2.75]	[3.70]	[3.59]
HML	0.0021	0.0033*	0.0020	0.0008	0.0018	0.0040**	0.0026	0.0034	-0.0030
	[1.18]	[1.88]	[0.80]	[0.29]	[0.69]	[2.21]	[1.07]	[1.44]	[-0.98]
R_m-R_f	0.0021*	0.0020*	0.0032*	0.0018	0.0042***	0.0027**	0.0033**	0.0031***	0.0056***
	[1.81]	[1.68]	[1.99]	[1.32]	[2.34]	[2.20]	[2.10]	[2.60]	[3.60]
MOM	0.0015	0.0003	0.0011	0.0009	0.0030*	0.0004	0.0022	0.0011	0.0026
	[1.45]	[0.32]	[0.76]	[0.59]	[1.87]	[0.35]	[1.58]	[0.83]	[1.44]
No. of Obs.	219	216	191	191	190	216	191	207	185
Adj R^2	0.0309	0.0206	0.0227	0.0464	0.0158	0.0384	0.0465	0.0771	0.1129