Lockup Agreements and Survival of IPO Firms

Wasim Ahmad*

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Abstract

This paper examines the role of lockup agreements on the survival of 580 UK Initial Public Offerings (IPOs) during the period of 1990-2006. Our results suggest that lockup length positively affects the survival and IPO firms with longer lockups exhibit better survival rates and times; thus lending support to the views that lockups signal firm quality. Our study highlights the impact of choice of lockup characteristics on the subsequent survival of newly public firms.

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Keywords: Initial Public Offerings, IPO lockups, Survival Analysis, Private Equity, Venture Capital

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* The author is from the Business School at the University of Birmingham, UK. He would like to thank Ranko Jelic and participants of the Staff Research Seminar at Birmingham Business School for helpful comments and suggestions.
Address for correspondence: Department of Accounting & Finance, Business School-University of Birmingham, B15 2TT UK. Email: wxa855@bham.ac.uk

1. Introduction

Going public firms are plagued by two major problems; information asymmetry and moral hazard at the time of initial public offering (IPO). The high uncertainty coupled with the potential agency problems results in higher discounts in offering prices and less wealth appropriation by IPO firms, which could be detrimental to their long term growth and survival. The issuing firms can signal their quality in a variety of ways.[1] IPO lockup represents one of the signalling mechanisms and by agreeing to longer lockups, insiders can signal quality and survival prospects of their firms.

Lockups prevent insiders of firms from selling whole or some percentage of their equity during a certain post-IPO period. Lockups are voluntary agreements between firms' insiders and underwriters, yet evidence shows that most of the firms go public with lockups in US and UK[2]. Even for markets which require compulsory minimum lockups (i.e. France, Germany etc.), insiders' lockup periods exceed the minimum required (Goergen et al., 2006). The extant literature on the motivations of lockups suggests that lockups signal issuing firm's quality and serve as a "commitment device" between the insiders and outside investors. Not evidenced earlier, however, is the association of lockups and long term survival of issuing firms.

A number of studies (Schultz, 1993; Hensler et al., 1997; Jain and Kini, 2000; Hamza and Kooli, 2010; Bhattacharya et al., 2011; and Espenlaub et al., 2012) have examined the determinants of IPO survival. However, the question of whether the lockup period affects or improves the survival of IPOs has remained an unexplored area. In this study, we focus on the role of lockup length in the survival of 580 LSE Official List IPOs during the period of January 1990 to December 2006. We report survival rates and delisting reasons for sample IPOs by tracking them until the end of December 2011. Our analysis utilizes hand collect data on the types and length of lockups committed by the issuing firms. Finally, we use survival analysis that enables us to investigate the determinants of IPO survival focusing on the length of lockups.

We find that 69% of the sample firms survive for at least 5 years, and the median survival time is 92 months. We also find a relatively larger percentage of PEVC (Private Equity or Venture Capital) backed IPOs and use of absolute expiry (calendar dates or specific period) lockups after the bubble years of 1999-2000. Over the sample period, 56% of the firms were delisted due to mergers and acquisitions (M&A).

[1] Quality signals might include; higher ownership retention (Leland and Pyle,1977), reputed underwriters (Carter and Manaster, 1990), backing by venture capital (Megginson and Weiss, 1991), reputable accounting firm (Titman and Trueman (1986), Michaely and Shaw (1995)), underpricing (Allen and Faulhaber, 1989) and voluntary earnings forecasts (Clarkson et al., 1992).

[2] For US evidence see Field and Hanka (2001), Mohan and Chen (2001), Brav and Gompers (2003) and Yung and Zender (2010). For UK evidence see Espenlaub et al., (2001) and Hoque (2011).

The results suggest that firms going public with above median lockup periods exhibit higher survival rates (and times) in general. We find that lockup length is positively and significantly related to the survival of issuing firms. For instance, results from our sensitivity analysis show that a twelve months increase in median lockup period increases the (median) survival time of sample firms by 26 months. Overall, the results lend support to our hypothesis that longer lockups improve the survival of issuing firms. Our results also suggest a significant negative impact of PEVC backing on the IPO survival.

Our research adds further weight to the strand of literature that argues that lockup length signals issuing firms' quality and helps to reduce moral hazard in the aftermarket.

The remainder of the paper is organised as follows. In section 2, we provide a summary of the related literature and develop testable hypotheses. Section 3 presents the data and methodology. Section 4 presents the univariate analysis and estimated results. In section 5, we test for robustness of our results and perform some further analysis. Finally, section 6 concludes the paper.

2. Related Literature and hypotheses for determinants of IPO survival

There is an extensive body of literature (mainly focused on US markets) on the determinants of long term survival of IPOs[3]. There is, however, a notable paucity of research on survival of UK IPOs. Recently, studies have examined the survival of UK buyouts and IPOs in different contexts. Jelic (2011) examines longevity of UK buyouts and different exit routes including the IPO exits on both markets of LSE, but the study does not examine survival of buyouts after the IPO exit. Espenlaub et al. (2012) study IPOs on second board market i.e. Alternative Investment Market (AIM) of LSE focusing on the role of Nomads (Nominated Advisors). Vismara et al.(2012) examine and compare financial performance and delistings of European's second and main board markets including LSE. They briefly report the delisting activity and reasons for delistings among different countries, and between upper and lower tier markets. We study IPOs on main board market (Official List) of LSE for the following reasons. First, due to its higher and stringent listing requirements, Official List attracts more established and mature companies which are signinficantly different from young and growing companies usually listed on the AIM. Second, although volunatry in nature, most of the IPOs on Official List go public with lockups in place. Moreover, lockups of Official List IPOs are relatively longer and are more diverse in terms of their characteristics (Espenlaub et al., 2001). However, IPO frims on AIM which have not been independent and earning revenues for atleast two years, are

[3] For example, Schultz (1993), Hensler et al.(1997), Jain and Kini (2000), Demers and Joos (2007), Hamza and Kooli (2010) and Bhattacharya et al. (2011) study the survival of IPOs in the US. Simialrly, Chancharat et al. (2012) and Carpentier and Suret (2011) study IPOs on Austrailian and Canadian markets respectivley.

required to have compulsory lockups for related parties and employees[4]. We therefore formulate empirical predictions for the determinants of IPO survival focusing on the lockup length.

2.1 IPO lockup length

Leland and Pyle (1977) develop a signalling model and show that fraction of retained ownership by insiders conveys a quality signal to the outsiders. Insiders in high quality firms can retain greater fraction of ownership after IPO to show confidence in their firms. However, if the insiders can sell the shares immediately after the IPO, the ownership retention signal may not be credible (Gale and Stiglitz, 1989). Courteau (1995) uses the length of holding period (lockup) as a signal of firm value. The commitment to holding period complements the signal provided by retained ownership. Entrepreneurs also use longer lockups to add credibility to their earnings forecasts (Chong and Ho, 2007). A lockup is a costly mechanism because it comes at a cost of illiquidity and non-diversification on the part of insiders' portfolios. Since the information about the true value of the firm will be revealed over a period of time after IPO, insiders will share the risk of negative information revelation during lockup period along with the investors. Lockup puts a penalty on inside managers for hiding negative information about firm value and serves as a bonding mechanism (commitment device) to regulate the actions of insiders (Brav and Gompers, 2003). High quality firms with better growth prospects and survival may not find longer lockup periods problematic. On the other hand, firms with marginal prospects and low quality may not afford to have such longer lockups because their poor quality will be revealed during that period before they can cash out.

Previous evidence supports the signalling role of lockups (Brau et al., 2005; Goergen et al., 2006; Bessler and Kurth, 2007; Arthurs et al., 2009). For example, Arthurs et al.(2009), for a sample of US venture IPOs find that lockup period acts as a signal of firm quality when other quality signals (i.e. venture capital backing, prestigious sponsor etc.) are not available. Moreover, they suggest that longer lockups help ventures with negative information to increase wealth appropriation at the time of IPO, which in turn could be critical for their future survival. Brav and Gompers (2003) and Yung and Zender (2010) suggest that better quality firms are likely to accept longer lockups to alleviate the problem of moral hazard subsequent to the IPO.

While most of the US studies report homogeneous and standardised lockups, evidence from other markets is not consistent. US studies have consistently reported average lockup period of 180 days (Field and Hanka, 2001; Mohan and Chen, 2001; Brau et al., 2004). The most significant differences in terms of lockup characteristics and length are, however, observed between US and UK markets. Espenlaub et al. (2001) report average lockup length of 561 days for directors of issuing firms which is much higher compared to 180 days for US firms. Likewise, Hoque (2011) in a recent study of IPO lockups on both (Main and AIM) markets of LSE, reports heterogeneity in terms of lockup length and

[4] AIM Rule 7, where related parties include directors, substantial shareholder and their associates.

types. For example, the average lockup length varies from 383 days to 714 days among different lockup types for IPOs listed between years 1999 and 2006. The evidence presented so far clearly indicates that firms in UK go public with significantly longer lockups in place.

Length of lockup may affect the decision making of inside managers after IPO depending on their locked equity stakes (Arthurs et al., 2009). Jain and Kini (2008) find that strategic investment decisions like the extent of R&D spending, capital expenditure and advertising at the time of IPO affect the post-issue operating performance and survival of the IPO firms. Similarly, strategic decisions in early post-IPO period by the inside managers, particularly in the areas of resource expansion, significantly affect the survival of issuing firms (Chandy and Sivasubramaniam, 2011). It is suggested that the post-IPO strategic decisions of inside managers with longer lockups may have positive impact on performance and survival of IPOs. Given the significant role of lockup length at the time of IPO and post-IPO period, we conjecture that:

$\boldsymbol{H_{1:}}$ *Survival of IPOs is positively related to lockup period.*

2.2 Backing by PEVC and reputed Sponsors

2.2.1 PEVC backing

The previous US evidence suggests a positive role of private equity and venture capital on the subsequent performance and survival of IPO firms (Megginson and Weiss, 1991; Jain and Kini, 1995 & 2000; Bhattacharya et al., 2011). Venture capitalists (VCs) certify the value of IPOs by reducing information asymmetry through employing prestigious underwriters, reputed auditors and eliciting greater interest from institutional investors (Megginson and Weiss, 1991). VCs assist and take active role in management of their portfolio companies even after IPOs (Barry et al., 1990). The certification and monitoring provided by the VCs results in superior post-issue operating performance and better survival profile for VC backed IPOs (Jain and Kini, 1995 & 2000).

Similarly, presence of VCs may be considered as a signal of quality by the potential acquirers, hence increasing the viability of firm as a target (Vismara et al., 2012). On the other hand, young VCs may "grandstand" by taking younger and "less mature" companies to public in order to establish their reputation (Gompers, 1996). Lee and Wahal (2004) find higher underpricing for VC backed IPOs and confirm the grandstanding by VCs. Likewise, due to multiple agency conflicts and short term goals, VCs may enhance the short term performance of IPO firms at the cost of long term performance and survival (Fischer and Pollock, 2004; Arthurs et al., 2008). Studies on UK IPOs have largely failed to find significant differences between PEVC and non-PEVC backed IPOs in terms of their post-issue performance and survival (Jelic et al., 2005; Coakley et al., 2007; Jelic and Wright, 2011; Espenlaub et al., 2012). We, therefore, posit that:

$\boldsymbol{H_{2:}}$ *IPO survival is related to PEVC backing at the time of IPO.*

2.2.2 Sponsor reputation

Reputed underwriters (sponsors) market low risk and high quality firms in order to maintain their reputation, and are associated with better long term performance of IPOs (Carter and Manaster, 1990; Carter et al., 1998). Dong et al. (2011) find that reputed underwriters, through their marketing, certification and screening roles, positively impact the long term performance of IPOs even with high uncertainty. Bhattacharya et al. (2011) find significant role of reputed underwriters on long term survival of IPO firms. Espenlaub et al. (2012) show that IPOs sponsored by reputed Nomads (sponsors) on UK AIM survive longer compared to those backed by other Nomads. We, therefore, hypothesize that;

H_3: *IPOs backed by reputed sponsors will have longer survival.*

Kooli and Meknassi (2007), however, find that underwriter prestige increases the likelihood of being acquired relative to surviving or non-surviving. Similarly, Chancharat et al. (2012) suggest that risky firms seek underwriter backing and find higher failure rates for IPOs backed by underwriters.

2.3 Control Variables

Next, we review and predict the impact of different firm and issue related characteristics on the survival of IPOs.

2.3.1 IPO Size

The size effect on the aftermarket performance and survival has been well documented in the literature. Large firms have less valuation uncertainty (Brav and Gompers, 2003) and better resources to cope with poor market conditions compared to the small IPOs (Hensler et al., 1997). Ritter (1991) finds that smaller IPOs tend to perform worst in the aftermarket. Larger IPOs are likely to have better survival and probability of delisting is inversely related to the IPO size (Schultz, 1993). Therefore, we expect a positive relation between survival and size of the IPO.

2.3.2 Firm age at Offering

Age of the firm at offering has often been used as a proxy for risk (Ritter, 1991; Georgen et al., 2006) and older firms are likely to have less information asymmetry due to longer operating history. Schultz (1993) shows that portability of failure decreases with increasing age and Demers and Joos (2007) find that younger (less established) firms are likely to fail. We, therefore, control for age of firm at the time of IPO and expect a positive impact of age on the post-IPO survival.

2.3.3 Initial returns (Underpricing)

Good quality issuers can reduce uncertainty and signal their quality by underpricing the IPOs (Allen and Faulhaber, 1989). Consistent with this prediction, Hensler et al. (1997) find positive impact of higher initial returns on survival of IPOs. Similarly, Schultz (1993) for first post-IPO year and Demers and Joos (2007) for high-tech IPOs, report positive association between the initial returns and long term survival. Beatty and Ritter (1986), on the other hand, suggest that higher ex-ante uncertainty about firm value results in higher underpricing, which in turn could lead to higher probability of failure. Hamza and Kooli (2010), consistent with above arguments, find that higher level of underpricing increases the likelihood of failure. Jain and Kini (1994), however, find no significant relation between underpricing and post-issue operating performance, thus rejecting the signalling explanation. Similarly, Espenlaub et al. (2012) fail to find significant impact of initial returns on survival of AIM IPOs. We, therefore, expect no significant relation between initial returns and survival.

2.3.4 Insider ownership

Evidence regarding impact of insider ownership on post-issue performance and survival of IPOs is mixed. Leland and Pyle (1977) suggest that insiders can signal firm quality by retaining significant ownership stake in the firm after IPO. This should result in improved performance and survival because of the reduced agency costs (Jensen and Meckling, 1976). Consistent with this prediction, Jain and Kini (1994) find positive relation between managerial ownership retention and post-issue operating performance. Hensler et al. (1997) and Jain and Kini (2008) find a positive impact of higher insider ownership on survival of IPOs. Goergen and Renneboog (2007), for a sample of UK IPOs, conclude that long term performance of IPOs is not correlated with ownership retention. Yang and Sheu (2006) find a non-linear relation between IPO survival and insider ownership for firms listed in Taiwan. Although, the impact of insider ownership on post-IPO performance is ambiguous, it is positive and evident in case of IPO survival. Overall, we therefore expect a positive effect of insider ownership on survival.

2.3.5 Market Conditions

Previous evidence suggests a negative relation between hot market periods and IPO survival, which is consistent with the window of opportunity theory (Ritter, 1991; Loughran and Ritter, 2004). Hot market periods are characterized by higher average initial returns and issue clusters (greater number of new issues). The high initial returns lead to excessive demand for IPOs and create favourable market conditions for issuers who can raise capital at lower costs (Demers and Joos, 2007). Lower quality issuers take advantage of investor sentiment and go public despite the danger of not being able to perform and survive in the long run (Coakley et al., 2007; Kooli and Meknassi, 2007). Therefore, we conjecture that IPOs issued in hot periods have lower survival rates and times.

2.3.6 Industry Performance

Industry effect on the performance and survival of IPOs has been well documented in the previous literature (Ritter, 1991; Hensler et al., 1997; Hamza and Kooli, 2010; Carpentier and Suret, 2011). For example, Ritter (1991) reports that IPOs in pharmaceutical, airline and financial industries outperform in the long run compared to the other industries. Hensler et al. (1997) observe shorter survival times for IPOs in computer, wholesale, restaurant and airline industries; and longer survival times for firms in optical and drug industries. In order to account for the differences across industries, we include industry dummies based on FTSE Global Classification system.

3. Data and Methodology

3.1 Data and sample Construction

Our sample consists of IPOs on the LSE Official List between January 1990 and December 2006.LSE is the Europe's biggest and one of the world's largest stock markets. For example, LSE in year 2005 only, saw 354 IPOs with offering value of €18.6bn more than the US exchanges combined.[5] The data for IPO activity from 1998-2006 is available from LSE website. LSE data includes firm names, issue price, market capitalisation on admission, industry and admission date. For IPOs between 1990 and 1997, we begin with listings in Thomson One Banker and Perfect Filings database during the period. We find 724 IPOs on Official List excluding IPOs on the other segments i.e. USM and AIM.[6] Panel A of Table 2 describes the filters we use to construct our final sample of IPOs. We exclude investment trusts, venture capital trusts (VCTs), privatisations, re-admissions, non-UK firms and firms with missing data and IPO prospectuses. This leaves us with a final sample of 378 IPOs during 1990-1997[7]. According to the LSE data, 686 IPOs were listed on Official List during the period of 1998-2006. We repeat the same filtration process as earlier to get a final sample of 202 IPOs during 1998-2006. Our final sample consists of 580 IPOs for the whole period of 1990-2006. We use Perfect Filings to collect IPO prospectuses. We hand collect most of our variable from the prospectuses including lockup information, sponsors, insider ownership, incorporation date (for calculating age of firm), market capitalisation, industry and PEVC backing. For relative expiry lockups, we use Perfect Filings to find the corporate announcement dates and the exact lockup expiry.[8] The data for initial returns is obtained from DataStream. The dates and reasons of delisting of IPOs are obtained from London Share Price Database (LSPD). The dates and delisting reasons of sample IPOs are further cross-referenced with Perfect Filings database.[9]

[5] PriceWaterhouseCoopers (2006), 'IPO Watch Europe—Review of the year 2005'
[6] Gregory et al. (2010) report 629 IPOs excluding investment trusts, financial trusts and banks on the Official List for the same time period i.e. 1990-1997.
[7] Our sample for period 1990-1997 is comparable to Coakley et al. (2007), who report 327 sample IPOs for 1990-1997 after the similar filtration process.
[8] In case of relative lockup expiry, the expiry date of lockup is specified in relation to other company events like announcement of results, publication of accounts etc. (Espenlaub et al.,2001)
[9] We also use UK IPO data from Jelic (2011).

Out of sample IPOs, 517 (89%) have lockups in place for at least one class of shareholders. However, IPOs in certain industry sectors before year 2000 were subject to compulsory lockups if they do not meet certain criteria.[10]

Panel B of Table 2 presents descriptive statistics of the variables used. The average lockup period of sample IPOs is 15.39 months (468 days), measured as number of months from IPO until the lockup expiry. The lockup length, however, varies considerably among sample firms with a minimum lockup of 2 months and a maximum of 41 months. This clearly shows the large diversity and non-standardisation of lockup length among the UK issuers and is consistent with the earlier findings of Espenlaub et al. (2001). The average size (market capitalisation) of IPO firms at the time of listing is £259.16m. There is also a large variation in terms of the market capitalisation of IPOs with a minimum of just £1.05m and a maximum of £7725m. Firms list with an average age of 7.211 years at the time of IPO, where age is defined as number of years between incorporation and IPO date. Age has been rounded up to the next full year in our analysis; however we find that 28% of the firms have age of one year or less at the time of IPO.[11] The oldest firm was incorporated about 95 years before the IPO. The issuing firms experience average initial returns of 11.18% during the sample period. The sample firms go public with insiders holding an average (median) of 50% (51.9%) of the post-IPO equity stakes. About 34% of the IPOs are sponsored by one of the top 10 reputed sponsors. More than half (51.4%) of the IPO firms are backed by PEVC. Finally, almost 60% of the firms conducted IPO in hot market periods as defined in Table 1.

Table 3 breaks down IPO frequency by year of listing and by industry (based on FTSE Global Classification System). The IPO frequency fluctuates greatly across the sample period. The highest percentage i.e. 18% of IPOs was listed in year 1994. Moreover, 71% of the IPOs are listed between 1990 and 1998 and listing activity falls after the bubble period of 1999-2000.[12] Most of our sample IPOs originated from Cyclical Services (general retailers, support services, Leisure and hotels, media and transport) and Information Technology industries. IPOs from Cyclical Services consistently show higher proportions across the sample years. IPOs in Information Technology are, however, clustered in years 1994 and 2000. Cyclical Services, Information technology and Non-Cyclical Consumer Goods jointly share about 61% of the sample IPOs.

3.2 Methodology

A number of studies have used survival analysis for studying the post IPO survival and the determinants of long term survival of issuing firms (Hensler et al., 1997; Jain and Kini, 2000 & 2008; Carpentier and Suret, 2011, Jelic, 2011; and Espenlaub et al., 2012). Survival analysis is preferred

[10] For details, see Espenlaub et al.(2001) p.1242
[11] We take incorporation date as reported in the “additional information” section of the prospectus.
[12] This is partly due to exclusion of a large number of IPOs of Investment trusts, VCTs, ADRs and non-UK firms for the period 1998-2006 as detailed in Panel-A of Table 2.

over the conventional statistical methods (linear regression, binary dependent variable models etc.) due to a number of benefits. For example, ordinary least square (OLS) regression cannot handle the censored observations, which is a unique characteristic of survival data (Jenkins, 2005). Censoring occurs when the event of interest (delisting of IPOs) has not yet occurred by the end of study or experiment. In our case, sample IPOs which are still trading (listed) by the end of December 2011 are right censored. Moreover, the binary dependent regression models (logit, probit etc.) do not take into account the timing of the events i.e. when the event for each observation occurs. On the other hand, survival analysis not only allows for censoring and different time horizons, it can also handle the time dependent variables.

In our analysis, survivors are defined as the IPO firms which remain listed on the market or transfer to another market. Consistent with this definition, non-survivors are IPOs which were delisted from the market due to administration/liquidation, mergers and acquisitions, permanent suspension or any other reasons. Our decision to treat market transfers as survivors is consistent with Espenlaub et al. (2012) and Vismara et al. (2012). On the other hand, treating mergers and acquisitions as non-survivors is also consistent with Jain and Kini (2000) and Chancharat et al. (2012), although M&A may not always be a negative delisting or death.

The survival rates of the sample IPOs are estimated using the Kaplan-Meier (KM) method. The KM estimator is a non-parametric maximum likelihood method and is defined as (see Clark et al.,2003)

$$S(t_j) = S(t_{j-1})\left(1 - \frac{d_j}{n_j}\right) \quad (1)$$

Where $S(t_j)$ is the probability of being listed at time (month) t_j , $S(t_{j-1})$ is the probability of being listed at time t_{j-1}, n_j is the number of IPOs listed just before the time t_j (also called risk set at t_j), d_j is the number of IPOs delisted at time t_j.

We use log rank test for testing the statistical differences in KM survival curves between various groups (across issue years and industries) and subsamples (lockup length). We also compare the median survival times across different groups and subsamples. Median survival time is the point in time at which survival probability is 0.5 (Kleinbaum and Klein, 2005). Clark et al. (2003) state that median survival time is the widely used measure instead of mean as survival data are often skewed and rarely normally distributed. In context of our analysis, median survival time is the time in months when cumulative survival rate for sample IPOs has dropped to 50% (half of the IPOs have been delisted). Following Espenlaub et al. (2012), we use minimum survival time when the median survival time cannot be estimated (when cumulative survival rate stays above 50% by the end of study period).

We evaluate the suitability of survival models with constant hazard rates (semi-parametric and non-parametric) and those models that allow the hazard to change over time (parametric). Based on the unreported results of different graphical methods and tests[13], we find that the constant hazard assumption does not hold for our data and therefore parametric models are preferred. Our survival model is implemented in the Accelerated Failure Time (AFT) form, which assumes that the effect of predictors is multiplicative on the survival time. The model is commonly expressed in log-linear form with respect to survival time as (see Bradburn et al.,2003)

$$\mathrm{Ln}(\mathrm{T_j}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_p X_p + \varepsilon_j \quad (2)$$

where $\beta_0, \ldots, \beta_p$ are parameters to be estimated, $X_1, \ldots, X_p$ are covariates, and ε_j is the error term with a specific distributional form which determines the regression model. AFT models being the parametric models require specific underlying distribution (i.e. weibull, gamma, lognormal etc.). Akaike's Information Criterion (AIC) can be used to distinguish between different non-nested parametric models (Allison, 2010). The likelihood-ratio test or Wald test can be used to discriminate between the nested models. We compare different parametric models based on the AIC and the unreported results show that lognormal is most appropriate model with the lowest AIC value.

AFT models measure the direct effect of covariates on survival time which makes the interpretation of results easier because the parameters measure the effect of covariates on the median survival time. In AFT models the covariate effects are assumed to be multiplicative and constant on the time scale; the covariate impacts on survival time by a constant (acceleration) factor. Survival time is extended or contracted by the relative constant factor. The marginal effect of the covariates is measured by the exponentiated coefficients,exp(β_i), called time ratios. A positive coefficient on covariate implies a time ratio of greater than 1 and means that increase in covariate prolongs the survival time (time to delisting). On the other hand a negative coefficient on the covariate results in a time ratio below 1 and indicates that increase in covariate is associated with lower survival time (delisting occurs quickly).

We estimate the following specific model where natural logarithm of the time to delist (survival time) is presented as a linear function of the covariates:

$$\mathrm{Ln}(\mathrm{T_j}) = \beta_0 + \beta_1 \mathit{Lockup\ Period} + \beta_2 \mathit{Ln(Size)} + \beta_3 \mathit{Ln(Age)} + \beta_4 \mathit{Initial\ Return} + \beta_5 \mathit{Insider\ Ownership} + \beta_6 \mathit{Sponsor\ Reputation} + \beta_7 \mathit{PEVC} + \beta_8 \mathit{Hot\ Period} + \beta_9 \mathit{Industry\ Dummies} + \varepsilon_j \quad (3)$$

[13] Available in Stata (2012)

Where $\text{Ln}(T_j)$ is natural logarithm of time to delisting or survival time and covariates are as defined in Table 1. *Lockup Period* is the length of lockup measured in months from date of IPO to lockup expiry date. *Ln (Size)* is the natural logarithm of market capitalisation of IPO at offering price in £millions. *Ln (Age)* is natural logarithm of the number of years between incorporation date and IPO date. *Initial Return* is the difference of first day closing price and offer price as percentage of offer price. *Insider Ownership* is the percentage of post-IPO equity retained by the firms' insiders. *Sponsor Reputation* is a dummy variable coded one for IPOs sponsored by the Top10 sponsors and zero otherwise. The sponsor reputation has been calculated as equally weighted average of rank scores based on the (i) number of IPOs sponsored and (ii) the amount sponsored in £ millions during the sample period as a lead sponsor.[14] *PEVC* is a dummy variable coded one for IPOs backed by PE or VC and zero otherwise. *Hot Period* is a categorical variable coded one for IPOs listed in hot markets and zero otherwise. The definition of Hot Period is similar to the one used by (Jelic, 2011) and is given in Table 1. We include dummies for industry sectors based on the FTSE Global Classification as outlined in Table 1 using "non-cyclical services" sector as the base.

4 Results

4.1 Characteristics of sample firms and Lockup types

In Table 4, we provide the number and percentage of sample IPOs by PEVC backing (Panel A) and the type of lockup (Panel B) across the sample years. Panel A of table 4 shows that the proportion of PEVC backed IPOs ranges from 40% to 66% during years 1990-2000 except for year 1990 when it was 33%. Starting from year 2001 onwards, however, the proportion of PEVC backed IPOs remains relatively higher with a peak of 94% in year 2004. Panel B of Table 4 shows the types of lockup agreement between the firms' insiders and the underwriters at the time of IPO. We first distinguish between the types of lockups; absolute date expiry, relative date expiry and a combination of both types. The lockups in case of absolute date expiry are set in terms of clear calendar dates or certain period of time after the IPO and usually give the exact length of the lockup period. The relative date expiry lockups, on the other hand, specify the expiry in relation to some corporate events like preliminary results announcements or publication of company accounts etc. Finding the exact lockup period and expiry date in case of relative date lockups is difficult, if not impossible.[15] The third type might be a combination of the other two types and may spread over more than one period (staggered lockup). Panel B shows a clear break-point between the use of absolute and relative expiry lockups in pre and post year 2000. Firms in the period 1990-1999, largely use relative expiry lockups which

[14] This measure is similar to the one used by Jelic (2011) for PE firms' reputation and is calculated as:
Reputation Score= $^1/_2$ (ranking by number of IPOs sponsored) + $^1/_2$ (ranking by amount sponsored in £ m)

[15] We first collect the type of relative event (corporate announcement) of relative date lockups from the IPO prospectus and then use PI Navigator to find the exact date of that event to find the length of lockup period.

range from 33% to 95% of all lockups types. However, the use of absolute expiry lockups picks up from year 2000 onwards and firms increasingly use absolute lockups or a combination of both. For example 75% of the lockups in each of years 2005 and 2006 are absolute expiry while this proportion is 100% in year 2003.

4.2 Survival Rates and Times

Table 5 reports one to five year cumulative survival rates and median survival times of sample IPOs across listing years and industry of issuing firms. This table is based on Kaplan Meier (KM) method which is a non-parametric approach of survival analysis (discussed in methodology section). Panel C of Table 5 shows the survival rates during first 5 years after listing for full sample. The one year survival rate for sample IPOs is 99% which falls to 69% after 5 years of listing. This translates into a 31% delisting rate after five years of IPO and is comparable to the recent findings of (Vismara et al., 2012) who report five year delisting rates of 20-28% for Europe's main markets. The five year survival rate on the Main market is, however, higher than 59% for AIM IPOs reported by (Espenlaub et al., 2011). The survival rates across listing years also vary considerably (Panel A). One year survival rates remain 100% except for years 1994, 1999 and 2000. Firms listed in year 2000 experience the lowest five year survival rates and 50% of the IPOs are delisted by their fifth anniversary. Firms listed in years 2002 and 1991 have the highest survival rates at 93% and 89% respectively. However, the differences in survival rates across years are statistically insignificant (chi^2:20.52, p-value: 0.198). The survival rates across industries show relatively less variation with minimum five year survival rate of 62% for Non-Cyclical Services. The Resources sector enjoys the highest five year survival rate of 76%. However, similar to the issue years, survival rates across industry sector are also insignificant with a chi^2 value of 4.71 (p-value: 0.789).[16]

The last column of Table 5 shows the median survival time for full sample (panel C); across issue years (panel A) and industry sectors (panel B). Median survival time is the widely used measure in survival analysis and means the time at which the survival probability is 0.5. The median survival time for our sample IPOs is 92 months (half of the IPOs survive for 92 months or less). The median survival time, however, varies substantially across the listing years. Similar to the lowest survival rates, the median survival time is lowest for IPOs issued in year 2001. Firms listed in year 1991 experience the highest median survival time where 50% of the firms survive for 136 months or less. We report minimum survival times for years 2002, 2003, 2004 and 2006 where the delisting probability has not dropped below 0.5 by the end of study period (December 2011). Comparison of the median survival time across industries shows that "Resources" sector enjoys the highest survival time of 155 months while firms in "Non-Cyclical Services" have the lowest survival time of 79 months.

[16] We conduct Log Rank test for testing equality of survival rates. The log rank test (a large sample chi-square test) uses the observed and expected failure over the comparison groups (Kleinbaum and Klein, 2005).

Table 6 breaks down the survival rates and time by different lockup lengths. In Panel A, we distribute lockup length in two groups; lockup period greater than the median and lockup period below the median length. The survival rates and median survival times are reported across different industry sectors over the two lockup lengths groups. The survival rates for one, three and five years post-IPO are consistently higher for lockups greater than median compared to the lockups lower than the median. For example, IPOs with lockup greater than the median enjoy 72 % five year survival rates while the survival rates for IPOs with lockup lower than the median length are 67% over five years after the IPO. Similarly, survival rates for the lockups greater than median are higher for most of the industry sectors. The median survival time of 87 months for lockups lower than median is less than the 92 months survival time reported for lockup greater than the median. Panel B provides survival rates and times of full sample over different lockup lengths; up to 12 months, 13 to 24 months and lockups greater than 24 months. Similar to the results observed in Panel A, the survival rates are consistently higher for longer lockup lengths. IPOs with lockups greater than 24 months experience 10% five year higher survival rates compared to the lockup periods of up to 12 months (77%-67%). Firms going public with lockup period of more than 24 months add 52 more months in their median survival time than for firms with lockup lengths of lower than or equal to 12 months. The log rank test for equality of survival rates also rejects the null hypothesis of equal survival rates across the three lockup lengths at 5% level. Overall, results from table 6 lend strong support to hypothesis 1.

In Table 7, we report delisting reasons across different industry sectors. Survivors are the firms that continue to be traded as of December 2011 or transfer to other markets (exclusively to AIM in our case) .The main delisting types are Mergers & Acquisitions (M&A), Administration/Liquidations (including receivership and voluntary liquidations) and other delisting reasons (permanent suspension/cancellation of trading, other reasons etc.) Out of the sample firms, 185 (32%) which went public from 1990-2006, are still listed at the end of December 2011. Delistings due to Mergers & Acquisitions account for 56% (82% of all delistings) of the total sample IPOs during the period. Of the sample firms, 8% are delisted due to Administration and Liquidations whereas just 4% delist due to other negative reasons. “Resources” is the only industry sector where more than 50% of the firms are still surviving. Basic Industries and Financials are the sectors where more than 60% of the firms are delisted due to M&A activity. The highest numbers of Administrations/Liquidations occur in Non-Cyclical services and Cyclical Consumer Goods at 19% and 17% respectively.

4.3 Univariate analysis of Survivors and Non-Survivors

Table 8 provides univariate analysis and comparison of survivors and non-survivors. Although the average lockup length of survivor IPOs is higher by 0.689 months (about 21 days) as compared to the Non-Survivors, the difference is not statistically significant. Moreover, both survivors and non-survivors have the same median lockup period. The survivor IPOs are much larger in terms of their size (measured as market capitalisation at offering price) in comparison to the non-survivor IPOs and the differences in their means and medians are highly significant. The non-survivors have higher age, lower initial returns and insider ownership compared to the survivors but the differences are not statistically significant. Although, a slightly higher percentage (35%) of survivor IPOs is sponsored by reputed sponsors, the differences between survivors and non-survivors are insignificant. There is a higher percentage of PEVC backed IPOs among the non-survivors compared to the survivors and the differences are highly significant, showing a negative impact of PEVC backing on the post IPO survival. Similarly the percentage of hot period IPOs is significantly higher in the non-survivors compared to survivors. The only significant industry effect is in Resources sector where a higher percentage is among the survivors. Although table 7 shows higher survival rates and times for lockups with longer periods, the differences between survivors and non-survivors are not significant in terms of lockup length in table 8.

Table 9 shows the correlations between the variables used in the survival regressions. Although there are significant correlations between some of the variables, the correlations are not high enough to cause the problem of multicollinearity.

4.4 Multivariate Analysis-Determinants of Survival

In this section we discuss the determinants of IPO based on our survival analysis. We employ Accelerated Failure Time (AFT) model with lognormal density distribution as the baseline survival function based on the Akaike Information Criterion (AIC). The estimation results from the AFT model are presented in Table 10. We present both the coefficient estimates and the time ratios along with the associated p-values. Time ratios are the exponentiated coefficients, exp (β), where β is the coefficient in AFT model. A time ratio or "acceleration factor" has the effect of stretching or contracting the survival time as a function of changes in covariates. A time ratio of above (below) one for an independent variable would mean a positive (negative) impact on the time to delist (survival time). Overall, our model exhibits reasonable explanatory power, measured by pseudo R^2 and statistically significant likelihood ratio.

4.4.1 Lockup length

The results from Table 10 show a positive impact of lockup period on the survival time. The coefficient on the lockup variable is positive and highly significant with a p-value of 0.003. The time ratio of 1.022 associated with the lockup period means that for one unit (a month) increase in lockup period, the survival time increases by a factor of 1.022 or by 2.2%. The results provide strong support for our hypothesis 1.

4.4.2 Sensitivity of the survival time due to changes in lockup length

Next, we perform a sensitivity analysis of the predicted median survival time in response to changes in lockup period based on the coefficient estimates from table 10. The results of the sensitivity or simulations of the survival time are reported in table 11. The table shows the expected survival time, absolute change in months and the percentage change in expected survival time when the median lockup period is changed first by one month and then by quarterly intervals up to twelve months. We first evaluate the predicted survival time at median (13 months) of lockup and means of all other variables.[17] This result in a base median survival time of 89 months after the IPO and all the changes are calculated relative to the base survival time.

The results show a significant impact of increase in lockup period on the survival time. An increase of twelve months in the median lockup length causes more than double increase of 26 months in the post IPO survival time (median survival time increases from 89 to 115 months). This translates into about 30% increase in the median survival time of the issuing firms. Similarly a decrease of 12 months in the median lockup length causes a 22.4% decline in the median survival time. Similar results were observed when mean instead of median of the lockup period was used in the analysis.

4.4.3 PEVC backing and Sponsor reputation

Surprisingly, we find that backing by PEVC significantly reduces the survival time of the issuing firms. The estimated time ratio for the variable PEVC is 0.758 which indicates that the survival time for IPOs backed by PEVC reduces by around 24% compared to IPOs without PEVC backing. Similarly, results from our marginal analysis suggest that predicted median survival time decreases by 27 months for PEVC backed compared to non-PEVC backed IPOs. The results lend strong support to our hypothesis 2. Our results are partly in line with the finding of Kooli and Meknassi (2007) and Vismara et al. (2012), who show that PEVC firms have higher probability of being acquired and delisted.[18] PEVC firms may be more attractive to potential acquirers due to the positive impact of PEVC backing. An alternate explanation could be the short term focus and grandstanding (Gompers, 1996) by the PEVC providers which may be deleterious for the survival. For example, (Jelic, 2011) show that a significant number of PE backed buyouts in UK exit early via IPOs. Our results, however, contradict findings for US IPOs reported in Jain and Kini (2000).

The insignificant coefficient on sponsor reputation does not support our hypothesis 3. Moreover, the negative sign on coefficient implies that IPOs taken public by reputed sponsors are more likely to be delisted. Our findings regarding sponsor reputation are not consistent with recent evidence by Bhattacharya et al. (2011) and Espenlaub et al.(2012) for US and UK AIM IPOs.

4.4.4 Control Variables

The results regarding IPO size and survival are in line with our expectations that larger IPOs are more likely to survive. We find a beneficial but small effect of size on the aftermarket survival in line with the widely documented size effect in earlier studies (Ritter, 1991; Schultz, 1993). A one per cent

[17] The analysis was conducted using the “margins” command in Stata 12

[18] This is plausible as most (82%) of the delistings in our case are due to mergers and acquisitions.

increase in the size of IPO increases the survival time by a mere 0.08%. Contrary to our expectations about age of IPO firm, we do not find a significant effect of firm age on survival. The positive but insignificant result on age variable is consistent with recent findings of Vismara et al.(2012) for European IPOs. Similarly, the coefficients on insider ownership and initial returns are also not statistically significant. The coefficient on the hot period variable is negative (as expected) but statistically insignificant. We, however, find some positive and significant (although weak) industry effects on survival time of issuing firms. The IPO firms in "Basic Industries" and "Resources" have much higher survival probability compared to the firms in base category i.e. "Non-Cyclical Services". These results are supported by our earlier analysis in Table 5 and 6. The results about significant industry effects are consistent with the findings reported in Hensler et al.(1997) and Carpentier and Suret (2011) for US and Canada respectively.

Summing up, the results of our study show that IPO firms with longer lockups and higher size have higher probability to survive. Interestingly, firms backed by PEVC have shorter survival times and are likely to delist earlier than the non-PEVC backed firms. We find positive but insignificant effect of age and initial returns on the survival time of IPO firms. We also report some counterintuitive results in terms of insider ownership and sponsor reputation where both of these variables negatively but insignificantly affect the survival times. Similarly, firms going public in hot market periods are less likely to survive but the results are not statistically significant.

5 Robustness of Results

5.1 Constant Hazard, Heterogeneity and Clustering

In order to check the robustness of our results, we estimate a Cox proportional hazard model with the same covariates. The Cox model makes no assumption about the underlying statistical distribution and the baseline hazard function is estimated non-parametrically. Table 12 shows that our main results remain robust to choosing Cox model except that the industry sector "Resources" loses its significance. We also account for unobserved heterogeneity (frailty) in our model which may have been caused by omitted variables or measurement errors (Jenkins, 2005). The introduction of frailty in survival model takes into account the fact that all the issuing firms in our sample might not be homogenous in terms of their delisting hazard. We re-estimate our AFT model with frailty which is introduced as an unobservable multiplicative effect. The (unreported) results were economically and statistically similar to our earlier results (i.e. without frailty).[19] As we have high number of IPOs in some of the sample years, we also consider our results adjusting for clustering standard errors. Again our results remain robust to clustering based on IPO frequency in different years.

[19] The p-value for likelihood ratio test of H_0: $\theta = 0$ is 0.345, where θ is frailty parameter.

5.2 Institutional changes regarding compulsory lockups

Firms in certain industry sectors were required to have compulsory lockups for listing on LSE prior to year 2000. For example, directors and other senior employees of mineral companies with less than three years of trading history were subject to compulsory lockups for two years after the IPO. Similar restrictions were applicable to scientific research based companies between years 1993 and 2000. Lockups are not obligatory for these companies since January 2000 but they have to include a statement in their prospectus about lockups.[20] We, therefore, test for robustness of our results to the institutional changes in lockup requirements. First, we exclude mineral and scientific research based companies floated before year 2000 from our sample. Second, we exclude all companies with exact two years of lockups from our sample. Unreported results show that the main inferences are robust to excluding both types of sample firms.

5.3 Alternative measurement of explanatory variables

Next we check the robustness of results to different measurements and definitions of some of the explanatory variables. A number of studies have reported positive impact of sponsor (underwriter) reputation on the long term performance and survival of IPOs (Carter et al., 1998; Bhattacharya et al., 2011). However, we find this variable to be insignificant in our analysis. We use different variations of our proxy for measuring sponsor reputation. First we use a narrower (Top5) definition of sponsor reputation but results remain qualitatively same. Next, we use reputation measured only by the market share based on number of IPOs sponsored during sample period; again the results are robust to new measure. We also follow the sponsor reputation measure used by Derrien and Kecskés (2007) for UK market which includes the global investments banks but our results qualitatively remain the same.[21] We consider a different definition for measuring the IPO hot periods. We use quarterly IPO frequency across the sample years in our analysis but the results are similar to our main results in Table 10. Using inflation adjusted market capitalisation (size) also does not affect our results qualitatively.

Finally, in order to eliminate the effect of extreme values, the values for variables lockup, size and age were truncated at specified thresholds. The values below 1st and above 99th percentile were replaced with the respective values at the 1st and 99th percentiles. The results based on these values of the covariates are not materially different from our original estimates. In conclusion, our results in Table 10 are robust to a wide range of alternative measurements of variables and methodological changes.[22]

[20] Similar rules are applicable to innovative high growth companies since January 2000. For a detail of regulatory changes regarding compulsory lockups, see Espenlaub et al.(2001) pp.1242-1243

[21] For details of Global Investment Banks, please refer to Derrien and Kecskes (2007), footnote 11, p. 460

[22] All unreported results in this section are available from author upon request.

6 Conclusion

Prior research has documented a positive impact of lockup agreements in the going public process. The empirical evidence suggests that lockups can signal quality of issuers and help to reduce the moral hazard problem. The innovative aspect of our study is that it explores the relationship between lockups and the survival likelihood of IPO firms. We argue that lockup characteristics at the time of going public have the potential to influence the time and occurrence of post-issue failure. Survival is the primary aim of firms and represents an unambiguous metric of performance (Chancharat et al., 2012). Using firm survival as our performance measure, we focus on the role of lockup length in explaining the post-IPO firm survival. We control for a number of other determinants of IPO survival identified in literature.

We find that five year survival rate for our sample IPOs is 69% and the median survival time is 92 months. The survival time and rates vary significantly across different lockup lengths. Our analysis of the sample firms reveals that 56% of the firms are delisted due to Mergers and Acquisitions (M&A) during the period of 1990 to 2011. Administrations/Liquidations, considered to be more negative delistings, only account for 8% of the sample firms.

Our empirical results, utilising the Accelerated Failure Time (AFT) Model, indicate a statistically and economically significant effect of lockup length on the post-issue survival of IPOs. We find that, ceteris paribus, a twelve month increase in median lockup period increases the (median) survival time from 89 months to 115 months. Our results support the positive impact of firm size on the post-IPO long term survival. We also report a significantly negative effect of PEVC backing on the survival of issuing firms. The results from our simulations suggest that the predicted median survival time decreases by 27 months for PEVC backed compared to Non-PEVC backed IPOs. Our results show some significant and positive industry effects on IPO survival. Unlike the previous documented evidence, we do not find significant effect of firm age, insider ownership, sponsor reputation, initial returns and going public in hot periods. Finally, our results are robust to different survival estimation techniques, heterogeneity and alternative specification of variables.

Our research presents useful insights both to the issuers and the investors, who are equally interested in the survivability of IPOs. While the issuing firms can increase probability of their survival by committing to longer lockups, the investors can also gauge the long term prospects of the IPOs in terms of their survival from the information about lockup in IPO prospectuses.

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Table 1

Definitions of Variables

Variable	*Definition*	*Data Source*
Lockup Period	Length of Lockup in months	IPO Prospectus, PI Navigator
Size	Size is the market capitalisation at the offering price in £ millions	London Stock Exchange, IPO Prospectus
Age	Number of Years between incorporation and IPO date	IPO prospectus
Initial Returns	First day closing price minus offer price divided by the offer price; in percentage	London Stock Exchange, DataStream
Insider Ownership	Insider Ownership at the time of IPO; in percentage	IPO Prospectus
Sponsor Reputation	A categorical variable that takes the value of one if the IPO sponsored by one of the top 10 sponsors, and zero otherwise. The Sponsor reputation is based on measure used by Jelic (2011), which is an equally weighted average of (i) ranking by number of deals and (ii) ranking by total amount sponsored in £m as lead sponsor.	London Stock Exchange, IPO Prospectus
PEVC	A categorical variable that takes the value of one if the IPO is backed by Private Equity or Venture Capital, and Zero otherwise.	IPO Prospectus
HOT Period	A categorical variable that takes the value of one if IPO is listed during hot period, and Zero otherwise. The definition of hot period is consistent with Jelic (2011) where the hot IPO years satisfy at least two out of following three criteria: abnormal initial returns, abnormal IPO volume, and non-negative autocorrelation in IPO volume.	London Stock Exchange
Industry Dummies	Binary Industry dummies based on FTSE Global Industry classification indicating companies in Basic Industries Cyclical Consumer Goods Cyclical Services Financials General Industrials Information Technology Non-Cyclical Consumer Goods Non-Cyclical Services Resources	London Stock Exchange, IPO Prospectus

Table 2

Sample Selection and Descriptive Statistics

Panel A describes the selection filters and data limitations for our full sample of IPOs during 1990-2006. We estimated number of listings for the period 1990-1997 form Thomson One Banker & PI Navigator. The data for listing activity for the period 1998-2006 is from LSE website. We eliminate investment trusts, venture capital trusts (VCTs), re-admissions, Global/American Depository Receipts (G/ADRs), privatisations, market transfers, listings by non-UK firms and firms with missing prospectuses and other data. Panel B shows the descriptive statistics of 580 sample IPOs. The variables are defined in Table1. Variable Age is measured in years rounded up to the next highest full year.

Panel A: Sample Selection

From 1990-1997		
Total estimated number of LSE Main Market Listings	724	
-Less: Investment Trusts, Venture Capital Trusts(VCTs),re-admissions, privatisations , market transfers and firms with missing data and prospectuses	- 346	
Equals: Sample IPOs from 1990-1997		**= 378**
From 1998-2006		
Total number of listings on LSE Main Market	686	
-Less: Listings by non UK firms	- 130	
-Less: Investment Trusts, Investment Entities, foreign listings, VCTs, missing data etc.	- 354	
Equals: Sample IPOs from 1999-2006		**= 202**
Total Sample IPOs from 1990-2006		**= 580**

Panel B: Sample Descriptive Statistics

Variables	**Mean**	**Median**	**Standard Deviation**	**Min**	**Max**
Lockup Period (Months)	15.391	13	6.213	2	41
Size (£ millions)	259.157	64.726	712.280	1.050	7725
Age (Years)	7.112	4	11.513	1	95
Initial Returns (%)	11.176	6.935	18.994	-51.880	139.100
Insider Ownership (%)	50.002	51.900	19.806	0	91.940
Sponsor Reputation	0.336	0	0.473	0	1
PEVC	0.514	1	0.500	0	1
HOT Period	0.595	1	0.491	0	1

Table 3

Sample IPOs by Industry and Year of Listing

This table presents the distribution of 580 sample IPOs by year of listing and across Industry sectors based on FTSE Global Classification system.

Year	Basic Industries	Cyclical Consumer Goods	Cyclical Services	Financials	General Industrials	Information Technology	Non-Cyclical Consumer Goods	Non-Cyclical Services	Resources	Total	%
1990	0	1	4	0	1	0	1	0	2	9	1.6%
1991	0	1	5	2	0	0	1	0	0	9	1.6%
1992	2	4	9	0	4	2	2	0	0	23	4.0%
1993	9	2	12	9	7	5	14	0	3	61	10.5%
1994	10	11	28	17	6	16	12	2	3	105	18.1%
1995	7	6	14	2	8	2	6	1	2	48	8.3%
1996	7	5	25	4	5	7	8	4	1	66	11.4%
1997	5	4	21	5	3	7	6	3	3	57	9.8%
1998	1	0	19	2	3	0	7	1	1	34	5.9%
1999	0	0	6	3	1	9	1	3	1	24	4.1%
2000	0	0	14	6	1	34	7	2	1	65	11.2%
2001	0	0	3	0	0	1	0	2	0	6	1.0%
2002	0	0	6	2	0	1	2	0	3	14	2.4%
2003	0	0	1	1	0	1	0	0	3	6	1.0%
2004	0	2	7	1	1	2	2	2	0	17	2.9%
2005	2	0	4	2	0	1	5	1	1	16	2.8%
2006	1	0	7	4	1	1	4	0	2	20	3.4%
Total Sample	44	36	185	60	41	89	78	21	26	580	100%
%	7.6%	6.2%	31.9%	10.3%	7.1%	15.3%	13.4%	3.6%	4.5%	100%	

Table 4

Sample IPOs by Year of Listing, PEVC backing and type of Lockup

This table shows the composition of our sample in terms of PEVC backing and the types of lockups. Panel A breaks down the 580 sample IPOs separately for PEVC and non-PEVC backing across listing years. Panel B reports numbers and percentages of IPOs across listing years for each lockup type. Absolute date expiry lockups are set in terms of clear calendar dates or certain period of time after the IPO and usually give the exact length of the lockup period. The relative date expiry lockups specify the expiry in relation to some corporate events like preliminary results announcements or publication of company accounts etc. Combination represents cases where both types are combined over different periods or different types of shareholders.

Year	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Panel A: PEVC Backing																	
PEVC Backed #	3	4	14	40	50	25	29	23	18	10	31	4	9	2	16	10	10
Non PEVC Backed #	6	5	9	21	55	23	37	34	16	14	34	2	5	4	1	6	10
PEVC Backed %	33	44	61	66	48	52	44	40	53	42	48	67	64	33	94	63	50
Non PEVC Backed %	67	56	39	34	52	48	56	60	47	58	52	33	36	67	6	38	50
Panel B: Lockup Type																	
Absolute Expiry #	4	1	1	15	25	11	18	15	16	9	41	3	9	6	9	12	15
Relative Expiry #	2	5	18	35	61	30	38	30	15	12	19	2	5	0	4	0	3
Combination #	0	0	0	5	5	0	1	0	1	1	4	1	0	0	4	4	2
Absolute Expiry %	67	17	5	27	27	27	32	33	50	41	64	50	64	100	53	75	75
Relative Expiry %	33	83	95	64	67	73	67	67	47	55	30	33	36	0	24	0	15
Combination %	0	0	0	9	5	0	2	0	3	5	6	17	0	0	24	25	10

Table 5

Kaplan Meier Survival Rates

This table shows the cumulative survival rates for sample IPOs calculated using the Kaplan Meier (KM) method (section 4) for each of one to five years after the IPO. Based on the survival rates, we also show the median survival times in months (Median ST). Median ST indicates the number of months after which half of the sample IPOs have been delisted (the cumulative survival rate has dropped below 50%). The survival rates and median survival times are reported separately for listing years (Panel A), for industry sectors (Panel B) and for full sample (Panel C). In Panel A, figures in parenthesis show the minimum survival times calculated following Espenlaub et al. (2012). Minimum Survival Time (ST) is the time remaining from the issue year until the end of the study period (December 2011) and shows that cumulative survival rates up to the end of December 2011have not yet dropped below 50%.

	Full Sample						
Panel A:		Cumulative Survival Rates					
Issue Year	**Obs**	**1 Yr**	**2Yrs**	**3 Yrs**	**4Yrs**	**5 Yrs**	**Median ST**
1990	9	100	100	89	89	78	109
1991	9	100	100	89	89	89	136
1992	23	100	96	96	87	78	92
1993	61	100	95	92	82	75	88
1994	105	98	93	90	81	68	85
1995	48	100	90	81	69	63	75
1996	66	100	92	82	73	68	105
1997	57	100	88	79	74	67	106
1998	34	100	88	68	65	55	71
1999	24	96	92	87	83	83	99
2000	65	98	92	75	69	63	75
2001	6	100	100	83	83	50	51
2002	14	100	100	93	93	93	(111)
2003	6	100	100	100	100	67	(98)
2004	17	100	94	88	76	76	(87)
2005	16	100	88	75	56	56	71
2006	20	100	100	95	95	85	(61)
Panel B: Industry							
Basic Industries	44	100	95	84	80	73	85
Cyclical Consumer Goods	36	100	100	89	75	64	75
Cyclical Services	185	99	93	84	76	67	99
Financials	60	97	95	87	72	65	82
General Industrials	41	100	88	83	78	70	90
Information Technology	89	100	91	84	80	72	95
Non-Cyclical Consumer Goods	78	99	91	82	76	73	92
Non-Cyclical Services	21	100	86	81	67	62	79
Resources	26	100	96	92	92	76	155
Panel C: Full Sample							
Total	**580**	**99**	**93**	**84**	**77**	**69**	**92**

Table 6

Kaplan Meier Survival Rates stratified by Lockup Length

This table shows the cumulative survival rates for 517 IPOs with lockups only calculated using the Kaplan Meier (KM) method (section 4) for one, three and five years after the IPO. Based on the survival rates, we also show the median survival times in months (Median ST). Median ST indicates the number of months after which half of the sample IPOs have been delisted (the cumulative survival rate has dropped below 50%). The survival rates and median survival times are reported by dividing the IPOs into below and above median lockup length across industry sectors (Panel A) and in Panel B for three different lockup lengths; 0-12 months, 13-24 months and greater than 24 months. Panel B also shows the results of log rank test to assess the statistical significance of differences between survival curves across lockup lengths.

Panel A: Kaplan Meier Survival Rates by Median Lockup Length

	Lockup > Median					**Lockup < Median**				
		Cum. Survival Rates					Cum. Survival Rates			
Industry	**Obs**	**1Yr**	**3Yrs**	**5Yrs**	**Median ST**	**Obs**	**1Yr**	**3Yrs**	**5Yrs**	**Median ST**
Basic Industries	19	100	79	63	93	17	100	94	88	107
Cyclical Consumer Goods	15	100	100	79	75	17	100	82	53	66
Cyclical Services	80	100	89	67	93	81	99	81	70	102
Financials	23	96	87	74	92	25	96	84	56	64
General Industrials	24	100	83	75	101	11	100	82	64	79
Information Technology	35	100	83	71	88	50	100	84	71	98
Non-Cyclical Consumer Goods	39	100	85	77	99	36	100	81	69	75
Non-Cyclical Services	10	100	80	70	79	11	100	82	55	71
Resources	12	100	100	92	161	12	100	83	56	91
	257	**100**	**87**	**72**	**92**	**260**	**99**	**83**	**67**	**87**

Panel B: Kaplan Meier Survival Rates by Lockup Length

Lockup Length		Cumulative Survival Rates					
	Obs	**1Yr**	**2Yrs**	**3Yrs**	**4Yrs**	**5Yrs**	**Median ST**
0-12 Months	231	99	94	83	74	67	88
13-24 Months	255	100	91	86	79	71	90
> 24 Months	31	100	94	90	87	77	140
Log Rank Test for Equality of Survivor Function							
Chi-Square	5.95						
P-value	0.050						

Table 7

Reasons of Delisting by Industry

This table shows the post-IPO state of sample firms segmented by industry sectors. The numbers and percentages show the survivor firms and those delisted due to M&A, Administration/Liquidation and Other reasons. Survivors are defined as firms which are listed by the end of study period (December 2011) or transferred to another market.

Industry	**Survivors**	**%**	**M & A**	**%**	**Administration/ Liquidation**	**%**	**Other Delisting**	**%**	**Total**
Basic Industries	15	34%	28	64%	1	2%	0	0%	44
Cyclical Consumer Goods	8	22%	21	58%	6	17%	1	3%	36
Cyclical Services	56	30%	106	57%	15	8%	8	4%	185
Financials	18	30%	38	63%	2	3%	2	3%	60
General Industrials	15	37%	24	59%	2	5%	0	0%	41
Information Technology	29	33%	44	49%	9	10%	7	8%	89
Non-Cyclical Consumer Goods	21	27%	46	59%	8	10%	3	4%	78
Non-Cyclical Services	8	38%	9	43%	4	19%	0	0%	21
Resources	15	58%	8	31%	1	4%	2	8%	26
Total	185	32%	324	56%	48	8%	23	4%	580

Table 8

Univariate Analysis of Survivors and Non-Survivors

This table show the means, medians and standard deviations of the variables defined in Table 1 separately for survivor IPOs and non-survivor IPOs. Survivors are defined as firms which are listed by the end of study period (December 2011) or transfer to another market. Non-Survivors are IPO firms which have delisted (failed) by end of December 2011. Equality of means is assessed using a t-test estimated under assumption of unequal variances. Equality of medians is assessed using Man-Whitney two sample test. ***, ** and * indicate levels of statistical significance at 1, 5 and 10% respectively.

	Survivor IPOs 185 Obs			Non-Survivor IPOs 395 Obs				
Variables	Mean	Median	Std Dev.	Mean	Median	Std Dev.	Test of Equality of Means	Test of Equality of Medians
Lockup Period	15.853	13.000	7.301	15.164	13.000	5.601	1.083	0.174
Size	385.196	102.8	816.405	200.126	57.55	650.648	2.936***	4.089***
Age	6.649	4.000	10.924	7.329	4.000	11.786	-0.681	-0.421
Initial Returns	12.056	6.54	21.491	10.764	7	17.719	0.763	0.031
Insider Ownership	50.493	53.87	21.596	49.772	51.1	18.935	0.408	0.913
Sponsor Repute	0.351	0.000	0.479	0.329	0.000	0.470	0.524	
PEVC	0.427	0	0.496	0.554	1	0.498	-2.877***	
HOT Period	0.514	1.000	0.501	0.633	1.000	0.483	-2.706***	
Industry Dummies								
Basic Industries	0.081	0	0.274	0.073	0	0.261	0.324	
Cyclical Consumer Goods	0.043	0	0.204	0.071	0	0.257	-1.286	
Cyclical Services	0.303	0	0.461	0.327	0	0.470	-0.574	
Financials	0.097	0	0.297	0.106	0	0.309	-0.332	
General Industrials	0.081	0	0.274	0.066	0	0.248	0.667	
Information Technology	0.157	0	0.365	0.152	0	0.359	0.151	
Non-Cyclical Consumer Goods	0.114	0	0.318	0.144	0	0.352	-1.012	
Non-Cyclical Services	0.043	0	0.204	0.033	0	0.179	0.62	
Resources	0.081	0	0.274	0.028	0	0.165	2.904***	

Table 9

Correlation Matrix

This table provides correlation coefficients across the variable used in our regression model specified in equation 3. All variables are defined in Table 1. ** indicate significance at 5% level.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Lockup Period	1.000															
2. Size	-0.174**	1.000														
3. Age	-0.021	0.022	1.000													
4. Initial Returns	-0.051	-0.012	-0.066	1.000												
5. Insider Ownership	0.026	0.017	0.000	0.095**	1.000											
6. Sponsor Reputation	-0.044	0.408**	-0.017	0.015	-0.017	1.000										
7. PEVC	-0.054	0.039	-0.010	0.029	-0.065	0.086**	1.000									
8. HOT Period	0.036	-0.203**	-0.04	0.010	0.014	-0.052	-0.016	1.000								
9. Basic Industries	0.002	-0.074	0.005	-0.047	-0.054	-0.025	0.057	0.091**	1.000							
10. Cyclical Consumer Goods	0.001	-0.135**	-0.037	-0.049	-0.036	-0.092**	0.064	0.038	-0.074	1.000						
11. Cyclical Services	-0.006	-0.028	0.115**	-0.018	-0.031	-0.041	-0.074	-0.128**	-0.196**	-0.176**	1.000					
12. Financials	0.006	0.129**	-0.01	-0.111**	-0.07	0.022	-0.145**	0.027	-0.097**	-0.087**	-0.232**	1.000				
13. General Industrials	0.014	-0.119**	-0.001	-0.003	0.027	-0.025	0.026	0.036	-0.079	-0.071	-0.189**	-0.094**	1.000			
14. Information Technology	-0.098**	0.066	-0.017	0.284**	0.132**	0.092**	0.117**	0.108**	-0.122**	-0.109**	-0.291**	-0.145**	-0.117**	1.000		
15. Non-Cyclical Consumer Goods	0.079	-0.009	-0.059	-0.075	-0.016	0.019	0.080	0.006	-0.113**	-0.101**	-0.270**	-0.134**	-0.109**	-0.168**	1.000	
16. Resources	0.036	0.064	-0.067	-0.093**	-0.001	0.022	-0.056	-0.093**	-0.062	-0.056	-0.148**	-0.074	-0.060	-0.092**	-0.085**	1.000

Table 10

Accelerated Failure Time (AFT) Estimation Results

This table shows the estimation results of Accelerated Failure Time (Time) model. The Lognormal density distribution was selected based on the Akaike (1974) Information Criterion (AIC). All variables are defined in Table 1. Time ratios are the exponentiated coefficients, exp (β), and measure the extent to which changes in covariates accelerate or decelerate the occurrence of event (delisting). A time ratio of above (below) one indicates that increase in the covariate increases (reduces) the survival time. Pseudo R^2 were estimates as $R^2 = 1 - Lu/Lo$; where *Lu* corresponds to the last log-likelihood number before the convergence and *Lo* corresponds to the first log-likelihood number at the start of the iteration. ***, ** and * indicate the statistical significance at 1, 5 and 10% respectively.

Variables	***Coeff.***	***P-value***	***Time Ratio***
Lockup Period	0.021***	0.003	1.022
Ln (Size)	0.081**	0.030	1.085
Ln (Age)	0.012	0.761	1.012
Initial Returns	0.001	0.538	1.001
Insider Ownership	-0.003	0.182	0.997
Sponsor Reputation	-0.046	0.633	0.955
PEVC	-0.277***	0.002	0.758
HOT Period	-0.016	0.856	0.984
Industry Dummies			
Basic Industries	0.512*	0.060	1.669
Cyclical Consumer Goods	0.291	0.290	1.338
Cyclical Services	0.243	0.281	1.276
Financials	0.028	0.911	1.029
General Industrials	0.278	0.306	1.321
Information Technology	0.211	0.379	1.234
Non-Cyclical Consumer Goods	0.209	0.384	1.233
Resources	0.534*	0.079	1.706
Constant	3.929	0.000	
Log-likelihood	-579.271		
LR(Prob.>chi)^2	28.36**		
Pseudo R^2	0.113		
Time at Risk	47782.2		
N	517		

Table 11

Sensitivity of Survival Time to Changes in Median Lockup Period

This table shows the actual, absolute and percentage change in the predicted median survival time as the lockup length varies by multiples of 1 to 12 months, holding all other variables at their mean values. The changes to the predicted median survival time are calculated relative to the base predicted survival time at median of lockup and means of all other independent variables. At median (13 months) of lockup and means of all other independent variables, the predicted median survival time equals 89 months. This table is based on AFT coefficient estimates in Table 10.

Variable	**+ 12**	**+ 9**	**+ 6**	**+ 3**	**+ 1**	**Median Lockup**	**- 1**	**- 3**	**- 6**	**- 9**	**- 12**
Expected Survival Time (months)	115	108	101	95	91	89	87	84	79	74	69
Absolute Change (months)	26	19	12	6	2		-2	-5	-10	-15	-20
Percentage Change (%)	29.5	21.5	13.9	6.9	2.4		-1.9	-5.9	-11.8	-17.2	-22.4

Table 12

Cox Proportional Hazard Model Results

This table shows the estimation results of Cox Proportional Hazard model. All variables are defined in Table 1. The hazard ratio is calculated as the exponential of coefficient estimate, exp (β). A hazard ratio of above (below) one indicates that increase in the explanatory variable increases (reduces) the failure rate. Pseudo R^2 were estimates as $R^2 = 1 - Lu/Lo$; where *Lu* corresponds to the last log-likelihood number before the convergence and *Lo* corresponds to the first log-likelihood number at the start of the iteration. ***, ** and * indicate the statistical significance at 1, 5 and 10% respectively.

Variables	***Coeff.***	***P-value***	***Hazard Ratio***
Lockup Period	-0.022**	0.016	0.979
Ln (Size)	-0.106**	0.025	0.900
Ln (Age)	0.009	0.869	1.009
Initial Returns	0.000	0.990	1.000
Insider Ownership	0.004	0.147	1.004
Sponsor Reputation	0.135	0.288	1.144
PEVC	0.382***	0.001	1.465
HOT Period	0.009	0.940	1.009
Industry Dummies			
Basic Industries	-0.634*	0.083	0.531
Cyclical Consumer Goods	-0.176	0.621	0.839
Cyclical Services	-0.304	0.311	0.738
Financials	0.024	0.942	1.024
General Industrials	-0.336	0.347	0.715
Information Technology	-0.244	0.440	0.783
Non-Cyclical Consumer Goods	-0.183	0.566	0.832
Resources	-0.673	0.116	0.510
Log-likelihood	-1914.128		
LR(Prob>chi)^2	30.50**		
Pseudo R^2	0.093		
Time at Risk	47782.2		
N	517		