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Lockup Agreements and Survival of UK IPOs

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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 1990–2011. Our accelerated failure time (AFT) survival model shows a statistically and economically significant effect of lockup length on the post-IPO survival. A 12 month increase in median lockup period increases the (median) survival time by 27%. Furthermore, the failure rates for IPOs with longer lockups are consistently lower than the failure rates for IPOs with shorter lockups regardless of delisting reasons. The results are robust to choice of different survival estimation models, heterogeneity, clustering, and alternative specification of variables. Our results highlight the importance of lockup characteristics on the subsequent survival of newly listed firms and inform recent debate regarding alleged short-termism in the UK equity market. (Paper received February, 2013; revised version accepted December, 2013).

Keywords: IPOs, lockups, survival, going private, private equity

1. INTRODUCTION

Lockups prevent firms' insiders from selling whole or some percentage of their equity during post-IPO periods. Existing literature shows that the majority of US and UK firms go public with voluntary lockups (Espenlaub et al., 2001; Field and Hanka, 2001; Mohan and Chen, 2001; Hoque, 2011) and tends to focus on roles of lockups and their price effect around expiry dates (Brav and Gompers, 2003; Brau et al., 2004; Arthurs et al., 2009; Yung and Zender, 2010). Although IPOs' survival has been studied before (Jain and Kini, 2000, 2008), the association of the survival and characteristics of lockups has not received attention in the past.[1] We extend the literature by studying the relationship between lockup length and long term performance (i.e., survival)

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1 Jain and Kini (2000; 2008), for example, examine the impact of strategic investment decisions and the presence of venture capital on the survival profile of US IPO firms. Prior literature has also identified firm survival in the long term as a consistent measure of firm performance and a prerequisite of success in other terms such as market share and profitability (Suárez and Utterback, 1995; Welbourne and Andrews, 1996; Audretsch and Lehmann, 2005).

of 580 IPOs from the London Stock Exchange's (LSE) Main Market, during the period of January 1990 to December 2011. The innovative aspect of our study is also a separate examination of longevity and probability of post-IPO failure. The importance of length of lockup periods for the probability of survival was examined using an Accelerated Failure Time (AFT) survival model. We further make a distinction between "positive" (e.g., mergers and acquisitions) and "negative" (e.g., failures) reasons for delistings and control for alternative signalling mechanisms utilized by IPO firms.

The examination of the relationship between lockups and survival for IPOs from the LSE Main Market is important for several reasons. First, the LSE is the leading European and one of the world's largest stock markets.[2] Second, in contrast to some markets such as France, Germany (Goergen et al., 2006a) and Singapore (Chong and Ho, 2007) lockups are completely voluntary for Main Market IPOs.[3] The LSE Main Market, therefore, provides an excellent setting for testing the relationship between lockups and firm survival which might not have been relevant in the case of countries/markets with compulsory lockups. Third, lockups for LSE IPOs are quite diverse and heterogeneous particularly in terms of their length. For example, Espenlaub et al. (2001) report average lockup length of 561 days whilst Hoque (2011) reports variation from 383 to 714 days for UK IPOs. This is in sharp contrast to the US findings of standardised lockups of 180 days (Field and Hanka, 2001; Brav and Gompers, 2003; Brau et al., 2004; Yung and Zender, 2010). The diversity of lockup length in Main Market IPOs allows us to examine the role of lockups in IPO survival which would not have been possible in markets with short and/or standardised lockups. Fourth, recent government (Kay, 2012) and industry (BBC, 2013; Deloitte, 2013) reports expressed concerns regarding short-termism of UK listed companies. The alleged short-termism fails to create incentives for long-term performance improvements. Kay (2012), for example, recommends that directors' remuneration should be linked to long-term performance and incentives should be provided in the form of company shares locked-in until director's retirement. More recently, some of the leading institutional investors in European companies argue in favour of lengthening incentive schemes in order to promote the companies' investments and prevent short-termism.[4] Examination of the relationship between various incentive schemes and longevity is thus important for informing the above debate.

We argue that the length of lockup at the time of going public has the potential to influence the post-issue survival as a listed company. Longer lockups expose firms' insiders to significant illiquidity and non-diversification costs in the post-IPO period. Consequently, only insiders of better quality firms with strong survival prospects will be willing to commit to longer lockups whilst insiders in low quality firms will avoid lengthy lockups. In addition, lockups force "insiders to not only put their money where their mouth is but to keep it there as well" (Brau et al., 2005). In this way, lockups work

2 In 2005, LSE saw 354 IPOs with offering value of €18.6 billion. This was more than the combined volume of all US exchanges in the same year. See PriceWaterhouseCoopers (2006).

3 In the LSE's Alternative Investment Market (AIM), lockups have been compulsory for certain IPO firms since 2000. For example, IPO firms on AIM which have not been independent and/or have not reported earning revenues for at least 2 years are required to have 1 year lockups for related directors, substantial shareholders and their associates and employees (AIM Rule 7).

4 For example, Fidelity Worldwide Investment announced that it would start voting against management compensation plans unless companies' executives would commit to hold shares longer than 3 years before cashing them in (BBC, 24th September 2013).

as a commitment mechanism to reduce agency problems and managerial incentives of shirking and consumption, leading to increased firm performance and survival in the aftermarket. Hence, longer lockups are likely to positively affect the survival of IPOs. Our analysis is related to Bharath and Dittmar (2010) who find that some of the variables (available at the time of IPOs) can predict which firms are more likely to go private.

Our results suggest an increasing popularity of lockups with clearly defined lockup periods in terms of a calendar date, rather than in relation to various corporate events. The sample IPO lockup periods range from 2 to 41 months with a mean (median) of 15.39 (13) months. The median sample IPO survival period was 92 months, with 69% surviving for at least 5 years. Our analysis highlights the importance of the length of lockup periods for the survival of issuing firms. For example, a 12 month increase in median lockup period increases the (median) survival period by 24 months. The results of our survival model confirm positive and statistically significant association of the survival rates and lockup period. Overall, the results of our study are in line with the recent calls from both regulators and investment industry for lengthier incentive schemes.

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

2. PREVIOUS LITERATURE AND HYPOTHESES

(i) Lockups and Survival

The extant literature on the motivations for use of lockups suggests that lockups signal issuing firm's quality and serve as a "commitment device" (Brav and Gompers, 2003; Brau et al., 2005; Goergen et al., 2006b). For example, lockup puts a penalty on inside managers for hiding negative information about firm value and serves as a bonding mechanism to regulate the actions of insiders. 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 the insiders can cash out. Brav and Gompers (2003) and Yung and Zender (2010), for example, suggest that better quality US firms are likely to accept longer lockups to alleviate the problem of moral hazard subsequent to the IPO. Similarly, Arthurs et al. (2009) suggest that lockup periods tend to be used when other quality signals (e.g., venture capital (VC) backing, more reputable sponsors, etc.) are not available. In addition to the signalling effect, the longer length of the lockup period may be beneficial for strategic managerial decisions (e.g., extent of R&D spending, capital expenditure, advertising and expansion) made during the early post-IPO period (Jain and Kini, 2009; Chandy and Sivasubramaniam, 2011). The above decisions ultimately affect the performance and the survival of IPOs in the long run. Thus, we expect a positive association of IPOs' survival and length of lockup period.

(ii) Alternative Signalling Mechanisms

The previous US evidence suggests a positive role of VC backing (Megginson and Weiss, 1991; Jain and Kini, 2000), underwriters' reputation (Carter and Manaster, 1990; Bhattacharya et al., 2013) and initial returns (Schultz, 1993; Hensler et al., 1997; Demers and Joos, 2007) on the subsequent performance and survival of IPO firms. Studies on UK IPOs, however, have largely failed to find significant differences between private equity (PE) and non-PE backed IPOs in terms of their post-issue performance (Jelic et al., 2005; Coakley et al., 2007; Jelic and Wright, 2011; Espenlaub et al., 2012). Espenlaub et al. (2012) fail to find significant impact of initial returns on survival of AIM IPOs but report that IPOs sponsored by reputed Nomads (sponsors) on the UK's Alternative Investment Market (AIM) survive longer compared to those backed by other Nomads.

Evidence regarding impact of insider ownership on post-issue performance and survival of IPOs is also mixed. Consistent with Leland and Pyle's (1977) prediction, Jain and Kini (1994) find a positive relationship between managerial ownership retention and post-issue operating performance. Similarly, Hensler et al. (1997) and Jain and Kini (2008) find a positive impact of higher insider ownership on survival of US IPOs. Goergen and Renneboog (2007), howevever, conclude that long-term performance of IPOs is not correlated with UK IPOs' retained ownership. Overall, the evidence on the importance of alternative signalling mechanisms on IPO survival is inconclusive. Their association with the IPO survival will be, therefore, determined empirically.

3. DATA AND METHODOLOGY

(i) Data and Sample Construction

Panel A, of Table 1, describes the filters we use to construct our final sample of IPOs. For example, we exclude investment trusts, venture capital trusts (VCTs), privatisations, re-admissions, non-UK firms and firms with missing data and IPO prospectuses. The above exercise resulted in 580 IPOs from the LSE Official List between January 1990 and December 2006.[5]

As noted earlier, survival as an independent public listed company (PLC) is a necessary condition of success for firms that went public in order to finance their growth prospects.[6] Being public enhances both the credibility and reputation of a firm and improves its ability to hire key managers through incentives such as stock options (Bancel and Mittoo, 2009). Similarly, other stakeholders (e.g. board members and executives, underwriters, auditors, brokers, legal advisors etc.) have their interests linked with the continued listing of a firm on the stock market (Espenlaub et al., 2012). We, therefore, define survivors as IPO firms which remain listed on the stock

5 For IPOs between 1990 and 1997, we use Thomson One Banker and Perfect Filings databases. The data for IPO activity from 1998–2006 were obtained from the LSE website.

6 For example, public listings provide firms with better access to capital markets, visibility within the investment community, higher liquidity and pricing efficiency and are also ssociated with lower borrowing cost. Listings (i.e., IPOs) represent the most critical benchmark of a company's operating performance (Hsu et al., 2010). For the above reasons, going public is often seen as a rite of passage in the life-cycle of a young successful firm (Ritter, 1991).

Table 1

Sample Selection and Definitions of the Variables

Panel A: Sample Selection		
Total estimated number of LSE Main Market Listings	1,410	
-Less: Investment Trusts, Venture Capital Trusts(VCTs), re-admissions, privatisations, market transfers and firms with missing data and prospectuses	− 700	
-Less: Listings by non-UK firms	− 130	
Sample IPOs from 1999–2006	**580**	
Survival of Sample IPOs from 1990–2011		**580**

Panel B: Definitions of Variables		
Variable	*Definition*	*Data Source*
Lockup Period	Length of lockup period in months.	IPO Prospectus, PI Navigator
Size	Size is the market capitalisation at the offer price in £ millions.	London Stock Exchange, IPO Prospectus
Age	Age has been calculated as the difference (in years) between the date of IPO and the date the company was founded. Age is in years rounded up to the next highest full year.	IPO prospectus
Initial Returns	First day closing price minus offer price divided by the offer price; in percentages.	London Stock Exchange, Datastream
Insider Ownership	Insider (directors and officers) ownership at the time of IPO; in percentages.	IPO Prospectus
Sponsor Reputation	The sponsor reputation is measured as the number of IPOs sponsored by a sponsor as a percentage of the total number of IPOs during the year prior to the IPO year, following Goergen et al. (2006a) and Espenlaub et al. (2012).	London Stock Exchange, IPO Prospectus

Table 1 (Continued)

Panel B: Definitions of Variables

Variable	*Definition*	*Data Source*
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 Issue Returns	Average initial returns to all IPOs issued during the 3 months prior to the month of IPO, following Espenlaub et al. (2012).	London Stock Exchange
Leverage	Total liabilities divided by the sum of total assets and issue proceeds at the date of IPO, following Demers and Joos (2007).	IPO Prospectus
Survtime	The number of months between the IPO date and the delisting date.	London Share Price Database
Industry Dummies	Binary Industry dummies based on the 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 and Resources	London Stock Exchange, IPO Prospectus

Note:
Panel A describes the selection filters for our sample of IPOs during 1990–2006. We estimate number of listings for the period 1990–97 form Thomson One Banker & PI Navigator. The data for listing activity for the period 1998–2006 are from the LSE website (www.londonstockexchange.com/statistics/historic/company-files/company-files.htm). 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. The survival of sample firms was traced during January 1990-December 2011. Panel B defines all variables and provides their sources.

Table 2
Descriptive Statistics

Variables	*Mean*	*Median*	*Standard Deviation*	*Min*	*Max*
Lockup Period (Months)	15.391	13.000	6.213	2.000	41.000
Size (£ millions)	259.157	64.726	712.280	1.050	7,725.000
Age (Years)	17.360	11.000	18.172	1.000	102.000
Initial Returns (%)	11.176	6.935	18.994	−51.880	139.100
Insider Ownership (%)	24.705	19.790	21.609	0.000	80.900
Sponsor Reputation (%)	2.991	2.080	3.211	0.000	15.380
Hot Issue Returns (%)	13.322	11.590	10.310	−14.430	64.420
Leverage	0.370	0.351	0.233	0.000	1.398
PEVC	0.514	1.000	0.500	0.000	1.000

Note:
This table presents descriptive statistics of sample firms. All variables are defined in Table 1.

exchange as long as the benefits of listing are greater than the cost of remaining listed.[7] When costs outweigh the benefits, firms can completely delist (i.e., go private) and become private thus expecting lower costs (Bharath and Dittmar, 2010). Going private firms were classified as non-survivors and included in the sub-sample of acquired companies.[8] Another possibility for UK IPOs, in cases where costs outweigh the benefits, is to transfer to the second tier market with the ability to raise additional capital at significantly lower costs.[9] Consistent with previous literature (Espenlaub et al., 2012, Vismara et al., 2012) these firms are classified as survivors.

Based on the above criteria, we established and traced survival of our sample IPOs up to December 2011. The dates and reasons of delisting of IPOs are obtained from the London Share Price Database (LSPD). The dates and delisting reasons of sample IPOs are further cross-referenced with the Perfect Filings database. We hand collect the following variable directly from IPO prospectuses: lockup information, sponsors, insider ownership, incorporation date, market capitalisation, industry and private equity (PE) or VC backing. For relative expiry lockups, we use Perfect Filings to find the corporate announcement dates and the exact lockup expiry.[10] The data for initial returns are obtained from Datastream. All variables are defined in Panel B of Table 1.

Table 2 presents sample descriptive statistics. Out of the sample IPOs, 517 (89%) have lockups in place for at least one class of shareholder. The average lockup period of the sample IPOs is 15.39 months (468 days), measured as number of

7 We acknowledge that survival as a public company might not be the ultimate aim of firms going public. IPOs may represent the first stage in the sale of a firm by establishing the market value of shares. Firms also engage in IPO with a view to being taken over (Zingales, 1995). However, it is very difficult, if not impossible, to infer the intent to sell from at the time of listing. What is directly observable, however, are the reasons for listings stated in IPO prospectuses. The majority of firms, for example, state that the main reason for listing is to raise money (Kim and Weisbach, 2008) which is consistent with our definition of survival (i.e., continued listing).Unreported results suggest (as expected) that the ability to raise new capital was the most frequently stated reason for listings in IPO prospectuses.

8 Going private transactions are normally completed via management buy-outs, tender offers and acquisitions by financial institutions (see Borden and Yunis, 2007). Treating mergers and acquisitions as non-survivors is consistent with previous literature (see Jain and Kini, 2000).

9 In the US, firms would have yet another choice. For example, they can also exit mandatory disclosure while continue to be publicly traded (i.e., go dark) (see Leuz et al., 2008).

10 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).

months from IPO date until the lockup expiry date. 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. The average size (market capitalisation) of IPO firms at the time of listing is £259.16 million. There is also a large variation in terms of the market capitalisation of IPOs with a minimum of just £1.05 million and a maximum of £7,725 million. Firms list with an average age of 17.36 years at the time of IPO.[11] The issuing firms exhibit average initial returns of 11.18% during the sample period. The sample firms go public with insiders holding an average (median) of 24.71% (19.79%) of the post-IPO equity stakes. The average sponsor market share as a percentage of total sponsorship by IPO numbers is 2.99% with a maximum of 15.38%. More than half (51.4%) of the IPO firms are backed by PE or VC. The average initial return of all the IPOs in the 3 months prior to the firm's IPO month is 13.32%. The highest average initial return of 64.42% is experienced in the first quarter of year 2000. The mean leverage ratio for the sample firms is 0.37.

(ii) Methodology

Survival analysis is preferred over the conventional statistical methods (e.g., ordinary least square (OLS), binary dependent variable models etc.) due to a number of benefits. For example, 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. On the other hand, survival analysis not only allows for censoring and different time horizons, it can also handle the time dependent variables.

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)

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

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 sub-samples (lockup length). We also compare the median survival times across different groups and sub-samples. 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 the context of our analysis, median survival time is the

11 Age is defined as number of years between the IPO date and the date the company was established. We take company establishment date as reported in the "introduction/historical background" section of the prospectus.

time in months when cumulative survival rate for sample IPOs has dropped to 50% (i.e., 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 (i.e., 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, 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:

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

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.). Unreported results for Akaike's Information Criterion (AIC) identify lognormal as the most appropriate distribution with the lowest AIC value.[12] 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:

$$\begin{aligned} Ln(T_j) = {} & \beta_0 + \beta_1 LockupPeriod + \beta_2 Ln(Size) + \beta_3 Ln(Age) + \beta_4 InitialReturns \\ & + \beta_5 InsideOwnership + \beta_6 SponsorReputation + \beta_7 HotIssueReturns \\ & + \beta_8 Leverage + \beta_9 PEVC + \beta_{10} IndustryDummies + \varepsilon_j \end{aligned} \tag{3}$$

Where $Ln(T_j)$ is natural logarithm of time to delisting or survival time and covariates are as defined in Table 1 (Panel B). *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 IPO date and the date the company was established. *Initial Return* is the difference of first day closing price and offer price as a percentage of offer price. *Insider Ownership* is the percentage of post-IPO equity retained by the firms' insiders. *Sponsor Reputation* for each sponsor is measured as the number of IPOs sponsored in the year prior to the IPO as a percentage of total IPOs in that year. *PEVC* is a dummy variable coded one for IPOs backed by PE or VC, and zero otherwise. *Hot Issue Returns* is a proxy for market hotness and is defined as the average of initial returns of all IPOs issued in the 3 months prior to the month of IPO. *Leverage* is the ratio of total liabilities divided by the sum of total assets and IPO proceeds. We include dummies for industry sectors based on the FTSE Global Classification as outlined in Table 1 (Panel B).[13]

Size, age, leverage, industry and market conditions were identified in the previous literature as important for IPO survival. Large firms, for example, have less valuation

12 For more on use of AIC to distinguish between different non-nested parametric models, see Allison (2010).

13 A correlation matrix with all variables is provided in Appendix Table A1.

uncertainty (Brav and Gompers, 2003) and better resources to cope with poor market conditions compared to the small IPOs (Hensler et al., 1997). Larger IPOs, therefore, are likely to have better survival and probability of delisting is inversely related to the IPO size (Schultz, 1993). Similarly, Schultz (1993) shows that probability of failure decreases with increasing age and Demers and Joos (2007) find that younger (less established) firms are more likely to fail. Industry effect on the performance and survival of IPOs has also been documented in the previous literature (Ritter, 1991; Hensler et al., 1997; Hamza and Kooli, 2010; Carpentier and Suret, 2011). Hensler et al. (1997), for example, observe shorter survival times for IPOs in computer, wholesale, restaurant and airline industries. Firms with higher levels of debt are more likely to accept mergers or being taken over in order to avoid bankruptcy (Loderer et al., 2009). Consistent with these predictions, a number of studies have reported that IPO firms with higher leverage are more likely to delist (Demers and Joos, 2007; Bhattacharya et al., 2010). Finally, previous evidence suggests a negative relationship between hot market periods and IPO survival (consistent with the window of opportunity theory, Ritter (1991) and Loughran and Ritter (2004). We, therefore, control for the above variables when examining importance of lockups for the survival of IPO firms.

4. RESULTS

(i) Characteristics of Sample Firms and Lockups

In Table 3, we provide the number and percentage of sample IPOs by PEVC backing (Panel A), type of lockup (Panel B) and summary statistics for lockup length across the sample years (Panel C). Panel A of Table 3 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 3 shows the types of lockup agreement between the firms' insiders and the underwriters at the time of IPO. We distinguish between lockups with absolute date expiry, relative date expiry and a combination of both types. The lockups in the case of absolute date expiry are set in terms of clear calendar dates or a 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.[14] The third type is a combination of the two lockup types (e.g., some directors have relative expiry and others have absolute expiry). The combinations also include cases of lockups with multiple expiry dates.[15] 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

14 We first collect the type of relative event (corporate announcement) of relative date lockups from the IPO prospectus and then use Perfect Filings Database to find the exact date of that event to find the length of lockup period.

15 The staggered or lockups with multiple expiry dates could be specified in both absolute and relative lockups. An absolute date lockup with multiple expiry dates has been classified as an absolute lockup for the purposes of Table 3. Similarly, a relative date lockup with multiple expiry dates has been classified as a relative lockup. Following Espenlaub et al. (2001), we have taken the earliest expiry date for the analysis in case of staggered lockups.

Table 3

Sample IPOs by Year of Listing, PE Backing and Type of Lockup

Year	*1990*	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*1998*	*1999*	*2000*	*2001*	*2002*	*2003*	*2004*	*2005*	*2006*
Panel A: PEVC Backing																	
PEVC Backed (N)	3	4	14	40	50	25	29	23	18	10	31	4	9	2	16	10	10
Non PEVC Backed (N)	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 (N)	4	1	1	15	25	11	18	15	16	9	41	3	9	6	9	12	15
Relative Expiry (N)	2	5	18	35	61	30	38	30	15	12	19	2	5	0	4	0	3
Combination (N)	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
Panel C: Lockup Length (Months)																	
Mean	12.2	13.8	16.2	16.9	15.2	17.2	17.2	18.1	15.0	13.4	12.5	18.5	11.8	10.5	12.8	15.0	15.5
Median	12.0	13.5	12.0	16.0	12.0	15.0	15.0	16.0	14.0	12.0	12.0	19.5	12.0	12.0	12.0	12.0	12.0
SD(σ)	0.41	2.99	7.22	6.45	6.26	6.38	5.98	5.62	5.72	4.88	5.31	5.65	5.48	2.51	3.80	7.70	7.79
IPOs with 12 month lockups (%)	83	33	32	22	24	15	18	13	22	32	41	33	29	67	47	69	65

Note:

This table shows the composition of our sample in terms of PE backing and the types of lockups. Presented figures are numbers (N) and percentages (%). Panel A presents sample IPOs across PE backing and 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. Panel C reports main summary statistics for lockup length across sample years and percentage of IPOs using 12 month lockups.

period 1990–99, largely use relative expiry lockups which 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. Panel C of Table 3 provides summary statistics for lockup lengths across sample years. Lockups are quite heterogeneous with varying levels of dispersion in their length over the sample period. Reported annual average (mean) lockup length is ranging from 12.2 (1990) to 18.5 (2001) months. Annual standard deviation of the lockups' length also varies substantially from 0.41 (1990) to 7.79 (2006) months. Notably, popularity of 12 month lockups has increased since 2003.

(ii) Longevity and Survival Rates

Table 4 reports 1 to 5 year cumulative survival rates and median survival times of sample IPOs across listing years (Panel A) and industry of issuing firms (Panel B).[16] The survival rates across listing years vary considerably. One year survival rates remain 100% except for years 1994, 1999 and 2000. Firms listed in year 2000 experience the lowest 5 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. The survival rates across industries show relatively less variation with a minimum 5 year survival rate of 62% for Non-Cyclical Services. The Resources sector enjoys the highest 5 year survival rate of 76%. However, the differences in survival rates across industries are not statistically significant.

The median survival time for our sample IPOs is 92 months (i.e., half of the IPOs survive for 92 months or less). The median survival time, however, varies substantially across the listing years. For example, the median survival time is lowest for IPOs issued in year 2001 and longest for firms listed in year 1991. The shortest longevity was reported for years 2002, 2003, 2004 and 2006. Comparison of the median survival time across industries shows that the "Resources" sector enjoys the highest survival time of 155 months while firms in "Non-Cyclical Services" have the lowest survival time of 79 months.

Panel C of Table 4 shows the survival rates during the first 5 years after listing for the full sample. The first 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 5 years of IPO and is higher than the percentage of 20–28% for Europe's main market recently reported in Vismara et al. (2012). The 31% delisting rate is, however, lower than 41% for AIM IPOs, reported in Espenlaub et al. (2012).

Table 5 breaks down the survival rates and time by different lockup lengths. In Panel A, we stratify results by lockup length (i.e., lockup period greater than the median and lockup period below the median length). The survival rates for 1, 3 and 5 years post-IPO are consistently higher for lockups greater than the median compared to the lockups lower than the median. For example, the 5 year survival rates for IPOs with lockups greater than median lockup are 72% compared to the 67% survival rate for

16 This table is based on Kaplan Meier (KM) method which is a non-parametric approach of survival analysis.

Table 4
Kaplan Meier Survival Rates

	Full Sample						
Issue Year	*Observations*	*1 Yr*	*2 Yrs*	*3 Yrs*	*4 Yrs*	*5 Yrs*	*Median ST*
Panel A: Cumulative Survival Rates							
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**

Note:
This table shows the cumulative survival rates for sample IPOs calculated using the Kaplan Meier (KM) method for each of 1 to 5 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 parentheses show the minimum survival times since the median survival time could not be estimated. 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 2011 have not yet dropped below 50%.

IPOs with lockups lower than the median lockup length. The cumulative survival rates for firms with average lockup length above the median are higher in six out of nine industries. Overall, sample firms with a longer lockup period survive longer compared to their counterparts with the shorter lockups. Panel B provides survival rates and times of the full sample over three different lockup periods (i.e., up to 12 months, 13

Table 5

Kaplan Meier Survival Rates Stratified by Lockup Length

	Lockup > Median Cumulative Survival Rates					*Lockup < Median Cumulative Survival Rates*				
Industry	*Obs.*	*1 Yr*	*3 Yrs*	*5 Yrs*	*Median ST (months)*	*Obs.*	*1 Yr*	*3 Yrs*	*5 Yrs*	*Median ST (months)*
Panel A: Survival Rates By Median Lockup Length (%)										
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 (%)

		Cumulative Survival Rates					
Lockup Length	*Obs.*	*1 Yr*	*2 Yrs*	*3 Yrs*	*4 Yrs*	*5 Yrs*	*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						

Note:

This table shows the cumulative survival rates for 517 IPOs with lockups only calculated using the Kaplan Meier (KM) method for 1, 3 and 5 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 tests to assess the statistical significance of differences between survival curves across lockup lengths.

to 24 months, and lockups greater than 24 months). Similar to the results observed in Panel A, the survival rates are consistently higher for firms with longer lockup periods. For example, IPOs with lockups greater than 24 months experience higher 5 year survival rates comparedto the IPOs with 12 months lockups (77% vs. 67%). Firms going public with a lockup period of more than 24 months, add 52 months to their survival time compared to the survival time for firms with 12 months lockup. The log rank test for equality of survival rates rejects the null hypothesis of equal survival rates across the three lockup periods, at the 5% level of significance. Overall, results from Table 5 lend strong support to our hypothesis regarding importance of lockups' length for the IPO survival.

(iii) Delisting and Failure Rates

In Table 6, we report numbers and percentages of survivors and delisted firms across different delisting reasons and industry sectors during the first 5 years after the IPO. Survivors are the firms that continue to be traded as of December 31, 2011 or transfer to other markets (exclusively to AIM in our case). The main delisting types are Mergers & Acquisitions (M&A), Administration/Liquidation (including receivership and voluntary liquidations) and other delisting reasons (permanent suspension/cancellation of trading, other reasons etc.) M&A account for 25% of the 31% failure (delisting) rate within 5 years after the IPOs. Only 32% of all the firms listed on LSE Official List during 1990–2006 are still listed by the end of December 2011. Failure rates due to more negative delisting reasons i.e., administration/liquidation, receivership and cancellation of listing are just 6% during the first 5 years after IPO and 12% for the full sample period (Panel A). Highest survival rates and lowest M&A delistings are observed for the "Resources" sector (Panel B). More than 60% of the firms in Basic industries and Financial sectors are delisted due to M&A activity over the full sample period.

Table 7 shows the failure rates across delisting reasons and lockup lengths. In Panel A, we report 1 year, 3 year and 5 year failure rates for IPOs with lockups above and below the median lockup length by different delisting reasons. Panel B shows the failure rates across different delisting types for three categories of lockup periods (up to 12 months, 13 to 24 months, and lockups greater than 24 months). The 1, 3 and 5 year post-IPO failure rates due to mergers and acquisitions are not much different across various lengths of lockup, although failure rates decrease with increase in the length of lockup. The most notable differences in failure rates, however, are observed for the more negative delisting reasons (i.e., administration/liquidations and other delisting). The failure rates for longer lengths of lockup are consistently lower than the failure rates for shorter lockups across the administration/liquidations and other delisting reasons. For example, none of the IPOs with lockups longer than 24 months were delisted due to administration/liquidations and other delisting reasons. These results provide further support to our conjecture that longer lockups signal quality and better survival prospects of the issuing firms.

(iv) Determinants of IPOs Survival

The estimation results from the AFT model are presented in Table 8. We present both the coefficient estimates and the time ratios along with the associated *p*-values.

Table 6

Reasons for Delisting by Industry

	Basic Industries	*Cyc. Cons. Goods*	*Cyc. Services*	*Financials*	*General Industrials*	*Info. Tech.*	*Non-Cyc. Cons. Goods*	*Non-Cyc. Services*	*Resources*	*N*	*%*
Panel A: First Five Post-IPO Years											
Survivors	32	23	125	39	29	65	57	13	20	403	69%
	73%	64%	68%	65%	71%	73%	73%	62%	77%		
Mergers & acquisitions	12	11	50	19	10	17	15	6	4	144	25%
	27%	31%	27%	32%	24%	19%	19%	29%	15%		
Administration & Liquidation	0	2	9	1	2	2	5	2	0	23	4%
	0%	6%	5%	2%	5%	2%	6%	10%	0%		
Other reasons	0	0	1	1	0	5	1	0	2	10	2%
	0%	0%	1%	2%	0%	6%	1%	0%	8%		
Panel B: Full Sample Period (1990–2011)											
Survivors	15	8	56	18	15	29	21	8	15	185	32%
	34%	22%	30%	30%	37%	33%	27%	38%	58%		
Mergers & acquisitions	28	21	106	38	24	44	46	9	8	324	56%
	64%	58%	57%	63%	59%	49%	59%	43%	31%		
Administration & Liquidation	1	6	15	2	2	9	8	4	1	48	8%
	2%	17%	8%	3%	5%	10%	10%	19%	4%		
Other reasons	0	1	8	2	0	7	3	0	2	23	4%
	0%	3%	4%	3%	0%	8%	4%	0%	8%		
Total	**44**	**36**	**185**	**60**	**41**	**89**	**78**	**21**	**26**	**580**	**100%**

Note:
This table shows the post-IPO state of sample firms segmented by industry sectors during first 5 years after IPO (Panel A) and across the full sample and tracking period (Panel B). The numbers (*N*) 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.

Table 7
Delisting (Failure) Rates

	Mergers and Acquisitions			*Administration and Liquidation*			*Other Delisting*		
Failure Rates	*1 Yr*	*3 Yrs*	*5 Yrs*	*1 Yr*	*3 Yrs*	*5 Yrs*	*1 Yr*	*3 Yrs*	*5 Yrs*
Panel A: Failure Rates By Median Lockup Length									
Lockup < Median (%)	0.77	13.26	25.46	0.00	3.80	6.31	0.00	0.44	3.47
Lockup > Median (%)	0.39	12.16	25.17	0.00	0.79	3.27	0.00	0.43	0.43
Panel B: Failure Rates By Different Lockup Lengths									
0–12 months (%)	0.87	13.20	25.61	0.00	4.28	7.10	0.00	0.50	3.39
13–24 months (%)	0.39	12.65	25.38	0.00	0.80	3.33	0.00	0.43	0.90
> 24 months (%)	0.00	9.68	22.58	0.00	0.00	0.00	0.00	0.00	0.00

Note:
This table shows the failure rates, using the Kaplan-Meier (K-M) method, for sample firms across different delisting reasons and broken down by below and above median lockup length (Panel A) and three different lockup lengths; 0–12 months, 13–24 months and longer than 24 months (Panel B). The percentages show the firms delisted due to Mergers & Acquisitions, Administration and Liquidation and Other delisting reasons. Survivors are defined as firms which continue to be listed by the end of study period (December 2011) or transferred to another market.

Table 8
Accelerated Failure Time (AFT) Model

Variables	*Coeff.*	*p-value*	*Time Ratio*
Lockup Period	0.020***	0.006	1.020
Ln (*Size*)	0.097***	0.008	1.102
Ln (*Age*)	0.117**	0.020	1.124
Initial Returns	0.001	0.573	1.001
Insider Ownership	0.004*	0.090	1.004
Sponsor Reputation	−0.016	0.253	0.984
Hot Issue Returns	−0.008**	0.047	0.992
Leverage	−0.096	.638	0908
PEVC	−0.192**	0.040	0.826
Industry Dummies			
Basic Industries	0.404	0.138	1.498
Cyclical Consumer Goods	0.157	0.569	1.170
Cyclical Services	0.153	0.500	1.165
Financials	−0.085	0.735	0.918
General Industrials	0.192	0.479	1.221
Information Technology	0.143	0.553	1.154
Non−Cyclical Consumer Goods	0.156	0.518	1.169
Resources	0.583*	0.058	1.791
Constant	3.548	0.000	
Log−likelihood	−566.380		
LR(Prob.>chi)^2	40.21***		
Pseudo R^2	0.113		
Time at Risk	47,065.9		
N	509		

Note:
This table shows the estimation results of the Accelerated Failure Time (AFT) model. The lognormal density distribution was selected based on the Akaike 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 an increase in the covariate increases (reduces) the survival time. Pseudo R^2 was estimated 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 statistical significance at the 1, 5 and 10% level, respectively.

Overall, our model exhibits reasonable explanatory power, measured by pseudo R^2 and statistically significant likelihood ratio. The results 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 0.006. The time ratio of 1.020 associated with the lockup period means that for a 1 month increase in lockup period, the survival time increases by a factor of 1.020 or by 2%. The results regarding IPO size and its impact on post-IPO survival are in line with our expectations and suggest that larger IPOs are more likely to survive longer and have higher survival rates. 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). An increase of 1% in the size of IPO increases the survival time by 0.1%.[17] Age of the IPO firm has

17 In other words, the time ratio of Ln(*Size*) shows that survival time increases by a multiple of 1.102 as Ln(*Size*) increases by one unit.

a positive and significant impact on the survival. For example, post-issue survival time increases by 0.12% for a 1% increase in the age of firm. The statistically insignificant and small coefficient on initial returns shows no effect of initial returns on survival of IPOs. Higher ownership retention by the insiders positively affects the survival of IPOs. However, the coefficient is weakly statistically significant with a small effect on survival (e.g., 1% increase in the insider ownership increases the survival time by 0.4%). Contrary to Bhattacharya et al. (2013) and Espenlaub et al. (2012), we find an insignificant effect of sponsor reputation on survival. The coefficient of hot issue returns is negative (as expected) and statistically significant. The survival time decreases by 0.8% for a 1% increase in hot issue returns. The negative relationship between hot market proxy and IPO survival is consistent with Espenlaub et al. (2012), who find that IPOs issued during hot periods in UK market have significantly reduced survival times. Our results also provide support to the argument that poor quality firms take advantage of market sentiment and go public during hot periods in the UK (Coakley et al., 2007). Moreover, Yung et al. (2008) report that US firms going public in hot markets are much more likely to delist within 3 years than those in cold markets. The results also show a negative but statistically insignificant effect of leverage on IPO survival. We find that backing by PE or VC firms significantly reduces the survival time of the issuing firms. The estimated time ratio for the variable *PEVC* is 0.826 which indicates that the survival time for IPOs backed by PE or VC reduces by 17.4% compared to IPOs without PE backing.[18]

Our results are in line with the finding of Kooli and Meknassi (2007) and Vismara et al. (2012), who show that PE backed firms have a higher probability of being acquired and delisted.[19] PE backed sample firms may be more attractive to potential acquirers due to the positive impact of PE or VC backing. An alternate explanation could be the short-term focus and/or grandstanding of PE firms (Gompers, 1996). For example, Jelic (2011) shows that a significant number of PE backed buy-outs exit early in the AIM market. Finally, we find a positive and significant (although weak) industry effect on survival time of issuing firms. IPO firms from the Resources sector have much higher survival probability compared to the firms in Non-Cyclical Services.[20] The results about significant industry effects are consistent with the findings reported for US IPOs in Hensler et al.(1997).

We further perform a sensitivity analysis of the predicted median survival time in response to changes in lockup period based on the coefficient estimates from Table 8. The results of the sensitivity or simulations of the survival time are reported in Table 9. The table shows the expected survival time, absolute change in months and the percentage change in expected survival time when the median lockup period changes first by 1 month and then by quarterly intervals up to 12 months. We first evaluate the predicted survival time at median (13 months) of lockup and means of all other variables. The predicted median survival time equals 89 months.

The results show a significant impact of increase in lockup period on the survival time. An increase of 12 months in the median lockup length causes an increase of 24 months in the post-IPO survival time (median survival time increases from 89 to

18 Similarly, results from our (unreported) marginal analysis suggest that predicted median survival time decreases by 18 months for PE backed compared to non-PE backed IPOs at means of all other variables. The results are available upon request from the authors.

19 This is plausible as most of the delistings in our sample are due to mergers and acquisitions.

20 These results are supported by our earlier analysis in Tables 5 and 7.

Table 9
Sensitivity Analysis

Variable	*+12*	*+9*	*+6*	*+3*	*+1*	*Median Lockup*	*−1*	*− 3*	*− 6*	*− 9*	*− 12*
Expected Survival Time (months)	113	106	100	94	91	89	87	84	79	75	70
Absolute Change (months)	24	17	11	5	2		−2	−5	−10	−14	−19
Percentage Change (%)	26.7	19.4	12.5	6.1	2.0		−1.9	−5.7	−11.1	−16.2	−21.0

Note:
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 8.

113 months). This translates into about 27% increase in the median survival time of the issuing firms. Similarly a decrease of 12 months in the median lockup length causes a 21% decline in the median survival time.[21]

5. ROBUSTNESS OF RESULTS

(i) Constant Hazard, Heterogeneity and Clustering

We re-estimate our AFT model with frailty which is introduced as an unobservable multiplicative effect. The introduction of frailty in the 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 (see Jenkins, 2005). The (unreported) results were economically and statistically similar to our earlier results in Table 8 (i.e., without frailty).[22] We also consider our results adjusting for clustering standard errors since we have high number of IPOs in some of the sample years. Again our results remain robust to clustering based on IPO frequency in different years.[23]

In order to check the robustness of our results to the choice of different survival estimation models, 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 10 shows that our main results remain robust. The only exception is the insider ownership variable and Resources sector which are no more statistically significant.

(ii) Regulatory Changes

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

21 We obtain even more striking results when mean (instead of median) of the lockup period is used in the analysis. The results are available upon request from authors.
22 The *p*-value for the likelihood ratio test of H_0: $\theta = 0$ is 0.145, where θ is the frailty parameter.
23 The unreported results are available upon request from the authors.

Table 10
Cox Model

Variables	*Coeff.*	*p-value*	*Hazard Ratio*
Lockup Period	−0.024***	0.006	0.976
Ln (*Size*)	−0.120***	0.009	0.887
Ln (*Age*)	−0.116*	0.097	0.890
Initial Returns	0.000	0.885	1.000
Insider Ownership	−0.003	0.293	0.997
Sponsor Reputation	0.020	0.248	1.021
Hot Issue Returns	0.014**	0.013	1.014
Leverage	0.013	0.963	1.013
PEVC	0.295**	0.019	1.343
Industry Dummies			
Basic Industries	−0.500	0.18	0.606
Cyclical Consumer Goods	0.016	0.965	1.016
Cyclical Services	−0.192	0.534	0.825
Financials	0.164	0.628	1.178
General Industrials	−0.222	0.539	0.801
Information Technology	−0.151	0.638	0.860
Non-Cyclical Consumer Goods	−0.097	0.764	0.907
Resources	−0.684	0.123	0.504
Log-likelihood	−1883.000		
LR(Prob>chi)^2	38.98***		
Pseudo R^2	0.093		
Time at Risk	47065.9		
N	509		

Note:
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 was estimated 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 statistical significance at the 1, 5 and 10% levels, respectively.

mineral companies with less than 3 years of trading history were subject to compulsory lockups for 2 years after the IPO. Similar restrictions were applicable to scientific research based companies between years 1993 and 2000. Lockups have not been obligatory for these companies since January 2000 but they have to include a statement in their prospectus about lockups.[24] 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 exactly 2 years of lockups from our sample. Unreported results show that the main inferences are robust to excluding both types of sample firms.

(iii) Alternative Measures of Explanatory Variables

We also check the robustness of results to different measurements and definitions of some of the explanatory variables. For example, we use different variations of

24 Similar rules have been applicable to innovative high growth companies since January 2000. For a detail of regulatory changes regarding compulsory lockups, see Espenlaub et al. (2001) pp.1,242–43.

our proxy for measuring sponsor reputation. First, we employ a measure of sponsor reputation similar to the one used by Jelic (2011) for PE firm reputation. The sponsor reputation is calculated as an equally weighted average of rank scores based on (i) the number of IPOs sponsored, and (ii) the amount sponsored in £ millions during the sample period as a lead sponsor. *Sponsor Reputation* is a dummy variable coded one for IPOs sponsored by the Top10 sponsors, and zero otherwise. Finally, we follow the sponsor reputation measure used by Derrien and Kecskés (2007) for the UK market.[25] Our (unreported) results are economically and statistically robust to alternative measures of sponsors' reputation.

6. CONCLUSION

Using a sample of 580 IPOs from 1990–2006, we examine the overall survival rates (and times), delisting reasons and determinants of IPO survival focusing on lockup length. Five year survival rate for our sample IPOs is 69% and the median survival time over the entire sample period (1990–2011) is 92 months. The reported 31% delisting rate, during the 5-year period after listing, is higher than reported for other European markets (see Vismara et al., 2012). M&As account for one quarter, whilst failures (administration, liquidations, receivership, and cancellations) account for only 6% of all delistings in the first 5-year period. The failure rates for longer lengths of lockup are consistently lower than the failure rates for shorter lockups regardless of delisting reasons. Notably, none of the sample IPOs with lockups longer than 24 months delisted due to administration/liquidations. Furthermore, firms going public with a lockup period of more than 24 months, add 52 months to their median survival time relative to the survival time of their counterparts with 12 months lockups.

We provide empirical evidence that locking-in inside managers for longer periods improves the long-term survival of IPO firms. A 12 month increase in median lockup period increases the (median) survival time by 27%. The results are robust to different survival estimation models, heterogeneity, clustering and alternative specification of variables. The above results inform the recent debate about the alleged short-termism of the UK equity market by lending support to recent recommendations which suggest that directors' remuneration should be based on long-term performance and provided in the form of company shares to be held (locked-in) for a much longer period of time (Kay, 2012; BBC, 2013; Deloitte, 2013).

Our results have important implications for IPO firms, investors and regulators. Issuing firms for example, can signal long-term survival prospects through length of lockups. Lockups' characteristics thus can help investors assessing IPOs' quality. Regulators and policymakers concerned about the short-termism of equity markets may consider longer lockups as a means to align managers' interests with those of investors in the long run.

25 See Derrien and Kecskes (2007), footnote 11, p. 460. All unreported results in this section are available from the authors upon request.

Table A1
Correlation Matrix

Variables	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*
1. Ln *Survtime*	1.00																	
2. *Lockup Period*	0.14*	1.00																
3. Ln (*Size*)	−0.01	−0.17*	1.00															
4. Ln (*Age*)	0.12*	−0.01	0.00	1.00														
5. *Initial Returns*	−0.01	−0.05	−0.01	−0.10*	1.00													
6. *Insider Ownership*	0.06	0.13*	−0.22*	0.01	0.10*	1.00												
7. *Sponsor Reputation*	−0.03	0.01	0.21*	0.11*	−0.04	−0.08	1.00											
8. *Hot Issue Returns*	−0.06	−0.05	0.04	0.02	0.03	−0.26*	0.11*	1.00										
9. *Leverage*	−0.10*	−0.07	0.16*	−0.12*	0.13*	0.07	−0.07	0.06	1.00									
10. *PEVC*	−0.02	−0.03	−0.01	0.24*	−0.19*	−0.11*	0.05	0.08	−0.23*	1.00								
11. *Basic Industries*	0.02	0.00	−0.07	0.09*	−0.05	0.02	0.04	0.06	−0.03	0.07	1.00							
12. *Cyc. Cons. Goods*	0.01	0.00	−0.13*	0.08	−0.05	0.02	−0.02	0.06	−0.10*	0.08	−0.07	1.00						
13. *Cyclical Services*	0.02	−0.01	−0.03	0.16*	−0.02	0.06	0.04	−0.07	−0.05	0.16*	−0.20*	−0.18*	1.00					
14. *Financials*	−0.01	0.01	0.13*	−0.08	−0.11*	−0.09*	−0.02	−0.14*	−0.04	0.17*	−0.10*	−0.09*	−0.23	1.00				
15. *General Industrials*	−0.02	0.01	−0.12*	0.06	0.00	0.00	−0.04	0.03	−0.04	0.01	−0.08	−0.07	−0.19*	−0.09*	1.00			
16. *Info. Tech.*	−0.03	−0.10*	0.07	−0.20*	0.28*	0.11*	−0.03	0.12*	0.20*	−0.33*	−0.12*	−0.11*	−0.29*	−0.14*	−0.12*	1.00		
17. *Non−Cyc. Cons. Goods*	0.00	0.08	−0.01	−0.01	−0.08	−0.09*	0.00	0.08	0.03	−0.12*	−0.11*	−0.10*	−0.27*	−0.13*	−0.11*	−0.17*	1.00	
18. *Resources*	0.03	0.04	0.06	−0.05	−0.09*	−0.07	0.01	−0.06	0.00	−0.04	−0.06	−0.06	−0.15*	−0.07	−0.06	−0.09*	−0.08*	1.00

Note:
This table provides correlation coefficients across the variables used in regression model specified in equation (3). All variables are defined in Table 1 (Panel B).
*indicates significance at the 5% level or better.

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