An Article Submitted to

*Journal of Business Finance and Accounting*

Manuscript 3509

# IPO survival in a reputational market

Susanne Espenlaub* Arif Khurshed†

Abdulkadir Mohamed‡

*Manchester Business School, susiespenlaub@hotmail.com

†Manchester Business School, arif.khurshed@mbs.ac.uk

‡University of Liverpool, Abdulkadir.Mohamed@liv.ac.uk

# IPO survival in a reputational market

**Abstract**

We examine IPO survival in a "reputational" market, the Alternative Investment Market (AIM), where principle-based regulation pivots on the role of a regulatory agent, the nominated advisor (Nomad) to the IPO company. We find that Nomad reputation has a significant impact on IPO survival. IPOs backed by reputable Nomads survive longer (by about two years) than those backed by other Nomads. We also find that survival rates of AIM IPOs are broadly comparable to those of North American IPOs. While these results are of obvious interest to various stakeholders of AIM firms, they also provide important lessons for market places modeled on AIM including the upper-tier of the U.S. over-the-counter market (OTCQX), Italy's AIM Italia, and Japan's Tokyo AIM.

*JEL classification*: G14, G18

*Keywords*: IPO; new list(ing); survival; delisting; Alternative Investment Market; AIM; Nominated Adviser; Nomad;

## 1. Introduction

This paper investigates the survival of IPOs on a "reputational market", the Alternative Investment Market (AIM). Founded in 1995, AIM was designed to attract smaller, growing companies that could not meet the listing rules of the upper-tier of the London Stock Exchange (LSE). Although AIM has lower listing and disclosure requirements than other major markets (see Table 1), it distinguishes itself from other markets in that it requires listed firms to retain a nominated advisor (Nomad) at all times. We focus on the role of the Nomad, who acts not only as IPO adviser and underwriter but also as a gatekeeper and "decentralized regulator" that certifies and controls the quality of new listings and the issuer's compliance with the rules of the market. Nomads are repeated players in the IPO market, and their reputation is likely to be of crucial importance in limiting informational problems and incentive conflicts. This study aims to quantify the reputation of the Nomad and its impact on the performance of IPOs in terms of their life expectancy (or survival times).[1] By examining the survival of IPOs since the opening of AIM, we examine not merely the survival of AIM listings but by implication the survival and success of AIM itself.

The question of how long an IPO will survive on a stock exchange carries important implications for a firm's stakeholders. Owners (investors) are interested in the likelihood of an IPO firm's exit from the stock exchange because it provides them with an additional dimension on stock valuation. *Ex ante*, information on how long an IPO stock is likely to remain listed can help the market to assess a stock's cash-flow profile and hence price it efficiently. The professional and business interests of a firm's other stakeholders such as the executives, board members, underwriters, brokers, accountants and auditors, are also tied to the likelihood of its survival on the stock exchange. Regulators can use survival as one of the benchmarks to measure the success of the rules they impose on firms that plan a listing. Companies and policy makers are interested in IPO survival because as long as a company remains listed, it can raise funding from public markets. IPO survival is also of interest to researchers. Prior literature has proposed firm survival as a measure of firm performance (Welbourne and Andrews 1996, Caves 1998). Audretsch and

[1] IPO survival on AIM has been the focus of a spat between SEC and the UK regulator, FSA. In March 2007, the SEC claimed that 30 percent of IPOs on AIM were 'gone within a year' (SEC commissioner Roel Campos quoted in The Financial Times, 9 March 2007). The London Stock Exchange indignantly rejected the SEC claim arguing in turn that IPO failure rates on AIM were a mere 3 percent.

Lehmann (2005) suggest that an appropriate measure of performance for IPO firms is their ability to survive over time.[2]

Since opening in 1995, AIM has continually attracted new listings (see Figure 1 in the Appendix), even in the aftermath of the internet bubble when other lower-tier stock markets folded (Audretsch and Lehmann 2005, Giudici and Roosenboom 2004 and Goergen et al. 2009). Compared to the listing activity in the U.S., which collapsed after the internet bubble burst in 2000 and stagnated until 2010, the numbers of non-financial IPOs on AIM roughly matched or exceeded those in the U.S. (taking Amex, NYSE and NASDAQ together) during 2001-2004. In the same period, AIM also attracted more IPOs than the upper-tier of the London Stock Exchange, the Main Market. However, the flip side of AIM's apparent success in attracting listings under its "light-touch" rules may be that AIM "*did not have any standards at all and anyone could list*" (John Thain, CEO of the New York Stock Exchange, quoted in The Financial Times, 26 January 2007).

AIM is a prime example of a principle-based regulation market (as opposed to rule-based regulation) with a system that allows players discretion in the interpretation and implementation of broad principles. The functioning of this regulatory regime relies on repeated players' concerns for their reputational capital. On AIM, these repeated players include institutional investors and, in particular, the nominated advisors (Nomads) who act not merely as underwriters but also as guardians of AIM listed companies during the listing process and throughout the period of listing. A substantial part of regulation is effectively outsourced to Nomads, who act as "regulatory agents" or "decentralized regulators". AIM has been termed a "reputational market" (Davidoff 2007 cited in Mendoza 2008) where the quality of listed company is certified and controlled by regulatory agents staking their reputational capital rather than by the explicit rules and oversight of the (central) regulatory authorities (including the Financial Services Authority, FSA). Given the long-term involvement of Nomads with the IPO companies they advise, the expected survival times of IPOs are likely to be of concern to Nomads. Nomads may be reluctant to back IPOs with short expected survival times due to reputational concerns vis-à-vis investors and other

[2] Studying survival complements other analyses of post-IPO events and long-term performance, e.g., delisting decisions by AIM firms (Kashefi-Pour and Lasfer, 2011), the recent long-term performance study of UK IPOs (Gregory, Guermat and Al-Shawawreh, 2010) and post-listing returns of IPOs on UK and US markets (Gerakos, Lang and Maffett, 2011).

stakeholders that are concerned with IPO survival. There are also likely to be diseconomies for Nomads, arising from fixed costs associated with learning about a client IPO company that may not be recouped by the fees charged over a short life-span of the client company.

We collect data for all IPOs floated in the period from the opening of AIM in 1995 until the end of 2004. Our sample comprises 896 UK-incorporated and other firms that listed on AIM during 1995-2004 by conducting an IPO. In total, our sample IPOs raised approximately £7 billion. Tracking these IPO stocks until 31 December 2010, we estimate survival rates of AIM IPOs and find them broadly comparable to those of North American IPOs. We define survivors as stocks that continue to be traded on AIM or transfer their listing to another market, (for example, the upper-tier of the London Stock Exchange, the so-called Official List or Main Market).[3] We identify various reasons for delisting, and estimate delisting rates associated with alternative delisting reasons. We investigate the determinants of survival rates (and times) focusing on the reputation of Nomads. We estimate an accelerated failure time (AFT) model that allows the independent variables to have stronger (or weaker) impact on survival times nearer the IPO date as compared to later in the listing period.

We find that Nomad reputation has a highly significant, positive impact on survival times. IPO companies with reputable Nomads have median survival time of 91 months as compared to 58 for IPOs backed by other Nomads. Further, results of our sensitivity analysis show that *ceteris paribus*, a one-standard deviation increase in our measure of Nomad reputation increases the survival time by approximately 2 years (from a median of 78 months to 103 months). These findings highlight the crucial role played by Nomads on AIM, and the value of Nomad reputation in resolving information problems and incentive conflicts that are left unresolved by AIM's principle-based regulation.

[3] A stock is a non-survivor if it is delisted due to a merger or acquisition (M&A), suspension, liquidation or for any reason other than a transfer to another market. We recognize that delisting due to a merger or acquisition is not always bad news for the shareholders of the delisted stock. Therefore, we differentiate M&As from other, "unfavourable", reasons for delisting. We check the robustness of our survival analyses that classify M&As as failures to treating some or all M&As as "right censored" survivors (i.e., observations that are not delisted during the period over which they are tracked). Previous IPO survival studies classify (some) M&As as non-survivors (e.g. Carpentier and Suret 2011) or as censored survivors (Jain and Kini 2000), or exclude them altogether from their samples (Hensler et al 1997).

Our analysis controls for a number of potential determinants of survival time including company age, size, public float, insider ownership, initial returns and pre-IPO sales. We also control for VC-backing, hot-issue periods, industry dummies, and a dummy for UK incorporation of the company (as opposed to foreign, non-UK incorporation).

We find that survival time increases with company age, size, pre-IPO sales and insider ownership. Our results also show that going public during hot issue periods reduces survival time, or in other words, accelerates the time to delisting (i.e., failure). During hot issue periods (as measured by high average initial returns), a one-standard deviation increase in average initial returns or number of IPOs, decreases the median survival time by 42.3 percent (from a median of 78 months to 45 months).

Our results provide valuable new insights and lessons for new markets with regulatory features modeled on AIM such as the OTCQX, the "premier tier" of the U.S. over-the-counter market, the First North tier of the Nordic OMX market, the Tokyo AIM (a joint venture between the London and Tokyo stock exchanges) and AIM Italia.[4] The OTCQX website explicitly credits the successful advisory role of the Nomads on AIM for inspiring its own "community-based" listing process.

The rest of the paper is organized as follows: Section 2 provides an overview of AIM and its regulation; it also reviews the literature on IPO survival and outlines our research questions. Section 3 describes the data and methodology. Our empirical findings are discussed in Section 4, and Section 5 concludes the paper.

## 2. Background, Literature and Research Questions

The Alternative Investment Market (AIM) was established in 1995 by the London Stock Exchange (LSE) to provide a market for small and growing companies, especially those unable to meet the listing rules of the upper tier, the Main Market. Regulation on AIM, both in terms of initial listing requirements and ongoing obligations after listing, is among the least stringent in

[4] OTCQX has positioned itself as a competitor to AIM seeking to attract both U.S. and foreign companies. Its marketing material claims substantially higher stock liquidity on OTCQX than on AIM (http://www.otcmarkets.com/content/doc/ps/OTCQXMedia.pdf). See Mendoza (2008) for a list of further markets emulating the AIM model.

the world. The status of AIM as an exchange-regulated market allows AIM to operate outside the regulatory regime imposed by European Union directives on listing rules. The regulatory approach of AIM is a prime example of principles-based regulation involving a comply-or-explain option giving companies considerable scope to interpret the principles laid down in AIM's regulatory documents and customizing their compliance. By contrast, the rule-based regulatory approach adopted by the SEC provides detailed, explicit guidelines that facilitate routine compliance checks but provide less flexibility and are likely to impose higher compliance costs on companies (see e.g. Ford 2010). Central to self-regulation approach of AIM is the role and the reputation of the Nominated Adviser (the so-called "Nomad"). AIM regulation requires every AIM company to retain an AIM-approved financial firm to act as its Nomad not only at the time of its IPO but for as long as the company is listed on AIM. Nomads act not only as advisers and underwriters to companies at the time of the IPO; they also guide them on how to comply with AIM's regulatory principles. By certifying compliance by their advisee companies to the market, they also act as "gatekeepers" and "decentralized regulators".[5] AIM has been described as a "reputational market" in which the quality of listed company is certified by the reputational capital of Nomads rather than by the explicit rules and oversight of market authorities (Davidoff 2007 cited in Mendoza 2008).

If a company dismisses its Nomad, or if a Nomad decides to end its relationship with an AIM quoted company, the company has 30 days to appoint a new Nomad, otherwise its shares are suspended and eventually removed from AIM. A Nomad has to be a firm (not just an individual) that has practiced corporate finance for at least two years and has been involved in at least three relevant transactions (e.g., IPOs or takeovers requiring a prospectus) in those two years. Nomads include accounting firms, investment banks, corporate finance firms and stockbrokers; all of these firms are required to employ at least four suitably qualified individuals. The LSE website carries a list of all firms authorized to act as Nomads (63 firms in 2010).

AIM requires that all new entrants produce an admission document disclosing details of the directors' backgrounds, their promoters, business activities and the firm's financial position. The main requirement for listing on AIM is that the stock is "appropriate" for the AIM market. It is

[5] By contrast, on the upper-tier Main Market of the London Stock Exchange, the sponsoring financial advisers to IPOs companies are not required to provide continued advice and oversight to issuing companies after the IPO.

the responsibility of the Nomad to make this judgement and certify the suitability of the stock to AIM participants. Once admitted to AIM, a company has ongoing disclosure requirements. It is the Nomads' responsibility to ensure the adequacy and timeliness of these disclosures.

Table 1 summarizes the admission requirements on the AIM, the Main Market, OTCQX and NASDAQ. While the distinctive regulatory feature of AIM is the Nomad, on OTCQX this role is performed by the so-called "designated advisor for disclosure" (DAD). While the admission documents of companies listing on the UK Main Market or on NASDAQ (Capital Market) are checked by the respective market regulatory authority, these checks are delegated to the Nomad on AIM and to the DAD on OTCQX. Both AIM and OTCQC have no minimum requirements on public float, while the Main Market requires at least 25% of the shares in public hands, and NASDAQ requires at least 300 shareholders and at least one million shares in public hands. Like OTCQX, AIM does not require its entrants to have a trading record while the Main Market requires at least three years trading record. Depending on the listing route, NASDAQ requires zero to two years listing record. Unlike OTCQX and the other markets, AIM does not stipulate a lower limit on size or market capitalization. By contrast, the minimum market capitalization required is $5 million on OTCQX, £10m on the Main Market and $50 million on NASDAQ.[6]

In sum, the explicit admission requirements stipulated by AIM (and OTCQX) are less stringent than those on the Main UK Market or on NASDAQ. At the same time, many regulatory responsibilities on AIM are delegated to the Nomads. Despite its apparent success in spawning imitators, the role of Nomad has recently come under close scrutiny following several scandals involving corporate fraud and failure, and allegations that Nomads failed in their duties to appropriately screen and monitor companies. In response, the LSE introduced a new rulebook for Nomads in February 2007 spelling out the duties of a Nomad in greater detail. One Nomad, Nabarro Wells, was fined and publicly censured in October 2007 for failing to conduct due diligence on companies it was bringing to AIM in 2005 and earlier. Others decided to withdraw from the market resulting in a substantial decline in the number of Nomads from 85 at the start of

[6] For an overview of the listing rules of several European lower tier markets (the so called new markets) see Giudici and Roosenboom (2004).

2007 to 63 in 2010. Given the ample scope for abuse or negligence by Nomads, their concern for their reputation is a crucial mechanism for controlling the multitude of information and incentive problems among market participants on AIM (and similar markets).

There is an established body of literature on the survival of newly listed stocks in North America, but to our knowledge, there is no published survival analysis of IPOs on UK stock markets. Gregory, Guermat and Al-Shawawreh (2010) study the UK Main and AIM markets (and the now defunct Unlisted Securities Market). The focus of their study is on the long-run returns performance of UK IPOs issued during 1975-2004. In this context, they briefly report the proportion of firms in their sample that go "bankrupt" over three and five years following the IPO. They find that 9.5 percent of AIM companies are delisted within five years of the IPO for reasons that can be classified as 'bankrupt' (including liquidation and receivership). Their sample period of AIM IPOs is identical to ours (1995-2004) but they track delistings only up to 2007. The five-year failure rate Gregory et al. report for UK IPOs listing on the LSE upper-tier, the Main Market, are substantially lower than those for AIM at 3.6 percent firms.

Two recent working papers study delisting activity on the AIM. Kashefi-Pour and Lasfer (2011) study the frequency and determinants of the decision by AIM companies to voluntarily delist. They examine 184 voluntary delistings and a matched control sample of 184 companies that remain listed. They find that firms with higher leverage, lower growth opportunities and lower capital expenditure are more likely to voluntarily delist from AIM. By contrast, our study presents a detailed survival analysis of all AIM IPOs examining the rates, lengths and determinants of survival and considering all possible delisting reasons. Gerakos, Lang and Maffett (2011) compare the characteristics and performance of AIM companies with those on "traditionally regulated" markets, specifically, the Nasdaq and OTC Bulletin Board (OTCBB) in the US and the UK Main Market. They find that AIM firms perform poorly in terms of their post-listing returns and liquidity. The survival analysis of Gerakos et al. focuses on a comparison across markets (i.e. dummies for the various stock markets) and does not examine the impact of Nomads on survival. By contrast, the impact of the Nomad on survival is at the centre of the present paper.

Next, we discuss the most relevant North American studies, but we do not provide a comprehensive literature review. Schultz (1993), Seguin and Smoller (1997), Hensler et al (1997), Jain and Kini (1999, 2000, 2008), Fama and French (2004), Bradley et al (2006), Demers and Joos (2007), Kooli and Meknassi (2007), and Bhattacharya, Demers and Joos (2010) examine IPO survival using US data, while Carpentier and Suret (2011) use Canadian data. Table 2 summarizes the key aspects and findings of these studies. The failure rates reported in previous US studies range from 2 to 9 percent over the first year of listing, 6 to 42 percent over two years, 9 to 47 percent over five years, to 58.5% over 10 years post-IPO. The wide range of failure-rate findings is due to differences between markets, sample periods, and stratification criteria (e.g. comparisons of penny and other stocks, or between high tech and other industries).

Hensler et al. (1997) investigate the relation between the survival rate of IPO stocks and firm characteristics using a hazard model. Their findings show that survival rates are positively related to firm age and size, IPO initial returns and insider ownership. Jain and Kini (1999) examine the probability of surviving post-IPO using a multinomial logit model. The results indicate that firm size at the time of the IPO, pre-IPO operating performance and investment bankers' prestige are positively related to IPO survival. Jain and Kini (2000) examine whether venture capital (VC) involvement improves the survival profile of IPO firms. Their findings indicate that the probability of post IPO survival is significantly positively affected by VC backing and the prestige of the investment bank leading the underwriting syndicate (as well as by other factors likely to benefit from VC involvement such as road show success and analyst following). Jain and Martin (2005) investigate the relationship between audit quality and post-IPO survival using a proportional hazard model. They find that the hazard rate is negatively (and hence survival time is positively) related to auditor quality. Kooli and Meknassi (2007) examine the survival profile of IPO issuers from 1985 to 2005. They find that large IPOs have lower probability of failing relative to small IPOs. They also find evidence that IPO underpricing increases the likelihood of failure, while having a prestigious underwriter improves the survivability of the issuing firm.

Fama and French (2004) examine 10-year post-issue survival rates of US 'new lists' coming to the market between 1973 and 1991. They find that the characteristics of companies going public, such as profitability and growth, significantly changed over their sample period with more recent new lists having lower profitability and higher growth. These changes in firm characteristics are

associated with a sharp decline in survival rates of new lists. Fama and French (2004) argue their results show that the changes in the characteristics and survival rates of new lists are due to a decline in the cost of equity allowing younger and less profitable firms to go public.

Our study examines the determinants of IPO survival in a market specifically designed for younger and riskier companies. We seek to answer the following questions: What are the survival rates and times of AIM IPOs, and how do they vary over the post-IPO period, and by industry, delisting reason, listing year and country of incorporation. Is AIM a reputational market where the reputation of the regulatory agent, the Nomad, has a quantifiable impact on listing and market performance in terms of the survival of new listings? Specifically, does the backing of a reputable Nomad increase the survival time of an IPO? This issue is of interest to issuers, investors, regulators and, of course, to Nomad firms.

We use a range of alternative measures for Nomad reputation including the Nomad's market share (based on IPO numbers or proceeds in the previous year)[7], credit score, profitability and the Nomad firm's age.[8] Based on these five reputation measures, we create a composite measure of Nomad reputation based on the average of a Nomad's percentile ranks in each of the five separate measures.[9] In the UK, the reputation measure typically used in US studies, the Carter-Manaster (1990) tombstone measure, is often unavailable as "tombstone" listings of the underwriting syndicate are rarely published. Our first two measures are designed to reflect reputation in terms of market share. The three other reputation measures (credit score, profitability and age) are chosen to capture the stability and likelihood of survival of the Nomad firm, which is often crucial to the survival of AIM stocks given the requirement of ongoing Nomad supervision of AIM companies.

We measure survival rates and times, and estimate the impact on survival times of Nomad reputation for market, company and issue characteristics including company age, size, and initial IPO returns. We seek to quantify the impact of IPO market "hotness" at the time of an IPO on its

[7] These measures have been used by Goergen et al. (2006) to measure underwriter reputation of IPOs on the Main Market of the London Stock Exchange.

8 The five nomads backing the highest numbers of IPOs over our sample period 1995-2004 are Seymour Pierce Ltd, W. H. Ireland Ltd, Colins Stewart Europe, Nabarro Wells & Co. Ltd, and Canaccord Adams Ltd (ranked in descending order).

[9] We are thankful to Paul Andre for suggesting we use a composite measure of Nomad reputation.

subsequent survival. Based on the previous U.S. results (Demers and Joos 2007; Bhattacharya et al. 2010), we expect hotness to reduce survival times. We also estimate the impact on survival of domestic versus foreign incorporation of the issuing company, and we control for the impact of pre-IPO sales of the issuing company and its insider ownership at the time of the IPO. High insider ownership is likely to mitigate agency conflicts, and we expect the survival time to increase when insider ownership is high.

## 3. Data and Methodology

Our sample comprises all IPOs issued on AIM from the opening of the market in 1995 to the end of 2004. There were a total of 1683 new admissions during 1995-2004. We exclude 765 companies that entered AIM without conducting an IPO, such as introductions of stocks previously traded on another market. This leaves a population of 918 IPOs. After excluding 22 IPOs with missing data (on company ownership and on Nomad characteristics), we are left with a sample of 896 IPOs.

These IPOs are tracked until 31 December 2010 to determine whether they were delisted or not. The list of IPO firms, offer price, market capitalization, issue proceeds, country of incorporation and industry sectors are obtained from the London Stock Exchange (LSE). Dates of incorporation are obtained from Companies House. The dates of the delisting of stocks are collected from World Scope and cross-referenced with the London Share Price Database (LSPD). First-day closing stock prices are taken from Datastream and Perfect Analysis. Venture-capital (VC) backed IPOs are identified using data provided by the British Venture Capital Association (BVCA). Information on the credit score, return on assets and firm age of Nomads is from the FAME database.

Unlike the Logit and Probit methods applied in some previous studies of IPO survival (see Table 2), survival analysis allows us to take into account not just binary information on whether a stock survives for a specified period or until a specified point in time, but also the length of time the stock survives. Unlike linear regression, survival analysis uses non-normal distributions that accommodate so-called “censored” observations. In our study, sample IPOs are “right censored” if they have not (yet) been delisted by the end of the study period (31 December 2010). Survival

analysis uses both censored and uncensored observations to provide consistent estimators (Allison 2000). Shumway (2001) finds that survival models are theoretically and empirically superior to "static models" (such as Logit or Probit).

We define survivors as stocks of firms that continue to be traded on AIM or transfer to another market.[10] By implication, non-survivors are stocks that were delisted from AIM trading due to liquidation, merger/acquisition, permanent suspension or for any other reason except a move to another market. We distinguish between delisting due to merger or acquisition and delisting due to other, negative reasons because the impact on investors is typically far more adverse in the case of negative delistings (e.g. liquidations) than in mergers or acquisitions. We examine the robustness of our results by alternately classifying all mergers and acquisitions as failures (non-survivors), or by treating all or some M&A stocks as "censored" survivors, that is, as stocks that drop out of the study for reasons other than delisting and are therefore still considered alive at the end of our study period. Some firms are likely to be acquired as a result of poor performance or financial difficulty. We seek to differentiate such poorly performing M&A stocks from others by imposing a performance criterion. We identify M&A delistings of well-performing companies and classify them as censored survivors by ranking companies on the basis of four performance measures: cash to total assets, total liabilities to total assets, operating income to total assets, and the current ratio (current assets over current liabilities) in the year prior to the M&A delisting. Companies that rank above median based on all four measures are considered censored survivors. We classify M&A delistings of below-median performing companies as non-survivors (or failures).

The survival rates of IPOs are estimated non-parametrically using the Kaplan-Meier method based on the following expression:

$$S(t_j) = \prod_{i=1}^{j} \left( \frac{n_i - d_i}{n_i} \right)^{\delta_i} \tag{1}$$

or equivalently

[10] Based on information from Thomson One Banker, LSPD, and detailed internet searches, we identified 47 transfers of AIM companies to the London Stock Exchange's upper tier, the Main Market, during 1995-2010.We found no transfers to any other markets.

$$S(t_j) = \left( \frac{n_j - d_j}{n_j} \right) S(t_{j-1}) \tag{2}$$

where $S(t_j)$ is the estimated survival function in month $t_j$ (measuring the probability of survival beyond $t_j$ conditional on a stock being listed until at least month $t_j$), $n_i$ is the number of the IPOs that are listed and participating in the study at the start of month $t_j$ (also known as the risk set at $t_j$), and $d_j$ is the number of the IPOs delisted during month $t_j$, $\delta_i$ is equal to one if there is a failure and zero if there is no failure. Alternatively and equivalently, Equation (1) can be restated as Equation (2) to express the survival function in month $t_j$ as the probability of survival in month $t_j$ (conditional on a stock being listed until at least month $t_j$) times the survival function in the previous month $t_{j-1}$ (see Kleinbaum 1996, p56).

Below, we apply Equation (2) to estimate the survival rates for each post-IPO month for the full sample and for various subsamples. To test whether IPOs in different groups (such as subsamples of IPOs grouped by issue year or by industry) share the same Kaplan-Meier survival curves, we use the log rank test (e.g., Kleinbaum 1996, p557-63), a large-sample chi-square test. The test involves classifying the failure rates into observed and expected failure rates. If the observed failure rate is significantly different from the expected failure rate, the test rejects the null hypothesis that the groups share the same survival curves.

Median survival time (ST) is defined as the number of months elapsed from the IPO until the point in time when half the sample stocks have failed and the cumulative sample survival rate has dropped to 50 percent. If the cumulative survival rate is still greater than 50 percent at the end of the study period (here, 31 December 2010), the median survival time cannot be computed. For companies classified by industries, this is reported as N/A. Where we report survival times of subsample segmented by issue year, we report a *minimum* median survival time calculated as the difference between the issue year and end of the study period (December 2010).

We estimate a survival model known as the Accelerated Failure Time (AFT) model. At least three previous studies use the (AFT) method (see Table 2). The AFT model allows the impact of the independent variables on survival time to vary over the post-IPO period depending on the length of time since listing. In the AFT model, $\exp(\sum \beta_i X_i)$ is an "acceleration factor": The effect

of a covariate is to extend or shrink the length of survival by a constant relative amount $\exp(\sum\beta_i X_i)$ if $\exp(\sum\beta_i X_i) > 1$ survival time is increased, and if $\exp(\sum\beta_i X_i) < 1$ it is decreased (Bradburn et al. 2003). Our AFT model allows for the possibility that the impact of the four regulatory levers on survival may be particularly pronounced in the period soon after the IPO and less so in the longer term.

The AFT model is typically expressed in terms of a log-linear function with respect to time (see e.g. Hensler et al. 1997; Bradburn et al. 2003)

$$\mathrm{Ln}(T_j) = \beta_0 + \beta_1 X_1 + ...\beta_p X_p + \varepsilon_j \tag{3}$$

Specifically, we estimate the following model

$\mathrm{Ln}(T_j) = \beta_0 + \beta_1$Nomad Reputation $+ \beta_2$Hot-issue returns $+ \beta_3$Ln(Age) $+ \beta_4$Ln(Size) $+ \beta_5$Initial return $+ \beta_6$Public float $+ \beta_7$Ln(Sales) $+ \beta_8$Insider ownership $+ \beta_9$VC backed $+ \beta_{10}$DOM-IPO + industry dummies $+ \varepsilon_j$ (4)

where $Ln(T_j)$ is the natural logarithm of the survival time or time to failure, and the independent variables are defined as in Table 3. *Nomad Reputation* is computed using five different measures: (i) the number of IPOs backed in the year prior to the IPO as a proportion of all the IPOs in that year (ii) the proceeds of the IPOs backed in the year prior to the IPO as a proportion of all the proceeds (iii) Nomad's credit score in the year prior to the IPO (iv) Nomad's return on assets in the year prior to the IPO (v) Nomad's age in the year prior to the IPO. In addition, we compute a composite index for Nomad reputation as the unweighted average of a Nomad's percentile rank in each of the five Nomad reputation measures observed in the year prior to a given IPO backed by that Nomad. The construction of the composite measure is similar to the method applied (in a different context) by Bushman, Chen, Engle and Smith (2004).

We include *Hot-issue returns* as a measure of IPO market hotness. It measures the activity of the IPO market at the time of a sample IPO is conducted and is defined as the average of the initial returns of the IPOs issued in the three months prior to the month of a given IPO. This measure is similar to the one used by Bhattacharya et al. (2010). *Ln(Age)* is the natural logarithm of the

number of years from incorporation of the IPO company until the IPO; *Ln(Size)* is the natural logarithm of the market capitalization of the IPO company at the IPO price in £ million; *Initial Return* is the difference between first day closing and offer prices as a percentage of the offer price; *Public float* is IPO proceeds as a percentage of market capitalization; *Ln(Sales)* is the natural logarithm of the sales of the IPO company averaged over the year before the IPO and the year of the IPO; *Insider ownership* is the percentage of insider ownership at the time of the IPO; *VC Backed* is a dummy variable coded one if the IPO firm is backed by venture capital or more generally, private equity and zero otherwise.

*DOM-IPO* is a dummy variable coded one for IPOs issued by domestic UK incorporated companies and zero for foreign issuers. We also include five industry dummies for financials, cyclical services, information technology, non-cyclical consumer goods and the resource sector using the industry sector "Others" as the base.

As the AFT is a parametric model, it is necessary to specify the distribution of the baseline survival function. We use the likelihood ratio or Wald tests to determine the appropriate distribution in the case of nested models, such as comparing the Weibull against the exponential distribution, or the gamma against the Weibull or log-normal distributions. The Akaike Information Criterion (AIC) is the appropriate test to choose the best-fitting model in the case of non-nested models such as between the log-logistic and the log-normal distribution. The AIC is defined as

$$AIC = -2LnL + 2(k + c) \tag{5}$$

where L is the maximized value of the likelihood function, k is the number of model covariates and c is the number of model-specific distributional parameters. Either of the log-normal and log-logistic models has two distributional parameters (c = 2). The AIC test shows that the log-normal distribution has a lower AIC value than the log-logistic model, and hence we select the log-normal distribution.

Pseudo $R^2$ is used as a measure of the goodness of the fit. Pseudo $R^2$ provides a value reflecting how well the model fits the data (although it does not measure the proportion of variation in the dependent variable explained by the independent variables as does the conventional $R^2$).

Specifically, pseudo $R^2$ is calculated as $1 - (L_u/L_0)$, where $L_u$ is the log-likelihood function of the unrestricted model and $L_0$ is the log-likelihood function of the restricted model with only an intercept.

As a robustness check and for comparison with other studies, we also estimate the Cox proportional hazard model applied by, e,g., Carpentier and Suret (2011) in addition to the AFT model. The Cox model makes no assumption about the failure distribution. The dependent variable in the Cox model measures the risk of failure as opposed to survival time in the AFT model. In the Cox model, the marginal effect of an independent variable is measured by the so-called hazard ratio. A positive coefficient implies a hazard ratio (calculated as the exponentiated coefficient from the Cox model; see e.g., Kleinbaum 1996) of greater than one, suggesting that an increase of the covariate increases the failure rate. Similarly, a negative coefficient implies a hazard ratio of less than one, indicating that an increase in the covariate reduces the failure rate.

The corresponding measure of the marginal effect in the AFT model is the so-called time ratio. The time ratio is calculated as the exponential of the AFT coefficient (see e.g. Bradburn et al. 2003, p434). A positive AFT coefficient implies a time ratio of greater than one, which indicates that an increase in the covariate increases the survival time (or equivalently, slows down failure). As a consequence, we expect that a given independent variable with a positive sign and a time ratio above one in the AFT model will have a negative coefficient and a hazard ratio of less than one in the Cox model due to the structural differences between the Cox and AFT models.

## 4. Results

*Descriptive Statistics and IPO Frequency*

Table 4 presents descriptive statistics of the variables used in the analysis. The average age of IPO firms joining the AIM, measured as the number of years from incorporation until AIM listing, is almost four years. The youngest firm in our sample was incorporated only four months before the IPO (which is rounded up to one year in our analysis). By contrast, the oldest company had been incorporated for 11 years at the time of its IPO. AIM firms show a lot of variability in terms of their size. While the average market capitalization at IPO is £21.54 million, market capitalization ranges from a mere £233,000 to £518.6m. Over the sample period, the average

initial return is 14.94 percent. Public float, in terms of the proportion of IPO proceeds over market capitalization at the IPO, averages 31 percent and ranges from a mere one percent to a maximum of 95 percent. AIM firms show high levels of insider ownership with mean ownership of around 66 percent. Pre-IPO average sales are around £5.1m. Only 11 percent of AIM IPOs are backed by private equity or venture capital; this is discussed further below.

We measure Nomad reputation using five alternative measures. For our first reputation measure (Reput1), the average Nomad market share (by IPO numbers) is 3.8 percent with the maximum of 23.4 percent. For Reput2, the average market share (by IPO proceeds) is 1.03 percent while the maximum is 18.23 percent. Next, we examine the characteristics of Nomads in terms of their credit scores, profitability (return on assets) and Nomad age. The average credit score of the Nomad (at the time of the advisee company's IPO) is nearly 69 ranging from a minimum of 9 to a maximum of 96. The return on assets of the Nomad firms (at the time of the advisee's IPO) is healthy averaging 22 percent but ranging from a very low -87 percent to almost 98 percent. The average age of the Nomad firm (at the advisee's IPO) is 12.9 years ranging from one to 57 years. The composite Nomad reputation measure has a mean score of 43.4 percent with a minimum of zero percent and a maximum of 85.2 percent.

The average initial return (Hot-issue returns) in the quarter prior to a firm's own IPO is 16.83 percent. The second quarter of 1999 had the highest average initial return of 59.4 percent. The majority (89 percent) of the IPOs are issued by domestic companies. In terms of industry composition, the largest number of IPOs come from the cyclical services industry (30 percent), followed by the financial sector (23 percent). The resources, information technology and non-cyclical consumer goods industries each account for around 8 to 11 percent of our sample IPOs.[11]

Table 5 shows the distribution of IPOs by year of issue and by industry (based on the FTSE Global industry classification). During our sample period from 1995 to 2004, the IPO market on AIM tends to fluctuate around an upward sloping trend line reaching temporary peaks every four years: first in 1996 with 94 IPOs, then in 2000 with 179 IPOs, and finally again in 2004 with the highest number of IPOs in the sample period (243 IPOs). In 1997 and 1998, and again in 2001

[11] We check the correlation amongst the variables in our analysis and find that multicollinearity is not an issue.

and 2002, IPO numbers on AIM fell. In the U.S., listing activity collapsed after the internet bubble burst in 2000 and stagnated until 2010. By contrast, during 2001-2004 the numbers of IPOs (of non-financial companies) on AIM roughly matched or exceeded those in the U.S. (for Amex, NYSE and NASDAQ together). During 2001-2004, there were 94, 60, 66 and 243 IPOs on AIM, and only 79, 66, 62 and 174 IPOs in the U.S.[12] AIM also attracted more IPOs during 2001-2004 than the upper-tier of the London Stock Exchange, the Main Market.[13]

As noted previously, most AIM IPOs in our sample originate from the financial and cyclical services sectors. The number of IPOs in the cyclical service sector was consistently high since the inception of the market, while the number of IPOs in the financial sector only gathered momentum from 1999 onwards. The number of technology firms joining AIM only picked up during the internet bubble of 1999 and early 2000 and, as expected, dropped off after the internet bubble burst in the spring of 2000. However, 2004 saw a renewed rise in IPOs from the IT sector.

Table 6 breaks down the numbers and percentages of sample IPOs by year and by Nomad reputation (Panel A), domestic versus foreign incorporation (Panel B), or venture-capital backing of the issuing company in Panel C (where venture capital is defined broadly to include private equity).

As shown in Panel A, between 9 and 15 percent of AIM IPOs involved a reputable Nomad where reputable Nomads are those in the top 5 percentiles of the composite reputation measure described in Section 3 (see also Table 3). This excludes the first year of the AIM (1995), which was characterized by small numbers of IPOs and Nomads, and the year 2003 which saw a sudden rise in the percentage of top-5 Nomad-backed IPOs to 28 percent. Notably, in the hot-issue years 2000 and 2004, characterized by unusually large numbers of IPOs (171 and 241 IPOs, respectively), the percentage of reputable Nomad-backed IPOs remained comparable to other sample years. This suggests that reputable Nomad firms (as well as others) are able to expand

[12] See Figure 1 in the Appendix. The figures are numbers of IPOs per year. For the U.S. the figures are based on IPOs with an offer price of at least $5.00, excluding ADRs, unit offers, closed-end funds, REITs, partnerships, banks and S&Ls, and stocks not listed on CRSP. The figures are taken from Jay Ritter's website http://bear.cba.ufl.edu/ritter; see that site for further details on U.S. IPO activity.

[13] Our sample comprises almost the full population of AIM IPOs during the years 1995-2004, and hence the figures of sample IPOs vary closely with those of total IPOs on AIM.

their business rapidly, probably in the face of increased demand by issuers, and are unlikely to face tight capacity constraints during hot issue periods.

Panel B of Table 6 gives a breakdown of IPO numbers for UK-incorporated IPO companies and others. IPOs of foreign firms make up a relatively small proportion ranging from a minimum of five percent in 2000 to a maximum of over 19 percent in 2004. The highest number of foreign IPOs took place in 2004 with 46 foreign IPOs; by contrast, throughout the previous nine years, 1995-2003, there were only 52 foreign IPOs.

Finally, Panel C shows figures on IPOs backed by venture capital or private equity versus non-backed IPOs. The proportion of backed IPOs dropped between 1998 and 2000 from around 22 percent in 1998 to under six percent in 2000 and then to a low of three percent in 2002. This relatively low and declining proportion of venture-backed IPOs may appear surprising given the supposed attractiveness of AIM to speculative and young ventures. However, it needs to be appreciated that "venture capital" in the UK is mostly not in the form of seed or early-stage funding but rather later stage funding known in the US as private equity. It seems that AIM is not an attractive exit venue for these private-equity backers.

*IPO Survival Rates and Times*

Table 7 shows the survival rates of our sample AIM IPOs for one, three and five years after the IPO. Specifically, the table reports median survival times and cumulative survival rates calculated using the non-parametric Kaplan-Meier method. The median survival time (ST) for the full sample is 80 months (Panel C); that is, half the sample IPOs survive for 80 months or less. Median survival time varies considerably by issue year with IPOs issued during the hot markets of 1999-2000 and 2003-04 having the lowest median survival times. Half the IPOs issued during 1999-2000 survive for only 43 and 60 months or less, respectively. The figures for 2003-04 are 46 and 58 months or less, respectively. By contrast, more than half the IPOs issued in 2001 (after the internet bubble of 1999-2000) survived until the end of 2010. This implies a median survival time greater than 108 months.

By comparison with issue year, the industry sector of the issuing company causes less survival-time variation with median survival times ranging from 70 months for financials to 98 months for

companies in "other" industries. Breaking down the figures in Panel A by Nomad reputation, we find that IPOs with top-5 Nomads have higher median survival times for all issue years and in many years this difference is substantial. Overall, IPO companies with reputable Nomads have median survival time of 91 months as compared to 58 for IPOs backed by other Nomads.

As with median survival times, the figures on survival rates in Table 7 indicate a substantial degree of variation depending on the year of issue with one-year survival rates ranging from 85 to 100 percent: Specifically, survival rates drop from the maximum of 100 percent recorded for IPOs in 1995 and 2002 to 85 percent for issues during the internet bubble in 1999. The bubble year 1999 is also associated with the lowest survival rates over three and five years (at 58 and 34 percent, respectively). These year differences are statistically significant as a log rank test rejects the null hypothesis of equality of survival rates across issue years (chi-square: 42, p-value: 0.000).[14]

Breaking the sample down by industry, we find that survival rates vary comparatively little across industries; e.g., survival rates over one year range from 92 percent (for Information Technology IPOs) to 96 percent for the non-cyclical consumer goods sector and resource companies. Overall, the industry differences in survival rates are statistically insignificant with the log rank test across industries taking a chi-square value of 5.723 (p-value: 0.331).

We find a substantial effect of Nomad reputation on survival rates and times. Table 7 shows the survival rates separately for IPOs backed by a "Top-5 Nomad" and those backed by an "Other Nomad". We find that cumulative survival rates over 1, 3 and 5 years after the IPO are consistently higher for reputable Nomad-backed IPOs than for others for the full sample period, and in each issue year (except for 1-year survival rates in 1995 and 2002 which equal 100 percent for both reputable and other Nomads). The pattern is similarly consistent when we compare IPOs with reputable Nomads and other Nomads across the issuers' industrial sectors (in Panel B). Overall, one-year survival rates for reputable Nomad backed IPOs are 98 percent compared to 91 percent for others. The difference is larger for the three and five-year survival rates where reputable Nomad backing adds around 22 percentage points to the survival rates of the IPOs

[14] Under the null hypothesis of equality of the subsamples, the log rank test statistic is chi-square distributed with G – 1 degrees of freedom, where G is the number of groups (G=10 in panel A and 6 in Panel B).

(calculated as the difference between 85 percent and 63 percent for 3-year survival rates and 70 percent and 48 percent for 5-year rates).

Table 8 breaks down the delisting rates (defined as 100 percent minus the survival rate) by reason of delisting. It also reports figures separately for IPOs with and without reputable Nomads. Delisting due to M&A accounts for 1.56 percent points of the overall one-year failure rate of 6 percent (see Table 7). Of the three-year failure rate of 26 percent, over 10 percentage points are due to M&A delistings; and for the five year window, M&A make up 16 percent out of a total failure rate of 41 percent. We also find a clear-cut Nomad reputation effect in that the involvement of a reputable Nomad results in consistently lower failure rates across all three windows and all delisting reasons.

Referring back to the summary of the results of earlier studies in Table 2, we conclude that the delisting rates we estimate for AIM IPOs are within the ranges reported in previous studies of the US and Canadian markets (Bradley et al 2006, Kooli and Meknassi 2007, Schultz 1993). We find delisting rates that are slightly higher than those previously reported for AIM. Specifically, Gregory et al (2010) report that 9.5 percent of AIM companies are delisted within 5 years for reasons that can be classified as 'bankrupt' (including liquidation and receivership). Based on the figures we report in Table 8, the combined delisting rates for voluntary liquidations and administration/receivership are 10.7 percent. This difference is expected because we track AIM IPOs till the end of 2010 whereas the study period of Gregory et al. (2010) ends in 2007 at the start of the current global financial crisis (see Gregory et al 2010 footnote 10, p. 633).

*Univariate Analysis of Survivors and Failures*

Table 9 compares the descriptive statistics for the subsamples of survivors (stocks that remain listed until the end of the study period on 31 December 2010) and non-survivors (stocks that are delisted). In Panel A we classify all delistings due to M&A as non-survivors. The results in Panel A show that there are substantial and significant differences between survivor and non-survivor IPOs.

Survivors clearly differ from non-survivors in terms of the reputation of their Nomads. Survivors are backed by higher reputation Nomads (mean composite score of 48.5) as compared to non

survivors (mean composite score of 41.4). Similar results are observed using the Reput1 and Reput2 measures, and the means and medians of the three other reputation measures (Nomad credit score, return on assets and age) are also statistically significantly higher for survivors than for non-survivors. Among survivors, the average Nomad credit score is almost 69, but among non survivors it is only 41. The Nomads of survivors have an average return on assets of over 21 percent, compared with 16.6 percent for the Nomads of non survivors. The average age of the Nomad is almost 14 years among survivors but less than 11 years among non-survivors.

IPOs that come to the market during hot issue periods (measured by high average initial returns) show lower survival than those from cold periods. In terms of the characteristics of IPO companies, we find that surviving IPO companies are significantly older and larger than non-surviving IPO companies. Survivor IPOs have lower initial returns (underpricing) than non survivors. The proportion of IPOs issued by domestic companies is similar among the survivors and the non-survivors suggesting that domestic IPOs are equally likely to survive as non-domestic IPOs. There are also some significant industry effects with a higher percentage of cyclical services IPOs among survivor IPOs than among non-survivor IPOs, and vice versa for IPOs of companies in the resource sector. By contrast, there are no significant differences between survivors and non-survivors in terms of public float and VC backing. Survivors have substantially higher pre-IPO sales than non-survivors. Survivors also differ in terms of inside ownership at the IPO with survivors having a higher insider ownership than non survivors.

In Panel B of Table 9, delistings due to M&A are classified as censored if they rank above median based on all of four performance measures: cash to total assets, total liabilities to total assets, operating income to total assets and the current ratio, each observed in the year prior to IPO. The results remain qualitatively unchanged except for the industry effect in the cyclical services and resources sectors which are no longer significant.

*AFT Estimation of Survival Model*

Next, we estimate an Accelerated Failure Time (AFT) model to investigate the determinants of IPO survival time, specifically the impact of Nomad reputation on survival time, controlling for other firm and issue characteristics, such as the occurrence of the IPO during a hot-issue market , company age, market capitalization (size), public float, initial returns of the IPO, VC backing,

domestic (UK) incorporation, and industry effects. As noted in the Methodology section above, we choose the log-normal distribution as the baseline survival function based on the Akaike Information Criterion.

The results of the AFT model are presented in Table 10. To measure Nomad reputation, we employ a composite measure based on five separate characteristics of Nomads as outlined in the Methodology section above and summarized in Table 3. Model I in Table 10 treats observations delisted due to a merger or acquisition as non-survivors (or failures), while Models II and III treat some mergers and acquisitions as censored observations (i.e., delisting is not observed in the period over which the observation is tracked). Specifically, M&A delistings of companies with above-median performance in the year before the M&A are classified as censored survivors, while M&A delistings of below-median performers are treated as failures (see the discussion of Table 9 in the previous sub-section). Prior studies of IPO survival classify some or all mergers and/or acquisitions as non-survivors (e.g. Carpentier and Suret 2011), while others classify them as censored survivors (Jain and Kini 2000) or exclude them altogether from their samples (Hensler et al 1997).

Models I and II in Table 10 are based on the full sample period comprising IPOs listed during 1995-2004. Model III is estimated on a restricted sample from 1995 to 2001 excluding in particular the large number of IPOs that listed on AIM in 2003-04. In all three models, survival time is positively related to *Nomad Reputation*. This result is robust to a wide range of alternative classifications of M&As. Our results are qualitatively similar by defining the top 25 percent, or the top 75 percent, or all M&As as censored survivors.[15]

We find that having an IPO during hot issue markets significantly reduces survival time. The *Age* and *Size* of the IPO firm (expressed as natural logarithms) have a positive effect on survival time. *Initial returns* and *Public float* have no effect on survival time while *Insider ownership* and pre-IPO *Sales* have a positive effect on survival time. Venture-capital backing (*VC-Backed*) has no significant effect on survival time (except in Model II). Similarly, the indicator of domestic incorporation (*DOM-IPOs*) of the IPO firm is insignificant, and there are no statistically significant industry effects.

[15] These results are not reported but are available from the authors.

Our results are broadly consistent with prior U.S. studies (Schultz 1993; and Hensler et al 1997) on the determinants of the survival rate and time, indicating that age, size and initial returns at the time of issue are positive key determinants of survival times. Contrary to Jain and Kini (2000), we find an insignificant effect of venture backing on survival. However, this result is probably unreliable due to the small number of venture-backed IPOs on AIM (with venture-backed IPOs accounting for only 11 percent of our sample).

Next, we assess the impact of the explanatory variables on IPO survival on the basis of the estimated time ratios. As outlined in the Methodology section, the time ratio equals the exponential of the coefficient, exp($\beta$), and measures the extent to which changes in the independent variable speed up or delay the occurrence of delisting (i.e., shorten or lengthen the time to failure or delisting). *Ceteris Paribus*, a one-unit increase in the composite measure of *Nomad reputation* (i.e. a one percentage point increase in the average of the percentile ranks of the five separate reputation measures) increases the survival time by between 5 and 14 percent (i.e., by a multiple of 1.05 to 1.14). The time ratio for *Hot-issue returns* ranges from 0.97 to 0.98, indicating that an increase in *Hot-issue returns* of one unit decreases survival time by between two and three percentage points. A one-unit increase in *Age*, increases survival time by about 22 percent while a one-unit increase in *Size* increases the survival time by between 19 and 22 percent. The impact of a one-unit increase in *Initial returns* on survival time is minimal (0.3 percent).

*Sensitivity analysis*

In this section we further examine the sensitivity of the expected (or predicted) survival times to the changes in the continuous independent variables. Based on the AFT coefficient estimates of Model II (in Table 10), Table 11 shows the actual, absolute and percentage changes in the median expected (or predicted) survival time due to changes in the continuous independent variables expressed in terms of multiples of their standard deviations, σ. Changes are calculated relative to the base of predicted survival time evaluated at the means of all independent variables; at this

base, the median predicted survival time equals 78 months. The analysis is similar to Hensler et al. (1997). [16]

The results of the sensitivity analysis suggest that there is considerable scope for issuers to increase their IPO's survival times by choosing a more reputable Nomad. A one-standard deviation increase in the composite measure of Nomad reputation increases the expected median survival time from 78 to 103 months (a change of 25 months or 32.1 percent).

Hot-issue markets have a significant impact on survival time but in the opposite direction. A one-standard deviation increase in the average initial returns of the IPOs issued in the three months before the IPO month (the variable *Hot-issue returns*), decreases survival time by 33 months (or 42.3 percent). The age and size of the issuing company also have significant impact on survival times: a two-standard deviation increase in *Age* increases predicted median survival time from 78 months to 112 months; and a corresponding increase in *Size* raises survival time to 106 months. These changes are equivalent to percentage increases in survival time of 43.6 percent and 35.9 percent, respectively. By contrast, the impact of public float is more limited with a two-standard deviation increase in *Public float* raising expected survival time by only 6.4 percent or 5 months (from 78 to 83 months).

Finally, we evaluate the impact of variations in average sales, and insider ownership. We find that one-standard deviation increase in pre-IPO sales extends survival time by 16.7 percent, while one- standard deviation increase in the insider ownership increases the survival time by 14.1 percent.

*Robustness of the results*

The results on the impact of Nomad reputation reported above are based on a composite measure of five separate reputation measures. Appendix Table A1 reports the results for each of these five measures of Nomad reputation separately (classifying M&A delistings in the same way as Model II in Table 10). All five separate reputation measures have a negative impact on survival times and all but Reput4 (the Nomad firm's return on assets) are statistically significant.

[16] The sensitivity analysis in Table 11 is based on Table 5 in Hensler et al. (1997). We are grateful for advice from Thomas Springer (one of the co-authors of Hensler et al. 1997) and to Wesley Eddings, Senior Statistician at Stata, for helping us create this table.

As a robustness check, we re-estimate our results using the Cox proportional hazard model. Table 12 reports the results of the Cox model and shows that our results remain qualitatively unchanged. An obvious concern about our sample is the high percentage of observations in the latter period 2002-2004. Since we aim to study the population of IPOs in each year, this is unavoidably due to variations in IPO activity and the particularly high numbers of IPOs in 2004 (see Table 5). Therefore, we examine whether our AFT and Cox results in Tables 10 and 12 are robust to omitting IPOs issued after 2001. Model III in Tables 10 and 12 shows the results of the AFT and Cox estimations based on the reduced sample period to be qualitatively equivalent to those of the full sample.

We further explore the robustness of our results by using alternative classifications of delistings due to M&A as survivors or non-survivors. We classify M&A firms as censored survivors if firm performance ranks either in the top quartile or alternatively above the bottom quartile in terms of four measures of performance (see Section 3); M&A companies with lower performance are treated as non-survivors. The results (not reported in the paper) suggest that our earlier findings are mostly robust except for a slight reduction in their statistical significance.

Finally, we examine alternative measures of market hotness. Hot markets are characterized by unusually high numbers of IPOs coming to the market, and IPOs earning unusually high initial returns. However, IPO numbers and initial returns do not necessarily move in lock step. Instead Ritter (1984) finds that periods of high IPO volume tend to follow periods of high average initial returns. We included as an alternate proxy of market hotness the variable, *Hot-issue numbers*, which is defined as the *number* (rather than the initial returns) of IPOs issued in the three months prior to the month of the given sample IPO. This variable has a negative impact on survival time broadly similar to (but statistically less significant than) the hot-issue proxy included in the main analysis (*Hot-issue returns*). All other results remain qualitatively unchanged. Finally, we include a dummy taking a value of 1 during the internet "bubble" of 1999-2000, and zero otherwise. This variable has a highly significant, negative impact on survival time (with all other results remaining qualitatively unchanged). In conclusion, the hot-issue effect we report is robust to several variations in its modeling.

## 5. Conclusion

This paper examines the survival of new listings on a "reputational market", the UK Alternative Investment Market (AIM). AIM's principle-based regulation delegates important aspects of oversight to financial firms acting as nominated advisors (Nomads) to issuers and expected to certify and control listing quality. We examine the determinants of survival times of IPOs on AIM focusing on the impact of the reputation of the Nomad. We control for a broad range of other known determinants of survival times. Based on data of all non-financial IPOs issued since the opening of AIM until the end of 2004, we find historical survival rates that are in line with previously reported results for other (North American) markets. We use the Kaplan-Meier approach to estimate survival times and rates, and find that the median survival time is 80 months. Survival rates also vary statistically significantly across issue years with much lower survival times of between 43 to 46 months for IPOs issued during hot markets (in 1999 and 2004).

We estimate an Accelerated Failure Time (AFT) model that allows the impact of independent variables on survival times to vary over the post-IPO period, e.g. by having a stronger impact on stocks nearer the IPO than later on. The results show a statistically and economically significant impact of Nomad reputation that is robust to a wide range of variations in research design including five alternative measures of Nomad reputation. Based on a careful sensitivity analysis and a composite of the five separate reputation measures, we find that *ceteris paribus* a one-standard deviation increase in Nomad reputation delays the (median) time to delisting from 78 months to 103 months.

We find that going public during a hot-issue market hastens delisting significantly. A one-standard-deviation increase in the average initial returns of the IPOs issued during three months before a company lists on AIM reduces survival time by 33 months (or 42.3 percent). The age and size of the issuing company also have significant impact on survival times. A one-standard deviation increase in firm age increases survival time by 27 months (or 34.6 percent) whereas a one-standard deviation increase in firm size raises survival time by 24 months (or 30.77 percent). By contrast, the impact of other statistically significant firm characteristics (sales and insider

ownership) is comparatively limited. A one-standard increase in either sales or insider ownership increases survival time by about one year.

Our findings demonstrate the important role played by the reputation of the decentralized regulator (the Nomad) in extending expected survival times and in offsetting the detrimental impact of hot-issue markets. Our results on the impact of the separate Nomad reputation measures suggest that investors ought to pay close attention to the issuer's choice of Nomad, not just in terms of the Nomad firm's market share, but also its age and credit score. The significance of credit score, proxying the long-term viability of the Nomad firm, may be due to the regulatory requirement of a long-term relationship between the Nomad and the client IPO company, unlike underwriters on other markets whose involvement is usually limited to the IPO.

Our findings are of relevance to (long-term) investors and other stakeholders interested in the survivability of IPOs. Our results suggest that it is important that these parties pay attention to the reputation of the Nomad backing a given IPO. Equally, our results have important implications for Nomads. Nomad firms may be reluctant to back IPOs with short expected survival times due to reputational concerns. Nomads may also face diseconomies arising from incurring fixed costs associated with learning about a client IPO company; these fixed costs may not be recouped by the fees charged over a short life-span of the client company. According to our results, Nomads that seek to back long-lived clients should be wary of companies proposing to list during hot-issue markets because of the relatively short survival times of hot-issue IPOs.

Finally, our results provide important lessons to the designers and regulators of market places modeled on AIM such as the upper tier of the U.S. over-the-counter market, the OTCQX, Italy's AIM Italia, and Japan's AIM Tokyo. They suggest that stock markets with light-touch and delegated regulation, require the existence of sufficient numbers of reputable players who can act as credible, decentralized regulators. Our findings demonstrate that these are required to ensure the survival of new listings and, by implication, the survival of the market itself.

## References


Allison, P., 2000, *Survival analysis using the SAS system: A practical guide*. SAS Institute Publishing: Texas

Audretsch, D.B., and Lehmann, E.E., 2005, The effects of experience, ownership, and knowledge on IPO survival: Empirical evidence from Germany, *Review of Accounting and Finance* 4; 13-33.

Baum, C., 2006, *An introduction to modern econometrics using Stata*. A Stata Press Publication: Texas, 78-82.

Bhattacharya, N., Demers, E., Joos, P., 2010, The relevance of accounting information in a stock market bubble: evidence from internet IPOs. *Journal of Business Finance & Accounting.* 37; 291-321.

Bradburn, M., Clark, T., Love, S., Altman, D., 2003, Survival analysis part II: multivariate data analysis–an introduction to concepts and methods, *British Journal of Cancer* 89; 431-436.

Bradley, D., Cooney, J., Dolvin, S., Jordan, B., 2006, Penny stock IPOs. *Financial Management* 39; 5-29.

Bushman, R., Chen, Q., Engel, E. Smith, A., 2004, Financial accounting information, organizational complexity and corporate governance systems. *Journal of Accounting and Economimcs.* 37, 167-201.

Carpentier, C., Suret, J., 2011, The survival and success of penny stock IPOs: Canadian evidence. *Small Business Economics* 36, 101-121.

Carter, R., Manaster, S., 1990, Initial public offerings and underwriter reputation, *Journal of Finance* 45, 1045-1067.

Cox, D., 1972, Regression models and life tables. *Journal of Statistics Society* 34; 187-220.

Cox, D., Oakes, D., 1984, *Analysis of survival data.* University Printing House: Cambridge London.

Davidoff, S. M., 2007, Regulating listings in a global market, *Wayne State University Law School. Law and Economics Research Paper No. 73*.

Demers, E., Joos, P., 2007, IPO failure risk. *Journal of Accounting Research* 45; 333-371.

Fama, F., French, K., 2004, New lists: Fundamentals and survival rates. *Journal of Financial Economics* 73; 229-269.

Ford, C., 2010, Principles-based securities regulation in the wake of the global financial crisis, *McGill Law Review* 55.

Gerakos, J., Lang, M., Maffett, M., 2011, Listing choices and self-regulation: The experience of the AIM. *Chicago Booth Working Paper No. 11-04.*

Giudici, G., Roosenboom, P., 2004, *The Rise and Fall of Europe's New Stock Markets*, Amsterdam: Elsevier.

Goergen, M., Khurshed, A., Mudambi, R., 2006, The strategy of going public: How UK firms choose their listing contracts. *Journal of Business Finance and Accounting* 33, 1/2 (Jan/Mar 2006), 79-101.

Goergen, M., Khurshed, A., Renneboog, L., 2009, Why are the French so different from the Germans? Underpricing of IPOs on the Euro New Markets. *International Review of Law and Economics* 29; 260-271.

Greene, W., 2003, *Econometrical analysis*. Pearson Prentice Hall*:* New Jersey.

Gregory, A., Guermat, C., Al-Shawawreh, F., 2010, UK IPOs: Long Run Returns, Behavioural Timing and Pseudo Timing. *Journal of Business Finance and Accounting* 37, 5/6 (Jun/Jul 2010), 612-647.

Hamilton, L., 2006, *Statistics with Stata*. A Stata Press Publication: Texas.

Hensler, D., Rutherford, R., Springer, T., 1997, The survival of initial public offerings in the aftermarket. *Journal of Financial Research* 20; 93-110.

Jain, B, Kini, O., 1999, The life cycle of initial public offerings. *Journal of Business Finance and Accounting* 26; 1281-1307.

Jain, B., Kini, O., 2000, Does the presence of venture capitalists improve the survival profile of IPO firms? *Journal of Business Finance & Accounting* 27; 1139-1176.

Jain, B., Martin, C., 2005, The association between audit quality and post-IPO performance: A survival analysis approach. *Review of Accounting and Finance* 4; 50-75.

Jain, B., Kini, O., 2008, The Impact of strategic investment choices on post-issue operating performance and survival of US IPO firms. *Journal of Business Finance & Accounting* 35; 459–490.

Kashefi-Pour, E., Lasfer, M., 2011, The delisting-decision and leverage: The AIM market evidence. *Cass Business School Working Paper*.

Kleinbaum, D., 1996, *Survival analysis: A self-learning text* Springer Verlag: New York.

Kooli, M., Meknassi, S., 2007, The Survival Profile of U.S. IPO Issuers: 1985-2005. *Journal of Wealth Management* 10; 105-119.

Leon, G. C. 2007, Stigmata: The Strain of Sarbanes-Oxley on U.S. Capital Markets, *Duquesne Business Law Journal* 9; 125-182.

London Stock Exchange, 2010, *AIM Rules for Companies*, Available at http://www.londonstockexchange.com/companies-and-advisors/aim/documents/publications.htm

London Stock Exchange, 2010, *AIM Rules for Nominated Advisors*, Available at http://www.londonstockexchange.com/companies-and-advisors/aim/documents/publications.htm

Mendoza, J., 2008, Securities regulation in low tier listing venues: The rise of the alternative investment market. *Fordham Journal of Corporate & Financial Law* 13; 257-328.

Ritter, J., 1984, The “Hot Issue” Market of 1980. *Journal of Business* 57; 215-240.

Ritter, J., 1991, The long-run performance of initial public offerings. *Journal of Finance* 42; 365-94.

Schultz, P., 1993, Unit initial public offerings. *Journal of Financial Economics* 34; 199-229.

Seguin, P, Smoller M., 1997, Share price and mortality: An empirical evaluation of newly listed NASDAQ stocks. *Journal of Financial Economics* 45; 333-363.

Shumway, T., 2001, Forecasting bankruptcy more accurately: A simple hazard model. *Journal of Business* 74; 101-124.

The U.S. Government Accountability Office (GAO) 2008, Sarbanes Oxley Act: Considerations of key principles needed in addressing implementation for smaller public companies. In Fletcher, W.H. and Plette, T.N. (Eds.), *The Sarbanes-Oxley Act: Implementation, Significance and Impact*, Nova Science Publishers, New York.

## Table 1

## Comparison of Listing Rules

| Rules on | AIM | LSE Main Market | OTCQX U.S. | NASDAQ Capital Market |
|---|---|---|---|---|
| Public float | No minimum required | Minimum 25% of shares in public hand | No minimum required | 300 shareholders; 1m shares publicly held with minimum market value between $4-5m |
| Trading record | None required | Three years trading record required | None required | 0-2 year trading record |
| Minimum market capitalization | No minimum required | Minimum £10 million market capitalization | Minimum $5 million market capitalization | Minimum $50 million market capitalization |
| Profitability | No minimum requirement | No minimum requirement | No minimum requirement | No minimum or $750k net income depending on listing standard |
| Role of advisors | Nominated advisor Nomad required for all transactions at and post-IPO | No such requirement | Designated Advisor for Disclosure DAD required for all transactions at and post-IPO | No such requirement |
| Admission documents | Admission documents not examined by UKLA* | Admission documents inspected by UKLA* | Admission documents not examined by US SEC | Admission documents inspected by US SEC |

***United Kingdom Listing Authority**

**Source: AIM, NASDAQ, www.otcqx.com, Mendoza (2008)**

## Table 2

## Selected previous studies of IPO survival

| Authors | Country | Sample; IPO years | Method | Reported failure (delisting) rates over | | |
|---|---|---|---|---|---|---|
| | | | | 1 Year | 3 Years | 5 Years |
| Schultz (1993) | US | Shares vs unit IPOs; 1986-1988 | Logit/Probit | 2-7% | 12-42% | - |
| Hensler et al, (1997) | US | NASDAQ; 1975-84 | Survival analysis AFT | - | - | 28% |
| Seguin and Moller (1997) | US | Penny vs non-penny stocks; 1974-1988 | Logit/Probit | - | - | 47% (penny); 17% (others) |
| Jain and Kini (2000) | US | U.S. new issues on SDC; 1977-1990 | Survival analysis AFT | - | - | 28% |
| Fama and French (2004) | US | NASDAQ; 1973-91 | 10-year survival rates | | | 58.5%* |
| Bradley et al. (2006) | US | Penny vs non-penny stocks; 1990-1998 | Logit/Probit | - | 6-35% | - |
| Demers and Joos (2007) | US | U.S. new issues on SDC; high-tech vs other stocks; 1980-2000 | Logit/Probit | - | - | 9% (high-tech); 17% (others) |
| Kooli and Meknassi (2007) | US | U.S. new issues on SDC; 1985-2005 | Multinomial Logit and survival analysis AFT | 2% | 24% | 45% |
| Jain and Kini (2008) | US | U.S. new issues on SDC; 1980-1997 | Survival analysis Cox model | - | - | 35% |
| Bhattacharya et al. (2010) | US | Internet, hi-tech and NASDAQ; 1982-Feb. 2000 | Logit | - | - | 24% (internet), 14% (high-tech), 18% (NASDAQ) |
| Gregory, Guermat and Al-Shawawreh (2010) | UK | Main Market, AIM and Unlisted Securities Market; 1975-2004 | Descriptive statistics (proportion of bankrupt firms) | | 1.2% (Main); 4.3% (AIM) | 3.6% (Main); 9.5% (AIM) |
| Carpentier and Suret (2011) | Canada | 1986-2003 | Survival analysis Cox model | - | - | 20% |

* Failure rate derived from the authors' reported 10-year survival rates as (100% - 10-year survival rate).

## Table 3

## Definition of Variables

| Variable | Definition of variable and unit of measurement | Data source |
|---|---|---|
| Size | Market capitalization at IPO number of shares outstanding at IPO times initial offer price measured in £ million | London Stock Exchange |
| Age | Number of years between incorporation and IPO date. | Companies House |
| Initial returns | First-day closing price minus offer price divided by offer price; in percentage | London Stock Exchange and DataStream. |
| Public float | Money raised at the IPO issue proceeds divided by market capitalization at offer price; in percentage | London Stock Exchange |
| Sales | Average of the sales of the IPO company in the year prior to the IPO and in the year of the IPO, measured in £ millions. | IPO prospectus |
| Insider ownership % | Percentage of insider ownership at the time of IPO | IPO prospectus |
| VC-Backed | Binary variable taking a value of 1 if IPO is backed by at least one "venture capitalist" more accurately, private equity, and zero otherwise | BVCA |
| Nomad reputation | Composite reputation measure:<br>For each IPO, the reputation of the Nomad at the time of the IPO year is measured as the value of the composite measure derived from data on the component measures Reput1 to Reput5 (see below) in the year prior to the IPO. In each pre-IPO year (1994-2003), Nomads are ranked based on each of the five component measures Reput1 to Reput5 detailed below. The composite measure for each Nomad is then calculated as the un-weighted average of the percentile ranks of the Nomad in each of the five component measures.<br>Nomad reputation is defined in several ways.<br>(1) Reput1: Nomad market share in terms of the number of issues a Nomad backed in the year prior to the IPO year as a proportion of the total number of IPOs in that year.<br>(2) Reput2: Nomad market share in terms of the proceeds of IPOs a Nomad backed in the year prior to the IPO year as a proportion of the total IPO proceeds in that year.<br>(3) Reput3: The Nomad firm's credit score in the year prior to the IPO of the company advised by the Nomad; Nomads with a higher credit score are more stable firms than those with a lower credit scores.<br>(4) Reput4: The Nomad firm's return on assets in the year prior to the IPO of the company advised by the Nomad.<br>(5) Reput5: Age of the Nomad firm measured as the number of years between incorporation of the Nomad firm and the year prior to the IPO of the company advised by the Nomad. | London Stock Exchange and FAME database |
| Hot-issue returns | Average initial returns of IPOs issued during the three months prior to the month of the IPO (similar to a measure used by Demers and Joos 2007). | London Stock Exchange and DataStream. |
| DOM-IPOs | Dummy variable taking 1 if IPO company is domestic (UK) | London Stock Exchange |

| | | |
|---|---|---|
| | incorporated, zero otherwise | |
| Industry dummies | Binary industry dummies based on the FTSE Global industry classification indicating companies in the<br>• financial industry (financials)<br>• cyclical services<br>• information technology<br>• non-cyclical consumer goods<br>• resources<br>The industry class “Others” is used as the base category in the estimations. | London Stock Exchange |

## Table 4

## Descriptive statistics

The table shows descriptive statistics for our sample of 896 AIM IPOs listed during 1995-2004. The variables are defined in Table 3. IPO company age (Age) is measured in years rounding up to the next highest full year; the lowest value of Age observed in our sample is just over four months rounded up to one year. Initial returns are winsorised at 1%.

| Variables | Obs. | Mean | Median | Standard Deviation | Min | Max |
|---|---|---|---|---|---|---|
| Age (Years) | 896 | 3.702 | 3 | 2.666 | 1* | 11 |
| Size (£ million) | 896 | 21.539 | 10.970 | 36.030 | 0.233 | 518.623 |
| Initial returns (%) | 896 | 14.941 | 7.802 | 24.552 | -23.076 | 128.00 |
| Public float (%) | 896 | 31.014 | 27 | 22.555 | 1 | 94.88 |
| Insider ownership (%) | 896 | 66.387 | 72.044 | 23.030 | 9.200 | 98.864 |
| Sales (£m) | 896 | 5.182 | 2.036 | 6.421 | 0.749 | 19.301 |
| VC-Backed (binary) | 896 | 0.107 | 0 | 0.311 | 0 | 1 |
| Nomad reputation measures | | | | | | |
| Reput1: market share by IPOs (%) | 896 | 3.835 | 1.754 | 2.626 | 0.415 | 23.404 |
| Reput2: market share by IPO proceeds (%) | 896 | 1.038 | 0.492 | 1.777 | 0.010 | 18.230 |
| Reput3: Nomad credit score (#) | 896 | 68.916 | 68.970 | 22.841 | 9 | 96 |
| Reput4: Nomad return on assets (%) | 896 | 22.111 | 18.782 | 28.120 | -87.560 | 97.640 |
| Reput5: Nomad age (years) | 896 | 12.95 | 11 | 8.642 | 1 | 57 |
| Composite reputation measure (%) | 896 | 43.431 | 41.600 | 16.961 | 0.000 | 85.210 |
| Top 5% Composite reputation measure (Dummy) | 896 | 0.136 | 0 | 0.339 | 0 | 1 |
| Hot-issue returns (%) | 896 | 16.836 | 14.145 | 10.786 | 3.264 | 59.412 |
| DOM-IPOs (binary; 1 if UK incorporated) | 896 | 0.891 | 1 | 0.311 | 0 | 1 |
| Industry dummies (binary) | | | | | | |
| Financials | 896 | 0.231 | 0 | 0.423 | 0 | 1 |
| Cyclical services | 896 | 0.300 | 0 | 0.462 | 0 | 1 |
| Information technology | 896 | 0.111 | 0 | 0.312 | 0 | 1 |
| Non-cyclical consumer goods | 896 | 0.116 | 0 | 0.317 | 0 | 1 |
| Resources | 896 | 0.084 | 0 | 0.274 | 0 | 1 |
| Others | 896 | 0.158 | 0 | 0.423 | 0 | 1 |

## Table 5

## AIM IPOs by year of listing and industry

The table shows the distribution of our sample of 896 AIM IPOs listed during 1995-2004 by year of listing and by industry based on the FTSE Global industry classification.

| FTSE Global classification | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Financials** | **2** | **7** | **8** | **6** | **21** | **44** | **21** | **11** | **19** | **68** | **207** |
| Insurance | | 1 | | | | 4 | 1 | 2 | | 1 | |
| Investment companies | | | | | | 1 | 6 | | 1 | 7 | |
| Real estates | 1 | 4 | 4 | | 3 | 6 | 4 | 1 | 3 | 4 | |
| Specialty &other finance | | | | 6 | 15 | 32 | 10 | 3 | 14 | 54 | |
| Investment entity | 1 | 2 | 4 | | 3 | 1 | | 5 | 1 | 2 | |
| **Cyclical services** | **11** | **37** | **30** | **13** | **16** | **40** | **26** | **17** | **18** | **60** | **268** |
| General retailers | 1 | | 2 | | | 3 | 2 | 1 | | 5 | |
| Leisure, entertainment &hotel | 4 | 7 | 8 | 1 | 7 | 9 | 3 | 7 | 5 | 14 | |
| Media &photograph | 5 | 11 | 6 | 3 | 2 | 15 | 12 | 8 | 3 | 15 | |
| Support service | 1 | 15 | 12 | 8 | 6 | 11 | 9 | 1 | 9 | 17 | |
| Transport | | 4 | 2 | 1 | 1 | 2 | | | 1 | 9 | |
| **Information technology** | **0** | **0** | **0** | **0** | **10** | **26** | **13** | **12** | **8** | **31** | **100** |
| Information technology &hardware | | | | | | 5 | 3 | | | 1 | |
| Software &computer service | | | | | 10 | 21 | 10 | 12 | 8 | 30 | |
| **Non-cyclical consumer goods** | **1** | **10** | **9** | **7** | **4** | **15** | **10** | **14** | **4** | **30** | **104** |
| Beverage | | | 1 | 5 | 3 | | 2 | 5 | | 2 | |
| Food producers and process | | 5 | 1 | | | 1 | 1 | 2 | 2 | 5 | |
| Health | | | 4 | | | 8 | | 2 | 1 | 10 | |
| Personal care &household product | | | | 2 | 1 | | 1 | 4 | | | |
| Pharmaceutical and biotechnology | 1 | 5 | 3 | | | 6 | 6 | 1 | 1 | 13 | |
| **Resources** | **0** | **2** | **1** | **2** | **1** | **17** | **18** | **1** | **10** | **23** | **75** |
| Mining | | | | | 1 | 11 | 13 | 1 | 7 | 10 | |
| Oil & gas | | 2 | 1 | 2 | | 6 | 5 | | 3 | 13 | |
| **Others** | **1** | **34** | **17** | **8** | **7** | **29** | **6** | **5** | **6** | **29** | **142** |
| Automobile and parts | | | 2 | | 1 | 2 | | | 1 | 3 | |
| Household goods & textiles | | 1 | 3 | 2 | 1 | 3 | | 2 | 1 | 3 | |
| Aerospace & defence | | | | | | | | 1 | | 1 | |
| Electronic & electrical equipment | 1 | 7 | | | | 5 | | 2 | | 5 | |
| Engineering & machinery | | 2 | 3 | 2 | 1 | 7 | 1 | | 3 | 5 | |
| Diversified industrials | | 2 | | | | | | | | | |
| Chemicals | | | | | | 5 | 1 | | 1 | 3 | |
| Construction & building materials | | | 3 | 3 | 2 | 2 | 1 | | | 2 | |
| Packaging | | 2 | | | | | 1 | | | | |
| Steel & other metals | | 3 | | | | | | | | 1 | |
| Food & drug retailers | | | 2 | 1 | 2 | | | | | 1 | |
| Telecommunication services | | 9 | | | | 4 | 2 | | | 4 | |
| Electricity | | 6 | | | | | | | | 1 | |
| Water | | 2 | 4 | | | 1 | | | | | |
| **Total sample IPOs** | **15** | **90** | **65** | **36** | **59** | **171** | **94** | **60** | **65** | **241** | **896** |
| **Total AIM IPOs** | **16** | **94** | **70** | **37** | **59** | **179** | **94** | **60** | **66** | **243** | **918** |

## Table 6

## AIM IPOs by year of listing, Nomad reputation, venture-capital backing and country of incorporation

The table shows the composition of our sample of 896 AIM IPOs in terms of a breakdown by the year of listing and separately for reputable and other Nomads (in Panel A); Reputable Nomads are those that are within the top five percentiles ("top 5%") of the composite Nomad reputation measure (see Table 3). Panel B reports figures separately for UK-incorporated and other IPO companies, and Panel C breaks down the numbers for IPOs with venture-capital or private-equity backing ("VC backed") and for un-backed IPOs.

| *Listing year* | *1995* | *1996* | *1997* | *1998* | *1999* | *2000* | *2001* | *2002* | *2003* | *2004* |
|---|---|---|---|---|---|---|---|---|---|---|
| Panel A: Nomad Reputation | | | | | | | | | | |
| Reputable Nomad # | 7 | 13 | 6 | 4 | 7 | 17 | 8 | 9 | 18 | 33 |
| Other Nomad # | 8 | 77 | 59 | 32 | 52 | 154 | 86 | 51 | 47 | 208 |
| Reputable Nomad % | 47 | 14 | 9 | 11 | 12 | 10 | 9 | 15 | 28 | 14 |
| Other Nomad % | 53 | 86 | 91 | 89 | 88 | 90 | 91 | 85 | 72 | 86 |
| Panel B: Country of IPO company incorporation | | | | | | | | | | |
| UK incorporated # | 14 | 81 | 61 | 31 | 53 | 162 | 88 | 53 | 60 | 195 |
| Others # | 1 | 9 | 4 | 5 | 6 | 9 | 6 | 7 | 5 | 46 |
| UK incorporated % | 93 | 90 | 94 | 86 | 90 | 95 | 94 | 88 | 92 | 81 |
| Others % | 7 | 10 | 6 | 14 | 10 | 5 | 6 | 12 | 8 | 19 |
| Panel C: VC backed and un-backed IPOs | | | | | | | | | | |
| VC backed IPOs # | 4 | 23 | 16 | 8 | 8 | 10 | 8 | 2 | 3 | 14 |
| Un-backed IPOs # | 11 | 67 | 49 | 28 | 51 | 161 | 86 | 58 | 62 | 227 |
| VC backed IPOs % | 27 | 26 | 25 | 22 | 14 | 6 | 9 | 3 | 5 | 6 |
| Un-backed IPOs % | 73 | 74 | 75 | 78 | 86 | 94 | 91 | 97 | 95 | 94 |

## Table 7

## Kaplan-Meier survival rates

For our sample of 896 AIM IPOs listed during 1995-2004, the table shows cumulative survival rates calculated using the Kaplan-Meier method (see Section 3 and, e.g., Kleinbaum 1996) for one year, three years and five years after the IPO. Survival rates are shown for one year, three years and five years post-IPO. Based on the survival rates, the table also reports median survival times (ST) in months. The value of ST shows after how many months post-IPO half the IPOs have been delisted, i.e., the cumulative survival rate drops below 50 percent. In Panel B, ST is reported as missing (N/A) when cumulative survival rates up to the end of our sample period are greater than 50 percent. However, in Panel A, we can infer in these cases that the minimum ST is the time remaining from the issue year until the end of the study period (December 2010). Figures in parentheses indicate minimum survival times calculated in this way. We conduct log rank tests to assess the statistical significance of any differences between the survival curves across issue years and industries, and between reputable and other Nomads. Reputable Nomads are those in the top five percentile of the composite Nomad reputation measure (see Table 3).

| | All IPOs | | | | | | Reputable NOMAD | | | | | | OTHER NOMAD | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Cum. Survival rate | | | | | Cum. survival rate | | | | | | Cum. survival rate | | | | |
| **Panel A: By issue year** | **Obs** | **Log Rank** | **1 Yr** | **3 Yrs** | **5 Yrs** | **ST** | **Obs** | **Log Rank** | **1 Yr** | **3 Yrs** | **5 Yrs** | **ST** | **Obs** | **Log Rank** | **1 Yr** | **3 Yrs** | **5 Yrs** | **ST** |
| 1995 | 15 | 42 | 100 | 75 | 63 | 103 | 7 | 12.830 | 100 | 100 | 81 | 145 | 8 | 37.920 | 100 | 51 | 47 | 63 |
| 1996 | 90 | 0.000 | 91 | 72 | 61 | 92 | 13 | 0.1703 | 100 | 85 | 81 | (168) | 77 | 0.000 | 84 | 60 | 41 | 87 |
| 1997 | 65 | | 96 | 73 | 61 | 88 | 6 | | 100 | 85 | 71 | 91 | 59 | | 92 | 62 | 51 | 80 |
| 1998 | 36 | | 95 | 62 | 57 | 98 | 4 | | 100 | 67 | 67 | (144) | 31 | | 93 | 58 | 49 | 97 |
| 1999 | 59 | | 85 | 58 | 34 | 43 | 7 | | 91 | 70 | 43 | 48 | 52 | | 81 | 47 | 27 | 42 |
| 2000 | 171 | | 89 | 63 | 50 | 60 | 17 | | 96 | 70 | 52 | 60 | 154 | | 83 | 56 | 50 | 46 |
| 2001 | 94 | | 97 | 83 | 73 | (108) | 8 | | 100 | 87 | 80 | (108) | 86 | | 95 | 79 | 67 | 78 |
| 2002 | 60 | | 100 | 90 | 78 | 72 | 9 | | 100 | 100 | 84 | (96) | 51 | | 100 | 80 | 72 | 72 |
| 2003 | 65 | | 97 | 83 | 68 | 58 | 18 | | 100 | 94 | 88 | (84) | 47 | | 96 | 72 | 48 | 58 |
| 2004 | 241 | | 93 | 77 | 40 | 46 | 33 | | 97 | 89 | 51 | 48 | 208 | | 90 | 66 | 31 | 43 |
| **Panel B: By industry** | | | | | | | | | | | | | | | | | | |
| Financials | 207 | 5.723 | 92 | 73 | 56 | 70 | 17 | 2.94 | 100 | 80 | 68 | N/A | 190 | 6.51 | 89 | 66 | 44 | 68 |
| Cyclical service | 268 | 0.331 | 93 | 70 | 55 | 73 | 24 | 0.709 | 97 | 87 | 64 | 88 | 244 | 0.259 | 91 | 53 | 46 | 72 |
| Information technology | 100 | | 92 | 71 | 51 | 72 | 22 | | 96 | 79 | 61 | 62 | 78 | | 89 | 60 | 41 | 48 |
| Non-cyclical consumer goods | 104 | | 96 | 79 | 58 | 76 | 19 | | 100 | 92 | 71 | 78 | 85 | | 96 | 66 | 45 | 75 |
| Resources | 75 | | 93 | 79 | 67 | 88 | 16 | | 100 | 89 | 72 | N/A | 59 | | 88 | 69 | 62 | 88 |
| Others | 142 | | 94 | 76 | 62 | 98 | 24 | | 98 | 85 | 71 | 107 | 118 | | 90 | 67 | 53 | 78 |
| **Panel C: Full sample** | | | | | | | | | | | | | | | | | | |
| Total | 896 | | 94 | 74 | 59 | 80 | 122 | | 98 | 85 | 70 | 91 | 774 | | 91 | 63 | 48 | 58 |

## Table 8

### Delisting rate within one year, three years and five years after the IPO by delisting reason and Nomad reputation

For our sample of 896 AIM IPOs listed during 1995-2004, the table shows the failure rates estimated using the Kaplan-Meier (K-M) method, broken down by delisting reason and Nomad reputation. The delisting reasons are merger and acquisition, voluntary liquidation, administration or receivership, permanent suspension of quotation, and delisting for other, unknown reasons (excluding transfer to another market). Reputable Nomads are those in the top five percentile of the composite measure of Nomad reputation (see Table 3). Table 7 above shows a one-year survival rate for all IPOs of 94 percent; this implies a delisting rate of 6 percent (100 percent minus 94 percent). Table 8 breaks down this 6 percent delisting rate by delisting reason to show that 1.56 percent delist due to merger and acquisition, 1.12 percent through voluntary liquidation, 0.95 percent due to administration or receivership, 1.17 percent as a result of permanent suspension of the quotation, and 1.23 percent for other unknown reasons for delisting (excluding transfers to other markets).

| **Failure rates** | **Merger and acquisition** | | | **Voluntary liquidation** | | | **Administration/receivership** | | | **Quotation suspended permanently** | | | **Other delisting** | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 Yr | 3 Yrs | 5 Yrs | 1 Yr | 3 Yrs | 5 Yrs | 1 Yr | 3 Yrs | 5 Yrs | 1 Yr | 3 Yrs | 5 Yrs | 1 Yr | 3 Yrs | 5 Yrs |
| Failure rates by Nomad reputation based on IPOs numbers | | | | | | | | | | | | | | | |
| Top 5 Nomad (%) | 0.48 | 6.24 | 11.36 | 0.43 | 2.1 | 5.03 | 0.38 | 2.12 | 2.88 | 0.84 | 2.21 | 5.98 | 0.395 | 2.41 | 4.67 |
| Other Nomad (%) | 2.63 | 14.04 | 19.56 | 1.81 | 4.82 | 8.46 | 1.52 | 5.01 | 5.04 | 1.502 | 8.17 | 11.1 | 2.06 | 4.96 | 7.84 |
| AVERAGE | **1.56** | **10.1** | **15.46** | **1.12** | **3.46** | **6.75** | **0.95** | **3.57** | **3.96** | **1.17** | **5.19** | **8.54** | **1.23** | **3.68** | **6.25** |

## Table 9

## Univariate analysis of survivors and non-survivors

For our sample of 896 AIM IPOs listed during 1995-2004, the table shows means, medians and standard deviations of the variables defined in Table 3 separately for survivor IPOs that survived until at least 31 December 2010 and non-survivor IPOs that had failed by 31 December 2010. In Panel A, delistings due to M&A are classified as non-survivors, while in Panel B, M&A delistings of well-performing companies are classified as censored survivors if they rank above median based on all of the following four company performance measures in the year prior to the M&A delisting: cash to total assets, total liability to total asset, operating income to total asset, and the current ratio. The statistical significance of differences in means is assessed using a t-test estimated under the assumption of unequal variances. The statistical significance of differences in medians is assessed using the Mann-Whitney two-sample test. Asterisks *, **, and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent level, respectively.

| **Panel A** | Survivor IPOs 433 Obs. | | | Non-survivor IPOs, incl. all M&As classed as non-survivors; 463 Obs. | | | *Equality of means test* | *Equality of medians test* |
|---|---|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *Median* | *Std Dev.* | *Mean* | *Median* | *Std Dev.* | | |
| Age (Years) | 3.676 | 3.000 | 2.829 | 2.524 | 2.000 | 2.088 | 6.982*** | 7.759*** |
| Size (£ million) | 23.805 | 11.679 | 45.470 | 19.076 | 9.024 | 23.954 | 1.952** | 3.343** |
| Initial returns (%) | 13.599 | 6.250 | 23.331 | 16.193 | 8.750 | 25.599 | -1.690* | -2.160** |
| Public float (%) | 31.989 | 27.500 | 22.900 | 30.040 | 25.500 | 22.254 | 1.306 | 0.194 |
| Insider ownership (%) | 66.474 | 72.071 | 23.205 | 63.069 | 72.00 | 23.185 | 2.080** | 1.433 |
| Sales (£m) | 6.472 | 2.500 | 7.614 | 4.403 | 2.031 | 6.363 | 4.470*** | 0.539 |
| VC-Backed (binary) | 0.086 | 0 | 0.280 | 0.111 | 0 | 0.328 | -1.238 | |
| Nomad reputation measures | | | | | | | | |
| Composite reputation measure (%) | 48.52 | 47.80 | 15.21 | 41.450 | 40.700 | 12.30 | 5.427*** | 3.356*** |
| Reput1: market share by IPOs (%) | 4.175 | 2.222 | 3.091 | 3.517 | 1.394 | 2.141 | 2.643** | 2.121** |
| Reput2: market share by IPO proceeds (%) | 1.212 | 0.529 | 2.207 | 0.849 | 0.458 | 1.120 | 3.100*** | 2.971*** |
| Reput3: Nomad credit score (#) | 68.572 | 73.000 | 22.902 | 41.072 | 52.000 | 22.831 | 17.333*** | 2.440** |
| Reput4: Nomad return on assets (%) | 21.2 | 19.5 | 27.7 | 16.6 | 17.8 | 28.3 | 2.358** | 2.112** |
| Reput5: Nomad age (years) | 13.678 | 13.000 | 8.305 | 10.589 | 6.000 | 8.810 | 5.151** | 15.482** |
| Hot-issue returns (%) | 15.661 | 13.620 | 8.509 | 17.932 | 14.483 | 12.453 | -3.203*** | -1688* |
| DOM-IPOs (binary; 1 if UK incorporated) | 0.892 | 1 | 0.304 | 0.884 | 1 | 0.309 | 0.150 | |
| Industry dummies (binary) | | | | | | | | |
| Financials | 0.225 | 0 | 0.414 | 0.241 | 0 | 0.42 | -0.780 | |
| Cyclical services | 0.353 | 0 | 0.476 | 0.257 | 0 | 0.439 | 2.647** | |
| Information technology | 0.107 | 0 | 0.296 | 0.11 | 0 | 0.313 | -0.645 | |
| Non-cyclical consumer goods | 0.113 | 0 | 0.302 | 0.112 | 0 | 0.299 | 0.100 | |
| Resources | 0.048 | 0 | 0.332 | 0.117 | 0 | 0.232 | -3.668*** | |
| Others | 0.160 | 0 | 0.367 | 0.151 | 0 | 0.358 | 0.362 | |

*Table 9 continues*

| **Panel B** | Survivor IPOs, incl. top 50% of M&As classed as censored; 482 Obs. | | | Non-survivor IPOs, incl. bottom 50% of M&As classed as non-survivors; 414 Obs. | | | *Equality of means test* | *Equality of medians test* |
|---|---|---|---|---|---|---|---|---|
| *Variables* | *Mean* | *Median* | *Std Dev.* | *Mean* | *Median* | *Std Dev.* | | |
| Age (Years) | 3.788 | 3 | 2.958 | 2.724 | 2 | 2.056 | 4.513*** | 2.035*** |
| Size (£ million) | 24.684 | 11.293 | 38.069 | 19.005 | 8.738 | 22.551 | 1.998** | 2.036*** |
| Initial returns (%) | 14.127 | 7.416 | 23.651 | 15.932 | 8.000 | 25.600 | -1.108 | -1.425 |
| Public float (%) | 30.728 | 29 | 22.524 | 29.582 | 26 | 20.524 | 0.563 | 1.165 |
| Insider ownership (%) | 65.036 | 71.302 | 20.964 | 61.054 | 69.911 | 20.753 | 2.016** | 1.393 |
| Sales (£m) | 6.7 | 2.096 | 7.3 | 4.4 | 2.22 | 6.1 | 3.637*** | 1.686* |
| VC-Backed (binary) | 0.107 | 0 | 0.301 | 0.085 | 0 | 0.264 | 0.824 | |
| Nomad reputation measures | | | | | | | | |
| Composite reputation measure (%) | 49.42 | 48.60 | 16.21 | 42.350 | 41.623 | 11.30 | 5.464*** | 3.251*** |
| Reput1: market share by IPOs (%) | 4.552 | 2.777 | 3.114 | 2.961 | 1.667 | 2.121 | 6.465*** | 6.013*** |
| Reput2: market share by IPO proceeds (%) | 1.239 | 0.709 | 1.929 | 0.791 | 0.290 | 1.537 | 3.830*** | 5.843*** |
| Reput3: Nomad credit score (#) | 70.688 | 68 | 23.423 | 48.172 | 51 | 20.183 | 10.936*** | 2.043** |
| Reput4: Nomad return on assets (%) | 21.6 | 19.9 | 28.5 | 16.24 | 17.204 | 25.5 | 2.101*** | 2.045** |
| Reput5: Nomad age (years) | 12.46 | 12 | 8.621 | 10.58 | 8.2 | 8.156 | 2.369*** | 4.683*** |
| Hot-issue returns (%) | 15.708 | 12.582 | 10.203 | 18.209 | 14.616 | 11.318 | -3.517*** | -4.413*** |
| DOM-IPOs (binary; 1 if UK incorporated) | 0.901 | 1 | 0.299 | 0.879 | 1 | 0.326 | 0.742 | |
| Industry dummies (binary) | | | | | | | | |
| Financials | 0.226 | 0 | 0.419 | 0.242 | 0 | 0.429 | -0.398 | |
| Cyclical services | 0.337 | 0 | 0.473 | 0.271 | 0 | 0.445 | 1.520 | |
| Information technology | 0.095 | 0 | 0.294 | 0.126 | 0 | 0.332 | -1.043 | |
| Non-cyclical consumer goods | 0.101 | 0 | 0.302 | 0.128 | 0 | 0.335 | -0.893 | |
| Resources | 0.071 | 0 | 0.258 | 0.094 | 0 | 0.292 | -0.881 | |
| Others | 0.169 | 0 | 0.374 | 0.140 | 0 | 0.347 | 1.186 | |

## Table 10

## Accelerated failure time (AFT) results

The table shows the results of three estimated Accelerated Failure Time (AFT) models. The variables are defined in Table 3. Model I presents the results with all M&A delistings classified as non-survivors. Model II classifies M&A delistings of well-performing companies as censored survivors. M&A delistings of well-performing companies are classified as censored survivors if they rank above median based on all of the following four performance measures in the year prior to the M&A delisting: cash to total assets, total liability to total asset, operating income to total asset, and the current ratio. Models I and II show the results for the full sample period comprising IPOs issued during 1995 to 2004; Model III is based on a reduced sample period of 1995 to 2001 (and classifies M&As in the same way as Model II). Next to the coefficient (coeff.) the table presents the p-value. The time ratio (*TR*) is calculated as the exponential of the estimated coefficient, exp(β). The time ratio measures the extent to which changes in the independent variables speed up or slow down the occurrence of delisting. For example, in Model I, the time ratio of Ln Age indicates that survival time increases by a multiple of 1.195 as Ln Age increases by one unit. Asterisks *, **, and *** indicate statistical significance at the 10 percent, 5 percent and 1 percent levels, respectively

| | Model I: all M&As are non-survivors | | | Model II: well-performing M&As are censored | | | Model III: 1995-2001; well-performing M&As censored | | |
|---|---|---|---|---|---|---|---|---|---|
| *Variables* | *Coeff.* | *P-value* | *TR* | *Coeff.* | *P-value* | *TR* | *Coeff.* | *P-value* | *TR* |
| Nomad reputation | 0.084** | 0.045 | 1.088 | 0.131*** | 0.004 | 1.140 | 0.048* | 0.096 | 1.049 |
| Hot-issue returns (%) | -0.021*** | 0.000 | 0.979 | -0.023*** | 0.000 | 0.977 | -0.023*** | 0.000 | 0.977 |
| Ln (Age) | 0.178** | 0.010 | 1.195 | 0.199** | 0.045 | 1.220 | 0.142* | 0.067 | 1.153 |
| Ln (Size) | 0.177*** | 0.000 | 1.194 | 0.200*** | 0.000 | 1.221 | 0.292*** | 0.001 | 1.339 |
| Initial returns | 0.002 | 0.312 | 1.002 | 0.003 | 0.217 | 1.003 | 0.004* | 0.097 | 1.004 |
| Public float | 0.001 | 0.601 | 1.001 | -0.001 | 0.579 | 0.999 | -0.001 | 0.968 | 0.999 |
| Ln (Sales) | 0.145*** | 0.000 | 1.156 | 0.142*** | 0.000 | 1.152 | 0.201*** | 0.000 | 1.223 |
| Insider ownership | 0.007*** | 0.000 | 1.007 | 0.006*** | 0.003 | 1.006 | 0.006** | 0.048 | 1.006 |
| VC-Backed | -0.172 | 0.271 | 0.842 | 0.382* | 0.098 | 1.466 | 0.340 | 0.155 | 1.405 |
| DOM-IPOs | 0.133 | 0.392 | 1.143 | 0.223 | 0.132 | 1.250 | 0.224 | 0.408 | 1.251 |
| Industry dummies | | | | | | | | | |
| Financials | -0.143 | 0.342 | 0.867 | -0.225 | 0.129 | 0.798 | -0.677 | 0.006 | 0.508 |
| Cyclical services | -0.224 | 0.113 | 0.799 | -0.127 | 0.387 | 0.880 | -0.427 | 0.066 | 0.652 |
| Information technology | -0.286 | 0.150 | 0.751 | -0.437 | 0.022 | 0.646 | -0.861 | 0.009 | 0.423 |
| Non-cyclical consumer goods | -0.083 | 0.641 | 0.921 | -0.328 | 0.053 | 0.720 | -0.559 | 0.068 | 0.572 |
| Resources | 0.007 | 0.976 | 1.007 | -0.320 | 0.075 | 0.726 | -0.215 | 0.653 | 0.807 |
| Constant | 1.298*** | 0.000 | | 1.302*** | 0.000 | | 1.313*** | 0.000 | |
| Wald Chi-square Test Prob > $\chi^2$ | 0.000*** | | | 0.000*** | | | 0.000*** | | |
| Pseudo $R^2$ | 0.195 | | | 0.210 | | | 0.172 | | |
| No obs. | 896 | | | 896 | | | 548 | | |

## Table 11

## Sensitivity analysis of the continuous variables for the log-normal AFT Model

Based on the coefficient estimates of Model II in Table 10, this table shows actual, absolute and percentage changes in predicted median survival time as independent variables vary by multiples of their standard deviations, σ, holding all other parameters constant. The variables *Age*, *Size* and *Sales* are expressed in levels rather than natural logarithms for the purpose of this analysis. Changes are calculated relative to the base of predicted survival time evaluated at the means of all independent variables; at this base, predicted survival time equals 78 Months. The analysis is similar to Hensler et al. (1997).

| | +2σ | +σ | +σ/2 | +σ/4 | -σ/4 | -σ/2 | -σ | -2σ |
|---|---|---|---|---|---|---|---|---|
| **Nomad reputation (composite measure)** | | | | | | | | |
| Expected survival time months | 106 | 103 | 94 | 84 | 73 | 67 | 56 | 53 |
| Absolute change months | 28 | 25 | 16 | 6 | -5 | -11 | -22 | -25 |
| Percentage change % | 35.9 | 32.1 | 20.5 | 7.7 | -6.4 | -14.1 | -28.2 | -32.1 |
| **Hot-issue returns** | | | | | | | | |
| Expected survival time months | 38 | 45 | 60 | 69 | 75 | 86 | 93 | 97 |
| Absolute change months | -40 | -33 | -18 | -9 | -3 | 8 | 15 | 19 |
| Percentage change % | -51.3 | -42.3 | -23.1 | -11.5 | -3.8 | 10.3 | 19.2 | 24.4 |
| **Age** | | | | | | | | |
| Expected survival time months | 112 | 105 | 101 | 97 | 94 | 83 | 77 | 71 |
| Absolute change months | 34 | 27 | 23 | 19 | 16 | 5 | -1 | -7 |
| Percentage change % | 43.6 | 34.6 | 29.5 | 24.4 | 20.5 | 6.4 | -1.3 | -9.0 |
| **Size** | | | | | | | | |
| Expected survival time months | 106 | 102 | 97 | 91 | 82 | 77 | 66 | 61 |
| Absolute change months | 28 | 24 | 19 | 13 | 4 | -1 | -12 | -17 |
| Percentage change % | 35.9 | 30.8 | 24.4 | 16.7 | 5.1 | -1.3 | -15.4 | -21.8 |

*Table 11 continued*

| | +2σ | +σ | +σ/2 | +σ/4 | -σ/4 | -σ/2 | -σ | -2σ |
|---|---|---|---|---|---|---|---|---|
| **Initial returns** | | | | | | | | |
| Expected survival time months | 89 | 86 | 83 | 82 | 80 | 76 | 73 | 70 |
| Absolute change months | 11 | 8 | 5 | 4 | 2 | -2 | -5 | -8 |
| Percentage change % | 14.1 | 10.3 | 6.4 | 5.1 | 2.5 | -2.6 | -6.4 | -10.3 |
| **Public float** | | | | | | | | |
| Expected survival time months | 83 | 81 | 79 | 77 | 73 | 71 | 70 | 69 |
| Absolute change months | 5 | 3 | 1 | -1 | -5 | -7 | -8 | -9 |
| Percentage change % | 6.4 | 3.8 | 1.3 | -1.3 | -6.4 | -9 | -10.2 | -11.53 |
| **Sales** | | | | | | | | |
| Expected survival time months | 93 | 91 | 85 | 80 | 76 | 69 | 64 | 62 |
| Absolute change months | 15 | 13 | 7 | 2 | -2 | -9 | -14 | -16 |
| Percentage change % | 19.2 | 16.7 | 9.0 | 2.5 | -2.6 | -11.5 | -17.9 | -20.5 |
| **Insider ownership** | | | | | | | | |
| Expected survival time months | 91 | 89 | 86 | 83 | 79 | 74 | 68 | 66 |
| Absolute change months | 13 | 11 | 8 | 5 | 1 | -4 | -10 | -12 |
| Percentage change % | 16.7 | 14.1 | 10.3 | 6.4 | 1.3 | -5.1 | -12.8 | -15.4 |

## Table12

## Cox proportional hazard model

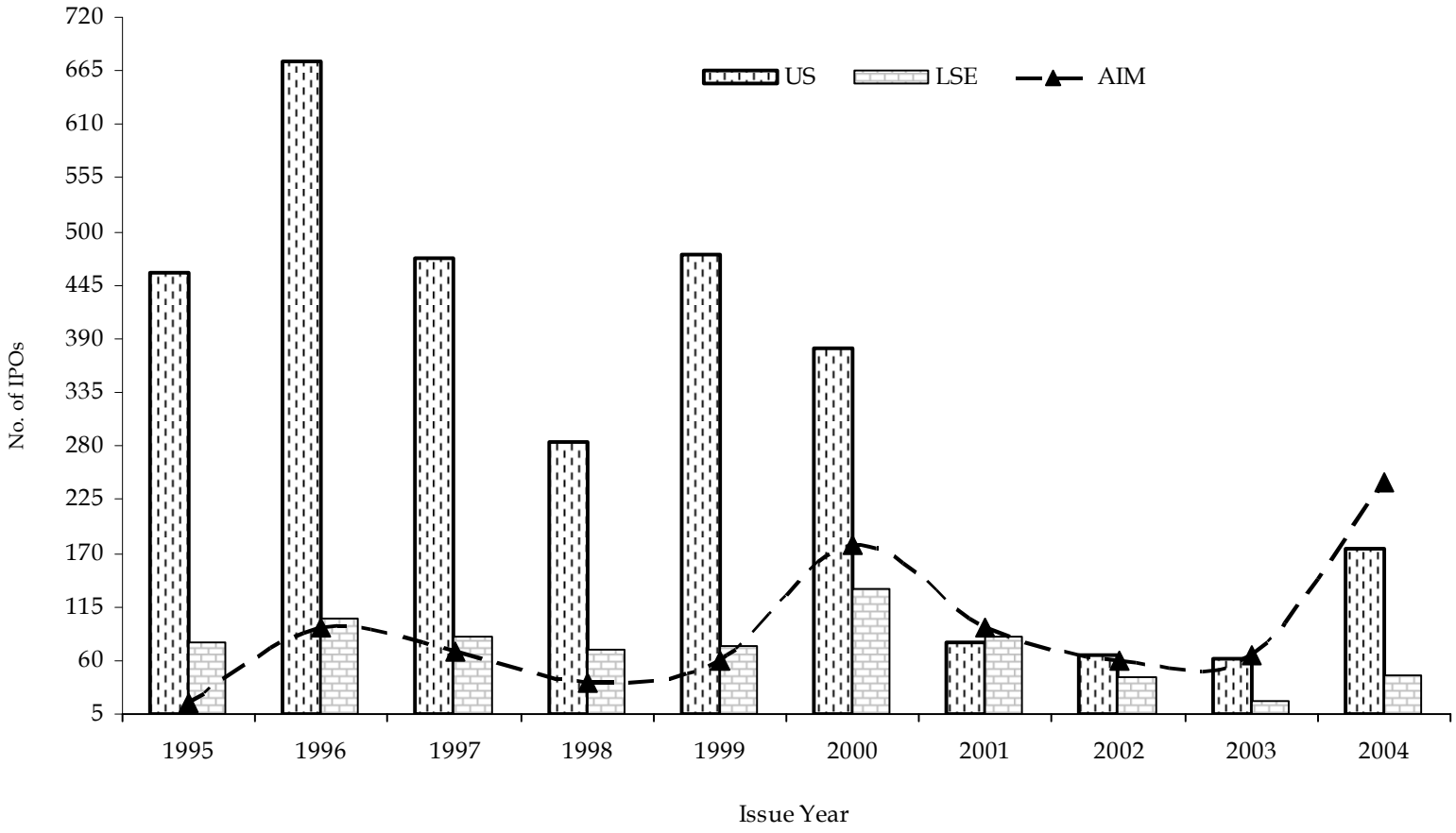
The table shows the results of Cox proportional hazard model. The variables are defined in Table 3. Model I presents the results with all M&A delistings classified as non-survivors. Model II classifies M&A delistings of well-performing companies as censored survivors. M&A delistings of well-performing companies are classified as censored survivors if they rank above median based on all of the following four performance measures in the year prior to the M&A delisting: cash to total assets, total liability to total asset, operating income to total asset, and the current ratio. Models I and II show the results for the full sample period comprising IPOs issued during 19995 to 2004; Model III is based on a reduced sample period of 1995 to 2001 (and classifies M&As in the same way as Model II). Next to the coefficient (coeff.) the table presents the p-value. The hazard ratio (*HR*) is calculated as the exponential of the estimated coefficient, $\exp(\beta)$. For instance, in Model I, an increase in Ln (Age) by one unit decreases the failure rate by 19 percent (1.000 – 0.814). Asterisks $^{*}$, $^{**}$, and $^{***}$ indicate statistical significance at the 10 percent, 5 percent and 1 percent levels respectively.

| | Model I: all M&As classed as failures | | | Model II: Top 50% of M&As are censored | | | Model III: 1995-2001; top 50% of M&As censored | | |
|---|---|---|---|---|---|---|---|---|---|
| *Variables* | *Coeff.* | *P-value* | *HR* | *Coeff.* | *P-value* | *HR* | *Coeff.* | *P-value* | *HR* |
| Nomad reputation | -0.097** | 0.031 | 0.907 | -0.163*** | 0.001 | 0.850 | -0.073* | 0.095 | 0.930 |
| Hot-issue returns (%) | 0.015*** | 0.000 | 1.016 | 0.017*** | 0.000 | 1.018 | 0.016** | 0.011 | 1.016 |
| Ln (Age) | -0.206** | 0.017 | 0.814 | -0.233*** | 0.001 | 0.793 | -0.184*** | 0.006 | 0.832 |
| Ln (Size) | -0.218*** | 0.000 | 0.804 | -0.220*** | 0.000 | 0.803 | -0.288*** | 0.000 | 0.750 |
| Initial returns | -0.001 | 0.597 | 0.999 | -0.001 | 0.508 | 0.999 | -0.002 | 0.497 | 0.998 |
| Public float | -0.003 | 0.190 | 0.997 | -0.001 | 0.894 | 0.999 | -0.002 | 0.621 | 0.998 |
| Ln (Sales) | -0.144*** | 0.000 | 0.866 | -0.144*** | 0.000 | 0.866 | -0.189*** | 0.000 | 0.828 |
| Insider ownership | -0.009*** | 0.000 | 0.991 | -0.008*** | 0.000 | 0.992 | -0.009*** | 0.001 | 0.991 |
| VC-Backed | 0.076 | 0.598 | 1.079 | -0.550** | 0.046 | 0.577 | -0.393 | 0.112 | 0.675 |
| DOM-IPOs | -0.098 | 0.530 | 0.906 | -0.183 | 0.258 | 0.833 | -0.173 | 0.543 | 0.841 |
| Industry dummies | | | | | | | | | |
| Financials | 0.201 | 0.202 | 1.223 | 0.328 | 0.068 | 1.389 | 0.748 | 0.008 | 2.112 |
| Cyclical services | 0.201 | 0.154 | 1.222 | 0.083 | 0.624 | 1.087 | 0.341 | 0.175 | 1.406 |
| Information technology | 0.221 | 0.243 | 1.248 | 0.440 | 0.035 | 1.553 | 0.728 | 0.024 | 2.070 |
| Non-cyclical consumer goods | 0.118 | 0.530 | 1.126 | 0.424 | 0.034 | 1.529 | 0.534 | 0.096 | 1.705 |
| Resources | -0.087 | 0.696 | 0.916 | 0.421 | 0.041 | 1.523 | 0.059 | 0.906 | 1.061 |
| Wald Chi-square Test Prob > $\chi^2$ | 0.000*** | | | 0.000*** | | | 0.000*** | | |
| Pseudo $R^2$ | 0.092 | | | 0.121 | | | 0.089 | | |
| No obs. | 896 | | | 896 | | | 548 | | |

# Appendix

## Appendix Figure 1

The figure shows the numbers of IPOs on US markets and UK markets (the Alternative Investment Market, AIM, and the Main Market of the London Stock Exchange, LSE) by year of issue from 1995 until the end of our IPO sample period in 2004. The numbers of UK IPOs are from JP Morgan, the London Stock Exchange, and the AIM website (http://www.londonstockexchange.com/en-gb/products/companyservices/ourmarkets/ AIM_new/). The numbers of US IPOs are collected from Jay Ritter's website, (http://bear.cba.ufl.edu/ritter), and the and NASDAQ (http://www.nasdaq.com/). Ritter's IPO numbers are based on IPOs with an offer price of at least $5.00, excluding ADRs, unit offers, closed-end funds, REITs, partnerships, banks and S&Ls, and stocks not listed on CRSP.



# Appendix Table A1

The table shows the estimates of five Accelerated Failure Time (AFT) models. The variables are defined in Table 3. The analysis classifies the delistings of well-performing companies due to M&A as censored observations. Specifically, M&A delistings are classified as censored survivors if the companies rank above median based on all of four performance measures: cash to total assets, total liability to total asset, operating income to total asset, and the current ratio in the year prior to the M&A delisting. Model I presents the results using the Nomad reputation measure Reput1 measured as the number of IPOs the Nomad backed in the year prior to the year of the IPO, as a proportion of all the IPOs in that year. Model II uses Nomad Reput2 measured as the proceeds of all the IPOs the Nomad backed in the year prior to the IPO year, as a proportion of the total IPO proceeds in that year. Model III uses Nomad Reput3, the Nomad's credit score in the year prior to the year of a given IPO. Model IV uses Nomad Reput4, which is the Nomad's return on assets in the year prior to the year of a given IPO. Model V uses Nomad Reput5, which is the natural logarithm of the age of the Nomad firm in the year prior to the IPO year. The time ratio (*TR*) is calculated as the exponential of the estimated coefficient, exp(β). The time ratio (TR) measures the extent to which changes in the independent variables speed up or slow down the occurrence of delisting (time to failure or delisting). For example, in Model I, the time ratio of Ln (Age) indicates that survival time increases by a multiple of 1.184 as Ln (Age) increases by one unit. Asterisks $^{*}$, $^{**}$, and $^{***}$ indicate statistical significance at the 10 percent, 5 percent and 1 percent levels, respectively.

**AFT Results (Well-performing M&A companies classified as survivors)**

| | Model I: Nomad Reput 1 | | | Model II: Nomad Reput 2 | | | Model III: Nomad Reput 3 | | | Model IV: Nomad Reput 4 | | | Model V: Nomad Reput 5 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Variables* | *Coeff.* | *P(value)* | *TR* | *Coeff.* | *P(value)* | *TR* | *Coeff.* | *P(value)* | *TR* | *Coeff.* | *P(value)* | *TR* | *Coeff.* | *P(value)* | *TR* |
| Nomad reputation | 0.074*** | 0.000 | 1.077 | 0.065** | 0.038 | 1.068 | 0.004** | 0.046 | 1.004 | 0.029 | 0.886 | 1.030 | 0.259*** | 0.000 | 1.295 |
| Hot-issue returns | -0.022*** | 0.000 | 0.978 | -0.023*** | 0.000 | 0.977 | -0.023*** | 0.000 | 0.977 | -0.023*** | 0.000 | 0.977 | -0.024*** | 0.000 | 0.977 |
| Ln (Age) | 0.169** | 0.016 | 1.184 | 0.156** | 0.028 | 1.169 | 0.172** | 0.016 | 1.188 | 0.171** | 0.017 | 1.186 | 0.154** | 0.025 | 1.167 |
| Ln (Size) | 0.210*** | 0.000 | 1.234 | 0.215*** | 0.000 | 1.239 | 0.201*** | 0.000 | 1.222 | 0.217*** | 0.000 | 1.242 | 0.196*** | 0.000 | 1.217 |
| Initial returns | 0.003 | 0.123 | 1.003 | 0.003 | 0.163 | 1.003 | 0.003 | 0.191 | 1.003 | 0.004* | 0.100 | 1.004 | 0.003 | 0.214 | 1.003 |
| Public float | -0.001 | 0.703 | 0.999 | -0.001 | 0.738 | 0.999 | -0.001 | 0.839 | 0.999 | 0.001 | 0.872 | 1.001 | -0.002 | 0.418 | 0.998 |
| Ln (Sales) | 0.150*** | 0.000 | 1.162 | 0.155*** | 0.000 | 1.168 | 0.146*** | 0.000 | 1.158 | 0.156*** | 0.000 | 1.169 | 0.141*** | 0.000 | 1.152 |
| Insider ownership | 0.006*** | 0.002 | 1.006 | 0.007*** | 0.001 | 1.007 | 0.006*** | 0.002 | 1.006 | 0.007*** | 0.001 | 1.007 | 0.005*** | 0.008 | 1.005 |
| VC-Backed | 0.187 | 0.16 | 1.206 | 0.166 | 0.159 | 1.181 | 0.219 | 0.178 | 1.245 | 0.228 | 0.184 | 1.256 | 0.186 | 0.152 | 1.204 |
| DOM-IPOs | 0.212 | 0.152 | 1.236 | 0.225 | 0.133 | 1.252 | 0.247 | 0.101 | 1.280 | 0.241 | 0.105 | 1.272 | 0.223 | 0.136 | 1.249 |
| Industry dummies | | | | | | | | | | | | | | | |
| Financials | -0.212 | 0.151 | 0.809 | -0.215 | 0.147 | 0.807 | -0.228 | 0.124 | 0.796 | -0.225 | 0.131 | 0.799 | -0.203 | 0.17 | 0.816 |
| Cyclical services | -0.116 | 0.429 | 0.890 | -0.116 | 0.430 | 0.890 | -0.106 | 0.467 | 0.899 | -0.103 | 0.483 | 0.902 | -0.125 | 0.393 | 0.882 |
| Information technology | -0.210 | 0.152 | 0.811 | -0.225 | 0.166 | 0.799 | -0.217 | 0.26 | 0.805 | -0.214 | 0.272 | 0.807 | -0.251 | 0.197 | 0.778 |
| Non-cyclical consumer goods | -0.214 | 0.264 | 0.807 | -0.216 | 0.262 | 0.806 | -0.220 | 0.161 | 0.803 | -0.207 | 0.174 | 0.813 | -0.230 | 0.259 | 0.795 |
| Resources | -0.228 | 0.065 | 0.796 | -0.21 | 0.085 | 0.811 | -0.253 | 0.111 | 0.776 | -0.211 | 0.083 | 0.810 | -0.211 | 0.103 | 0.810 |
| Constant | 1.391*** | 0.000 | | 1.402*** | 0.000 | | 1.411*** | 0.000 | | 1.432*** | 0.000 | | 1.425*** | 0.000 | |
| Wald Chi-square Test Prob > $\chi^2$ | 0.000*** | | | 0.000*** | | | 0.000*** | | | 0.000*** | | | 0.000*** | | |
| Pseudo $R^2$ | 0.134 | | | 0.154 | | | 0.105 | | | 0.087 | | | 0.089 | | |
| No obs. | 896 | | | 896 | | | 896 | | | 896 | | | 896 | | |