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Dimitrios Gounopoulos, Hang Pham



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Dimitrios Gounopoulos, Hang Pham¹

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Abstract

This study examines the influence of specialist CEOs on the probability of failure and survivability of initial public offering (IPO) firms. We construct a generalist skills index based on CEOs' past employment history in order to classify CEOs into specialist and generalist ones. Specialist CEOs pursue a career in particular functional roles, firms and industry sectors, as opposed to generalist CEOs who accumulate their work experience through various positions, firms and industries. We uncover strong evidence that IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive in subsequent periods following the offering. The findings suggest that specialist managerial ability has significant implications for post-issue performance of newly listed firms. Additionally, specialist CEOs may have incentives that are more aligned with those of the firm and its shareholders; thus, they are more likely to enhance the viability of IPO firms for a longer period of time.

Keywords: IPOs, IPO survival, specialist CEOs, CEO's work experience.

¹ This study is based on a chapter of Hang Pham's thesis submitted to the University of Sussex in July 2016. Dimitrios Gounopoulos is at the School of Management, University of Bath, Claverton Down, Bath BA2 7AY. Hang Pham is at Essex Business School, the University of Essex, Wivenhoe Park, Colchester, CO4 3SQ, UK. We are grateful to Rashad Abdel Khaliq, Jaffrey Callen, Paul Chaney, Andreas Charitou, Thomas Chemmanur, Leonidas Doukakis, Jon Davies, Francois Derrien, Igor Filatochev, Chinmoy Ghosh, Ranko Jelic, Irene Karamanou, Johannes Kolb, Suresh Radhakrishnan, Tim Loughran, David Newton, Jay Ritter, Ana Simpson, Lakshmanan Shivakumar, Silvio Vismara conference participants at the FMA Meeting 2016 and seminar participants at the University of Leeds, Newcastle University, the University of Sussex and the University of Warwick for valuable comments and suggestions. Special Thanks goes to our discussant in the International Journal of Accounting 2017 Symposium, Theodore Sougiannis. Corresponding author: Dimitrios Gounopoulos (email: d.gounopoulos@bath.ac.uk).

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Abstract

This study examines the influence of specialist CEOs on the probability of failure and survivability of initial public offering (IPO) firms. We construct a generalist skills index based on CEOs' past employment history in order to classify CEOs into specialist and generalist ones. Specialist CEOs pursue a career in particular functional roles, firms and industry sectors, as opposed to generalist CEOs who accumulate their work experience through various positions, firms and industries. We uncover strong evidence that IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive in subsequent periods following the offering. The findings suggest that specialist managerial ability has significant implications for post-issue performance of newly listed firms. Additionally, specialist CEOs may have incentives that are more aligned with those of the firm and its shareholders; thus, they are more likely to enhance the viability of IPO firms for a longer period of time.

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1. Introduction

The extant empirical evidence from both U.S. and international IPO markets suggests that although IPO firms often offer substantial initial returns, they show poor long-run performance with around 30% of firms either failing or being acquired in five years subsequent to the offering (see Ritter (2003), Ritter and Welch (2002), Jenkinson and Ljungqvist (2001), Loughran et al. (1994) for a review of U.S. and international evidence of the phenomena). In the transition from private to public ownership, issuing firms face various challenges such as changes in ownership structure and governance mechanisms, more stringent scrutiny from capital market participants and regulators, increased market competition, etc. (Jain and Kini 2008; Jain and Kini 2000). All of these challenges threaten the survivability of IPO firms. Prior studies rigorously investigate various firm-level characteristics influencing IPO survival such as underwriter prestige (Schultz 1993), firm age, firm size, underpricing, IPO activity level, insider ownership, risk factors (Hensler et al. 1997), audit quality (Jain and Martin 2005; Demers and Joos 2007), venture backing (Jain and Kini 2000), board effectiveness (Charitou et al. 2007), and earnings management (Alhadab et al. 2014). However, little has been known about CEO-level determinants of IPO survival.

In recent decades, there has been substantially increasing attention to the significance of CEOs in the organisational context. In the 1950s, most of CEOs ascended within the firm, were rarely fired, and received mainly a basic salary which was slightly higher than their subordinate executives (Quigley and Hambrick 2015; Frydman and Jenter 2010; Khurana 2002). However, since the 1990s, there have been considerable changes in the perception of CEO significance. CEOs have been featured more prominently in the press, more likely to be recruited from outside the firm, more easily fired, and have received much larger compensation packages including not only a salary but also bonuses and equity compensation (Quigley and Hambrick 2015; Kaplan and Minton 2012; Frydman and Jenter 2010; Murphy et al. 2004; Hayward et al. 2004; Khurana 2002). Quigley and Hambrick (2015) investigate “CEO effect” based on the dataset spanning 60 years and provide evidence that CEOs are actually gaining increasing importance; particularly, the proportion of variation in firm performance attributable to CEOs has risen considerably over the decades of the study. Mackey (2008) also shows that the CEO effect explains 29.2 percent of the variance in a firm’s performance.

Remarkably, the upper echelons theory by Hambrick and Mason (1984) postulates that managerial background characteristics and experiences can exert an impact on managers’ decision-making, and thereby influencing organisational outcomes. Particularly, work experience represents

an important background factor and its significant impact on firms' strategy adoption has been supported by various empirical evidence. Different types of CEOs' functional experience have been examined such as engineering and scientific backgrounds (Malmendier and Tate 2005), financial expertise (Custódio and Metzger 2014), and industry-specific career experience (Huang 2014; Custódio and Metzger 2013; Orens and Reheul 2013). Notably, a recent trend in the business environment is a substantial growth in the percentage of CEOs with diverse career backgrounds and experiences (Crossland et al. 2014). General managerial skills which are more readily transferable across firms and industries, as opposed to specialist managerial skills which are more specific to particular firms and industries, tend to be more desirable in the executive labour market. Firms are more willing to offer higher pay packages to generalist CEOs who acquired general managerial skills through various positions, firms and industries than specialist ones whose career experience is more focused in particular functional roles, firms and industries (Custódio et al. 2013).

CEOs are responsible for making important strategic decisions to enable IPO firms to capitalise on their post-issue opportunities to survive and grow. Given the growing significance of CEOs in the organisational context, and especially, the increasing preference for CEOs with more general managerial ability, we question whether there is heterogeneity in the survival profiles following the offering between IPO firms having a generalist CEO and those having a specialist CEO. We argue that different incentives between generalist and specialist CEOs may explain the differences in their course of actions and decision-making, thereby influencing the failure risk and survivability of issuing firms. Generalist CEOs may demonstrate different risk-taking incentives which may be misaligned with those of the firm (Mishra 2014); and such misalignment is exacerbated by the high level of agency problem inherent in the IPO market. Generalist CEOs are more likely to engage in job-hopping (Giannetti 2011) and more easily get hired due to their prominent presence in executive search databases (Dasgupta and Ding 2010). The higher employability makes their wealth less contingent on the future of the firm that they manage. Moreover, prior studies show the tendency of CEOs with varied career experiences to deviate from current firm strategies (Hambrick et al. 1993), have different risk propensity (Vardaman et al. 2008; Nicholson et al. 2005) and openness to experiences (Zimmerman 2008; Boudreau et al. 2001), and favour experimentation and change (Crossland et al. 2014). Generalist CEOs may also be more inclined to undertake riskier strategies to show the market that they have superior ability. Therefore, generalist CEOs may have more incentives to pursue risky projects without much concern about the consequences of such strategies on long-term viability of the firm. On the other hand, the job mobility across firms and industries of specialist CEOs is more limited (Custódio et al. 2013). Thus, specialist CEOs' future wealth tends to be dependent on the long-term performance of the firm,

making them more incentivised to ensure the firm's longevity. Moreover, Crossland et al. (2014) argue that CEOs with lower career variety tend to prefer stability in strategic decisions. In addition, considerable industry expertise, thorough understanding of the firm, and long-standing relationships with customers and suppliers allow specialist CEOs to develop proper strategic corporate decisions to ensure the survivability of IPO firms. **Therefore, we expect that firms having a specialist CEO will have a lower probability of failure and a higher survival rate.**

We **aim to investigate CEOs' career experience in a wide array of roles, firms, and industry sectors to capture the differences among diverse institutional and occupational contexts. Following Custódio et al. (2013), we construct a generalist skills index that summarises five features of a CEO's employment history: the number of positions that the CEO held, the number of firms where the CEO was employed, the number of industries where the CEO worked, whether the CEO used to be a CEO in a different firm, and whether the CEO had experience in a conglomerate. If a CEO's generalist skills index is equal to or above the median of the overall sample, the CEO is categorised as a generalist CEO. Otherwise, the CEO is classified as a specialist CEO. Conducting the survival analysis on the sample of U.S. common share IPOs from 1999 to 2009, we find that IPO firms with a specialist CEO have a lower probability of failure and survive longer in subsequent periods after the offering. Particularly, the failure risk of IPO firms with a specialist CEO is 35% that of firms with a generalist CEO.**

Some may argue that the measure to categorise CEOs as specialists and generalists does not distinguish between specialist-generalist dimension and founder-professional dimension and between specialist-generalist dimension and insider-outsider dimension. This is due to the fact that a CEO who is a founder and a CEO who is promoted within the firm tend to have prior experiences concentrated on a particular firm and industry. Moreover, extant literature often makes an implicit assumption that outsiders tend to possess generalist skills, while insiders tend to possess specialist skills (e.g., Palomino and Peyrache (2013), Gao and Jain (2011)). Founder CEOs are also often characterised by a greater degree of firm specific skills relative to professional CEOs (Yan and Rajagopalan (2004), Zhang and Rajagopalan (2003)). Using a similar approach as Brockman et al (2016) to disentangle these different dimensions of CEO attributes, we show that it is usual for specialists to be professionals and for generalists to be founders. It is also common for specialists to be outsiders and for generalists to be insiders. We also find a weak correlation between being a specialist and being a founder and between being a specialist and being an insider. The results suggest that specialist-generalist, founder-professional and insider-outsider are distinct dimensions of CEO attributes. After unravelling the specialist-generalist dimension of CEO characteristics from the founder-professional dimension and the insider-outsider dimension, we examine the impacts of

specialist-generalist versus founder-professional attributes and specialist-generalist versus insider-outsider attributes on IPO survival. Consistent with the main findings, we document that generalist CEOs do not significantly enhance the survivability of IPO firms. Regarding specialist CEOs, those with a combination of specialist and professional skills and those with a mix of specialist and outside experiences exert a significant influence on IPO survival. Particularly, the failure risk of IPO firms with a specialist professional CEO is 35% the failure risk of firms without a specialist professional CEO; and the failure risk of IPO firms with a specialist outsider CEO is around 45% the failure risk of firms without a specialist outsider CEO. However, we do not find evidence supporting the role of specialist CEOs who are founders or insiders in improving the survival profiles of IPO firms. The results suggest that professional expertise accumulated from experiences outside the firm is of significant importance for specialist CEOs to be able to enhance the future survivability of IPO firms.

Our paper provides several contributions to the literature. First of all, it contributes to the financial literature that emphasizes the influence of managerial characteristics on corporate decisions and outcomes. Previous research examines various CEO characteristics such as age (Serfling 2014; Orens and Reheul 2013), education (King et al. 2016), early-life experiences (Malmendier et al. 2011), psychological traits (e.g., overconfidence (Huang et al. 2016; Malmendier et al. 2011; Malmendier and Tate 2008, 2005), and risk attitudes (Cain and McKeon 2016; Graham et al. 2013)), specific managerial skills (Kaplan et al. 2012), and managers' fixed effects (Bertrand and Schoar 2003). In terms of CEOs' work experience, prior studies investigate functional experience (Custódio and Metzger 2014; Malmendier and Tate 2005), industry expertise (Huang 2014; Custódio and Metzger 2013; Orens and Reheul 2013), and career variety (Hu and Liu 2015; Crossland et al. 2014). Those studies largely link CEOs' characteristics and experiences with corporate strategic decisions. The empirical evidence of the impact of CEOs' employment histories on the long-term survivability of IPO firms is scarce. To the best of our knowledge, this is the first study to directly investigate the influence of CEOs' managerial ability on IPO firms' survival profiles. Moreover, Custódio et al. (2013) find that generalist CEOs receive higher pay than specialist CEOs and do not find evidence indicating that generalist CEOs positively affect firm performance. Our results suggest that generalist CEOs are not only more costly than specialist CEOs but also associated with a higher probability of failure and a lower survival rate in subsequent periods following the offering. In addition, prior literature mainly focuses on analysing firm and offering characteristics influencing the survivability of IPO firms (e.g., earnings management (Alhadab et al. 2014), board effectiveness (Charitou et al. 2007), audit quality (Jain and Martin 2005; Demers and Joos 2007), venture backing (Jain and Kini 2000), firm age, firm size,

underpricing, IPO activity level, insider ownership, risk factors (Hensler et al. 1997), and underwriter prestige (Schultz 1993)). We further provide novel evidence of a significant manager-level factor determining IPO survival - specialist managerial experience. Moreover, our study has important implications for IPO firm's decisions on CEO appointment. Our findings emphasize the importance of CEOs' specialist managerial experience in ensuring the survivability of IPO issuers.

The rest of the paper is organised as follows. Section 2 discusses related literature and hypothesis development. Section 3 describes the sample and explains the survival analysis methodology. Section 4 reports empirical findings of the impact of specialist CEOs on the probability of failure and time to survive of IPO firms in periods subsequent to the offering. Section 5 provides discussion and analyses on different aspects of CEO attributes, particularly specialist-generalist versus founder-professional and specialist-generalist versus insider-outsider, and their effects on IPO survival. Section 6 presents several robustness checks of the results. Finally, section 7 provides concluding remarks.

2. CEOs' managerial ability and IPO survival

Upper echelons theory (Hambrick and Mason 1984; Hambrick 2007) postulates that managerial background characteristics and experiences can influence organisational outcomes. Various empirical studies provide findings consistent with the theory and document the significance of managerial heterogeneity in explaining corporate strategies and performance. For instance, Bertrand and Schoar (2003) find that manager fixed effects have significant explanatory power for the heterogeneity in various corporate decisions including investment policies such as capital expenditures and acquisition, financial policies such as cash holdings, financial leverage, interest coverage and dividend payouts, and organisational strategies such as R&D, advertising and diversification. Subsequent studies investigate the effects on corporate decisions of managers' psychological traits such as overconfidence and personal risk attitudes (e.g., Huang et al. (2016), Cain and McKeon (2016), Graham et al. (2013), Malmendier et al. (2011), Malmendier and Tate (2008), Malmendier and Tate (2005)), early life experiences (e.g., Malmendier et al. (2011)), age (e.g., Serfling (2014), Orens and Reheul (2013)), and education (e.g., King et al. (2016)). Moreover, Mackey (2008) shows that CEO effect explains 29.2 percent of the variance in a firm's performance and the impact is more pronounced at the corporate level than the segment level and in diversified firms than focused firms.

Along with cognitive abilities, personal traits, and observable demographic backgrounds, functional experience represents an important factor suggested by the upper echelons theory as having crucial implications for managerial decision-making. Prior studies document the significant

impacts of different types of CEOs' past work experience on corporate strategy adoption such as engineering and scientific backgrounds (Malmendier and Tate 2005), financial expertise (Custódio and Metzger 2014), and industry-specific career experience (Huang 2014; Custódio and Metzger 2013; Orens and Reheul 2013). Rather than focusing on particular work experience, we attempt to investigate the variety in career backgrounds of CEOs. We follow Custódio et al. (2013) and construct a generalist skills index based on different aspects of CEOs' employment experiences. Custódio et al. (2013) define general managerial ability as a set of knowledge, skills and experience that the CEO acquired from working in various functional roles, firms, and industries in his lifetime employment. As opposed to general managerial ability, specialist managerial ability refers to a more focused skill set obtained from particular functional roles, firms, and industry sectors. As individuals progress through different functions, organisations and business environment, they gain a wide array of experiences and broaden their cognitive ability for handling business situations (Dragoni et al. 2011; Tesluk and Jacobs 1998). Therefore, generalist CEOs may be more desirable among firms with more sophisticated operations such as conglomerates (Xuan 2009), and to deal with more complex business circumstances such as changes in product market (Hubbard and Palia 1995), technology and management practices (Garicano and Rossi-Hansberg 2006), restructuring, acquisitions, industry shocks and operational distress (Custódio et al. 2013). **However, the impact of CEOs' general managerial ability in the IPO context remains unexplored.**

IPO markets demonstrate high information asymmetries. Public information about an IPO issuer is scarce and often limited to the prospectus that provides details of the business and the offering and includes financial statements for up to the most recent three years. In the presence of the information asymmetry, the agency problem arises due to a conflict of interests between the principal (i.e., shareholders) and the agent (i.e., managers) (Jensen and Meckling 1976). This creates the adverse selection issue when managers have access to private information relevant to the decision-making, and the moral hazard problem when managers go against shareholders' interests to act for their own benefits. Thus, the agency theory implies that managers can exercise their discretion in the firm to influence corporate decisions to achieve their objectives (Bertrand and Schoar 2003). Managers' decisions will be detrimental to the firm if they are not aligned with shareholders' interests.

Mishra (2014) suggests that CEOs with more general managerial experience demonstrate incentives that may not be aligned with those of shareholders and the impact of such incentives aggravates in firms exhibiting high agency issues. Particularly, generalist CEOs appear to be different from the specialist counterparts in their risk-taking incentives. Generalist CEOs possess general managerial skills that are easily transferable across firms and industries and increasingly

sought after in the executive labour market (Custódio et al. 2013). Thus, they are more likely to take advantage of a promising job market and undertake job-hopping (Giannetti 2011). They also tend to be featured more prominently in executive search companies' databases, and thus, more easily recruited (Dasgupta and Ding 2010). **Therefore, generalist CEOs' long-term wealth is less dependent on the firm's future prospects.** Moreover, CEOs with varied career experience are less psychologically committed to current firm strategies (Hambrick et al. 1993), have different risk propensity (Vardaman et al. 2008; Nicholson et al. 2005) and openness to experiences (Zimmerman 2008; Boudreau et al. 2001), and are more likely to favour experimentation and change (Crossland et al. 2014). **Generalist CEOs may also attempt to signal to the market that they have superior ability by adopting risky strategies. Therefore, generalist CEOs may have more incentives to pursue risky projects without much concern about the consequences of such strategies on long-term viability of the firm.**

On the contrary, as specialist CEOs' work experience concentrates on particular functions, firms or industries, their choices in switching firms are more limited (Custódio et al. 2013). Poor firm performance will reflect worse on specialist CEOs' employment histories and adversely affect their future employability. The lower job mobility across firms and industries makes the future prosperity of specialist CEOs crucially depend on the firm's performance and viability. Thus, specialist CEOs may have stronger incentives to ensure that the firm remains viable in the long-term as their long-term interests tend to be more closely tied to the firm's future prospects. Moreover, the long-lasting and on-going involvement in a specific industry and firm equips specialist CEOs with considerable industry expertise, thorough understanding of the firm's business environment, and established relationships with customers and suppliers. Therefore, specialist CEOs can make more suitable resource allocation decisions that are best suited for the market conditions of a particular IPO firm and help the firm adjust to various structural changes resulting from going public. The above arguments lead us to expect that specialist CEOs – as opposed to generalist CEOs – will significantly make positive contributions to the survivability of IPO firms, specifically *IPO firms with a specialist CEO are more likely to have a lower probability of failure and a longer time to survive in subsequent periods following the offering.*

3. Sample and Data

3.1. Sample construction

We construct a sample of U.S. common share IPOs from 1st January 1999 to 31st December 2009 from the Securities Data Corporation's (SDC) New Issues database. Following prior IPO literature, we impose the following restrictions in arriving at the final sample: (1) The offer price is

at least five dollars a share, (2) The IPO is not a spin-off, a privatisation, an American depositary receipt (ADR), a leveraged buyout (LBO), a real estate investment trust (REIT), a unit offering, a rights issue, a limited partnership, a closed-end fund, and a financial institution; (3) For each firm, data are available on Compustat and the Center for Research in Security Prices (CRSP). We obtain financial data from Compustat, stock prices and delisting information from CRSP. We gather biographical profiles of CEOs from BoardEx in order to extract CEO characteristics and work experience. We also complement our dataset with information on share ownership and executive compensation manually collected from S-1 filings available on Securities and Exchange Commission (SEC)'s EDGAR database. After merging the databases and eliminating observations with missing values, our final sample consists of 722 IPO firms.

We track each firm from the IPO date to the earlier of the delisting date or the end of 2014. CRSP provides delisting codes to indicate the status of the issuing firm, specifically, whether the firm is still trading and specific reasons for delisting such as failure to meet listing standards, corporate governance violation, liquidation, insufficient capital, bankruptcy, etc. Based on the CRSP delisting codes, we categorise IPO firms into three groups: survived, acquired, and failed firms. All firms that are still trading (i.e., code of 100) at the end of 2014 are classified as survived firms. Acquired firms are those having the delisting code from 200 to 299, which indicates that the firm was acquired in mergers. Following prior research (e.g., Alhadab et al. (2014), Ahmad and Jelic (2014), Espenlaub et al. (2012), Jain and Kini (2008), Demers and Joos (2007), Jain and Martin (2005), Jain and Kini (2000)), we define failed firms as those that are involuntarily delisted (i.e., delisted for negative reasons such as financial distress, liquidation, failure to meet listing standards, etc.). Thus, failed firms include those whose delisting code is greater than or equal 300. Our sample of 722 IPOs is comprised of 462 survived firms, 206 acquired firms, and 54 failed firms.

Following Custódio et al. (2013), we employ the principal component analysis (PCA) to construct a generalist skills index based on CEOs' lifetime work experience. This method is also used by Mishra (2014) to investigate general managerial skills of CEOs. The index is the first factor of applying PCA to five proxies of general managerial ability: (1) the number of roles (e.g., sales, marketing, finance, production, etc.) that the CEO held, (2) the number of firms where the CEO was employed, (3) the number of industries at the four-digit Standard Industrial Classification (SIC) level where the CEO worked, (4) whether the CEO used to be a CEO in another firm, and (5) whether the CEO had experience in a conglomerate. A higher index indicates a higher degree of general managerial ability. Using one variable instead of five reduces measurement errors and enhances the power of the regression tests by mitigating the multicollinearity problem (Custódio et

al. 2013). Based on the index, we classify a CEO as a generalist or a specialist. The CEO is categorised as a specialist if the generalist skills index is below the overall median, and as a generalist otherwise.

3.2. Data description

Table 1 presents the distribution by issue year and industry of the overall sample and the three sub-samples: failed, acquired, and survived firms. Panel A shows the distribution of IPOs from 1999 to 2009. Tracking from the offering date to the end of 2014, 41% of the firms survived, 47% were acquired, and 12 % failed. Tracking for five years after the issue date, 64% of the firms survived, 29% were acquired, and 7% failed. Consistent with prior literature, we find that approximately 36% of IPOs either fail or are acquired within five years after the offering.

Panel B shows the distribution by issue year. There is a clustering of IPOs around 1999-2000 and 2004-2007. The crash of the stock market in 2001 following the collapse of the Dot-com bubble considerably reduced the number of IPO deals being initiated during 2001-2003. The IPO market rebounded from 2004 to 2007 before plummeting again due to the 2008 financial crisis. The percentage of firms being delisted for negative reasons within five years after the issue date is highest for firms going public in 1999 and 2008 (15%). This is consistent with the economic crises in those years, which had an adverse impact on the IPO firms' survivability. The percentage of firms being acquired in five years after the issue is highest for IPOs in 1999 (38%) and lowest for those in 2008 (14%). For IPOs in other years, the percentage of acquired firms range from 22% to 36%. In general, more than half of the firms survive for five years after the IPO, except for IPOs in 1999 which have the lowest proportion of survived firms (47%).

Panel C displays the distribution by two-digit SIC code industry. IPO firms cluster in industries that develop high technological products including chemical products, computer equipment and services, electronic equipment, and scientific instruments. These industries also have the highest percentage of IPOs that are acquired within five years after the offering (over 30%). In all industries, the majority of IPOs survive for five years subsequent to the stock issue. In particular, the proportion of survived firms is highest in entertainment services and oil and gas industries. Food products and manufacturing are the industries with the highest percentage of failed firms (20% and 24% respectively). The sectors with the lowest proportion of failed firms are electronic equipment (4%) and oil and gas (5%). The percentage of failed firms in other industries ranges from 5% to 8%.

Table 2 illustrates the survival distribution by issue year and industry for the two groups of IPO firms: those with a specialist CEO and those with a generalist CEO. The survival profiles are examined for five years following the offering. Panel A provides the survival distribution by issue

year. For each year in the sample period, there are differences in the proportion of firms with a specialist CEO and those with a generalist CEO. From 1999 to 2002, the percentage of IPO firms with a generalist CEO increase steadily from 51% in 1999 to 63% in 2000 and 73% in 2002. However, from 2003, IPO firms with a specialist CEO account for a greater proportion, with the yearly percentage ranges from 50% to 64%. This pattern is indicative of the greater appreciation of CEOs' specialist skills and experience among IPO firms. The cumulative percentage of failed firms is lower for IPO firms with a specialist CEO in most years. For the overall sample, the cumulative percentage of firms failing within five years after the offering is 6% for firms with a specialist CEO compared with 9% for firms with a generalist CEO.

Panel B provides the survival distribution by industry. Specialist CEOs have more presence in manufacturing, wholesale and retail trade sectors, and particularly, in industries that develop high technological products such as chemical products, computer equipment and services, and electronic equipment. The five-year cumulative percentage of failed firms is lower for IPO firms with a specialist CEO than those with a generalist CEO in all industries except for manufacturing, food products and oil and gas industries. Overall, the results so far suggest that IPO firms with a specialist CEO tend to have a lower failure rate than those with a generalist CEO.

Table 3 presents the descriptive statistics for the overall sample and the sub-samples of IPO firms with a specialist CEO and those with a generalist CEO. Panel A presents the summary statistics of CEOs' work experience. On average, a CEO used to work in 5 functional areas, 5 firms, and 1 industry before he or she became the CEO of the current firm. In addition, 52% of CEOs worked as a CEO in another firm and 37% had experience in a conglomerate. In general, a specialist CEO performed approximately 3 different roles and worked for around 3 firms in one industry. 33% of specialist CEOs used to be a CEO in another firm, and 13% were employed by a conglomerate. Work histories of generalist CEOs typically include experience in around 7 positions, 7 firms, and 2 industries. 70% of generalist CEOs had CEO experience in another firm and 61% worked for a conglomerate.

Panel B provides the descriptive statistics of CEO characteristics. On average, a CEO is approximately 50 years old and has been serving the firm for 4 years. 3% of CEOs are female, 27% are recruited internally, 37% hold the roles of both CEO and chairman of the board, and 27% are also a founder of the firm. The mean share ownership of a CEO is 13%. In terms of compensation, a CEO earns annually an average of 658 thousand dollars in cash compensation, 690 thousand dollars in equity compensation, and 1.67 million dollars in total compensation. With regard to education, 26% of CEOs have an MBA, 10% have a PhD, and 17% graduated from an Ivy League institution. Specialist CEOs are significantly different from generalist CEOs in all the characteristics examined

except for gender and cash compensation. A specialist CEO is younger than a generalist counterpart (48 versus 51 years old). The average tenure of a specialist CEO is 5 years, which is one year longer than that of a generalist CEO. The percentage of specialist CEOs hired internally is significantly higher than that of generalist CEOs (29% and 24% respectively). Moreover, specialist CEOs are more likely to hold the dual positions of CEO and chairman of the board (39% of specialist CEOs compared with 34% of generalist CEOs). The percentage of specialist CEOs who are a founder (35%) is almost double that of generalist CEOs (20%). Specialist CEOs also have significantly higher share ownership than generalist counterparts (14% versus 11%). The longer tenure, higher share ownership, and higher proportion of CEOs being a founder and those holding dual roles of CEO and chairman imply that specialist CEOs tend to have a stronger tie with the firm than generalist CEOs. In terms of compensation, while cash compensation is not significantly different between the two groups of CEOs, equity compensation and total compensation are significantly higher for generalist CEOs than specialist ones. The average equity compensation of a generalist CEO is 829 thousand dollars, while that of a specialist CEO is 553 thousand dollars. The average total compensation of a generalist CEO is 1.87 million dollars, while that of a specialist CEO is 1.47 million dollars. This is consistent with the finding by Custódio et al. (2013) that generalist CEOs are paid significantly higher than specialist ones. With regard to education, significantly more generalist CEOs hold an MBA compared to specialist CEOs (30% versus 23%). However, for a more specialized degree like a PhD, the percentage of specialist CEOs with this degree is significantly higher than that of generalist CEOs (13% versus 8%). In addition, a higher proportion of generalist CEOs are Ivy League alumni than that of specialist CEOs (21% versus 14%).

Panel C presents the firm and offering characteristics for the overall sample and the subsamples of firms with a specialist CEO and those with a generalist CEO. IPO firms are generally young and small with the mean firm age of 17 years and the mean total sales of 402 million dollars. They have the mean ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total assets of -0.03 and the mean leverage ratio of 0.14. Moreover, IPO issuers exhibit a low degree of diversification; specifically, on average, they operate in one business segment. In addition, issuing firms allocate resources considerably in R&D and capital investments with the mean R&D and capital expenditure intensity of 10% and 6% respectively, while the mean advertising intensity is merely 2%. Issuers raise an average of 145 million dollars in the offering. They have the mean initial returns of 28% and the mean market to book ratio of 4.12. Around half of the IPOs are underwritten by top-tier investment banks, 57% are venture backed, and 92% are audited by big four auditors. Moreover, 45% of firms are in a high-tech industry. With regard to

delisting events, on average, 7% of IPO firms are delisted due to negative reasons within 5 years after the offering.

IPO firms with a specialist CEO are significantly different from those with a generalist CEO in most of the firm and offering characteristics, except for the market-to-book ratio and the percentage of firms receiving venture capital financing, being audited by big four accounting firms, and being in the high tech industry. On average, firms with a generalist CEO are more established with 19 years in operation compared to 16 years for firms with specialist CEOs. The average sales of firms with a generalist CEO (526 million dollars) nearly double that of firms with a specialist CEOs (277 million dollars). Firms with a generalist CEO tend to be more diversified than those with a specialist CEO. The proceeds raised in the offering by firms with a generalist CEO (170 million dollars) are significantly higher than by firms with a specialist CEO (119 million dollars). The findings that firms with a generalist CEO are larger and more diversified than those with a specialist CEO are consistent with the literature. For example, Custódio et al. (2013) show that generalist CEOs are preferred in multi-segment firms which have more complex operations. In terms of investment policies, R&D, advertising and capital investments are not significantly different between the two groups. In addition, firms with a specialist CEO are more profitable and less leveraged (profitability ratio of -0.01 and leverage ratio of 0.13) than firms with a generalist CEO (profitability ratio of -0.05 and leverage ratio of 0.16). A higher proportion of firms with a generalist CEO have the offering underwritten by reputable investment banks (54%) than firms with a specialist CEO (49%). Notably, IPO firms with a specialist CEO is less underpriced than those with a generalist CEO. This implies that generalist CEOs may have different risk-taking incentives, resulting in a higher agency problem; thus, investors require higher returns to compensate for the increased uncertainties. Regarding the delisting incident, significantly higher percentage of IPO firms with a generalist CEO are delisted due to negative reasons within five years after the issue than that of firms with a specialist CEO (9% and 6% respectively). Finally, Panel D provides the correlation matrix of the variables used in our analyses. No multicollinearity is detected among the variables.

4. Empirical analysis of the impact of specialist CEOs on IPO survival

4.1. Survival analysis methodology

Survival analysis is a statistical technique that has been used extensively in prior research to examine determinants of IPO survival (e.g., Alhadab et al. (2014), Espenlaub et al. (2012), Gerakos et al. (2013), Carpentier and Suret (2011), Jain and Martin (2005), Fama and French (2004), Jain and Kini (2000), Hensler et al. (1997)). Its primary benefit over regression analysis such as cross-

sectional logistic models lies in its ability to account for both event occurrence and time to event. In addition, survival analysis is also useful in examining censored data and time-series data with different time horizons (Shumway 2001; LeClere 2000). The survival time of IPO firms is right censored because many firms do not encounter failure for the duration of the study. The time window is different for each firm depending on the IPO date. For example, in our analysis, IPO firms are tracked until the end of 2014. Thus, a firm that went public in 1999 is tracked for 15 years compared to 5 years for a firm that went public in 2009.

In analysing the association between specialist CEOs and IPO survival, we employ both nonparametric and semiparametric approaches. Nonparametric estimates of hazard and survival functions allow us to compare the failure risks and survival rates of IPO firms with a specialist CEO and those with a generalist CEO, thereby determining whether specialist CEOs improve issuing firms' survival profiles. The hazard function provides the conditional probability of failure given that the firm has survived up to the specified time. If specialist CEOs can reduce the failure risk, the hazard function for IPO firms with a specialist CEO will remain below that of firms with a generalist CEO. We estimate the hazard functions for the two groups of IPO firms using the Nelson-Aalen estimator, which is defined as:

$$\hat{H}(t) = \sum_{t_i \leq t} \frac{d_i}{n_i} \quad (1)$$

where d_i is the number of failed firms at time t_i , and n_i is the number of firms at risk at time t_i .

The survival function provides the probability that the firm survives up to a particular time. If specialist CEOs can enhance the survivability of issuing firms, the survival function curve of firms with a specialist CEO will be above that of firms with a generalist CEO. We estimate the survival functions of the two groups of IPO firms using the Kaplan-Meier estimator, which is defined as:

$$\hat{S}(t) = \prod_{t_i \leq t} \frac{n_i - d_i}{n_i} \quad (2)$$

where d_i is the number of failed firms at time t_i , and n_i is the number of firms at risk at time t_i . In addition, we use the log-rank test to examine the difference between the estimated survival curves of IPO firms with a specialist CEO and those with a generalist CEO.

With regard to the semiparametric approach, we employ Cox proportional hazards model. The primary advantage of Cox proportional hazards model over other hazards models is that the baseline hazard function does not have to be pre-specified and can take any functional form (Allison 2000). In addition, no assumption needs to be made about the distribution of event dates (Alhadab et al. 2014). We estimate the model as follows:

$$h(t) = h_0(t) \exp[\beta_1 \text{Specialist CEO}_{i,t} + \beta_2 \text{Log}(\text{firm age})_{i,t} + \beta_3 \text{Log}(\text{sales})_{i,t} + \beta_4 \text{Top-tier underwriter}_{i,t} + \beta_5 \text{Big4 auditor}_{i,t} + \beta_6 \text{Venture capitalist}_{i,t} + \beta_7 \text{Profitability}_{i,t} + \beta_8 \text{Leverage}_{i,t} + \beta_9 \text{Market-to-book}_{i,t} + \beta_{10} \text{R\&D}_{i,t} + \beta_{11} \text{Advertising}_{i,t} + \beta_{12} \text{Capital expenditure}_{i,t} + \beta_{13} \text{Diversification}_{i,t} + \beta_{14} \text{Log}(\text{proceeds})_{i,t} + \beta_{15} \text{Initial returns}_{i,t} + \beta_{16} \text{CEO-Chairman}_{i,t} + \beta_{17} \text{CEO-Founder}_{i,t} + \text{Industry dummies} + \text{Year dummies}] \quad (3)$$

where $h_0(t)$ is the baseline hazard function, and t is the time to failure (i.e., the duration to the delisting date). The dependent variable indicates the failure risk; thus, a positive (negative) coefficient suggests that failure is more (less) likely to happen and the survival time is shorter (longer). The hazard ratio for each independent variable is computed as the exponentiated coefficient for the variable. It measures the increase in failure risk for a unit increase in the value of the independent variable. For indicator variables, the risk ratio is the ratio of the estimated hazard for those with the value of one to the estimated hazard for those with the value of zero. For continuous variables, the estimated change in the hazard rate for a unit increase in the independent variable is $100 * (\text{hazard ratio} - 1)$ (Alhadab et al. 2014; Jain and Martin 2005; Allison 2000).

The main variable of interest is *specialist CEO*, which indicates whether the CEO has specialist managerial ability. Besides the indicator variable *specialist CEO*, for robustness check, we also run the regressions on *generalist skills index*, and the individual five proxies employed to construct the index, namely, *number of roles*, *number of firms*, *number of industries*, *CEO experience dummy* and *conglomerate experience dummy*. We control for various firm and offering characteristics that are suggested by prior literature as determinants of IPO survival. Specifically, we include variables *log(firm age)*, *log(sales)*, *log(proceeds)* and *initial returns* to account for the positive effects of firm age, firm size, and underpricing on IPO survival as documented by Hensler et al. (1997). Moreover, Schultz (1993) finds the positive association between reputable underwriters and IPO survival. Jain and Kini (2000) indicate that the involvement of venture capitalists in the IPO process improves the survival profiles of IPO firms. Jain and Martin (2005) document that IPO firms audited by high-quality accounting firms survive longer in the following years. To capture the impacts of these financial intermediaries on IPO survival, we include indicator variables *top-tier underwriter*, *venture capitalist*, and *big4 auditor*. Furthermore, we add the variable *leverage* to control for the firm's leverage based on the finding of Demers and Joos (2007) that the leverage ratio of IPO firms is positively related to the probability of failure. Additionally, Jain and Kini (2008) argue that managers' strategic investment choices at the time of the IPO may

influence the post-issue performance of IPO firms; particularly, the probability of IPO survival is positively associated with R&D intensity and product diversification. We control for this effect by adding variables indicating strategic investment decisions of the firm, namely *R&D*, *advertising*, *capital expenditure*, and *diversification*. Furthermore, we account for the firm performance by including the variable *profitability* and the growth opportunity proxied by the *market-to-book* ratio as suggested by Alhadab et al. (2014). In addition, we control for the CEO's structural power by adding variables *CEO-Chairman* and *CEO-Founder*. Since there may be differences in the survival profiles of IPO firms in different industries and years, we also add to the model industry and year fixed effects. The definitions of all variables are provided in Appendix A.

4.2. Empirical results

4.2.1. Analysis of the hazard and survival curves

The hazard and survival functions for both groups of IPO firms with specialist CEOs and those with generalist CEOs are estimated. The plots of Nelson-Aalen cumulative hazard estimates and Kaplan-Meier survival estimates are provided in Figure 1 and Figure 2 respectively. In Figure 1, the hazard function of IPO firms with a specialist CEO is below that of firms with a generalist CEO. The gap widens as the length of time following the issue increases. On the contrary, as can be seen from Figure 2, the survival function of IPO firms with a specialist CEO is above that of firms with a generalist CEO. The longer the time elapses after the issue, the broader the gap is between the survival functions of the two groups. The probability of surviving 5 years after the issue is 94% for firms with a specialist CEO, compared to 89% for firms with a generalist CEO. The survival probability after 10 years following the issue decreases considerably for firms with a generalist CEO to 79%, while this probability is 88% for firms with a specialist CEO. In addition, the log-rank test for the equality of survival functions shows that the estimated survival curves of the two groups are different at the 1% significance level. Overall, the plots of hazard and survival functions demonstrate that IPO firms with a specialist CEO have a lower risk profile and a higher survival profile compared to firms with a generalist CEO. The nonparametric approach of the survival analysis provides evidence suggesting that specialist CEOs tend to improve the survival profiles of IPO issuers.

4.2.2. Estimation of the Cox proportional hazards model

Table 4 presents the results of the Cox proportional hazards model of probability of failure and time-to-failure which assesses the impact of having a specialist CEO on IPO survival after controlling for various firm factors influencing the survivability. In specification (1), the coefficient

on *specialist CEO* is negative and significant at the 1% level, indicating that IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive in the periods following the offering. This result is consistent with our previous finding in the nonparametric analysis that IPO firms with a specialist CEO survive for a longer period than those with a generalist CEO. The hazard ratio of 0.351 suggests that the failure risk of IPO firms with a specialist CEO is 35 % of the failure risk of firms with a generalist CEO.

Specifications (2) to (7) estimate the regressions on *generalist skills index*, and the five measures of managerial skills employed to generate the index, specifically, *number of roles*, *number of firms*, *number of industries*, *CEO experience dummy* and *conglomerate experience dummy*. We find positive and significant coefficients on all those variables. This suggests that IPO firms managed by CEOs who possess more general managerial ability in terms of varied experience in different roles, firms, and industries have a higher probability of failure and a shorter time to survive. The hazard ratio of 1.443 of the variable *generalist skills index* indicates that for each unit increase in the general ability index, the firm's failure risk increases by 44.3%. The variables *number of roles*, *number of firms*, and *number of industries* have the risk ratios of 1.217, 1.157, and 1.314 respectively. This implies that for each additional number of roles, firms and industries in which the CEO worked, the failure risk increases by 21.7%, 15.7% and 31.4% respectively. The variables *CEO experience dummy* and *conglomerate experience dummy* have the hazard ratios of 1.717 and 1.634 respectively. This suggests that the failure risks of firms whose CEOs used to work as a CEO in another firm and had prior experience in a conglomerate are 172% and 163% the failure risks of firms whose CEOs do not have such experiences.

The coefficients on control variables are consistent across all specifications. In general, the signs of the control variables are in line with prior literature. We find that larger, more profitable, and growing firms have a lower probability of failure and a longer time to survive. However, firms with higher underpricing and leverage tend to have higher failure risks in subsequent periods and survive for a shorter time. We do not find a significant association between IPO survival and strategic investment decisions including R&D, capital expenditure and diversification. The coefficient on *advertising* is marginally significant. Moreover, the mean values of *R&D*, *advertising*, and *capital expenditure* presented in Table 3 do not show significant differences between IPO firms with a specialist CEO and those with a generalist CEO. Therefore, it appears that specialist CEOs influence the survival of IPO firms through a different channel other than strategic investment decisions such as R&D, advertising, capital expenditure, and diversification. Notably, the coefficient on *leverage* is strongly significant at the 1% level across specifications. Additionally, the mean *leverage* is significantly lower for IPO firms with a specialist CEO than

those with a generalist CEO as described in Table 3. Therefore, it is plausible that financial leverage may be a channel through which specialist CEOs influence IPO firms' survival profiles. Specialist CEOs may be more risk-averse, and they may want to reduce the firms' overall risks through more conservative financial policies such as maintaining lower leverage ratios. Overall, the results from the Cox proportional hazards model support our hypothesis that IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive in subsequent periods following the offering.

5. Specialist-Generalist versus Founder-Professional and Insider-Outsider attributes

In our study, we follow Custódio et al. (2013) to define generalist CEOs as those whose past work experience spans across various positions, firms and industries while specialist CEOs as whose employment history focuses on specific roles, firms and industries. To categorise CEOs according to the specialist-generalist dimension, we employ the generalist skills index developed by Custódio et al. (2013) which measures the general ability of a CEO based on the number of roles, firms and industries in which the CEO has worked, as well as whether the CEO used to be a CEO in a different firm and whether the CEO worked in a conglomerate. Based on this measurement, it is very likely that a CEO who is a founder and a CEO who is appointed within the firm are considered specialist CEOs as a founder CEO and an insider CEO tend to accumulate their expertise and experience from the particular firm and industry. Thus, it is arguable that this measure does not distinguish between specialist-generalist dimension and founder-professional dimension and between specialist-generalist dimension and insider-outsider dimension. Prior studies sometimes implicitly assume that outsiders tend to possess generalist skills, while insiders tend to possess specialist skills (e.g., Palomino and Peyrache (2013), Gao and Jain (2011)). Founder CEOs are often characterised by having more firm specific skills relative to professional CEOs (Yan and Rajagopalan (2004), Zhang and Rajagopalan (2003)). However, a recent study by Brockman et al. (2016) documents that specialist-generalist and insider-outsider are two different CEO attributes; and thus, insiderness (outsiderness) cannot be used as a reliable proxy for specialist skills (generalist skills). Regarding specialist-generalist versus founder-professional, little has been done to explicitly unravel these two aspects of CEO characteristics.

To rule out the possible effects of founder CEOs and insider CEOs due to the way the *Specialist CEO* variable is constructed, we re-estimate the Cox proportional hazard model on *Specialist CEO* for the sample of IPO firms excluding firms with a founder CEO and the sample of IPO firms excluding firms with an insider CEO. The results are presented in Table 5. Consistent with the main results, we find that the coefficients on *Specialist CEO* are negative and significant at

the 1% level. Thus, the main finding that IPO firms with a specialist CEO tend to have a lower probability of failure and a longer time to survive is robust to the exclusion of firms with a founder CEO and firms with an insider CEO.

Furthermore, we apply the approach by Brockman et al. (2016) to disentangle specialist-generalist attributes from founder-professional and insider-outsider attributes. Table 6 presents the number of CEOs across the specialist-generalist, founder-professional, and insider-outsider dimensions. Panel A illustrates the count of CEOs in specialist-generalist versus founder-professional dimensions. In the overall sample, 126 CEOs are specialist-founders, 234 are specialist-professionals, 71 are generalist-founders and 291 are generalist-professionals. Out of the 197 founders, 126 (64%) are specialists. Out of 360 specialists, 234 (65%) are professionals. We also observe 55% of professionals are generalists and 20% of generalists are founders. Thus, in a slightly more than half of the case, founders are specialists and professionals are generalists. However, more than half specialists are founders and it is usual for generalists to be founders. This result does not strongly support the notion that professionals are generalists and founders are specialists.

Additionally, we rank and categorise CEOs into quartile groups based on the generalist skills index. Panel B presents the number of CEOs according to the specialist skills in quartiles and the founder-professional dimension. We observe that 67 (34%) founders and 115 (22%) professionals are in the highest specialist category; and 32 (16%) of founders and 149 (28%) professionals are in the highest generalist category. This result suggests that while founders are more likely to be highly specialists and professionals are more likely to be highly generalists, it is not uncommon for highly specialists to be professionals and highly generalists to be founders. We also test the correlation between *General skills index* and *Founder CEO* and between *Specialist CEO* and *Founder CEO*. In untabulated results, we find the correlations are -0.1643 and 0.1727 respectively. It suggests a weak correlation between being a founder CEO and having specialist skills. Overall, the results suggest that CEO specialist-generalist and CEO founder-professional attributes are distinct CEO characteristics.

Similarly, we examine the distribution of CEOs according to the specialist-generalist and insider-outsider dimensions and present the results in Panel C. Out of 722 CEOs in our sample, 106 CEOs are specialist-insiders, 254 are specialist-outsiders, 86 are generalist-insiders and 276 are generalist-outsiders. There are 106 specialists (55%) out of 192 insiders and 276 generalist (52%) out of 530 outsiders. We also observe 254 out of 530 of outsiders (or 48%) are specialists and 86 out of 192 insiders (or 45%) are generalists. The results suggest that although specialists are more likely to be insiders and generalists are more likely to be outsiders, a little less than half of outsiders

are specialists and a little less than half of insiders are generalists. Moreover, we check the correlation between *Generalist skills index* and *Insider CEO* and between *Specialist CEO* and *Insider CEO*. In untabulated results, we find the correlations are -0.0594 and 0.0644 respectively. It indicates a low correlation between an insider CEO and a specialist CEO. Thus, consistent with Brockman et al. (2016), we find that insider-outsider and specialist-generalist skills are distinct CEO attributes.

An IPO is an important development stage in which the firm evolves from a private firm to a public firm with a more complex organisational system. The transition to a public status exposes IPO firms to various challenges due to changes in the ownership and governance structure, more stringent scrutiny from regulators and market participants and higher expectations from investors and analysts. Prior studies document several advantages of founder CEO leadership relative to professional one such as lower agency costs, greater organisational influence, stronger psychological attachment with the firm, higher degree of firm specific skills, larger ownership stakes, stronger economic ties and longer investment horizons (Gao and Jain (2011), He (2008), Nelson (2003), Certo et al. (2001), Begley (1995)). Extant literature also shows the downside of founder CEOs which may hinder firm performance such as the entrenchment behaviour regarding the market for corporate control, the lack of diversification and insufficient skills and experience in managing a public firm in a transition to a different stage in its evolution (Gao and Jain (2011), Adams et al. (2009), Wasserman (2003)). Moreover, organisational life cycle theory posits that top management needs different managerial skill sets during various phases of development. It suggests that as new ventures evolve and grow, managerial styles and capabilities of the founder are inadequate to lead the firm effectively (He (2008), Certo et al. (2001)). Prior literature also examines the differences between outsider CEOs and insider CEOs. Particularly, insider CEOs possess firm specific knowledge and skills obtained from their experience within the firm. Relative to insider CEOs, outsider CEOs tend to have more limited understanding of the firm's resources and constraints (Greiner et al. 2003). Nevertheless, they can bring fairly novel skills and expertise (Zhang and Rajagopalan (2010), Yan and Rajagopalan (2004), Zhang and Rajagopalan (2003)). Thus, they are often hired when firms anticipate substantial corporate changes (Cannella and Lubatkin 1993). As founder versus professional CEOs and insider versus outsider CEOs bring different experiences and expertise, they may exert different impacts on the long-term survivability of IPO firms. In the main analysis, we document that CEOs with specialist skills are more likely to enhance the survival profiles of IPO firms. We also show that specialist-generalist, founder-professional and insider-outsider are different aspects of CEO characteristics which may influence

firm performance differently. Thus, it would be useful to investigate whether the differences are relevant to the association between specialist skills and IPO survivability.

First, we categorize CEOs in four groups according to the specialist-generalist and founder-professional dimensions: specialist-founder, specialist-professional, generalist-founder and generalist-professional. We then re-estimate the Cox proportional hazard model on these four indicator variables and present the results in Panel A of Table 7. We find a negative and significant coefficient on *Specialist-Professional* and a positive and significant coefficient on *Generalist-Professional*. This suggests that IPO firms whose CEOs possess professional and specialist managerial skills have a lower probability of failure and a longer time to survive. The hazard ratio of the variable *Specialist-Professional* is 0.352. This indicates that the failure risk of IPO firms with a specialist professional CEO is 35% the failure risk of firms without a specialist professional CEO. The coefficients on *Specialist-Founder* and *Generalist-Founder* are not significant, suggesting that having a founder CEO does not significantly improve IPO survivability.

Second, we classify CEOs in four categories according to the specialist-generalist and insider-outsider dimensions: specialist-insider, specialist-outsider, generalist-insider and generalist-outsider. We re-run the Cox proportional hazard regressions on these four indicator variables and present the results in Panel B of Table 7. We find a negative and significant coefficient on *Specialist-Outsider* and a positive and significant coefficient on *Generalist-Outsider*; whereas the coefficients on *Specialist-Insider* and *Generalist-Insider* are not significant. This suggests that IPO firms with specialist outsider CEOs have a lower probability of failure and a longer time to survive, while having an insider CEO does not significantly reduce the probability of failure and lengthen the time to survive. Moreover, the hazard ratio of the variable *Specialist-Outsider* is 0.448, indicating that the failure risk of IPO firms with a specialist outsider CEO is around 45% the failure risk of firms without a specialist outsider CEO.

Overall, after taking into account the founder-professional and insider-outsider aspects of CEO attributes in the analysis of the impacts of specialist CEOs on IPO survival, we find that IPO firms are benefited from the combination of specialist skills and professional expertise accumulated from prior experience outside the firm. Specifically, IPO firms with a specialist professional CEO and those with a specialist outsider CEO have a significantly lower probability of failure and a longer time to survive in the post-issue period.

6. Robustness checks

6.1. Controlling for high-tech industries and crisis periods

High-tech industries are characterised by high growth, continuous technological advancements and substantial competition, while crisis periods put considerable financial constraints on the firm. Thus, high-tech industries and crisis periods create more challenges for the job of a CEO and require the CEO to make more careful consideration to decide the most plausible actions to help the firm to withstand competitive pressures and market shocks. Thus, we evaluate whether the association between specialist CEOs and IPO survival differs depending on whether the firm is in a high-tech industry and whether the firm goes public during the financial crisis period.

Table 8 presents the results of the Cox proportional hazards model controlling for high-tech industries. In specification (1), the main Cox proportional hazards model (Equation (3)) includes the interaction effect between *specialist CEO* and *high-tech industry*. The coefficient on *specialist CEO* remains negative and significant, indicating that IPO firms led by a specialist CEO have a lower probability of failure and a longer time to survive. The coefficient on the interaction term *specialist CEO*high-tech industry* is not significant; thus, the influence of specialist CEOs on IPO survival is not significantly different when the firm is in a high-tech industry. In specifications (2) and (3), the main Cox proportional hazards model (Equation (3)) is performed for the sub-samples of IPO firms that are in a high-tech industry and those are not. We continue to find that specialist CEOs improve the survival profiles of IPO firms. For issuers in a high tech industry, those with a specialist CEO have the failure risk of 47.2% the failure risk of those with a generalist CEO. For issuers not in a high tech industry, the failure risk of those with a specialist CEO is 55.8% that of those with a generalist CEO.

Table 9 reports the results of the Cox proportional hazards model controlling for crisis periods. In specification (1), the main model (Equation (3)) includes the interaction effect between *specialist CEO* and *crisis period*. Consistent with the results reported in the main analysis, we find that having specialist CEOs is associated with a lower probability of failure and a longer time to survive. The coefficient on the interaction term *specialist CEO * crisis period* is not significant. This implies that the association between specialist CEOs and the survivability of IPO firms is not affected by crisis periods. In specifications (2) and (3), the main model (Equation (3)) is re-estimated for the sub-samples of IPOs that are in a crisis period and those that are not. We still find that specialist CEOs are associated with lower failure risks. IPO firms managed by a specialist CEO in a crisis period have the failure risk of 8.6% the failure risk of firms managed by a generalist CEO. For IPOs not in a crisis period, the failure risk of issuers with a specialist CEO is 37.3% that of issuers with a generalist CEO. Overall, our findings reported in the main analysis still hold when we control for high-tech industries and crisis periods.

6.2. Controlling for CEO power

Adams et al. (2005) argue that more powerful CEOs tend to make decisions with extreme consequences; thus, firms whose CEOs have more power over the board are more likely to exhibit more variability in performance. In the next robustness test, we examine whether the impact of specialist CEOs on the survivability of IPO firms is driven by CEOs' decision-making power. We follow the literature on CEO power (e.g., Han et al. (2016), Jiraporn et al. (2014), Baldenius et al. (2014), Chikh and Filbien (2011), Liu and Jiraporn (2010); Adams et al. (2005) and examine four power dimensions suggested by Finkelstein (1992), namely, structural power, ownership power, expert power, and prestige power. As a proxy for structural power, we use the variable *CEO-Chairman*, which indicates whether the CEO is also the chairman of the board, as CEO duality can be considered as the highest rank in the corporate hierarchy. As a proxy for ownership power, we use the variable *CEO-Founder*, which indicates whether the CEO is also a founder of the firm, and *CEO ownership*, which indicates the percentage of shares owned by the CEO. As a proxy for expert power, we use the variable *CEO tenure*, which indicates the duration of the CEO's service at the firm. Longer tenured CEOs tend to have a higher status, more experience, and better understanding of the firm. As a proxy for prestige power, we use the variable *Ivy League alumnus*, which indicates whether the CEO was graduated from an Ivy League institution. We then estimate a CEO power index as the first factor of applying the principal component analysis to the five proxies of CEO power. Based on the CEO power index, we classify a CEO as a powerful CEO if his or her power index is greater than the overall median. Our t-test of the difference in the means of power scores between specialist CEOs and generalist ones (unreported) shows significant results, suggesting that on average specialist CEOs are more powerful than generalist counterparts.

Table 10 presents the results of the Cox proportional hazards model controlling for CEO power. In specification (1), we include an interaction term between *specialist CEO* and *powerful CEO* in our main model (Equation 3). We continue to find a significant and negative coefficient on *specialist CEO*, indicating that IPO firms with a specialist CEO tend to have lower failure risks. The coefficient on the interaction term is not significant. Thus, the influence of specialist CEOs on IPO survival does not differ depending on the magnitude of CEO power. Moreover, re-estimating the main model (Equation (3)) on the sub-samples of IPO firms with and without powerful CEOs provides us with similar results to the main finding. Specialist CEOs significantly reduce the probability of failure and enhance the time to survive. Among firms whose CEOs have more decision-making power, IPO firms with a specialist CEO have the failure risk of 34.8% the failure risk of firms with a generalist CEO. This figure is only 7.3% among firms without powerful CEOs.

6.3. Controlling for endogeneity problem

First of all, we check whether the influence of specialist CEOs on IPO survival is driven by CEO characteristics other than past work experience. Thus, we include additional variables in the main regression (Equation (3)) to control for several observable executive characteristics. Prior literature suggests that strategic decision-making may be influenced by CEO age, tenure, and education (Boeker 1997; Fondas and Wiersema 1997). Age and tenure may also determine the risk attitudes of CEOs. As CEOs become older, their corporate risk-taking behaviours decrease, which, in turn, significantly influences firm performance (Serfling 2014). Moreover, CEOs who have worked for the firm for a longer time have lower incentives to establish a reputation and hence tend to be more risk averse (Graham 2013). There is also evidence of the association between ownership and compensation and strategic decision-making (e.g., Sanders and Hambrick (2007), Goodstein and Boeker (1991); Sanders and Hambrick (2007). Additionally, previous studies document the link between outsider CEOs and firm performance (Huson et al. 2001; Parrino 1997). Therefore, we control for those CEO characteristics and include the following variables in the main model (Equation (3)): *CEO age*, *CEO tenure*, *internal hire*, *CEO ownership*, *log(total compensation)*, *MBA*, *PhD*, and *Ivy League alumnus*. The results reported in Table 11 indicate that specialist CEOs significantly reduce IPO failure risks after controlling for the impact of observable CEO characteristics.

Moreover, a CEO may be selected due to the fit between the individual and job requirements. A firm may prefer to appoint a CEO who has managerial characteristics suitable to the firm's organisational context. Thus, our results may be biased due to this selection problem. To address the endogenous matching between CEOs and firms, we employ the propensity score matching procedure. Using this method, we compare the occurrence of delisting within five years after the offering of a firm with a specialist CEO with that of the same firm if it had appointed a generalist CEO. Initially, we measure the propensity score, which is the conditional probability of receiving the treatment (having a specialist CEO) given a firm's pre-treatment characteristics, for all the IPOs by estimating a probit regression for the probability of firms appointing a specialist CEO. We account for various CEO, firm, and industry characteristics in the probit regression including *log(firm age)*, *log(sales)*, *top-tier underwriter*, *ROA*, *R&D*, *advertising*, *capital expenditure*, *diversification*, *CEO-Founder*, *CEO-Chairman*, *high-tech industry*, and *year dummies*. Based on the propensity score, we match each observation in the treated group with the control group and estimate the average effect of the treatment on the treated (ATET) in order to evaluate the effect of specialist CEOs on the occurrence of delisting. Table 12 presents the results for the ATET on the occurrence of delisting for IPO firms with a specialist CEO versus those with a generalist CEO. The

ATET is negative and strongly significant at the 1% level, indicating that IPO firms with a specialist CEO are less likely to be delisted within five years following the issue. This finding is consistent with the results presented in the main analysis.

6.4. Other robustness checks

In the main analysis, we define failed firms as those that are delisted due to negative reasons. Several earlier studies suggest that acquired firms tend to experience financial distress (Jain and Kini 2000; Welbourne and Andrews 1996). Thus, for robustness, we categorise failed firms as those that are delisted from the stock exchanges due to either negative reasons or acquisitions and re-estimate the main model (Equation (3)). In addition, we also check the sensitivity of our findings when excluding firms that have CEO turnovers within five years after the offering from the sample. The results in Table 13 consistently show that specialist CEOs are negatively associated with future failure risks.

7. Conclusion

In this paper, we examine whether specialist CEOs are associated with the probability of failure and survivability in post-issue periods of IPO firms. We construct a generalist skills index as the first factor of applying the principal component analysis to five proxies of managerial general ability including the number of roles which the CEO performed, the number of firms where the CEO was employed, the number of industry sectors where the CEO worked, whether the CEO had experience as a CEO in another firm, and whether the CEO used to work in a conglomerate. Based on the generalist skills index, we categorise CEOs into specialists and generalists. Specialist CEOs possess focused experience in a particular functional area, firm, and industry. Thorough understanding of the firm and its market environment, as well as more aligned incentives with those of the firm make specialist CEOs more capable and motivated to enhance the viability of IPO firms for longer in the future. Employing the survival analysis, we find that IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive. Particularly, the failure risk of IPO firms with a specialist CEO is 35% that of firms with a generalist CEO. Furthermore, we unravel the specialist-generalist dimension of CEO attributes from the founder-professional dimension and the insider-outsider dimension. We also examine the impacts of CEOs possessing specialist-generalist versus founder-professional attributes and those having specialist-generalist versus insider-outsider attributes on the future survivability of IPO firms. The findings indicate that CEOs who possess a combination of specialist and professional skills and a combination of specialist and outside experiences can significantly enhance the survival profiles of IPO firms.

However, we do not find evidence supporting the relation between IPO survivability and specialist CEOs who are founders or insiders. Our study contributes to the literature that investigates the association between CEO experience and firm performance. Particularly, it contributes to the IPO literature by revealing specialist managerial experience of CEOs as a significant determinant of IPO survival. Our findings also have important implications for CEO appointment decisions of IPO firms.

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Appendix A: Variable definition

Panel A: CEO characteristics	
Variable	Definition
CEO age	Age of the CEO (in years).
CEO gender	Dummy variable that equals one if the CEO is female, and zero otherwise.
CEO tenure	Number of years the CEO has worked in the firm until the IPO.
CEO-Chairman	Dummy variable that equals one if the CEO is also the chairman of the board, and zero otherwise.
Founder CEO	Dummy variable that equals one if the CEO is also a founder of the firm, and zero otherwise.
CEO ownership	Percentage of shares owned by the CEO in the issue year.
MBA	Dummy variable that equals one if the CEO has an MBA degree, and zero otherwise.
PhD	Dummy variable that equals one if the CEO has a PhD degree, and zero otherwise.
Ivy League alumnus	Dummy variable that equals one if the CEO is an alumnus of an Ivy League institution, and zero otherwise.
Insider CEO	Dummy variable that equals one if the CEO is hired internally, and zero otherwise.
Cash compensation	A salary and bonuses of the CEO in the issue year (in thousands of dollars).
Equity compensation	Equity incentives and options granted of the CEO in the issue year (in thousands of dollars).
Total compensation	Total compensation of the CEO, which consists of a salary, bonuses, equity incentives, non-equity incentives, options, and other compensation in the issue year (in thousands of dollars).
Generalist skills index	First factor of applying principal component analysis to five proxies of general managerial skills: <i>Number of roles</i> , <i>Number of firms</i> , <i>Number of industries</i> , <i>CEO experience dummy</i> , and <i>Conglomerate experience dummy</i> .
Specialist CEO	Dummy variable that equals one if the CEO is a specialist, and zero otherwise. The CEO is classified as a specialist if his or her generalist skills index is below the sample median.
Generalist CEO	Dummy variable that equals one if the CEO is a generalist, and zero otherwise. The CEO is classified as a generalist if his or her generalist skills index is equal or above the sample median.
Number of roles	Number of roles which the CEO performed.
Number of firms	Number of firms where the CEO worked.
Number of industries	Number of industries (at four-digit SIC-code level) where the CEO worked.
CEO experience dummy	Dummy variable that equals one if the CEO worked as a CEO in another firm, and zero otherwise.
Conglomerate experience dummy	Dummy variable that equals one if the CEO worked in a multi-segment firm, and zero otherwise.
Powerful CEO	Dummy variable that equals one if the CEO is powerful, and zero otherwise. The CEO is classified as being powerful if his or her power index is above the sample median. The power index is estimated by applying the principal component analysis to five proxies of CEO power: <i>CEO-Chairman</i> , <i>CEO-Founder</i> , <i>CEO ownership</i> , <i>CEO tenure</i> , and <i>Ivy League alumnus</i> .
Panel B: Firm and offering characteristics	
Variable	Definition
Firm age	Firm age in years measured as the difference between the firm's IPO year and its founding year. Company founding years are collected from the Field-Ritter dataset. ²
Sales	Total sales in the issue year.
Profitability	Ratio of earnings before interest, taxes, depreciation, and amortization (EBITDA) to total assets in the issue year.
Leverage	Ratio of total debts to total assets in the issue year.
R&D	Ratio of research and development expenses to book value of total assets in the issue year.
Advertising	Ratio of advertising expenses to total assets in the issue year.

² The Field-Ritter dataset is available on Jay Ritter's webpage: <http://bear.warrington.ufl.edu/ritter/FoundingDates.htm>.

Capital expenditure	Ratio of capital expenditure to total assets in the issue year.
Diversification	Number of business segments in which the firm operates.
Proceeds	Total proceeds of the IPO.
Big4 auditor	Dummy variable that equals one if the firm is audited by a big four audit firm, and zero otherwise. Big four audit firms include Ernst & Young, Deloitte & Touche, KPMG, and PricewaterhouseCoopers.
Venture capitalist	Dummy variable that equals one if the firm is venture backed, and zero otherwise.
Top-tier investment bank	Dummy variable that equals one if the IPO is underwritten by reputable underwriters, and zero otherwise. Reputable underwriters are those with a ranking score of 9.0 or above based on Jay Ritter's underwriter rankings. ³
Market-to-book	Ratio of market value to book value in the issue year.
High-tech industry	Dummy variable that equals one if the firm is in an industry with a SIC code of 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3577, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812 4813 (telephone equipment), 4899 (communications services), 7371 – 7375, 7378, or 7379 (software), and zero otherwise.
Delist	Dummy variable that equals one if the firm is delisted within 5 years after the offering, and zero otherwise.
Initial returns	Stock returns on the first day of trading.

³ IPO underwriter reputation rankings are available on Jay Ritter's webpage: <http://bear.warrington.ufl.edu/ritter/ipodata.htm>.

Table 1
IPO distribution by issue year and industry

The table presents the distribution of the overall sample and the three groups of IPO firms: survived, acquired, and failed firms. Survived firms are those that are still trading (delisting code of 100). Acquired firms are those that are delisted due to acquisitions (delisting code from 200 to 299). Failed firms are those that are delisted for negative reasons (delisting code greater than or equal 300). *N* denotes the number of observations.

Panel A: Distribution of IPOs from 1999-2009

	From the IPO date to December 2014		From the IPO date to five years after the offering	
	<i>N</i>	%	<i>N</i>	%
Failed	83	11.50	54	7.48
Acquired	342	47.37	206	28.53
Survived	297	41.13	462	63.99
Total	722	100.00	722	100.00

Panel B: Distribution by issue year

Year	All IPOs	Failed		Acquired		Survived	
	<i>N</i>	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
1999	107	16	14.95	41	38.32	50	46.73
2000	125	7	5.60	30	24.00	88	70.40
2001	30	2	6.67	9	30.00	19	63.33
2002	30	2	6.67	10	33.33	18	60.00
2003	39	4	10.26	14	35.90	21	53.85
2004	95	3	3.16	30	31.58	62	65.26
2005	71	3	4.23	16	22.54	52	73.24
2006	83	7	8.43	19	22.89	57	68.67
2007	98	7	7.14	27	27.55	64	65.31
2008	14	2	14.29	2	14.29	10	71.43
2009	30	1	3.33	8	26.67	21	70.00
Total	722	54		206		462	

Note: Delisting is tracked for five years after the IPO.

Panel C: Distribution by industry

Industry (two-digit SIC codes)	All IPOs		Failed	Acquired		Survived	
	<i>N</i>	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Oil and gas (13)	22	1	4.55	2	9.09	19	86.36
Food products (20)	5	1	20.00	1	20.00	3	60.00
Chemical products (28)	107	9	8.41	32	29.91	66	61.68
Manufacturing (30 - 34)	17	4	23.53	3	17.65	10	58.82
Computer equipment & services (35, 73)	229	18	7.86	85	37.12	126	55.02
Electronic equipment (36)	70	3	4.29	23	32.86	44	62.86
Scientific instruments (38)	60	5	8.33	19	31.67	36	60.00
Transportation & public utilities (41, 42, 44 - 49)	56	4	7.14	10	17.86	42	75.00
Wholesale & retail trade (50 - 59)	54	3	5.56	12	22.22	39	72.22
Entertainment services (70, 78, 79)	13	1	7.69	0	0.00	12	92.31
Health services (80)	19	1	5.26	5	26.32	13	68.42
All others (01, 12, 15, 17, 22-27, 29, 37, 39, 72, 75, 82, 87, 96)	70	4	5.71	14	20.00	52	74.29
Total	722	54		206		462	

Note: Delisting is tracked for five years after the IPO.

Table 2

Survival distribution of IPO firms with a specialist CEO and those with a generalist CEO by issue year and industry

The table presents the comparison of the distribution and cumulative failure rates by issue year and industry between the two groups of IPO firms: those with a specialist CEO and those with a generalist CEO. The cumulative number and percentage of failed firms are examined for five years after the offering. *N* denotes the number of observations.

Panel A: Survival distribution by issue year

Year	CEO type	Number and percentage of IPO firms		Cumulative number and percentage of failed firms									
				Within 1 year		Within 2 years		Within 3 years		Within 4 years		Within 5 years	
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
1999	Specialist	52	48.60	0	0.00	3	5.77	4	7.69	5	9.62	6	11.54
	Generalist	55	51.40	0	0.00	3	5.45	8	14.55	9	16.36	10	18.18
2000	Specialist	46	36.80	0	0.00	1	2.17	2	4.35	2	4.35	2	4.35
	Generalist	79	63.20	0	0.00	3	3.80	3	3.80	5	6.33	5	6.33
2001	Specialist	8	26.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	22	73.33	0	0.00	0	0.00	1	4.55	1	4.55	2	9.09
2002	Specialist	7	23.33	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	23	76.67	0	0.00	0	0.00	1	4.35	1	4.35	2	8.70
2003	Specialist	22	56.41	0	0.00	2	9.09	2	9.09	2	9.09	2	9.09
	Generalist	17	43.59	1	5.88	1	5.88	1	5.88	1	5.88	2	11.76
2004	Specialist	58	61.05	0	0.00	2	3.45	2	3.45	2	3.45	2	3.45
	Generalist	37	38.95	0	0.00	0	0.00	0	0.00	0	0.00	1	2.70
2005	Specialist	37	52.11	0	0.00	1	2.70	1	2.70	1	2.70	2	5.41
	Generalist	34	47.89	0	0.00	0	0.00	0	0.00	1	2.94	1	2.94
2006	Specialist	53	63.86	0	0.00	1	1.89	2	3.77	4	7.55	4	7.55
	Generalist	30	36.14	0	0.00	2	6.67	3	10.00	3	10.00	3	10.00
2007	Specialist	56	57.14	0	0.00	0	0.00	0	0.00	1	1.79	1	1.79
	Generalist	42	42.86	0	0.00	2	4.76	3	7.14	6	14.29	6	14.29
2008	Specialist	8	57.14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	6	42.86	0	0.00	2	33.33	2	33.33	2	33.33	2	33.33
2009	Specialist	13	43.33	0	0.00	0	0.00	0	0.00	1	7.69	1	7.69
	Generalist	17	56.67	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
1999-2009	Specialist	360	49.79	0	0.00	10	2.78	13	3.61	18	5.00	20	5.56
	Generalist	362	50.21	1	0.28	13	3.58	22	6.06	29	7.99	34	9.37

Panel B: Survival distribution by industry

Industry (two-digit SIC code)	CEO type	Number and percentage of IPO firms		Cumulative number and percentage of failed firms									
				Within 1 year		Within 2 years		Within 3 years		Within 4 years		Within 5 years	
		<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
Oil and gas (13)	Specialist	8	36.36	0	0.00	0	0.00	0	0.00	1	12.50	1	12.50
	Generalist	14	63.64	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Food products (20)	Specialist	1	20.00	0	0.00	1	100.00	1	100.00	1	100.00	1	100.00
	Generalist	4	80.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
Chemical products (28)	Specialist	61	57.01	0	0.00	0	0.00	0	0.00	1	1.64	1	1.64
	Generalist	46	42.99	1	2.17	1	2.17	2	4.35	6	13.04	8	17.39
Manufacturing (30-34)	Specialist	10	58.82	0	0.00	2	20.00	3	30.00	3	30.00	3	30.00
	Generalist	7	41.18	0	0.00	0	0.00	1	14.29	1	14.29	1	14.29
Computer equipment & services (35, 73)	Specialist	115	50.22	0	0.00	5	4.35	6	5.22	7	6.09	9	7.83
	Generalist	114	49.78	0	0.00	1	0.88	6	5.26	8	7.02	9	7.89
Electronic equipment (36)	Specialist	37	52.86	0	0.00	0	0.00	0	0.00	1	2.70	1	2.70
	Generalist	33	47.14	0	0.00	1	3.03	1	3.03	2	6.06	2	6.06
Scientific instruments (38)	Specialist	27	45.00	0	0.00	1	3.70	1	3.70	2	7.41	2	7.41
	Generalist	33	55.00	0	0.00	1	3.03	2	6.06	2	6.06	3	9.09
Transportation & public utilities (41, 42, 44-49)	Specialist	23	41.07	0	0.00	0	0.00	1	4.35	1	4.35	1	4.35
	Generalist	33	58.93	0	0.00	2	6.06	3	9.09	3	9.09	3	9.09
Wholesale & retail trade (50-59)	Specialist	29	53.70	0	0.00	1	3.45	1	3.45	1	3.45	1	3.45
	Generalist	25	46.30	0	0.00	1	4.00	1	4.00	1	4.00	2	8.00
Entertainment services (70, 78, 79)	Specialist	6	46.15	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	7	53.85	0	0.00	1	14.29	1	14.29	1	14.29	1	14.29
Health services (80)	Specialist	8	42.11	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	11	57.89	0	0.00	1	9.09	1	9.09	1	9.09	1	9.09
All others (01, 12, 15, 17, 22-27, 29, 37, 39, 72, 75, 82, 87, 96)	Specialist	35	49.30	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Generalist	35	50.70	0	0.00	4	11.43	4	11.43	4	11.43	4	11.43

Table 3
Descriptive statistics

The table presents descriptive statistics for the sample of U.S. IPOs over the period from 1999 to 2009. CEOs' work experience and characteristics are illustrated in Panel A and B respectively. Firm and offering characteristics are reported in Panel C. The correlation matrix is provided in Panel D. All variables are defined in Appendix A. Tests of differences in means between the two sub-samples of IPO firms with a specialist and those with a generalist CEO are based on t-tests. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. *N* denotes the number of observations.

Panel A: CEO work experience

	All IPOs						IPOs with a specialist CEO	IPOs with a generalist CEO
	<i>N</i>	Mean	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>sd</i>	Mean	Mean
Number of roles	722	5.07	3.00	5.00	7.00	2.82	3.46	6.66
Number of firms	722	5.13	3.00	4.00	6.00	3.31	3.10	7.13
Number of industries	722	1.47	1.00	1.00	2.00	0.93	1.00	1.94
CEO experience dummy	722	0.52	0.00	1.00	1.00	0.50	0.33	0.70
Conglomerate dummy	722	0.37	0.00	0.00	1.00	0.48	0.13	0.61

Panel B: CEO characteristics

	All IPOs						IPOs with a specialist CEO	IPOs with a generalist CEO	Difference
	<i>N</i>	Mean	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>sd</i>	Mean	Mean	<i>p-value</i>
CEO age	722	49.18	43.00	49.00	55.00	8.07	47.96	50.57	0.000
CEO gender	722	0.03	0.00	0.00	0.00	0.18	0.03	0.04	0.228
CEO tenure	722	4.40	1.00	3.00	6.00	4.42	4.96	3.83	0.002
Insider CEO	722	0.27	0.00	0.00	1.00	0.44	0.29	0.24	0.040
CEO-Chairman	722	0.37	0.00	0.00	1.00	0.48	0.39	0.34	0.070
Founder CEO	722	0.27	0.00	0.00	1.00	0.45	0.35	0.20	0.000
CEO ownership	722	12.63	2.10	4.30	13.88	18.66	13.76	11.48	0.055
Cash compensation (in thousands)	722	658.11	292.16	409.76	641.15	1494.21	603.80	713.37	0.168
Equity compensation (in thousands)	722	690.08	0.00	149.83	605.38	1938.34	553.47	829.49	0.031
Total compensation (in thousands)	722	1666.07	444.42	805.94	1561.21	3071.64	1468.40	1866.62	0.044
MBA	722	0.26	0.00	0.00	1.00	0.44	0.23	0.30	0.013
PhD	722	0.10	0.00	0.00	0.00	0.31	0.13	0.08	0.031
Ivy League alumnus	722	0.17	0.00	0.00	0.00	0.38	0.14	0.21	0.006

Panel C: Firm and offering characteristics

	All IPOs						IPOs with a specialist CEO	IPOs with a generalist CEO	Difference
	<i>N</i>	Mean	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>sd</i>	Mean	Mean	<i>p-value</i>
Firm age	722	17.33	5.00	9.00	18.00	23.67	16.02	18.62	0.070
Sales (in millions)	722	401.63	25.19	82.80	288.15	1168.94	276.70	525.86	0.002
Profitability	722	-0.03	-0.16	0.06	0.14	0.40	-0.01	-0.05	0.024
Leverage	722	0.14	0.00	0.01	0.22	0.23	0.13	0.16	0.024
R&D	722	0.10	0.00	0.04	0.13	0.18	0.10	0.09	0.349
Advertising	722	0.02	0.00	0.00	0.01	0.07	0.02	0.02	0.457
Capital expenditure	722	0.06	0.02	0.03	0.07	0.08	0.06	0.06	0.268
Diversification	722	1.38	1.00	1.00	1.00	0.96	1.24	1.52	0.000
Proceeds (in millions)	722	144.68	50.00	80.50	140.00	203.36	118.92	170.30	0.000
Initial returns	722	0.28	0.00	0.11	0.31	0.52	0.24	0.32	0.034
Top-tier underwriter	722	0.51	0.00	1.00	1.00	0.50	0.49	0.54	0.064
Venture capitalist	722	0.57	0.00	1.00	1.00	0.50	0.58	0.56	0.233
Big4 auditor	722	0.92	1.00	1.00	1.00	0.28	0.91	0.93	0.133
Market-to-book	722	4.12	1.13	2.27	4.20	7.33	4.09	4.14	0.463
High-tech industry	722	0.45	0.00	0.00	1.00	0.50	0.45	0.45	0.473
Delist	722	0.07	0.00	0.00	0.00	0.26	0.06	0.09	0.025

Panel D: Correlation matrix

	Specialist CEO	Log(firm age)	Log(sales)	Top-tier underwriter	Big4 auditor	Venture capitalist	Profitability	Leverage	Market-to-book	R&D	Advertising	Capital expenditure	Diversification	Log(proceeds)	Initial returns	CEO-Chairman	CEO-Founder
Specialist CEO	1.000																
Log(firm age)	0.024	1.000															
Log(sales)	-0.044	0.558	1.000														
Top-tier underwriter	-0.057	0.067	0.209	1.000													
Big4 auditor	-0.041	-0.013	0.034	0.179	1.000												
Venture capitalist	0.027	-0.479	-0.491	0.000	0.174	1.000											
Profitability	0.074	0.433	0.684	0.097	0.019	-0.392	1.000										
Leverage	-0.074	0.358	0.407	0.187	0.013	-0.369	0.237	1.000									
Market-to-book	-0.004	-0.240	-0.218	-0.012	0.002	0.174	-0.159	-0.210	1.000								
R&D	0.015	-0.199	-0.456	-0.090	-0.012	0.309	-0.540	-0.148	0.085	1.000							
Advertising	-0.004	-0.072	0.035	-0.001	0.031	0.020	-0.174	-0.045	-0.020	-0.037	1.000						
Capital expenditure	-0.023	0.020	0.145	0.052	-0.016	-0.126	0.027	0.200	-0.068	-0.124	0.125	1.000					
Diversification	-0.146	0.326	0.365	0.087	-0.027	-0.308	0.180	0.284	-0.115	-0.163	-0.061	0.079	1.000				
Log(proceed)	-0.141	0.321	0.630	0.327	0.107	-0.317	0.411	0.434	-0.129	-0.309	-0.035	0.112	0.305	1.000			
Initial returns	-0.060	-0.264	-0.088	0.035	0.055	0.182	-0.081	-0.153	0.504	-0.042	0.007	-0.027	-0.091	-0.006	1.000		
CEO-Chairman	0.055	0.018	0.080	-0.022	-0.074	-0.032	0.108	0.059	-0.006	-0.103	-0.046	0.004	0.040	0.053	0.001	1.000	
CEO-Founder	0.173	-0.224	-0.170	-0.021	0.004	0.218	-0.094	-0.159	0.091	0.104	-0.029	-0.035	-0.131	-0.209	0.093	0.207	1.000

Figure 1

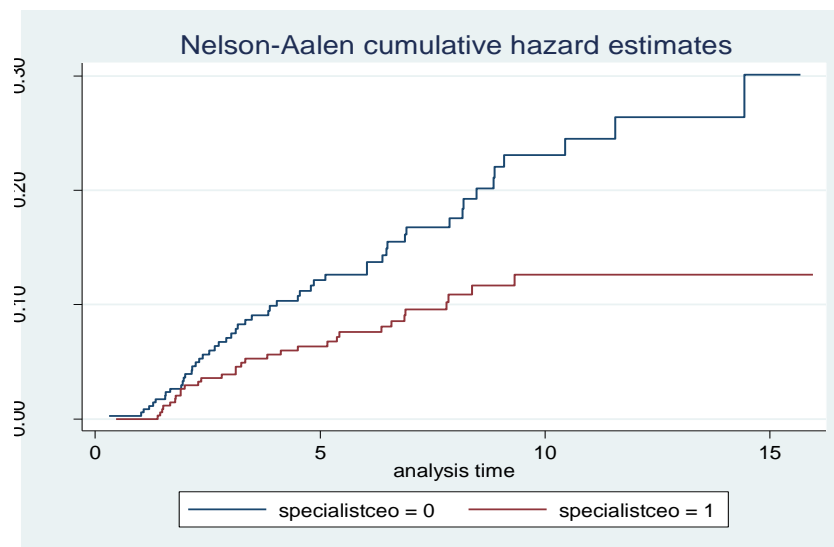


Figure 2

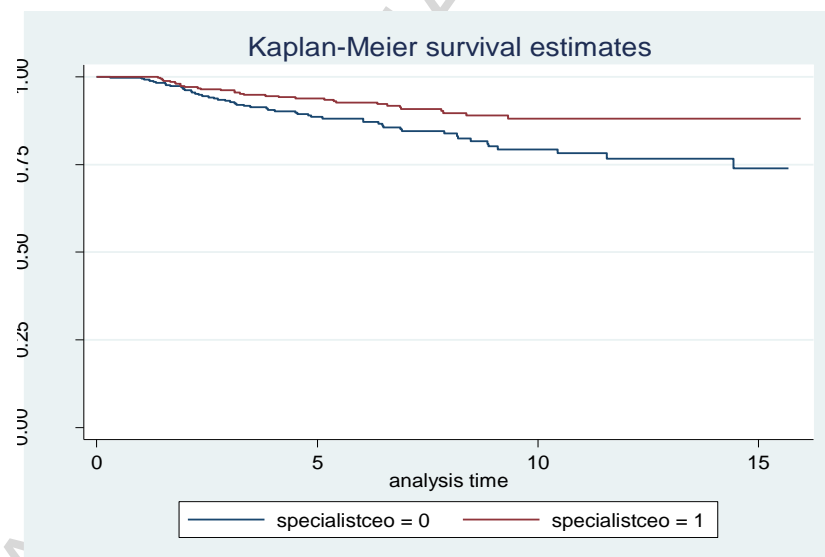


Table 4

Estimation of Cox proportional hazards model of probability of failure and time-to failure

The table illustrates the estimation of Cox proportional hazards model of probability of failure and time-to failure. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Appendix A. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. The test statistics are shown in parentheses below coefficient estimates.

	(1)		(2)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-1.048*** (-3.89)	0.351		
Generalist skills index			0.366*** (4.26)	1.443
Log(firm age)	-0.593 (-1.27)	0.553	-0.494 (-1.06)	0.610
Log(sales)	-0.688** (-2.28)	0.503	-0.690** (-2.32)	0.501
Top-tier underwriter	-0.487* (-1.68)	0.615	-0.509* (-1.75)	0.601
Big4 auditor	-0.417 (-0.88)	0.659	-0.328 (-0.70)	0.720
Venture capitalist	0.007 (0.02)	1.007	-0.014 (-0.04)	0.986
Profitability	-2.119*** (-3.51)	0.120	-2.267*** (-3.84)	0.104
Leverage	2.569*** (3.93)	13.058	2.655*** (4.17)	14.231
Market-to-book	-0.106*** (-2.81)	0.899	-0.107*** (-2.85)	0.899
R&D	-0.403 (-0.61)	0.668	-0.464 (-0.71)	0.629
Advertising	2.497* (1.95)	12.143	2.166* (1.72)	8.723
Capital expenditure	-0.434 (-0.30)	0.648	-0.144 (-0.10)	0.866
Diversification	-0.192 (-1.05)	0.826	-0.256 (-1.38)	0.774
Log(proceeds)	-1.013* (-1.92)	0.363	-1.030** (-1.97)	0.357
Initial returns	0.430* (1.91)	1.537	0.496** (2.29)	1.641
CEO-Chairman	-0.455 (-1.58)	0.635	-0.492* (-1.70)	0.612
CEO-Founder	-0.225 (-0.73)	0.798	-0.104 (-0.34)	0.901
Chi-square	203.78		204.88	
Chi-square test probability	0.000		0.000	
Number of observations	722		722	

	(3)		(4)		(5)		(6)		(7)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Number of roles	0.197*** (3.96)	1.217								
Number of firms			0.146*** (4.31)	1.157						
Number of industries					0.273* (1.80)	1.314				
CEO experience dummy							0.540** (2.07)	1.717		
Conglomerate experience dummy									0.491* (1.74)	1.634
Log(firm age)	-0.529 (-1.11)	0.589	-0.490 (-1.06)	0.613	-0.453 (-0.96)	0.636	-0.518 (-1.07)	0.596	-0.433 (-0.92)	0.648
Log(sales)	-0.731** (-2.43)	0.482	-0.718** (-2.36)	0.488	-0.663** (-2.23)	0.515	-0.612** (-2.02)	0.542	-0.689** (-2.28)	0.502
Top-tier underwriter	-0.494* (-1.71)	0.610	-0.415 (-1.42)	0.661	-0.494* (-1.70)	0.610	-0.397 (-1.35)	0.673	-0.486* (-1.68)	0.615
Big4 auditor	-0.293 (-0.62)	0.746	-0.256 (-0.55)	0.774	-0.398 (-0.85)	0.672	-0.348 (-0.72)	0.706	-0.434 (-0.91)	0.648
Venture capitalist	-0.095 (-0.29)	0.909	-0.011 (-0.03)	0.989	-0.012 (-0.04)	0.988	0.048 (0.14)	1.049	0.007 (0.02)	1.007
Profitability	-2.395*** (-4.07)	0.091	-2.231*** (-3.74)	0.107	-2.109*** (-3.53)	0.121	-2.199*** (-3.65)	0.111	-2.273*** (-3.79)	0.103
Leverage	2.347*** (3.72)	10.456	2.566*** (4.20)	13.018	2.534*** (4.10)	12.609	2.479*** (4.00)	11.923	2.556*** (4.03)	12.880
Market-to-book	-0.130*** (-3.26)	0.878	-0.107*** (-2.84)	0.899	-0.103*** (-2.75)	0.902	-0.100*** (-2.62)	0.905	-0.110*** (-2.94)	0.896
R&D	-0.474 (-0.72)	0.622	-0.306 (-0.46)	0.737	-0.258 (-0.40)	0.773	-0.393 (-0.59)	0.675	-0.348 (-0.53)	0.706
Advertising	1.793 (1.46)	6.007	2.187* (1.85)	8.905	2.314* (1.90)	10.114	2.400** (1.96)	11.025	2.171* (1.79)	8.765
Capital expenditure	-0.453 (-0.31)	0.636	0.134 (0.09)	1.144	-0.401 (-0.27)	0.669	-0.840 (-0.55)	0.432	-0.454 (-0.31)	0.635
Diversification	-0.195 (-1.09)	0.823	-0.200 (-1.11)	0.819	-0.131 (-0.75)	0.877	-0.163 (-0.91)	0.850	-0.206 (-1.12)	0.814
Log(proceeds)	-1.035** (-1.96)	0.355	-0.967* (-1.88)	0.380	-0.821 (-1.58)	0.440	-0.779 (-1.48)	0.459	-0.799 (-1.53)	0.450
Initial returns	0.524** (2.50)	1.689	0.462** (2.08)	1.587	0.457** (2.17)	1.579	0.432* (1.95)	1.540	0.452** (2.13)	1.572
CEO-Chairman	-0.434 (-1.50)	0.648	-0.426 (-1.48)	0.653	-0.350 (-1.24)	0.705	-0.452 (-1.54)	0.637	-0.387 (-1.35)	0.679
CEO-Founder	-0.037 (-0.12)	0.963	-0.205 (-0.67)	0.814	-0.245 (-0.81)	0.783	-0.218 (-0.71)	0.804	-0.207 (-0.68)	0.813
Chi-square	203.29		203.54		190.89		192.23		190.83	
Chi-square test probability	0.000		0.000		0.000		0.000		0.000	
Number of observations	722		722		722		722		722	

Table 5

Estimation of Cox proportional hazards model of probability of failure and time-to failure for IPO firms without founder CEOs and those without insider CEOs

The table illustrates the estimation of Cox proportional hazards model of probability of failure and time-to failure for the sample of IPO firms excluding firms with founder CEOs and the sample of IPO firms excluding firms with insider CEOs. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Appendix A. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively.

	Excluding firms with founder CEOs		Excluding firms with insider CEOs	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-1.597*** (-4.30)	0.202	-0.975*** (-3.15)	0.377
Log(firm age)	-0.497 (-0.92)	0.608	-0.430 (-0.86)	0.650
Log(sales)	-0.562 (-1.62)	0.570	-0.506 (-1.54)	0.603
Top-tier underwriter	-0.398 (-1.09)	0.672	-0.359 (-1.09)	0.698
Big4 auditor	-0.067 (-0.12)	0.936	-0.085 (-0.15)	0.919
Venture capitalist	-0.077 (-0.17)	0.926	-0.328 (-0.89)	0.721
Profitability	-3.539*** (-4.06)	0.029	-2.801*** (-4.05)	0.061
Leverage	2.301*** (2.73)	9.986	2.118*** (2.68)	8.312
Market-to-book	-0.136** (-2.57)	0.873	-0.050* (-1.67)	0.951
R&D	-1.813 (-1.23)	0.163	-3.638** (-2.34)	0.026
Advertising	2.818** (2.03)	16.748	3.227*** (2.67)	25.193
Capital expenditure	-1.285 (-0.67)	0.277	-0.308 (-0.19)	0.735
Diversification	-0.263 (-1.08)	0.769	-0.283 (-1.31)	0.753
Log(proceeds)	-1.563** (-2.38)	0.209	-1.123* (-1.85)	0.325
Initial returns	0.709** (2.00)	2.031	0.614*** (2.58)	1.847
CEO-Chairman	-0.792** (-2.05)	0.453	-0.380 (-1.20)	0.684
Chi-square	186.61		172.93	
Chi-square test probability	0.000		0.000	
Number of observations	525		530	

Table 6

Distribution of CEOs across specialist-generalist, founder-professional and insider-outsider dimensions

The table presents the number of CEOs across different dimensions: specialist-generalist versus founder-professional and specialist-generalist versus insider-outsider. Panel A tabulates our sample according to two dimensions, founder-professional and specialist-generalist. Panel B tabulates our sample according to two dimensions, founder-professional and specialist skills in quartiles. Panel C tabulates our sample according to two dimensions, insider-outsider and specialist-generalist. Panel D tabulates our sample according to two dimensions, insider-outsider and specialist skills in quartiles.

Panel A

	Professional	Founder	Total
Generalist	291	71	362
Specialist	234	126	360
Total	525	197	722

Panel B

		Professional	Founder	Total
<div>Generalist</div> <div>↕</div> <div>Specialist</div>	1	149	32	181
	2	139	39	178
	3	122	59	181
	4	115	67	182
	Total	525	197	722

Panel C

	Outsider	Insider	Total
Generalist	276	86	362
Specialist	254	106	360
Total	530	192	722

Panel D

		Outsider	Insider	Total	
<div>Generalist</div> <div><div></div></div>	<div>Specialist skills</div>	1	145	36	181
		2	129	49	178
		3	129	52	181
		Specialist	4	127	55
Total		530	192	722	

Table 7

Estimation of Cox proportional hazards model of probability of failure and time-to failure

The table illustrates the estimation of Cox proportional hazards model of probability of failure and time-to failure against different dimensions of CEO characteristics: specialist-generalist versus founder-professional and specialist-generalist versus insider-outsider. In Panel A, CEOs are classified in four categories based on specialist-generalist and founder-professional dimensions: *Specialist-Founder*, *Specialist-Professional*, *Generalist-Founder* and *Generalist-Professional*. In Panel B, CEOs are classified in four categories based on specialist-generalist versus insider-outsider dimensions: *Specialist-Insider*, *Specialist-Outsider*, *Generalist-Insider* and *Generalist-Outsider*. All regressions control for industry and year fixed effects whose coefficients are suppressed. All variables are defined in Appendix A. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively.

Panel A: Specialist-generalist versus founder-professional dimensions

	(1)		(2)		(3)		(4)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist-Founder	-0.381 (-0.97)	0.683						
Specialist-Professional			-1.045*** (-3.36)	0.352				
Generalist-Founder					-0.026 (-0.07)	0.975		
Generalist-Professional							1.104*** (4.20)	3.016
Log(firm age)	-0.426 (-0.89)	0.653	-0.638 (-1.33)	0.528	-0.443 (-0.91)	0.642	-0.662 (-1.44)	0.516
Log(sales)	-0.691** (-2.27)	0.501	-0.726** (-2.39)	0.484	-0.693** (-2.27)	0.500	-0.615** (-2.10)	0.541
Top-tier underwriter	-0.450 (-1.56)	0.638	-0.520* (-1.80)	0.595	-0.457 (-1.59)	0.633	-0.459 (-1.59)	0.632
Big4 auditor	-0.385 (-0.80)	0.681	-0.457 (-0.95)	0.633	-0.402 (-0.84)	0.669	-0.385 (-0.82)	0.681
Venture capitalist	0.020 (0.06)	1.020	0.015 (0.05)	1.015	0.020 (0.06)	1.021	-0.066 (-0.20)	0.936
Profitability	-2.134*** (-3.52)	0.118	-2.199*** (-3.76)	0.111	-2.202*** (-3.63)	0.111	-2.360*** (-3.99)	0.094
Leverage	2.430*** (3.94)	11.356	2.823*** (4.28)	16.830	2.508*** (4.09)	12.278	2.555*** (4.00)	12.876
Market-to-book	-0.109*** (-2.87)	0.897	-0.102*** (-2.68)	0.903	-0.107*** (-2.84)	0.899	-0.109*** (-2.94)	0.897
R&D	-0.325 (-0.50)	0.722	-0.448 (-0.69)	0.639	-0.321 (-0.49)	0.726	-0.156 (-0.24)	0.855
Advertising	2.187* (1.82)	8.905	2.636** (2.10)	13.964	2.203* (1.86)	9.055	2.487** (2.05)	12.027
Capital expenditure	-0.549 (-0.37)	0.578	-0.114 (-0.08)	0.892	-0.467 (-0.31)	0.627	-0.550 (-0.37)	0.577
Diversification	-0.122 (-0.70)	0.885	-0.158 (-0.86)	0.854	-0.111 (-0.64)	0.895	-0.182 (-0.99)	0.834
Log(proceeds)	-0.724 (-1.39)	0.485	-0.864 (-1.64)	0.421	-0.681 (-1.32)	0.506	-1.071** (-2.05)	0.343
Initial returns	0.432**	1.541	0.375*	1.456	0.415**	1.514	0.458**	1.581

CEO-Chairman	(2.00) -0.373 (-1.33)	0.689	(1.79) -0.591** (-2.08)	0.554	(1.98) -0.407 (-1.44)	0.665	(2.14) -0.354 (-1.27)	0.702
Chi-square	188.13		199.81		187.13		204.69	
Chi-square test probability	0.000		0.000		0.000		0.000	
Number of observations	722		722		722		722	

Panel B: : Specialist-generalist versus Insider-Outsider dimensions

	(1)		(2)		(3)		(4)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist-Insider	-0.788 (-1.60)	0.455						
Specialist-Outsider			-0.802*** (-2.84)	0.448				
Generalist-Insider					0.240 (0.59)	1.271		
Generalist-Outsider							0.966*** (3.71)	2.628
Log(firm age)	-0.381 (-0.79)	0.683	-0.619 (-1.29)	0.538	-0.456 (-0.94)	0.634	-0.547 (-1.17)	0.579
Log(sales)	-0.666** (-2.19)	0.514	-0.738** (-2.42)	0.478	-0.699** (-2.31)	0.497	-0.704** (-2.28)	0.495
Top-tier underwriter	-0.457 (-1.59)	0.633	-0.489* (-1.68)	0.613	-0.439 (-1.52)	0.644	-0.561* (-1.91)	0.571
Big4 auditor	-0.388 (-0.81)	0.678	-0.428 (-0.90)	0.652	-0.398 (-0.83)	0.672	-0.449 (-0.94)	0.638
Venture capitalist	0.016 (0.05)	1.016	0.012 (0.04)	1.012	-0.008 (-0.03)	0.992	0.132 (0.40)	1.141
Profitability	-2.124*** (-3.54)	0.120	-2.191*** (-3.66)	0.112	-2.198*** (-3.68)	0.111	-2.069*** (-3.42)	0.126
Leverage	2.479*** (4.00)	11.926	2.620*** (4.10)	13.736	2.503*** (4.09)	12.217	2.616*** (4.00)	13.686
Market-to-book	-0.109*** (-2.88)	0.896	-0.103*** (-2.73)	0.902	-0.110*** (-2.88)	0.896	-0.096** (-2.51)	0.909
R&D	-0.404 (-0.61)	0.668	-0.332 (-0.51)	0.718	-0.339 (-0.52)	0.713	-0.391 (-0.58)	0.677
Advertising	2.157* (1.79)	8.646	2.463** (1.98)	11.745	2.211* (1.84)	9.122	2.500** (2.04)	12.183
Capital expenditure	-0.419 (-0.28)	0.658	-0.423 (-0.29)	0.655	-0.486 (-0.33)	0.615	-0.188 (-0.13)	0.828
Diversification	-0.144 (-0.81)	0.866	-0.134 (-0.75)	0.874	-0.119 (-0.68)	0.888	-0.152 (-0.83)	0.859
Log(proceeds)	-0.774 (-1.49)	0.461	-0.798 (-1.52)	0.450	-0.694 (-1.34)	0.499	-0.918* (-1.74)	0.399
Initial returns	0.432** (2.05)	1.540	0.397* (1.81)	1.487	0.426** (2.01)	1.531	0.379* (1.71)	1.461

CEO-Chairman	-0.419 (-1.50)	0.658	-0.470* (-1.69)	0.625	-0.403 (-1.45)	0.668	-0.524* (-1.87)	0.592
Chi-square	190.18		195.86		187.46		200.91	
Chi-square test probability	0.000		0.000		0.000		0.000	
Number of observations	722		722		722		722	

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Table 8

**Estimation of Cox proportional hazards models of probability of failure and time-to failure
controlling for high-tech industries**

The table illustrates the estimation of Cox proportional hazards models of probability of failure and time-to failure controlling for high-tech industries. Specification (1) includes a dummy variable *high-tech industry* indicating whether the IPO firm is in a high-tech industry, and an interaction term between *specialist CEO* and *high-tech industry*. Specification (2) shows the regression on the sub-sample of IPO firms in high-tech industries. Specification (3) shows the regression on the sub-sample of IPO firms not in the high-tech industries. All regressions include year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. All variables are defined in Appendix A.

	Overall IPO sample		Sub-sample of IPOs in high-tech industries		Sub-sample of IPOs not in high-tech industries	
	(1)		(2)		(3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.622** (-1.98)	0.537	-0.751* (-1.69)	0.472	-0.584* (-1.76)	0.558
High-tech industry	0.282 (0.88)	1.325				
Specialist CEO * High-tech industry	-0.212 (-0.43)	0.809				
Log(firm age)	-0.601 (-1.48)	0.548	-1.110 (-1.38)	0.329	0.229 (0.41)	1.257
Log(sales)	-0.495** (-2.13)	0.610	-1.297*** (-2.94)	0.273	-0.669** (-2.36)	0.512
Top-tier underwriter	-0.336 (-1.24)	0.715	-0.204 (-0.47)	0.815	-0.452 (-1.19)	0.636
Big4 auditor	-0.232 (-0.54)	0.793	1.119 (0.91)	3.063	-0.563 (-1.10)	0.569
Venture capitalist	-0.369 (-1.32)	0.691	-0.655 (-1.37)	0.519	-0.671 (-1.38)	0.511
Profitability	-2.404*** (-4.85)	0.090	-1.999** (-2.35)	0.135	-2.972*** (-4.68)	0.051
Leverage	2.356*** (4.66)	10.549	1.784* (1.68)	5.953	2.151*** (3.05)	8.595
Market-to-book	-0.099*** (-2.76)	0.906	-0.064 (-1.38)	0.938	-0.309*** (-3.54)	0.734
R&D	-2.559** (-2.25)	0.077	-3.722 (-1.59)	0.024	-0.333 (-0.51)	0.717
Advertising	2.472 (1.56)	11.851	8.491** (2.18)	4871.218	1.320 (1.01)	3.744
Capital expenditure	0.354 (0.28)	1.425	-1.519 (-0.52)	0.219	1.632 (1.12)	5.113
Diversification	-0.161 (-0.99)	0.852	-0.059 (-0.18)	0.943	-0.226 (-1.16)	0.798
Log(proceeds)	-0.684* (-1.66)	0.505	-0.021 (-0.02)	0.979	-0.901* (-1.69)	0.406
Initial returns	0.355* (1.82)	1.426	0.364 (1.17)	1.439	0.745** (2.19)	2.107
CEO-Chairman	-0.426 (-1.62)	0.653	-0.303 (-0.72)	0.739	-0.321 (-0.85)	0.725
CEO-Founder	-0.164 (-0.59)	0.849	0.287 (0.61)	1.332	-0.135 (-0.33)	0.873
Chi-square	144.19		78.14		104.33	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		324		398	

Table 9
Estimation of Cox proportional hazards models of probability of failure and time-to-failure
controlling for crisis periods

The table illustrates the estimation of Cox proportional hazards models of probability of failure and time-to failure controlling for crisis periods including the collapse of the dotcom bubble in 2000-2001 and the financial crisis 2007-2008. Specification (1) includes a dummy variable *crisis period* indicating whether the IPO firm is in a crisis period, and an interaction term between *specialist CEO* and *crisis period*. Specification (2) shows the regression on the sub-sample of IPO firms in crisis periods. Specification (3) shows the regression on the sub-sample of IPO firms not in crisis periods. All regressions include industry dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. All variables are defined in Appendix A.

	Overall IPO sample		Sub-sample of IPOs in crisis periods		Sub-sample of IPOs not in crisis periods	
	(1)		(2)		(3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.699** (-2.18)	0.497	-2.450*** (-3.59)	0.086	-0.985*** (-2.76)	0.373
Crisis period	-0.057 (-0.17)	0.945				
Specialist CEO * Crisis period	-0.768 (-1.35)	0.464				
Log(firm age)	-0.586 (-1.33)	0.557	-1.795* (-1.84)	0.166	-0.024 (-0.04)	0.976
Log(sales)	-0.868*** (-2.98)	0.420	-1.457** (-2.08)	0.233	-0.779** (-2.05)	0.459
Top-tier underwriter	-0.507* (-1.77)	0.602	-1.796*** (-2.67)	0.166	-0.094 (-0.23)	0.910
Big4 auditor	-0.564 (-1.30)	0.569	2.749 (1.47)	15.620	-0.529 (-0.93)	0.589
Venture capitalist	-0.132 (-0.41)	0.877	-0.273 (-0.31)	0.761	0.161 (0.39)	1.174
Profitability	-2.004*** (-3.40)	0.135	-4.891*** (-2.93)	0.008	-3.057*** (-3.93)	0.047
Leverage	2.654*** (4.37)	14.206	3.791* (1.90)	44.319	2.841*** (3.48)	17.140
Market-to-book	-0.103*** (-2.67)	0.902	-0.433*** (-2.70)	0.649	-0.075* (-1.85)	0.928
R&D	0.162 (0.25)	1.176	3.251 (1.50)	25.818	-5.781*** (-2.85)	0.003
Advertising	2.655** (2.11)	14.219	3.923* (1.80)	50.568	3.303 (1.28)	27.205
Capital expenditure	-0.646 (-0.46)	0.524	-10.702*** (-2.61)	0.000	1.076 (0.56)	2.934
Diversification	-0.187 (-1.07)	0.829	1.212*** (2.63)	3.360	-0.557* (-1.94)	0.573
Log(proceeds)	-0.520 (-1.07)	0.594	-2.129** (-2.04)	0.119	-0.489 (-0.77)	0.613
Initial returns	0.356 (1.59)	1.428	0.684 (1.55)	1.982	0.596* (1.86)	1.814
CEO-Chairman	-0.496* (-1.78)	0.609	-1.873*** (-2.60)	0.154	-0.501 (-1.37)	0.606
CEO-Founder	-0.161 (-0.54)	0.852	0.866 (1.31)	2.378	-0.092 (-0.24)	0.912
Chi-square	192.57		134.61		139.42	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		267		455	

Table 10
Estimation of Cox proportional hazards models of probability of failure and time-to-failure
controlling for CEO power

The table illustrates the estimation of Cox proportional hazards models of probability of failure and time-to failure controlling for CEO power. The power index is the first factor of applying principal component analysis to five proxies of CEO power: *CEO-Chairman*, *CEO-Founder*, *CEO ownership*, *CEO tenure*, and *Ivy League alumnus*. Powerful CEOs are identified as those whose power index is greater than the sample median. Specification (1) includes a dummy variable *powerful CEO* indicating whether the IPO firm has a powerful CEO, and an interaction term between *specialist CEO* and *powerful CEO*. Specification (2) shows the regression on the sub-sample of IPO firms with a powerful CEO. Specification (3) shows the regression on the sub-sample of IPO firms without a powerful CEO. All regressions include industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. All variables are defined in Appendix A.

	Overall IPO sample		IPOs with powerful CEOs		IPOs without powerful CEOs	
	(1)		(2)		(3)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-1.509*** (-2.98)	0.221	-1.056* (-1.89)	0.348	-2.611*** (-3.40)	0.073
Powerful CEO	-0.409 (-0.92)	0.664				
Specialist CEO * Powerful CEO	0.444 (0.61)	1.560				
Log(firm age)	-0.735 (-1.10)	0.480	0.038 (0.04)	1.039	-2.331* (-1.81)	0.097
Log(sales)	-1.049** (-2.51)	0.350	-2.441*** (-3.20)	0.087	-1.716* (-1.77)	0.180
Top-tier underwriter	-0.561 (-1.51)	0.570	0.336 (0.50)	1.399	-0.057 (-0.07)	0.944
Big4 auditor	-0.360 (-0.58)	0.698	-1.725 (-1.55)	0.178	1.278 (0.96)	3.590
Venture capitalist	-0.187 (-0.45)	0.829	-0.859 (-1.45)	0.423	-0.279 (-0.29)	0.757
Profitability	-2.677*** (-3.21)	0.069	1.120 (0.87)	3.066	-5.102*** (-2.91)	0.006
Leverage	3.937*** (3.67)	51.246	4.060** (2.01)	57.961	0.280 (0.12)	1.324
Market-to-book	-0.133** (-2.46)	0.875	-0.094 (-1.59)	0.910	-0.533*** (-2.68)	0.587
R&D	-3.977** (-2.21)	0.019	1.909 (1.38)	6.745	-3.396 (-1.48)	0.033
Advertising	3.062 (1.20)	21.369	-1.126 (-0.21)	0.324	3.161 (0.56)	23.593
Capital expenditure	-3.033 (-1.22)	0.048	1.438 (0.36)	4.214	-5.982 (-1.04)	0.003
Diversification	-0.443 (-1.64)	0.642	0.308 (0.63)	1.360	-0.741 (-1.28)	0.476
Log(proceeds)	-0.328 (-0.50)	0.720	0.652 (0.57)	1.920	-1.951 (-1.23)	0.142
Initial returns	0.373 (1.30)	1.452	0.815** (2.12)	2.259	0.541 (0.57)	1.718
Chi-square	158.05		89.31		135.26	
Chi-square test probability	0.000		0.000		0.000	
Number of observations	722		361		256	

Table 11

**Estimation of Cox proportional hazards models of probability of failure and time-to-failure
controlling for CEO characteristics**

The table illustrates the estimation of Cox proportional hazards models of probability of failure and time-to failure controlling for CEO characteristics including *CEO age*, *CEO tenure*, *internal hire*, *CEO ownership*, *total compensation*, *MBA*, *PhD*, *Ivy League alumnus*. The regression includes industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively. All variables are defined in Appendix A.

	Coefficient	Hazard ratio
Specialist CEO	-1.340*** (-3.00)	0.262
Log(firm age)	-0.935 (-1.16)	0.393
Log(sales)	-1.079* (-1.85)	0.340
Top-tier underwriter	-0.646 (-1.38)	0.524
Big4 auditor	-1.125 (-1.63)	0.325
Venture capitalist	-0.258 (-0.48)	0.772
Profitability	-3.025*** (-2.75)	0.049
Leverage	5.547*** (4.36)	256.550
Market-to-book	-0.152** (-2.21)	0.859
R&D	-0.742 (-0.90)	0.476
Advertising	2.337 (0.76)	10.349
Capital expenditure	-7.356* (-1.76)	0.001
Diversification	-0.211 (-0.67)	0.809
Log(proceeds)	-0.102 (-0.14)	0.903
Initial returns	0.574 (1.43)	1.776
CEO-Chairman	-0.322 (-0.65)	0.724
CEO-Founder	-0.257 (-0.56)	0.773
CEO age	0.059* (1.82)	1.061
CEO tenure	-0.014 (-0.24)	0.987
Internal hire	-0.004 (-0.01)	0.996
CEO ownership	0.004 (0.24)	1.004
Log(total compensation)	0.369 (0.56)	1.447
MBA	0.411 (0.91)	1.509
PhD	0.848 (1.41)	2.336
Ivy League alumnus	0.670 (1.38)	1.955
Chi-square	153.51	
Chi-square test probability	0.000	
Number of observations	438	

Table 12

Endogeneity control – Propensity score matching

The table illustrates the analysis of the effect of specialist CEOs on the occurrence of delisting in the five year period subsequent to the offering, controlling for the endogeneity of CEO selection using propensity score matching. The variables used for matching include: *log(firm age)*, *log(sales)*, *top-tier underwriter*, *ROA*, *R&D*, *advertising*, *capital expenditure*, *diversification*, *CEO-Founder*, *CEO-Chairman*, *high-tech industry*, and *year dummies*. All variables are defined in Appendix A. The test statistic is shown in parentheses below the coefficient estimate. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% level respectively.

	Delist
ATET (Specialist CEO vs. Non-specialist CEO)	-0.078*** (-2.80)
Number of observations	722

Table 13
Other robustness checks

The table illustrates the estimation of Cox proportional hazards models of probability of failure and time-to failure. In specification (1), failed firms include those delisted from the stock exchanges due to either negative reasons or acquisitions. In specification (2), the sample excludes firms that have CEO turnovers within 5 years after the offering. All models include industry and year dummies whose coefficients are suppressed. The test statistics are shown in parentheses below coefficient estimates. One, two and three asterisks denote statistical significance at the 10%, 5% and 1% levels respectively. All variables are defined in Appendix A.

	Failed firms include those that are delisted from the stock exchanges for either negative reasons or acquisitions		IPO sample excludes firms that have CEO turnovers within 5 years after the offering	
	(1)		(2)	
	Coefficient	Hazard ratio	Coefficient	Hazard ratio
Specialist CEO	-0.500*** (-4.57)	0.606	-0.938*** (-2.98)	0.391
Log(firm age)	-0.353* (-1.89)	0.702	-1.005* (-1.91)	0.366
Log(sales)	-0.047 (-0.36)	0.954	-0.510 (-1.42)	0.601
Top-tier underwriter	0.091 (0.81)	1.095	-0.609* (-1.84)	0.544
Big4 auditor	-0.305 (-1.36)	0.737	-0.472 (-0.72)	0.624
Venture capitalist	0.079 (0.57)	1.082	0.284 (0.75)	1.329
Profitability	-1.169*** (-3.74)	0.311	-2.269*** (-3.17)	0.103
Leverage	1.024*** (3.30)	2.784	2.356*** (2.90)	10.547
Market-to-book	-0.027*** (-2.90)	0.973	-0.097** (-2.22)	0.907
R&D	-0.549 (-1.10)	0.577	-3.741** (-2.00)	0.024
Advertising	1.273 (1.53)	3.570	2.996** (2.24)	20.003
Capital expenditure	-1.666** (-2.06)	0.189	0.066 (0.04)	1.068
Diversification	-0.405*** (-4.62)	0.667	-0.173 (-0.83)	0.841
Log(proceeds)	-0.257 (-1.22)	0.774	-0.732 (-1.20)	0.481
Initial returns	0.192** (2.10)	1.212	0.290 (1.13)	1.336
CEO-Chairman	-0.551*** (-4.67)	0.576	-0.768** (-2.28)	0.464
CEO-Founder	0.084 (0.70)	1.087	-0.029 (-0.09)	0.971
Chi-square	254.96		169.29	
Chi-square test	0.000		0.000	
Number of observations	722		592	

"Specialists CEOs and IPO Survival"

Highlights

Approximately 36% of IPOs either fail or are acquired within five years after the offering

IPO firms with a specialist CEO have a lower probability of failure and a longer time to survive

Specialist managerial ability has significant implications for post-issue performance on IPOs

Ideal combinations for survival are 'specialist and professional skills' and a 'specialist and outside experiences'

Specialist CEOs have incentives that are more aligned with those of the firm and its shareholders;