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Founder-CEO Resistance and Ambition: An empirical analysis of firm survival in Japanese junior stock markets¹

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Abstract

This study investigates whether founder-chief executive officer (founder-CEO) presence is associated with initial public offering (IPO) survival. Using 1,393 IPOs listed on Japanese junior stock markets, we examine the impact of founder-CEO presence on the time to involuntary delisting, voluntary delisting, and graduation from junior stock markets. We find that founder-CEO-led firms are less likely to voluntarily delist through mergers and acquisitions (M&A) and buyouts, while they are more likely to graduate to main stock markets than non-founder-CEO-led firms. Our findings suggest that founder-CEOs at the time of the IPO have ambitions to advance the firms beyond the initial IPO, despite their resistance to strategic delisting through M&A. In addition, we find that while younger firms are more likely to delist, regardless of whether the manner is involuntary or voluntary, they are more likely to graduate from junior stock markets. Furthermore, our analyses reveal that firms with CEO retention after the IPO are less likely to delist involuntarily and voluntarily, while they are more likely to graduate from junior stock markets.

Keywords: entrepreneurial resistance, failure, founder-CEO, graduation, initial public offering, survival, voluntary delisting

JEL classification: G33, G34, L26, M13

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1. Introduction

Top management, such as a chief executive officer (CEO), plays a critical role in firm performance, especially in small businesses (Tomczyk et al., 2013; Wallace et al., 2010). Founder-CEOs, who have created firms and retain management control, are the initial architects of the organization's structure and strategy, and they play a central role in initiating ideas and making managerial decisions (Abebe and Alvarado, 2013; Nelson, 2003; Wang et al., 2019). Compared to non-founder-CEOs, founder-CEOs have a strong psychological attachment and express commitment to their firms (Abebe and Tangpong, 2018; He, 2008; Hendricks et al., 2019; Lee et al., 2020; Nelson, 2003). Based on this, the literature has examined the differences in motivation, behavior, strategy, and performance between founder- and non-founder-CEOs (Blank and Carmeli, 2021; Honjo et al., 2024; Honjo and Kato, 2022; Jain and Tabak, 2008). The importance of CEO succession has also been highlighted (Bennedsen et al., 2020; Gao et al., 2017; Schepker et al., 2017). In particular, founder-CEO succession is a critical issue in the post-foundation growth cycle of the firm.

An initial public offering (IPO) is a significant stage in the growth cycle. Firms with a demand for equity financing, such as young and innovative firms, are more likely to pursue IPOs on junior stock markets (synonymously, second-tier stock exchanges), which allow the shares of small and young firms to be publicly floated (Abbate and Sapio, 2019).¹ It may also be necessary to change CEOs prior to the IPO because of the different and complex post-IPO environment (Chahine and Zhang, 2020). While an IPO brings a significant change in financing, it also brings challenges in sustaining a post-IPO business.

¹ Several countries and regions introduced junior stock markets in the 1990s, following the National Association of Securities Dealers Automated Quotations (NASDAQ) in the US. For instance, the Alternative Investment Market (AIM) in the UK, Neuer Markt in Germany, Nouveau Marché in France, and Nuovo Mercato in Italy were launched in the mid- and late 1990s. Moreover, the Toronto Stock Exchange Venture (TSXV) was introduced in Canada, and the Korean Securities Dealers Automated Quotations (KOSDAQ) was introduced in the Republic of Korea.

In the literature, how IPO firms survive in stock markets—in other words, “IPO survival”—is a prominent topic of debate and investigation (Carpentier and Suret, 2011; Espenlaub et al., 2012, Espenlaub et al., 2016; Fama and French, 2004; Jain and Kini, 2000). As several founder-CEOs still manage their firms after the IPO, studies have focused on the impact of founder-CEO presence on IPO survival. Some empirical studies have found a positive effect of founder-CEO presence on IPO survival (He, 2008; Le et al., 2017; Pour, 2015; Williams, 2013; Yan and Williams, 2021), while others have found no effect (Fischer and Pollock, 2004; Gounopoulos and Pham, 2018). Founder-CEOs who have struggled with IPOs may be more likely to strive for IPO survival.

However, IPO firms can exit junior stock markets to pursue business expansion. An alternative to IPO survival includes not only involuntary delisting due to business failure, such as bankruptcy, but also voluntary delisting through mergers and acquisitions (M&A) or buyouts. Moreover, junior stock markets play a role in nurturing young and innovative firms, and firms listed on junior stock markets are expected to graduate to main stock markets (synonymously, senior stock exchanges). Graduating to main stock markets rather than staying in junior stock markets is critical for rapid growth through equity financing. Even if founder-CEOs maintain a certain probability of IPO survival, they may be inherently reluctant to allow delisting through M&A. Thus, founder-CEOs may adopt takeover resistance strategies (Gao and Jain, 2012). Founder-CEOs’ efforts leading up to the IPO may prevent their firms from successful exits associated with firm growth. Despite intensive research on IPO survival in stock markets, little attention has been paid in the literature to the role of founder-CEOs in successful exits, such as voluntary delisting through M&A and graduation to main stock markets. Further research on successful exits is needed to improve our understanding of the role of junior stock markets in the creation of young and innovative firms.

This study explores IPO survival in junior stock markets. Specifically, we demonstrate how IPO survival differs across firms, according to founder- and non-founder-CEOs. By identifying not only involuntary delisting due to business failure, but also voluntary delisting through M&A and graduation to main stock markets, we examine whether founder-CEO presence is associated with IPO survival in junior stock markets. Our sample consists of 1,393 IPOs listed on Japanese junior stock markets, which are expected to provide equity capital to young and innovative firms. In our sample, firms led by

founder-CEOs at the time of the IPO account for about 57%. We examine the time to involuntary delisting, voluntary delisting, and graduation of IPO firms from junior stock markets. Since the observation periods from IPO to exit date are censored, we use a survival analysis approach, such as a proportional hazards model (hereafter “PH model”) and a competing-risks regression model (hereafter “CR model”), whereas binary choice models, which are often used in previous studies (Le et al., 2017), ignore how quickly IPO firms exit.

We find that founder-CEO-led firms are less likely to voluntarily delist through M&A and buyouts, while they are more likely to graduate to main stock markets than non-founder-CEO-led firms. Our findings suggest that founder-CEOs at the time of the IPO have ambitions to advance the firms beyond the initial IPO, despite their resistance to strategic delisting through M&A. However, we do not find rigorous evidence on the impact of founder-CEO presence on the time to involuntary delisting due to business failure. Moreover, we identify whether young and innovative firms achieve successful exits by highlighting the role of junior stock markets in nurturing such firms. We also find that while younger firms are more likely to delist, regardless of whether the manner is involuntary or voluntary, they are more likely to graduate from junior stock markets. Furthermore, our analyses reveal that firms with CEO retention after the IPO are less likely to delist involuntarily and voluntarily, while they are more likely to graduate from junior stock markets.

There are several ways in which this study contributes the existing literature. First, we find that founder-CEO presence affects successful exits from junior stock markets. While numerous scholars have shed light on IPO survival, only a few have examined the most typical type of successful exit, namely, graduation from junior stock markets (Carpentier et al., 2010; Carpentier and Suret, 2011; Honjo and Kurihara, 2023; Meoli et al., 2018). To the best of our knowledge, no studies have examined the relationship between founder-CEO presence and graduation to main stock markets. We provide novel evidence that founder-CEOs achieve firm growth using a survival analysis approach to graduation from junior stock markets. Our findings support the notion of founder-CEO ambition (i.e., entrepreneurial ambition), as measured by a founder-CEO’s aspirations for an upper stage.

Second, we provide insights into how founder-CEOs strengthen firms’ IPO survival. While many studies have examined IPO survival, very few have examined IPO survival by identifying the type of

delisting through M&A (He, 2008). We provide novel evidence on how the determinants of delisting, including founder-CEO presence, differ between involuntary and voluntary delisting. While our results do not necessarily support the notion of founder-CEO resilience (i.e., entrepreneurial resilience) to adversity in junior stock markets, they support the notion of founder-CEO resistance (i.e., entrepreneurial resistance) to voluntary delisting via M&A and buyouts.

Third, we identify the factors, other than founder-CEO presence, that affect post-IPO exit routes; specifically, research and development (R&D) intensive firms are less likely to graduate from junior stock markets. In addition, while younger firms are more likely to voluntarily delist through M&A and buyouts, they are less likely to graduate from junior stock markets. Such findings provide novel insights into the regulations of stock markets that encourage the growth of young and innovative firms.

The remainder of this paper is organized as follows. The next section discusses the research background, including a literature review and theoretical arguments. Section 3 describes the data and methods used in this study. Section 4 presents the estimation results. Finally, concluding remarks are provided.

2. Research background

2.1. Founder-CEOs' advantages

From the perspective of stewardship theory, the literature has addressed founder-CEO advantages in firm performance (Gao and Jain, 2012; Schuster et al., 2020; Wasserman, 2006). Founder-CEOs who have struggled to sustain their businesses have a strong psychological attachment and express commitment to their firms (Abebe and Tangpong, 2018; He, 2008; Lee et al., 2020; Nelson, 2003). Founder-CEOs have faced challenges in launching their businesses while serving as organizational stewards. Founder-CEOs' motivations may be derived from non-pecuniary benefits, as they tend to accept low compensation (He, 2008; Wasserman, 2006). Founder-CEOs may also be more risk tolerant than others (Eisenmann, 2002; Tang, et al., 2016) and may be more resilient to adversity (Honjo and Kato, 2022).

Moreover, from the perspective of agency theory, the literature has emphasized founder-CEO advantages in firm performance (Abebe et al., 2020; Gao and Jain, 2012; Munir and Li, 2018).

Organizational goals are inextricably linked to their personal wealth, as most founder-CEOs own firm shares in the early stages. Founder-CEOs whose interests are aligned with organizational interests are intrinsically motivated to achieve organizational goals. Therefore, agency costs are lower in founder-CEO-led firms (Fischer and Pollock, 2004).² In addition, founder-CEOs not only have knowledge of firms' operations, but also know firms' antecedents (Williams, 2013). Founder-CEOs who shape their organizations from the beginning have firm-specific knowledge and skills (Ampenberger et al., 2013).

Empirical studies have demonstrated the impact of CEO succession on firm performance (Georgakakis and Ruigrok, 2017; Jalal and Prezas, 2012). Some have found that founder-CEO-led firms outperform others in terms of profitability, market valuation, and long-term returns (Adams et al., 2009; Gao and Jain, 2011). While the perspective of stewardship and agency theory reinforces the notion of founder-CEO advantages in firm performance, founder-CEOs may have advantages in terms of agile decision making. In general, CEOs must pay attention to democratic decision making within the organization. However, founder-CEOs may be able to make dogmatic decisions that are often effective for better performance in the early stages. In this respect, founder-CEOs may have advantages in firm performance over non-founder-CEOs

Conversely, founder-CEOs may have disadvantages in firm performance. Founder-CEOs have less experience than non-founder-CEOs, such as professional CEOs, and may lack personal networks with customers and investors. Founder-CEO-led firms may also exhibit poor performance when founder-CEOs are entrenched (Adams et al., 2009; Gao and Jain, 2011). Additionally, founder-CEOs are overly optimistic and confident (Hendricks et al., 2022; Lee et al., 2017). Therefore, founder-CEOs fail to accurately assess their businesses. Moreover, founder-CEOs may miss opportunities to expand businesses because of their psychological attachment and commitment to firms. Despite rapid growth opportunities, they may turn down an acquisition offer.

Furthermore, entrepreneurial ability, including the knowledge and skills required to start a business, may differ from the managerial ability to maintain current operations (Gifford, 1993). As firms grow,

² The separation of ownership and management creates agency costs (Jensen and Meckling, 1976), which may worsen managerial incentives (Mikkelsen et al., 1997).

they reach a stage where management styles and skills must evolve to meet the fundamentally different challenges of managing complex organizations (Boeker and Karichalil, 2002; Gao and Jain, 2012). Not surprisingly, the impact of human capital on firm performance varies at different stages of a firm's life cycle (Tzabbar and Margolis, 2017). The knowledge and skills required for rapid growth in a competitive environment are different from those initially required for new firm creation (Picken, 2017). According to organizational life cycle theory, the impact of founder-CEO presence on firm performance may differ between early and later stages. Despite a growing body of research on the impact of founder-CEO presence on firm performance, the empirical evidence remains mixed (Abebe et al., 2020). From the perspective of a firm's life cycle theory, founder-CEO advantages may change over time. The impact of founder-CEO presence on firm performance varies between the pre- and post-IPO stages. Changes in management through an IPO, which facilitate strategic changes in orientation, may create additional capabilities for IPO firms.

2.2. Founder-CEO presence and IPO survival

An IPO enables private firms to raise funds by accessing public equity capital. An IPO provides an opportunity to access the funds needed for firm growth (Fattoum-Guedri et al., 2018). In particular, access to public equity markets is necessary for firms with a high demand for equity financing, such as R&D intensive firms. However, IPO firms often face a gap in strategy and performance between private and public equity capital. Despite gaining access to public equity markets, IPO firms do not necessarily improve their operating performance. In fact, the literature repeatedly finds a significant decline in operating performance after the IPO (Krishnan et al., 2011; Mikkelsen et al., 1997; Wang, 2005). IPO firms can rather learn about their capabilities and market conditions by going public.

Junior stock markets have been introduced to encourage the creation of new technology firms (Eberhart and Eesley, 2018). Generally, junior stock markets allow young and innovative firms to go public regardless of stable profitability; therefore, these firms face challenges in improving their post-IPO performance, despite uncertain business outcomes. Not surprisingly, younger firms that have completed IPOs within a few years of being founded are vulnerable during their development (Kroll et al., 2007). As IPO survival is necessary for firm growth, several scholars have studied IPO survival in

junior stock markets (Pour and Lasfer, 2013; Vismara et al., 2012). Moreover, an IPO in junior stock markets can be seen a preparatory stage for firm growth (Honjo and Kurihara, 2023). Growing firms step up to main stock markets, and successful IPO firms soon graduate from junior stock markets.

More importantly, an IPO is an opportunity to change ownership and control because certain shares are distributed to new shareholders (Alavi et al., 2008). Founder-CEOs—more precisely, early-stage shareholders—decide to sell their shares when firms go public. New shareholders sometimes seek active participation in corporate governance, and an IPO dilutes the equity held by founder-CEOs (Fattoum-Guedri et al., 2018). Founder-CEOs lose ownership by selling their shares at the time of the IPO, while they have the opportunity to gain enormous financial wealth. Thus, an IPO is a critical experience with difficult choices for founder-CEOs (Fattoum-Guedri et al., 2018). In this context, the trade-off between wealth (rich) and control (king)—namely the “wealth-versus-control dilemma”—has been debated in the literature (Wasserman, 2008, 2012, 2017).

Following the context of the wealth-versus-control dilemma, we can consider that founder-CEOs who are not replaced at the time of the IPO retain management control as kings and they prefer management control (king) to wealth (rich). Such founder-CEOs have a special attachment to their IPO firms because they strive to sustain their businesses from inception to IPO. It is likely that founder-CEOs who retain management control at the time of the IPO prioritize firm survival and strive to sustain their businesses more than non-founder-CEOs. However, it is unclear whether they have higher ambitions for post-IPO growth.

Table 1 summarizes the relationship between founder-CEO presence and IPO survival in these studies. As shown in Table 1, some empirical studies have found a positive effect of founder-CEO presence on IPO survival (He, 2008; Le et al., 2017; Pour, 2015; Williams, 2013; Yan and Williams, 2021). Their results indicate that founder-CEO-led firms are more likely to survive than others, suggesting that founder-CEOs have more advantages for IPO survival. Meanwhile, other studies have found no effect of founder-CEO presence on IPO survival (Fischer and Pollock, 2004; Gounopoulos and Pham, 2018).³ However, although a few studies have examined delisting via M&A (He, 2008), previous

³ In addition, a negative effect of founder-CEO presence on firm growth was found in the literature (Yan and Williams, 2021).

studies have tended to ignore successful exits related to firm growth. Even if founder-CEOs retain some probability of IPO survival in junior stock markets, this may simply indicate that founder-CEO-led firms avoid risk without seeking rapid growth. In contrast to main stock markets, junior stock markets are expected to promote the creation of young and innovative firms. In this respect, it remains an issue to focus more on successful exits in junior stock markets.

[Insert Table 1 here]

2.3. Founder-CEO resistance and ambition in junior stock markets

The existing literature has addressed the exit routes of start-up firms, such as bankruptcy and merger (Grilli, 2011; Kato and Honjo, 2015). It has been found that the impact of founder-CEO retention and turnover on new firm survival depends on the type of exit route (Honjo and Kato, 2022). Post-IPO performance can be categorized into three states: survival, takeover (acquisition), and non-survival. In addition, delisting is usually voluntary and involuntary (Martinez and Serve, 2017). This categorization depends on whether the initiator of delisting is the firm itself or the stock exchange authority. While in the case of voluntary delisting, the firm decides to leave the stock market, in the case of involuntary delisting, the stock exchange authority forces the firm to delist.

Involuntary delisting usually occurs due to business failure, such as bankruptcy, financial restructuring, and liquidation (Macey et al., 2008). Another cause of involuntary delisting is the violation of listing requirements, which can also be considered business failure in a broader sense. Whether firms delist due to business failure depends heavily on their post-IPO performance. In contrast, voluntary delisting involves a transaction between the firm and its shareholders (Martinez and Serve, 2017). This transaction aims to drastically change the ownership structure of the firm through M&A and buyouts, including management buyouts (MBO). Delisted firms in such transactions have strategic incentives to exit the stock market due to a cost-benefit trade-off (Bharath and Dittmar, 2010). Voluntary delisting

Chen and Thompson (2015) found that among surviving firms, the turnover of founder-CEOs is positively associated with firm performance. A U-shaped relationship between founder-CEO turnover and firm growth was also found, suggesting that rapid growth and slow growth are associated with founder-CEO turnover (Boeker and Karichalil, 2002).

differs from involuntary delisting due to business failure because the former involves a successful exit.

The reasons and incentives for delisting differ between involuntary and voluntary delisting, and these differences may be driven by top management, such as CEOs. Given that CEOs have homogeneous preferences, whether they make delisting decisions may depend on their willingness or resistance to changes in ownership and control. Some scholars have emphasized how founder-CEO presence affects certain types of behavior, such as acquisitions (Fahlenbrach, 2009; Gao and Jain, 2012). Founder-CEOs may resist changes that threaten their power and discretion (Le et al., 2017). Most founder-CEOs, with the exception of serial entrepreneurs with many previous IPOs who have personal relationships with investors, lack historical stock market scrutiny (Fattoum-Guedri et al. 2018). They are inherently reluctant to approve delisting requests; in particular, founder-CEOs who are not replaced at the time of the IPO may prefer management control (king) to wealth (rich). In contrast, non-founder-CEOs are more likely to voluntarily delist because they do not necessarily seek to preserve their firms to date.

Based on the above arguments, we first propose a hypothesis about entrepreneurial resistance to voluntary delisting. Founder-CEOs' resistance to loss of control prevents their firms from voluntarily delisting through M&A and buyouts. Founder-CEOs may also have fewer opportunities for strategic delisting than professional CEOs. Firms led by founder-CEOs are more likely to engage in takeover resistance strategies (Gao and Jain, 2012). Thus, we expect that founder-CEOs are more likely to have entrepreneurial resistance to delisting than non-founder-CEOs.

Second, we propose another hypothesis regarding entrepreneurial ambition for upper stages. IPOs in junior stock markets are not yet well positioned, and graduation is a special case and only occurs as another exit route for IPOs listed on junior stock markets. Founder-CEOs who retain management control at the time of the IPO have a special attachment to their IPO firms, which could motivate them to aim higher for further growth. Graduating to main stock markets allows them to increase their status and prestige. Thus, we expect that founder-CEOs are more likely to graduate from junior stock markets. In this study, we test these hypotheses using the case of Japanese junior stock markets. Founder-CEOs with higher ambitions may aim for upper stages, that is, graduation to main stock markets.

3. Data and methods

3.1. Data collection

Since the late 1990s, Japan has founded junior stock markets in established stock exchanges. The Market of the High-Growth and Emerging Stocks (MOTHERS) was the junior stock market of the Tokyo Stock Exchange (TSE), and the first IPO emerged in 1999. JASDAQ Securities Exchange (JASDAQ) was founded in December 2004, when the over-the-counter (OTC) market was reorganized as a general stock exchange. MOTHERS and JASDAQ were junior stock markets of the TSE. Ambitious, Centrex, and Q-Board are junior stock markets of the Sapporo Stock Exchange (SSE), Nagoya Stock Exchange (NSE), and Fukuoka Stock Exchange (FSE), respectively. Additionally, Nippon New Market Hercules (Hercules), which was opened in the Osaka Stock Exchange (OSE) and renamed NASDAQ Japan, although already closed, is included in our sample.⁴ However, our sample does not include IPOs directly listed on senior stock exchanges (i.e., TSE, OSE, SSE, NSE, and FSE). Moreover, we do not consider the listing experience of firms listed on the OTC, which was closed and renamed “JASDAQ” in December 2004, and Tokyo Pro Market (formerly, Tokyo AIM), which is a special market to offer new investment opportunities only to professional investors. This is because the listing systems and requirements of these markets differ substantially from those of the other junior stock markets. Consequently, our sample consists of IPOs listed between December 1999 and December 2021 on Japanese junior stock markets: MOTHERS, JASDAQ, Hercules, Ambitious, Centrex, and Q-Board.

We target Japanese junior stock markets to generate the sample of IPOs, including delisting from junior stock markets. Although some junior stock markets in European nations were closed in the 2000s, Japanese markets, such as MOTHERS and JASDAQ, have attracted new IPOs (Granier et al., 2019; Honjo and Kurihara, 2023). Owing to less stringent listing requirements in the markets, IPOs in junior

⁴ The New Market of the OSE was opened in the OSE from May 2000 to December 2002, but closed before the launch of NASDAQ Japan. Six firms listed on the New Market of the OSE and NASDAQ Japan are included as those listed on Hercules in our sample. Additionally, the OSE acquired more than half of the shares of JASDAQ in December 2008, and JASDAQ was absorbed into the OSE in April 2010. New Entrepreneurs’ Opportunity Market (NEO) was closed and merged into JASDAQ. JASDAQ, NEO, and Hercules were reorganized as the new JASDAQ in October 2010. Moreover, the Japan Exchange Group (JPX) emerged, and the cash equity market of the OSE was integrated into the TSE in July 2013. Eventually, both MOTHERS and JASDAQ became subsidiaries of the TSE, which was held by JPX (Honjo and Kurihara, 2023).

stock markets account for a large share in countries, such as Canada, Japan, the Republic of Korea and the UK (Granier et al., 2019; Honjo and Kurihara, 2023; Pandes and Robinson, 2014; Park et al., 2016). Young and innovative firms, which are allowed to go public regardless of stable profitability in Japanese junior stock markets, are expected to graduate to the main stock markets. Particularly, IPOs listed on MOTHERS were forced to graduate to the TSE main markets or retention within 10 years (referred to as the “10-year rule”), which was announced in March 2011 and applied to IPOs on MOTHERS in March 2014. A certain portion of IPOs listed on junior stock markets graduate to the main stock markets, such as the TSE (Honjo and Kurihara, 2023). Furthermore, an IPO is virtually established as the most successful sellout (exit) strategy because M&A is less common as a strategic sellout in Japan (Honjo, 2021). Thus, an IPO in Japanese junior stock markets must be a milestone in a firm’s growth process.

We collect a list of IPOs using *Kabushiki Kokai Hakusho* (White Paper on IPOs), edited by Pronexus, Inc.⁵ We also use Nikkei Needs Financial Quest (hereinafter, “Needs FQ”) compiled by Nikkei Media Marketing Inc. to obtain yearly data on financial statements. Moreover, we use the Nikkei Needs Corporate Governance Evaluation System (hereinafter, “Cges”) to collect data on the appointment date of CEOs.

3.2. *Founder-CEOs and the type of delisting*

We encounter some challenges in collecting data on founder-CEOs and the type of delisting. We identify CEOs as founder- and non-founder-CEOs using data on their appointment dates obtained from Cges. A CEO is considered a founder-CEO if the CEO’s appointment date is after the firm’s incorporation date, otherwise a CEO is considered a non-founder-CEO. However, there are two critical issues. First, we cannot identify some founder-CEOs because information before 2004 is not available. To identify CEOs of firms founded before 2004, we use prospectus issued at the IPO, in addition to securities registration statements and securities reports, obtained from the eol (database) compiled by Pronexus. Unless

⁵ For data collection, we use *Kabushiki Kokai Hakusho*, which excludes IPO firms incorporated through the reorganization of publicly listed firms. Therefore, the number of IPOs in this study does not match the number of IPOs reported by the stock exchanges.

information on CEOs is obtainable from these sources, we collect it using Nikkei Telecom compiled by Nikkei Media Marketing, Inc. Second, some CEOs have changed their titles—for example, from President to Chairperson after incorporation—irrespective of their control rights. As Cges determines the appointment date of CEOs, based on their last titles, we confirm whether CEOs regarded as non-founder-CEOs simply change their titles by using prospectus or securities registration statements.

We identify the type of delisting in our sample. To determine the type of delisting, we collect information on the type of delisting from announcements released by stock exchanges. For instance, JPX publishes a list of delisting transactions in MOTHERS and JASDAQ on its website. We also use *Kaisha Shikiho* (Japanese Company Handbook), published by Toyo Keizai, Inc., because JPX does not provide a list of firms that delisted themselves from MOTHERS and JASDAQ before 2012. These sources include some keywords on delisting transactions, such as acquisition and bankruptcy. We classify the types of delistings into four categories corresponding to the keywords.

Table A1 in the Appendix presents the keywords, in addition to the distribution of delisting across the categories. Delisting is classified into voluntary and involuntary. Voluntary delisting refers to the case in which a firm is owned by specific shareholders, including management teams. Voluntary delisting involves delisted firms through M&A and strategic buyouts, including MBOs. Involuntary delisting indicates a case in which a firm is forced to delist itself because of bankruptcy and default, including a case in which a firm does not attain listing requirements.

3.3. Sample

We collect data on firms listed on these six markets (i.e., MOTHERS, JASDAQ, Hercules, Ambitious, Centrex, and Q-Board) by the end of December 2021. We observe the events of delisting and graduation up to January 2022.⁶ However, some firms, including financial firms, are excluded as outliers.⁷

⁶ In April 2022, stock markets in the TSE, including MOTHERS and JASDAQ, were reorganized into three segments: Prime, Standard, and Growth. In addition, stock markets in the NSE, including Centrex, were reorganized into three segments: Premier, Main, and Next.

⁷ From the original sample of 1,463 IPOs, we exclude (i) 45 financial firms, (ii) eight firms regarded as foreign firms by the

Consequently, our sample consists of 1,393 non-financial firms listed on Japanese junior stock markets by the end of December 2021. The numbers of IPOs on regional markets (Ambitious, Centrex, and Q-Board) are much smaller than those on MOTHERS, JASDAQ, and Hercules; hence, these firms are combined into one category. Of the 1,393 firms, 778 firms (56%) went public on MOTHERS, 338 firms (24%) went public on JASDAQ (including NEO), 205 firms (15%) went public on Hercules (including the New Market of the OSE), and 82 firms (6%) went public on the other markets (Ambitious, Centrex, and Q-board).⁸ At the time of the IPO, the mean firm size, measured by the number of employees, is 219 with a median of 93. The mean firm age at the time of the IPO is 182 months (approximately 15 years) with a median of 136 months (approximately 11 years).

Of the 1,393 firms, 296 firms (21%) delisted from junior stock markets by January 2022, while 1,097 firms (79%) remained in the markets. This also indicates that the time to delisting is right-censored for 1,097 firms. Of the 296 firms, 59 firms delisted after graduating to the main stock markets. Table A1 in the Appendix also presents the number of firms by delisting category and shows that 214 (= 191 + 23) firms delisted voluntarily and 82 (= 36 + 46) firms delisted involuntarily from junior stock markets. Moreover, of the 1,393 firms, 492 firms (35%) graduated from junior stock markets by January 2022. In this study, graduating from a junior stock market is not considered delisting, because the behavior and performance of graduating firms differ from those of delisting firms. However, if firms that have graduated from junior stock markets delist from main stock markets (senior stock exchanges) within the observation period, they are considered delisting. Table A2 in the Appendix also shows the transition of delistings and graduations from junior stock markets by year.

Furthermore, some IPO firms seem to have a history of being created as spin-offs from existing firms. Unlike independent firms, these firms may be influenced by their parent firms in determining their CEOs,

Needs FQ, (iii) six firms listed simultaneously on the NSE, (iv) one firm listed on the FSE the day after listed on JASDAQ, (v) one firm with experience in listing and delisting from the TSE, (vi) three firms with excess debt (total debt exceeding total assets) prior to the IPO, (vii) four firms with no information available from *Kabushiki Kokai Hakusho*, (viii) one firm with no financial data prior to the IPO, and (ix) one firm with no identification of founder-CEOs. The 70 IPOs are regarded as outliers.

⁸ Five firms went public both on MOTHERS and Centrex, four firms went public both on MOTHERS and Q-Board, and one firm went public both on JASDAQ and Q-Board. A total of 10 firms went public on multiple markets.

even if their parent firms' shares are sold at the time of the IPO. For 161 firms in the sample, 50% or more of total shares prior to the IPO. We further examine the impact of founder-CEO presence on the time to delisting by excluding these firms from the sample, referred to as the subsample of firms with no subsidiary history.

3.4. Analytical approach

We can use binary choice models, such as probit and logit models, to examine the impact of founder-CEO presence on IPO survival. However, these models ignore the observation periods from IPO dates that differ across firms. In the literature, the time to delisting has been estimated, based on a survival analysis approach (Feng et al., 2020; Jain and Kini, 2000, 2008). In practice, previous studies have estimated the time to delisting from junior stock markets using a survival analysis approach (Audretsch and Lehmann, 2005; Espenlaub et al., 2012). Such an examination provides evidence not only on the types of IPO firms that delist or graduate from junior stock markets, but also of how long they remain in the markets.

We observe the time to delisting, measured by the number of months, up to January 2022. In other words, firms that did not delist from stock markets by January 2022 are considered surviving firms. Since the starting point of the time to delisting ($t = 0$) depends on the firm's IPO date, it differs across firms. Therefore, the length of the observation window varies across IPO firms according to the IPO date. The time to delisting for firms that remain public during the observation period is right-censored. We also observe the time to graduation, as well as delisting, up to January 2022.

First, we demonstrate IPO survival among IPOs listed on junior stock markets using a cumulative hazard function proposed by Nelson (1972) and Aalen (1978). We provide the cumulative hazard estimates of delisting, involuntary delisting, voluntary delisting, and graduation. We also reveal differences in the estimates between founder- and non-founder-CEOs.

Second, we estimate regression models to describe the factors affecting the time to delisting and graduation. A duration regression model has been used to take into account right-censoring of time to an event, and the PH model proposed by Cox (1972) has been widely used in the literature (Carpentier et al., 2010; Carpentier and Suret, 2011). We calculate the time from firm i 's IPO date. The hazard

function of delisting at time t ($t = 0$ at the time of the IPO), $h_i(t; x, z)$, is written as follows:

$$h_i(t; x, z, w, v) = h_0(t) \exp(x_{it} \alpha + z_{it}^T \beta + w_i^T \gamma + v_t \delta), \quad (1)$$

where $h_0(t)$ is the baseline hazard, x_{it} represents a management variable to measure founder-CEO presence, z_{it} (vector) represents CEO- and firm-specific variables, w_i (vector) represents time-invariant variables, including ownership structure prior to the IPO, and v_t represents market conditions. α , β (vector), γ (vector), and δ are the coefficients of variables to be estimated.

Importantly, a competing event arises in the estimation of involuntary delisting, voluntary delisting, and graduation. Specifically, delisting impedes the event of graduation because firms that have already delisted from junior stock markets have no chance to graduate. Moreover, voluntary delisting impedes the event of involuntary delisting, and vice versa. To take into account competing events, we employ the CR model following previous studies (He et al., 2010; Honjo and Kurihara, 2023).⁹

3.5. Variables

We identify the date of delisting or graduation from junior stock markets. We measure the number of months to delisting and graduation, based on IPO and delisting dates obtained from the *Kabushiki Kokai Hakusho* and Needs FQ.

We define the dummy of founder-CEO presence to capture whether the CEO is a founder at the time of the IPO. We use the time-invariant variable of founder-CEO presence following previous studies (Fischer and Pollock, 2004; Gounopoulos and Pham, 2018; He, 2008; Yan and Williams, 2021). Since it is possible that firms with a high probability of delisting replace founder-CEOs, the use of the time-invariant variable can rule out this reverse causality. However, it is also important to identify whether CEO turnover, which will occur after the IPO, affects delisting strategies. Firms that replace CEOs may promote going-private strategies through founder-CEO turnover. While we shed light on whether the CEO at the time of the IPO is a founder-CEO, we can examine the impact of CEO retention and turnover on IPO survival using a time-varying variable of CEO presence. In addition, by focusing on founder-

⁹ Some studies have also used an accelerated failure-time (AFT) model (Espenlaub et al., 2012; Espenlaub et al., 2016; Honjo and Kurihara, 2023). However, we do not use it, because we consider competing events.

CEO-led firms, we identify how founder-CEO retention and turnover affect the likelihood of delisting and graduation from junior stock markets after the IPO. We measure the variable of CEO presence at the time of the IPO, based on CEO data, which is a time variant, but this variable is only replaced when firm data are obtained annually from the Nikkei Needs FQ.

Regarding firm-specific variables, we use leverage, defined as the ratio of total debt to total assets. We also use a dummy for R&D intensity to capture firms devoted to R&D. This variable takes a value of one if the firm's R&D intensity, defined as the ratio of R&D expenditures to sales, is equal to or greater than 1%. Additionally, we control for firm size and age. Firm size is defined as the logarithm of the number of employees. Firm age is also defined as the logarithm of the number of months from founding (incorporation) to IPO. Indeed, previous studies have shown that younger firms are more likely to delist themselves from junior stock markets (Carpentier and Suret, 2011; Espenlaub et al., 2012).

Existing literature has shown that macroeconomic and market conditions influence IPO survival (Espenlaub et al., 2012; Hsu, 2013; Michala, 2019). When market prices are lower, IPO firms rely on bank loans rather than equity financing in stock markets. Therefore, IPO firms have less incentive to remain public and seek voluntary delisting via M&A and buyouts if they have an opportunity for strategic delisting. In contrast, favorable market conditions encourage IPO firms to remain public, and they may encourage graduation to main stock markets. To capture market conditions, we use the Tokyo Stock Price Index (TOPIX), one of the most typical market indices in Japan.

We also use dummies for MOTHERS, JASDAQ, and Hercules to control for differences in regulations between the junior stock markets, partly because, as already mentioned, the 10-year rule was applied to IPOs only on MOTHERS. We also include five industry dummies: (i) manufacturing, (ii) information and communications technology (ICT), (iii) infrastructure and energy, (iv) wholesale and retail, and (v) real estate (the others are a reference category).

Furthermore, a CEO's human capital may determine post-IPO performance regardless of founder-CEO presence, and IPO survival may vary across CEOs. Although we cannot collect data on founder-CEOs who have been replaced by their successors, we can collect data on current CEOs, some of whom are not founders. In this study, we measure current CEO-specific variables using CEO age and education dummies to capture a CEO's human capital. CEO educational background is classified into three

categories: undergraduate (bachelor's degree), postgraduate (master's and doctoral degrees), and other.¹⁰

Table 2 presents the definitions of the variables used in this study. Table 3 provides the descriptive statistics of the variables used at the IPO, including the correlation matrix. The mean of founder-CEO presence (Founder-CEO) is approximately 57% in our sample; that is, founder-CEO-led firms account for more than half of IPO firms. Regarding ownership structure prior to the IPO, firms with half or more of a board member's ownership account for approximately 46% of IPO firms.

[Insert Tables 2 and 3 here]

4. Results

4.1. Cumulative hazard estimates

Figure 1 depicts the cumulative hazard estimates of delisting and graduate for founder-CEO-led and non-founder-CEO-led firms. The cumulative hazard estimates indicate the fraction of delisting and graduation from junior stock markets. Figure 1 (A) displays the cumulative hazard estimate of delisting, irrespective of involuntary or voluntary delisting. As shown in Figure 1 (A), founder-CEO-led firms are less likely to delist from junior stock markets than non-founder-CEO-led firms. Figure 1 (B) and (C) display the cumulative hazard estimates of involuntary and voluntary delisting, respectively. We find no difference in the cumulative hazard estimates of involuntary delisting between founder-CEO-led and non-founder-CEO-led firms. In contrast, the figure reveals that founder-CEO-led firms are less likely to delist via M&A and buyouts than non-founder-CEO-led firms. Moreover, Figure 1 (D) displays the cumulative hazard estimate of graduation. We find that founder-CEO-led firms are more likely to

¹⁰ Existing literature has addressed the relationship between ownership structure and post-IPO performance (Audretsch and Lehmann, 2005; Bruton et al., 2010; Kroll et al., 2007). Therefore, ownership structure prior to the IPO may influence IPO survival. Some studies have examined the relationship between ownership structure and IPO survival (Jain and Kini, 2000; Fischer and Pollock, 2004). However, the variable of board members' ownership prior to the IPO tends to be positively correlated with the dummy for founder-CEO presence. Since this study does not necessarily target board members' ownership, we do not include the variable of ownership prior to the IPO. In practice, we find similar results to those including a dummy for a board member's ownership to measure whether the largest share held by a board member, including their family, is equal to or greater than 50% of the total shares prior to the IPO.

graduate to main stock markets than non-founder-CEO-led firms.

[Insert Figure 1 here]

4.2. *Time to involuntary and voluntary delisting*

Tables 4 and 5 present the estimation results (hazard and sub-hazard ratios) for involuntary and voluntary delisting, respectively.¹¹ It is important to note that while the hazard and sub-hazard ratios of less than one mean that the estimated coefficient has a negative effect on the likelihood of delisting, those of more than one mean that the estimated coefficient has a positive effect. Columns (i) and (ii) include the following variables: founder-CEO (invariant), leverage, R&D intensity, firm size, firm age, and TOPIX along with the market and industry dummies.¹² The current CEO-specific dummies (CEO age, Bachelor CEO, and Master/PhD CEO) are included in columns (iii) and (iv) to control for current CEO-specific characteristics. In addition, columns (v) and (vi) show them using the subsample of 1,232 firms with no subsidiary history prior to the IPO. The PH model is employed in columns (i), (iii), and (v) of Tables 4 and 5, and the CR model is employed in columns (ii), (iv), and (vi). While voluntary delisting is regarded as a competing event in Table 4, involuntary delisting is regarded as it in Table 5.

[Insert Tables 4 and 5 here]

The hazard and sub-hazard ratios of founder-CEO (invariant) for involuntary delisting are approximately 0.6–0.8 and below one but insignificant in Table 4. As also shown in columns (iii) and (iv), we obtain similar results regardless of whether current CEO-specific characteristics are controlled. The results for involuntary delisting are consistent with the cumulative hazard estimates shown in Figure 1 (B). We find no significant evidence that founder-CEO-led firms are less likely to delist from junior stock market than non-founder-CEO-led firms, although previous studies found a negative relationship

¹¹ The estimation results for delisting and graduation, irrespective of involuntary and voluntary delisting, are shown in the Appendix.

¹² As shown in Table 4, there may be a negative correlation between founder-CEO presence and firm age because founder-CEOs are more likely to be replaced in older firms. Therefore, we estimate the regression equations by excluding firm age. As a result, we obtain similar results for founder-CEO presence, regardless of firm age.

between founder-CEO presence and IPO survival (He, 2008; Le et al., 2017; Pour, 2015; Yan and Williams, 2021). In contrast, the hazard and sub-hazard ratios for voluntary delisting are below one and significant in columns (i)–(iv) of Table 5. The results reveal that founder-CEO-led firms are less likely to voluntarily delist from junior stock markets than non-founder-CEO-led firms. The results for voluntary delisting are consistent with the cumulative hazard estimates shown in Figure 1 (C), although they are not consistent with He (2008) who did not find a significant relationship between founder-CEO presence and M&A. Our findings support the notion of entrepreneurial resistance to voluntary delisting, which is consistent with the arguments of Gao and Jain (2012), suggesting that founder-CEOs are unwilling to make strategic delisting decisions. CEO-led firms. However, the results are insignificant in column (vi) when the subsample of firms with no subsidiary history prior to the IPO. This suggests that the impact of founder-CEO presence is weak in the subsample of firms with no subsidiary history prior to the IPO and firms with subsidiary history are more likely to seek voluntary delisting through M&A.

While the sub-hazard ratios of CEO age are below one and significant for involuntary delisting in Table 4, it is above one for voluntary delisting in Table 5. The results indicate that younger CEO-led firms are more likely to delist involuntarily but they are less likely to voluntarily delist from junior stock markets. Regarding a CEO's educational background, the sub-hazard ratios of bachelor CEO for voluntary delisting are above one and significant, indicating that firms led by CEOs with a bachelor's degree are more likely to voluntarily delist from junior stock markets. However, we do not find significant results for the impact of master/PhD CEO. Overall, the impact of founder-CEO presence on involuntary and voluntary delisting is stable regardless of controlling for current CEO-specific characteristics.

The hazard and sub-hazard ratios of leverage for involuntary delisting are above one in Table 4, indicating that firms that rely on debt financing have a high probability of involuntary delisting due to failure. However, the results are partially insignificant. In addition, the results for voluntary delisting are insignificant, and we find no evidence on the relationship between leverage and voluntary delisting. Additionally, while the sub-hazard ratios of R&D intensity for involuntary delisting are above one in Table 4, those for involuntary delisting are below one. However, these results are insignificant, indicating that the survival of IPO firms does not differ between R&D-intensive firms and others.

The hazard and sub-hazard ratios of firm size and age in Table 4 are below one, although those of firm size are significant at the 10% level. We find that younger and smaller firms are more likely to involuntarily delist from junior stock markets. Even if these firms go public on junior stock markets within a short period of time after incorporation, they may face difficulties in staying in the markets. The results suggest that younger and smaller firms tend to delist from junior stock markets due to poor performance without improving their post-IPO performance. Moreover, although the hazard and sub-hazard ratios of firm age in Table 5 are below one, those of firm size are above one. We find that while younger firms are more likely to voluntarily delist from junior stock markets, smaller firms are less likely to do so. Firms that have not expanded capital in junior stock markets may not be attractive targets for M&A and buyouts.

Regarding market conditions, the hazard and sub-hazard ratios of TOPIX are below one and significant at the 1% level in Table 4. In addition, those of TOPIX are below one in Table 5. We find that market conditions have a significant effect on delisting from junior stock markets irrespective of involuntary or voluntary delisting.¹³ The results indicate that the likelihood of delisting is low under favorable market conditions, conversely suggesting that a lower stock market value promotes delisting from junior stock markets and that IPO firms are more likely to undertake buyout strategies when the stock markets are stagnant.

Furthermore, the hazard and sub-hazard ratios of MOTHERS and JASDAQ for involuntary delisting are below one, and the estimated coefficients are significant at the 1% level. We find that IPOs listed on MOTHERS and JASDAQ have a high probability of IPO survival. However, their hazard and sub-hazard ratios for voluntary delisting are insignificant in Table 5.

¹³ From the perspective of entrepreneurial resilience, founder-CEOs may strive to sustain their businesses under unfavorable conditions (Bullough and Renko, 2013; Honjo and Kato 2022; Santoro et al., 2020, Santoro et al., 2021). Such emotional and psychological attachment may be vital for IPO survival during the times of adversity. Thus, we examine whether entrepreneurial resilience to adversity affects IPO survival, using the interaction term of founder-CEO presence and TOPIX. However, we do not obtain any significant results for the variable. This finding does not support the notion of entrepreneurial resilience to unfavorable market conditions, suggesting that IPO firms, regardless of founder-CEO presence, delist under unfavorable market conditions.

4.3. Time to graduation

Table 6 presents the estimation results (hazard and sub-hazard ratios) for graduation, using the PH and CR models. Each column in Table 6 reports the estimation results corresponding to the combination of variables used for involuntary and voluntary delisting in Tables 4 and 5.

[Insert Table 6 here]

In Table 6, the hazard and sub-hazard ratios of founder-CEO (invariant) for graduation are approximately 1.2–1.4 and above one, which is contrary to those for involuntary and voluntary delisting. The results indicate that founder-CEO presence increases the likelihood of graduation from junior stock markets. This is consistent with the cumulative hazard estimates shown in Figure 1 (D). We find that founder-CEO-led firms are more likely to graduate to main stock markets than non-founder-CEO-led firms.¹⁴

The sub-hazard ratios of CEO-specific characteristics, specifically age and educational background, for graduation are insignificant. We find little evidence that the time to graduation from junior stock markets varies according to CEO age and educational background. Overall, the impact of founder-CEO presence on graduation is stable regardless of controlling for current CEO-specific characteristics.

The hazard and sub-hazard ratios of leverage are below one and significant at the 1% level. We find that leverage is negatively associated with graduation, indicating that firms that rely on debt financing are less likely to graduate from junior stock markets. The hazard and sub-hazard ratios of R&D intensity are also below one and significant at the 1% level. We also find that R&D intensity is negatively associated with graduation, which is inconsistent with Carpentier and Suret (2011) who found evidence on whether firms developing high-tech products graduate from junior stock markets.

The hazard and sub-hazard ratios of firm size are above one and significant at the 1% level. In addition, those of firm age are above one and significant at the 1% level. We find that the time to

¹⁴ We also estimate the synergistic effect of ownership and management by including the interaction term of founder-CEO and board ownership to identify the synergistic effect of ownership and management control prior to the IPO. However, we do not obtain any significant results for the synergistic effect.

graduation from junior stock markets varies according to firm size and age. The results reveal that younger and smaller firms are less likely to graduate from junior stock markets. Even if younger and smaller firms secure access to public equity markets through the IPO, they may face difficulties in graduating to main stock markets by improving their post-IPO performance.

The sub-hazard ratios of TOPIX are above one and significant at the 5% level in columns (ii), (iii), and (iv). We find that IPO firms are more likely to graduate from junior stock markets under favorable market conditions, indicating that the likelihood of graduation is affected by market conditions.

Finally, the sub-hazard ratios of MOTHERS are approximately 2.7–3.0 and significant at the 1% level. The results indicate that IPO firms listed on MOTHERS are more likely to graduate than those listed on other markets. This is partly because the 10-year rule for IPOs listed on MOTHERS leads to an incentive to graduate to main stock markets (Honjo and Kurihara, 2023).

4.4. Additional estimation: CEO retention and turnover

Tables 7, 8, and 9 present the estimation results for involuntary delisting, voluntary delisting, and graduation, respectively, when the time-variant variable of CEO retention (1: retention; 0: turnover) is used. Columns (i) and (ii) in Tables 7, 8, and 9 correspond to columns (iii) and (iv) in Tables 4, 5, and 6. We also identify the differences between founder- and non-founder-CEO-led firms. To do so, columns (iii) and (iv) in Tables 7, 8, and 9 show the estimation results using the subsample of firms led by founder-CEO at the time of the IPO. In contrast, columns (v) and (vi) in these tables show the estimation results using the subsample of firms led by non-founder-CEOs.

[Insert Tables 7, 8, and 9 here]

The hazard and sub-hazard ratios of CEO retention for involuntary delisting are less than 0.5 and significant at the 1% level in columns (i) and (ii) of Table 7, while they are insignificant in Table 4. We find that the time to involuntary liquidation is negatively associated with CEO retention, even when the variable of CEO retention is allowed to vary after the IPO. The results indicate that the likelihood of involuntary delisting increases with CEO turnover. Additionally, in the subsample of firms led by founder-CEO at the time of the IPO, the hazard and sub-hazard ratios of CEO retention for involuntary delisting, shown in columns (iii) and (iv) of Table 7, are below one and significant at the 1% level.

Moreover, in the subsample of firms led by non-founder-CEO at the time of the IPO, those of CEO retention for voluntary delisting, shown in columns (v) and (vi) of Table 7, are also below one and significant at the 5% level. These results indicate that the likelihood of involuntary delisting from junior stock markets increases with CEO turnover after the IPO, regardless of whether the CEO is a founder or not.

Additionally, the hazard and sub-hazard ratios of CEO retention for voluntary delisting are less than 0.4 and significant at the 1% level in columns (i) and (ii) of Table 8. We find that the time to voluntary delisting is negatively associated with CEO retention. Additionally, in the subsample of founder-CEO-led firms, the hazard and sub-hazard of CEO retention for voluntary delisting, shown in columns (iii) and (iv) of Table 8, are below one and significant at the 1% level. This relationship is also found in the subsample of non-founder-CEO-led firms, as shown in columns (v) and (vi). The results reveal that the likelihood of voluntary delisting, as well as involuntary delisting, from junior stock markets increases with CEO turnover after the IPO, regardless of whether the CEO is founder or not.

Furthermore, the hazard and sub-hazard ratios of CEO retention for graduation are more than 1.4 and significant at the 1% level in columns (i) and (ii) of Table 9. Contrary to involuntary and voluntary delisting, we find that the time to graduation is positively associated with CEO retention. This relationship is supported, regardless of whether the CEO is founder or not. The results reveal that the likelihood of graduation from junior stock markets decreases with CEO turnover. This is consistent with the findings for founder-CEO presence shown in Table 6, suggesting that firms with CEO retention, including founder-CEOs prior to the IPO, are more likely to graduate from junior stock markets, while they are less likely to delist voluntarily. Our findings suggest that founder-CEO resistance to strategic delisting and ambition for upper stages increase over time with founder-CEO presence.

4.5. Discussion

Previous studies have found a positive relationship between founder-CEO presence and IPO survival (He, 2008; Le et al., 2017; Pour, 2015; Yan and Williams, 2021). From the perspective of stewardship and agency theory, founder-CEOs are more advantageous than non-founder-CEOs for firm performance (Gao and Jain, 2012; Schuster et al., 2020; Wasserman, 2006). However, we find no rigorous evidence

that founder-CEO-led firms have a lower probability of delisting due to business failure, which is not consistent to these studies. In this respect, it is unclear whether founder-CEOs are resilient enough to cope with challenges to IPO survival in junior stock markets.

Our findings support the notion of founder-CEO resistance to strategic delisting through M&A and buyouts. Since founder-CEOs strive to sustain their businesses from founding to IPO, they may have a strong psychological attachment and express commitment to their firms. Therefore, founder-CEOs may have a propensity for entrepreneurial resistance to voluntary delisting through M&A. At the same time, this implies that founder-CEOs may have fewer M&A and buyout opportunities than non-founder-CEOs. Conversely, non-founder-CEO-led firms are more likely to voluntarily delist from junior stock markets, suggesting that non-founder-CEOs, especially professional CEOs, have more M&A and buyout opportunities due to their profile networks. In this respect, the turnover of founder-CEOs may benefit firm growth through M&A and buyouts. These findings improve our understanding of how founder-CEO retention and turnover affect IPO survival and firm performance.

More importantly, we provide novel evidence that founder-CEO-led firms are more likely to graduate to main stock markets. Whereas, as already mentioned, numerous scholars have examined the relationship between founder-CEO presence and IPO survival, it remains unclear whether founder-CEO-led firms outperform non-founder-CEO-led ones; specifically, they attain rapid growth. Our findings suggest that founder-CEOs achieve better post-IPO performance than non-founder-CEOs, implying that founder-CEOs who choose to be king by holding management control at the time of the IPO have ambitions to advance the firms beyond the initial IPO.

Moreover, using the time-variant variable of CEO retention, we find that the time to delisting is negatively associated with CEO retention after the IPO, while the time to graduation is positively associated with it. The results indicate that CEO retention after the IPO, in addition to founder-CEO presence prior to the IPO, affect the likelihood of voluntary delisting and graduation. This suggests that IPO survival depends not only on founder-CEO presence but also the occurrence of CEO turnover.

Furthermore, our findings provide new insights into the support of young and innovative firms from the policy implication perspective. Less stringent listing requirements, especially for stable profitability, in junior stock markets allow young and innovative firms to access public equity markets. Although

junior stock markets are expected to provide equity capital to young and innovative firms, our results indicate that R&D-intensive firms are less likely to graduate from junior stock markets. This may suggest that junior stock markets in Japan does not fully fulfill the function of supplying equity financing to R&D-intensive firms. In addition, our results indicate that R&D-intensive firms that secure external equity financing in junior stock markets do not achieve a successful exit, including graduation to main stock markets, suggesting that R&D-intensive firms have a propensity for resistance to voluntary delisting through M&A and they tend to remain in junior stock markets without a successful exit. In this respect, it is difficult to improve their performance solely through access to public equity markets due to the high uncertainty of business outcomes. Their early-stage shareholders, including private equity funds, may also seek to go public on junior stock markets to sell out their shares in countries with underdeveloped private equity markets (Honjo and Kurihara, 2023). Despite the possibility of successful outcomes, young and innovative firms may rash into IPOs to gain access to public equity markets (Honjo, 2021). In this respect, the development of private equity markets may be needed to screen firms with growth potential, which could also strengthen the legitimacy of junior stock markets.

5. Conclusions

This study investigated whether founder-CEO presence is associated with IPO survival. Using 1,393 IPOs listed on Japanese junior stock markets, we examined the impact of founder-CEO presence on the time to involuntary delisting, voluntary delisting, and graduation from junior stock markets. We found that founder-CEO-led firms are less likely to voluntarily delist through M&A and buyouts, while they are more likely to graduate to main stock markets than non-founder-CEO-led firms. The results support the notion of entrepreneurial resistance to strategic delisting. Our findings also suggest that founder-CEOs at the time of the IPO have ambitions to advance the firms beyond the initial IPO, despite their resistance to strategic delisting through M&A. However, we did not find rigorous evidence regarding the impact of founder-CEO presence on the time to involuntary delisting due to business failure. In addition, we found that while younger firms are more likely to delist, regardless of whether the manner is involuntary or voluntary, they are more likely to graduate from junior stock markets. Furthermore, our analyses revealed that firms with CEO retention after the IPO are less likely to delist involuntarily

and voluntarily, while they are more likely to graduate from junior stock markets.

However, there are some limitations to the measurement of ownership and management. First, we do not pay attention to potential selection bias and endogeneity arising from the turnover of founder-CEOs before IPO because of limited data during the period of privately held equity. Whereas this study focuses only on how founder-CEO presence at the time of the IPO affects firm survival after IPO to avoid reverse causality, we should pay attention to firm behavior from founding to IPO. Further investigation using data during the period of privately held equity would confirm the validity of our findings. Second, we ignore top management teams other than CEOs. In particular, the role of chief financial officers in financing strategies is not trivial. Professional management ability is inevitable for post-IPO performance, and firms delist through M&A and buyouts may depend on their relationships with acquiring firms and private equity capital (i.e., buyout funds). However, we do not examine how founder-CEOs' and other board members' career experience affects IPO survival. Third, we do not observe firm performance after delisting. Follow-up investigation on post-delisting helps nurture firms with growth potential in junior stock markets.

Appendix

Table A1 presents the types of delistings, the associated keywords, and the number of firms in the four categories. Panel A of Table A2 presents the transition of delistings from junior stock markets, and Panel B presents that of graduations. Table A3 presents the estimation results (hazard ratios) for both involuntary and voluntary delisting, in addition to graduation, using the PH model.

Founder-CEO-led firms may outperform others in terms of profitability after the IPO (Adams et al., 2009; Gao and Jain, 2011). It is plausible that founder-CEO presence affects not only successful exits, such as strategic delisting through M&A and graduation to main stock markets, but also post-IPO performance, such as profitability. Therefore, we examine whether founder-CEO presence plays a role in improving firm performance using return on assets (ROA), defined as the ratio of operating income to total assets, instead of delisting and graduation. Table A4 presents the estimation results for ROA

using a random-effects generalized least squares (GLS) regression model.¹⁵ Columns (i) and (iii) of Table A4 use the variables in columns (i) and (ii) of Tables 4, 5, and 6, and columns (ii) and (iv) use the variables in columns (iv) of these tables. While columns (i) and (ii) present the estimation results with the time-variant variable of founder-CEO presence, columns (iii) and (iv) present the results with its time-invariant variable. As shown in Table A4, we find that founder-CEO presence positively affects ROA. However, we find no evidence that founder-CEO presence affects ROA when measuring it at the time of the IPO. These results suggest that founder-CEOs who still maintain their positions after the IPO have higher ability to achieve better performance.

Furthermore, Table A5 presents the estimation results for involuntary delisting, voluntary delisting, and graduation when founder-CEO (invariant) is endogenously determined. It is possible that founder-CEO presence is endogenously determined, even if we measure founder-CEO presence at the time of the IPO. For this purpose, we employ an extended probit regression model—specifically a probit regression model with a binary endogenous covariate—allowing for the endogeneity of founder-CEO presence at the time of the IPO.¹⁶ As the correlation matrix in Table 3 indicates, founder-CEO presence may depend on firm size, firm age, and the type of junior stock markets. In addition, ownership structure may affect founder-CEO presence. Hence, firm size, firm age, MOTHERS, JASDAQ, Hercules, board ownership, and parent ownership are used to estimate founder-CEO (invariant) in the first stage. Consequently, we find that founder-CEO presence has a negative effect on voluntary delisting and a positive effect on graduation, which is consistent with the results shown in Table 6. To regress founder-CEO presence at the time of the IPO on several variables, including firm size and age, and then estimate the relationship between founder-CEO presence and delisting or graduation. Consequently, we find that

¹⁵ Of the 1,393 firms, 48 firms were excluded because their fiscal year ends were not observed once before January 2022. In addition, we used random effects rather than fixed effects because several firms were observed only once.

¹⁶ We could have proposed a CR model with a binary endogenous covariate. However, this model is too complex to properly specify the estimation method. Therefore, we identify the effects of founder-CEO presence, based on cross-section data at the time of the IPO. Further improvement of the method is warranted.

founder-CEO presence has a negative effect on voluntary delisting and a positive effect on graduation, which is consistent with the results shown in Table 6. Moreover, we regress founder-CEO presence at the time of the IPO on the following variables: ROA, Firm size, Firm age, Board ownership, Parent ownership, and the market dummies.

[Insert Tables A1, A2, A3, A4, and A5 here]

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Table 1 Literature on the relationship between founder-CEO presence and IPO survival.

Study	Economy	Sample	Model	Dependent variable	Relationship with IPO survival
Fischer and Pollock (2004)	US	218 IPOs	Discrete logit	Time to failure	Founder-CEO [NS], CEO ownership [NS], Founder-CEO and CEO ownership [+]
Gounopoulos and Pham (2018)	US	722 IPOs	PH	Time to failure	Specialist CEO [+], Founder-CEO [NS]
He (2008)	US	1143 IPOs	PH	Time to delisting (plus M&A and bankruptcy)	Founder-CEO [+], CEO ownership [+]
Le et al. (2017)	US	272 IPOs	Probit	Survival	Founder-CEO [+]
Pour (2015)	China	140 IPOs (matching)	Logit, PH	Time to failure	Founder-CEO [+], CEO ownership [+]
Williams (2013)	US	153 IPOs	Logit	3-year delisting (financial distress and takeover)	Founder-CEO [NS/+]
Yan and Williams (2021)	US	425 IPOs	AFT	Time to exit	Founder control at the IPO [+]

Note. PH represent a proportional hazards model. AFT represent an accelerated failure-time model. [+] and [-] indicate positive and negative effects of the variable on IPO survival, respectively, roughly at the 5% significance level. [NS] indicates that the variable does not affect IPO survival.

Table 2 Definitions of variables.

Variable	Time unit	Definition
Delisting	Monthly	Time to delisting if the firm delists from the junior stock market by January 2022.
Involuntary delisting	Monthly	Time to delisting if the firm involuntarily delists (e.g., bankruptcy and violation of listing requirements) from the junior stock market by January 2022.
Voluntary delisting	Monthly	Time to delisting if the firm voluntarily delists (e.g., M&A and MBO) from the junior stock market by January 2022.
Graduation	Monthly	Time to graduation if the firm graduates from the junior stock market by January 2022.
Founder-CEO (invariant)	(Invariant)	(= 1) if a founder-CEO is not replaced by a successor at the time of the IPO, and (= 0) otherwise.
CEO at the IPO	Yearly	(= 1) if the CEO at the time of the IPO is not replaced by a successor during the post-IPO period, and (= 0) otherwise.
Leverage	Yearly	Ratio of total debt to total assets.
R&D intensity	Yearly	(= 1) if the ratio of R&D expenditures to sales is equal to or greater than 1%, and (= 0) otherwise.
Firm size	Yearly	Logarithm of the number of employees plus one.
Firm age	Monthly	Logarithm of the number of months from founding (incorporation) to the time.
CEO age	Yearly	Logarithms of a CEO's age in the data year
Bachelor CEO	Yearly	(=1) if a CEO's educational background is at the undergraduate level (bachelor), and (=0) otherwise.
Master/PhD CEO	Yearly	(=1) if a CEO's educational background is at the graduate (master or doctor) level, and (=0) otherwise.
TOPIX	Monthly	TOPIX normalized by its value in December 1999.
MOTHERS	(Invariant)	(= 1) if the firm went public on MOTHERS, and (= 0) otherwise (reference category: Ambitious/Centrex/Q-Board).
JASDAQ	(Invariant)	(= 1) if the firm went public on JASDAQ, and (= 0) otherwise (reference category: Ambitious/Centrex/Q-Board).
HERCULES	(Invariant)	(= 1) if the firm went public on the Hercules, and (= 0) otherwise (reference category: Ambitious/Centrex/Q-Board).
Industry dummies	(Invariant)	Five dummies for (i) manufacturing, (ii) ICT, (iii) infrastructure and energy, (iv) wholesale and retail, and (v) real estate industries (reference category: others).
ROA	Yearly	Ratio of operating income to total assets

Note. Invariant represents a time-invariant variable. The observation period for delisting, involuntary delisting, voluntary delisting, and graduation ranges from the firm's IPO month to January 2022.

Table 3 Summary statistics and correlation coefficients of variables at the IPO

	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Founder-CEO	0.574	0.495	1.000											
(2) CEO age	3.866	0.210	-0.101	1.000										
(3) Bachelor CEO	0.634	0.482	-0.062	-0.058	1.000									
(4) Master/PhD CEO	0.101	0.301	0.003	-0.021	-0.440	1.000								
(5) Leverage	0.524	0.229	-0.015	0.134	-0.004	-0.158	1.000							
(6) R&D intensity	0.230	0.421	-0.038	0.088	-0.055	0.163	-0.279	1.000						
(7) Firm size	4.630	1.129	-0.140	0.281	-0.061	-0.104	0.356	-0.133	1.000					
(8) Firm age	4.912	0.779	-0.273	0.466	-0.055	-0.078	0.206	0.018	0.350	1.000				
(9) TOPIX	0.837	0.185	-0.001	-0.007	-0.010	0.016	0.027	-0.043	0.066	0.089	1.000			
(10) MOTHERS	0.559	0.497	0.163	-0.288	0.012	0.134	-0.154	0.030	-0.196	-0.297	0.139	1.000		
(11) JASDAQ	0.243	0.429	-0.213	0.378	-0.025	-0.089	0.160	0.000	0.352	0.440	-0.046	-0.637	1.000	
(12) Hercules	0.147	0.354	-0.002	-0.013	0.059	-0.065	-0.020	0.004	-0.067	-0.090	-0.155	-0.467	-0.235	1.000

Note. The number of observations is 1,393. The definitions of variables are listed in Table 2. SD indicates standard deviation. These statistics are measured at the IPO ($t = 0$).

Table 4 Estimation results (hazard and sub-hazard ratios) for the time to involuntary delisting

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Full	Full	Non-sub	Non-sub
Founder-CEO (invariant)	0.767 (0.192)	0.831 (0.209)	0.743 (0.183)	0.794 (0.197)	0.637 (0.177)	0.675 (0.184)
CEO age			0.201** (0.145)	0.185*** (0.133)	0.139*** (0.102)	0.133*** (0.097)
Bachelor CEO			1.271 (0.356)	1.146 (0.322)	1.537 (0.471)	1.373 (0.421)
Master/PhD CEO			0.408 (0.270)	0.321* (0.216)	0.555 (0.366)	0.495 (0.323)
Leverage	1.352 (0.279)	1.382 (0.312)	1.355 (0.287)	1.380 (0.306)	1.827*** (0.154)	1.857*** (0.152)
R&D intensity	1.179 (0.376)	1.324 (0.429)	1.336 (0.417)	1.443 (0.457)	0.778 (0.284)	0.779 (0.292)
Firm size	0.788* (0.103)	0.768* (0.109)	0.791* (0.100)	0.766* (0.104)	0.792* (0.110)	0.764* (0.114)
Firm age	0.302*** (0.081)	0.495*** (0.101)	0.374*** (0.102)	0.576** (0.123)	0.394*** (0.109)	0.571** (0.126)
TOPIX	0.062*** (0.043)	0.102*** (0.064)	0.069*** (0.048)	0.111*** (0.070)	0.076*** (0.056)	0.120*** (0.081)
MOTHERS	0.362*** (0.121)	0.409*** (0.136)	0.350*** (0.111)	0.399*** (0.126)	0.403*** (0.134)	0.421*** (0.138)
JASDAQ	0.256*** (0.128)	0.212*** (0.106)	0.243*** (0.121)	0.205*** (0.103)	0.307** (0.151)	0.252*** (0.123)
Hercules	0.759 (0.296)	0.823 (0.316)	0.748 (0.283)	0.814 (0.302)	1.020 (0.369)	1.035 (0.369)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	146874	146874	146874	146874	129742	129742
# subjects	1393	1393	1393	1393	1232	1232
# events	82	82	82	82	75	75
# competing events		214		214		155
Log pseudo-likelihood	-480	-496	-474	-490	-408	-421
Wald χ^2	108***	95.2***	120***	106***	233***	232***

Note. Columns (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR represent proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, and "Non-sub" represents the subsample consisting of firms that were not subsidiaries prior to the IPO. A subsidiary is defined as a firm in which a non-financial firm owns 50% or more of total shares prior to the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (involuntary delisting) is measured monthly.

Table 5 Estimation results (hazard and sub-hazard ratios) for the time to voluntary delisting

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Full	Full	Non-sub	Non-sub
Founder-CEO (invariant)	0.605** (0.087)	0.640*** (0.091)	0.640*** (0.092)	0.678*** (0.096)	0.749* (0.138)	0.800 (0.138)
CEO age			2.672** (1.147)	2.940** (1.245)	1.915 (0.963)	2.248 (1.131)
Bachelor CEO			1.980*** (0.395)	1.967*** (0.394)	1.863*** (0.414)	1.835*** (0.408)
Master/PhD CEO			1.534 (0.497)	1.590 (0.518)	1.316 (0.489)	1.337 (0.502)
Leverage	1.078 (0.061)	0.838 (0.148)	1.085 (0.057)	0.863 (0.162)	1.249* (0.163)	0.863 (0.164)
R&D intensity	0.851 (0.171)	0.827 (0.167)	0.822 (0.173)	0.795 (0.167)	0.937 (0.219)	0.928 (0.219)
Firm size	1.155*** (0.063)	1.184*** (0.063)	1.175*** (0.065)	1.207*** (0.065)	1.176** (0.079)	1.203*** (0.080)
Firm age	0.544*** (0.096)	0.673** (0.109)	0.488*** (0.089)	0.594*** (0.101)	0.488*** (0.115)	0.595** (0.135)
TOPIX	0.249*** (0.091)	0.363*** (0.123)	0.250*** (0.092)	0.361*** (0.123)	0.229*** (0.099)	0.333*** (0.134)
MOTHERS	0.836 (0.264)	0.938 (0.306)	0.722 (0.233)	0.783 (0.260)	0.922 (0.333)	0.978 (0.358)
JASDAQ	1.122 (0.365)	1.181 (0.396)	0.962 (0.321)	0.972 (0.334)	1.035 (0.399)	1.013 (0.394)
Hercules	1.101 (0.348)	1.227 (0.396)	0.954 (0.308)	1.025 (0.337)	1.014 (0.376)	1.065 (0.395)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	146874	146874	146874	146874	129742	129742
# subjects	1393	1393	1393	1393	1232	1232
# events	214	214	214	214	155	155
# competing events		82		82		75
Log pseudo-likelihood	-1364	-1383	-1355	-1373	-963	-977
Wald χ^2	57.2***	46.4***	73.8***	62.6***	49.2***	39.2***

Note. Columns (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR represent proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, and "Non-sub" represents the subsample consisting of firms that were not subsidiaries prior to the IPO. A subsidiary is defined as a firm in which a non-financial firm owns 50% or more of total shares prior to the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (voluntary delisting) is measured monthly.

Table 6 Estimation results (hazard and sub-hazard ratios) for the time to graduation

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Full	Full	Non-sub	Non-sub
Founder-CEO (invariant)	1.326*** (0.132)	1.392*** (0.140)	1.297** (0.130)	1.358*** (0.138)	1.241** (0.134)	1.266** (0.138)
CEO age			1.301 (0.353)	1.256 (0.349)	1.531 (0.442)	1.524 (0.448)
Bachelor CEO			0.930 (0.097)	0.895 (0.095)	1.015 (0.111)	0.984 (0.110)
Master/PhD CEO			0.772 (0.141)	0.781 (0.144)	0.876 (0.162)	0.884 (0.165)
Leverage	0.373*** (0.080)	0.333*** (0.068)	0.368*** (0.080)	0.331*** (0.068)	0.335*** (0.077)	0.304*** (0.066)
R&D intensity	0.505*** (0.070)	0.519*** (0.072)	0.502*** (0.070)	0.516*** (0.071)	0.494*** (0.072)	0.505*** (0.073)
Firm size	1.497*** (0.064)	1.485*** (0.065)	1.487*** (0.064)	1.473*** (0.065)	1.525*** (0.071)	1.512*** (0.071)
Firm age	1.399*** (0.140)	1.628*** (0.159)	1.337*** (0.144)	1.562*** (0.165)	1.281** (0.147)	1.468*** (0.165)
TOPIX	1.179 (0.258)	1.683** (0.363)	1.198 (0.262)	1.690** (0.364)	0.984 (0.227)	1.334** (0.303)
MOTHERS	2.909*** (0.793)	2.951*** (0.811)	2.953*** (0.801)	3.031*** (0.830)	2.715*** (0.749)	2.763*** (0.770)
JASDAQ	1.179 (0.348)	1.130 (0.336)	1.172 (0.345)	1.137 (0.338)	1.094 (0.332)	1.073 (0.329)
Hercules	0.973 (0.290)	1.038 (0.310)	0.972 (0.290)	1.052 (0.314)	0.928 (0.285)	0.981 (0.303)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	108823	108823	108823	108823	95230	108823
# subjects	1393	1393	1393	1393	1232	1393
# events	492	492	492	492	441	441
# competing events		237		237		179
Log pseudo-likelihood	-3088	-3151	-3086	-3149	-2721	-2769
Wald χ^2	229***	248***	233***	251***	199***	215***

Note. Columns (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR represent proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, and "Non-sub" represents the subsample consisting of firms that were not subsidiaries prior to the IPO. A subsidiary is defined as a firm in which a non-financial firm owns 50% or more of total shares prior to the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (graduation) is measured monthly.

Table 7 Estimation results (hazard and sub-hazard ratios) for the time to involuntary delisting

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Founder	Founder	Non-founder	Non-founder
CEO at the IPO	0.446*** (0.103)	0.451*** (0.107)	0.403*** (0.134)	0.450** (0.158)	0.444** (0.174)	0.393** (0.155)
CEO age	0.317* (0.216)	0.270* (0.184)	0.225* (0.172)	0.119*** (0.093)	0.779 (0.974)	0.872 (1.135)
Bachelor CEO	1.227 (0.341)	1.105 (0.313)	1.060 (0.428)	0.936 (0.376)	2.509** (1.115)	2.555** (1.171)
Master/PhD CEO	0.401 (0.264)	0.340 (0.225)	0.271 (0.289)	0.250 (0.263)	0.985 (0.785)	0.806 (0.713)
Leverage	1.321* (0.202)	1.343* (0.226)	1.785*** (0.199)	1.817*** (0.199)	1.075 (0.079)	1.096 (0.084)
R&D intensity	1.251 (0.370)	1.325 (0.402)	0.866 (0.362)	0.875 (0.378)	1.635 (0.991)	1.766 (1.101)
Firm size	0.816* (0.100)	0.781* (0.102)	0.852 (0.147)	0.817 (0.160)	0.677** (0.110)	0.666** (0.122)
Firm age	0.344*** (0.095)	0.522*** (0.113)	0.225*** (0.091)	0.434*** (0.140)	0.398** (0.156)	0.582 (0.197)
TOPIX	0.075*** (0.053)	0.125*** (0.079)	0.178* (0.172)	0.286 (0.260)	0.024*** (0.028)	0.060*** (0.058)
MOTHERS	0.348*** (0.109)	0.392*** (0.123)	0.430* (0.218)	0.497 (0.255)	0.220*** (0.097)	0.228*** (0.104)
JASDAQ	0.244*** (0.117)	0.212*** (0.102)	0.774 (0.491)	0.750 (0.466)	0.070*** (0.048)	0.050*** (0.036)
Hercules	0.737 (0.260)	0.795 (0.283)	2.260 (1.137)	2.359* (1.223)	0.193*** (0.098)	0.195*** (0.097)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	146874	146874	82176	82176	64698	64698
# subjects	1393	1393	799	799	594	594
# events	82	82	46	46	36	36
# competing events		214		98		116
Log pseudo-likelihood	-470	-485	-223	-231	-169	-177
Wald χ^2	146***	131***	131***	125***	114***	117***

Note. Columns (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR represent proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, "Founder" represents the subsample consisting only of firms led by founder-CEOs at the time of the IPO, and "Non-founder" represents the subsample consisting only of firms led by non-founder-CEOs at the time of the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (involuntary delisting) is measured monthly.

Table 8 Estimation results (hazard and sub-hazard ratios) for the time to voluntary delisting

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Founder	Founder	Non-founder	Non-founder
CEO at the IPO	0.369*** (0.055)	0.360*** (0.054)	0.352*** (0.082)	0.343*** (0.081)	0.398*** (0.081)	0.384*** (0.077)
CEO age	3.956*** (1.634)	4.402*** (1.820)	4.813** (3.194)	5.832** (4.014)	3.572** (2.073)	3.633** (2.048)
Bachelor CEO	1.902*** (0.374)	1.871*** (0.371)	1.372 (0.351)	1.346 (0.343)	2.752*** (0.936)	2.721*** (0.938)
Master/PhD CEO	1.435 (0.470)	1.461 (0.481)	0.819 (0.433)	0.842 (0.441)	2.551** (1.208)	2.573** (1.231)
Leverage	1.084 (0.055)	0.869 (0.134)	1.138 (0.203)	0.800 (0.182)	1.081 (0.058)	0.962 (0.216)
R&D intensity	0.816 (0.170)	0.793 (0.165)	0.713 (0.231)	0.698 (0.231)	0.911 (0.259)	0.882 (0.245)
Firm size	1.205*** (0.065)	1.239*** (0.066)	1.137 (0.106)	1.165* (0.107)	1.250*** (0.099)	1.303*** (0.092)
Firm age	0.491*** (0.085)	0.572*** (0.093)	0.390*** (0.136)	0.484** (0.159)	0.502*** (0.099)	0.502*** (0.107)
TOPIX	0.262*** (0.096)	0.360*** (0.122)	0.259** (0.140)	0.311** (0.159)	0.302** (0.154)	0.470 (0.217)
MOTHERS	0.741 (0.232)	0.769 (0.248)	0.866 (0.344)	0.874 (0.355)	0.629 (0.348)	0.743 (0.428)
JASDAQ	0.933 (0.306)	0.917 (0.308)	0.749 (0.355)	0.693 (0.328)	0.874 (0.479)	1.021 (0.601)
Hercules	0.951 (0.298)	0.981 (0.315)	1.179 (0.477)	1.095 (0.443)	0.726 (0.402)	0.924 (0.536)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	146874	146874	82176	82176	64698	64698
# subjects	1393	1393	799	799	594	594
# events	214	214	98	98	116	116
# competing events		82		46		36
Log pseudo-likelihood	-1338	-1353	-553	-561	-629	-637
Wald χ^2	111***	102***	56.2***	50.7***	65.7***	62.9***

Note. Column (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR indicate proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, "Founder" represents the subsample consisting only of firms led by founder-CEOs at the time of the IPO, and "Non-founder" represents the subsample consisting only of firms led by non-founder-CEOs at the time of the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (voluntary delisting) is measured monthly.

Table 9 Estimation results (hazard and sub-hazard ratios) for the time to graduation

Variable	(i)	(ii)	(iii)	(iv)	(v)	(vi)
	PH	CR	PH	CR	PH	CR
	Full	Full	Founder	Founder	Non-founder	Non-founder
CEO at the IPO	1.470*** (0.181)	1.563*** (0.198)	1.489** (0.271)	1.593** (0.301)	1.529** (0.267)	1.624*** (0.287)
CEO age	1.219 (0.339)	1.188 (0.337)	1.097 (0.404)	1.007 (0.380)	1.170 (0.559)	1.175 (0.567)
Bachelor CEO	0.919 (0.096)	0.885 (0.094)	0.960 (0.131)	0.948 (0.131)	0.898 (0.151)	0.841 (0.143)
Master/PhD CEO	0.739 (0.138)	0.742 (0.139)	1.008 (0.218)	1.007 (0.222)	0.473** (0.160)	0.477** (0.160)
Leverage	0.357*** (0.078)	0.311*** (0.065)	0.312*** (0.089)	0.287*** (0.077)	0.423** (0.153)	0.345*** (0.118)
R&D intensity	0.506*** (0.070)	0.518*** (0.071)	0.452*** (0.080)	0.470*** (0.082)	0.595** (0.135)	0.578** (0.132)
Firm size	1.470*** (0.064)	1.458*** (0.064)	1.405*** (0.084)	1.376*** (0.083)	1.586*** (0.111)	1.610*** (0.113)
Firm age	1.292** (0.135)	1.512*** (0.155)	1.291 (0.207)	1.547*** (0.243)	1.549*** (0.246)	1.815*** (0.286)
TOPIX	1.238 (0.271)	1.771*** (0.380)	1.076 (0.305)	1.442 (0.403)	1.512 (0.553)	2.308** (0.813)
MOTHERS	2.954*** (0.802)	3.037*** (0.823)	3.001*** (0.991)	2.910*** (0.953)	2.534** (1.139)	3.031** (1.425)
JASDAQ	1.161 (0.341)	1.110 (0.325)	1.602 (0.587)	1.535 (0.556)	0.787 (0.370)	0.840 (0.410)
Hercules	0.967 (0.288)	1.052 (0.311)	0.996 (0.370)	0.995 (0.365)	0.843 (0.408)	1.084 (0.543)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
# observations	108823	108823	59394	59394	49429	49429
# subjects	1393	1393	799	799	594	594
# events	492	492	299	299	193	193
# competing events		237		119		118
Log pseudo-likelihood	-3085	-3148	-1716	-1749	-1031	-1058
Wald χ^2	235***	257***	118***	137***	122***	140***

Note. Column (i), (iii), and (v) present hazard ratios, and columns (ii), (iv), and (vi) present sub-hazard ratios. Figures in parentheses are robust estimates of standard errors. PH and CR represent proportional hazards and competing-risks regression models, respectively. "Full" represents the full sample, "Founder" represents the subsample consisting only of firms led by founder-CEOs at the time of the IPO, and "Non-founder" represents the subsample consisting only of firms led by non-founder-CEOs at the time of the IPO. ***, **, and * represent 1%, 5%, and 10% significance levels, respectively. The dependent variable (graduation) is measured monthly.

Table A1 Delisting type

Category	Keyword	Delisting type	N
M&A	“Acquisition,” “acquiring all the common shares,” “acquisition by a demand for share,” “becoming a wholly owned subsidiary,” and “merger.”	Voluntary	191 (39)
MBO	“Management buyout (MBO).”	Voluntary	23 (12)
Failure	“Bankruptcy,” “business suspension,” “civil rehabilitation,” “corporate rehabilitation,” and “having liabilities in excess of assets.”	Involuntary	36 (6)
Others	Other than M&A, MBO, and Failure.	Involuntary	46 (2)
Total			296 (59)

Note. We classify the types of delistings using the above keywords. N represents the number of firms in each category. Figures in parentheses indicate the number of firms after graduating to the main stock markets.

Table A2 Transition of delistings and graduations from junior stock markets.

Panel A: Delistings																								
IPO	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021+	XA	Total	
1999							1		1														2	
2000	1		2	1		3	2	5	3	1	3	1	1		4							3	31	61
2001		1	1	1		2	3		4	3	2	1	1	1	2	2	1						24	49
2002				1	1	1	2	1	3	1		2										1	18	31
2003					2		2	1	5	1		3		1	1	1	1		1			1	18	38
2004							3	3	3	3	9	6	2	1	2	1	1	1			2	1	38	76
2005								11	10	5	3	3	4	3	1	5			5	1	1	1	81	133
2006							1	3	10	2	7	7	5	1	5	4	2	1	3	2			95	148
2007								2	2	2	4	3	2	2	2	1	1	1	2	2		1	75	102
2008									1	1		2	2	1	1	1						1	30	40
2009													1		1								10	12
2010													1						1				11	13
2011													1	1	1	1			1				22	27
2012																		1			3	1	33	38
2013																1		1	1			1	37	41
2014																		1				1	49	51
2015																							73	73
2016																					1	2	60	63
2017																						1	66	67
2018																							74	74
2019																							72	72
2020																						2	75	77
2021																							105	105
Total	1	1	3	3	3	6	14	26	42	19	28	28	20	11	20	17	6	6	14	11	17	1097	1393	

Panel B: Graduations																								
IPO	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	XB	Total	
1999																							2	2
2000	3	5	4	5		2					1		1	5	2	1			1	1			30	61
2001		1	3	4	1		1				1	1		3				1		1			32	49
2002			1	4	1			1				1		1	2				1				19	31
2003				2	1		1			1				3	6						1		24	38
2004					2	2	3	2		1		1	4	4	13	2							42	76
2005						3	9	5	1	3	3	1	4	4	5	14							82	133
2006						1	1	8	1		3	3	4	3	5	8	8	2	2	3			93	148
2007								1		2	3	4	5	4	6	5	3	8	2	2			59	102
2008									1	1	2	1	1	1				2	1	1			28	40
2009											2	1											6	12
2010											1	4	1	1		1						1	4	13
2011												6	1	2	2				1				15	27
2012												2	8	6	3	2		1	1				15	38

2013													1	6	5	2	1	3	1	1				21	41
2014															11	7		2	1	2				28	51
2015																16	7	5	2			2		41	73
2016																	18	15	3	1			27	63	
2017																		12	8	3	2		42	67	
2018																			10	9	2		53	74	
2019																				10	4		58	72	
2020																					2		75	77	
2021																							105	105	
Total	3	6	8	15	5	8	15	17	3	8	16	25	30	43	61	58	36	51	34	37	13	901	1393		

Note. "XA" in Panel A represents the number of firms that did not delisted by January 2022; that is, these firms remain in junior or main stock markets. "XB" in Panel B represents the number of firms that did not graduate from junior stock markets by January 2022; that is, these firms remain or have delisted from junior stock markets. "2021+" in Panel A includes two firms that delisted in January 2022.

Table A3 Estimation results (hazard ratios) for the time to delisting and graduation

Variable	(i)	(ii)	(iii)	(iv)
	PH	PH	PH	PH
	Delisting + Graduation	Delisting + Graduation	Delisting	Delisting
Founder-CEO (invariant)	1.079 (0.086)	1.076 (0.087)	0.633*** (0.079)	0.661*** (0.082)
CEO age		1.286 (0.290)		1.373 (0.511)
Bachelor CEO		1.104 (0.100)		1.720*** (0.283)
Master/PhD CEO		0.821 (0.133)		1.066 (0.308)
Leverage	1.150*** (0.048)	1.149*** (0.048)	1.204*** (0.056)	1.203*** (0.056)
R&D intensity	0.688*** (0.074)	0.692*** (0.074)	0.975 (0.165)	0.981 (0.171)
Firm size	1.270*** (0.043)	1.269*** (0.043)	1.046 (0.054)	1.063 (0.055)
Firm age	0.986 (0.081)	0.949 (0.083)	0.463*** (0.068)	0.447*** (0.068)
TOPIX	0.706* (0.124)	0.721* (0.131)	0.171*** (0.055)	0.175*** (0.057)
MOTHERS	1.617*** (0.287)	1.591*** (0.282)	0.582** (0.128)	0.526*** (0.118)
JASDAQ	0.916 (0.179)	0.887 (0.174)	0.730 (0.177)	0.661* (0.163)
Hercules	0.936 (0.180)	0.910 (0.174)	0.863 (0.194)	0.781 (0.178)
Industry dummies	Yes	Yes	Yes	Yes
# observations	108823	108823	146874	146874
# subjects	1393	1393	1393	1393
# events	729	729	296	296
Log pseudo-likelihood	-4626	-4623	-1876	-1868
Wald χ^2	128***	135***	111***	128***

Note. All columns present hazard ratios. Figures in parentheses are robust estimates of standard errors. PH indicates the proportional hazards model. ***, **, and * represent the 1%, 5%, and 10% significance levels, respectively. The dependent variables (time to delisting or graduation and time to delisting) are measured monthly.

Table A4 Estimation results (coefficients) for involuntary delisting, voluntary delisting, and graduation

Variable	(i)	(ii)	(iii)
	E-Probit Involuntary delisting	E-Probit Voluntary delisting	E-Probit Graduation
Founder-CEO (invariant)	0.069 (0.399)	-1.419*** (0.156)	0.510** (0.223)
CEO age	-0.497 (0.349)	0.418 (0.216)	-0.327 (0.201)
Bachelor CEO	0.066 (0.147)	0.144 (0.091)	-0.046 (0.083)
Master/PhD CEO	-0.381 (0.282)	-0.059 (0.162)	-0.193 (0.138)
Leverage	0.628** (0.317)	0.905*** (0.201)	-0.087 (0.183)
R&D intensity	0.194 (0.164)	0.168 (0.105)	-0.266*** (0.099)
Firm size	-0.088 (0.067)	0.063 (0.042)	0.168*** (0.038)
Firm age	-0.386*** (0.117)	-0.450*** (0.063)	0.121* (0.064)
TOPIX	-1.364*** (0.349)	-0.832*** (0.212)	-1.614*** (0.201)
MOTHERS	-0.981*** (0.215)	-0.404** (0.183)	0.544*** (0.178)
JASDAQ	-0.940*** (0.276)	-0.306 (0.199)	0.263 (0.196)
Hercules	-0.207 (0.225)	0.145 (0.196)	0.226 (0.196)
Industry dummies	Yes	Yes	Yes
# observations	1393	1393	1393
Log likelihood	-1054	-1322	-1646
Wald χ^2	101***	241***	133***

Note. All columns present the estimated coefficients obtained using the probit regression model with a binary endogenous covariate. Figures in parentheses are standard errors. ***, **, and * represent the 1%, 5%, and 10% significance levels, respectively. E-Probit indicates the extended probit regression model. Founder-CEO (invariant) is a binary endogenous covariate. In the first stage, Firm size, Firm age, MOTHERS, JASDAQ, Hercules, and ROA, in addition to Parent ownership and Board ownership prior to the IPO, are used to estimate founder-CEO (invariant). Parent ownership takes a value of one if the share of non-financial firms is equal to or greater than 50% of the total prior to the IPO, and takes a value of zero otherwise. Board ownership takes a value of one if the share of a board member and their family is equal to or greater than 50% of the total prior to the IPO, and takes a value of zero otherwise. The dependent variables (Involuntary delisting, Voluntary delisting, and Graduation) are binary and takes a value of one if the firm delists (or graduates) from the junior stock market by January 2022.

Table A5 Estimation results (coefficients) for ROA

Variable	(i)	(ii)	(iii)	(iv)
	RE	RE	RE	RE
	Full	Full	Founder	Non-founder
Founder-CEO (invariant)	0.009 (0.006)			
CEO at the IPO		0.043*** (0.004)	0.040*** (0.006)	0.044*** (0.005)
CEO age	-0.003 (0.011)	-0.032 (0.011)	-0.020 (0.016)	-0.039** (0.016)
Bachelor CEO	0.001 (0.005)	0.006 (0.005)	-0.007 (0.007)	0.025*** (0.007)
Master/PhD CEO	-0.032*** (0.008)	-0.026*** (0.008)	-0.034*** (0.011)	-0.010 (0.011)
Leverage	-0.257*** (0.004)	-0.256*** (0.004)	-0.259*** (0.007)	-0.255*** (0.004)
R&D intensity	-0.077*** (0.005)	-0.078*** (0.005)	-0.091*** (0.007)	-0.061*** (0.007)
Firm size	0.037*** (0.002)	0.037*** (0.002)	0.036*** (0.003)	0.039*** (0.003)
Firm age	-0.016*** (0.005)	-0.006 (0.005)	-0.023*** (0.007)	0.015* (0.008)
MOTHERS	0.020 (0.013)	0.015 (0.013)	0.018 (0.015)	0.006 (0.024)
JASDAQ	0.038*** (0.014)	0.035*** (0.014)	0.033** (0.017)	0.026 (0.024)
Hercules	-0.005 (0.014)	0.002 (0.014)	0.005 (0.017)	-0.005 (0.025)
Industry dummies	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
# observations	12272	12272	6886	5386
# subjects	1345	1345	780	565
Wald χ^2	5625***	5794***	2108***	4077***

Note. All columns present the estimated coefficients obtained using the random-effects GLS regression model. Figures in parentheses are standard errors. "Full" represents the full sample, "Founder" represents the subsample consisting only of firms led by founder-CEOs at the time of the IPO, and "Non-founder" represents the subsample consisting only of firms led by non-founder-CEOs at the time of the IPO. ***, **, and * represent the 1%, 5%, and 10% significance levels, respectively. RE represents a random-effects GLS regression model.

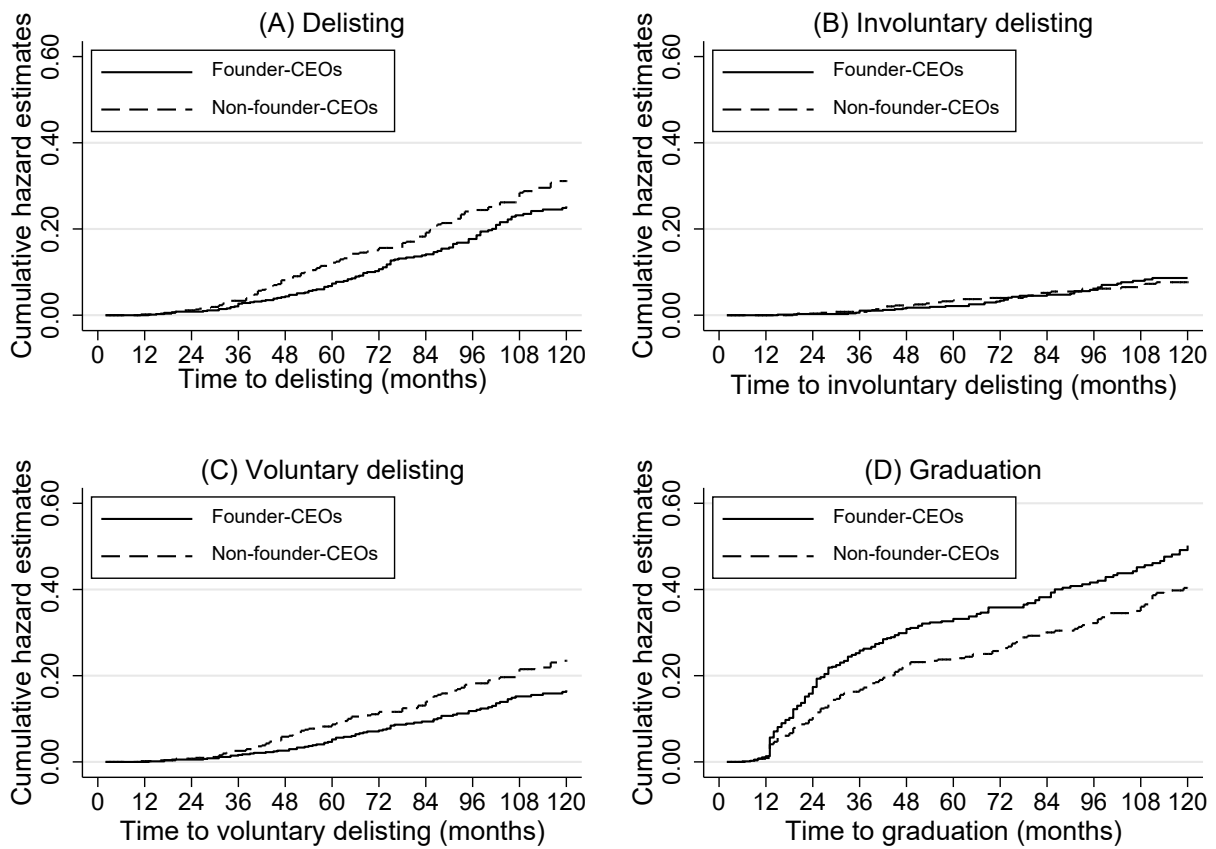


Figure 1 Cumulative hazard estimates of delisting and graduation: Founder-CEOs versus non-founder-CEOs
 Note. The number of IPOs is 1,393. The numbers of founder-CEO-led and non-founder-CEO-led firms at the time of the IPO are 799 and 594, respectively. The number of delistings by January 2022 is 296 and the chi-square log-rank test statistic is 5.56 ($p < 0.05$) in (A) Delisting. The number of involuntary delistings by January 2022 is 82 and the chi-square log-rank test statistic is 0.02 ($p > 0.1$) in (B) Involuntary delisting. The number of voluntary delistings by January 2022 is 214 and the chi-square log-rank test statistic is 8.24 ($p < 0.01$) in (C) Voluntary delisting. The number of graduations by January 2022 is 492 and the chi-square log-rank test statistic is 7.10 ($p < 0.01$) in (D) Graduation.