Boards and IPO Firm Survival

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Abstract

The initial public offering (IPO) process provides increased visibility for the boards of newly listed firms. Drawing on the resource dependency and the upper echelon theories, we investigate the impact of board heterogeneity on the survival of IPO firms five years after listing. We find that executive director professional expertise heterogeneity improves the likelihood of IPO firm survival. Further analysis reveals that IPO firms are more likely to survive when executive directors with financial expertise are complemented by executives with industry expertise, and led by CEOs who also serve as board chairs. Such Dual CEOs typically leverage their industry expertise with the financial expertise of other executive directors to improve the information flow to the board for better decision-making. These findings have practical implications for potential IPO firms, investors, and regulators, suggesting that incorporating professional expertise into the diversity listing requirements improves the survival prospect of IPO firms after listing.

JEL Classification Codes : G30, G39, M14, G10

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1. Introduction

The transition from private to public ownership represents a significant change for initial public offering (IPO) firms due to the increased complexity associated with the IPO process. Greater uncertainty surrounding the IPO process means that such firms face a liability of newness, i.e., the potential to fail without adequate access to resources that establish unique strategies (Yang & Aldrich, 2017). IPO firms experience changes to their governance structure around listing and are exposed to greater scrutiny from regulators, investors, and the public (Jain & Kini, 2008). All these factors potentially threaten the survival prospects of IPO firms. In this paper, we particularly examine the impact of board heterogeneity on the survival of IPO firms.

IPO firms offer a unique setting to study boards, as this is the first time the board becomes visible to the public. Prior research documents the impact of board and firm characteristics, such as venture capitalist board representation (Chahine & Goergen, 2011), board size and independence (Chancharat et al., 2012), family involvement (Cirillo et al., 2017), having a specialist CEO (Gounopoulos & Pham, 2018) and marketing orientation (Feng et al., 2020), on IPO survival. Another stream of literature suggests that technical specialised knowledge (Junkunc & Eckhardt, 2009), financial expertise (Ettredge et al., 2021; Nipper, 2021), CEO education (Kallias et al., 2023), and industry expertise (Drobetz et al., 2018) improve IPO firm value and performance. In mature listed firms, Drobetz et al. (2018) show that board industry expertise has a positive impact on firm value and this effect is more pronounced in complex firms. It has also been documented that IPOs increase the complexity of listed firms, as governance and business structures change around listing (Chancharat et al., 2012).

In the IPO context, Junkunc and Eckhardt (2009) find that boards where directors have a higher level of specialised technical knowledge through PhD, are more likely to focus on the value of equity from the IPO than a sale of secondary shares. Nipper (2021) shows that boards

with financial expertise around listing are more likely to complete the IPO process successfully than withdraw, and Ettredge et al. (2021) provide evidence of the positive impact of executive directors' financial expertise on IPO underpricing. The authors argue that executive directors in IPO firms provide firm-specific knowledge and expertise beyond those of non-executives to the board, reducing information asymmetry surrounding the IPO process and resulting in lower IPO underpricing. Kallias et al. (2023) document that CEO education plays a significant role in IPO performance post-listing. The central theme emerging in these papers, but not yet tested in the literature, is that IPO firms value better decision-making by executive directors on the board, including CEOs, especially when it comes to financial expertise and industry expertise. Our study addresses this research gap and contributes to the IPO literature by examining the potential impact of professional expertise heterogeneity, measured at the entire board level and then separately for the executive and non-executive directors on the board, on IPO survival five years after listing. Whilst directors are multifaceted and may have various competencies associated with their prior experiences (Adams et al., 2018), our study focuses on the primary expertise of board members aggregated into a professional expertise heterogeneity index.[2]

Drawing on the resource dependency and upper echelon theories, we hypothesize that professional expertise heterogeneity improves the likelihood of IPO survival, and this effect is powered by the heterogeneous professional expertise of executive directors on the board. The resource dependency theory views directors as resources that facilitate the relationships between the firm and its external environment (Hillman et al., 2000). In this vein, IPO firms with heterogeneous professional expertise on the board have better access to resources and information for strategic decision-making, which ultimately improves the survival prospects of

[2] As detailed in Section 3.2 of the paper, professional expertise heterogeneity categories include academic, accountant, banker, consultant, doctor, engineer, professional executive with industry expertise, professional executive without industry expertise, finance expert, IT expert, investment professional, lawyer, and scientist. We explored the board skills diversity which focuses on competencies but this is less clear-cut and difficult to disentangle compared to primary expertises.

the firm post-IPO. In addition, the upper echelons theory (Hambrick & Mason, 1984), emphasises the impact of different characteristics and expertises possessed by the top management on the strategic decision-making and outcomes of a firm. We posit that in the IPO boardroom context, differences in the professional expertise of executive directors not only imply a richer firm-specific knowledge base for decision-making, but also provides a better informational flow to the board. Moreover, Ettredge et al. (2021) show that executive directors leverage their firm-specific financial expertise to decrease information asymmetry around listing, at a time when IPO firms face the liability of newness, improving IPO performance.

The aim of this paper is two-fold. First, building on the prolific role of executive directors in the IPO process, this paper examines whether heterogeneity in the professional expertise of executive directors on the board of directors influences the survival of the firm five years after the IPO. Notwithstanding the focus of our hypothesis on the professional expertise of executive directors, we also examine the impact of professional expertise heterogeneity measured at the entire board level and then separately for non-executive directors on the likelihood of survival of IPO firms. The rationale behind this is that boards of IPO firms are smaller before listing, predominantly comprised of executive directors, with fewer non-executive directors. However, this structure changes substantially around the IPO due to the listing requirements (Bakers & Gompers, 2003). Second, this unique setting provides an opportunity to investigate whether combinations of professional expertise, within or between executive and non-executive directors, impact the likelihood of IPO survival. Motivated by past research (Junkunc & Eckhardt, 2009; Ettredge et al., 2021; Nipper, 2021; Drobetz et al., 2018), we explore whether the combination of industry expertise, financial expertise and technical expertise influences the likelihood of IPO survival. These novel findings provide fresh insights to prospective IPO firms on how to leverage professional expertise heterogeneity for survival in the stock market after listing.

The sample consists of 661 IPOs listed between 1st January 1997 and 31st December 2015, and tracked for five years after the IPO to 31st December 2020. We hand-collect information from prospectuses on board characteristics including directors' professional expertise. Survivors are defined as the firms that remain publicly traded and independent entities up to five years post-IPO. Non-survivors are the firms that exit the sample post-IPO due to mergers or delistings.[3] There are 304 survivors and 357 non-survivors by year five post-IPO in our sample. We analyse the impact of the entire board professional expertise heterogeneity, and separately for executives and non-executive directors, on the likelihood of IPO survival. A logit estimator using an unbalanced and entropy-balanced sample (Hainmueller, 2012) is used to address potential endogeneity concerns. Board characteristics may be endogenous in that, directors with attractive professional expertise may self-select onto the boards of IPO firms that perform better. In further robustness tests, we use the Cox proportional hazard and accelerated failure time survival models to examine the impact of the main variables of interest on survival time to year 5 post-IPO.

Consistent with our hypothesis, the results indicate that the professional expertise heterogeneity of executive directors at the IPO improves the likelihood of survival to year 5 post-IPO. In exploring whether specific combinations of industry, financial or technical expertise of executive directors explain our main results, we find that IPO firms where executives with financial expertise are complemented by executives with industry expertise are more likely to survive five years after listing. We further explore whether the type of CEO leading the firm is an important factor in this context. We find that our results are driven by IPO firms where the CEO is also the board chair, supporting the notion that unified leadership

[3] Although being a non-survivor has a negative connotation, we acknowledge that not all types of exits post-IPO indicate firm failure We create a censored survivor measure that includes well-performing mergers as survivors. Mergers may not indicate firm failure as the IPO may be driven by the founders wanting to sell their firm in the near future, while benefitting from a more objective value metric, i.e., a stock price (Hovakimian & Hutton, 2010). Delistings are firms that do not survive as independent entities after the IPO and exit the stock market regardless of the reasons for delisting.

improves decision-making (Yang & Zhao, 2014). Further analysis reveals that the majority of these Dual CEOs are industry experts, and these boards have a higher level of other executive directors with financial expertise on their boards around listing. This alludes to Dual CEOs with industry expertise appointing complementary executives with financial expertise to centralise their control over the firm, while improving the information flow to the board. Conversely, our further analysis suggests that when a Founder CEO is leading the IPO firm, such firms are less likely to survive post-IPO and exit through a merger. This is consistent with the findings reported by Gao and Jain (2012) that Founder CEOs are more entrenched and use their position to gain higher acquisition premiums as target firms post-IPO.[4]

Our results are robust using an alternative definition of IPO survival, the Cox proportional hazard and accelerated failure time survival models and controlling for potential endogeneity concerns. Additionally, we control for the potential effects of internal governance factors (staggered boards and dual class shares) and external factors (high technology industries and crisis periods), and we obtain consistent findings. Despite the focus of this paper on professional expertise heterogeneity, we perform further tests examining the impact of board heterogeneity in terms of gender and age on IPO survival and found no evidence that these measures influence IPO survival.

This study makes three novel contributions to the IPO and corporate governance literature. First, we extend the literature on board heterogeneity (Anderson et al., 2011; Upadhyay & Zeng, 2014; Gray & Nowland, 2017) in the IPO context. We show that higher professional expertise heterogeneity of executive directors improves the likelihood of survival of IPO firms, whereas the professional expertise heterogeneity of the entire board and non-executive directors does not matter. This evidence shows that firm-specific knowledge of

[4] 97% of firms that exit through a merger in our sample are target firms and 38% of these firms have Founder CEOs.

executive directors, embedded in their heterogenous professional expertise, is more important for the survival of IPO firms compared to the monitoring and advice offered by the non-executive directors on the board. The demographic board characteristics linked to better board monitoring, such as female board representation and board age heterogeneity, do not explain IPO survival. Second, we extend the literature on executive directors in IPO firms (Ettredge et al., 2021) with new evidence on the importance of complementarity between the industry expertise and financial expertise of executive directors for long-term survival post-IPO. We show that it is about the combination of professional expertise of all the executive directors on the board rather than the CEO alone, as suggested by the prior literature (Gounopoulos & Pham, 2018). Third, we find that whilst Founder CEOs are focused on exiting post-IPO, Dual CEOs improve IPO survival. Dual CEOs typically leverage their industry expertise and the financial expertise of other executive directors to improve the information flow to the board for better decision-making. This finding is consistent with the results reported by Yang and Zhao (2014) that Dual CEOs facilitate effective decision making, consequently improving the performance of firms with higher information costs.

This paper is organised as follows. Section 2 discusses the theoretical framework and develops the hypothesis tested in the paper. Section 3 reviews the data sources, sample selection, and methodology. Section 4 discusses the main results exploring the impact of professional expertise heterogeneity and combinations of professional expertise on IPO survival. The mechanisms driving the results and robustness tests are also reported in Section 4, while Section 5 provides a conclusion to the paper.

2. Theoretical Framework and Hypothesis Development

Despite the extensive information disclosed in prospectuses, IPO firms are often relatively unknown to the investing community as they have limited data for potential investors to analyse and review. With this information gap in mind, IPO firms face the "liability of newness" around

the time of listing, when the quality of decision-making and access to resources are imperative for survival post-IPO (Perrault & McHugh, 2015). Past studies suggest that executive directors provide firm-specific knowledge, bridging the informational gap and affecting the potential of the firm for success (Adams & Ferreira, 2007; Bedard et al., 2014).

We draw in this study on the resource dependency and the upper echelon theories. The resource dependency theory argues that board members are resources linking the firm to its external environment (Pfeffer & Salancik, 2006). The upper echelon theory highlights the role of different backgrounds and expertises of executive directors as a channel that impacts strategic decision-making and performance (Hambrick & Mason, 1984). At the IPO, heterogeneity of professional expertise in the boardroom shows the ability of the firm to attract directors from different professional expertise, backgrounds and access to invaluable contacts, information, and skills. Moreover, where executive directors have heterogeneous professional expertise at the point of listing, they are better equipped with the relevant knowledge to mitigate information asymmetry on the quality and prospects of the firm to potential investors. Hoitash and Mkrtchyan (2022) suggest that directors with heterogeneous backgrounds and experiences improve the information flow to the board and facilitate innovative critical thinking in problem-solving. Furthermore, Ettredge et al. (2021) provide evidence of the positive impact of executive directors' financial expertise on IPO performance. Therefore, we argue that greater executive professional expertise heterogeneity provides increased access to unique resources and firm-specific knowledge, thereby improving the board's decision-making function, and ultimately the likelihood of survival post-IPO.

Extant studies on mature listed firms examine the role of specific types of professional expertise, including the role of accounting expertise on audit committees (Aldamen et al., 2012), the impact of banking expertise on debt capital (Güner et al., 2008), and the impact of financial expertise on appointment announcements (Davidson et al., 2004). Gray and Nowland

(2017) show that there is a positive relationship between professional expertise diversity and firm value, specifically when boards diversify their expertise within a subset of specialist professional expertise, such as lawyers, accountants, consultants, bankers, and outside CEOs. Using a board heterogeneity index combining six dimensions (education, experience, profession, gender, age, ethnicity), Anderson et al. (2011) find that board heterogeneity improves firm value. Similarly, Upadhyay and Zeng (2014) find that greater gender and ethnic heterogeneity promotes accountability, improves the firm's access to quality information, reduces its cost of capital, and facilitates information dissemination. They conclude that diverse boards are more transparent.

In the IPO context, Nipper (2021) shows that firms with board financial expertise, i.e., at least one executive or non-executive director with financial expertise around listing are more likely to complete the IPO process successfully than to withdraw. Ettredge et al. (2021) report that the presence of executive directors with financial expertise in the boardroom of IPO firms reduces IPO underpricing, shortens the IPO process and minimises downward price adjustments. The authors argue that executive directors provide relevant financial expertise beyond those of non-executives to the board, and this effect is greater if the executive directors are accounting experts. Ettredge et al. (2021) maintain that executive directors with financial expertise mitigate the information asymmetry surrounding the IPO firm, resulting in better IPO performance, and the effect is stronger in firms with fewer non-executive directors on the board.

Extant literature suggests that non-executive directors perform monitoring and advisory roles in the boardroom (Adams & Ferreira 2007; Adams et al. 2009) and are expected to be objective monitors that provide oversight of management decision-making. However, in the IPO context, such non-executive directors do not possess sufficient firm-specific knowledge of the day-to-day running of the business as executive directors (Ettredge et al. 2021). Hence, they

are unable to fulfil an informational role when it comes to firm-specific circumstances. With greater information asymmetry between the firm and potential investors around the IPO, Ettredge et al. (2021) and Kallias et al. (2023) show that executive directors' characteristics, such as financial expertise and education, can improve IPO performance. However, there is no prior literature analysing the relationship between professional expertise heterogeneity of executive directors and IPO survival.

Taken together, the above literature suggests that firms with greater board heterogeneity have a better governance structure due to better decision-making, innovation, transparency, and accountability, which in return improves firm outcomes, including survival. The literature also highlights the significance of executive directors' professional expertise in IPO firms in this context. Based on the above, we expect that greater executive professional expertise heterogeneity at the IPO improves the likelihood of survival post-IPO. Subsequently, we hypothesize:

> ***Hypothesis:*** *IPO firms with greater executive professional expertise heterogeneity at the time of listing are more likely to remain listed as independent entities by year 5 post-IPO.*

3. Data and Methodology

3.1 Data Sources and Sample Selection

The population of US IPOs is obtained from the Thomson One Banker database over the period from 1st January 1997 to 31st December 2015 and tracked for five years to 31st December 2020. Following prior IPO literature e.g., Boone et al. (2007) and Chahine and Goergen (2011), we exclude the followings from our sample: American Depository Receipts (ADRs), Real Estate Investment Trusts (REITs), unit offerings, spin-offs, carve-outs, closed-end funds, financial firms with Standard Industrial Classification (SIC) codes 6000-6799, and IPOs with an offer

price below $5. This leads us to the population of 2,641 IPO firms from which we randomly select the final sample of 661 IPOs (25% of the population) due to the labour-intensive nature of hand-collecting data. Director-level and board characteristics data are manually collected from the offering prospectuses. The Center for Research in Security Prices (CRSP) database provides data on IPO survivorship status, while the Compustat database is the source of the IPO financial data. Table 1 reports the IPO distribution suggesting that there is a sufficiently balanced sample across survivors and non-survivors to test the validity of the hypothesis. Furthermore, Table 1 indicates that firms from some industries (i.e., those from the oil, gas, coal extraction and products, chemical and allied products, and healthcare industries) have a higher survival rate compared to other industries (i.e., the business equipment industry). These patterns emphasise the importance of including industry controls in regression analysis.

[Insert Table 1 about here]

3.2 Methodology and Key Variables

We study the effect of executive professional expertise heterogeneity on the likelihood of survival post-IPO. As this examination shares a common baseline i.e., professional expertise whether of the entire board, executives, or non-executive directors, equation (1) estimates the logit regression with the binary dependent variable predicting the conditional probability of IPO survival until year 5 post-IPO using a common baseline regression model.

$$IPO\ Survival_{i,t} = \beta_0 + \beta_1\ Professional\ Expertise\ _{i,x} + \sum_{n=2}^{5} \beta_n\ Firm\ Characteristics_{i,x} + \sum_{n=6}^{14} \beta_n\ Board\ Characteristics_{i,x} + \sum_{n=15}^{17} \beta_n\ IPO\ Characteristics_{i,x} + Industry\ Dummies + Year\ Dummies\ + \varepsilon_{i,x} \quad (1)$$

where *t* relates to year five post-IPO, x relates to the IPO year (year 0), while i refers to the firm. The dependent variable, *IPO survival*, takes a value of one in the logit regression if the IPO firm is categorised as a survivor. Survivors is a dummy variable that takes a value of one if IPO firms remain publicly traded as an independent entity up to year five post-IPO, and zero

otherwise. Professional expertise is based on the Blau Index using the proportion of expertise groups on the entire board and separately for executive directors and non-executive directors. The index is based on thirteen expertise groups drawn partially from Gray and Nowland (2017) and the nature of the data collected.[5] Further details on the coding of professional expertise groups are reported in the Online Appendix Table A1. The groups are as follows: academic, accountant, banker, consultant, doctor, engineer, professional executive with industry expertise, professional executive without industry expertise, finance expert, IT expert, investment professional, lawyer, and scientist. The Blau index, which equally accounts for the differences in these expert groups, is calculated as follows:

$$Blau\ Index\ (Professional\ Expertise\ )_{i,x} = 1 - \sum_{j=1}^{n} P_i^2 \qquad (2)$$

where Pi is the proportion of directors in each of the n (expert) groups. High scores indicate higher professional expertise heterogeneity and vice versa.

Based on the prior literature on financial expertise (Ettredge et al., 2021; Nipper, 2021), industry expertise (Drobetz et al., 2018) and technical expertise (Junkunc & Eckhardt, 2009), we classify the thirteen professional expertise groups into these three types. Financial expertise is an indicator variable which equals one for firms where at least one director has expertise as an accountant, banker, finance expert or investment professional, and zero otherwise. Industry expertise is an indicator variable which equals one for firms where at least one director on the board has executive expertise in the same industry as the firm, and zero otherwise. For instance, a director in a pharmaceutical firm with prior experience as a president or chief operation officer in another pharmaceutical firm. Technical expertise is an indicator variable which equals one for firms where at least one director offers operational expertise as a consultant,

[5] We drew on nine of the professional expertise groups in Gray and Nowland including executives, accountants, bankers, lawyers, scientists, engineers, consultants, academics and doctors. However, we split executives based on their expertise in the industry i.e. professional executives with and professional executives without industry expertise. Furthermore, we extended our expertise groups to include finance experts and investment professionals as we focus on IPO firms and venture capitalists have such expertise in the boardroom.

academic, doctor, engineer, scientist, IT expert or lawyer, and zero otherwise. As a further matter, we explore whether specific combinations of industry expertise, financial and technical expertise influence the likelihood of IPO survival.

All regressions control for firm characteristics, including firm age, firm size, leverage, risk, return on assets, R&D intensity, and asset tangibility (Espenlaub et al., 2012). Board and CEO characteristics linked to IPO survival by previous studies are also included as control variables. These include board size, board independence, board voting share ownership, CEO tenure, founder CEO, CEO duality and venture capitalist board representation (Fischer & Pollock, 2004; Jain & Tabak, 2008; Gounopoulos & Pham, 2018). Considering the focus of this paper on IPO survival, we also control for the IPO characteristics highlighted in the literature, including IPO underpricing and the IPO premium (Cirillo et al., 2017; Gounopoulos & Pham, 2018). All variables are defined in Appendix A.

3.3 Endogeneity in IPO Survival

It is imperative to control for the potential effects of endogeneity especially in corporate governance related studies. On the one hand, greater heterogeneity in professional expertise may improve the likelihood of IPO survival. On the other hand, it could be the case that directors with certain types of professional expertise are attracted to IPO firms that are perceived as better performing and, inherently, more likely to survive post-IPO. To address this potential endogeneity concerns, we apply entropy balancing. Entropy balancing adopts a weighing process using distributional properties that achieve a covariate balance between the treated group and the control group such that, except for the treated, both groups are indistinguishable (Hainmueller, 2012).

The treated group for our measure of professional expertise is less clear-cut as the professional expertise heterogeneity index is a continuous variable. Hence, we consider IPO firms with equal or above-median professional expertise to be part of the treated group and

those IPO firms with below-median professional expertise to be part of the control group. Covariate balance between the treated and control firms is achieved by weighing the distributional properties of both groups using the following observable firm characteristics: firm age, firm size, ROA, risk, leverage, asset tangibility, and Tobin's Q. The test for the differences between the pre-and post-weighing means of covariates confirms the success of entropy balancing (see Appendix B for details). Consequently, we repeat the logit regression in Model (1) on the entropy-balanced sample and these are reported as part of the main results.

4. Results

4.1 Descriptive Statistics

4.1.1 Summary Statistics

Table 2 reports descriptive statistics comparing survivors (N=304) and non-survivors (N=357). Panel A focuses on the measures of heterogeneity in professional expertise, for the entire board, and then separately for executive and non-executive directors. In turn, Panels B and C report descriptives for the board, CEO, firm, and IPO characteristics, respectively.

For the entire board, the difference between the mean values of the professional expertise for the survivors (0.522) and the equivalent for the non-survivors (0.484) is significant at the 1% level or better. A similar pattern is observed in the subsamples of executive and non-executive directors. This indicates that IPO firms that survive five years after listing have a broader range of professional expertise compared to non-survivors, whether we refer to the entire board, executive or non-executive directors. Hence, we find support in Panel A for our hypothesis that firms with greater heterogeneity in executive professional expertise at the IPO are more likely to survive to year 5 post-IPO.

In Panels B & C, we find that survivors have significantly larger and more independent boards (at the 1% level) compared to non-survivors. Survivors are also better connected to other firms than non-survivors. This evidence is in line with prior literature suggesting that the

surviving IPO firms are larger in size with more independent, and better-connected boards compared to the non-survivors (Chancharat et al., 2012; Chahine & Goergen, 2013). In terms of IPO characteristics, there is no significant difference between the IPO premium and underpricing measures for survivors and non-survivors.

[Insert Table 2 about here]

Overall, the descriptive statistics are consistent with prior IPO literature. A preliminary conclusion from the univariate analysis is that IPO firms benefit from greater heterogeneity in professional expertise in terms of their survival post-IPO. This is consistent with our hypothesis.[6]

4.1.2 Types of Professional Expertise in the Boardroom

Table 3 examines the distribution of professional expertise. Panel A reports the percentages of professional expertise across the thirteen groups: accountant, banker, finance expert, investment professional, academic, consultant, doctor, engineer, IT expert, lawyer, scientist, professional executive with industry expertise, professional executive without industry expertise. These statistics are reported separately for the entire board, executive and non-executive directors in each survivorship category. Panel B reports the percentage combinations of professional expertise types, such as financial expertise, industry expertise and technical expertise, highlighted in section 3.2 for the entire board, executive directors and non-executive directors in each survivorship category. By exploring combinations of professional expertise, we add a layer of depth to our analysis on whether specific types of professional expertise held by the entire board, executive or non-executive directors impact the survival prospects of the firm. This provides novel insights on how the IPO firms could leverage professional expertise in the boardroom for greater efficiency in decision-making and survival in the stock market.

[6] We run the Pearson correlation matrix for all the variables in Table 2 and the results shows that the highest correlation is between board size and board independence (0.395). Hence, we do not have sever multicollinearity issues.

Panel A shows that the professional expertise of the entire board is equitably distributed across survivorship categories for industry expertise (professional executives with industry expertise and professional executives without industry expertise), financial expertise (accountant, banker, finance expert, investment professional), and technical expertise (academic, consultant, doctor, engineer, IT expert, lawyer, scientist). In detail, 75% of survivors and 78% of non-survivors have executive directors who are professional executives with industry expertise while 56% of survivors and 54% of non-survivors have non-executives with the same expertise. In comparison, this proportion is much higher than the 2% of survivors and non-survivor IPO firms where executive directors have investment professional expertise. Conversely, 78% of survivors and non-survivors have at least one non-executive director on the board with investment professional expertise. In distinguishing between the professional expertise of executive and non-executive directors, it is evident that the majority of IPO firms (survivors/non-survivors) have executive directors with industry expertise while non-executives provide more financial expertise. Still, it is imperative to examine whether combinations of less prevalent expertise in the boardroom influence the survival prospects of IPO firms.

In Panel B, we explore combinations of the three types of professional expertise: industry expertise, financial expertise and technical expertise. *Entire Board with Financial Expertise Facing Industry expertise* is an indicator variable denoting boards where at least one director has financial expertise while another has industry expertise. In the same vein, we create another indicator variable, such as *Entire Board with Technical Expertise Facing Industry expertise* which takes a value of one if there is at least one director on the board with technical expertise and at least another director with industry expertise. Similar combinations are created separately for executives and non-executive directors e.g., *Executives with Financial Expertise Facing Executives with Industry expertise, Executives with Technical Expertise Facing*

Executives with Industry expertise and six other iterations. The results reported in Panel B of Table 3 show that 73% of the survivors and 72% of non-survivors have at least one director on the board with financial expertise and another director with industry expertise. This combination is prevalent in the executive and also non-executive groups of surviving IPOs.

[Insert Table 3 about here]

4.2 Main Regression Analysis

4.2.1 The Impact of Heterogeneity in Professional Expertise on IPO Survival

Table 4 reports the regression results for the impact of heterogeneity in professional expertise on IPO survival. We report the logit regression based on the unbalanced sample in columns 1 and 2 and the entropy-balanced sample in columns 3 and 4. The dependent variable for the logit regression is a dummy variable that takes a value of one if the firm has survived until year 5 post-IPO and zero otherwise. All variables are winsorised at the 1% and 99% levels to mitigate outliers influencing the results. All the regressions adjust for industry and year fixed effects and include control variables introduced in the methodology section. For ease of interpretation, each regression reports the marginal effects and heteroscedasticity consistent t-statistics in parentheses.

The regression results reported in columns 1 and 2 for the unbalanced sample show that firms with higher executive professional expertise heterogeneity at the IPO are more likely to survive five years post-IPO, while the professional expertise heterogeneity of the entire board or non-executive directors has no impact on IPO survival. This result is significant at the 5% level or better. The marginal effects in column 2 show that the executive professional expertise heterogeneity at the IPO increases the likelihood of survival by 36%. In columns 3 and 4 using the entropy-balanced sample, these results are stronger showing that executive professional heterogeneity improves IPO survival by 48% and the result is significant at the 1% level.

Hence, we find support for our hypothesis and the results are robust after controlling for potential effects of endogeneity.

In line with our expectations, the findings emerge in firms with heterogeneous executive professional expertise as executive directors in IPO firms typically have a higher level of firm-specific information (Ettredge et al., 2021). With a range of expertise in the boardroom, Desai (2016) argues that directors are able to assess and influence more effectively the strategy of the firm. Hence, consistent with our hypothesis, we find that executive professional expertise heterogeneity at the point of listing improves the likelihood of IPO survival to year 5. Gray and Nowland (2017) show that professional expertise heterogeneity of the entire board improves the value of mature firms. Our study shows for the first time that IPO firms are different from mature firms in this regard. In particular, we find that the likelihood of survival of IPO firms is determined by the heterogeneity of executive directors on the board.

[Insert Table 4 about here]

The results for the control variables in Table 4 show that larger IPO firms, better-connected boards, and IPOs that are perceived to be of higher value, as indicated by the IPO premium, have a higher likelihood of survival. These results are significant at the 5% level or better and are consistent with the prior IPO survival studies of Jain and Tabak (2008), Guo and Zhou (2016) and Feng et al. (2019).

Overall, the regression results reported in Table 4 show strong evidence that firms with executive directors possessing a range of professional expertise are more likely to survive as independent entities to year 5 post-IPO. These results are consistent with our hypothesis that IPO firms with greater executive professional expertise heterogeneity at the time of listing are more likely to remain listed as independent entities by year 5 post-IPO. This finding has important practical implications as it emphasises the vital role of executive directors and their professional expertise heterogeneity on IPO survival. It shows that firm-specific knowledge of

executive directors, embedded in their heterogenous professional expertise, is more important for the survival of IPO firms compared to the monitoring and advice offered by the non-executive directors on the board.

4.2.2 Combinations of Professional Expertise Heterogeneity and IPO Survival

Next, we examine whether specific combinations of professional expertise introduced in section 4.1.2 influence the likelihood of IPO survival. By exploring combinations of professional expertise, we add a layer of depth to our analysis on whether specific types of professional expertise held by the entire board, executives or non-executives impact the survival prospects of the firm. This provides novel insights to IPO firms on how to leverage professional expertise in the boardroom for greater efficiency in decision-making and survival in the stock market. We do not develop a hypothesis in this regard, but we are guided by prior research on mature listed firms, such as Gore et al. (2011) and Gray and Nowland (2017), that examines the impact of expertise combinations in the boardroom. Gray and Nowland (2017) find that firm value improves when board heterogeneity reflects a mix of specialist expertise groups, such as lawyers, accountants, consultants, bankers, and outside CEOs. Whereas Gore et al. (2011) focus more broadly on the implications of financial and technical expertise on mature firm governance structures. They find that financial experts provide more oversight with regard to financial policies and strategies. Our analysis provides novel evidence and expands the IPO literature by examining whether there are specific combinations of professional expertise types that influence the likelihood of IPO survival.

The rationale of the regression results reported in Table 5 is to unearth the specific combinations of professional expertise heterogeneity that improve the likelihood of IPO survival. Considering the main results referring to executive professional expertise, we expect our findings to be clustered in combinations of expertise for executive directors. Nonetheless, we report the logit regressions for all combinations of professional expertise using the

unbalanced and entropy balanced samples. To eliminate any potential multicollinearity issues, we run three regressions for each sample. Column 1 focuses on combinations for the entire board (i.e., *Financial Expertise Facing Industry expertise, and Financial Expertise Facing Technical Expertise*) and column 2 reports similar combinations within the executive and non-executive director groups (i.e., *Executives with Financial Expertise Facing Executives with Industry expertise; Non-executives with Financial Expertise Facing Non-executives with Industry expertise*). Column 3 examines similar combinations between director groups (i.e., *Executives with Financial Expertise Facing Non-Executives with Industry expertise*). We repeat these regressions using the entropy-balanced sample in columns 4 to 6.

The regression results reported in Table 5 support our expectations and show that the significant results emanate from the combination of professional expertise within executive directors. In detail, IPO firms where there is at least one executive director with industry expertise and at least one executive director with financial expertise at the time of listing are more likely to survive to year 5 post-IPO (columns 2 and 5). The marginal effects of the logit regression reported in column 5, using the entropy balanced sample, show that the existence of a combination of financial and industry expertise within the executive directors at the IPO increases the likelihood of survival by 31%. These nuanced results build on Gounopoulos and Pham's (2018) findings that IPO firms with specialist CEOs are more likely to survive. We show for the first time that in terms of IPO survival, it is about the combination of professional expertise for the entire executive directors' group in the boardroom rather than the CEO alone. We find that a mix of executive directors with industry expertise and financial expertise ensures a higher likelihood of survival post-IPO. There is no evidence linking the combinations of expertise for the entire board, within non-executive directors or between executive and non-executive directors to the likelihood of IPO survival (see columns 1, 3, 4 and 6). This is consistent with the results reported in Table 4.

[Insert Table 5 about here]

4.2.3 Mechanism: The Type of CEO Leading the IPO Firm

Next, we test whether the main results are influenced by the type of CEO leading the firm, such as CEO Duality, Founder CEO and Founder CEO with duality using the entropy balanced sample. A CEO who is also the board chair has sufficient influence to impact decisions in the boardroom, that have performance implications for the firm (Adams et al., 2005), whilst a Founder CEO may use their influence to exit through mergers post-IPO and gain acquisition premiums (Gao & Jain, 2012).

Table 6 reports regression analysis by interacting the type of CEO leading the firm with the dummy variable for the *Executives with Financial Expertise Facing Executives with Industry expertise.* In doing so, we test whether CEO Duality (column 1), Founder CEO (column 2) and Founder CEO with duality (column, in conjunction with the combination of financial and industry expertise of executive directors on the board influences the likelihood of IPO survival. The regression results reported in column 1 of Table 6 show that the positive effect of the above combination of the professional expertise of executive directors on IPO survival is strengthened by the presence of a Dual CEO. IPO firms with a Dual CEO and a combination of financial and industry expertise within the executive directors are 60% more likely to survive compared to similar IPO firms without a dual CEO at the time of listing. This result is significant at the 5% level. Next, we focus our attention on the Founder CEO. The results reported in column 2 of Table 6 show that IPO firms led by Founder CEOs, and characterised by a combination of financial and industry expertise within the executive directors, are 14 % less likely to survive five years after the IPO and the result is significant at the 10% level.[7] This evidence is consistent with the results reported by Gao and Jain (2012)

[7] The combined effect from the interaction of IPO firms led by Founder CEOs, and characterised by a combination of financial and industry expertise within the executive directors is -0.545+0.396=-0.149

that Founder CEOs are more entrenched than their counterparts and use this position to gain higher acquisition premiums as target firms post-IPO.[8] Finally, the interaction term for *Founder CEO with Duality* in column 3 is insignificant.

The evidence reported in Table 6 shows that our main results are explained by the Dual CEOs with discretion in decision-making. Figure 1 (A) provides further insights into the type of expertise held by Dual CEOs (i.e., industry, financial and technical expertise). Figure 1 (B) displays the corresponding expertise of other executives in the boardroom. The displayed trends show that Dual CEOs have a higher level of industry expertise and these CEOs are associated with the highest level of executives with financial expertise. In other words, Dual CEOs complement their industry expertise with the financial expertise of other executive directors in the boardroom to improve the likelihood of IPO survival. Consistent with Yang and Zhao (2014), our findings indicate that Dual CEOs leverage the firm-specific knowledge of executives to improve information flow to the board for better decision-making. In addition, the interaction terms related to Founder CEOs show that Founders use their influence to exit in a merger post-IPO. Hence, the type of CEO at the helm of the firm, in conjunction with the professional expertise possessed by other executives on the board, has a tangible impact on the likelihood of survival of an IPO firm.

[Insert Table 6 about here]

4.3 Robustness Checks and Further Analyses

4.3.1 Alternative Definition of IPO Survival

We test the robustness of our main results using an alternative definition of IPO survival used in the prior literature (Espenlaub et al., 2012). Mergers may not indicate firm failure as the IPO could be driven by the founders wanting to sell their firm in the near future, while benefitting

[8] Unreported multinomial logistic regression results show that such firms with Founder CEOs are more likely to exit through a merger than survive or delist. 97% of the firms that exit through a merger in our sample are target firms.

from a more objective value metric, i.e., a stock price (Hovakimian & Hutton, 2010). To this end, we explore another definition of survivors, such as censored survivors. Censored survivors is a dummy variable that takes a value of one if IPO firms remain publicly traded as an independent entity up to year 5 post-IPO or exit through a merger and rank above the median in cash to total assets, operating income to total assets, total liabilities to total assets and current assets to current liabilities, and zero otherwise. The rationale for using these four performance-based measures in the classification of mergers into censored survivors is to distinguish between poorly performing firms and well performing firms that are acquired. This new classification yields a sample of 321 survivors and 340 non-survivors.

The logit regression results for the unbalanced and entropy balanced samples are reported in Panel A of Table 7. The regression results exploring the impact of executive professional expertise heterogeneity on the likelihood of IPO survival are reported in columns 1 and 3. The respective regressions for the executive professional expertise combinations are tabulated in columns 2 and 4. The findings with this alternative classification are in line with our main results. Firms with executive professional expertise heterogeneity at the IPO (columns 1 and 3), specifically *Executives with Financial Expertise Facing Executives with Industry Expertise* (columns 2 and 4), have a higher likelihood of survival to year 5 post-IPO. Thus, we find further support for our main result that IPO firms benefit from appointing executives to board with industry expertise and financial expertise around the IPO.

4.3.2 Alternative Estimations: Survival Analysis Methodology

We argue that estimating the timing of the event (exit) provides further context regarding the impact of our primary variables of interest i.e., executive professional expertise heterogeneity and executive professional expertise combinations, on the likelihood of survival post-IPO. Panel B of Table 7 reports the results of the Cox model (columns 1 and 2), where the dependent variable is the survival time. Columns 3 and 4 of the same panel tabulate the regression results

using the accelerated failure time (AFT) model, where the dependent variable is the time to failure. For each estimation, we report the coefficients, (robust t-statistics), [hazard ratios], and [time ratios].[9]

The results of the Cox model and AFT model suggest that IPO firms with greater executive professional expertise heterogeneity, and within the combination of the executive directors with the financial and industry expertise, have longer survival times and the results are significant at the 5% level of significance. The hazard ratio reported in column 2 suggests that firms with *Executives with Financial Expertise Facing Executives with Industry Expertise* have a 48% longer survival time compared to other firms. Similarly, the time ratio in column 4 shows that these firms are associated with a 65% decrease in the time to failure, implying a lower likelihood of exit. To provide some context, the results from the Cox model indicate that a mix of executives with industry expertise and financial expertise increases average survival time from 3.9 years (the average survival time in the sample) to 5.8 years (i.e., 3.9x1.485). Hence the main logit regression results are robust to survival analysis models.

[Insert Table 7 about here]

4.3.3 Controlling for Internal Governance and External Factors

In this section, we control for internal governance factors and external factors that may influence the survival prospects of a firm. Prior evidence in the field (e.g., Cremers et al., 2017) indicates that staggered boards and dual-class shares could affect the likelihood of survival of IPO firms. Staggered boards refer to boards where directors are elected to different classes and serve terms of three years with only one class up for re-election each year. The potential for

[9] In the current empirical context based on the Cox model, a negative (positive) coefficient indicates that a predictor decreases (increases) the likelihood of exit compared to the sample or improves (worsens) IPO survival. If the hazard ratio is greater (less) than one, it implies that the non-survivor firm has a shorter (greater) time to the event/exit from the sample. Conversely, if the time ratio in the AFT model is less (greater) than one, it implies that the non-survivor firm has a greater (shorter) time to failure/exit from the sample. A hazard/time ratio, which equals one shows that there is no difference between survivors and non-survivors.

exit through acquisition post-IPO is less in firms with staggered boards as such structures serve as anti-takeover devices (Cremers et al., 2017). Firms with dual-class shares have two classes of shares, that separate voting rights in decision-making processes. In the IPO context, dual-class shares may impact the influence of board members on the decision-making process and consequently, the likelihood of IPO survival.

In Table 8, we control for the potential effects of staggered boards (columns 1) and dual class shares (columns 2) in IPO firms.[10] Since we do not have any firms in our sample with dual-class shares where executives have a combination of industry expertise and financial expertise, we control for dual shares alone in the model and report the results in column 2. We obtain robust results. Particularly, we find a similar positive effect of *Executives with Financial Expertise Facing Executives with Industry Expertise* on the likelihood of IPO survival. IPO firms with this combination of executive professional expertise at the point of listing have between 30 to 31% higher likelihood of survival and these results are significant at the 1% level or better. Staggered boards increase the likelihood of survival of all IPO firms whereas the interaction term is insignificant. Our main results remain robust after controlling for internal governance factors.

Next, we account for the external factors that may influence the likelihood of IPO survival to year 5 post-IPO such as the presence of high-technology firms in the sample (column 3) or listing during a crisis period (column 4). High technology firms are highly competitive and are characterised by the continuous development of technological products whereas crisis periods increase firms' exposure to financial difficulty. Hence, IPO firms with executive director professional expertise heterogeneity may face challenges in making salient decisions that help firms maintain competitive advantage and navigate crisis periods.

[10] 24% of IPO firms in the sample have staggered boards.

Columns 3 and 4 of Table 8 report the logit regression results using interaction terms to test whether firms in high technology industries (columns 3) or listed within crisis periods (columns 4) impact our findings. We find in both columns that the interaction terms have no significant impact on IPO survival and our main results are still present. As expected, we find firms listed in a crisis period are 12% less likely to survive and this result is significant at the 1% level or better. Thus, a combination of executive directors with industry expertise and financial expertise still improves the survival prospect of IPO firms whether that firm is in the high technology industry or listed within a crisis period. Overall, our findings stay robust after controlling for internal governance and external factors that influence the likelihood of IPO survival.

[Insert Table 8 about here]

4.3.4 Other Measures of Board Heterogeneity and IPO Survival

Notwithstanding the focus of this paper on professional expertise heterogeneity, we also explore whether other measures of board heterogeneity prevalently examined in prior literature, such as gender or age heterogeneity, impact the likelihood of IPO survival. Extant literature suggests that greater female board representation impacts financial performance (Adams & Ferreira, 2009; Sila et al., 2016) and reduces the level of risk-taking by the firm, as female directors are more risk-averse than their male counterparts (Perryman et al., 2016). Age heterogeneity on the board of directors has been associated with better firm performance (Ararat et al., 2015) and more sustainable business practices (Post et al., 2011), which ultimately influence the survival prospect of the firm.

Following the same logic as the main analysis, we test whether the measures of gender heterogeneity (*Female Board Representation*) and age heterogeneity (*Age Heterogeneity Index*) for the entire board, executive and non-executive directors influence IPO survival. The Online Appendix Table A2 reports the results. Heterogeneity in terms of gender is measured

as the percentage of females in the boardroom (Adams & Ferreira, 2009; Sila et al., 2016). Age heterogeneity is measured as the standard deviation of the board's age divided by the mean age of the board (standard deviation of board age/mean of board age). A larger standard deviation (larger age differences between board members) and lower mean age (higher representation of young board members) generate higher age heterogeneity values. High scores indicate greater age heterogeneity (Ali et al., 2014). There is no evidence that the measures of board heterogeneity for gender or age influence the likelihood of IPO survival. This is an interesting result given that the literature for board heterogeneity in mature listed firms emphasises the importance of these measures. Hence, we provide novel evidence that in the IPO context, gender and age heterogeneity of directors on the board does not matter. However, professional expertise heterogeneity of executive directors is an important factor to consider when making board appointments at the point of listing.

5. Conclusion

This paper analyses the relationship between board heterogeneity and IPO survival. Board heterogeneity is measured based on the professional expertise of the entire board and separately for the executive and non-executive directors. We find consistent evidence, after controlling for potential endogeneity concerns, that professional expertise heterogeneity of executive directors at the IPO improves the likelihood of survival post-IPO. Particularly, this positive effect emerges in firms where executive directors have a combination of industry expertise and financial expertise. We also show that the positive effect of the above combination of the professional expertise of executive directors on IPO survival is strengthened by the presence of a Dual CEO. Further analysis reveals that Dual CEOs are typically industry experts and they are associated with a level of other executive directors with financial expertise. Consistent with Yang and Zhao (2014), these novel findings indicate that Dual CEOs leverage the firm-specific

knowledge and expertise of executives to improve information flow to the board for better decision-making. Conversely, our further analysis suggests that when a Founder CEO is leading the IPO firm, such firms are less likely to survive post-IPO and exit through a merger. These results are robust using an alternative definition of IPO survival, survival analysis models, and controlling for internal governance and external factors such as staggered boards, dual class shares, high technology industries and crisis periods. Finally, we find that other measures of board heterogeneity (gender and age) have no influence on the survival prospect of IPO firms.

The main contribution of this paper to the literature is three-fold. First, we show that in terms of IPO survival, the role of the professional expertise heterogeneity of executive directors is more important compared to the professional expertise heterogeneity of the entire board or non-executive directors. This evidence indicates that firm-specific knowledge of executive directors, embedded in their heterogenous professional expertise, is more critical for the survival of IPO firms compared to the monitoring and advice offered by the non-executive directors on the board. Furthermore, gender and age heterogeneity of directors on the board do not matter for IPO survival. Second, we provide new evidence on the importance of complementarity between the industry expertise and financial expertise of executive directors for long-term survival post-IPO. We show that it is about the combination of professional expertise of all the executive directors on the board rather than the CEO alone, as suggested by the prior literature (Gounopoulos & Pham, 2018). Hence, the focus of IPO firms as they bridge the information asymmetry gap should be on improving heterogeneity in the professional expertise of executive directors with a combination of industry expertise and financial expertise which improves the information flow to the board. Finally, we provide evidence supporting the benefits of unified leadership through Dual CEOs in IPO firms. Our findings show that, whilst Founder CEOs are focused on exiting post-IPO, Dual CEOs improve the information flow to

the board through other executive directors' financial expertise, resulting in a higher likelihood of survival. Therefore, unified leadership facilitates better decision-making and IPO firms need to consider the type of CEO hired at the point of listing.

This paper has practical implications for potential IPO firms, investors and regulators. The novel evidence provided in this paper provides clear guidance to the companies about strategies to use when appointing new directors on the board around the IPO. This knowledge is also useful to investors in identifying IPO firms with a higher likelihood of survival. Furthermore, these results are also informative in terms of listing regulations, such as the NASDAQ board diversity listing standard implemented from 31st December 2023. This listing standard requires IPO firms to disclose the diversity of their board members. However, the standard focuses on the demographic attributes only of board members, such as gender and ethnicity. Our findings show that incorporating professional expertise in such listing standards works towards improving the survival prospect of IPO firms after listing.

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Table 1: IPO Survival Rates Across Time and Industries

This table presents the distribution of IPO survivorship for 661 US IPO firms across the sample period. There are two main survivorship categories: Survivors and Non-Survivors. Survivors are defined as firms that remains publicly traded as an independent entity up to year five post-IPO, and zero otherwise. Non-survivors relate to all other firms that are not classified as survivors and exit the sample post-IPO due to a merger or delisting. Panel A shows the distribution of IPOs by survivorship category while Panel B reports the industry distribution of firms at the IPO (year 0) and five years post-IPO (year 5) and the survival rates for each industry.

Panel A: Post-IPO Survival by Category

Years After IPO	Survivors		Non-Survivors	
	Number	Percentage	Number	Percentage
0	661	100.00	0	0.00
1	565	85.48	96	14.52
2	508	76.85	153	23.15
3	466	70.50	195	29.50
4	431	65.20	230	34.80
5	304	45.99	357	54.01

Panel B: Fama-French 12 Industry Classification in Year 0 and Year 5 post-IPO

Industry	Year 0		Year 5		Survival Rate
	N	Percentage	N	Percentage	
Consumer non-durables	21	3.18	7	2.30	33.33
Consumer durables	10	1.51	5	1.64	50.00
Manufacturing	35	5.30	19	6.25	54.29
Oil, gas, coal extraction and products	16	2.42	11	3.62	68.75
Chemical and allied products	6	0.91	4	1.32	66.67
Business equipment	226	34.19	96	31.58	42.48
Telephone and television transmission	33	4.99	11	3.62	33.33
Utilities	4	0.61	2	0.66	50.00
Wholesale, retail, and some services	79	11.95	35	11.51	44.30
Healthcare, medical equipment, drugs	132	19.97	72	23.68	54.55
Other	99	14.98	42	13.82	42.42
Total	661	100.00	304	100.00	45.99

Table 2: Summary Statistics

This table presents summary statistics for the 661 US IPOs in the sample by survivorship categories. There are 304 survivors and 357 non-survivors in our sample. The differences in the mean and median values between the two categories are tested using a t-test and a Wilcoxon rank-sum test, respectively. All board data is hand-collected from IPO prospectuses, IPO deals data is obtained from Thomson One Banker and firm financial data from Compustat and CRSP. All variables are defined in Appendix A.*, **, and *** represent significance at the 10%, 5% and 1% levels, respectively.

	Survivors			Non-Survivors		
	Mean	Median	St. Dev	Mean	Median	St. Dev
Panel A: Boardroom Professional Expertise Heterogeneity						
Entire Board Professional Expertise	0.522	0.571	0.183	0.484***	0.494***	0.168
Executive Professional Expertise	0.068	0.000	0.173	0.051*	0.000	0.150
Non-Executive Professional Expertise	0.499	0.560	0.200	0.450***	0.480***	0.206
Panel B: Board and CEO Characteristics						
Board Size	7.243	7.000	1.829	6.737	7.000***	1.801
Board Independence (%)	74.973	80.000	16.559	70.230	75.000***	19.312
Board Voting Share Ownership (%)	41.361	43.876	25.125	41.564	43.299	22.853
Board Connections	1.943	1.667	1.349	1.507	1.333***	1.049
CEO Tenure (years)	5.908	4.000	5.564	5.429	4.000	4.662
Founder CEO	0.359	0.000	0.480	0.375	0.000	0.485
CEO Duality	0.461	0.000	0.499	0.476	0.000	0.500
VC Board Representation	0.747	1.000	0.436	0.720	1.000	0.450
Panel C: Firm and IPO Characteristics						
Firm Age (years)	11.225	8.000	12.196	9.991	6.000***	13.591
Firm Size	5.247	4.973	1.537	4.742***	4.716***	1.401
Leverage	0.157	0.013	0.242	0.156	0.017	0.311
Risk	0.416	0.109	0.889	0.410	0.102	0.955
Return on Assets	-0.113	-0.011	0.292	-0.144	-0.050*	0.290
R&D Intensity	0.094	0.042	0.123	0.082	0.015**	0.156
Asset Tangibility	0.260	0.145	0.293	0.237	0.136	0.259
IPO Underpricing	-0.248	-0.092	0.525	-0.270	-0.105	0.525
IPO Premium	0.884	0.808	0.698	0.788	0.783	0.359

Table 3: Types of Professional Expertise in the Boardroom

This table reports the distribution of Professional Expertise in the boardroom of 661 IPO firms in the sample. Panel A reports the distribution of each professional expertise group for the entire board, executive and non-executive directors, across survivorship categories. Panel B provides a distribution of ten combinations of professional expertise in the entire board, between executives and non-executives, using the three types of professional expertise from Panel A: *Industry expertise*, *Financial Expertise* and *Technical Expertise*.

Panel A: Professional Expertise Groups

	Entire Board		Executive Directors		Non-Executive Directors	
	Percentage of Survivors	Percentage of Non-Survivors-	Percentage of Survivors	Percentage of Non-Survivors-	Percentage of Survivors	Percentage of Non-Survivors
Types of Professional Expertise: Industry expertise						
Professional Executive with Industry Expertise	83.88	85.43	75.00	78.15	55.92	54.34
Professional Executive without Industry Expertise	16.12	14.57	25.00	21.85	44.08	45.66
Types of Professional Expertise: Financial Expertise						
Accountant	11.84	9.52	2.30	1.96	9.54	8.12
Banker	6.58	4.20	0.00	0.28	6.58	3.92
Finance Expert	21.71	15.69	2.96	2.24	18.75	13.45
Investment Professional	77.96	77.87	2.30	1.68	77.63	77.87
Types of Professional Expertise: Technical Expertise						
Academic	9.21	9.52	0.00	0.28	9.21	9.52
Consultant	19.74	22.13	0.66	2.52	19.08	19.89
Doctor	13.49	6.72	1.97	1.12	12.83	6.16
Engineer	7.57	1.96	3.29	0.56	5.26	1.96
IT Expert	6.58	5.32	2.30	0.28	4.28	5.04
Lawyer	13.82	11.48	2.30	1.68	12.50	10.08
Scientist	9.87	3.08	3.29	1.12	8.55	2.80

Panel B: Professional Expertise Combinations

	Percentage of Survivors	Percentage of Non-Survivors
Entire Board with Financial Expertise Facing Industry Expertise	73.03	72.27
Entire Board with Technical Expertise Facing Industry Expertise	46.38	39.22
Executives with Financial Expertise Facing Executives with Industry Expertise	5.26	3.08
Executives with Technical Expertise Facing Executives with Industry Expertise	4.93	4.20
Non-Executives with Financial Expertise Facing Non-Executives with Industry Expertise	48.36	46.78
Non-Executives with Technical Expertise Facing Non-Executives with Industry Expertise	27.63	22.69
Executives with Financial Expertise Facing Non-Executives with Industry Expertise	2.63	2.24
Executives with Technical Expertise Facing Non-Executives with Industry Expertise	4.28	3.64
Non-Executives with Financial Expertise Facing Executives with Industry Expertise	64.14	64.99
Non-Executives with Technical Expertise Facing Executives with Industry Expertise	38.16	33.89

Table 4: Professional Expertise Heterogeneity and IPO Survival

This table reports the logit regression results for the impact of Professional Expertise Heterogeneity on the likelihood of IPO survival to year 5 post-IPO. The dependent variable, Survivors is a dummy variable that takes a value of one if IPO firms remain publicly traded as an independent entity up to year 5 post-IPO, and zero otherwise. Columns 1 and 2 report the results for the unbalanced sample while columns 3 and 4 report the results after accounting for potential endogeneity using the entropy balanced sample. All independent variables are defined in Appendix A. For consistent discussion, we present the marginal effects and robust t-statistics in parentheses. Independent and control variables are measured in the year of the IPO (year 0). *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Survivors five years after the IPO			
	Unbalanced Sample		Entropy Balanced Sample	
	(1)	(2)	(3)	(4)
Entire Board Professional Expertise	0.027		0.030	
	(0.165)		(0.167)	
Executive Professional Expertise		0.359**		0.483***
		(2.455)		(3.056)
Non-Executive Professional Expertise		0.047		0.008
		(0.395)		(0.060)
Firm Age	0.000	0.000	-0.000	-0.000
	(0.059)	(0.063)	(-0.212)	(-0.145)
Firm Size	0.062***	0.064***	0.051**	0.052**
	(2.657)	(2.739)	(2.016)	(2.014)
Leverage	-0.280**	-0.296**	-0.051	-0.067
	(-2.056)	(-2.151)	(-0.390)	(-0.479)
Risk	0.029	0.026	0.005	0.006
	(1.159)	(1.008)	(0.178)	(0.223)
Return on Assets	0.180	0.195	0.266**	0.299**
	(1.528)	(1.564)	(2.200)	(2.318)
R&D Intensity	0.203	0.237	0.338	0.408*
	(1.003)	(1.121)	(1.484)	(1.695)
Asset Tangibility	0.127	0.128	0.105	0.101
	(1.263)	(1.255)	(0.964)	(0.896)
Board Size	0.020	0.015	0.019	0.013
	(1.420)	(1.083)	(1.305)	(0.895)
Board Independence	0.001	0.003	0.001	0.003
	(0.994)	(1.597)	(0.667)	(1.518)
Board Connections	0.041*	0.043**	0.046**	0.049**
	(1.917)	(1.985)	(2.111)	(2.247)
Board Voting Share Ownership	-0.000	-0.001	-0.001	-0.001
	(-0.429)	(-0.558)	(-0.697)	(-0.979)
CEO Tenure	0.003	0.003	0.005	0.005
	(0.666)	(0.631)	(0.996)	(0.916)
Founder CEO	0.007	0.014	-0.036	-0.020
	(0.141)	(0.268)	(-0.663)	(-0.364)
CEO Duality	0.029	0.024	0.058	0.050
	(0.640)	(0.528)	(1.169)	(1.003)
VC Board Representation	-0.084	-0.086	-0.095	-0.089
	(-1.447)	(-1.473)	(-1.510)	(-1.449)
IPO Underpricing	-0.031	-0.031	-0.049	-0.052
	(-0.736)	(-0.720)	(-1.135)	(-1.168)
IPO Premium	0.086*	0.093**	0.097*	0.105*
	(1.841)	(1.972)	(1.774)	(1.892)
Constant	-3.526***	-3.887***	-3.410***	-3.878***
	(-3.782)	(-4.435)	(-3.431)	(-4.190)
Industry and Year Dummies	Yes	Yes	Yes	Yes
No. of observations	661	661	661	661
Pseudo R^2	0.109	0.116	0.118	0.131
Chi-square	84.664***	89.811***	83.372***	88.419***
Log Likelihood	-406.330	-403.010	-409.746	-404.032

Table 5: Combinations of Professional Expertise and IPO Survival

This table reports the results on whether combinations of Professional Expertise in the boardroom impact the likelihood of IPO survival to year 5 post-IPO. We report the logit regressions using the unbalanced sample and entropy balanced sample for the impact of each combination on the likelihood of survival post-IPO. Independent and control variables are measured in the year of the IPO (year 0). For consistent discussion, we present the marginal effects and robust t-statistics in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Survivors five years after the IPO					
	Unbalanced Sample			Entropy Balanced Sample		
	(1)	(2)	(3)	(4)	(5)	(6)
Entire Board with Financial Expertise Facing Industry Expertise	0.001 (0.011)			0.003 (0.041)		
Entire Board with Technical Expertise Facing Industry Expertise	0.035 (0.766)			0.004 (0.079)		
Executives with Financial Expertise Facing Executives with Industry Expertise		1.238*** (2.692)			1.306*** (2.809)	
Executives with Technical Expertise Facing Executives with Industry Expertise		0.231 (0.521)			0.432 (0.893)	
Non-Executives with Financial Expertise Facing Non-Executives with Industry Expertise		0.047 (0.224)			0.142 (0.647)	
Non-Executives with Technical Expertise Facing Non-Executives with Industry Expertise		0.062 (0.259)			-0.169 (-0.669)	
Executives with Financial Expertise Facing Non-Executives with Industry Expertise			0.184 (1.358)			0.225 (1.577)
Executives with Technical Expertise Facing Non-Executives with Industry Expertise			0.005 (0.040)			0.044 (0.303)
Non-Executives with Financial Expertise Facing Executives with Industry Expertise			0.000 (0.003)			0.010 (0.170)
Non-Executives with Technical Expertise Facing Executives with Industry Expertise			0.018 (0.373)			-0.021 (-0.417)
Constant	-3.477*** (-3.982)	-3.843*** (-4.451)	-3.592*** (-4.130)	-3.344*** (-3.682)	-3.837*** (-4.114)	-3.500*** (-3.828)
Control Variables, Industry and Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
No. of observations	661	661	661	661	661	661
Pseudo R^2	0.110	0.118	0.111	0.118	0.130	0.122
Chi-square	85.359***	89.792***	86.132***	83.285***	88.477***	85.379***
Log Likelihood	-406.043	-402.216	-405.404	-409.757	-404.168	-407.888

Table 6: Type of CEO Leading the IPO Firm

This table tests whether the type of CEO leading the IPO firm in terms of CEO Duality, Founder CEO or Founder CEO with Duality explains the impact of the combination between the financial and industry expertise within the executive directors on the likelihood of IPO survival using the entropy balanced sample. We interact the type of the CEO at the helm of the IPO firm with the dummy variable measuring the combination of the financial and industry expertise within the executive directors. Marginal effects are reported for consistency and the robust t-statistics are reported in parentheses. Independent and control variables are measured in the year of the IPO (year 0). *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

	Survivors five years after the IPO		
	Entropy Balanced Sample		
	(1)	(2)	(3)
CEO Duality	0.025		
	(0.504)		
Founder CEO		-0.013	
		(-0.240)	
Founder CEO with Duality			0.042
			(0.699)
Executives with Financial Expertise Facing Executives with Industry Expertise	0.093	0.396***	0.380***
	(0.623)	(3.153)	(2.841)
Executives with Financial Expertise Facing Executives with Industry Expertise* CEO Duality	0.606**		
	(2.305)		
Executives with Financial Expertise Facing Executives with Industry Expertise* Founder CEO		-0.545*	
		(-1.780)	
Executives with Financial Expertise Facing Executives with Industry Expertise*Founder CEO with Duality			-0.190
			(-0.705)
Executives with Technical Expertise Facing Executives with Industry Expertise	0.098	0.104	0.105
	(0.812)	(0.853)	(0.859)
Non-Executive Professional Expertise	0.043	0.016	0.022
	(0.336)	(0.130)	(0.173)
Constant	-3.826***	-3.850***	-3.837***
	(-4.080)	(-4.068)	(-4.053)
Control Variables, Industry and Year Dummies	Yes	Yes	Yes
No. of observations	661	661	661
Pseudo R^2	0.138	0.133	0.130
Chi-square	92.487***	88.686***	87.954***
Log Likelihood	-400.741	-403.074	-404.560

Table 7: Alternative Definition of IPO Survival and Estimations

This table reports robustness results to our main results related to the impact of Executive Professional Expertise on the likelihood of survival. The regression results reported in Panel A use an alternative measure of IPO survival (censored survivors) as a dependent variable. Consistent with Espenlaub et al. (2012), censored survivors are defined as survivors including mergers that rank above the median for four performance-based measures. Marginal effects are reported for consistency. Panel B tabulates the regression results using alternative survival estimations, such as Cox Proportional Hazard and Accelerated Failure Time models. It reports the results for the Cox proportional hazard model and the accelerated failure time model for the impact of Executive Professional Expertise on survival time and time to failure. Survival time is used to generate the hazard rate in columns 1 and 2, while the time to failure is used to generate the time ratio in columns 3 and 4. Hazard rates (Cox model) and time ratios (AFT model) are reported in square brackets. Independent and control variables are measured in the year of the IPO (year 0). Robust t-statistics are reported in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

Panel A: Logit Regression for Professional Expertise and IPO Survival Using Censored Survivorship				
	Censored Survivors five years after the IPO			
	Unbalanced sample		Entropy Balanced Sample	
	(1)	(2)	(3)	(4)
Executive Professional Expertise	0.327**		0.461***	
	(2.185)		(2.847)	
Executives with Financial Expertise Facing		0.277**		0.307**
Executives with Industry Expertise		(2.355)		(2.568)
Executives with Technical Expertise Facing		0.084		0.135
Executives with Industry Expertise		(0.775)		(1.122)
Non-Executive Professional Expertise	0.022	0.028	-0.012	-0.008
	(0.186)	(0.236)	(-0.097)	(-0.061)
Constant	-3.404***	-3.431***	-3.310***	-3.261***
	(-3.945)	(-4.016)	(-3.625)	(-3.530)
Firm and Board Controls	Yes	Yes	Yes	Yes
Industry and Year Dummies	Yes	Yes	Yes	Yes
No. of observations	661	661	661	661
Pseudo R^2	0.109	0.111	0.124	0.123
Chi-square	83.084***	84.440***	83.141***	83.870***
Log Likelihood	-407.800	-406.970	-409.719	-409.920
Panel B: Survival Models for the Impact of Executive Professional Expertise on Survival Time				
	Cox model		Accelerated Failure Time Model	
	(1)	(2)	(3)	(4)
Executive Professional Expertise	-0.424		0.435*	
	(-1.609)		(1.667)	
	[0.654]		[1.545]	
Executives with Financial Expertise Facing		-0.723**		0.728**
Executives with Industry Expertise		(-2.286)		(2.287)
		[0.485*]		[1.654*]
Executives with Technical Expertise Facing		0.065		-0.019
Executives with Industry Expertise		(0.226)		(-0.066)
		[1.067]		[0.981]
Non-Executive Professional Expertise	-0.182	-0.239	0.285	0.339
	(-0.797)	(-1.068)	(1.262)	(1.536)
	[0.833]	[0.787]	[1.330]	[1.404]
Constant			0.016	-0.047
			(0.037)	(-0.111)
Control variables, Industry, and Year Dummies	Yes	Yes	Yes	Yes
No. of observations	661	661	661	661
No. of failures	357	357	357	357
Pseudo R^2	0.018	0.019	-	-
Chi-square	97.347***	102.034***	103.511***	108.546***

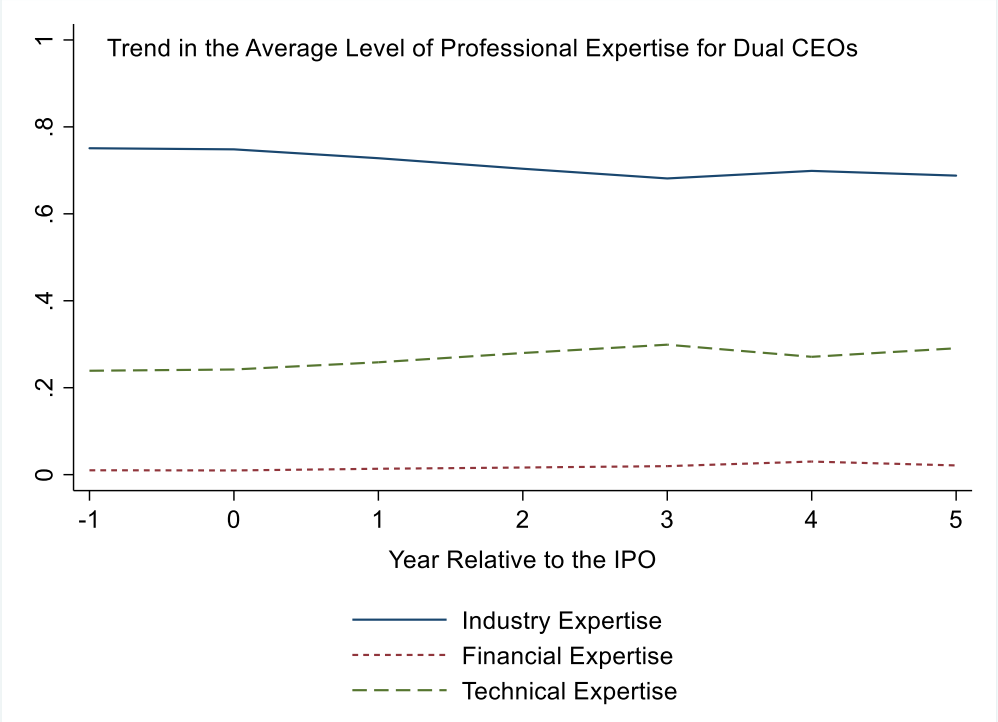
Table 8: Controlling for Internal Governance and External Factors

This table reports regression results testing whether the impact of Executive Professional Expertise heterogeneity on IPO survival is influenced by Internal Governance (staggered boards and dual-class shares) or External factors (high technology industries and crisis periods) using the entropy balanced sample. Column 1 reports the results of the interaction between *Executives with Financial Expertise Facing Executives with Industry Expertise* and *Staggered Boards*. There are no firms in our sample with dual-class shares where executives have a mix of industry expertise and financial expertise. Hence, we simply control for this effect in column 2. Columns 3 and 4 report similar interactions with *High Technology Industries* and *Crisis periods*, respectively. Marginal effects are reported for consistency and ease of discussion on the likelihood of IPO survival. Robust t-statistics are reported in parentheses. *, **, *** represent significance at the 10%, 5%, and 1% levels, respectively.

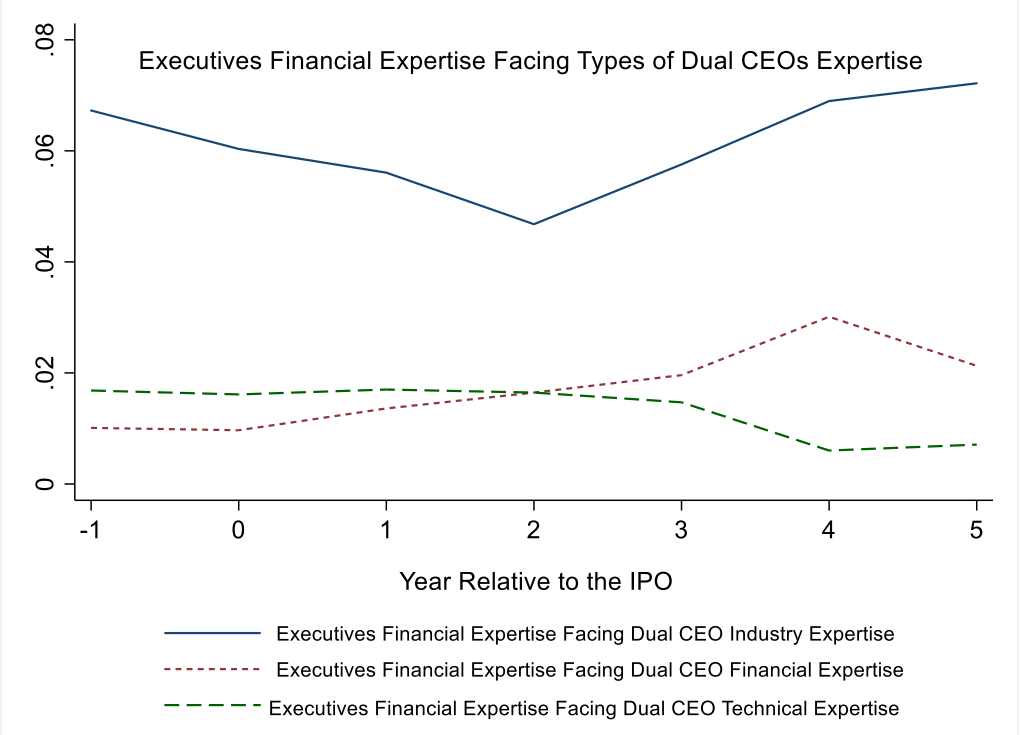
	Survivors five years after the IPO			
	Entropy Balanced Sample			
	(1)	(2)	(3)	(4)
Executives with Financial Expertise Facing Executives with Industry Expertise	0.315***	0.302***	0.253**	0.237**
	(2.590)	(2.625)	(2.146)	(2.013)
Staggered Boards	0.439***			
	(7.559)			
Executives with Financial Expertise Facing Executives with Industry Expertise* Staggered Boards	-0.119			
	(-0.540)			
Dual Class Shares		-0.029		
		(-0.359)		
High Technology Industries			-0.002	
			(-0.042)	
Executives with Financial Expertise Facing Executives with Industry Expertise* High Technology Industries			0.093	
			(0.272)	
Crisis Period				-0.129***
				(-2.308)
Executives with Financial Expertise Facing Executives with Industry Expertise* Crisis Period				0.303
				(0.687)
Executives with Technical Expertise Facing Executives with Industry Expertise	0.083	0.058	0.076	0.066
	(0.735)	(0.526)	(0.666)	(0.630)
Non-Executive Professional Expertise	0.095	0.059	0.048	0.153
	(0.723)	(0.493)	(0.406)	(1.338)
Constant	-4.521***	-3.891***	-2.913***	-4.114***
	(-4.951)	(-4.464)	(-4.478)	(-5.047)
Control variables and Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	No
No. of observations	661	661	661	661
Pseudo R^2	0.185	0.118	0.107	0.092
Chi-square	142.967***	89.646***	82.740***	72.581***
Log Likelihood	-370.270	-401.912	-407.285	-414.170

Figure 1: Trends in Dual CEOs and Executive Directors' Professional Expertise

Figure 1 (A) and (B) provide evidence supporting the results in Table 6. Figure 1(A) shows that Dual CEOs have a higher level of industry expertise while Figure 1(B) shows that firms with Dual CEOs typically also have on the board at least one other executive director with financial expertise. This evidence shows that there is a complementary effect between the industry expertise possessed by the Dual CEOs and other executive directors on the board with financial expertise.



(A)



(B)

Appendix A: Variable Definitions

Dependent Variables	Description
Survivors	Survivors is a dummy variable that takes a value of one if IPO firms remain publicly traded as an independent entity up to year 5 post-IPO, and zero otherwise.
Non-Survivors	Non-survivors relate to all other firms that are not classified as survivors and exit the sample post-IPO due to a merger or delisting. Mergers are firms that are involved in a merger or are acquired after listing and they lose their identity as independent entities post-IPO. Delistings are firm that do not survive as independent entities after the IPO and exit the stock market regardless of the reason for delisting.
Censored Survivors	Censored survivors is a dummy variable that takes a value of one if IPO firms remain publicly traded as an independent entity up to year 5 post-IPO or exit through a merger and rank above the median in cash to total assets, operating income to total assets, total liabilities to total assets and current assets to current liabilities, and zero otherwise.
Independent Variables	
Professional Expertise (Computed for the entire board, executive and non-executive directors)	An expertise index based on the Blau index using the proportion of expertise groups on each board. Professional Expertise includes the following thirteen categories: Academic, Accountant, Banker, Consultant, Doctor, Engineer, Professional Executive with Industry expertise, Professional Executive without Industry expertise, Finance Expert, IT Expert, Investment Professional, Lawyer, and Scientist. $$1 - \sum_{i=1}^{n} P_i^2$$ Where Pi is the proportion of group members in each of the i categories. High scores indicate higher professional expertise heterogeneity.
Board Professional Expertise Groups	
Academic	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as an academic i.e., lecturer or other academic roles in higher institutions.
Accountant	A dummy variable that takes a value of one if at least one director on the board is a chartered accountant or has prior or current accounting experience such as, as a CPA, and otherwise zero.
Banker	A dummy variable that takes a value of one if at least one director on the board has prior or current experience in the banking industry, and otherwise zero.
Professional Executives with Industry expertise	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as a professional executive in the same industry as the firm, for example, the director in a pharmaceutical firm has prior experience as a Chief financial officer or President in another pharmaceutical firm, and otherwise zero.
Professional Executives without Industry expertise	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as a professional executive in firms from other industries, for example, the director in a pharmaceutical firm has prior experience as a Chief financial officer or President in a technology firm, and otherwise zero.
Consultant	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as a consultant regardless of the industry, and otherwise zero.
Doctor	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as a medical doctor, and otherwise zero.
Engineer	A dummy variable that takes a value of one if at least one director on the board has prior or current engineering experience, and otherwise zero.

Finance Expert	A dummy variable that takes a value of one if at least one director on the board has prior or current experience in a finance role such as in mutual funds or other firms, and otherwise zero.
IT Expert	A dummy variable that takes a value of one if at least one director on the board has prior or current experience in technological firms.
Investment Professional	A dummy variable that takes a value of one if at least one director on the board has prior or current experience as a venture capitalist or in private equity, and otherwise zero.
Lawyer	A dummy variable that takes a value of one if directors are lawyers with prior or current experience in legal firms, and otherwise zero.
Scientist	A dummy variable that takes a value of one if directors have prior or current experience as scientific researchers.
Board Professional Expertise Types Computed for the Entire Board, Executives and Non-Executive Directors	
Financial Expertise	A dummy variable that takes a value of one for firms where at least one director has expertise as an accountant, banker, finance expert or investment professional, and otherwise zero.
Industry Expertise	A dummy variable that takes a value of one for firms where at least one director has expertise in the same industry as the firm i.e., professional executives with industry expertise, and otherwise zero. For example, a director in a pharmaceutical firm with prior experience as the president or chief operations officer in another pharmaceutical firm
Technical Expertise	A dummy variable that takes the value of one for firms where at least one director offers operational expertise as a consultant, academic, doctor, engineer, scientist, IT expert or lawyer, and otherwise zero.
Professional Expertise Combinations Computed for the Entire Board, Executives and Non-Executive Directors	
Financial Expertise Facing Industry expertise	A dummy variable that takes a value of one if the firm has a mix of directors with industry expertise facing directors with financial expertise, and otherwise zero
Technical Expertise Facing Industry expertise	A dummy variable that takes a value of one if the firm has a mix of directors with technical expertise facing directors with industry expertise, and otherwise zero.
Control Variables	
Firm Age	The number of years since incorporation of the firm.
Firm Size	The natural log of total assets.
Leverage	The ratio of the book value of long-term debt to total assets.
Risk	The return variance is measured as the standard deviation of the daily stock return annualised as computed in CRSP using the formula below: $r_t = \left(\frac{p_t * f_t + d_t}{p_{t'}}\right) - 1$ where r_t = return on purchase at t, p_t= last sale price or closing bid/ask average at time t; d_t= cash adjustment for t; f_t = price adjustment factor for t; $p_{t'}$= last sale price or closing bid/ask average at time of last available price < t.
Return on Assets (ROA)	Earnings before interest, taxes, depreciation, and amortisation divided by total assets.
R&D Intensity	The natural log of one plus the ratio of research and development expenditures to total assets.
Asset Tangibility	The net property, plant and equipment scaled by total assets.
Board Size	The number of directors on the board.
Board Independence	Percentage of independent directors on the board relative to board size. Director independence is measured in line with prior literature as a director who: is not a substantial shareholder of the firm up to 5%; had not been employed in any executive capacity by the company within the last 5 years; is not retained as a professional adviser by the company (either personally or through their firm); is not a significant supplier or

	customer of the company; has no significant contractual relationship with the company other than as a director.
Board Connections	This is the average number of connections the board has to other boards in terms of board seats.
Board Voting Share Ownership	The total percentage of voting shares owned by the board.
CEO Tenure	The number of years the CEO has served on the board.
Founder CEO	A variable that takes a value of one if the founder of the firm is the CEO, and zero otherwise.
CEO Duality	A dummy variable that takes a value of one if the CEO is also the board chair, and zero otherwise.
VC Board Representation	A dummy variable that takes a value of one if a Venture Capitalist Director is present on the board, and zero otherwise.
IPO Underpricing	The difference between the price at the end of the first day of trading and the offer price is expressed as a fraction of the offer price.
IPO Premium	The difference between the offer price and the book value per share is expressed as a fraction of the offer price.
High Technology Industries	A dummy variable that takes a value of one if an IPO firm has an industry SIC code of 3571, 3572, 3575, 3577, 3578 (computer hardware), 3661, 3663, 3669 (communications equipment), 3671, 3672, 3674, 3675, 3577, 3678, 3679 (electronics), 3812 (navigation equipment), 3823, 3825, 3826, 3827, 3829 (measuring and controlling devices), 3841, 3845 (medical instruments), 4812 4813 (telephone equipment), 4899 (communications services), 7371–7375, 7378, or 7379 (software), and zero otherwise zero, consistent with Guonopoulos and Pham (2018).
Crisis Period	A dummy variable that takes a value of one if an IPO firm is listed within the dot com bubble (2000 to 2001) or the subprime financial crisis (2007 to 2008)
Staggered Boards	A dummy variable that takes a value of one if the board is staggered, and otherwise zero.
Dual Class Shares	A dummy variable that takes a value of one if a firm has dual-class shares, and otherwise zero.
Other Measures of Board Heterogeneity	
Female Board Representation	Percentage of females on the board of directors.
Age Heterogeneity Index	The standard deviation of board age is divided by the mean age of the board. Using the coefficient of variation formula (SD of Board Age/ Mean of Board Age). A larger standard deviation (larger age differences between board members) and lower mean age (higher representation of young board members) would generate higher age diversity values. High scores indicate greater age heterogeneity

Appendix B: Professional Expertise Entropy Balancing Diagnostic Test

This table reports the entropy balancing results that ensure better covariate balance between the treated firms (firms with high level of professional expertise) and control groups (firms with low level professional expertise) Balancing is based on the IPO year and uses the first two moments(i.e. mean and variance). We report the standardised mean differences for treated and re-weighted control samples, as well as the variance ratio comparing both samples to show that entropy balancing is achieved. After re-weighing the observations, the mean difference is on average zero while the variance ratio is on average one in Panel B.

Panel A: Unbalanced Sample						
	Treated N= 338		Control N=338		Std. Mean Difference	Variance Ratio
	Mean	Variance	Mean	Variance		
Firm Age	11.080	185.100	10.020	150.700	1.060	1.228
Firm Size	4.946	2.008	5.004	2.420	-0.058	0.830
Return on Assets	-0.152	0.085	-0.107	0.084	-0.045	1.012
Risk	0.480	1.164	0.342	0.524	0.138	2.221
Leverage	0.152	0.095	0.161	0.062	-0.009	1.532
Asset Tangibility	0.225	0.069	0.271	0.081	-0.046	0.852
Tobin's Q	3.776	8.526	4.132	14.160	-0.356	0.602
Panel B: Entropy Balanced Sample						
	Treated N= 338		Control N=338		Std. Mean Difference	Variance Ratio
	Mean	Variance	Mean	Variance		
Firm Age	11.080	185.100	11.080	181.800	0.000	1.018
Firm Size	4.946	2.008	4.946	2.009	0.000	1.000
Return on Assets	-0.152	0.085	-0.152	0.085	0.000	1.000
Risk	0.480	1.164	0.480	1.164	0.000	1.000
Leverage	0.152	0.095	0.152	0.095	0.000	1.000
Asset Tangibility	0.225	0.069	0.225	0.069	0.000	1.000
Tobin's Q	3.776	8.526	3.776	8.530	0.000	1.000