

# Age Divide, Risk Decides: CEO-Chair age gap and D&O Liability Insurance

## Abstract

**Purpose** – This study investigates the impact of CEO-Chairman age dissimilarity on the likelihood of purchasing Directors and Officers (D&O) liability insurance, exploring whether the relationship varies across organizational contexts, such as CEO tenure, state ownership, and family firm status.

**Design/methodology/approach** – We analyze a sample of 36,210 firm-year observations from publicly listed firms in China from 2001–2021. Using panel data regression, we examine the association between the CEO-Chairman age gap and D&O insurance purchases, incorporating firm characteristics such as CEO tenure, state ownership, and family firm control. We also explore the potential curvilinear effects of the age gap on insurance decisions.

**Findings** – Our findings show a positive and statistically significant relationship between the CEO-Chairman age gap and the likelihood of purchasing D&O liability insurance. This association is more pronounced in firms with higher CEO tenure, state-owned enterprises (SOEs), and family firms, suggesting that larger governance risks due to leadership disparities drive insurance decisions. Additionally, the relationship is curvilinear, with moderate age gaps leading to a higher likelihood of purchasing D&O insurance, but the effect diminishes at very large age gaps.

**Implications** – This study underscores the importance of CEO-Chairman age dissimilarity in corporate risk management. For practitioners, particularly in state-owned and family firms, larger age gaps may signal heightened governance risks, driving the need for D&O insurance. The curvilinear relationship suggests that firms should assess the optimal age balance between executives. Policymakers could use these insights to refine governance regulations, particularly in markets with unique ownership structures, enhancing risk management strategies.

**Originality/Value** – This study contributes to the literature by highlighting the role of leadership dynamics, specifically the CEO-Chairman age gap, in influencing corporate risk management decisions. It offers new insights into how organizational characteristics such as CEO tenure, ownership structure, and family control interact with the firm's approach to risk mitigation through D&O liability insurance. The findings provide valuable implications for governance practices, risk management strategies, and policymaking, particularly in markets with distinctive ownership structures like China.

**Keywords:** *CEO-Chairman age gap, D&O liability insurance, state-owned enterprises, family firms, CEO tenure.*

**JEL Classification:** G22; G30.

# Age Divide, Risk Decides: CEO-Chair age dissimilarity and D&O Liability Insurance

## 1. Introduction

We investigate the relationship between Director and Officer (*hereafter* D&O) liability insurance and the age dissimilarity between the CEO and the Chairman (*hereafter* Chair) of the board. D&O liability insurance is designed to protect corporate directors and officers from personal financial loss if they are sued for alleged wrongful acts—such as breach of fiduciary duty or mismanagement—while carrying out their responsibilities in the company. This form of insurance serves as a critical risk management tool for firms, particularly in protecting the personal assets of top executives and ensuring that they are not unduly deterred from making bold decisions due to concerns about personal liability. Empirical research provides evidence that Directors and Officers (D&O) liability insurance has various effects on firms, such as enhancing firm digitalization (Huang et al., 2023), fostering innovation (Wang et al., 2020), reducing corporate misconduct (Wang & Wu, 2023), increase related-party transactions (Huang et al., 2024), and improve corporate social responsibility (CSR) performance (Xia et al., 2024). However, empirical evidence remains relatively limited in understanding the factors that influence a firm's decision to purchase D&O liability insurance, which forms the focus of our research question.

We propose that CEO-Chair age dissimilarity influences a firm's decision to purchase D&O liability insurance. Age dissimilarity, defined as the difference in age between the CEO and the Chair of the board, reflects a generational divide that may lead to divergent perspectives on strategic leadership and corporate governance. This dynamic can result in distinct governance structures, decision-making processes, and varied approaches to risk management. These age-based differences in leadership styles are likely to shape the firm's risk appetite, thereby influencing its decision to invest in D&O insurance as a risk mitigation strategy. Extant literature suggests that individuals tend to align with those with similar characteristics, such as age, fostering effective communication and group cohesion (McPherson et al., 2001). However, in the context of age heterogeneity, such differences can stimulate healthy disagreement and cognitive conflict, encouraging diverse perspectives that improve problem-solving and decision-making (Choi & Sy, 2010; Talavera et al., 2018). While homogeneity may reduce cognitive

conflict, it could also limit the quality of corporate decisions, underscoring the potential benefits of age diversity in enhancing strategic and risk-related decisions, such as the purchase of D&O insurance.

Several corporate governance factors, including board independence, ownership structure, management turnover, litigation risk, and financial health, influence the decision to purchase D&O liability insurance. Firms with more independent boards and lower managerial ownership are more likely to invest in D&O insurance, as these features signal higher governance risks (Chang & Hsiao, 2012; O’Sullivan, 2002). Companies with frequent management turnover or operating in high-risk industries, such as energy, or those with poor financial health, such as firms with financial restatements, are also more likely to purchase D&O coverage (Core, 1997; Cao & Narayanamoorthy, 2014). Additionally, firms with higher board compensation, complex disclosure practices, or those involved in aggressive tax planning face higher premiums due to perceived governance risks (Chang & Hsiao, 2012; Gillan & Panasian, 2014; Donelson et al., 2022). Family-owned businesses with overconfident CEOs are similarly inclined to buy D&O insurance to mitigate risks associated with executive decision-making (Lai & Tai, 2019). Overall, larger firms or those with external monitoring or cross-listings often face higher premiums due to increased governance scrutiny (Core, 1997; Gillan & Panasian, 2014). Thus, D&O insurance decisions are shaped by a combination of governance structures, financial risks, and external pressures.

We hypothesize that companies with a larger age gap between the CEO and the Chair may be more likely to invest in D&O liability insurance as a precautionary measure, anticipating greater potential for conflict or misalignment in leadership styles. For example, a significant age gap may be associated with generational differences in leadership philosophy, which could lead to disagreements or tensions over strategic direction, increasing the likelihood of legal challenges. In such cases, D&O insurance would serve as an added safeguard for senior management, mitigating personal financial risk. Alternatively, companies with a smaller age gap may experience greater alignment between the CEO and Chair, potentially reducing the perceived risk of leadership conflict and, thus, the need for extensive D&O coverage. By exploring this relationship, we aim to shed light on how age dynamics within corporate leadership influence risk management strategies and the adoption of D&O liability insurance.

We examine the regulatory context of China to address our research question, as it offers a distinctive setting for exploring the dynamics of D&O liability insurance. Interest in D&O insurance in China began following key regulatory changes, starting in 2002 with clarifications from the Supreme People’s

Court on directors' liability in securities cases and continuing with the 2005 revision of the Company Law, which introduced a shareholder litigation system. Further regulatory developments in 2006 and 2014 highlighted the need to enhance D&O protocols and modernize the insurance industry. Despite these reforms, the D&O insurance market in China remains underdeveloped compared to mature markets in the US, Europe, and Japan due to differences in legal systems, corporate governance, and market maturity. Additionally, the persistence of agency conflicts in China's state-owned enterprises (SOEs) complicates the situation, as management often acts in ways that diverge from the interests of state ownership. These agency problems are exacerbated by weak corporate governance, hindering the adoption of D&O insurance. Therefore, while regulatory changes aim to improve corporate governance and risk management, the slow development of the D&O market in China is shaped by institutional differences, cultural factors, and the complexities of managing agency conflicts in SOEs.

Using a sample of 36,210 firm-year observations from listed companies in China between 2001 and 2021, our findings provide robust evidence that firms are more likely to purchase Directors and Officers (D&O) liability insurance when the age gap between the CEO and Chairman is larger. This supports the agency theory, which suggests that a greater age gap between these key governance figures increases the potential for strategic misalignment, conflicts, and higher agency costs, thereby raising the perceived need for D&O insurance. The relationship is particularly strong in firms with longer CEO tenure, indicating that CEO entrenchment may exacerbate governance conflicts and further drive the demand for insurance. Additionally, the link between CEO-Chairman age dissimilarity and D&O insurance purchase is stronger in state-owned enterprises (SOEs), where political interests and government involvement can complicate governance dynamics, increasing the perceived risk of leadership conflict. Our analysis also shows that family firms, despite potential familial cohesion, are more likely to invest in D&O insurance when there is a significant age gap between the CEO and Chairman, reflecting governance challenges related to generational differences. Furthermore, we find that the cost of D&O insurance premiums increases with a larger CEO-Chairman age gap, highlighting the perceived risks associated with leadership dissimilarity. Finally, we identify a curvilinear relationship between the age gap and D&O insurance purchase, suggesting that while the need for insurance rises with the age gap up to a point, very large gaps may signal more effective governance and reduce the perceived need for protection.

The remainder of this paper is organized as follows. Section 2 provides a review of the relevant literature and develops the research hypothesis. Section 3 outlines the research methodology, including

the sample selection process and the model used to test the hypothesis. The results are presented in Section 4, followed by additional robustness tests in Section 5. Section 6 presents cross-sectional analyses, and Section 7 concludes the paper.

## **2. Literature Review & Hypothesis Development**

### **2.1 Literature Review**

The determinants of D&O liability insurance are shaped by various firm-specific and governance-related factors (for a detailed review, see Bhuiyan et al., 2024). Several studies have identified key drivers that influence a firm's decision to purchase D&O insurance, as well as the level of coverage and premiums it incurs. Core (1997) suggests that larger firms with costly external ownership and monitoring mechanisms are more likely to purchase D&O liability insurance. This is because larger firms are exposed to higher risks of legal actions and need additional safeguards for their executives. Moreover, D&O insurance can act as a substitute for other forms of monitoring, such as shareholder oversight. Core (1997) also points out that firms in sectors with greater litigation risk (such as the energy sector) or a higher probability of financial distress are more inclined to purchase D&O insurance. Ownership structure plays a significant role in the decision to purchase D&O insurance. For instance, O'Sullivan (2002) finds that UK firms with low managerial ownership, a higher number of non-executive directors, and US subsidiaries are more likely to buy D&O coverage. Similarly, in Taiwan, Chang and Hsiao (2012) report that D&O liability insurance is positively associated with board independence, director compensation, and management turnover, while it is negatively related to factors like auditor turnover, ownership concentration, and the number of non-executive directors on the board. This suggests that more independent and dynamic governance structures may encourage firms to take out D&O insurance to protect against potential risks related to executive decision-making.

Several studies highlight the relationship between D&O insurance and a firm's exposure to legal and financial risks. For example, Cao and Narayanamoorthy (2014) find that US firms with financial restatements or lower earnings quality face higher D&O premiums, as they are seen as more likely to be subject to legal claims or shareholder lawsuits. Similarly, Chen and Li (2010) document that D&O insurance demand is positively related to a firm's litigation risk and board compensation but negatively related to the ownership of outside directors. The sector in which a firm operates also plays a significant role. For instance, Core (1997) notes that firms in high-risk industries, such as energy, are more likely to

purchase D&O liability insurance. Donelson et al. (2022) further extend this idea, finding that firms involved in aggressive tax planning or those facing higher tax uncertainty are more likely to invest in D&O coverage. This suggests that firms with greater external risks—whether from regulatory scrutiny, litigation exposure, or complex tax strategies—tend to seek additional protection for their directors and officers.

Governance structures, including board independence and executive ownership, also influence D&O insurance demand. Gillan and Panasian (2014) find that US-Canada cross-listed firms generally pay higher premiums for D&O insurance, with premiums fluctuating based on the complexity of financial disclosure. Additionally, Boyer and Stern (2012) argue that the pricing of D&O insurance reflects the insurer's own risk assessment, with premiums acting as a signal of governance risk. Firms with complex governance structures or weak internal controls may face higher premiums due to the increased perceived risk of managerial missteps. In more recent studies, the relationship between CSR performance and D&O insurance has also been explored. Lu et al. (2023) find that firms with better CSR performance are more likely to purchase D&O insurance, and they tend to have a lower premium-to-coverage ratio. This suggests that strong CSR performance may help mitigate the perceived liability risks faced by directors and officers, potentially leading to lower premiums for D&O coverage.

Kang et al. (2019) reveal that audit firms themselves often purchase D&O liability insurance to protect against litigation risks, especially in cases where there is a higher ratio of audit partners or when non-audit services are segregated from audit services. They also note that there is a positive relationship between the premiums for professional liability insurance and the growth in auditors' revenue and instances of operating losses. This underscores the importance of risk management in professional services firms, where legal and financial risks are particularly salient. Boyer and Tennyson (2015) provide a comprehensive framework that incorporates both financial risk factors and the board's risk tolerance into the decision-making process for purchasing D&O insurance. They emphasize that the firm's market value, the proportion of shareholders with claims, and the expected downward return on stock in the event of managerial wrongdoing are all critical factors. Furthermore, Gupta and Prakash (2012) suggest that D&O insurance premiums can reflect the private information that managers possess about a firm's governance risk, indicating that insurers take into account both publicly available information and insider knowledge when pricing policies.

Chalmers et al. (2002) focus on the relationship between IPO size and the extent of D&O liability insurance coverage. They find that larger IPO firms are more likely to secure more extensive D&O insurance, highlighting that the size and visibility of a firm can influence the decision to purchase higher levels of coverage, particularly when entering public markets. In sum, the determinants of D&O liability insurance are multifaceted, with a wide range of financial, governance, and industry-specific factors influencing firms' decisions. These include firm size, litigation risk, governance structures, managerial ownership, and CSR performance. Understanding these factors is crucial for firms in evaluating their risk exposure and making informed decisions about the protection of their executives.

## **2.2 Hypothesis Development**

To explore the relationship between CEO-Chair age dissimilarity and the likelihood of investing in D&O liability insurance, we can draw on several relevant corporate finance theories, particularly agency theory and behavioural finance theory. These frameworks help us understand how leadership dynamics, including generational differences, influence corporate decision-making, governance structures, and risk management strategies, including the purchase of D&O insurance.

Agency theory, which addresses the principal-agent problem, suggests that conflicts between the CEO (agent) and the Chair of the board (principal) can arise due to differing interests, information asymmetry, and divergent incentives (Jensen, 1986). When the CEO and Chair are from different generational cohorts, the age dissimilarity may reflect not only differences in personal characteristics but also in leadership philosophies and strategic priorities. For example, a younger CEO may be more risk-seeking and growth-oriented, focusing on innovation and short-term market opportunities, while an older Chair may prioritize stability, long-term sustainability, and risk-aversion (Peltomäki et al., 2021). This generational gap could lead to strategic disagreements or conflicting approaches to decision-making. In situations where such conflicts are anticipated, D&O liability insurance becomes an important tool to mitigate risks associated with potential legal actions or shareholder disputes. The insurance serves as a safeguard against personal liability for directors and officers, protecting them from lawsuits that might arise from strategic misalignments, executive decisions, or leadership disagreements. The greater the perceived risk of conflict between the CEO and Chair, the more likely the firm will invest in D&O insurance as a precautionary measure, which is consistent with findings from Core (1997) and Gillan and Panasian (2014), who argue that governance risks often drive the demand for such insurance.

The application of behavioural finance theory further enriches our understanding of the CEO-Chair age gap and its implications for D&O insurance. Behavioral finance suggests that individuals' decisions can be influenced by cognitive biases, emotional responses, and heuristics. Generational differences may give rise to distinct biases in decision-making and leadership styles. For instance, older individuals may exhibit more risk aversion and a preference for caution, while younger leaders might prioritize aggressive strategies or be more inclined to take risks in pursuit of growth. This psychological divergence could lead to tensions or misaligned decision-making processes, increasing the likelihood of disputes over corporate strategy, risk-taking, or financial practices. In turn, these tensions may raise the probability of legal challenges, shareholder activism, or other governance issues, driving the firm to purchase D&O liability insurance to mitigate the associated risks. As Boyer and Stern (2012) argue, the perceived governance risk influences the pricing of D&O insurance premiums, suggesting that generational differences that lead to governance instability could be priced into the insurance policy.

In summary of the above-mentioned theories, the age gap between the CEO and Chair can influence the decision to purchase D&O liability insurance through several theoretical lenses. Agency theory suggests that a larger age gap may increase the likelihood of leadership conflict, which in turn drives the demand for insurance as a risk mitigation tool. Stewardship theory provides an opposing view, suggesting that a smaller age gap may lead to greater alignment, reducing the need for D&O insurance. Finally, behavioural finance highlights how generational differences can influence decision-making styles and risk perceptions, further contributing to the governance dynamics that shape the need for D&O coverage. By exploring these theoretical arguments, we can better understand how age dissimilarity within corporate leadership affects risk management strategies and the adoption of D&O liability insurance.

The discussion supports the hypothesis that companies with a larger age gap between the CEO and Chair are more likely to purchase D&O liability insurance, driven by the potential governance risks associated with generational differences in leadership styles. A significant age gap may signal differing priorities and philosophies between the CEO and Chair – typically characterized by a younger, more risk-seeking CEO and an older, more risk-averse Chair – leading to strategic misalignments and conflicts. According to agency theory, these conflicts can increase the likelihood of governance issues and legal challenges, making D&O insurance a precautionary measure to protect executives from personal liability. Additionally, behavioural finance theory suggests that generational differences may influence risk perception and decision-making, further escalating the potential for governance-related risks. Thus, the



need for D&O insurance is greater when there is a larger age gap as firms seek to mitigate the risks of leadership conflict. In contrast, a smaller age gap, indicating closer alignment between the CEO and Chair, may reduce the perceived governance risks and decrease the need for such insurance. Overall, the positive relationship hypothesis is consistent with the argument that larger CEO–Chair age dissimilarity is linked to a higher likelihood of D&O insurance adoption as a safeguard against potential legal and strategic conflicts.

**H<sub>1</sub>:** *Firms with a larger age gap between the CEO and Chair are more likely to purchase D&O liability insurance.*

### **3. Methodology**

#### **3.1 Sample**

This study examines our research hypothesis using data from listed companies in China. Financial and firm governance data for Chinese listed firms spanning the period from 2001 to 2021 are obtained from the China Stock Market & Accounting Research (CSMAR) database. We begin with an initial sample of 53,344 firm-year observations. We exclude a total of 14,491 firm-year observations where CEO-Chair age-related information is missing, board-related attributes, auditing information, and firm-specific financial information are missing. Consistent with Fang et al. (2021), financial institutions (SIC codes J66 to J69) are excluded due to their distinct regulatory frameworks. The final sample consists of 36,210 firm-year observations from 3,679 unique firms. The sample selection process is outlined in Table 1, Panel A. Also, Table 1, Panel B provides the sample distribution across industries, with firm classification based on SIC codes from CSMAR, following the approach of prior studies (Xie et al., 2021). The sample is well-balanced across 17 industries, with industrial products comprising the largest sector. This is consistent with the sector’s prominent role in the Chinese economy. The three largest industries in the sample are Metal & Non-Metal (SIC codes C29-C43), accounting for 39.5%, Chemical Manufacturing (C25-C28) at 15.4%, and the Retail sector (SIC codes F51-F52) at 6.1%. To mitigate potential biases from outliers, all continuous variables are winsorized at the 1% level, both at the top and bottom.

**[Insert Table 1]**

### 3.2 Research Model

In  $H_1$ , we examine the association of Chair and CEO age dissimilarity and D&O liability insurance. The following Ordinary Least Square (OLS) regression tests the  $H_1$ .

$$DOL_{i,t} = \eta_0 + \eta_1 AGAP_{i,t} + \eta_2 FSIZE_{i,t} + \eta_3 LEVER_{i,t} + \eta_4 MTB_{i,t} + \eta_5 ROA_{i,t} + \eta_6 BODSIZE_{i,t} + \eta_7 INDDIR_{i,t} + \eta_8 BLOCK_{i,t} + \eta_9 ZSCORE_{i,t} + \eta_{10} AUDOPIN_{i,t} + \eta_{11} BIG4_{i,t} + Industry\_FE + Year\_FE + \varepsilon_{i,t} \dots \dots \dots (1)$$

Our primary variable of interest is  $\eta_1 AGAP_{i,t}$ . A positive coefficient for this variable would suggest that firms are more likely to purchase D&O liability insurance when there is greater age dissimilarity between the CEO and the Chair. Conversely, a negative coefficient would indicate that firms are less likely to purchase such insurance when the age gap between the CEO and Chair is smaller.

### 3.3 Variable Definition

#### **Dependent Variable: D&O liability insurance (DOL)**

DOL is a dichotomous variable that takes the value of 1 if a firm is covered by D&O liability insurance in a given year and 0 otherwise. DOL serves as an indicator of whether the firm has chosen to purchase D&O insurance, reflecting the firm's decision to protect its directors and officers against potential legal liabilities. By using a dummy variable, we capture whether the firm has made this risk management choice within the given time period, providing a clear distinction between insured and uninsured firms for analysis.

#### **Independent Variable: CEO-Chair age dissimilarity (AGAP)**

Empirical research has yet to reach a consensus on the optimal measure of age dissimilarity (AGAP) between corporate leaders. In light of this, we adopt several measures of the CEO and Chair age dissimilarity that are consistent with established literature (Goergen et al., 2015; Zhou et al., 2019; Zhu et al., 2021). Specifically, this study employs two distinct variables to quantify age dissimilarity between the CEO and Chair. The first, GAPU, represents the age difference between the CEO and Chair, calculated as the absolute value of the Chair's age minus the CEO's age. This variable is intended to capture the magnitude of the age difference between the two leaders. The second, LNGAPU, is the natural logarithm of the absolute value of the GAPU. Additionally, we include GAPSQU, the squared value of GAPS, to test for potential non-linear relationships in the regression model (Younsi & Bechtini, 2020).

**Control Variables:**

To account for potential confounding factors, we control for several firm-specific attributes that may influence the decision to purchase D&O liability insurance. We control for several firm-specific attributes that may influence the likelihood of purchasing such insurance. We include firm size (FSIZE), as larger firms are generally more likely to purchase D&O liability insurance. This is because larger firms typically face greater scrutiny from regulators, investors, and the public, thereby increasing the need for risk management and protection for their directors and officers against potential lawsuits or claims. We control for firm leverage (LEVER), as firms with higher leverage are more likely to purchase D&O liability insurance. Highly leveraged firms are exposed to greater financial risk, which can increase the potential for shareholder disputes or creditor actions. In such firms, the purchase of D&O liability insurance serves as a safeguard against the increased likelihood of legal claims or financial distress scenarios that may arise from their capital structure. Also, we include firm growth (MTB), measured by the market-to-book ratio, as firms with higher growth prospects may face greater risks and, thus, a higher likelihood of purchasing insurance. We also control for firm performance (ROA), where underperforming firms might be more prone to legal claims and, thus, more likely to seek coverage. Board size (BODSIZE) and board independence (INDDIR) are included to capture the governance structure, as larger or more independent boards may reduce perceived risks, potentially lowering the need for insurance. Block shareholders (BLOCK) are considered as they may influence risk preferences, while distress risk (ZSCORE) accounts for the likelihood of financial instability, which could increase litigation risk. Finally, we control for audit opinion (AUDOPIN) and auditor quality (BIG4), as firms facing financial misreporting concerns or those with lower-quality audits may perceive higher legal risks, leading to a greater propensity to purchase D&O liability insurance. These controls allow for a more precise assessment of the relationship between CEO-Chair age dissimilarity and the purchase of D&O liability insurance. Together, these control variables help to account for other firm-level factors that could affect the decision to purchase D&O liability insurance, providing a more robust analysis of the relationship between CEO-Chair age dissimilarity and insurance purchase behaviour.

## 4. Results

### 4.1 Descriptive Statistics

Panel A of Table 2 presents the descriptive statistics for the variables used in our analysis. Our sample reveals that 5.9% of the firms have D&O liability insurance in any given year, indicating that the majority of firms in our sample do not opt for this form of coverage. The mean age gap between the CEO and Chairman (GAPU) is 5.94 years, with a range spanning from 0 to 28 years, suggesting considerable variation in age dissimilarity within the sample. The average firm size, as measured by total assets, is 21.94, reflecting a diverse range of firm sizes. The average leverage ratio is 45.7%, indicating that firms in the sample are moderately leveraged on average. In terms of financial performance, the mean Return on Assets (ROA) is 4.7%, with 11.5% of firm-year observations reporting negative profitability (LOSS), pointing to a significant portion of firms facing financial challenges. Regarding corporate governance, 35.9% of directors in the sample are identified as independent, highlighting a moderate level of board independence. Furthermore, 94.6% of the sample firms received a clean audit opinion (AUDOPIN), suggesting a relatively high degree of financial transparency. Approximately 5.5% of the firms are audited by a Big Four accounting firm (BIG4), indicating that a significant proportion of firms in the sample are subject to rigorous external audit standards. Overall, these descriptive statistics suggest that our sample exhibits considerable variation in key firm-specific attributes, including governance structures, financial performance, and risk management practices. This variability is essential for our analysis, as it allows us to examine how these factors, including the age dissimilarity between the CEO and Chairman, may influence the likelihood of purchasing D&O liability insurance.

**[Insert Table 2]**

### 4.2 Mean Difference Test

Panel B of Table 2 reports the findings of the mean difference test. We divide the sample into two groups based on the purchase of D&O liability insurance: DOL = 1 for firms that have purchased insurance and DOL = 0 for firms that have not. Our analysis reveals that firms with a higher mean age gap between the CEO and Chairman (GAPU) are more likely to purchase D&O liability insurance, suggesting that greater age dissimilarity between top executives is associated with a higher likelihood of acquiring this coverage. Additionally, we find that larger firms, those with higher leverage, and firms with a higher market-to-book

ratio are more likely to purchase D&O liability insurance, supporting the view that firms with greater financial complexity and risk are more inclined to invest in risk management strategies. Firms that purchase D&O insurance also tend to have larger boards, a higher proportion of independent directors and are more likely to be audited by Big Four accounting firms (BIG4), indicating that stronger governance structures and higher financial reporting quality are associated with a greater propensity to purchase insurance. In contrast, firms with lower profitability (as measured by ROA) are less likely to purchase D&O liability insurance because they perceive lower financial or legal risk. These findings highlight that both financial and governance characteristics influence the decision to purchase D&O liability insurance, with firms facing greater operational complexity, higher risks, and stronger governance mechanisms being more likely to invest in such coverage. Our reported findings are statistically significant at a 1% level.

### **4.3 Correlation Analysis**

Table 2 reports the findings of the correlation matrix. Our analysis reveals a positive correlation between the purchase of D&O liability insurance and the age dissimilarity between the CEO and the Chairman (measured by both GAPU and LNGAPU), suggesting that firms with a larger age gap between their CEO and Chairman are more likely to purchase such insurance. From an agency theory perspective, this could reflect an increased need for risk mitigation in firms with greater leadership asymmetry, as a larger age gap may signal differences in experience or power dynamics, heightening agency costs and governance challenges. Additionally, D&O liability insurance is positively correlated with firm size (FSIZE), leverage (LEVER), board size (BODSIZE), the proportion of independent directors (INDDIR), and audit quality (BIG4). Larger firms, facing more complex governance and heightened exposure to legal risks, may purchase D&O insurance to protect against shareholder litigation or regulatory scrutiny. Firms with higher leverage may perceive a greater risk of financial instability, making insurance essential to shield executives from potential claims. Similarly, larger boards may indicate more governance complexities and a higher likelihood of disputes, while firms with more independent directors may seek D&O coverage as an additional safeguard for non-executive directors. Finally, firms with Big 4 auditors, though benefiting from strong audit oversight, may still view D&O insurance as crucial to protect against potential executive liabilities arising from financial misreporting or governance failures. These findings align with resource dependence theory, suggesting that firms with more complex governance structures and higher exposure to risks invest in D&O insurance as a tool to mitigate uncertainty and safeguard leadership. We also find a positive correlation between D&O liability insurance and firm profitability (ROA), suggesting that more

profitable firms are more likely to purchase this insurance. From an agency theory perspective, profitable firms may seek D&O insurance to protect executives from increased legal risks and shareholder scrutiny that come with higher profitability. Our reported findings are statistically significant at a 1% level.

**[Insert Table 3]**

#### **4.4 Regression Analysis**

Table 4 presents the regression results examining the relationship between CEO-Chairman age dissimilarity (GAPU & LNGAPU) and the likelihood of a firm purchasing D&O liability insurance (DOLDUM). In our analysis, we consider GAPU and LNGAPU as separate proxies for age dissimilarity. Columns 1 through 3 focus on GAPU. Column 1 reports the relationship between DOLDUM and GAPU without control variables, revealing a positive and statistically significant coefficient (0.013; t-statistic = 4.975;  $p < 0.01$ ), indicating that firms are more likely to purchase D&O insurance when the age gap between the CEO and Chairman is larger. Column 2 includes control variables and industry fixed effects, with the coefficient on GAPU increasing to 0.013 (t-statistic = 6.121;  $p < 0.01$ ), further reinforcing the positive relationship. Finally, Column 3 adds year-fixed effects alongside the control variables and industry-fixed effects, maintaining a positive and statistically significant coefficient (0.014; t-statistic = 6.329;  $p < 0.01$ ). This consistent pattern suggests that a larger age gap between the CEO and Chairman is a robust predictor of D&O insurance purchase, potentially reflecting higher governance complexity and the need for greater risk protection in firms with more pronounced leadership dissimilarity.

We now turn to the alternative proxy for CEO-Chairman age dissimilarity, LNGAPU, in Columns 4 to 6. Our results consistently show that LNGAPU has a positive and statistically significant coefficient in relation to D&O liability insurance, indicating that a larger age gap between the CEO and Chairman is associated with a higher likelihood of purchasing D&O insurance. Based on the coefficient of Column 6, economic significance of the findings indicates that the odds ratio for LNGAPU is 1.153, meaning that for each 1 unit increase in LNGAPU (which represents a 1% increase in the number of years of age gap), the odds of a D&O liability insurance purchase increase by 15.2%, holding all other factors constant<sup>1</sup>. This pattern supports the findings from the previous analysis using GAPU, suggesting that firms with greater age

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<sup>1</sup> *Economic significance* =  $(e^{0.142} - 1) * 100 = 15.3\%$ .

dissimilarity between these key executives are more likely to seek protection against potential governance risks.

**[Insert Table 4]**

In terms of the control variables, our analysis reveals several noteworthy patterns. Larger firms (FSIZE), firms with higher leverage (LEVER), those with a higher proportion of independent directors (INDDIR), and firms audited by high-quality auditors (BIG4) are more likely to purchase greater levels of D&O liability insurance. These findings align with agency theory, which suggests that firms with more complex structures or greater governance oversight face higher risks of legal and regulatory scrutiny, thus motivating them to invest in D&O insurance to protect executives and directors from potential liabilities. Larger and more leveraged firms, for example, may face greater exposure to shareholder lawsuits or regulatory challenges, while firms with more independent directors may be more concerned with safeguarding non-executive board members from legal claims related to governance failures. Similarly, firms audited by high-quality auditors (e.g., Big 4) may seek D&O insurance to protect against risks associated with financial misreporting or auditor-related litigation. On the other hand, profitable firms (ROA) and those with higher blockholder ownership are less likely to purchase D&O liability insurance. From a resource dependence theory perspective, this may indicate that more profitable firms have lower perceived risks of executive or director misconduct, given their stable financial position. Additionally, firms with significant blockholder ownership may experience more concentrated governance, which could reduce agency costs and perceived risks, as blockholders typically have more direct control and oversight over management. As a result, these firms may feel less need for the protective measure that D&O insurance provides. In sum, these patterns suggest that firms' governance structures, financial characteristics, and ownership configurations significantly influence their decision to purchase D&O insurance, highlighting the role of both risk management and governance dynamics in shaping such decisions.

From an agency theory perspective, these findings suggest that greater age dissimilarity between the CEO and Chairman may increase the likelihood of governance conflicts, which in turn motivates firms to invest in D&O insurance as a safeguard for top executives. Additionally, the persistence of the positive relationship across different model specifications highlights the robustness of this finding, pointing to the

importance of governance structures in shaping risk management decisions like D&O insurance purchases.

## **5. Additional Test**

### **5.1 Alternative measure of CEO-Chairman age gap dissimilarity**

Our primary analysis uses GAPU and LNGAPU as a continuous proxy for CEO-Chairman age dissimilarity to examine its relationship with D&O liability insurance. Building on prior research (e.g., Goergen et al., 2015; Zhou et al., 2019), we conducted additional tests by splitting the age gap into discrete categories based on inter-generational age differences. Specifically, we created dummy variables for different age gap thresholds, including GAP20 (age gap  $\geq 20$  years), GAP10 (19.99 years  $\geq$  age gap  $\geq 10$  years), and GAP5 (5 years  $\geq$  age gap  $\geq 0$  years). These categorical measures of age dissimilarity – GAP20, GAP10, and GAP5 – allow us to more precisely capture the varying effects of CEO-Chairman age differences on the likelihood of purchasing D&O liability insurance. By using these three dummy variables, we can better understand the influence of different levels of age dissimilarity on insurance purchase behaviour. We then re-estimate Equation (1) to test these alternative specifications.

#### **[Insert Table 5]**

Table 5 presents the findings of our analysis. We observe a positive association between GAP20 (age gap  $\geq 20$  years) and the purchase of D&O liability insurance, with a coefficient of 0.043 (t-statistic = 2.708;  $p < 0.01$ ). This suggests that firms with an age gap of 20 years or more between the CEO and Chairman are more likely to purchase D&O liability insurance. Consistently, we find that GAP10 (age gap  $\geq 10$  years &  $\leq 19.99$  years) is positively associated with the purchase of D&O liability insurance, with a coefficient of 0.097 (t-statistic = 2.117;  $p < 0.05$ ). Finally, we find that GAP5 (age gap  $\geq 5$  years) is positively associated with the purchase of D&O liability insurance, with a coefficient of 0.232 (t-statistic = 4.217;  $p < 0.01$ ). This suggests that firms with a CEO-Chairman age gap of 5 years or more are significantly more likely to purchase D&O liability insurance. Overall, our findings suggest that the relationship between the age gap and D&O insurance purchases remains robust, even when categorized into different age gap thresholds. This finding further supports the notion that leadership dissimilarity plays a crucial role in firms' risk management strategies.



## **5.2 Does the CEO-Chairman age gap affect D&O insurance premiums?**

We now investigate whether CEO-Chairman age dissimilarity influences D&O liability insurance premiums, as this relationship could provide further insights into how leadership dynamics impact firms' risk management costs. From an agency theory perspective, a larger CEO-Chairman age gap increases agency costs by heightening governance conflicts, as differing leadership styles or generational perspectives may create misalignments in decision-making. These increased risks are likely to be reflected in higher D&O insurance premiums, as insurers view the firm as more susceptible to disputes, legal claims, or managerial inefficiencies. The larger the age gap, the greater the perceived governance risk, leading to a higher likelihood of purchasing D&O insurance and, consequently, higher premiums.

### **[Insert Table 6]**

To test our hypothesis, we re-estimate Equation (1) with D&O liability insurance premiums as the dependent variable. The results are presented in Columns 1 and 2 of Table 6. Column 1 shows a positive coefficient for GAPI (0.009; t-statistic = 1.849;  $p < 0.10$ ), which is statistically significant at the 10% level. These findings suggest that an increase in the CEO-Chairman age gap is associated with a higher D&O liability insurance premium, indicating that larger age gaps between the CEO and Chairman lead to increased insurance costs. Consistently, Column 2 shows a positive coefficient for LNGAPI (0.005; t-statistic = 1.981;  $p < 0.05$ ), which is statistically significant at the 5% level. These findings suggest that a larger CEO-Chairman age gap, when measured on a logarithmic scale, is associated with higher D&O liability insurance premiums, reinforcing the notion that greater leadership dissimilarity increases insurance costs.

## **5.3 Does the age dissimilarity have a curvilinear relationship with D&O insurance?**

From an agency theory perspective, the relationship between the CEO-Chairman age gap and the decision to purchase D&O liability insurance may be curvilinear because agency costs and governance risks do not increase uniformly with the age gap. Initially, as the age gap grows, conflicts, misalignments, and differing leadership styles increase, raising agency costs and the perceived risk of governance failures, which incentivizes firms to purchase D&O insurance. However, beyond a certain threshold, very large age gaps may signal a more stable governance structure, with clearer role definitions and reduced conflict. In such cases, the perceived governance risk decreases, and the need for D&O insurance may plateau or

even decline. Thus, while moderate age gaps may lead to higher agency costs and a greater likelihood of purchasing D&O insurance, very large age gaps could signal more effective governance, leading to a curvilinear relationship.

We test this conjecture in Table 6, Columns 3 and 4, by examining the potential curvilinear relationship between the CEO-Chairman age gap and the decision to purchase D&O liability insurance. We include the squared term of the CEO-Chairman age gap (GAPSQ) in Equation (1) and re-estimate the model to test for a potential curvilinear effect. The results show that both GAPU and LNGAPU are positively associated with the decision to purchase D&O liability insurance, indicating that larger age gaps between the CEO and Chairman increase the likelihood of purchasing insurance. However, the negative coefficients for GAPSQ ( $-0.002$ ;  $p < 0.05$  and  $-0.001$ ;  $p < 0.10$ ) suggest that the relationship between the age gap and D&O insurance purchase is curvilinear. Specifically, as the age gap grows, the likelihood of purchasing D&O insurance increases at a diminishing rate, implying that after a certain threshold, further increases in the age gap have less of an impact on the purchase decision. This finding supports the theoretical argument that while moderate age gaps increase governance risks and the need for D&O insurance, very large age gaps may signal more stable and defined leadership roles, leading to a reduced need for such insurance.

## **6. Cross-Sectional Test: CEO Tenure and State-owned Enterprise**

### **6.1 Role of CEO Tenure**

From an agency theory perspective, the positive and statistically significant relationship between the CEO-Chairman age gap and the likelihood of purchasing D&O liability insurance may vary depending on CEO tenure. In firms with higher CEO tenure, the CEO is more likely to have a stable and entrenched position within the governance structure. However, a larger age gap between the CEO and Chairman may still signal potential governance conflicts, as it may reflect differences in leadership styles, strategic vision, or generational perspectives. These differences can create friction and increase agency costs, leading to higher perceived governance risks. As a result, firms with higher CEO tenure may still be motivated to purchase D&O insurance as a risk management tool to protect against potential disputes or decision-making conflicts despite the CEO's experience. Thus, even in more established governance structures, the age gap can increase governance risks and the need for D&O liability insurance.

To test our conjecture, we split the sample into two groups based on CEO tenure: those with CEO tenure above the median (CEOTENURE = high) and those below the median (CEOTENURE = low). The findings, reported in Columns 1 and 2 of Table 7, show that the coefficient for the CEO-Chairman age gap is statistically significant (0.026; t-statistic = 2.346;  $p < 0.05$ ) in the high CEO tenure group, but not in the low CEO tenure group. From an agency theory perspective, this suggests that in firms with higher CEO tenure, the CEO's entrenched position and greater stability may still be associated with governance risks due to the age gap, leading to an increased likelihood of purchasing D&O insurance. Conversely, in firms with lower CEO tenure, the relationship may be less pronounced, potentially because the CEO's position is less secure, and the age gap might not be perceived as a significant governance risk.

**[Insert Table 7]**

## **6.2 Role of State-owned Enterprise**

In our primary analysis, we find a positive association between the CEO-Chairman age gap and the likelihood of purchasing D&O liability insurance. However, this relationship may vary depending on the level of state ownership. From an agency theory perspective, even in state-owned enterprises (SOEs), where the government is the principal owner, agency conflicts can arise due to the separation of ownership and control. In SOEs, the CEO and Chairman may have conflicting priorities driven by political agendas, generational differences, or differing leadership styles. These conflicts can increase agency costs and governance risks, motivating SOEs to purchase D&O insurance as a risk management tool to protect against potential legal or financial consequences of leadership disputes. In contrast, in firms with lower state ownership, the alignment between the CEO and Chairman is typically more focused on maximizing shareholder value, leading to fewer governance conflicts and, consequently, a lower likelihood of purchasing D&O insurance. Therefore, the relationship between the CEO-Chairman age gap and D&O insurance is likely stronger in SOEs, where governance risks and agency conflicts are more pronounced.

To test our conjecture, we divide the sample into two groups: firms with higher state ownership (SOE = 1) and non-state-owned enterprises (SOE = 0). The results are presented in Columns 3 and 4 of Table 7. We find a positive and statistically significant coefficient for GAPU (0.028, t-statistic = 2.643;  $p < 0.01$ ) in the state-owned enterprise group (SOE = 1), compared to the non-SOE group (SOE = 0). These findings suggest that the CEO-Chairman age gap is more strongly associated with the likelihood of purchasing D&O liability insurance in state-owned enterprises, likely due to the heightened governance

risks and agency conflicts that arise in these firms, driven by political considerations and the separation of ownership and control.

### **6.3 Role of Family firm**

From an agency theory perspective, the governance dynamics in family firms are often distinct from those in non-family firms, which may influence the decision to purchase D&O insurance. In family firms, the CEO and Chairman are typically family members, and while differences in age and leadership style may exist, these firms often have more cohesive governance structures due to the close personal ties among family members. Even if generational differences exist, family firms tend to place a strong emphasis on maintaining family control and continuity, which may reduce the perceived governance risks associated with the CEO-Chairman age gap. As a result, the need for D&O liability insurance may be less pronounced in family firms, as they may be more able to manage internal conflicts informally and with a longer-term focus. In contrast, in non-family firms, the CEO and Chairman are more likely to be professional managers with distinct roles and objectives. A larger age gap between these leaders can highlight differences in leadership styles, strategic priorities, and decision-making approaches. These differences, while not necessarily leading to significant conflict, may still increase governance complexity and perceived risks, motivating the firm to purchase D&O liability insurance as a precautionary measure. Additionally, in non-family firms, the separation of ownership and management can make it harder to address internal disagreements without formal mechanisms, increasing the need for D&O insurance to mitigate potential legal or financial risks.

To test our conjecture, we divide the sample into two groups: family firms (FFIRM = 1) and non-family firms (FFIRM = 0). The results are presented in Columns 5 and 6 of Table 7. We find a positive and statistically significant coefficient for GAPU (0.025, t-statistic = 2.116;  $p < 0.05$ ) in the non-family firm group (FFIRM = 0), compared to the family firm group (FFIRM = 1). These findings suggest that the CEO-Chairman age gap is more strongly associated with the likelihood of purchasing D&O liability insurance in non-family firms. This is likely due to the more formalized governance structures in non-family firms, where leadership differences—such as those stemming from a larger age gap—are more likely to be perceived as governance risks. In non-family firms, where ownership and control are often separate, such differences may increase the potential for strategic misalignment or decision-making conflicts, prompting the purchase of D&O insurance as a protective measure against these risks. Conversely, in family firms,

where personal relationships and a shared long-term vision may mitigate such risks, the age gap is less likely to be associated with the need for D&O liability insurance.

## **7. Conclusion and Implications**

This study investigates the impact of CEO-Chairman age dissimilarity on a firm's decision to purchase D&O liability insurance, drawing on agency theory to understand how governance risks associated with leadership disparities may influence corporate risk management strategies. Our theoretical framework suggests that a larger CEO-Chairman age gap can create differences in leadership styles, decision-making processes, and generational perspectives, potentially increasing the governance risks and agency costs within the firm. As a result, firms may be more inclined to purchase D&O liability insurance as a safeguard against the risks of governance failure, disputes, or legal challenges.

Using a sample of listed firms in China from 2001 to 2021, covering 36,210 firm-year observations, we find robust evidence that firms are more likely to purchase D&O liability insurance when the CEO-Chairman age gap is larger. This finding supports the agency theory argument that a greater age gap between these two key governance figures amplifies the potential for strategic misalignment, conflict, and increased agency costs, thereby heightening the perceived need for protection through D&O insurance. Additionally, our results indicate that this relationship is more pronounced in firms with a higher CEO tenure, suggesting that the stability and entrenchment of the CEO's position may increase the likelihood of governance conflicts when paired with a significant age gap, reinforcing the need for such insurance as a risk management tool. Furthermore, we show that the relationship between CEO-Chairman age dissimilarity and the purchase of D&O liability insurance is stronger in state-owned enterprises (SOEs) than in non-state-owned firms. This suggests that in SOEs, where political interests and government involvement can complicate governance dynamics, the perceived risk of leadership conflicts is higher, motivating the firm to purchase D&O insurance as a precautionary measure. Similarly, our analysis reveals that family firms, despite the potential for familial cohesion, are also more likely to invest in D&O liability insurance when the CEO-Chairman age gap is substantial. This may reflect the governance complexities unique to family-run businesses, where generational differences can lead to strategic friction and potential conflicts of interest.

In addition to these findings, our tests reveal that the cost of D&O insurance premiums tends to be higher when the CEO-Chairman age gap is larger, which further underscores the perceived risk associated

with greater leadership dissimilarity. We also find statistically significant evidence of a curvilinear relationship between the age gap and the likelihood of purchasing D&O insurance, suggesting that while the need for insurance increases with the age gap up to a certain point, very large gaps may signal more effective governance and lead to a reduction in the perceived need for protection.

From a professional and governance perspective, our findings carry important implications for both corporate managers and policymakers. For firms, especially those with a larger CEO-Chairman age gap, our results highlight the value of D&O liability insurance as a tool for mitigating governance risks associated with leadership disparities. Companies may benefit from proactively assessing the dynamics between their CEO and Chairman, particularly when generational differences or leadership styles may create friction that could affect corporate performance or decision-making. For policymakers, especially in the context of state-owned or family firms, this study suggests that governance structures should account for the risks that arise from leadership dissimilarities and ensure appropriate mechanisms are in place to address potential conflicts. This research also provides insight into the role of firm-specific characteristics—such as CEO tenure, state ownership, and family control—in shaping corporate risk management decisions. Understanding how these factors interact with governance dynamics to influence the decision to purchase D&O liability insurance can help firms better tailor their risk management strategies to their unique governance contexts. Future research could further explore how different types of governance structures and ownership forms influence other risk management tools, providing a more comprehensive view of how leadership dissimilarity affects corporate decision-making. In summary, our study enhances the understanding of the factors driving D&O insurance purchases, demonstrating that the CEO-Chairman age gap is a key determinant of this decision, with its effects varying based on CEO tenure, firm ownership structure, and governance characteristics.

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## Appendix: Variable Definitions

Variables	Definition
DOLDUM	A dummy variable Equals one if a firm has D&O insurance in the fiscal year before the acquisition announcement year; zero otherwise.
AGAP	Age gap (or dissimilarity) measured in two different proxies such as GAPU and LNGAPU. We also use three alternative measures of AGAP such as GAP20, GAP10 and GAP5.
GAPU	Age dissimilarity is the absolute value of the age difference (in years) between the Chair and the CEO.
LNGAPU	Age dissimilarity is the natural logarithm of the absolute value of the age difference (in years) between the Chair and the CEO.
GAP20	A dummy variable where the Chair and the CEO age gap is at least 20 (15/10/5) years, and 0 otherwise.
GAP10	A dummy variable where the Chair and the CEO age gap is at least 20 (15/10/5) years, and 0 otherwise.
GAP5	A dummy variable where the Chair and the CEO age gap is at least 20 (15/10/5) years, and 0 otherwise.
FSIZE	Natural log of book value of total assets
LEVER	Leverage is measured as the firm's total liabilities over total assets.
MTB	Market-to-Book is the sum of the fiscal year-end market value of equity and book value of liabilities, divided by total assets.
ROA	Return on assets, Earnings before interest and taxes divided by total assets.
LOSS	Loss, a dummy variable of value 1, is assigned if the firm reports a negative earning, 0 otherwise.
BODSIZE	Board size is the total number of members on the board.
INDPER	Board independence, the proportion of independent directors to the total board size.
BLOCK	Blockholder 50%, dummy variable that takes the value of 1 if a single shareholder holds at least 50% of the common shares outstanding, and 0 otherwise
ZSCORE	Z-Score, a composite score for measuring a firm's financial risk, is measured following the methodology of Altman (1968). Using the following formula: $Z\text{-score} = (0.012 \times X1) + (0.014 \times X2) + (0.033 \times X3) + (0.006 \times X4) + (0.999 \times X5).$ where X1 is the working capital/total assets; X2 is retained earnings/total assets; X3 is EBIT/total assets; X4 is market capitalization/total liabilities; X5 is sales/total assets. Using 2.67 and 1.81 as critical values to calculate the range of the sample score. The standard of judgment is that Z-score>2.67 means a good financial situation with a low possibility of bankruptcy, Z-score<1.81 means a financial situation with a lurking bankruptcy crisis, and 1.81<Z-score<2.67 is the area indicating that the firm's financial situation is extremely unstable, with a high likelihood of financial distress.
AUDOPIN	Audit Opinion is a dummy variable equal to 1 if the audit opinion is a standard unqualified audit opinion and 0 otherwise.
BIG4	A dummy variable equals one if the firm employed a big-five accounting firm as the auditor in a year and zero otherwise.
LN_PREMIUM	Natural logarithm of the coverage limit (in C ¥ mln., RMB) on the personal coverage portion of the D&O insurance policy.
CEOTEN	CEO tenure, a dummy variable, is set to 1 if the CEO tenure is greater than the mean value and 0 otherwise.
SOE	SOE, dummy variable set to 1 if state-owned or state-holding firms and 0 otherwise.
FFIRM	Family firm, dummy variable that is set to 1 if the firm is a family firm and 0 otherwise.

**Table 1: Panel A – Sample selection procedure**

<b>Selection Process</b>	<b>Observations</b>
Total observations produced from 2001 to 2021	53,344
Drop: observations with missing data on CEO-Chairman age dissimilarity due to missing age information, missing board of directors' attributes, missing firm-specific attributes and missing auditing-related variables	-14,491
	38,853
Drop: missing industry code & SIC codes between J66-J69 (Financial institutes)	-2,643
<b>Total Sample (2001 to 2021)</b>	<b>36,210</b>

**Table 1: Panel B – Industry Distribution**

<b>SIC Code</b>	<b>Industry</b>	<b>N</b>	<b>%</b>
A1-A4	Agriculture	604	0.017
A5; B06-B11; C13	Mining	1,444	0.04
C14-C15	Food Manufacturing	942	0.026
C17-C24	Machine Manufacturing	2,010	0.056
C25-C28	Chemical Manufacturing	5,579	0.154
C29-C43	Metal & Non-Metal	14,302	0.395
D44-D46	Utility	1,371	0.038
E47-E50	Construction	919	0.025
F51-F52	Retailing	2,201	0.061
G53-G60	Transport	1,250	0.035
H61-H62	Hotel	149	0.004
I63-I65	IT	2,053	0.057
K70; L71	Real Estate	1,844	0.051
L72; M73-M75	Business & Research Service	664	0.018
N77-N78; O79-O81	Other Service	473	0.013
Q83	Health Service	66	0.002
R85-R86	Press	339	0.009
<b>Total</b>		<b>36,210</b>	<b>1</b>

**Table 2: Panel A – Descriptive Statistics**

Variable	Obs.	Mean	Std. Dev.	Min	Max
DOLDUM	36,210	0.059	0.236	0	1
GAPU ( <i>in years</i> )	36,210	5.942	6.748	0	28
LNGAPU	36,210	1.421	1.079	0	3.367
GAP20	36,210	0.058	0.234	0	1
GAP15	36,210	0.116	0.32	0	1
GAP10	36,210	0.237	0.425	0	1
GAP5	36,210	0.458	0.498	0	1
FSIZE	36,210	21.941	1.303	19.070	26.650
LEVER	36,210	0.457	0.217	0.058	1.230
MTB	36,210	4.082	3.768	-1.373	30.071
ROA	36,210	0.047	0.062	0	4.489
LOSS	36,210	0.115	0.320	0	1
BODSIZE	36,210	8.831	1.839	5	15
INDPER	36,210	35.876	7.620	0	80
BLOCK	36,210	0.203	0.402	0	1
ZSCORE	36,210	4.307	5.196	-1.674	33.560
AUDOPIN	36,210	0.946	0.227	0	1
BIG4	36,210	0.055	0.228	0	1
CEOTEN ( <i>in years</i> )	36,210	3.592	3.287	0	22.917
CEOTEN	36,210	0.373	0.484	0	1
SOE	36,210	0.432	0.495	0	1
FFIRM	36,210	0.591	0.492	0	1

**Notes:** This table reports descriptive statistics of the variables used in the regression models. Variables are defined in the Appendix.

**Table 2: Panel B – Mean Difference Test**

Variables	DOLDUM = 1 N=2,136	DOLDUM=0 N=34,074	Mean Diff	t-statistics
GAPU	6.259	5.922	0.337	2.774***
LNGAPU	1.571	1.410	0.161	6.832***
FSIZE	23.038	21.871	1.167	41.754***
LEVER	0.529	0.452	0.077	16.271***
MTB	4.222	4.073	0.149	2.798***
ROA	0.042	0.048	-0.006	-3.847***
LOSS	0.114	0.116	-0.002	-0.287
BODSIZE	9.198	8.808	0.390	9.674***
INDPER	37.335	35.783	1.552	9.292***
BLOCK	0.219	0.202	0.018	1.991**
ZSCORE	3.326	4.368	-1.042	-9.152***
AUDOPIN	0.954	0.945	0.009	1.824*
BIG4	0.254	0.043	0.211	43.126***

**Notes:** This table presents the results of the mean difference test for variables between firms with D&O liability (DOLDUM=1) and those without (DOLDUM=0). \*, \*\*, \*\*\* denotes two-tailed p-values of less than 0.10, 0.05 and 0.01, respectively. Variables are defined in the Appendix.

**Table 3: Correlation Matrix**

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) DOLDUM	1.000													
(2) GAPU	<b>0.028</b>	1.000												
(3) LNGAPU	<b>0.035</b>	<b>0.897</b>	1.000											
(4) FSIZE	<b>0.212</b>	<b>0.010</b>	<b>0.037</b>	1.000										
(5) LEVER	<b>0.084</b>	<b>0.045</b>	<b>0.055</b>	<b>0.299</b>	1.000									
(6) MTB	<i>0.009</i>	<b>0.039</b>	<b>-0.023</b>	<b>-0.098</b>	<b>0.332</b>	1.000								
(7) ROA	<b>-0.020</b>	<b>-0.046</b>	<b>-0.030</b>	-0.007	<b>-0.251</b>	-0.003	1.000							
(8) LOSS	-0.001	-0.007	0.001	<b>-0.115</b>	<b>0.250</b>	<b>0.175</b>	<b>-0.277</b>	1.000						
(9) BODSIZE	<b>0.050</b>	<b>0.054</b>	<b>0.121</b>	<b>0.191</b>	<b>0.123</b>	<b>-0.052</b>	<b>-0.019</b>	<b>-0.036</b>	1.000					
(10) INDDIR	<b>0.048</b>	<b>0.089</b>	<b>-0.119</b>	<b>0.136</b>	-0.012	<b>0.056</b>	<b>0.028</b>	-0.008	<b>-0.353</b>	1.000				
(11) BLOCK	<i>0.010</i>	0.008	<b>0.036</b>	<b>0.151</b>	<b>0.015</b>	<b>-0.073</b>	<b>0.046</b>	<b>-0.063</b>	<b>0.072</b>	<b>-0.082</b>	1.000			
(12) ZSCORE	<b>-0.047</b>	<b>-0.019</b>	<b>-0.059</b>	<b>-0.272</b>	<b>-0.600</b>	<b>0.149</b>	<b>0.281</b>	<b>-0.130</b>	<b>-0.140</b>	<b>0.065</b>	<b>-0.057</b>	1.000		
(13) AUDOPIN	<i>0.009</i>	0.005	<i>-0.009</i>	<b>0.141</b>	<b>-0.265</b>	<b>-0.173</b>	<b>0.090</b>	<b>-0.356</b>	<b>0.020</b>	<b>0.041</b>	<b>0.053</b>	<b>0.103</b>	1.000	
(14) BIG4	<b>0.218</b>	<i>0.020</i>	<b>0.032</b>	<b>0.334</b>	<b>0.056</b>	<b>-0.035</b>	<b>0.036</b>	<b>-0.043</b>	<b>0.109</b>	<b>0.035</b>	<b>0.123</b>	<b>-0.050</b>	<b>0.036</b>	1.000

**Notes:** Bolds are statistically significant at a 1% level, and italics are statistically significant at a 5% level. Appendix defines the variables.

**Table 4: Regression Analysis – D&O liability insurance and CEO-Chair Age dissimilarity**

Variables	(1) DOLDUM	(2) DOLDUM	(3) DOLDUM	(4) DOLDUM	(5) DOLDUM	(6) DOLDUM
Constant	-1.424*** (-13.475)	-13.701*** (-27.639)	-10.208*** (-35.923)	-1.539*** (-13.674)	-13.786*** (-27.927)	-10.219*** (-36.685)
GAPU	0.013*** (4.975)	0.013*** (6.121)	0.014*** (6.329)			
LNGAPU				0.172*** (10.292)	0.127*** (6.535)	0.142*** (7.898)
FSIZE		0.431*** (14.079)	0.379*** (30.449)		0.431*** (13.947)	0.375*** (29.208)
LEVER		0.746** (2.071)	1.012*** (3.568)		0.731** (2.041)	1.011*** (3.691)
MTB		0.012 (1.189)	0.009 (0.871)		0.012 (1.236)	0.009 (0.891)
ROA		-2.539*** (-3.528)	-2.734*** (-4.134)		-2.47*** (-3.421)	-2.632*** (-3.966)
LOSS		0.067 (0.916)	-0.003 (-0.034)		0.069 (0.942)	-0.001 (-0.017)
BODSIZE		0.022 (1.615)	0.038*** (4.628)		0.019 (1.403)	0.036*** (4.432)
INDDIR		0.02*** (2.673)	0.012*** (2.721)		0.021*** (2.794)	0.013*** (2.961)
BLOCK		-0.366*** (-4.473)	-0.286*** (-4.346)		-0.373*** (-4.551)	-0.291*** (-4.387)
ZSCORE		0.026** (2.489)	0.027*** (2.746)		0.026** (2.513)	0.027*** (2.799)
AUDOPIN		-0.019 (-0.16)	0.023 (0.187)		-0.02 (-0.165)	0.024 (0.195)
BIG4		1.285*** (11.622)	1.367*** (15.597)		1.28*** (11.673)	1.365*** (15.733)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	Yes	No	Yes
Cluster	firm	firm	firm	firm	firm	firm
N	36,210	36,210	36,210	36,210	36,210	36,210
Pseudo R <sup>2</sup>	0.045	0.126	0.135	0.048	0.127	0.137

**Notes:** This table presents the regression results for the relationship between D&O liability insurance and CEO-Chairman age dissimilarity. Robust standard errors clustered by firm. *z-values* are reported in parentheses. \*, \*\*, \*\*\* denotes two-tailed p-values of less than 0.10, 0.05 and 0.01, respectively. Variables are defined in the Appendix.

**Table 5: Additional Test – Alternative measure of CEO-Chair Age dissimilarity**

Variables	(1) DOLDUM	(2) DOLDUM	(3) DOLDUM
Constant	-0.569*** (-12.636)	-10.151*** (-34.713)	-10.167*** (-36.875)
GAP20	0.043*** (2.708)		
GAP10		0.097** (2.117)	
GAP5			0.232*** (4.217)
FSIZE	0.025*** (11.226)	0.379*** (30.651)	0.377*** (29.538)
LEVER	0.053*** (6.238)	0.997*** (3.534)	0.992*** (3.497)
MTB	0.001 (1.268)	0.009 (0.867)	0.009 (0.893)
ROA	-0.128*** (-7.979)	-2.748*** (-4.121)	-2.699*** (-4.057)
LOSS	0.002 (0.632)	-0.004 (-0.044)	-0.003 (-0.029)
BODSIZE	0.002*** (2.978)	0.038*** (4.704)	0.036*** (4.532)
INDDIR	0.001*** (3.385)	0.012*** (2.607)	0.012*** (2.793)
BLOCK	-0.017*** (-3.66)	-0.291*** (-4.432)	-0.291*** (-4.439)
ZSCORE	0.002*** (4.822)	0.027*** (2.707)	0.027*** (2.749)
AUDOPIN	-0.001 (-0.201)	0.019 (0.159)	0.023 (0.193)
BIG4	0.173*** (10.973)	1.369*** (15.529)	1.365*** (15.831)
Industry FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Cluster	firm	firm	firm
N	36,210	36,210	36,210
Pseudo R <sup>2</sup>	0.139	0.135	0.136

**Notes:** This table presents the regression results for the relationship between D&O liability insurance and CEO-Chairman age dissimilarity using alternative measures of CEO-Chairman age dissimilarity. Robust standard errors clustered by firm. *z-values* are reported in parentheses. \*, \*\*, \*\*\* denotes two-tailed p-values of less than 0.10, 0.05 and 0.01, respectively. Variables are defined in the Appendix.

**Table 6: Additional Tests - Impact of CEO-Chairman Age Dissimilarity on D&O Insurance Premiums and the Curvilinear Relationship**

Variables	Impact on D&O Insurance Premium		Curvilinear relation of age gap	
	(1) LN_PREMIUM	(2) LN_PREMIUM	(3) DOLDUM	(4) DOLDUM
Constant	-1.320* (-1.935)	-1.321* (-1.934)	-10.153*** (-34.668)	-10.156*** (-35.016)
GAPU	0.009* (1.849)		0.048*** (3.170)	
LNGAPU		0.005** (1.981)		0.208*** (4.208)
GAPSQU			-0.002** (-2.198)	-0.001* (-1.793)
FSIZE	0.067* (1.751)	0.066* (1.751)	0.374*** (28.727)	0.371*** (28.182)
LEVER	-0.019 (-0.355)	-0.019 (-0.361)	0.994*** (3.466)	0.989*** (3.471)
MTB	0.002 (0.879)	0.002 (0.871)	0.009 (0.886)	0.009 (0.905)
ROA	-0.195** (-2.253)	-0.193** (-2.26)	-2.621*** (-3.817)	-2.538*** (-3.683)
LOSS	0.019 (1.405)	0.019 (1.407)	-0.002 (-0.028)	-0.001 (-0.005)
BODSIZE	-0.005 (-1.033)	-0.006 (-1.054)	0.036*** (4.632)	0.034*** (4.441)
INDDIR	-0.001 (-0.954)	-0.001 (-0.922)	0.013*** (2.917)	0.013*** (3.019)
BLOCK	-0.063** (-2.401)	-0.063** (-2.451)	-0.291*** (-4.377)	-0.298*** (-4.453)
ZSCORE	0.001 (0.913)	0.001 (0.911)	0.027*** (2.737)	0.027*** (2.758)
AUDOPIN	-0.042 (-0.719)	-0.042 (-0.716)	0.021 (0.175)	0.021 (0.174)
BIG4	0.204*** (3.005)	0.203*** (3.004)	1.367*** (15.675)	1.366*** (15.723)
Industry FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Cluster	firm	firm	firm	firm
N	36,210	36,210	36,210	36,210
(Adjusted) Pseudo R <sup>2</sup>	0.145	0.146	0.136	0.137

**Note:** This table presents the regression results for the relationship between D&O liability insurance premium and CEO-Chairman age dissimilarity in Columns 1 & 2. Curvilinear relations between the CEO-Chairman age dissimilarity on the purchase decision of D&O liability insurance is presented in Columns 3 & 4. Robust standard errors clustered by firm. *z-values* (or *t-values* in Columns 3 & 4) are reported in parentheses. \*, \*\*, \*\*\* denotes two-tailed p-values of less than 0.10, 0.05 and 0.01, respectively. Variables are defined in the Appendix.

**Table 7: Cross-Sectional Test - Impact of CEO Tenure, Firm Ownership Structure (SOE vs. Non-SOE), and Family Ownership on D&O Insurance Purchase**

Variables	DOLDUM					
	CEOTEN=1	CEOTEN=0	SOE=1	SOE=0	FFIRM=1	FFIRM=0
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	-12.525*** (-6.044)	-9.731*** (-6.395)	-8.151*** (-3.971)	-10.723*** (-4.84)	-9.652*** (-4.661)	-7.774*** (-3.822)
GAPU	0.026** (2.346)	0.003 (0.365)	0.028*** (2.643)	0.014 (1.312)	0.014 (1.374)	0.025** (2.116)
FSIZE	0.384*** (4.954)	0.376*** (5.856)	0.392*** (4.626)	0.263*** (2.862)	0.198** (2.325)	0.364*** (4.442)
LEVER	1.717*** (2.749)	0.703 (1.531)	0.284 (0.457)	1.244** (2.502)	1.216** (2.418)	0.638 (0.937)
MTB	-0.023 (-0.767)	0.018 (1.410)	0.014 (0.893)	0.004 (0.195)	0.017 (1.074)	-0.002 (-0.116)
ROA	-1.81 (-0.934)	-2.651** (-2.082)	-1.532 (-0.906)	-1.871 (-1.136)	-2.207 (-1.337)	-0.935 (-0.547)
LOSS	0.099 (0.575)	-0.066 (-0.601)	-0.029 (-0.211)	0.113 (0.772)	0.047 (0.322)	0.017 (0.123)
BODSIZE	0.061 (1.355)	0.024 (0.708)	-0.046 (-1.01)	0.121** (2.074)	0.158*** (2.869)	-0.048 (-1.166)
INDDIR	0.005 (0.371)	0.016* (1.653)	0.011 (0.954)	0.016 (1.001)	0.014 (0.872)	0.011 (1.001)
BLOCK	-0.181 (-0.763)	-0.348** (-2.343)	-0.449** (-2.406)	-0.261 (-0.995)	-0.283 (-0.946)	-0.463*** (-2.578)
ZSCORE	0.047** (2.184)	0.019 (1.498)	-0.022 (-0.958)	0.042*** (2.631)	0.036** (2.335)	-0.016 (-0.701)
AUDOPIN	0.366 (1.031)	-0.058 (-0.229)	-0.179 (-0.569)	0.153 (0.677)	0.218 (0.951)	-0.328 (-1.001)
BIG4	1.534*** (6.91)	1.236*** (6.407)	1.296*** (5.514)	1.521*** (5.186)	1.184*** (3.735)	1.382*** (6.290)
Industry FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	firm	firm	firm	firm	firm	firm
Observations	13,506	22,704	15,642	20,568	21,400	14,810
Pseudo R <sup>2</sup>	0.163	0.135	0.151	0.121	0.096	0.161

**Note:** This table presents the regression results for the relationship between D&O liability insurance and CEO-Chairman age dissimilarity using alternative measures of CEO-Chairman age dissimilarity depending on the duration of CEO tenure, firm state-ownership and family firm ownership. Robust standard errors clustered by firm. *z-values* are reported in parentheses. \*, \*\*, \*\*\* denotes two-tailed *p-values* of less than 0.10, 0.05 and 0.01, respectively. Variables are defined in the Appendix.