



Article

Industry Expertise of Independent Directors and Firm Misconduct: Evidence from China

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Abstract

Independent directors play a critical role in overseeing company management, safeguarding the interests of both the company and its shareholders, and ensuring that decisions made by the board are scientific, rational, and fair. Directors with industry expertise bring greater experience and knowledge to their roles, enabling them to prevent short-sighted decision-making while preserving their professional reputations. This research empirically examines whether the industry expertise trait of independent directors can inhibit the irregularities of the companies they serve, using a fixed-effects model that controls for industry, company, and year, with Chinese A-share-listed companies from 2003 to 2023 as the observational sample. Endogeneity issues are addressed by using the Heckman two-stage model and the propensity score matching (PSM) model. The findings reveal that (1) independent directors with industry expertise significantly mitigate corporate violations; and (2) their influence primarily stems from improvements in the quality of information disclosure, enhancements to internal control systems, and the resolution of principal–agent conflicts. Further analysis indicates that the restraining effect of independent directors with industry expertise is particularly pronounced in environments characterized by low institutional ownership and fewer analysts, highlighting their stronger supervisory role in such contexts.

Keywords: independent directors; industry expertise; violations by enterprises; internal control; quality of information disclosure

1. Introduction

In the era of economic globalization, the pursuit of profit by enterprises has given rise to a variety of unethical and illegal practices which have attracted significant attention from regulators, scholars, and investors alike. Corporate misconduct manifests in multiple forms, including accounting fraud, insider trading, market manipulation, and environmental violations. In recent years, several high-profile companies have been exposed for engaging in financial fraud scandals. For example, the FTX exchange was embroiled in multi-billion-dollar fraud and embezzlement of customer funds, while Wirecard faced serious allegations of financial fraud in 2020, including inflating its financial position through fictitious transactions and revenue. Additionally, Wirecard was accused of falsifying its financial position. Corporate violations, amounting to billions of euros, not only tarnish the company's reputation and jeopardize shareholders' interests and future growth prospects, but also undermine trust and stability within the investment market, hindering the development of the capital market. The study of corporate violations holds both academic



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and practical significance, offering valuable insights into the optimization of government regulatory policies, the enhancement of market oversight, the safeguarding of investors' rights, and the preservation of market order. Existing research on the incentives behind corporate violations can be divided into internal and external factors. Internal factors primarily involve the governance structure (McKendall et al., 1999), corporate culture (Zaman, 2024), CEO leadership qualities (Abebe & Acharya, 2022), and the role of board members (Jin et al., 2022). External factors include the religious environment of the company (McGuire et al., 2012), Confucian culture (Tang et al., 2022), and environmental policies (J. Wang et al., 2024). The independent director system has played a pivotal role in enhancing corporate governance structures and reducing agency costs, marking a critical phase in the development of the Chinese capital market. Furthermore, it has contributed to mitigating corporate misconduct among listed companies to some extent. However, the question of whether the professionalism of independent directors can lead to stronger governance outcomes that reduce corporate violations remains underexplored. This gap holds considerable theoretical and practical importance. By examining how the professionalism of independent directors influences violations within listed companies from a comprehensive perspective, this research can offer valuable insights into their governance effectiveness, while enriching the existing literature on the factors influencing corporate misconduct.

As key members of the corporate governance structure, independent directors are responsible for overseeing and guiding managerial decision-making, while ensuring transparency and compliance within company operations. The industry expertise held by independent directors plays a critical role in enhancing the quality of internal controls in listed companies. These directors not only improve decision-making effectiveness and efficiency but also provide more accurate assessments of a company's conditions, thereby strengthening internal control processes. Existing research further supports the negative correlation between the quality of internal controls and corporate violations (Huang et al., 2023; Beneish et al., 2008). Because independent directors typically lack direct financial ties to company management, they are in a better position to oversee managerial activities and reduce information asymmetry between shareholders and management. This oversight helps mitigate agency costs (Hsu & Yang, 2022). Given the often conflicting objectives between managers and shareholders, high agency costs increase the likelihood of corporate violations driven by management's profit-seeking behavior (Dey, 2008). Scholars have long examined the background characteristics of independent directors, such as their professional qualifications (Y. Wang et al., 2016), part-time employment status (Fu, 2024), and academic backgrounds (Pang et al., 2020). This body of research provides a theoretical foundation for analyzing the role of industry expertise among independent directors. From the perspective of individual behavioral motivation, independent directors with industry expertise typically have experience working across multiple enterprises within the same industry. As a result, they are more likely to safeguard their professional reputation, making them less susceptible to engaging in or tolerating corporate misconduct.

Based on the inference regarding the correlation between independent directors' industry expertise and corporate violations in the business environment, this study anticipates proposing a research hypothesis supported by subsequent literature analysis and theoretical backing. Specifically, it posits that the industry expertise of independent directors of listed companies can inhibit the company's violations.

This study empirically examines the impact of independent directors' industry expertise on corporate violations, using a sample of Chinese A-share-listed companies from 2003 to 2023. A fixed-effects model that controls for industry, company, and year separately was employed to conduct regression analysis on the research samples, aiming to verify the main hypothesis of this study. Furthermore, the Heckman two-stage method and the

propensity score matching (PSM) model were adopted to handle endogeneity issues and demonstrate the robustness of the regression results. In additional tests, regression analysis was conducted on the mechanism through which industry-specialized independent directors inhibit corporate misconduct, encompassing three impact channels: enhancing the quality of information disclosure, improving internal control, and reducing agency costs.

This study selects Chinese A-share-listed companies as the source of research data based on the following research considerations. First, the China A-share market has experienced rapid growth in recent years, establishing itself as a significant player in the global capital market. Second, China A-share-listed companies provide a rich source of data, thanks to increasingly stringent information disclosure requirements and an expanding scope of required disclosures. Given China's central role in the global economy, understanding the dynamics and developmental trends of the Chinese market, especially in the context of ongoing economic uncertainty, is essential for grasping broader global economic shifts. Consequently, data from these companies not only offer valuable insights for academic research but also serve as a crucial reference for global investors and policymakers.

In order to better demonstrate the institutional context of this study, it is necessary to briefly elaborate on the basic system, regulatory framework, and corporate governance structure of the Chinese capital market. The Chinese capital market has been gradually established and developed during the process of economic transformation. Its core regulatory authority is the China Securities Regulatory Commission (CSRC), responsible for rule-making, law enforcement, and market supervision. Within China, the Shanghai Stock Exchange and Shenzhen Stock Exchange are the main securities trading platforms. Under the overall framework established by the CSRC, they are responsible for formulating specific listing, trading, and ongoing regulatory business rules and implementation details, and undertake daily regulatory responsibilities for listed companies. Under this regulatory system, the governance structure of listed companies in China has distinct characteristics. Since the CSRC issued the "Guiding Opinions on Establishing an Independent Director System in Listed Companies" in 2001, the independent director system has been officially introduced and become a mandatory requirement for corporate governance. This system requires that at least one-third of the board members of listed companies be independent directors, whose main duty is to balance the interests of controlling shareholders and management to protect the interests of small and medium-sized investors. However, compared to the markets in the UK and the US, listed companies in China generally exhibit a high degree of equity concentration, with the phenomenon of "one share dominates" or insider control affecting the effectiveness of traditional governance mechanisms to some extent. Therefore, whether the independent directors of a company can effectively perform their supervisory functions and restrain the misconduct of the company's management and of controlling shareholders has become an important research topic with distinct local characteristics.

This study is conducted against the aforementioned institutional background, focusing on the specific attribute of independent directors' industry expertise to explore its role in inhibiting corporate misconduct, a specific governance objective. The findings of this study highlight the significant impact of independent directors with industry expertise on improving the quality of corporate internal controls and information disclosure. This not only verifies the value of the professionalism of independent directors in complex governance environments, but also provides empirical evidence for the continuous improvement in the independent director system with Chinese characteristics. These directors, who have held or currently hold positions across multiple companies within the same industry, bring extensive industry experience and valuable insights that enable them to effectively oversee management, optimize internal control processes, and enhance the quality of financial

reporting. Furthermore, their roles as industry experts contribute positively to mitigating principal–agent problems within companies. By leveraging their deep professional knowledge and practical experience, these expert independent directors not only reduce potential moral hazards associated with management but also effectively counteract adverse selection behaviors exhibited by managers.

Through their constructive contributions, expert independent directors play a crucial role in lowering agency costs, which is essential for maintaining efficient corporate governance and ensuring fair decision-making. Additionally, this study reveals that the influence of independent directors with industry expertise on corporate violations is moderated by the number of analysts and the proportion of institutional ownership. Both the number of analysts and the level of institutional shareholding serve as indicators of external monitoring mechanisms within a firm. As a result, when a company has limited analyst coverage and low institutional ownership, the deterrent effect of independent directors with industry expertise on corporate violations becomes even more pronounced.

The potential contributions of this paper are as follows: First, it expands the existing research on corporate violations by listed companies. While previous research has primarily focused on informal institutions, motivations, consequences, and relevant policies related to such violations, there has been limited exploration of the impact of independent directors with industry expertise on corporate violations, particularly from the perspectives of internal control quality, agency costs, and information disclosure quality. Second, this paper offers important implications for corporate internal governance. Corporate violations not only damage a company's reputation but also erode investor confidence and hinder the healthy development of the broader capital market. The findings of this study also provide valuable practical insights: when selecting independent directors, senior management should consider not only their independence but also their professional qualifications and whether they can effectively perform their supervisory duties and mitigate corporate misconduct.

The remaining sections of this paper are organized as follows: The Section 2 presents a literature review and outlines the research hypotheses. The Section 3 details the research design, including the development of effective measurement indices for independent directors' industry expertise, corporate violations, agency costs, and information disclosure quality. It also introduces a regression model to test the research hypotheses. The Section 4 reports the empirical test results and provides an analysis. The Section 5 discusses further research opportunities and includes a mediating effect analysis. Finally, the conclusion is presented in the Section 6.

2. Literature Review and Hypothesis Development

2.1. Literature on Industry Expertise of Independent Directors

Masulis et al. (2013) identified the weak correlation between board independence and corporate performance as a significant empirical challenge. One possible explanation is that relying solely on director independence may be insufficient, as independent directors require certain prerequisites to effectively enhance corporate governance and performance. For example, Dass et al. (2014) found that the impact of industry-expert independent directors on corporate performance becomes more pronounced when a company's size and information asymmetry are greater. Jin et al. (2022) concluded that academic independent directors with financial backgrounds can reduce the risk of stock price crashes, particularly in non-state-owned companies with a high proportion of intangible assets. S. H. Chen and Zhang (2020) focused on bank performance following CEO resignations and demonstrated that industry-expert independent directors can improve the likelihood of identifying exceptional CEO successors, thus enhancing corporate performance and

reducing risk for banks. C. Wang et al. (2015) found that having independent directors with industry experience on audit committees significantly curbs earnings management within companies, which aligns with previous studies showing a negative relationship between earnings management and corporate valuation (Chi & Gupta, 2009), especially in cases of excessive compensation, multiple M&A profits, and CEO performance sensitivity. This research further supports the notion that companies with independent directors possessing industry expertise tend to have higher valuations compared to those with less experienced independent directors (Drobetz et al., 2018). Additionally, firms with industry-expert independent directors show a greater ability to generate patents for the same level of R&D investment, while experiencing lower volatility in R&D expenditures and future earnings. These factors collectively contribute to enhanced company value (Faleye et al., 2018). The existing literature consistently concludes that industry-expert independent directors positively impact corporate governance from various perspectives. This serves as the theoretical foundation for our study, which aims to clarify the mechanisms through which industry-expert independent directors influence corporate misconduct by adjusting and optimizing internal governance factors.

2.2. Literature on Firm Misconduct

Violations committed by listed companies not only undermine investor confidence and disrupt the order of the capital market but also hinder the company's market performance and weaken its competitive position. In light of these violations, regulatory authorities must critically assess and adjust the existing regulatory framework and enforcement strategies. At the same time, companies need to reassess their organizational structures and identify key factors contributing to management failures (Cole et al., 2021). Previous research on corporate violations has primarily focused on external environmental factors and internal governance issues. However, recent studies have increasingly examined the influence of external environmental factors on corporate misconduct, reflecting societal developments and long-standing institutional contexts. For instance, McGuire et al. (2012) found that companies headquartered in regions with strong religious social norms tend to exhibit fewer financial reporting violations due to the inhibitory effect of these norms on managers' motivation to breach regulations and mitigate agency conflicts. Tang et al. (2022) showed that Confucian culture effectively curbs corporate information disclosure violations through two main mechanisms: by restraining managers' self-interest tendencies and fostering a positive moral environment. The impact of social environmental factors on corporate behavior has been well documented, with external policy factors, such as the political environment, also playing a regulatory role in shaping corporate conduct. Moreover, an enterprise's industry environment is another critical external factor that must be carefully considered in strategic decision-making, as it significantly influences both the behavioral motivations and decision-making processes of companies. Zhang et al. (2023) demonstrated that increased competition within the banking industry helps banks fulfill their capital supervision responsibilities, thus reducing violations by private enterprises.

The influence of internal governance factors on corporate violations has long been a central topic in academic research and plays a crucial role in shaping corporate codes of conduct. For instance, J. Chen et al. (2024) argue that the CEO's hometown identity functions as an informal contractual mechanism that, while relatively inconspicuous, is closely aligned with China's institutional environment and effectively curbs corporate misconduct. Their study also explores how the CEO's hometown identity interacts with monitoring mechanisms to influence corporate wrongdoing. Additionally, their findings highlight the implications of CEO behavior in relation to corporate violations. Khanna et al. (2015) discovered that interpersonal networks established by CEOs with senior managers

and board members during the appointment process can reduce coordination costs associated with illicit activities, potentially heightening the risk of corporate fraud. Abebe and Acharya (2022) note that companies led by founder CEOs tend to exhibit lower probabilities of environmental violations due to these CEOs' central roles, psychological attachment, and management mindset. However, the influence of founder CEOs on environmental violations weakens over time as the company matures and expands. McKendall et al. (1999) examined corporate environmental violations from the perspective of ownership structure and found a significant positive correlation between the stock holdings of corporate managers and directors and the occurrence of serious environmental violations. While not traditionally regarded as part of the corporate governance structure, corporate culture plays an indirect but important role in supporting effective governance by positively influencing management and board decision-making. A strong corporate culture can help prevent or mitigate the risk of violations, as evidenced in Zaman's (2024) longitudinal study on monetary penalties imposed on US-listed companies.

Building on the existing literature regarding the impact of managerial attributes on corporate violations, this study explores the personal characteristics of independent directors and examines their influence on such violations. Specifically, the research focuses on internal governance factors within companies and seeks to uncover how the industry expertise of independent directors affects the internal governance mechanisms, ultimately either constraining or facilitating corporate violations.

2.3. Hypothesis Development

As integral members of the corporate governance structure, independent directors bear the critical responsibility of safeguarding the overall interests of the company and protecting the rights of minority shareholders. Through their supervisory role, independent directors significantly enhance transparency in corporate governance and ensure legal compliance in company operations (Xing et al., 2023). Additionally, they serve as both supervisors and evaluators of internal control systems within the organization. Their primary duty is to ensure the robustness and effective implementation of internal control mechanisms, thereby strengthening quality assurance processes and risk management practices (Zhao et al., 2024). However, the effectiveness of independent directors in fulfilling these duties and enhancing internal control capabilities, based solely on their independence, remains a subject of debate. The professional competence of independent directors is a key factor influencing their ability to perform these responsibilities effectively. Huang et al. (2023) argue that independent directors typically come from diverse backgrounds, including academia, law, accounting, or specific industries, bringing with them extensive knowledge and experience in their respective fields. On one hand, this combination of expertise contributes to improved decision-making quality and efficiency. On the other hand, independent directors with industry expertise possess the ability to accurately assess the operational status of companies and assist management in mitigating potential risks while capitalizing on development opportunities. As a result, their presence significantly enhances the quality of internal controls in listed companies. Existing research indicates a negative correlation between the quality of internal controls and the likelihood of violations; as defects in a company's internal control systems become more pronounced, adverse selection and moral hazard tendencies among management are likely to intensify, thereby increasing the risk of corporate violations (Beneish et al., 2008; Lin et al., 2018; Irwansyah & Zega, 2023). In conclusion, independent directors with industry expertise can effectively reduce corporate violations by improving the internal control quality of listed companies.

The effectiveness of addressing agency problems and improving corporate governance has been demonstrated through the independence, diversity, and proper structure of the

board of directors. Among these factors, board independence is considered a critical element in its supervisory function. Independent directors, free from direct conflicts of interest with company management, are better positioned to represent shareholders' interests and provide fair and effective oversight of management. This reduces agency costs in companies, which arise from the misalignment of goals between owners (principals) and managers (agents) (Dey, 2008). These costs encompass monitoring expenses as well as economic losses resulting from managers' failure to maximize shareholder value. High agency costs reflect greater inconsistency between management and shareholders' interests, which can lead to actions that conflict with shareholder interests or even result in corporate violations. Independent directors with industry expertise can more effectively supervise both management and major shareholders by leveraging their professional knowledge and extensive practical experience (Brooks et al., 2009). This enables them to mitigate both Type I (conflict between shareholders and managers) and Type II (conflict between major shareholders and minority shareholders) agency problems (Purkayastha et al., 2022), thereby significantly reducing the risk of corporate violations.

In the existing literature on the impact of independent directors on accounting information disclosure, some scholars suggest a positive correlation between the proportion of independent directors on boards and the quality of information disclosure by listed companies. However, other scholars contend that evidence supporting this correlation is weak and inconclusive (Larcker et al., 2007). As a result, researchers have broadened their focus beyond the proportion of independent directors to explore other attributes that may influence the quality of accounting information. For example, studies have examined variables such as independent director remuneration (Lee & Isa, 2015), part-time job status (Fu, 2024), attendance record (H. Liu et al., 2016), professional background (Y. Wang et al., 2016), gender composition (Fu, 2024), and academic credentials (Pang et al., 2020). Among these attributes, the professional background of independent directors is particularly significant in determining the quality of corporate accounting information disclosure. The personal knowledge and expertise of independent directors are crucial factors in enhancing the transparency and reliability of accounting information. Notably, their professional knowledge structure and industry-specific expertise, gained through experience, play a key role in deterring fraudulent activities and improving the overall quality of financial disclosure.

The impact of information disclosure quality on corporate violations is a critical topic in academic research. Studies indicate that high-quality disclosure plays a significant role in reducing the occurrence of corporate violations. However, there is limited research directly examining the correlation between information disclosure quality and corporate violations, with most research focusing on the mediating effect of disclosure quality. For example, F. Wu et al. (2023) found that Employee Stock Ownership Plans (ESOPs) can significantly reduce the likelihood of corporate violations. Moreover, subsequent research has shown that the governance effectiveness of ESOPs is particularly strong in companies with lower-quality information disclosure. Therefore, independent directors with industry expertise can effectively mitigate the risk of corporate violations by improving information disclosure quality. In summary, the primary research hypothesis for this paper is proposed as follows:

H1. *The industry expertise of independent directors of listed companies can inhibit a company's violations.*

3. Sample and Research Design

3.1. Sample Construction

This study empirically examines the influence of independent directors' industry expertise on corporate violations, utilizing a sample of Chinese A-share-listed companies

from 2003 to 2023. Data on the industry expertise of independent chairpersons were sourced from the CSMAR Research Database on China-listed companies. The original sample underwent the following processing steps: (1) the exclusion of companies that have been marked as ST or *ST (ST and *ST are two special treatment labels for listed company stocks that have been experiencing financial or other abnormal situations), which can avoid extreme values dominating the statistical results and ensure the robustness of the research findings; (2) the removal of listed companies in the financial industry (this industry differs significantly from other companies in terms of business models, financial statement structures, and regulatory environments), which can ensure the homogeneity of the research sample; (3) the elimination of observation samples with missing variables; (4) the application of winsorization at the 1% level for continuous variables to mitigate the effects of outliers. Following these screening and elimination procedures, a final dataset of 24,456 observation samples was obtained. The specific sample selection steps and respective exclusion quantities are presented in Table 1.

Table 1. Sample selection.

Sample Selection Steps	# Firm-Years	# Firms
Observations of all China A-share-listed firms in CSMAR	59,967	5617
Less		
Observations that been marked as ST or *ST	(2583)	(17)
Firms in the financial sector	(1241)	(93)
Observations without an independent directors' profile available	(18,672)	(2043)
Observations with missing data for control variables	(13,015)	(1547)
Final Sample	24,456	1917

Notes: # indicates the number of observations.

3.2. Measure of Independent Directors' Industry Expertise

The explanatory variable represents the industry expertise of independent directors in listed companies. Following C. Wang et al. (2015), this study measures the industry expertise of independent directors based on their employment in two or more companies within the same industry during a specific period. If they have such experience, it indicates that the independent director possesses industry expertise, and the value is set to 1; otherwise, it is set to 0.

3.3. Measure of Firm Misconduct

We interpret firm misconduct as the company's violations. The explained variable represents the company's violations. Referring to the relevant research of Donker et al. (2023), we use the number of violations committed by listed companies in the year to measure their misconduct. If the companies receive formal penalties from regulatory bodies such as the China Securities Regulatory Commission or stock exchanges, or if it announces irregularities in the current year, then their misconduct is represented by the number of violations.

3.4. Research Design

To test Hypothesis 1, the following model is established:

$$\text{Violation} = \alpha + \beta \times \text{Inddir Expert} + \gamma \times \text{Controls} + \text{Fixed Effects} + \mu \quad (1)$$

Among these, the explained variable is measured by Vio Number, which specifically represents the number of violations of listed companies in the year. The explanatory

variable is measured by *Inddir Expert*, which represents whether the independent directors possess industry expertise. Additionally, this research incorporates the following control variables: (1) Company's basic characteristics: reflecting its size by using the natural logarithm of total assets at the end of the period. Generally, larger and more standardized companies tend to have a more mature development trajectory, which can effectively mitigate violation tendencies. The return on total assets is calculated by dividing the net profit by the total assets at the end of the period. A lower return on total assets indicates weaker profitability and a higher likelihood of non-compliance occurrences. The asset–liability ratio represents the proportion of total liabilities to total assets at the end of the period, serving as an indicator of a company's solvency. A higher asset–liability ratio suggests an increased probability of non-compliance. The market value-to-total assets ratio reflects a company's growth potential and is utilized for performance assessment purposes. A binary variable for corporate loss is assigned a value of 1 if the company incurs losses, and 0 otherwise. The occurrence of financial losses often indicates inadequate management, while the growth rate of a company's operating revenue and its nature as either state-owned or non-state-owned are important factors to consider. State-owned enterprises are assigned a value of 1, whereas non-state-owned enterprises are assigned a value of 0. Generally speaking, state-owned enterprises face stricter supervision and regulation, resulting in lower possibilities of violations. (2) Corporate governance variables play a crucial role: Firstly, the integration of roles between the chairman and CEO is represented by a dummy variable; secondly, ownership concentration is measured by summing up the shareholding ratios of the top three shareholders; thirdly, the proportion of independent directors representing the company is considered; finally, the natural logarithm of the number of board members is taken into account. Due to inconsistent research findings in the existing literature, estimating the relationship between these corporate governance variables and corporate violations becomes challenging. (3) Other variables: whether the enterprise is audited by one of the Big Four accounting firms. If this is the case, the value is 1; otherwise, the value is 0. Generally, due to their professional expertise, the Big Four accounting firms are better equipped to fulfill their role as external supervisors and mitigate violations within audited enterprises. Additionally, this study also controls for year fixed effects and firm fixed effects. All variables are defined in Appendix A.

4. Empirical Results

4.1. Primary Results

The descriptive statistics for each variable in the model are presented in Table 2. Notably, the mean value of *Vio Number* indicates an average annual violation count of 0.591 for the listed companies in the observed sample. Additionally, the mean value of *Inddir Expert* reveals that approximately 45% of observations in our sample have an independent director possessing industry expertise. It is important to note that the remaining variables show descriptive statistics within a reasonable range; however, these results are not reiterated here.

The correlation coefficients between the main variables are presented in Table 3, with Pearson's correlation coefficients displayed below the diagonal and Spearman's correlation coefficients above it. Notably, a negative correlation is observed between the number of corporate violations (*Vio Number*) and the industry expertise of independent directors, providing initial support for Hypothesis 1. Additionally, a significant negative association is found between *Vio Number* and both *ROA* (return on assets) and *Top3* (ownership concentration), suggesting that companies with higher *ROA* and greater ownership concentration are less likely to engage in violations. In contrast, a significantly positive correlation is observed between *Vio Number* and both *Loss* (financial losses) and *Lev* (asset–liability

ratio), indicating that companies with higher asset–liability ratios and financial losses are more prone to violations. Furthermore, all other variable correlations fall within an acceptable range, suggesting no significant issue of multicollinearity among the variables.

Table 2. Summary statistics.

Variables	N	Mean	SD	Median	P25	P75
Vio Number	24,456	0.591	1.348	0.000	0.000	1.000
Inddir Expert	24,456	0.453	0.498	0.000	0.000	1.000
Size	24,456	21.965	1.224	21.832	21.109	22.672
Roa	24,456	0.025	0.083	0.032	0.009	0.062
Lev	24,456	0.439	0.218	0.428	0.268	0.593
Loss	24,456	0.149	0.356	0.000	0.000	0.000
growth	24,456	0.177	0.470	0.107	−0.038	0.280
Tobinq	24,456	2.035	1.330	1.595	1.231	2.305
Dual	24,456	0.283	0.450	0.000	0.000	1.000
Top3	24,456	0.469	0.149	0.461	0.356	0.577
Inddir	24,456	0.379	0.072	0.364	0.333	0.429
Board	24,456	2.268	0.248	2.197	2.197	2.398
State	24,456	0.332	0.471	0.000	0.000	1.000
Big4	24,456	0.039	0.194	0.000	0.000	0.000

Notes: All variables are defined in Appendix A. Some variables are left-skewed, which results in descriptive statistics where the standard deviation exceeds the mean.

Table 3. Correlation matrix.

Panel A: Vio Number to growth							
	1	2	3	4	5	6	7
1. Vio Number		−0.004	0.007	−0.210 *	0.109 *	0.210 *	−0.079 *
2. Inddir Expert	−0.002		0.104 *	0.026 *	−0.039 *	−0.034 *	−0.006
3. Size	0.021 *	0.099 *		0.015 *	0.366 *	−0.078 *	0.051 *
4. Roa	−0.286 *	0.037 *	0.088 *		−0.414 *	−0.617 *	0.346 *
5. Lev	0.130 *	−0.048 *	0.349 *	−0.384 *		0.231 *	−0.010
6. Loss	0.246 *	−0.034 *	−0.085 *	−0.701 *	0.263 *		−0.303 *
7. growth	−0.048 *	−0.021 *	0.046 *	0.244 *	0.013 *	−0.210 *	
8. Tobinq	0.015 *	0.011	−0.366 *	0.048 *	−0.193 *	0.040 *	0.030 *
9. Dual	0.040 *	0.042 *	−0.089 *	0.017 *	−0.102 *	−0.004	0.005
10. Top3	−0.130 *	−0.019 *	0.065 *	0.184 *	−0.056 *	−0.161 *	0.069 *
11. Inddir	0.004	0.102 *	−0.021 *	0.024 *	−0.081 *	−0.013 *	−0.014 *
12. Board	0.045 *	0.087 *	0.222 *	−0.034 *	0.133 *	0.021 *	0.008
13. State	−0.118 *	−0.077 *	0.209 *	−0.016 *	0.222 *	−0.005	−0.013 *
14. Big4	−0.043 *	0.010	0.265 *	0.049 *	0.080 *	−0.036 *	−0.001
Panel B: Tobinq to Big4							
	8	9	10	11	12	13	14
1. Vio Number	0.030 *	0.041 *	−0.134 *	0.005	0.030 *	−0.120 *	−0.050 *
2. Inddir Expert	0.040 *	0.042 *	−0.018 *	0.102 *	0.089 *	−0.077 *	0.010
3. Size	−0.422 *	−0.095 *	0.019 *	−0.027 *	0.211 *	0.194 *	0.205 *
4. Roa	0.231 *	0.038 *	0.205 *	0.033 *	−0.047 *	−0.093 *	0.039 *
5. Lev	−0.317 *	−0.105 *	−0.055 *	−0.081 *	0.130 *	0.232 *	0.083 *
6. Loss	0.008	−0.004	−0.163 *	−0.010	0.018 *	−0.005	−0.036 *
7. growth	0.065 *	0.026 *	0.089 *	−0.003	−0.024 *	−0.022 *	0.007
8. Tobinq		0.110 *	−0.127 *	0.114 *	−0.097 *	−0.230 *	−0.104 *
9. Dual	0.068 *		−0.010	0.115 *	−0.139 *	−0.267 *	−0.042 *
10. Top3	−0.114 *	−0.017 *		−0.004	−0.022 *	0.091 *	0.084 *
11. Inddir	0.087 *	0.118 *	0.003		−0.193 *	−0.192 *	−0.034 *
12. Board	−0.077 *	−0.136 *	−0.016 *	−0.194 *		0.212 *	0.078 *
13. State	−0.144 *	−0.267 *	0.096 *	−0.189 *	0.218 *		0.081 *
14. Big4	−0.067 *	−0.042 *	0.091 *	−0.033 *	0.085 *	0.081 *	

Notes: All variables are defined in Appendix A. Lower-triangular cells report Pearson’s correlation coefficients; upper-triangular cells are Spearman’s rank correlation. * indicates significance above 5% levels.

The regression results for Hypothesis 1 are presented in Table 4, with violation frequency (Vio Number) as the dependent variable. Controlling for industry, firm, and year fixed effects in columns (2) and (3), the regression coefficient of the independent variable Inddir Expert remains significantly negative at the 5% level (-0.060^{**} , $t = -2.26$; -0.058^{**} , $t = -2.20$). This suggests that Inddir Expert has a significant impact on Vio Number, indicating that listed companies with independent directors possessing industry expertise tend to have fewer violations. Further examination of the control variables reveals a significant positive relationship between size and violation frequency, implying that larger companies are more prone to violations. Meanwhile, Lev (asset–liability ratio) and Loss (financial losses) show significantly positive coefficients, suggesting that companies with higher asset–liability ratios and financial losses are more likely to experience violations. Additionally, other variables such as ROA (return on assets) and Big4 (audit firm) show signs consistent with our expectations.

Table 4. Primary results.

	Dependent Variable: Vio Number		
	(1)	(2)	(3)
Inddir Expert	-0.040^{**} (-2.42)	-0.060^{**} (-2.26)	-0.058^{**} (-2.20)
Size	0.093^{***} (11.38)	0.032^{*} (1.94)	0.125^{***} (5.12)
Roa	-3.573^{***} (-23.96)	-3.014^{***} (-10.91)	-2.208^{***} (-7.98)
Lev	0.154^{***} (3.38)	0.505^{***} (5.56)	0.328^{***} (2.83)
Loss	0.310^{***} (9.63)	0.358^{***} (6.94)	0.260^{***} (5.62)
growth	0.054^{***} (2.98)	0.032 (1.40)	-0.009 (-0.43)
Tobinq	0.032^{***} (4.71)	-0.002 (-0.21)	-0.001 (-0.06)
Dual	0.062^{***} (3.31)	0.047 (1.61)	0.007 (0.20)
Top3	-0.550^{***} (-9.81)	-0.522^{***} (-5.86)	-0.624^{***} (-4.00)
Inddir	-0.114 (-0.97)	-0.137 (-0.91)	0.045 (0.30)
Board	0.280^{***} (8.02)	0.268^{***} (5.19)	0.257^{***} (4.89)
State	-0.395^{***} (-20.83)	-0.320^{***} (-10.12)	-0.170^{**} (-2.43)
Big4	-0.271^{***} (-6.20)	-0.161^{***} (-3.18)	-0.127^{*} (-1.84)
Constant	-1.746^{***} (-9.21)	-0.490 (-1.40)	-2.489^{***} (-4.62)
Fixed Effects	None	Industry, Year	Firm, Year
Adj.R ²	0.116	0.155	0.321
N	24,456	24,443	24,456

Notes: This table presents the results of independent directors' industry expertise and firm misconduct. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

4.2. Endogeneity

Given the non-random selection of the sample, using the ordinary least squares (OLS) method may result in inconsistent estimates. Furthermore, unobserved characteristics could undermine the validity of Inddir Expert as an explanatory variable for independent

directors, potentially introducing bias in the assessment of the relationship between industry expertise and corporate violations. To address concerns related to heterogeneity and endogeneity stemming from omitted variables, we employ a Heckman two-stage model to ensure accurate and reliable findings. Table 5 presents the regression results obtained using the Heckman two-stage model. The first-stage regression results show a significantly positive impact of Inddir Expert on relevant control variables, such as the industry mean. Additionally, the second-stage regression results for the industry mean indicate that when Vio Number is used as the dependent variable, Inddir Expert exhibits a significantly negative coefficient at the 1% significance level, confirming the robustness of our findings.

Table 5. Heckman two-stage model.

	(1) Inddir Expert	(2) Vio Number
Industry Mean	3.398 *** (24.87)	
Inddir Expert		−0.239 *** (−2.82)
Size	0.085 *** (7.93)	0.129 *** (5.25)
Roa	0.275 (1.63)	−2.210 *** (−8.01)
Lev	0.034 (0.64)	0.309 *** (2.67)
Loss	−0.042 (−1.18)	0.259 *** (5.58)
growth	−0.078 *** (−3.78)	−0.009 (−0.44)
Tobinq	−0.004 (−0.51)	−0.001 (−0.11)
Dual	0.023 (1.12)	0.006 (0.17)
Top3	0.025 (0.40)	−0.664 *** (−4.25)
Inddir	1.721 *** (13.27)	0.143 (0.89)
Board	0.641 *** (16.60)	0.303 *** (5.52)
State	−0.034 (−1.53)	−0.168 ** (−2.39)
Big4	−0.017 (−0.35)	−0.129 * (−1.86)
lambda		0.118 ** (2.26)
Constant	−5.455 *** (−20.97)	−2.622 *** (−4.80)
Fixed Effects	Industry, Year	Firm, Year
Pseudo/Adj.R ²	0.197	0.322
N	24,367	24,365

Notes: This table presents the results of the Heckman two-stage model. The instrumental variable is the industry-year mean value of independent directors' industry expertise. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

Utilizing propensity score matching (PSM) and entropy balancing techniques effectively addresses sample selection bias by ensuring similarity in the distributions of key variables between treatment and control groups, thereby enhancing the accuracy of causal inferences. In Table 6, we conduct a bivariate analysis before PSM to assess the balance between firms

with industry-expert independent directors in the treatment group and those without such directors in the control group across various key variables. As shown in Panel A, we compare the mean values and standard deviations of specific variables, including firm size, return on total assets (ROA), and firm losses for both groups. The analysis reveals significant mean differences between the treatment and control groups for several variables. Specifically, Size and Tobin Q exhibit significantly higher mean values in the treatment group compared to the control group, while ROA and Loss show significantly lower mean values in the treatment group than in the control group. Additionally, the treatment group has significantly higher values for Inddir Expert (industry-expert directors) and Board (board size) compared to the control group, indicating systematic variations in key observable characteristics between the two samples before propensity score matching, which could impact the accuracy of causal inference. To address these discrepancies, we employ both propensity score matching and entropy balancing methods separately to process the two control groups. The analysis results after propensity score matching are presented in Panel B, and the outcomes of bivariate analysis after entropy balancing are reported in Panel C. The results following entropy balancing show minimal mean differences across all variables between the sample groups, with values approaching zero. This suggests that the balancing process has effectively reduced disparities in observable characteristics between the groups. Finally, the regression results from both matching methods, with an adjustment value of 0.332, are displayed in Panel D, indicating similar explanatory power for the model.

Table 6. PSM and entropy balancing.

Panel A: Bivariate Analysis Before Matching					
	Inddir Expert = 1		Inddir Expert = 0		Mean difference
	Mean	SD	Mean	SD	
Size	22.098	1.190	21.854	1.241	−0.244 ***
Roa	0.028	0.078	0.022	0.087	−0.006 ***
Lev	0.428	0.203	0.448	0.228	0.021 ***
Loss	0.136	0.343	0.16	0.367	0.024 ***
growth	0.166	0.429	0.186	0.500	0.020 ***
Tobinq	2.051	1.284	2.022	1.367	−0.029 *
Dual	0.303	0.460	0.266	0.442	−0.038 ***
Top3	0.466	0.146	0.472	0.152	0.006 ***
Inddir	0.387	0.074	0.372	0.069	−0.015 ***
Board	2.291	0.244	2.248	0.249	−0.043 ***
State	0.292	0.455	0.365	0.482	0.073 ***
Big4	0.041	0.199	0.037	0.189	−0.004
Panel B: Bivariate analysis after PSM					
	Inddir Expert = 1		Inddir Expert = 0		Mean Difference
	Mean	SD	Mean	SD	
Size	22.098	1.190	22.003	1.240	−0.095 *
Roa	0.028	0.078	0.027	0.082	−0.001
Lev	0.428	0.203	0.427	0.223	−0.001
Loss	0.136	0.343	0.141	0.348	0.005
growth	0.166	0.429	0.169	0.458	0.002
Tobinq	2.051	1.284	2.033	1.372	−0.018
Dual	0.303	0.460	0.29	0.454	−0.013
Top3	0.466	0.146	0.468	0.153	0.002
Inddir	0.387	0.074	0.378	0.071	−0.009
Board	2.291	0.244	2.269	0.249	−0.022
State	0.292	0.455	0.301	0.459	0.009
Big4	0.041	0.199	0.039	0.193	−0.002

Table 6. Cont.

Panel C: Bivariate analysis after entropy balancing					
	Inddir Expert = 1		Inddir Expert = 0		Mean Difference
	Mean	SD	Mean	SD	
Size	22.100	1.417	22.100	1.683	0.000
Roa	0.028	0.006	0.028	0.007	0.000
Lev	0.428	0.041	0.428	0.050	0.000
Loss	0.136	0.118	0.136	0.118	0.000
growth	0.166	0.185	0.167	0.209	0.000
Tobinq	2.051	1.648	2.051	1.937	0.000
Dual	0.303	0.211	0.303	0.211	0.000
Top3	0.466	0.021	0.466	0.023	0.000
Inddir	0.387	0.005	0.387	0.006	0.000
Board	2.291	0.059	2.291	0.066	0.000
State	0.292	0.207	0.293	0.207	0.000
Big4	0.041	0.039	0.041	0.039	0.000

Panel D: Regression using matched samples		
	(1) PSM	(2) Entropy Balancing
Inddir Expert	−0.065 ** (−2.32)	−0.056 ** (−2.05)
Size	0.132 *** (4.74)	0.142 *** (5.30)
Roa	−2.305 *** (−7.44)	−2.236 *** (−7.57)
Lev	0.411 *** (3.22)	0.349 *** (2.73)
Loss	0.299 *** (5.80)	0.299 *** (5.88)
growth	−0.003 (−0.10)	−0.020 (−0.80)
Tobinq	−0.001 (−0.05)	−0.004 (−0.38)
Dual	−0.008 (−0.19)	0.007 (0.19)
Top3	−0.658 *** (−3.82)	−0.695 *** (−4.15)
Inddir	0.022 (0.14)	−0.024 (−0.15)
Board	0.245 *** (4.41)	0.275 *** (4.95)
State	−0.145 * (−1.71)	−0.154 * (−1.94)
Big4	−0.102 (−1.33)	−0.120 (−1.61)
Constant	−2.629 *** (−4.24)	−2.854 *** (−4.73)
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.332	0.332
N	22,138	24,456

Notes: This table displays the results of propensity score-matched (PSM) and entropy-balanced samples. Panels A, B, and C report the results from balance checks. Panel D reports the estimation results using the matched samples. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

4.3. Other Robustness

In Table 7, we normalized all variables and conducted regression testing on Hypothesis 1. Controlling for industry, firm, and year fixed effects in columns (2) and (3), the regression coefficient of the independent variable Inddir Expert_n remains significantly negative at

the 5% level (-0.030^{**} , $t = -2.26$; -0.029^{**} , $t = -2.20$). This suggests that the research conclusion of Hypothesis 1 remains robust.

Table 7. Results using normalized value of all variables.

	Dependent Variable: Vio Number_n		
	(1)	(2)	(3)
Inddir Expert_n	-0.015^{**} (-2.42)	-0.030^{**} (-2.26)	-0.029^{**} (-2.20)
Size_n	0.085^{***} (11.38)	0.039^{*} (1.94)	0.152^{***} (5.12)
Roa_n	-0.220^{***} (-23.96)	-0.250^{***} (-10.91)	-0.183^{***} (-7.98)
Lev_n	0.025^{***} (3.38)	0.110^{***} (5.56)	0.071^{***} (2.83)
Loss_n	0.082^{***} (9.63)	0.127^{***} (6.94)	0.093^{***} (5.62)
growth_n	0.019^{***} (2.98)	0.015 (1.40)	-0.004 (-0.43)
Tobinq_n	0.031^{***} (4.71)	-0.003 (-0.21)	-0.001 (-0.06)
Dual_n	0.021^{***} (3.31)	0.021 (1.61)	0.003 (0.20)
Top3_n	-0.061^{***} (-9.81)	-0.078^{***} (-5.86)	-0.093^{***} (-4.00)
Inddir_n	-0.006 (-0.97)	-0.010 (-0.91)	0.003 (0.30)
Board_n	0.052^{***} (8.02)	0.066^{***} (5.19)	0.064^{***} (4.89)
State_n	-0.138^{***} (-20.83)	-0.151^{***} (-10.12)	-0.080^{**} (-2.43)
Big4_n	-0.039^{***} (-6.20)	-0.031^{***} (-3.18)	-0.025^{*} (-1.84)
Constant	0.000 (0.00)	0.591^{***} (42.74)	0.591^{***} (>100)
Fixed Effects	None	Industry, Year	Firm, Year
Adj.R ²	0.116	0.155	0.321
N	24,456	24,443	24,456

Notes: This table presents the result of independent directors' industry expertise and firm misconduct. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. All variables have been normalized. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

In Table 8, we conduct additional empirical tests by altering the measurement method and model estimation approach for corporate violations. Following the measure of misconduct incidence by J. Chen et al. (2025), we employed a dummy variable to measure whether a listed company has engaged in irregularities. In column (1), Vio dummy indicates our dependent variable, which takes a value of 1 for companies with at least one violation; otherwise, it is set to 0. The Logit model is used for estimation in column (1). In column (2), we still use Vio Number as the dependent variable. While considering that the number of violations is a ranking variable, the Ordered Logit model is used for estimation. Notably, the regression results reveal significantly negative coefficients for Inddir Expert, indicating that independent directors with industry expertise play a crucial role in reducing violations within listed companies.

Table 8. Violation dummy and Ordered Logit model.

	(1) Vio Dummy	(2) Ologit
Inddir Expert	−0.101 *** (−2.93)	−0.106 *** (−3.14)
Size	−0.039 ** (−2.09)	−0.017 (−0.94)
Roa	−2.985 *** (−10.59)	−3.423 *** (−13.67)
Lev	0.988 *** (11.06)	1.008 *** (11.71)
Loss	0.496 *** (8.69)	0.559 *** (10.32)
growth	0.064 * (1.93)	0.062 * (1.91)
Tobinq	−0.005 (−0.37)	−0.012 (−0.87)
Dual	0.075 ** (2.16)	0.098 *** (2.94)
Top3	−1.188 *** (−10.86)	−1.220 *** (−11.43)
Inddir	−0.278 (−1.26)	−0.312 (−1.45)
Board	0.326 *** (4.99)	0.367 *** (5.80)
State	−0.522 *** (−13.61)	−0.574 *** (−15.27)
Big4	−0.413 *** (−4.33)	−0.460 *** (−4.84)
Constant/Cut	−0.335 (−0.77)	Yes
Fixed Effects	Industry, Year	Industry, Year
Pseudo R ²	0.086	0.064
N	24,456	24,456

Notes: The dependent variable in column (1) is an indicator variable that equals one if firms have violated conduct, and zero otherwise. The second column uses Vio Number as the dependent variable and is estimated using the ologit model. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

5. Additional Tests

5.1. Mechanisms

To examine the impact of independent directors with industry expertise on reducing violations in listed companies, we employ a grouped regression approach to investigate three channels: enhancing information disclosure quality, improving internal control, and mitigating agency costs. Theoretically, if independent directors with industry expertise effectively reduce violations through these channels, their inhibitory effect should be more pronounced in samples characterized by poor information disclosure quality, low internal control quality, and high agency costs.

To effectively measure the three variables involved in the mechanism test, we referred to the relevant existing literature. Specifically, following the research by B. Wu et al. (2024), we used the China Securities Regulatory Commission's information disclosure quality rating to assess the quality of information disclosure by listed companies. Similarly, drawing on the research of Rashid (2016), we employed the management expense ratio to

gauge agency costs. Considering the Chinese background, we used the internal control index created by Shenzhen Dibo Enterprise Risk Management Technology, i.e., DIB IC, to measure the quality of internal control in listed companies (Z. Liu et al., 2025). The variables involved in the mechanism test are defined in Appendix A.

Table 9 presents the empirical findings from the grouped regression analysis based on information disclosure quality, internal control quality, and agency costs. Panel A divides the samples into two categories: high-quality information disclosure and low-quality information disclosure. The results show that independent directors with industry expertise do not have a significant impact on corporate violations in cases with high-quality information disclosure. However, in cases with low-quality information disclosure, independent directors with industry expertise exhibit a significant disincentive effect on corporate violations. Panel B reveals that independent directors with industry expertise have a more substantial impact on corporate violations in environments characterized by poor internal control quality. Panel C demonstrates that independent directors with industry expertise have a more pronounced inhibitory effect on corporate violations when agency costs are high. However, they do not significantly reduce corporate violations in environments with low agency costs. Overall, the grouped regression analysis indicates that independent directors with industry expertise can effectively reduce corporate violations in listed companies through three channels: improving information disclosure quality, enhancing internal control, and mitigating agency costs.

Table 9. Mechanisms.

Panel A: Information Disclosure Quality		
	(1) High	(2) Low
Inddir Expert	−0.003 (−0.17)	−0.159 * (−1.80)
Controls	Yes	Yes
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.246	0.437
N	18,568	3,959
Diff. Between Coef. (2)−(1)		−0.156 *** (0.000)
Panel B: Internal control quality		
	(1) High	(2) Low
Inddir Expert	−0.051 ** (−2.49)	−0.184 ** (−2.56)
Controls	Yes	Yes
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.275	0.582
N	18,214	3487
Diff. Between Coef. (2)−(1)		−0.133 *** (0.000)
Panel C: Agency problems		
	(1) High	(2) Low
Inddir Expert	−0.095 *** (−3.11)	−0.027 (−1.08)
Controls	Yes	Yes
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.342	0.381
N	12,026	12,010
Diff. Between Coef. (2)−(1)		0.068 *** (0.000)

Notes: This table reports the results of the mechanism tests. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

5.2. Cross-Sectional Analysis

As a monitoring mechanism, independent directors with industry expertise should have the ability to effectively restrain corporate violations in listed companies. In this section, we further explore the moderating impact of external supervision.

In Table 10, we provide a supplementary analysis of the grouped regression conducted above, using the proportion of external institutional shareholding and the number of analysts as grouping variables. Panel A shows that independent directors with industry expertise have a significant negative effect on corporate violations when institutional ownership is low, whereas this effect is insignificant under high institutional ownership. Panel B indicates that when a company has a small number of analysts, independent directors with industry expertise exert a significantly negative effect on corporate violations. The results of the coefficient difference test further confirm that the difference in coefficients between the groups is statistically significant. These findings suggest that when a company lacks sufficient external environmental supervision mechanisms, independent directors with industry expertise play a particularly crucial role in restraining corporate violations, thereby further emphasizing their positive contribution to the corporate governance structure.

Table 10. Cross-sectional tests.

Panel A: Institutional Shares		
	(1) High	(2) Low
Inddir Expert	0.018 (0.77)	−0.111 *** (−3.62)
Controls	Yes	Yes
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.319	0.369
N	12,148	12,148
Diff. Between Coef. (2)−(1)		−0.129 *** (0.000)
Panel B: Analyst coverage		
	(1) High	(2) Low
Inddir Expert	−0.035 (−1.39)	−0.071 ** (−2.44)
Controls	Yes	Yes
Fixed Effects	Firm, Year	Firm, Year
Adj.R ²	0.301	0.384
N	11,004	13,169
Diff. Between Coef. (2)−(1)		−0.036 *** (0.000)

Notes: This table reports the results of the cross-sectional tests. The sample period is 2003 to 2023. Standard errors are clustered at the firm level. All continuous variables are winsorized at 1% and 99% levels. ***, **, and * indicate significance at 1%, 5%, and 10% levels, respectively. All variables are defined in Appendix A.

6. Conclusions

Corporate violations have become a central focus in both academic research and practical discourse. The transgressions of publicly traded companies not only pose significant risks to their reputation and financial stability but also erode trust and stability within the broader market system. Therefore, conducting comprehensive analysis and research on the underlying factors contributing to corporate violations is crucial. Among these factors, the role of independent directors has attracted considerable scholarly attention,

particularly in relation to their educational background and regional affiliations. This study highlights not only the autonomy inherent in the role of independent directors but also their professional competence. By examining how industry expertise intersects with the concepts of autonomy and professionalism among independent directors, this paper aims to identify three key findings.

Firstly, the presence of independent directors with industry expertise has a significantly negative impact on corporate violations, even after controlling for factors such as firm size, return on assets, financial leverage, the proportion of independent directors, and board size. Secondly, in listed companies with low internal control quality, poor information disclosure quality, and high agency costs, independent directors with industry expertise exhibit a heightened ability to effectively mitigate corporate violations. Thirdly, further analysis reveals that under conditions of inadequate external monitoring, independent directors with industry expertise play a more prominent role in restraining corporate violations.

This study contributes to existing research on corporate misconduct by examining three key mediating variables: internal control quality, agency costs, and information disclosure quality. It provides a comprehensive analysis of the impact of independent directors with industry expertise on corporate violations. In practical terms, the research findings have significant implications for enhancing corporate governance practices. Moreover, violations by listed companies not only tarnish their reputation but also erode investor confidence in the market, thereby impeding the healthy and orderly development of the broader capital market. However, this study still has certain research limitations, primarily manifested in the insufficient comprehensiveness of the sample and data scope. Therefore, the applicability of the research conclusions under different national or institutional backgrounds remains to be verified. Additionally, the definition of industry expertise of independent directors in the company is oversimplified, failing to adequately distinguish the differentiated impacts that may arise from industry expertise characteristics of different dimensions and sources. This also points out the direction for future deepening of this research. We can obtain scientific conclusions by comparing the consistency of the research findings under different institutional backgrounds and updating research data. In terms of research design, we can refine the representation method of independent directors' industry expertise and expand the types of corporate violations and their economic consequences. The research contribution of this paper will be further enhanced.

Given this context, it is essential to effectively leverage the positive role of independent directors with industry expertise in curbing violations by listed companies while strengthening external supervision mechanisms. These efforts will ensure the smooth operation of the capital market, promote the standardization of corporate behavior, and help establish a robust and stable market environment.

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Appendix A

Table A1. Variable definitions.

Variables	Definition
Variables in the main analysis	
Dependent variable	
Vio Number	The variable indicates the number of violations committed by listed companies in the year, which is used for representing their misconduct.
Independent variable	
Inddir Expert	The variable indicates whether the independent director of the company possesses industry expertise, signifying their concurrent employment in two or more enterprises within the same industry. It is represented as 1 if true and 0 otherwise.
Control variables	
Size	The firm size is indicated by the natural logarithm of total assets at the end of the period.
Roa	The return on total assets is calculated by dividing the net profit by the total assets at the end of the period.
Lev	The asset–liability ratio is the proportion of total liabilities to total assets at the end of a specified period.
Loss	The enterprise loss dummy variable is set to 1 if a loss occurs in the current year; otherwise, it is set to 0.
growth	The rate at which the operating income of the company is growing.
Tobinq	The ratio between the market value and total assets of the company at the end of a specific period.
Dual	A binary variable indicating whether there is integration between the roles of chairman and CEO.
Top3	The ownership concentration index calculated as the sum of shareholding ratios for the top three shareholders in a company.
Inddir	A percentage representation of independent directors on boards.
Board	Logarithmic transformation applied to the total number of board members.
State	Enterprise nature represented as 1 for state-owned enterprises (SOEs) and 0 for non-SOEs.
Big4	The presence or absence of an audit conducted by one of the Big Four accounting firms, indicated with binary values 1 for yes and 0 for no.

Table A1. Cont.

Variables	Definition
Variable in the robustness tests	
Vio dummy	The dummy variable indicates whether the company violates the rules, with a value of 1 for at least one violation and 0 otherwise.
Variables in the additional tests	
Information disclosure quality	The quality of information disclosure by listed companies is assessed by the China Securities Regulatory Commission's information disclosure quality rating.
Internal control quality	The quality of internal control in listed companies is assessed by the internal control index created by Shenzhen Dibo Enterprise Risk Management Technology.
Agency costs	Agency costs are indicated by the management expense ratio of listed companies.

Notes: The bold font in the table is used to indicate the type of variables.

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