Journal of Business Research 163 (2023) 113922

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

Do non-executive employees matter in curbing corporate financial fraud?

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ARTICLE INFO

Keywords:
Employee stock ownership plans
Corporate financial fraud
Internal monitoring
External monitoring

ABSTRACT

Exploiting staggered enactment of employee stock ownership plans (ESOPs) as a quasi-natural shock, we use a difference-in-differences (DiD) approach to investigate whether and how ESOPs mitigate corporate financial fraud in China. We find ESOPs significantly reduce corporate financial fraud. This is because of stock ownership of non-executives rather than executives. The underlying mechanisms are heightened internal monitoring and external monitoring through which ESOPs curb executives' opportunistic behaviour. Our results are robust to parallel trend test, placebo test, PSM approach, instrument variable test, and considering omitted variable concern, partial observability problem, model specification, stock market crash, and industry effect. Our additional analyses indicate that the effect of ESOPs on corporate financial fraud is more pronounced when firms with weaker corporate governance, poorer information environment, less powerful executives and higher-intensity and broader-based plans. Collectively, our results indicate that ESOPs play a role, as an alternative corporate governance mechanism, in mitigating financial fraud.

1. Introduction

An increasing number of firms are initiating stock ownership plans for all employees, including both executives and rank-and-file employees (Oyer & Schaefer, 2005). Many studies investigate the real effect of such employee stock ownership plans (ESOPs), but the evidence of their effects remains inconclusive or contradictory. Some studies document that ESOPs have an incentive effect, leading to increases in team effort (Blasi et al., 1996), productivity (Jones & Kato, 1995), corporate innovation (Chang et al., 2015), firms' operating performance (Blasi et al., 1996; Fang et al., 2015) and co-monitoring among employees (Blasi et al., 1996). This incentive effect arises because ESOPs link employees' incomes with firms' performance and reduce labour–management conflict (Blasi et al., 1996). Conversely, other studies find that 'free rider problems' among individual employees in the case of ESOPs may lead to decreased corporate performance and encourage employee shirking (Holmstrom, 1982; Meng et al., 2011; Kim & Ouimet, 2014). Free rider problems, which are a well-discussed topic in economic theory, can "limit the incentive effects of group-based reward systems because of the weak connection between individual effort and reward" (Blasi et al., 1996, p. 61). The divergent results of studies that investigate the increasing growth of ESOPs and their effects warrant further research on these topics.

Our study investigates whether and how ESOPs play a corporate governance role in curbing corporate financial fraud in China. This setting is particularly appropriate to examine the effect of ESOPs and ideal for providing solid causal evidence for the following reasons. First of all, in 2014, the China Securities Regulatory Commission (CSRC) issued a regulatory guide on a pilot program for the implementation of ESOPs. Thus, the implementation of ESOPs in China is exogenous because it was initiated by the CSRC and implemented regardless of whether companies were influenced by corporate financial fraud. This circumstance provides us with a quasi-natural experimental setting, enabling us to use a powerful difference-in-differences (DiD) approach to show causality in the impact of ESOPs on corporate financial fraud.

Another advantage of this setting is that all sample firms are from one country. The staggered implementation of ESOPs across companies at different times allows us to randomise other confounding factors that may affect corporate financial fraud, thus alleviating concerns related to omitted variables and confounding events occurring simultaneously in a country. In addition, it is economically important to understand the effect of ESOPs in China, the second-largest economy in the world. The results of our study will be of interest to global investors, helping them to understand Chinese capital markets.

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https://doi.org/10.1016/j.jbusres.2023.113922
Received 27 November 2022; Received in revised form 22 March 2023; Accepted 31 March 2023
Available online 13 April 2023

Furthermore, the focus of our study, corporate financial fraud, is important and relevant from a prudential standpoint. It is particularly significant to examine corporate financial fraud in China because although China has experienced phenomenal economic growth, with a 10% average annual growth rate of its gross domestic product (Wong, 2016), Chinese listed companies are facing unprecedented challenges such as audit failures, poor corporate governance and financial scandals. In 2011, over 20 Chinese companies that went public in the US were suspended from trading by the US Securities and Exchange Commission (SEC) (Cole et al., 2021). Since 2017, a wave of financial defaults has swept the Chinese capital market. Fox example, in 2017, there were 34 bonds defaulted, with a total default amount of RMB 31.249 billion. In 2018, there were 125 bonds defaulted, with a total default amount of RMB 120.961 billion. In 2019, there were 183 bonds defaulted, with a total default amount of RMB 148.304 billion. Lunan Chemical Fertilizer Plant (with a history of over 50 years) which is a subsidiary of Yankuang (one of the world's top 500 companies) went bankrupt due to a cumulative loss of over RMB 3.7 billion. Zhejiang Jindun Group with over RMB 45 billion debts experienced a debt crisis. A recent scandal concerned earnings manipulation by Luckin Coffee, which was fined US$80 million by SEC for intentionally fabricating over US$300 million in revenues, expenses and losses (SEC, 2020).

Besides economic loss, financial misconduct may also result in negative publicity and severe reputational losses (Zhong et al., 2021). It is important to prevent corporate fraud to protect not only the legitimate interests of investors and maintain healthy capital markets (Murphy et al., 2009) but also employees with stock ownership, given that their income is linked to corporate value. The literature documents that employee shareholders tend to concentrate their economic resources and wealth excessively in one company, making it highly risky for employees if their company fails or experiences bankruptcy as they lose not just their jobs but also their wealth (Kruse et al., 2022). Thus, investigating whether ESOPs can curb corporate financial fraud is important.

The literature investigates the antecedents of corporate fraud mainly from two perspectives, namely external and internal governance mechanisms. External governance mechanisms include government supervision (Hu et al., 2020), media and industrial regulation (Dyck et al., 2010; Sun et al., 2021), institutional investors (Kong et al., 2019) and external auditors (Halbouni, 2015). Conversely, internal governance mechanisms include executive characteristics (Beasley, 1996; Khanna et al., 2015), incentive measures (Efendi et al., 2007; Hass et al., 2016) and board structure (Khanna et al., 2015; Yang et al., 2017).

As important internal stakeholders, employees usually acquire unique information about firms and industry knowledge (Boatright, 2004), which can help to reduce corporate governance problems caused by information asymmetry. Moreover, the adoption of ESOPs makes employees internal shareholders. However, it remains unclear whether ESOPs can improve the governance level of listed companies. Call et al. (2016) prove that companies with financial disclosure violations tend to issue additional stock options to curb employees' whistleblowing. Therefore, whether and how ESOPs play a role in financial fraud requires empirical examination.

Drawing on all listed Chinese firm data during the 2007–2021 research period, we use a time-varying DiD approach to examine the relationship between ESOPs and corporate financial fraud. We find that the likelihood of financial fraud significantly decreases after ESOPs are adopted. This result is economically significant. In particular, the implementation of ESOPs reduces the likelihood (frequency) of financial fraud by approximately 9.85% (11.08%) of the sample standard deviation compared with firms without ESOPs. The underlying economic mechanisms are heightened internal and external monitoring after the implementation of ESOPs.

We conduct a series of tests to mitigate endogeneity issues and examine the robustness of our baseline results. First, following the literature (Bertrand & Mullainathan, 2003; Huang et al., 2021; Cao et al., 2022), we test the parallel trend assumption of the DiD model using a dynamic analysis framework. The results suggest that the reduction in corporate financial fraud only holds after the implementation of ESOPs. Second, we use a Heckman two-stage approach to mitigate sample selection bias, and our baseline results hold after considering such bias. Third, to control the fundamental differences between the treatment and control groups, we utilise a propensity score matching (PSM) approach to make the two groups more comparable. We still find a negative relationship between the implementation of ESOPs and corporate financial fraud. Fourth, we conduct a placebo test to further corroborate the sensitivity of the baseline results with respect to spurious correlations. Fifth, to mitigate the endogeneity of reciprocal causality between the adoption of ESOPs and corporate fraud, we follow the literature (Angrist & Krueger, 2001) and use a three-stage least squares (3SLS) method. Collectively, our baseline results continue to hold after conducting the series of robustness tests.

To show the variation in our baseline results across firms, we conduct numerous cross-sectional analyses. We find that the effect of ESOP implementation on corporate financial fraud is more (less) pronounced when firms have relatively weak (strong) corporate governance and when firms are state-owned enterprises (SOEs) rather than non-SOEs. In addition, we use an approach developed by Oster (2019) to mitigate omitted variable concerns and solve the potential partial observability problem arising from undetected and unobserved financial fraud cases. We consider an alternative model specification: the financial crisis and industrial heterogeneity. Finally, we test whether the number of employees holding stock ownership and the scale of ESOPs matter. Our empirical results indicate that the effect of ESOPs on curbing financial fraud is greater when firms have larger-scale ESOPs and a larger number of employees holding stock ownership than when they have smaller-scale schemes and fewer employees holding stock ownership.

We advance the literature on four fronts. First, we extend the studies investigating the effect of ESOPs by focusing on corporate financial fraud. The literature mainly examines the impact of ESOPs on companies' internal controls and earnings management and does not reach a consistent conclusion (Chen et al., 2019). Moreover, as an important indicator of listed companies' quality (Karpoff et al., 2008), corporate fraud is yet to receive sufficient academic attention in the ESOP-related literature.

Second, we examine the impact of dynamic changes in ownership structure on corporate fraud from the perspective of shareholding employees and thus enrich the literature on the antecedents of corporate fraud. Studies explore the effects of independent directors (Ding et al., 2010; Kong et al., 2019), external auditors (Lisic et al., 2015; Halbouni, 2015), the media (Sun et al., 2021), analysts (Young & Peng, 2013), internal and external tournament incentives (Zhong et al., 2021), and executive characteristics (Chidambaran et al., 2012; Khanna et al., 2015) on corporate fraud. However, the literature does not focus sufficiently on the role of employee shareholders who, as internal stakeholders, have both the capability and willingness to improve corporate governance.

Third, we examine the boundary conditions for the governance effect of ESOPs from the perspective of the ability of ESOPs to act as external governance and internal monitoring mechanisms, and we investigate the moderating effect of corporate governance and ownership structure on the relationship between ESOPs and corporate fraud, which enriches the theoretical framework.

Finally, the conclusions of this study provide a theoretical basis and implications for China's listed companies to further improve the ESOP system, abide by the capital market regulations and contribute to the high-quality development of the capital market.

The remainder of this paper is organised as follows. Section 2 describes the institutional background and reviews the key literature. Section 3 develops our hypotheses, and Section 4 discusses the sample selection and research design. Section 5 presents the main findings and a series of robustness and additional tests. Section 6 concludes this study.

2. Institutional background and literature review

2.1. Institutional background of ESOPs in China

On 20 June 2014, the CSRC issued the *Guiding Opinions on the Pilot Implementation of Employee Stock Ownership Plans by Listed Companies* (hereinafter *the Opinions*). This pointed out that the pilot adoption of ESOPs by listed companies was conducive to establishing and improving an interest-sharing mechanism between employees and owners, enhancing corporate governance and strengthening the cohesion of employees and the competitiveness of the listed companies.

An ESOP is an institutional arrangement whereby employees are legally entitled to acquire and hold their company's stocks for a long period, according to the employees' willingness, and the equity of stocks is distributed to employees as arranged (CSRC, 2014). These arrangements differ from equity incentive plans in the following aspects: first, ESOPs are offered to a wider range of employees, including middle and lower-level managers, general technicians as well as ordinary employees. Second, employees are granted stocks in ESOPs depending on the length of time for which they have served the company (Li, 2017). Conversely, equity incentive plans apply only to senior managers and core technicians and are exercised depending on whether certain performance conditions are met (Xie & Chen, 2010).

The purposes of ESOPs are to realise a unity of interests between the company and employees, motivate employees to be more active, attract and retain excellent management talents and core employees, improve corporate governance, and establish a long-term mechanism for employees to actively participate in the company's operation, management and supervision. However, the real impact of ESOPs remains inconclusive. The following literature review section demonstrates the effect of ESOPs and motivates our study.

2.2. Literature review

By examining the impact of ESOPs on corporate fraud, we bring together two groups of literature to provide in-depth insights into the relationship between ESOPs and corporate fraud incurrence. The first group focuses on the consequences of ESOPs, including economic consequences and governance effects. In terms of economic consequences, most studies identify a positive relationship between ESOP adoption and firm performance (Jones & Kato, 1995; Hochberg & Lindsey, 2010; Fang et al., 2015). However, some studies demonstrate that the effects of ESOPs are limited by employees' free-riding behaviour (Meng et al., 2011; Kim & Ouimet, 2014). In terms of the corporate governance role of ESOPs, no consistent conclusions have arrived in previous literature. Some studies determine that ESOPs improve corporate governance through information disclosure and employee supervision. For example, Blasi et al. (2016) show that ESOPs can enhance employees' willingness and ability to play a supervisory role and improve the quality of corporate information disclosure. Bova et al. (2015a) argue that ESOPs increase voluntary disclosure, improving the firm's transparency with investors and other stakeholders. Chang et al. (2015) claim that granting employees stock options strengthens employees' teamwork and supervision. Conversely, other studies hold that ESOPs may have a negative impact on corporate governance in terms of agency cost and earnings management (Chang & Mayers, 1992; Ben-Ner & Jones, 1995; Chen et al., 2019). For instance, Chang and Mayers (1992) suggest that ESOPs increase agency costs when they are used for anti-takeover purposes. Chen et al. (2019) disclose a significant positive correlation between ESOPs and accrual earnings management, noting that managers have incentives to push up stock prices using positive earrings management to increase the benefits for shareholding employees.

The second group of literature is about corporate fraud. This set of literature examines the determinants and effects of corporate fraud and can be broadly classified into studies on internal and external governance mechanisms. The internal governance mechanisms investigated include ownership structure (Chen et al., 2006; Wu et al., 2016), board composition (Uzun et al., 2004; Khanna et al., 2015; Yang et al., 2017), top management (Ashforth & Anand, 2003), and supervisory boards and independent directors (Ding et al., 2010; Kong et al., 2019). The external governance mechanisms include external auditors (Halbouni, 2015), the media (Sun et al., 2021), analysts and institutional investors (Chung & Jo, 1996; Wu et al., 2016; Chen et al., 2016; Kong et al., 2019). For instance, Chung and Jo (1996) argue that analyst coverage increases corporate transparency and reduces corporate fraud. Chen et al. (2016) also discover an inverse relationship between analyst coverage and corporate fraud propensity. Wu et al. (2016) verify the monitoring role of institutional investors in reducing corporate fraud. Our study aims to enrich the above literature by examining whether and how ESOPs play a role in controlling corporate financial fraud and the underlying mechanisms of external and internal corporate governance.

3. Hypothesis development

Dyck et al. (2010) find that 17% of financial fraud by US firms is firstly disclosed by employees. As mentioned above, unlike the equity incentive mechanism, the employees granted ESOPs include not only senior managers and core technicians but also ordinary employees. The impact of ESOPs on corporate fraud can be explained from two perspectives: employees' willingness and capability.

After the adoption of ESOPs, employees' willingness to deter corporate fraud increases as a result of the link between the employees' and the company's interests and risk aversion. First, because ESOPs help align employee incentives with shareholder value, employees benefit directly from their firm's improved performance and governance (Meng et al., 2011). According to *the Opinions* (CSRC, 2014), participating in an ESOP is a voluntary and independent decision made by employees rather than a compulsory act under the firm's administrative orders. Voluntary participation for an extended period indicates employees' confidence in future corporate development (Li et al., 2019) and the long-term value of the firm (Meng et al., 2019). Second, shareholding employees tend to avoid risks. At the corporate level, Bova et al. (2015b) find that the greater (lesser) the amount of company stock owned by non-executive employees, the lower (higher) the firm's subsequent risk. At the individual level, employees are generally more risk averse than other shareholders and senior managers because they have relatively less wealth in hand (Boatright, 2004). Therefore, shareholding employees are highly willing to participate in corporate governance and avoid risk by preventing potential violations of the laws or regulations.

Employees' capability to deter corporate fraud is manifested in their participation in effective supervision and decision-making. First, shareholding employees can effectively supervise the management and major shareholders of the company (Blasi et al., 2016). An ESOP grants company stock to employees, often (as noted) based on the duration of their employment. Senior employees are able to obtain internal information by directly participating in firm operations and thus have informational advantages over shareholders, which gives them shareholder supervision rights and reduces the agency problems caused by information asymmetry between shareholders and the management. It also strengthens the supervision of the management and daily operations by non-executive employees (Chen et al., 2019). Thus, shareholding employees can effectively supervise management (Wang et al., 2019) and restrain any opportunistic behaviour (Core & Guay, 2001; Njoya, 2011).

Second, to a certain extent, employees can reduce corporate fraud by participating in decision-making. Although major shareholders and management are responsible for developing corporate strategies, employees make decisions on how to use firm assets and take charge of specific implementation and operation tasks, which enables them to acquire more direct information than management or major shareholders (Boatright, 2004). Employees may have the capacity to filter or influence the menu of projects chosen by management (Bova et al.,

2015b) and to reduce unnecessary operating costs by optimising the daily operation and management procedures (Huang & Yu, 2015). Overall, ESOPs provide employees with the right to gain relevant information and the chance to participate in corporate operations, which enhances their governance capabilities to curb corporate fraud via effective supervision and participation in decision-making.

Conversely, ESOPs may increase managers' incentives to manage market value (Chen et al., 2019) and potentially increase corporate misconduct. However, internal supervision over corporate fraud does not require the consistent action of all employees, and even one employee is sufficient to ensure information disclosure (Li et al., 2019). In addition, ESOPs can promote effective communications among employees (FitzRoy & Kraft, 1992) and information disclosure to different stakeholders (Bova et al., 2015a), which is conducive to improving the quality of corporate information disclosure. Overall, therefore, the adoption of ESOPs can reduce corporate violations. Based on the above analysis, we propose the following hypothesis:

H1: The adoption of ESOPs inhibits the likelihood of corporate fraud.

Stockholders rely on internal and external monitoring mechanisms to help resolve agency problems deriving from information asymmetry (Huson et al., 2001). The objective of internal monitoring mechanisms in a corporation is to establish 'third party' monitors to supervise the business operations of the corporation and mitigate the vulnerability of the principal (i.e., the shareholders in this case) to the opportunism of the agent (i.e., the management). In China, the internal monitoring system includes both the supervisory board and the independent director (Goo & Hong, 2011).

The impact of ESOP adoptions on internal monitoring can be explained from two aspects. First, in most circumstances, an employee stock ownership administrative committee is established after an ESOP adoption. The committee members are elected to represent shareholding employees and exercise their responsibilities and obligations as stockholders. *The Opinions* direct that the committee members cannot hold more than 5% percent of the total shares, nor can they have an association with the ultimate controller, directors, supervisors or top managers of the listed company. In this sense, the independence of the committee members can ensure that the 'different voices' of the shareholding employees are heard, which can serve to oversee and balance the power of management. Second, shareholding employees can act as information providers for boards of independent directors and supervisors. For example, in Weihai Guangtai Airport Equipment Co Ltd.,[1] Haibo Wang, the director of the accounting department, was elected as a member of his company's ESOP committee in 2022. Wang's work experience enabled him to provide useful resources to both independent directors and supervisors and to mitigate information asymmetry between internal monitors and management, thus improving the quality of internal monitoring.

In the meantime, internal monitoring can balance the power of the biggest shareholder (Yang & Ma, 2015), deter opportunistic behaviours of top managers (Mitra et al., 2013), and improve the earnings quality (Ji et al., 2020). Therefore, we propose the following hypothesis:

H2: Internal monitoring mediates the effect of ESOP adoptions on corporate fraud.

In addition to internal monitoring mechanisms, external monitoring mechanisms are also effective in mitigating information asymmetry between stockholders and corporate insiders (Huson et al., 2001). Institutional investors and financial analysts are increasingly crucial in reducing information asymmetry and improving corporate governance (Chung & Jo, 1996; Hartzell & Starks, 2003; Cheng et al., 2016; Yang et al., 2020). They play an important role in monitoring the operation and management of listed companies from the outside perspective (Wu et al., 2016; Chen et al., 2016). Compared with other information-acquisition activities such as conference calls, the site visit is one of the most important and prevalent ways for analysts and investors to fulfil their role as external monitors (Cheng et al., 2016; Jiang & Yuan, 2018). Site visits are defined as the visits analysts or investors conduct to companies to communicate with managers and other employees as well as to understand companies' business and operational situations (Cheng et al., 2016).

The mediating role of external monitoring on the relationship between ESOPs and corporate fraud can be explained from two different directions. First, from the pull side, the announcement of an ESOP can attract more attention from external stakeholders, especially analysts and institutional investors to the focal company. In general, ESOP announcements are considered to be positive signals to the capital market, resulting in positive market reactions (Ding & Sun, 2001; Triki & Ureche-Rangau, 2012; Fang et al., 2015). However, the relationship between ESOPs and firm performance is mixed (Jones & Kato, 1995; Fang et al., 2015; Conte et al., 1996; Meng et al., 2011; Kim & Ouimet, 2014). Moreover, major shareholders may take advantage of the signalling function of ESOPs to maximize their own interests (Sun & Liu, 2021). With more attention from external stakeholders and lager operating uncertainty after ESOP implementations, more site visits will be conducted to those companies by institutional investors and analysts (Xu et al., 2015) to obtain more first-hand and updated information to improve decision-making quality.

Second, from the push side, firms are more likely to invite site visits after ESOP adoptions. Companies tend to implement ESOPs when firm value is underestimated (Grullon & Michaely, 2004). To prevent the negative impact of further underestimation of the stock price (Warner et al., 1988), they are inclined to invite institutional investors to visit them on-site (Bowen et al., 2018) and disclose private information (Aboody & Kasznik, 2000; Healy & Palepu, 2001). Around the time when site visits are conducted, stock returns are found to be positively related to forthcoming earnings news (Cheng et al., 2019). As a result of the dual role of pull and push, site visits to listed companies may increase following the adoption of ESOPs.

The effect of external monitoring on corporate fraud can be examined from the information effect and governance effect (Bu & Sun, 2020). From the aspect of the information effect, analysts and investors are able to obtain and disseminate incremental information to the capital market, which can reduce the information asymmetry of the company and thus discourage the insiders from fraud commitment. Site visits enable visitors to gain first-hand and updated or even implicit information (Bushee et al., 2011) by observing gestures, vocal tones and body language during private communications (Hobson et al., 2012). Through observing companies' operations, analysts can gain incremental, more detailed and contextual information about public announcements, so as to improve forecast accuracy (Cheng et al., 2016). Apart from the general operations, the company also discusses its future strategy with investors during site visits (Cheng et al., 2016). The external investors can thus have a better understanding of the company's future development and positioning. When more firm-specific information has been disclosed to the market, the cost of capital can be reduced, and the access to external financing can be increased (Myers & Majluf, 1984; Jiang & Yuan, 2018), which may act as a disincentive for insiders to commit fraud. Meanwhile, since the main causes of corporate fraud lie in the information asymmetry between external investors and corporate insiders (Bu & Sun, 2020), the information advantage of the management to commit misconduct can be weakened after site visits.

From the aspect of the governance effect, site visitors are more likely to identify and detect corporate fraud, which can deter the insiders and improve the governance level of visited companies. The effect of institutional investors' monitoring largely relies on their information acquisition and process capability (Chen et al., 2007). The valuable private information gained during site visits can facilitate external monitors to play their role. As participants of site visits are experts and experienced in financial analysis, they thus can effectively discover and

[1] The stock code for the company is 002111.

reveal corporate misconduct (Bu & Sun, 2020). Institutional investors are able to improve corporate governance (Jiang & Yuan, 2018) and reduce accrual-based earnings management by participating in site visits (Qi et al., 2021). Consequently, site visits are found to be effective in reducing corporate fraud (Bu & Sun, 2020; Su et al., 2021).

Based on the above analysis, we propose the following hypothesis:

H3: Site visits mediate the impact of ESOP adoptions on corporate fraud.

4. Research design and sample selection

4.1. Model specification

To test the first hypothesis of this study and analyse the influence of ESOPs on corporate fraud, we estimate a staggered DiD model as follows:

$$CF_{i,t} = \beta_0 + \beta_1 ESOP_{i,t} + \gamma Control_{i,t} + Firm\&YearFE + \varepsilon_{i,t} \quad (1)$$

where i represents the firm and t represents the year. The dependent variable is corporate fraud (*CF*). Following Su et al. (2021) and Sun et al. (2021), we define corporate fraud according to the regulatory enforcement conducted by the regulatory authorities such as the CSRC and its regional offices, the Ministry of Finance, and the stock exchanges of Shenzhen and Shanghai. If a listed company behaves against the related laws or regulations and has been detected by those authorities, then it is regarded as a firm with corporate misconduct or fraud. The CSRC categorizes fraud by listed companies into illegal information disclosure and illegal operation. In this study, *CF* is measured using two indicators, *Dfraud* and *Fraud*. *Dfraud* is an indicator variable that measures whether firm i has committed misconduct or not in year t. *Fraud* is a continuous variable that measures the number of fraud events committed by firm i in year t. Since only fraud detected by the official institutions can be observed, these two variables may not exactly measure the real status of fraud commitment by listed companies in a certain year. To address this concern of partial observability, we follow Xiong et al. (2021) to use a bivariate probit model to conduct robustness tests, and the results are shown in Section 5.5.2.

The explanatory variable *ESOP* is a dummy variable that equals one if firm i has adopted an ESOP and zero otherwise. We expect β_1 to be negative and statistically significant. From July 2014 to the end of 2021, China's A-share listed companies issued 1,385 ESOP announcements, of which 122 were suspended and 6 were not approved by the general meetings of shareholders. The number of ESOPs issued is the biggest in 2015 (338 ESOPs). Table 1 reports the annual distribution of ESOP announcements during this period.

We control for a variety of variables that the literature indicates may affect the likelihood of corporate fraud (Khanna et al., 2015; Chen et al., 2018). Specifically, we control for firms' total assets (*Size*) because larger firms with more complex operations provide more opportunities for managers to commit fraud than do smaller firms. We control for financial leverage (*Lev*) because firms with higher leverage are considered riskier and experience more pressure to maintain their financial performance to obtain further debt financing than firms with lower leverage. Moreover, we include variables to control for the potential effect of corporate operational performance, including Tobin's q (*Tobinq*) and sales growth (*Growth*), because firms with better performance have less incentive to commit fraud than poorly performing firms. We control for the size of the board (*Boardsize*) because a larger board means there are more board members to supervise management and prevent fraud. We control for the auditors' reputation using a dummy variable (*Big4*), which equals one if a firm is audited by E&Y, KPMG, Deloitte, or PwC (DeFond et al., 2017), and zero otherwise. Following Conyon and He (2016), we control for corporate governance characteristics, including the nature of firm equity (*Soe*), the number of years since establishment (*Firmage*), the ratio of independent board members to total board members (*Indep*), whether the CEO and the chairperson are the same people (*Dual*) and the shareholding ratio of the largest shareholders (*Top*1). In addition, we add the shareholding ratio of management (*Mshare*) to control for the potential effect of the existing ownership structure. Table A1 in Appendix A provides definitions of all the variables that we use in the study.

We incorporate both firm- and year- fixed effects in our model. Two-way fixed effects regressions are widely used to estimate causal effects in panel data because this technique mitigates the confounding effects of time-invariant, firm-specific characteristics and time trends (Angrist & Pischke, 2008). Furthermore, we cluster robust standard errors at the firm level to correct for firm-specific autocorrelation in the estimation errors.

To test the second and third hypotheses in this research and examine the relationship among ESOPs, monitoring mechanisms and corporate fraud, we follow prior studies (Baron & Kenny, 1986; Wheeler, 2019; Xiong et al., 2021) to perform a three-step mediation analysis. In specific, we use the following two models together with model (1) stated above:

$$MV_{i,t} = \delta_0 + \delta_1 ESOP_{i,t} + \delta Control_{i,t} + Firm\&YearFE + \varepsilon_{i,t} \quad (2)$$

$$CF_{i,t} = \alpha_0 + \alpha_1 ESOP_{i,t} + \alpha_2 MV_{i,t} + \alpha Control_{i,t} + Firm\&YearFE + \varepsilon_{i,t} \quad (3)$$

where *MV* stands for internal monitoring and site visits respectively. We use the indicator of internal monitoring (*Internalmonitor*) from the DIB Internal Control and Risk Management database, a database widely used by scholars studying internal control issues in China (Lennox & Wu, 2022). The larger the value of this variable, the better the internal monitoring effect of the firm. We use two indicators to measure site visits by investors and analysts: *Visit*, the number of visits to firm i in year t, and *Visitor*, the number of institutions that participate in visits to firm i in year t.

The two models include control variables in model (1). While the total effect of ESOPs on corporate fraud is captured by β_1 in model (1), the impact of ESOPs on monitoring mechanisms is captured by δ_1 in model (2), and the influence of monitoring mechanisms on corporate fraud is captured by α_2 in model (3). The indirect effect of ESOPs on corporate fraud through monitoring mechanisms is captured by $\delta_1 \times \alpha_2$. According to hypotheses 2 and 3, we expect δ_1 to be significantly positive and α_2 to be negative, and $\delta_1 \times \alpha_2$ to be significant and negative.

4.2. Sample selection

The data used in this study come from four sources. First, data on corporate fraud and site visits are obtained from the Wind Economic Database. Second, financial data are extracted from the China Stock Market & Accounting Research (CSMAR) database. Third, data on ESOPs are collected from the China Research Data Services (CNRDS) Platform. Fourth, the indicator of internal monitoring is acquired from the DIB Internal Control Risk Management database.

To examine the effect of ESOPs on corporate fraud and the

Table 1
Year distribution of ESOP announcements since 2014.

Year	2014	2015	2016	2017	2018	2019	2020	2021	Total
Cases	55	338	164	194	133	117	160	224	1,385

Notes: the number in 2014 starts from July 1, 2014.

monitoring mechanisms, we construct our sample using Chinese listed companies for the period from 2007 to 2021. Because the CSRC issued *the Opinions* in 2014, our sample period covers the 7 years before and 7 years after 2014, constituting a balanced period in which to conduct the DiD estimation.

5. Empirical results

5.1. Descriptive statistics

To mitigate the influence of outliers on the regression results, we winsorize all continuous variables at the 1st and 99th percentiles. The descriptive statistical results of the main variables are shown in Table 2. Panel A shows the descriptive statistics for the full sample. The mean value of *Dfraud* is 0.076, indicating that, on average, approximately 7.6% of the firm-year observations in our sample involve violations. The mean value of *ESOP* is 0.056, which means that 5.6% of the firm-year observations have adopted a valid ESOP. The average leverage ratio is 45.6%. The shareholding ratio of the largest shareholders is around 34.1%. 6.8% of the firms are audited by the Big 4 accounting firms and 25.9% of the firms have chairpersons who concurrently serve as the general manager. In addition, the average shareholding ratio of management is 7.9%, and 39% of the sampled companies are state-owned.

Panels B and C of Table 2 show the descriptive statistics of the main variables measured for the ESOP and non-ESOP firms, respectively. The mean values of *Dfraud* in the ESOP and non-ESOP groups are 0.085 and 0.075, respectively. The mean value of *Fraud* is 0.070 in the ESOP group and 0.066 in the non-ESOP group. These results indicate that the mean values of fraud commitment and frequency are higher in the ESOP group than in the non-ESOP group.

The mean values of the fundamental financial factors, including *Size* (22.611 for ESOP firms versus 22.171 for non-ESOP firms), *Lev* (0.429 versus 0.458), *Tobinq* (2.151 versus 2.111), *Growth* (0.236 versus 0.194) and *Boardsize* (2.102 versus 2.144) are not significantly different

Table 2
Descriptive statistics for primary variables.

Panel A: Descriptive statistics of the full sample

Variable	N	Mean	S.D.	Min	P25	P50	P75	Max
Dfraud	37,216	0.076	0.264	0.000	0.000	0.000	0.000	1.000
Fraud	37,216	0.066	0.241	0.000	0.000	0.000	0.000	1.386
ESOP	37,216	0.056	0.229	0.000	0.000	0.000	0.000	1.000
Size	37,216	22.196	1.438	19.223	21.205	21.984	22.939	27.100
Lev	37,216	0.456	0.220	0.051	0.285	0.448	0.614	1.049
Growth	37,216	0.197	0.536	−0.677	−0.026	0.112	0.283	3.868
Boardsize	37,216	2.142	0.208	1.609	1.946	2.197	2.197	2.708
Indep	37,216	0.374	0.053	0.308	0.333	0.333	0.429	0.571
Mshare	37,216	0.079	0.152	0.000	0.000	0.000	0.071	0.662
Tobinq	37,216	2.113	1.477	0.866	1.238	1.635	2.384	9.788
Top1	37,216	34.071	15.001	8.426	22.345	31.726	44.316	74.658
Firmage	37,216	2.850	0.355	1.609	2.639	2.890	3.091	3.497
Dual	37,216	0.259	0.438	0.000	0.000	0.000	1.000	1.000
Big4	37,216	0.068	0.251	0.000	0.000	0.000	0.000	1.000
Soe	37,216	0.390	0.488	0.000	0.000	0.000	1.000	1.000

Panel B: Descriptive statistics of ESOP firms

Variable	N	Mean	S.D.	Min	P25	P50	P75	Max
Dfraud	2,069	0.085	0.279	0.000	0.000	0.000	0.000	1.000
Fraud	2,069	0.070	0.240	0.000	0.000	0.000	0.000	1.386
ESOP	2,069	1.000	0.000	1.000	1.000	1.000	1.000	1.000
Size	2,069	22.611	1.230	19.699	21.782	22.420	23.211	27.100
Lev	2,069	0.429	0.190	0.051	0.274	0.428	0.568	1.049
Growth	2,069	0.236	0.427	−0.677	0.030	0.163	0.334	3.868
Boardsize	2,069	2.102	0.184	1.609	1.946	2.197	2.197	2.708
Indep	2,069	0.378	0.054	0.308	0.333	0.364	0.429	0.571
Mshare	2,069	0.113	0.148	0.000	0.000	0.023	0.211	0.662
Tobinq	2,069	2.151	1.270	0.866	1.306	1.771	2.551	9.788
Top1	2,069	30.657	13.154	8.426	20.965	28.563	38.634	74.658
Firmage	2,069	2.921	0.286	1.946	2.773	2.944	3.135	3.497
Dual	2,069	0.361	0.480	0.000	0.000	0.000	1.000	1.000
Big4	2,069	0.048	0.215	0.000	0.000	0.000	0.000	1.000
Soe	2,069	0.124	0.330	0.000	0.000	0.000	0.000	1.000

Panel C: Descriptive statistics of non-ESOP firms

Variable	N	Mean	S.D.	Min	P25	P50	P75	Max
Dfraud	35,147	0.075	0.263	0.000	0.000	0.000	0.000	1.000
Fraud	35,147	0.066	0.241	0.000	0.000	0.000	0.000	1.386
ESOP	35,147	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Size	35,147	22.171	1.445	19.223	21.172	21.950	22.919	27.100
Lev	35,147	0.458	0.222	0.051	0.285	0.449	0.617	1.049
Growth	35,147	0.194	0.541	−0.677	−0.030	0.109	0.279	3.868
Boardsize	35,147	2.144	0.209	1.609	1.946	2.197	2.197	2.708
Indep	35,147	0.374	0.053	0.308	0.333	0.333	0.429	0.571
Mshare	35,147	0.077	0.152	0.000	0.000	0.000	0.058	0.662
Tobinq	35,147	2.111	1.488	0.866	1.235	1.627	2.373	9.788
Top1	35,147	34.271	15.079	8.426	22.456	31.997	44.622	74.658
Firmage	35,147	2.846	0.358	1.609	2.639	2.890	3.091	3.497
Dual	35,147	0.253	0.434	0.000	0.000	0.000	1.000	1.000
Big4	35,147	0.069	0.253	0.000	0.000	0.000	0.000	1.000
Soe	35,147	0.406	0.491	0.000	0.000	0.000	1.000	1.000

Notes: Variable definitions are in Table A1 in Appendix A. Continuous variables are winsorized at 1% and 99%.

between the groups. However, to mitigate the effect of differences in fundamental firm characteristics on our baseline results, we use PSM to match the ESOP group with the non-ESOP group based on their fundamental characteristics. This ensures the comparability of observable covariates between the two groups. The details of the PSM method are provided in Section 5.2.4.

5.2. Empirical findings

5.2.1. Baseline results

Table 3 presents the baseline results for this research. In columns (1) – (2), the dependent variable is *Dfraud*, and in columns (3) – (4), it is *Fraud*. Obviously, all of the coefficients on *ESOP* are negative at a 1% significance level (β = -0.0296, p < 0.01; β = -0.0260, p < 0.01; β = -0.0311, p < 0.01; β = -0.0267, p < 0.01), supporting the contention that an ESOP adoption should ensure reduction in fraud commitment by listed companies. The magnitude of the coefficients is economically significant. Based on the results in column (2), after an ESOP is adopted, the likelihood of fraud commitment falls by approximately 9.85% (0.0260/0.264, where 0.0260 is the coefficient of *ESOP* and 0.264 is the standard deviation of *Dfraud*) compared with the firms that have not adopted an ESOP. Similarly, column (4) shows that the number of fraud events decreases by 11.08% on average after its ESOP adoption compared with the non-ESOP firms (calculated as 0.0267/0.241, where 0.0267 is the coefficient of *ESOP* and 0.241 is the standard deviation of *Fraud*).

Table 3
Baseline results.

	(1) *Dfraud*	(2) *Dfraud*	(3) *Fraud*	(4) *Fraud*
ESOP	−0.0296***	−0.0260***	−0.0311***	−0.0267***
	(-3.82)	(-3.38)	(-4.63)	(-4.03)
Size		−0.0283***		−0.0304***
		(-6.87)		(-7.89)
Lev		0.1613***		0.1510***
		(9.60)		(9.53)
Growth		−0.0084***		−0.0083***
		(-2.89)		(-3.26)
Boardsize		−0.0328*		−0.0290*
		(-1.91)		(-1.92)
Indep		−0.0027		−0.0075
		(-0.06)		(-0.17)
Mshare		−0.0791***		−0.0762***
		(-3.71)		(-4.00)
Tobinq		−0.0044***		−0.0058***
		(-2.65)		(-3.93)
Top1		−0.0010***		−0.0010***
		(-3.67)		(-3.67)
Firmage		0.0167		0.0053
		(0.64)		(0.21)
Dual		−0.0045		−0.0035
		(-0.78)		(-0.67)
Big4		0.0092		0.0104
		(0.64)		(0.74)
Soe		0.0146		0.0155
		(1.28)		(1.44)
Constant	0.0773***	0.7015***	0.0675***	0.7702***
	(179.21)	(5.79)	(180.90)	(6.61)
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	37,216	37,216	37,216	37,216
Adjusted R^2	0.188	0.196	0.249	0.259

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

The results of the control variables are also noteworthy. The coefficients on years since establishment (*Firmage*), the number of independent board members (*Indep*), CEO duality (*Dual*), auditor reputation (*Big4*) and equity nature (*Soe*) are insignificant, which can be partly attributed to the inclusion of firm and year fixed effects in the model. The coefficients on *Size* are significantly negative (β = -0.0283, p < 0.01; β = -0.0304, p < 0.01), indicating that smaller firms have a higher tendency to commit misconduct compared with larger firms. The coefficients on *Lev* are positive and significant (β = 0.1613, p < 0.01; β = 0.1510, p < 0.01), suggesting that firms with more leverage are more likely to commit fraud than firms with less leverage.

5.2.2. Parallel trend analysis

While DiD designs are widely used to mitigate potential endogeneity, it is essential for the control group and treatment group to meet the assumption of parallel trends before the event. Following Xiong et al. (2021) and Cao et al. (2022), we replace the independent variable of *ESOP* in model (1) with a set of variables to examine the dynamic effect of ESOP adoptions on corporate fraud. To be specific, we estimate the following regression model:

$$CF_{i,t} = \alpha_0 + \beta_{-3} IV_{i,t}^{\leq -3} + \beta_{-2} IV_{i,t}^{-2} + \beta_{-1} IV_{i,t}^{-1} + \beta_0 IV_{i,t}^{0} + \beta_1 IV_{i,t}^{1} + \beta_2 IV_{i,t}^{2} + \beta_3 IV_{i,t}^{\geq 3} + \gamma Control_{i,t} + Firm\&YearFE + \varepsilon_{i,t} \quad (4)$$

where *IV* stands for the independent variable. The negative and positive right superscripts correspondingly indicate years before or after the implementing year of ESOP for firm *i*. Specifically, IV^0 represents the year when an ESOP is implemented; $IV^{\leq -3}$ means years no fewer than 3 before the ESOP adoption; $IV^{\geq +3}$ means years no fewer than 3 after the ESOP adoption. The control variables are the same as those in model (1).

The results are shown in Table 4. All of the coefficients on the pre-IV dummy variables are found to be insignificant, while those on the post-IV dummy variables *current* and *post*1 are negative and significant, suggesting that the deterring effect of ESOPs on corporate fraud is realised only subsequent to the adoption of ESOPs. Thus, the above analysis indicates that the parallel trend assumption is satisfied, validating the research design in this study.

5.2.3. Heckman two-stage approach

The decision to adopt an ESOP could be endogenous: firms with more leverage are more likely than firms with less leverage to implement ESOPs to mitigate financial restrictions, and more profitable firms are more likely than less profitable firms to adopt ESOPs to incentivise employees. To mitigate such self-selection problems, we employ the Heckman (1979) two-stage approach. Specifically, we construct an endogenous indicator variable *ESOP_dum*, which equals one if the firm has a valid ESOP and zero otherwise. In the first stage, we estimate the probability of an ESOP adoption and include all control variables in model (1) as the explanatory variables. The results are reported in column (1) of Table 5.

In the second stage, the inverse Mills ratio is included in the regression model. The results are presented in columns (2) – (3) of Table 5. The coefficients of *ESOP* are still negative and significant (β = -0.0286, p < 0.01; β = -0.0300, p < 0.05), indicating that an ESOP adoption is conducive to fraud reduction. Therefore, the above results further identify a negative relationship between ESOPs and corporate fraud. Our results still hold after mitigating potential self-selection issues.

Table 4
Parallel trends test.

	(1) *Dfraud*	(2) *Fraud*
Pre3	−0.0321	−0.0245
	(-1.55)	(-1.33)
Pre2	−0.0239	−0.0175
	(-1.10)	(-0.92)
Pre1	−0.0309	−0.0256
	(-1.45)	(-1.36)
Current	−0.0531***	−0.0453***
	(-2.98)	(-2.83)
Post1	−0.0366**	−0.0323**
	(-1.99)	(-1.99)
Post2	−0.0276	−0.0222
	(-1.38)	(-1.24)
Post3	0.0182	0.0274
	(0.89)	(1.51)
Control variables	Yes	Yes
Constant	0.7337***	0.7962***
	(5.98)	(6.78)
Firm	Yes	Yes
Year	Yes	Yes
Observations	37,216	37,216
Adjusted R^2	0.197	0.260

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 5
Heckman two-stage selection model.

	(1) *ESOP_dum*	(2) *Dfraud*	(3) *Fraud*
ESOP		−0.0286***	−0.0300***
		(-3.23)	(-3.86)
Control variables	Yes	Yes	Yes
IMR		0.0129	0.0410
		(0.24)	(0.82)
Constant	−6.3497***	0.7219*	0.7184**
	(-10.91)	(1.85)	(2.03)
Firm	No	Yes	Yes
Year	Yes	Yes	Yes
Industry	Yes	No	No
Province	Yes	No	No
Observations	24,621	24,621	24,621
Pseudo R^2/Adj-R^2	0.1107	0.210	0.278

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

5.2.4. Propensity score matching approach

To further address potential endogeneity, we follow Bai et al. (2020) by adopting a PSM method to match the treatment and control firms. The treatment (control) group are firms that have (have never) adopted valid ESOPs. All control variables in model (1) are included as covariates. The treatment group is matched to the control group from the same year and industry without replacement, and three control firms are kept for each treatment according to the closest propensity score. Thus, we obtain 1,075 firms with ESOPs and 2,757 firms without ESOPs. Fig. 1 shows the PSM results. After matching, the mean bias of all covariates decreases from 24.2% to 6.9% (i.e., less than 10%), indicating that the PSM approach adequately balances the treated and control groups in terms of firm characteristics.

Then, we regress corporate fraud on ESOPs using the PSM-matched sample. Table 6 reports the results. In columns (1) – (2), the coefficients on *ESOP* are both negative and significant, indicating that the adoption of ESOPs reduces corporate fraud. The findings of this study have been further supported.

5.2.5. Placebo test

To confirm the relationship between corporate fraud and ESOPs is not due to confounding factors, we randomly select the experimental group and set a fictitious ESOP adoption year. In the traditional DiD model, since all individual companies are affected at the same time, a placebo test simply requires the random selection of individuals as the experimental group or a change of the shock year (Chen & Xie, 2022). Differently, in the time-varying DiD model, each company adopts an ESOP at a different time, so we follow Chen and Xie (2022) to first group them by company code and then select a year from 2007 to 2021 at random from each group as the ESOP adopting time. After 1,000 simulations, the results are presented in Fig. 2. The vertical axis is the p-value and the horizontal axis is the estimated coefficient. Obviously, most of the p values of the regression coefficients based on the pseudo-ESOP adopting time are different from zero. Overall, our findings are not results from potential random factors.

5.2.6. Instrumental variable approach (3SLS)

To further assuage endogeneity concerns, we use the three-stage least square (3SLS) method with an instrumental variable in this section. Kedia and Rajgopal (2009) point out that the adoption of an option by an individual firm is influenced by the practices of other firms in the local geographic region through peer effects or local labour market competition. Following Hochberg and Lindsey (2010) and Chang et al. (2015), we construct an instrumental variable (*ESOP_iv*) using ESOP practices of all firms located in the same region but do not have the same three-digit industry code as the focal firm. Referring to Kong et al. (2019), to exclude the effects of local enforcement shocks, we include only firms with no fraud experience so as to ensure the exclusion restriction of an instrumental variable can be met. Thus, *ESOP_iv* satisfies the assumptions of relevance and validity.

Because the explanatory variable *ESOP* is a dummy variable, the unbiased estimation may not be achieved using the two-stage least square method, which requires us to adopt a 3SLS method (Angrist & Krueger, 2001). Following Adams et al. (2009) and Meng et al. (2019), we construct the following simultaneous equations:

$$\begin{cases} CF_{i,t} = \beta_0 + \beta_1 ESOP_{i,t} + X_{it}\beta + \varepsilon_{i,t} \\ I_{i,t} = \gamma_0 + \gamma_1 ESOP\_iv_{i,t} + X_{i,t}\gamma + \delta_{i,t} \\ ESOP_{i,t} = 1 if I_{i,t} \geq I^*, or 0 if I_{i,t} \leq I^* \end{cases} \quad (5)$$

where I is an unobservable variable that indicates the probability of a firm implementing an ESOP. *ESOP* equals one when I is greater than or equal to some unobservable threshold value I^* and zero otherwise. $\boldsymbol{X_{it}}$ represents a series of control variables. Both ε and δ are subject to a normal distribution, but the covariance between them is not equal to zero.

We use 3SLS to estimate model (5). We expect β_1 to be negative and significant, which suggests that after considering endogeneity, the adoption of ESOPs can reduce corporate fraud. The results are reported in Table 7. In columns (3) – (4), the instrumental variable (*ESOP_iv*) is positively and significantly related to *ESOP*, indicating that an ESOP adoption by firms with no violations in the same region but in different industries has positive effects on the ESOP adoption by the focal firm. In columns (1) – (2), the coefficients on *ESOP* are consistent with our expectations. To a certain degree, the results mitigate the endogeneity of reciprocal causality between ESOP adoptions and corporate fraud. Thus, the negative relationship between ESOPs and corporate fraud is further

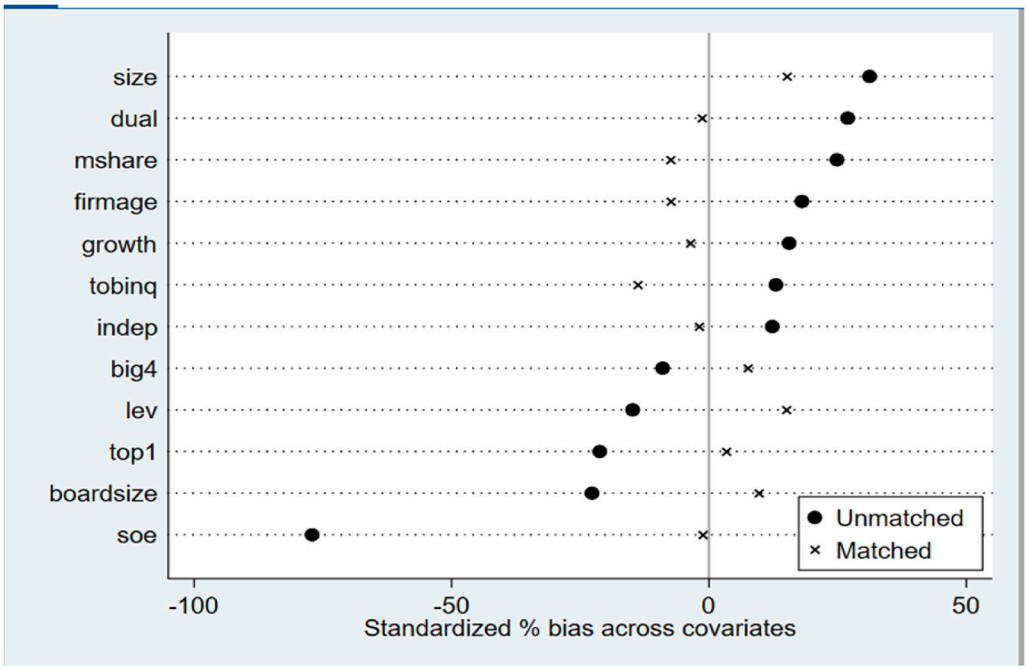

Fig. 1. Performance of PSM.

Table 6
PSM results.

	(1) *Dfraud*	(2) *Fraud*
ESOP	−0.4363***	−0.3265***
	(-2.96)	(-3.28)
Control variables	Yes	Yes
Year	Yes	Yes
Industry	Yes	Yes
Province	Yes	Yes
Observations	3,832	3,832
Pseudo R^2	0.1187	0.1004

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

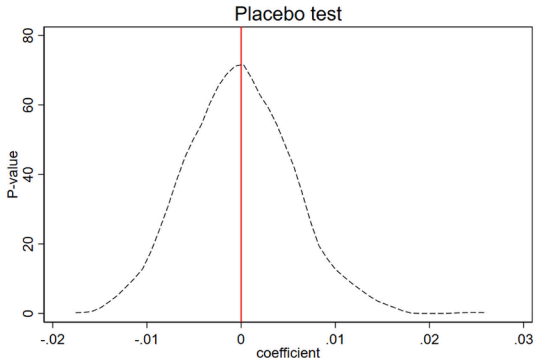

Fig. 2. Placebo Test.

confirmed.

5.3. Channel tests

In this section, we examine the mediating effects of internal monitoring and site visits on the relationship between ESOPs and corporate fraud, as stated in hypotheses 2 and 3.

5.3.1. Internal monitoring

As internal stakeholders, employees can provide useful information to the members of independent and supervisory boards, enabling them to better perform their duties of monitoring senior managers. After the adoption of ESOPs, employees have a stronger incentive to conduct internal monitoring over management than before, which further reduces their tendency to commit fraud. To test the mediating role of internal monitoring in the relationship between ESOPs and corporate fraud, we adopt models (1) – (3).

The results are shown in Table 8. Columns (1) – (2) report the total effect of ESOPs on corporate fraud, and the coefficients on ESOP are negative and significant (β = -0.0240, p < 0.01; β = -0.0233, p < 0.01). Column (3) shows the effect of ESOPs on internal monitoring, the coefficient is positive and significant (β = 0.2828, p < 0.01). In columns (4) – (5), the coefficients on *Internalmonitor* are significantly negative (β = -0.0037, p < 0.01; β = -0.0036, p < 0.01). To confirm whether the indirect effect of ESOPs on corporate fraud through internal monitoring is statistically significant or not, we perform a bootstrapping exercise proposed by Preacher and Hayes (2004) with 1,000 iterations. The same method is used to examine all the channel tests in this study. The results show that both indirect effects are significant at the l% level. Overall, the results suggest that ESOPs reduce corporate fraud by strengthening the quality of internal monitoring.

5.3.2. Site visits

We argue that an ESOP adoption reduces fraud because external monitors subsequently have incentives to pay attention to corporate development. As far as external monitors are concerned, site visits are effective tools to alleviate information asymmetry and reduce the risk of corporate fraud (Qi et al., 2021). To examine the mediating role of site visits, we repeat the mediation analysis as that in Section 5.3.1, choosing *Visits* and *Visitors* as two measures of site visits.

Table 9 reports the results. With the same sample as the baseline model, the total effect of ESOPs on corporate fraud is already shown in columns (2) – (4) in Table 3. Columns (1) and (4) of Table 9 report the effect of ESOPs on *Visits* and *Visitors*, and the coefficients are significantly positive (β = 0.1067, p < 0.01; β = 0.2776, p < 0.01). To examine whether the indirect effect of ESOPs on corporate fraud through site visits is statistically significant or not, we perform the same

Table 7
Instrumental variable method (3SLS).

	(1) *Dfraud*	(2) *Fraud*		(3) *ESOP*	(4) *ESOP*
ESOP	−1.8606***	−2.0777***	*ESOP_iv*	0.1142***	0.0990***
	(-4.16)	(-4.38)		(3.63)	(3.37)
Control variables	Yes	Yes		Yes	Yes
Constant	−0.0066	−0.0982	Constant	−0.2484***	−0.2501***
	(-0.05)	(-0.77)		(-11.79)	(-11.91)
Year	Yes	Yes	Year	Yes	Yes
Industry	Yes	Yes	Industry	Yes	Yes
Observations	37,119	37,119	Observations	37,119	37,119
Chi^2	1770.28***	2061.31***	Chi^2	1271.37***	1275.42***

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 8
The mediating role of internal monitoring.

	(1) *Dfraud*	(2) *Fraud*	(3) *Internalmonitor*	(4) *Dfraud*	(5) *Fraud*
ESOP	−0.0240***	−0.0233***	0.2828***	−0.0230***	−0.0223***
	(-2.97)	(-3.36)	(3.74)	(-2.85)	(-3.22)
Internalmonitor				−0.0037***	−0.0036***
				(-5.77)	(-6.23)
Control variables	Yes	Yes	Yes	Yes	Yes
Constant	0.6431***	0.6837***	8.9527***	0.6758***	0.7162***
	(5.27)	(5.87)	(6.74)	(5.56)	(6.16)
Firm	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes
The indirect effect through *Internalmonitor*				−0.0008**	−0.0008***
Observations	33,203	33,203	33,203	33,203	33,203
Adjusted R^2	0.195	0.259	0.735	0.196	0.261

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 9
The mediating role of site visits.

	(1) *Visit*	(2) *Dfraud*	(3) *Fraud*	(4) *Visitor*	(5) *Dfraud*	(6) *Fraud*
ESOP	0.1067***	−0.0242***	−0.0251***	0.2776***	−0.0235***	−0.0244***
	(4.88)	(-3.16)	(-3.82)	(6.47)	(-3.06)	(-3.71)
Visit		−0.0169***	−0.0147***			
		(-7.09)	(-6.32)			
Visitor					−0.0092***	−0.0081***
					(-6.57)	(-6.35)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−5.3858***	0.6103***	0.6908***	−12.6780***	0.5847***	0.6669***
	(-14.41)	(5.01)	(5.85)	(-17.30)	(4.79)	(5.66)
Firm	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes
The indirect effect through *Visit/Visitor*		−0.003***	−0.003***		−0.004***	−0.004***
Observations	37,216	37,216	37,216	37,216	37,216	37,216
Adjusted R^2	0.587	0.198	0.260	0.573	0.198	0.260

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

bootstrapping exercise as that in Section 5.3.1 with 1,000 iterations. The results show that both indirect effects are significant at the l% level. Overall, the results suggest that ESOPs reduce corporate fraud through an increase in site visits in terms of both visits and visitors.

5.4. Heterogeneity analysis

5.4.1. Effects of corporate governance

The possible effects of corporate governance on the relationship

between ESOPs and corporate fraud need to be examined from both external and internal governance perspectives.

External governance: Institutional investors comprise an important external mechanism of corporate governance and can significantly improve the efficiency of corporate governance (Boehmer & Kelley, 2007; An & Zhang, 2013; Callen & Fang, 2013). To examine the heterogeneous effect of external governance on the baseline results, we split the sample into two groups according to the median value of institutional investors' shareholdings.

Table 10 presents the results. In columns (1) – (3), the coefficients of *ESOP* are negative and significant, indicating that weaker external governance is associated with a stronger effect of ESOP adoptions on corporate fraud. In other words, ESOPs as an internal governance mechanism and institutional investors as an external governance mechanism can substitute for each other to some degree in terms of deterring corporate fraud. The differences in coefficients on *ESOP* between the two samples are significant at the 5% level. Thus, the effects of *ESOP* on both *Dfraud* and Fraud are statistically different between firms with weak and strong external governance.

Analysts are also important external monitors of a focal company (Young & Peng, 2013). Accordingly, analyst coverage may influence the relationship between ESOPs and corporate fraud. Then, we empirically test the role of analyst coverage in the effect of ESOPs on corporate fraud. The natural logarithm of the number of analysts following a given firm is used to measure *analyst coverage*. We divide the whole sample into two groups along the median value of *analyst coverage* and estimate the differential effects separately.

The results, reported in Table 11, show that the coefficients on *ESOP* are negative and significant in columns (1) and (3) but insignificant in other columns, indicating that the governance effect of ESOPs is stronger (weaker) in firms with low (high) analyst coverage. The results of differences in the coefficients on *ESOP* between the two samples are significant at a 1% level. Therefore, the effects of ESOPs on corporate fraud are statistically different for firms with high and low analyst coverage.

Internal governance: Top management power in listed companied is an important factor of internal governance mechanisms (Su et al., 2021), which may affect the effect of ESOPs on corporate fraud. Dunn (2004) argues that illegal corporate behaviour is positively related to the concentration of top management power. In this study, we use two indicators to measure top management power. The first indicator is CEO duality (*Dual*), measuring whether the CEO and the board chairperson are the same people. Based on the value of *Dual,* we partition the sample into two groups and examine the differential effects separately.

The results are reported in Table 12. In columns (1) and (3), the coefficients of *ESOP* are negative and significant, suggesting that the negative effect of ESOP adoptions on corporate fraud is more significant in companies with no CEO duality than in companies with CEO duality. The difference is significant at the level of 1%, suggesting that the values of the coefficients on *ESOP* are statistically different for firms with CEO duality and no CEO duality.

The second indicator is managerial ownership (*Mshare*), measured with the shareholding ratio by the top management team to the total shares. According to the median value of *Mshare*, we divide the sample and conduct the regressions separately with two sub-samples. The results are reported in Table 13. In columns (1) and (3), the coefficients of *ESOP* are negative and significant, suggesting that the negative effect of ESOP adoptions on corporate fraud is stronger in companies with lower managerial ownership than in companies with higher managerial ownership. The results of differences in coefficients on *ESOP* between the two groups are significant at a 5% level. Overall, the results suggest that the effects of *ESOP* on corporate fraud for firms with weak and strong internal governance are indeed different. Thus, ESOPs, as an internal governance mechanism, have a complementary relationship with other internal governance mechanisms.

5.4.2. Effect of product market competition

Product market competition is considered as an effective governance mechanism (Allen & Gale, 2000; Chou et al., 2011; Giround & Mueller, 2011). In competitive industries, greater efforts are made by managers

Table 10
The effect of institutional shareholding.

	(1) *Dfraud* Low-Shareholding	(2) *Dfraud* High-Shareholding	(3) *Fraud* Low-Shareholding	(4) *Fraud* High-Shareholding
ESOP	−0.0297**	−0.0122	−0.0317***	−0.0157
	(-2.45)	(-1.07)	(-2.96)	(-1.60)
Control variables	Yes	Yes	Yes	Yes
Constant	0.7011***	0.7497***	0.7673***	0.8491***
	(3.42)	(4.65)	(4.04)	(5.23)
b0-b1 for *ESOP*	−0.017**		−0.016**	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	16,253	20,209	16,253	20,209
Adjusted R^2	0.180	0.224	0.234	0.299

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 11
The effect of analyst coverage.

	(1) *Dfraud* Low-coverage	(2) *Dfraud* High-coverage	(3) *Fraud* Low-coverage	(4) *Fraud* High-coverage
ESOP	−0.0547***	0.0078	−0.0533***	0.0027
	(-2.83)	(0.85)	(-3.02)	(0.36)
Control variables	Yes	Yes	Yes	Yes
Constant	0.3261	0.2478	0.2942	0.5583***
	(1.44)	(1.39)	(1.37)	(2.72)
b0-b1 for *ESOP*	−0.062***		−0.056***	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	15,790	16,763	15,790	16,763
Adjusted R^2	0.184	0.267	0.209	0.402

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 12
The effect of CEO duality.

	(1) *Dfraud* *Dual* = 0	(2) *Dfraud* *Dual* = 1	(3) *Fraud* *Dual* = 0	(4) *Fraud* *Dual* = 1
ESOP	−0.0362***	−0.0032	−0.0362***	−0.0041
	(-4.00)	(-0.20)	(-4.71)	(-0.30)
Control variables	Yes	Yes	Yes	Yes
Constant	0.7119***	1.0594***	0.8244***	0.9558***
	(4.97)	(4.03)	(5.93)	(4.11)
b0-b1 for *ESOP*	−0.033***		−0.032***	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	27,476	9,249	27,476	9,249
Adjusted R^2	0.226	0.174	0.302	0.197

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 13
The effect of managerial ownership.

	(1) *Dfraud* Low-*Mshare*	(2) *Dfraud* High-*Mshare*	(3) *Fraud* Low-*Mshare*	(4) *Fraud* High-*Mshare*
ESOP	−0.0293*	−0.0058	−0.0301**	−0.0090
	(-1.93)	(-0.54)	(-2.22)	(-1.00)
Control variables	Yes	Yes	Yes	Yes
Constant	0.0063	0.0281	0.0056	0.0294
	(0.27)	(1.32)	(0.28)	(1.36)
b0-b1 for *ESOP*	−0.024**		−0.021**	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	11,356	15,751	11,356	15,751
Adjusted R^2	0.178	0.187	0.197	0.221

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

to improve operation performance (Schmidt, 1997), and innovation performance and investment efficiency are better than in less competitive industries (Blundell et al., 1995; Jagannathan & Srinivasan, 1999). Managers' opportunistic behaviour can be reduced in these circumstances (Hart, 1983). Moreover, agency costs are lower in competitive industries than in less competitive industries (Chhaochharia et al., 2017). Following Giroud and Mueller (2011), we use the Herfindahl-Hirschman Index (*HHI*) to measure product market competition. A higher value of *HHI* means stronger competition in the industry. According to the mean value of *HHI*, we split the sample into two groups and conduct regressions with the two sub-samples.

Table 14 reports the results. In columns (1) and (3), the coefficients on *ESOP* are both negative and significant. The results of difference tests show that the coefficients on *ESOP* between the split samples are significant at a 1% level, indicating that the effects of *ESOP* on corporate fraud are statistically different for firms with weak and strong market competition.

5.4.3. Effects of ownership structure

In China, ownership structure plays an important role in determining firm behaviour, which may influence the relationship between ESOPs and corporate fraud. While non-SOEs pursue profit maximization, SOEs have multiple goals, including maintaining social stability, defending national security, and subsidizing undeveloped areas (Bruton et al., 2015). SOEs often set easier financial targets than their non-SOE counterparts to keep them easier to perform social responsibility (Wei, 2020). Therefore, the motivation for SOEs to commit fraud should be comparatively weaker than non-SOEs. Under this logic, after ESOP adoptions, with stronger monitoring from shareholding employees, corporate fraud can be reduced more in SOEs than non-SOEs. To analyse the effect of ESOPs on corporate fraud conditioned on ownership structure, we divide the sample into two groups according to whether the actual controller is the state or not.

Table 15 presents the results. The absolute value of the coefficients of *ESOP* in columns (2) and (4) is smaller than those in columns (1) and (3). Obviously, ESOPs have a stronger effect on fraud reduction in SOEs than in non-SOEs. The differences in coefficients on *ESOP* between the two samples are significant at a 1% level. Consequently, compared with non-SOE firms, ESOPs are more conducive to controlling fraud for SOE firms.

5.5. Robustness tests and additional analyses

To ensure the robustness of our findings, we conduct Oster tests, adopt a bivariate probit model, change the regression models, and take the potential influence of stock market and industrial heterogeneity into consideration. In addition, we perform additional analyses to examine the impact of ESOP characteristics on fraud commitment by listed companies.

5.5.1. Oster tests addressing omitted variables concern

Following Donohoe et al. (2022), we use an approach developed by Oster (2019) to address the omitted variable concern. This approach compares the coefficient estimate sensitivity and the R-squared change between regressions with and without control variables. If a coefficient remains stable as the R-squared increases with the inclusion of control variables, the omitted variable bias should not be a concern. Oster (2019) suggests that an estimated delta with a value larger than 1 or smaller than −1 implies that omitted variables bias is unlikely.

Table 16 represents the results of the two methods of the Oster test. Column (1) shows that the "true" β is likely bounded at [-0.0387, −0.0261] and [-0.0377, −0.0267] with *Dfraud* and *Fraud* as dependent variables, respectively. Oster (2019) suggests two ways to check the sensitivity of estimated β coefficients: whether the bound (1) falls within the 99.5% confidence interval for the coefficient, and (2) excludes zero. Because the likely bounds for β falls within the 99.5% confidence intervals of *ESOP* are [-0.0477, −0.0044] and [-0.0453, −0.0081] with *Dfraud* and *Fraud* as dependent variables, respectively, and (2) the bounding estimates do not include zero, the estimated β coefficient is not likely driven by unobservable shocks that are at least as important as the observable, controlled variables. Column (2) indicates that the δ values are −2.13 and −2.54, smaller than −1. Overall, the results in Table 16 suggest that the omitted variable bias is not likely to have a significant influence on our findings.

Table 14
The effect of product market competition.

	(1) *Dfraud* Low-*HHI*	(2) *Dfraud* High-*HHI*	(3) *Fraud* Low-*HHI*	(4) *Fraud* High-*HHI*
ESOP	−0.0274***	−0.0139	−0.0268***	−0.0175
	(-3.12)	(-0.84)	(-3.46)	(-1.31)
Control variables	Yes	Yes	Yes	Yes
Constant	0.4322***	1.3237***	0.4860***	1.5040***
	(2.94)	(5.58)	(3.63)	(5.99)
b0-b1 for *ESOP*	−0.014***		−0.009***	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	25,588	11,093	25,588	11,093
Adjusted R^2	0.134	0.314	0.145	0.419

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 15
The effect of ownership structure.

	(1) *Dfraud* *SOE = 0*	(2) *Dfraud* *SOE = 1*	(3) *Fraud* *SOE = 0*	(4) *Fraud* *SOE = 1*
ESOP	−0.0237***	−0.0412**	−0.0240***	−0.0421***
	(-2.73)	(-2.13)	(-3.19)	(-2.72)
Control variables	Yes	Yes	Yes	Yes
Constant	0.9571***	0.3991**	1.0922***	0.4036**
	(5.68)	(2.33)	(6.64)	(2.50)
b0-b1 for *ESOP*	0.018***		0.018***	
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	22,469	14,452	22,469	14,452
Adjusted R^2	0.193	0.247	0.236	0.369

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 16
Oster tests addressing omitted variables concern.

Dependent variable	Parameter Assumptions (1) Identified set	(2) δ for $\beta = 0$
Dfraud	[-0.0387, −0.0261]	−2.13
Fraud	[-0.0377, −0.0267]	−2.54

Notes: The identified set includes the value of β in the controlled model (upper bound) and the value of β calculated for $R_{max} = 1.3R^2$, under the assumption that selection on observables and unobservables is proportional.

5.5.2. Solving the partial observability problem

Since only detected fraud can be observed and thus undetected fraud cannot be accounted for in the empirical analysis (Khanna et al., 2015; Kong et al., 2019), we adopt a bivariate probit model to address this concern (Xiong et al., 2021). To do so, two groups of control variables are needed, one for the fraud commission equation and the other for the fraud detection equation (Kong et al., 2019; Xiong et al., 2021). We include most of the control variables in model (1) but change the ownership of top managers (*Mshare*) and Tobin's q (*Tobinq*) into the compensation of the top 3 managers (*Top3salary*) and the return on assets (*Roa*), respectively, in the commission equation. Moreover, we include the average fraud commitment in the same industry (*M_fraud*) and the net cash increase (*Cash*) in the commission equation, and the fraud commitment experience of the focal firm (*Prefraud*) together with the annual average volatility of the daily stock returns (*Dvolatility*) in the detection equation. In both models, we include industry, year, and province fixed effects to control for possible systematic effects. The empirical results in Table 17 show that ESOPs can significantly reduce the commission of fraud in listed companies while having no significant influence on fraud detection.

5.5.3. Alternative regression models

If many observations have the value of zero for the dependent variable in a regression model, an ordinary least square regression may not estimate the marginal effects precisely (Xiong et al., 2021). To assuage this concern, we adopt Logit and Tobit models with *Dfraud* and *Fraud* as dependent variables, respectively (Belloc et al., 2016). The results are shown in Table 18. In both columns (1) and (2), the coefficients on *ESOP* are significantly negative (β = -0.1082, p < 0.05; β = -0.1467, p < 0.05), consistent with those reported in Table 3.

5.5.4. Excluding the potential influence of the stock market crash in 2015

In 2015, China's A-share market suffered a large-scale stock crash. It is likely that this crash increased stock repurchases or the adoption of ESOPs. Table 1 shows that 338 ESOP announcements were issued in 2015, significantly more than in other years. To mitigate the potential influence of unobservable market environment factors on our results, the observations in 2015 are excluded from the regressions. The results are shown in the first two columns in Table 19. The coefficients on *ESOP* in columns (1) – (2) are significantly negative, which is consistent with the results already reported.

Table 17
Results of the bivariate probit model test.

	(1) *Commission*	(2) *Detection*
ESOP	−0.6167**	0.1085
	(-2.12)	(0.71)
Control variables	Yes	Yes
Constant	−1.3163	0.5273
	(-0.65)	(0.61)
Year	Yes	Yes
Industry	Yes	Yes
Province	Yes	Yes
Observations	28,224	28,224
Wald chi2	2780.81***	

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 18
Alternative regression models: Logit and Tobit.

	(1) Dfraud	(2) Fraud
ESOP	−0.1082**	−0.1467**
	(-2.32)	(-2.32)
Control variables	Yes	Yes
Constant	−0.3475	−0.4663
	(-0.87)	(-0.86)
Year	Yes	Yes
Industry	Yes	Yes
Province	Yes	Yes
Observations	37,216	37,216
Pseudo R^2	0.1742	0.1492

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table 19
Excluding the influence of the crash in 2015 and industrial heterogeneity.

	(1) *Dfraud*	(2) *Fraud*	(3) *Dfraud*	(4) *Fraud*
ESOP	−0.0265***	−0.0276***	−0.0270***	−0.0269***
	(-3.17)	(-3.83)	(-3.01)	(-3.42)
Control variables	Yes	Yes	Yes	Yes
Constant	0.6956***	0.7693***	0.4988***	0.5523***
	(5.57)	(6.42)	(3.11)	(3.73)
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	34,789	34,789	23,300	23,300
Adjusted R^2	0.197	0.256	0.138	0.148

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

5.5.5. Controlling the effect of industrial heterogeneity

To mitigate the potential impact of industrial heterogeneity, we retain only observations in the manufacturing industry to estimate the effect of ESOPs on corporate fraud. The results are reported in columns (3) – (4) of Table 19. The coefficients on *ESOP* are negative and significant, suggesting that the results are robust after considering industrial heterogeneity.

5.5.6. The effects of ESOP intensity and width

The intensity of ESOPs is a potential variable because some companies grant nearly 10% of the total shares to employees, whereas others grant less than 0.0001%. Accordingly, the governance effect may vary with ESOP intensity. We construct a measure of ESOP intensity by using the ratio of shares granted in ESOPs to the total shares (*ESOP_ratio*) to estimate the relationship between ESOP intensity and corporate fraud. Columns (1) – (2) of Table 20 report the results. The significant and negative coefficients on *ESOP_ratio* suggest that the more (less) intense an ESOP, the greater (lesser) the governance effect.

Stocks are granted broadly to a large number of employees in some companies, whereas ESOPs are targeted to specific workers or groups in other companies. For example, Shanghai International Port (Group) Co

Table 20
The effects of ESOP intensity and width.

	(1) *Dfraud*	(2) *Fraud*	(3) *Dfraud*	(4) *Fraud*
ESOP_ratio	−0.0003***	−0.0003***		
	(-13.69)	(-13.73)		
ESOP_num			−0.0061***	−0.0056***
			(-3.96)	(-4.14)
Control variables	Yes	Yes	Yes	Yes
Constant	0.7303***	0.7997***	0.7115***	0.7825***
	(6.04)	(6.85)	(5.89)	(6.71)
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	37,216	37,216	37,216	37,216
Adjusted R^2	0.196	0.258	0.196	0.259

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, ** and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Ltd.[2] announced its ESOP in 2015, under which 16,082 employees were granted stocks, accounting for 72% of its total employees. In contrast, in 2019, Kelida Building and Decoration Co Ltd.[3] granted stocks to only three employees in its ESOP. Broadly distributed plans may foster cooperation and reinforce co-monitoring in companies where employees who share similar incentives jointly decide to make efforts and sanction those who shirk (Hochberg & Lindsey, 2010). Therefore, we expect a stronger (weaker) deterring effect on corporate fraud when a larger (smaller) number of employees are granted stocks in ESOPs. We construct a measure of ESOP width with the number of employees involved in an ESOP (*ESOP_num*) to estimate the relationship between ESOP width and corporate fraud. The results in columns (3) – (4) of Table 20 show that the coefficients on *ESOP_num* are significant and negative, indicating that the effect increases with the number of employees involved. Because the number of senior managers is more or less fixed, it is reasonable to contend that the more (fewer) non-executive employees are granted stocks, the stronger (weaker) - governance effect of an ESOP adoption has.

5.5.7. The effects of share pledges

Previous studies (Sun & Liu, 2021) document that firms with controlling shareholders having share pledges may be more likely to adopt ESOPs. To control for the effect of share pledges on the relationship between ESOPs and corporate fraud, we incorporate share pledges in our baseline model. We follow Sun and Liu (2021) using one dummy variable (*Pledge_dum*) and one continuous variable (*Pledge_ratio*) to measure the share pledge of controlling shareholders. When the controlling shareholder of firm *i* has pledged its shares in year *t*, then *Pledge_dum* takes the value of one, and zero otherwise. *Pledge_ratio* is the ratio of shares having been pledged by controlling shareholders to the total shares of firm *i* in year *t*. The results are shown in Table 21. The coefficients on *ESOP* are significantly negative, which suggests that the conclusions of this research still hold after considering the effect of share pledges by controlling shareholders.

6. Conclusion

We enrich the emerging literature on the effect of ESOPs by considering their corporate governance effect with respect to curbing corporate financial fraud. We exploit a quasi-natural setting and use a powerful DiD design to test the relationship between ESOP adoptions

Table 21
The effect of share pledges.

	(1) *Dfraud*	(2) *Fraud*	(3) *Dfraud*	(4) *Fraud*
ESOP	−0.0255***	−0.0261***	−0.0250***	−0.0256***
	(-3.31)	(-3.94)	(-3.25)	(-3.88)
Pledge_dum	−0.0116**	−0.0137***		
	(-2.46)	(-3.26)		
Pledge_ratio			−0.0968***	−0.1072***
			(-4.37)	(-5.38)
Control variables	Yes	Yes	Yes	Yes
Constant	0.6776***	0.7420***	0.6734***	0.7391***
	(5.58)	(6.35)	(5.56)	(6.34)
Firm	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
Observations	37,216	37,216	37,216	37,216
Adjusted R^2	0.197	0.259	0.197	0.260

Notes: Standard errors are clustered by firm, and t-statistics are shown in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

Table A1
Variable Definition.

Variable	Definitions
Dependent variables	
Dfraud	A dummy variable that equals one if a firm commits fraud in a certain year, and zero otherwise
Fraud	The natural logarithm of one plus the number of fraud cases committed by a firm in a certain year
Independent variables	
ESOP	A dummy variable that equals one if a firm has adopted an ESOP, and zero otherwise
Control variables	
Size	The natural logarithm of total assets
Lev	Total liabilities divided by total assets
Growth	The growth rate of annual sales revenue
Boardsize	The natural logarithm of the number of directors on a board
Indep	The proportion of independent directors on the board of directors to the number of directors
Mshare	The percentage of ownership held by the management
Tobinq	The ratio of the market value to the book value of assets
Top1	The percentage of ownership held by the largest shareholder
Firmage	The natural logarithm of one plus the number of years since a firm's establishment
Dual	A dummy variable that equals one if the chairperson and the CEO are the same people, and zero otherwise
Big4	A dummy variable that equals one if the auditor firm hired by a firm is PwC, Deloitte, KPMG or E&Y and zero otherwise
SOE	A dummy variable that equals one when the firm is a state-owned enterprise, and zero otherwise
Mediators	
Internalmonitor	The index of internal monitoring, including three sub-indicators concerning the management's reaction to the internal control, the capability of internal monitoring employees, and the internal auditing committee
Visit	The natural logarithm of one plus the number of visits to a firm
Visitor	The natural logarithm of one plus the number of institutions participating in visits to a firm
Other Models	
Cash	The natural logarithm of net cash increase
Roa	The net profits divided by the total assets
Top3salary	The natural logarithm of compensation of the top 3 managers
Dvolatility	The annual average volatility of daily stock returns
M_fraud	The industrial average fraud commitment
Prefraud	A dummy variable that equals one if a firm has ever committed fraud before, and zero otherwise

[2] The company's stock code is 600018.
[3] The company's stock code is 603828.

and corporate financial fraud reduction. Our empirical results suggest a negative relationship between ESOP adoptions and the likelihood of corporate financial fraud. The baseline results hold after a series of endogeneity tests and robustness checks. Collectively, we provide solid evidence of a causal effect of ESOPs, as a corporate governance mechanism, on curbing corporate financial fraud.

Our study has important implications for management, regulators and policy makers with respect to decisions and regulations to expand ESOPs to more companies. Managers should attach importance to the governance role of employees. In previous studies, the effectiveness of ESOPs as incentives has been questioned (Conte et al., 1996; Meng et al., 2011) due to the problem of free-riding employees (Holmstrom, 1982). This study provides additional evidence in this respect. In particular, ESOPs provide the conditions in which capable and willing ordinary employees can restrain corporate fraud, which aligns with the original intention of *the Opinions*. In addition, the *Report of the 19th National Congress of the Communist Party of China* clearly requires that China continue to deepen the reform of SOEs, develop a mixed ownership economy and cultivate world-class, globally competitive enterprises. As an important part of the new round of mixed ownership reform, ESOPs deserve the attention of senior SOE managers. They can make rational use of the governance role of employee stock ownership, improve the level of corporate governance and achieve the goal of making SOEs bigger and stronger over time.

Second, we shed light on the boundary conditions under which ESOPs play a governance role. Although employee stock ownership can significantly inhibit corporate fraud, its governance role is influenced by other internal and external governance mechanisms. Therefore, in enterprises with imperfect governance mechanisms, such as those lacking institutional investors, employee stock ownership should be adopted as an important mechanism of corporate governance to further improve governance and promote long-term corporate development.

Finally, companies planning to adopt ESOPs should ensure that they are cautiously devised, with serious consideration given to the arrangement of the shareholding structure. Our results indicate that higher proportions of ESOPs in the total shares and a bigger number of ordinary employee stock ownership are associated with a lower tendency of the company to violate the rules (versus lower proportions of ESOPs and a smaller number of ordinary employee stock ownership, respectively). Therefore, to maximise the governance role of employee stock ownership, companies should appropriately increase the number of shares held in the ESOPs, as well as the shareholding ratio of ordinary employees.

Regulators should affirm and recognise the positive impact of ESOPs on corporate governance and strengthen their supervision of the contents of ESOPs of listed companies. In line with the original intention of the CSRC in launching *the Opinions*, the introduction of ESOPs can significantly improve the level of corporate governance and effectively curb corporate fraud. However, the lower the proportion of total shares held in the ESOPs and the lower the shareholding ratio of ordinary employees, the greater the possibility of corporate misconduct. Therefore, government departments should strengthen the supervision of ESOP conditions to effectively prevent companies from violating regulations and protect the interests of investors. A potential limitation of our study is that the sample firms are all from China. Thus, local contextual factors must be considered when generalising our results to other settings.

CRediT authorship contribution statement

Fang Wu: Conceptualization, Writing – original draft, Formal analysis, Software, Investigation, Methodology, Data curation, Funding acquisition, Writing – review & editing, Validation. **June Cao:** Validation, Supervision, Resources, Project administration, Methodology, Investigation, Conceptualization, Funding acquisition, Project administration, Validation, Writing – original draft, Writing – review & editing. **Xiaosan Zhang:** Validation, Investigation, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Acknowledgement

The first author would like to acknowledge financial support from National Natural Science Foundation of China (Grant No. 72062016), Ministry of Education in China Project of Humanities and Social Sciences (Grant No. 21YJC630143), Jiangxi Science and Technology Project of Education Department (Grant No. GJJ200514), and Jiangxi Science and Technology Project of Education Department (Grant No. GJJ2200519). The second author would like to acknowledge financial support from School of Accounting, Economics and Finance of Curtin University.

Compliance with Ethical Standards

We certify that all authors have seen and approved the final version of the manuscript being submitted. We warrant that the article is our original work, hasn't received prior publication and isn't under consideration for publication elsewhere.

We certify that there's no financial or personal interest that could affect the work reported in this paper.

Data Availability

Data are available from the public sources cited in the text.

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