International Review of Financial Analysis 83 (2022) 102291

Contents lists available at ScienceDirect

International Review of Financial Analysis

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

ESG disclosure and financial performance: Moderating role of ESG investors

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ARTICLE INFO

Keywords:
ESG
Financial performance
Investor preference
Staggered difference-in-differences method
Goodman-Bacon decomposition

ABSTRACT

This study discusses the effect of environmental, social, and governance (ESG) disclosure on corporate financial performance. This study uses a sample of non-financial listed companies from 2000 to 2020 and applies the staggered difference-in-differences technique to eliminate the endogeneity problem. Findings show that ESG disclosure has a favorable effect on corporate financial performance. This conclusion remains robust after a series of robustness tests, including the parallel trend test, Goodman-Bacon decomposition, replacement of dependent variables, system GMM estimate, the placebo test, etc. ESG disclosure has heterogeneous effects on financial performance. The positive effect of ESG disclosure on corporate financial performance is more pronounced in companies with ESG investors and companies with longer inception, high media attention, and high agency costs. In addition, investors with ESG preferences exert a substantial moderating effect on the link between ESG disclosure and financial performance connection. We arrive at two conclusions in the extended analysis. One is that ESG disclosure attracts ESG investors. Another is that ESG investors also play a positive moderating role in the connection between ESG ratings and financial performance.

1. Introduction

In the face of issues such as global warming, COVID-19, and international conflicts, the principles of protecting the environment and respecting people's interests are leading to major social changes (Garel & Petit-Romec, 2021; Nordhaus, 2019). Companies are exploring a more ethically responsible and sustainable way to conduct long-term business, and the integration of environment, society, and governance has become a focus of capital markets. As the largest manufacturing country in the world, China has a particularly prominent conflict between environmental pollution and economic development in the global market. The "2018 Environmental Performance Index", released by Yale University in 2018, ranks the ecological performance of 180 countries. China ranked 177th in terms of air quality indicators, indicating how China coordinates pollution and sustainable development is a long-term and critical topic. In fact, the Chinese government is trying to change that situation. The Chinese government has officially committed to peaking carbon dioxide emissions by 2030 and achieving carbon neutralization by 2060. In the past, the Chinese market was more concerned about the financial performance of enterprises without undertaking corresponding environmental and social responsibilities. Meanwhile, the regulatory system has not required to disclose the non-financial information on social responsibility as the pressure from market competition and non-governmental social organizations is much lower than the one in other countries (Ong & Han, 2019). At present, the transformation of China's economy requires companies to undertake more environmental and social responsibilities, which means that all sectors of society will pay more attention to the ESG information of Chinese companies.

However, the ecological environment attributes public goods (Nordhaus, 2019), and social responsibility is also full of humanitarianism. In the absence of regulation, private companies have no incentive to improve their ecological environment and social goods. On the one hand, the public shares the benefits of enterprise ecological governance, while the enterprise alone bears the costs. An asymmetry can be observed between the costs and benefits of corporate participation in environmental governance (Xu & Kim, 2022). On the other hand, in the case of lax supervision, corporate managers seek their interests through tax evasion or false public welfare. Enterprises will be impelled to take account of environmental, social, and governance issues when external regulation such as governments, communities, institutions, etc., comes into play. Scholars are increasingly analyzing the relationship between sustainable practices and corporate financial performance and the role of different stakeholders such as government, consumers, management, and investors. Legitimacy and stakeholder theories provide a solid theoretical basis for the relationship between disclosure of environmental, social, and governance (ESG) and financial performance

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https://doi.org/10.1016/j.irfa.2022.102291
Received 15 May 2022; Received in revised form 16 June 2022; Accepted 5 July 2022
Available online 9 July 2022

(Qureshi, Kirkerud, Theresa, & Ahsan, 2020). Companies use the disclosure of non-financial information as a legalized tool. Transparent ESG information proves that companies are actively taking ecological and social responsibility, thereby enhancing their reputation with consumers and investors, accessing capital at a lower cost, and improving their competitive advantage (Ben-Porath, Dekel, & Lipman, 2018; Bofinger, Heyden, & Rock, 2022; Gillan, Koch, & Starks, 2021; Starks, 2021).

Stakeholder theory shows that the market value of an enterprise largely depends on the ability to meet stakeholders' requirements (Shakil, 2021). As one of the important stakeholders of enterprises, institutional investors pay attention to policy orientation and public needs, including product quality and humanitarian needs (Cao, Titman, Zhan, & Zhang, 2020). The rare experience of COVID-19 may lead investors to reexamine the expected effect of environmental and morality on business development (Garel & Petit-Romec, 2021). Investors assess risks and forecast returns based on non-financial information provided by businesses. Traditional economic theory assumes that rational investors, constrained by risk appetite and budget constraints, choose investment portfolios that maximize expected returns. Investors with special preferences changing the original utility function may give companies that disclose ESG higher risk tolerance and looser budget constraints (Cao, Titman, Zhan, & Zhang, 2020; Cornell, 2021; Dorfleitner, Kreuzer, & Sparrer, 2020; Fama & French, 2007; Goldstein, Kopytov, Shen, & Xiang, 2022; Kim, Ryou, & Yang, 2020; Shafron, 2019; Wang, Su, & Duxbury, 2021). Research on ESG disclosure and corporate behavior in developed markets is abundant (Atif & Ali, 2021; Egginton & McBrayer, 2019; Huang, Li, Lin, & McBrayer, 2022; Lokuwaduge & Heenetigala, 2017; Pham & Tran, 2020; Qureshi, Kirkerud, Theresa, & Ahsan, 2020). However, compared with developed countries, China's financial market is less developed, and the financial activities of institutional investors in the capital markets are much less active. In 2007, the proportion of institutional investors in the United States reached about 70% (Boubaker, Chourou, Saadi, & Zhong, 2019), while in 2020, the proportion of institutional shares in Chinese A-share listed companies was only 40% or so. Do institutional investors with unique preferences also play a prominent role in China's capital market? Therefore, we try to answer whether the shareholding ratio of Chinese investors with ESG preferences affects the relationship between ESG disclosure and financial performance.

Before examining the relationship between ESG disclosure, ESG investors, and corporate financial performance, three issues must be considered. The first issue is how to effectively identify corporate ESG information disclosure. In previous literature, ESG scores or ratings from authoritative institutions are used to measure companies' ESG performance (Atif & Ali, 2021; Baker, Boulton, Braga-Alves, & Morey, 2021; Garel & Petit-Romec, 2021; Joliet & Titova, 2018). However, this method has two drawbacks. First, no unified rating standard and regulatory requirements exist (Avramov, Cheng, Lioui, & Tarelli, 2022; Pedersen, Fitzgibbons, & Pomorski, 2021; Serafeim & Yoon, 2022). Rating agencies have different ESG ratings for the same company because of the different ESG keywords and weights selected, which may lead to biased conclusions (Clementino & Perkins, 2021; Friede, 2019). Second, managers may take strategic actions such as bribing rating agencies, withholding harmful information, and "greenwashing" to improve ESG scores, which damage the long-term value of their companies (Avetisyan & Hockerts, 2017). The second issue is how to address endogeneity caused by the reverse causality between ESG disclosure and financial performance. Better-developed companies can undertake more environmental and social responsibilities, so they are more willing to disclose ESG information. The third issue is how to distinguish between investors with ESG preferences and general investors.

To address the above three problems, we match the financial data of Chinese listed companies and Chinese fund data from 2000 to 2020 and take the first disclosure of the company's ESG rating by Bloomberg as a natural experiment. We use a staggered difference-in-differences (DID) model to address the endogeneity caused by the reverse causality between ESG disclosure and financial performance. The results show that ESG disclosure significantly improves the financial performance of companies. A series of tests, including parallel trend test, Goodman-Bacon decomposition, system GMM estimate, replacement of explained variables, and placebo test, has verified the robustness of the conclusions. The positive impact of ESG disclosure on financial performance is more pronounced in companies with ESG investors and companies with longer inception, high media attention, and high agency costs. In addition, we confirm that ESG investors exert a positive moderating effect. The higher the shareholding ratio or market value of ESG investors, the stronger the effect of ESG disclosure on financial performance. We further analyze the effect of ESG disclosure on investors with diverse tastes. We also replace ESG disclosures with ESG ratings to examine the relationship between ESG ratings, ESG investors, and financial performance.

Our study has three main contributions. First, we investigate ESG disclosures and firm financial performance, contributing to informal disclosure regimes and firm performance literature. This study provides the latest empirical evidence on the development of environmental, social, and governance integration in emerging markets. Compared with developed markets, ESG in China's capital market is at an early stage of development. China's ESG concept development provides a model that other similar developing countries can imitate. In addition, the influence of institutional investors in China's financial market is much lower than that of developed countries. With such a low shareholding ratio of institutional investors, ESG investors still can play a significant positive moderating role. This result is encouraging and suggests that China and other less developed countries should increase the proportion of institutional investors and lead them to focus on ESG. Second, to avoid disputes over ESG rating criteria (Avramov, Cheng, Lioui, & Tarelli, 2022; Clementino & Perkins, 2021; Friede, 2019; Pedersen, Fitzgibbons, & Pomorski, 2021; Serafeim & Yoon, 2022) and to be independent of reverse causality, we employ an event-study approach that allows us to indirectly infer the valuation effect of corporate disclosure of ESG information on financial performance. In the robustness analysis, we use the Goodman-Bacon decomposition method to verify that the use of the staggered DID technique is reasonable. We regard Bloomberg's first ESG rating announcement as a quasi-natural experiment, avoiding measurement errors in constructing ESG rating data and effectively mitigating endogenous effects. Third, we creatively construct ESG investors' data sets based on the public reports of Chinese listed securities investment funds. Unlike Cao, Titman, Zhan, and Zhang (2020) and Hwang, Titman, and Wang (2021), who use the weighted average of ESG scores and the market value of holding shares to distinguish investor tastes, we gather the investment horizons and investment objectives of all funds from the report to differentiate between investors with ESG preferences and other investors. Our data sets provide new data for studying corporate ESG behavior and specific investors.

The remainder of the study is organized as follows. Section 2 proposes research hypotheses on the basis of existing literature. Section 3 presents the model, main variables, and data sources. Section 4 expounds the benchmark results and performs multiple robustness tests on the relationship between ESG disclosure and financial performance. Section 5 examines the heterogeneous effects of ESG disclosures on financial performance. Section 6 reports on the moderating effect of ESG investors. Section 7 conducts further analysis. Section 8 concludes.

2. Literature review and hypothesis development

2.1. ESG disclosure and financial performance

ESG is an extension of corporate social responsibility (CSR) and socially responsible investment (SRI). The impact of ESG disclosure on companies' financial performance is controversial. Shareholder primacy theory and the stakeholder theory provide opposing theoretical

foundations for the relationship between ESG disclosure and financial performance.

Shareholder supremacy theory proposes that a company's sole goal is to maximize shareholders' interests. Managers' protection of owners' rights and interests is the embodiment of effective corporate governance. Managers use funds for environmental protection and social good causes and, in so doing, damage shareholder value and violate their core responsibilities (Friedman, 2007). In the separation of ownership and management rights, information asymmetry leads to moral hazard problems (Jensen & Meckling, 1976). Different management characteristics affect enterprise risk differently (Kinateder, Choudhury, Zaman, Scagnelli, & Sohel, 2021). Managers may use social responsibility as an excuse to seek personal gain, and the conflict between the practice of excessive investment and the commitment to sustainable development damages the market value of enterprises (Barnea & Rubin, 2010; Nekhili, Boukadhaba, Nagati, & Chtioui, 2021). Moreover, disclosure of non-financial information, such as environmental compliance and social responsibility, incurs additional costs (Lin, Li, Cheng, & Lam, 2021). Scandals and lower ESG scores jeopardize a company's reputation (Aouadi & Marsat, 2018; Fatemi, Glaum, & Kaiser, 2018). Managers' strategic use of disclosures to conceal unethical behavior negatively affects the long-term growth of companies (Shakil, 2021; Wong & Zhang, 2022).

Stakeholder theory refutes shareholder supremacy theory, arguing that only companies responsible to all stakeholders can develop sustainably. Stakeholders encompass internal stakeholders, such as shareholders, management, and employees, and external stakeholders, such as consumers, suppliers, communities, and governments (Freeman, 2010). Stakeholder theory emphasizes business and social ethics in the operation of a company. In the face of market downturns and shocks of external uncertainty, ethical capital protects companies committed to environmental protection and social responsibility (Olofsson, Råholm, Uddin, Troster, & Kang, 2021). Stakeholder theory supports that ESG practices and disclosures increase company value.

Much literature supports that social responsibility and ESG disclosure are beneficial to business development (Abdi, Li, & Càmara-Turull, 2022; Cohen, Gurun, & Nguyen, 2020; Krueger, Sautner, Tang, & Zhong, 2021; Li, Gong, Zhang, & Koh, 2018; Mohammad & Wasiuzzaman, 2021; Qureshi, Kirkerud, Theresa, & Ahsan, 2020; Wong, Batten, Mohamed-Arshad, Nordin, & Adzis, 2021). Previous studies have argued that corporate disclosure of ESG information reduces the cost of capital (Eichholtz, Holtermans, Kok, & Yönder, 2019), financing risk (Atif & Ali, 2021; Banerjee, Gupta, & Mudalige, 2020; Feng & Wu, 2021), and stock price volatility (Bofinger, Heyden, & Rock, 2022; Shakil, 2021). Under the premise of information asymmetry in the capital market, enterprises obtain the support of stakeholders by disclosing high-quality ESG information. Consumers increasingly prefer products with green rating labels (Austmann & Vigne, 2021; Young, Hwang, McDonald, & Oates, 2010). Companies that disclose CSR have fewer negative press reports and lawsuits and receive more government subsidies (Jackson, Bartosch, Avetisyan, Kinderman, & Knudsen, 2020). As significant shareholders, institutional investors care about policy orientation, social responsibility, public needs, and other information conducive to sustainable development. Companies that focus on short-term benefits while ignoring ESG factors face punishment from investors (Shakil, 2021). ESG comprehensively considers the corporate environment, social responsibility, and governance efficiency. ESG disclosure is essential for mitigating information asymmetry between companies and stakeholders. Companies that disclose ESG information are more transparent and reduce investment risks, satisfying investors' risk-averse preferences (Frydman & Wang, 2020; Joliet & Titova, 2018). Therefore, we propose Hypothesis 1 as follows:

Hypothesis 1. ESG disclosure positively affects corporate financial performance.

2.2. Mediating role of ESG investors

The link between ESG disclosures and investor responses is particularly critical. Investors are important shareholders, and their support sends a good signal to the capital market (Chen, Chou, & Lin, 2019). Part of the literature argues that ESG disclosure harms investors. Consumers in price-sensitive markets are reluctant to pay a premium for ESG products and services. The ESG behavior of enterprises occupies operating expenses and damages the direct interests of investors. Negative ESG information reduces reputation, triggers investor concerns and exits, and severely damages a company's ability to raise capital (Aouadi & Marsat, 2018; Wong & Zhang, 2022). Environmental problems exposed by enterprises or excessive emphasis on social responsibility may lead to conflicts between managers and shareholders. Cao, Titman, Zhan, and Zhang (2020) determine investors' ESG preferences based on the weighted average of the value of investors' holdings and the company's ESG scores and argue that investors with ESG preferences are less responsive to quantitative mispricing signals. Therefore, considering a company's ESG aspects, rather than just one of these dimensions, is necessary (Avramov, Cheng, Lioui, & Tarelli, 2022). The UK Pension Policy Institute declared in 2018 that companies must include ESG information in development reports. Institutions assess future risks and benefits based on disclosed ESG information.

This is not always bad for the business despite investors' preferences for ethics and the environment's influence on managers' decisions. Institutional investors ease financing pressure and send positive signals to other stakeholders. Gloßner (2019) and Buchanan, Cao, and Wang (2021) point out that companies with higher long-term institutional ownership pay more attention to social responsibility. Given that ESG information disclosure alleviates the information asymmetry between shareholders and companies, it attracts ESG-focused or risk-averse stakeholders. Listed companies pay particular attention to investors' investment goals and preferences. Under the constraints of risk appetite and investment budget, a rational investor chooses an investment portfolio that maximizes his expected benefits (Pathan, Haq, Faff, & Seymour, 2021; Shafron, 2019). Fama and French (2007) argue that investors' preferences change the original utility function, providing a higher risk tolerance and a larger investment budget for a particular firm. The Norwegian Fund, which controls the world's largest sovereign wealth fund, attaches great importance to the ESG behavior of its investees. Norges Bank Investment Management focuses on the investment sector's climate, water, and children's rights. Investors can motivate companies to improve the transparency of ESG information and participate in ESG behaviors by expressing their investment goals and wishes (Kim, Ryou, & Yang, 2020; Kim, Kim, Kim, & Park, 2019; Yu, Guo, & Luu, 2018). Investors who prefer ESG can better supervise companies' disclosure of ESG information to fulfill their responsibilities to shareholders and obtain more commercial benefits (Fu, Tang, & Yan, 2019; Nguyen, Kecskés, & Mansi, 2020). Therefore, we propose.

Hypothesis 2. ESG investors reinforce the effect of ESG disclosure on financial performance.

After sorting out the studies on ESG disclosure and financial performance, we conclude that the existing literature has three characteristics. First, conclusions about ESG disclosure and corporate performance are controversial. Most literature considers only one environmental, social, or governance aspect. Second, the most common practice is measuring ESG disclosure by ESG scores or ratings. However, China's ESG development is in its infancy, and no unified ESG standard is available. Different ESG criteria and weights lead to different ESG scores for each institution. Third, views on the relationship between ESG disclosure and institutional investors differ. Moreover, much of the literature discusses the role of institutional investors without considering investor tastes.

3. Methodology, variables, and data specification

3.1. Methodology

3.1.1. Benchmark model

In the benchmark regression, we use the two-way fixed effects (TWFE) staggered DID technique to examine the relationship between ESG information released by Chinese listed non-financial companies and their financial performance from 2000 to 2020 with reference to Beck, Levine, and Levkov (2010) and Molyneux, Reghezza, and Xie (2019). Specifically, regression model (1) is established to examine the effect of ESG disclosure on corporate financial performance.

$$\text{Tobin}'\text{s } Q_{it} = \alpha_0 + \alpha_1 \text{Disclosure}_{it} + \delta \text{Controls}_{it} + \text{Firm}_i + \text{Year}_t + \varepsilon_{it} \quad (1)$$

The variable subscripts i and t represent company i in year t. Tobin′s Q_{it} represents the financial performance of the company. We also use other indicators to measure financial performance in the robustness tests. Disclosure_{it} is a dummy variable, which equals to 1 in the year after company i disclosed ESG; 0, otherwise. We are interested in coefficient α_1, the relationship between ESG disclosure and corporate financial performance. A significantly positive α_1 indicates that the company's disclosure of ESG information is beneficial to its development. In contrast, a significantly negative one indicates that the higher the transparency of the company's ESG information, the greater the business risk. To alleviate the misleading results of omitted variables, we add a series of control variables related to financial performance, represented by the vector Controls_{it}. Firm_i and Year_t represent the firm fixed effect and year fixed effect, respectively.

3.1.2. Moderating effect model

The meaning of the coefficients of the main variables changes substantially before and after adding the multiplication term. To make the coefficient $\widehat{\gamma_1}$ in Eqs. (2) and (3) and the coefficient $\widehat{\alpha_1}$ in Eq. (1) comparable, we set the moderation effect model according to Balli and Sørensen (2013). The standardized coefficient $\widehat{\gamma_3}$ is the same as the unstandardized one and is nothing but a renormalization. Regression model (2) is established to study the moderating effect of ESG investors on the relationship between ESG disclosure and corporate financial performance.

$$\text{Tobin}'\text{s } Q_{it} = \gamma_0 + \gamma_1 \text{Disclosure}_{it} + \gamma_2 \text{ESGshare}_{std\,it} + \gamma_3 (\text{ESGshare}_{std\,it} * \text{Disclosure}_{it}) + \delta \text{Controls}_{it} + \text{Firm}_i + \text{Year}_t + \varepsilon_{it} \quad (2)$$

$$\text{Tobin}'\text{s } Q_{it} = \gamma_0 + \gamma_1 \text{Disclosure}_{it} + \gamma_2 \text{ESGvalue}_{std\,it} + \gamma_3 (\text{ESGvalue}_{std\,it} * \text{Disclosure}_{it}) + \delta \text{Controls}_{it} + \text{Firm}_i + \text{Year}_t + \varepsilon_{it} \quad (3)$$

We use the logarithm of the number of shares held by ESG investors and the value of the shares held as moderator variables, denoted as $\text{ESGshare}_{stdit}$and ESGvalue_{stdit}, respectively. $\text{ESGshare}_{stdit} = \text{ESGshare}_{it} - \text{mean}(\text{ESGshare}_{it})$ and $\text{ESGvalue}_{stdit} = \text{ESGvalue}_{it} - \text{mean}(\text{ESGvalue}_{it})$. Dependent variable (Tobin′s Q_{it}), independent variable (Disclosure_{it}), control variables and fixed effects are the same as in the benchmark regression. If the coefficients $\widehat{\gamma_3}$ of Eqs. (2) and (3) are significant and have the same sign as the coefficient $\widehat{\alpha_1}$ of Eq. (1), ESG investors magnify the relationship between ESG disclosure and financial performance. Opposite signs indicate that ESG investors weaken the effect of ESG disclosure on financial performance.

3.2. Primary variables

3.2.1. Independent variable: ESG disclosure

The ESG concept extends the SRI one. SRI emphasizes that companies should fulfill their humanitarian responsibilities, whereas ESG emphasizes the combination of environmental protection, social responsibility, and corporate development. Given that the coordinated development of the economy and the environment is valued, many influential rating agencies or financial information providers (i.e., MSCI, Bloomberg, SynTao Green Finance, Standard & Poor's, etc.) evaluate companies' ESG performance. These measures effectively incentivize sustainable corporate behavior. In recent years, the Chinese government and society have gradually paid more attention to the ESG performance of enterprises. In response to the capital market's concern about sustainable development, Bloomberg, WIND, Shanghai Huazheng Index Information Service Co., Ltd., and other institutions have begun to evaluate the ESG information of Chinese listed companies.

Unlike most existing literature that uses ESG scores, we use the ESG ratings of companies disclosed by rating agencies for the first time as shocks. After comparing data from multiple rating agencies, we find that Bloomberg's ESG assessment of companies is the most suitable for research. Bloomberg conducts ESG ratings on companies in many countries worldwide, so the results can be used for international comparisons. Bloomberg has been paying attention to companies' ESG behavior since 2011, and the evaluation time is early and continuous. Environmental indicators include 46 items, such as climate change, ecological cycle, and biodiversity. Social indicators include 46 items, such as ethics and legality, product safety, and anti-discrimination. Governance indicators include 30 indicators, such as management composition, company independence, development diversification, governance, and supervision. The above ratings are all from the annual reports of listed companies, media reports on the company's ESG behavior information, etc.

Combined with Bloomberg's ESG assessment events of companies, we set relevant dummy variables based on whether companies disclosed ESG ratings in the current year. The staggered DID model requires the trial groups to be consecutive, so we remove samples that do not have consecutive published ESG ratings. Disclosure_{it} is equal to 1 if the listed company i continuously publishes ESG ratings in year t and beyond; 0, otherwise. Companies disclosing ESG ratings increased from 593 in 2011 to 853 in 2020.

3.2.2. Moderating variable: ESG investors

As important shareholders of an enterprise, institutional investors pay attention to the short-term economic benefits of the enterprise and the sustainable development ability. Investors' preference changes their original utility function, which affects their return expectation, risk tolerance, and investment budget for a specific enterprise. Therefore, whether the shareholding ratio of ESG-preferring investors affects the relationship between ESG disclosure and corporate financial performance is meaningful to study.

We construct ESG investors' indicators using three data sets: keywords for constructing ESG indicators, each fund's investment objectives and scope in the Chinese fund market, and the fund's shares in listed companies. The selection of ESG keywords refers to Bloomberg's ESG rating standards. The investment objectives or scope of environmental

Table 1
Variable definitions.

Variable	Definition
Tobin's Q	Ratio of market capitalization plus liabilities to total assets
Disclosure	$Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information
Size	ln(1+ Total assets)
Staff Size	ln(1+ Total employees)
Age	ln(1+ Company age)
Lev	Total liabilities divided by total assets
Cash	ln(1+ Net cash flow from operating activities)
Purchaseco	Ratio of top five customer sales to total annual sales
Investinc	ln(1+ Investment income)
Equity	Shareholding ratio of the second to fifth largest shareholders/ Shareholding ratio of the first largest shareholder
Manfeeratio	Ratio of administrative expenses to operating income
Tolcost	ln(1+ Total operating costs)
ESGshare	ln(1+ Number of shares held by ESG investors)
ESGvalue	ln(1+ Market value of shares held by ESG investors)

protection investors (EIs) include ecology, renewable, recycling, low carbon, energy, water conservation, environmental quality, and so on. Socially responsible investors (SIs) prefer public welfare, anti-discrimination, health, and safety, ethics, social welfare, privacy protection, fairness, justice, and so on. Corporate governance investors (GIs) focus on executive composition, governance, oversight, audit risk, taxation, bribery, information disclosure, compensation, etc. We define the above three types of investors as investors with ESG preferences and denote them as ESG investors. We measure the influence of ESG investors on listed companies by ESG investors' shareholding ratio and shareholding value, denoted as $ESGshare_{it}$ and $ESGvalue_{it}$, respectively. $ESGshare_{it}$ and $ESGvalue_{it}$ are logarithmic. Institutional investors in the benchmark regression are equity funds. We also use innovative, bond, and hybrid funds in the robustness tests.

3.2.3. Dependent variable: financial performance

We measure financial performance using the Tobin Q ratio, widely used in management and financial research to evaluate corporate market responses (Bhandari, Kohlbeck, & Mayhew, 2022; Hauser, 2018; Nirino, Santoro, Miglietta, & Quaglia, 2021). Tobin's Q is the ratio of market capitalization plus liabilities to total assets. Tobin's Q is also commonly used to reflect business growth opportunities, providing stakeholders with information to predict the future development potential of the business. To explore the impact of the controversy on different measures of financial performance, we also conduct robustness tests using a firm's return on assets (ROA), return on equity (ROE), and the liabilities-to-assets ratio (Lev), which are commonly defined as performance accounting measures (Nirino, Santoro, Miglietta, & Quaglia, 2021).

3.2.4. Control variables

$Controls_{it}$ is a vector of all control variables, including $Size_{it}$, Staff $Size_{it}$, Age_{it}, Lev_{it}, $Cash_{it}$, $Purchaseco_{it}$, $Investinc_{it}$, $Equity_{it}$, $Management_{it}$, and $Tolcost_{it}$. Large companies are often the main focus of institutional investors, and their disclosures lead others to imitate them. Both the size and the age of establishment affect the company's market value, so we control the size of the company's assets, employee size, company age, etc. Specifically, $Size_{it}$ denotes the natural log of total assets (Bennouri, Chtioui, Nagati, & Nekhili, 2018; Jiang, Chen, Rughoo, & Zhou, 2022), Staff $Size_{it}$ denotes the natural log of total employees (Guoyou, Saixing, Chiming, Haitao, & Hailiang, 2013), Age_{it} denotes the natural log of enterprise age (Jiang, Chen, Rughoo, & Zhou, 2022). In addition, Lev_{it} denotes the total debt divided by the total assets (Bennouri, Chtioui, Nagati, & Nekhili, 2018; Jiang, Du, & Chen, 2022). Abundant cash flow means looser external financing constraints (Hirth & Viswanatha, 2011), so we control the company's operating cash flow ($Cash_{it}$). Supplier concentration affects a firm's cash flow (Zhang, Zou, Liu, & Zhang, 2020). $Purchaseco_{it}$ represents the ratio of top five customer sales to total annual sales. An enterprise's investment efficiency and investment returns are closely related to management characteristics and financial performance. (Menshawy, Basiruddin, Mohd-Zamil, & Hussainey, 2021). $Investinc_{it}$ denotes the logarithm of investment income. Corporate governance is an important factor affecting financial performance (Rodrigues, Samagaio, & Felício, 2020). $Equity_{it}$ mainly reflects the checks and balances among the top 5 shareholders of an enterprise. The higher the degree of equity checks and balances, the more effective the mutual supervision among shareholders (Xu & Wang, 1999). $Manfeeratio_{it}$ is the level of enterprise management expenses, denoted by the ratio of administrative expenses to operating income (Liu, Yin, Yin, & Sheng, 2021). $Tolcost_{it}$ denotes the natural logarithm of a firm's operating costs (De Vito & Gómez, 2020). The definitions of control variables are shown in Table 1.

Table 2
Descriptive statistics for primary variables.

Variable	Observations	Mean	Min	Max	SD
Tobin's Q	11,382	2.401	0.46	53.415	2.002
Disclosure	11,382	0.37	0	1	0.483
Size	11,382	22.125	19.593	25.63	1.204
Staff Size	11,382	7.901	5.037	10.936	1.164
Age	11,382	2.175	1.099	3.258	0.618
Lev	11,382	0.476	0.008	35.788	0.555
Cash	11,382	19.317	15.141	23.447	1.554
Purchaseco	11,382	32.552	18.413	92.99	19.23
Investinc	11,382	15.6	0	21.269	4.265
Equity	11,382	0.72	0.02	2.862	0.613
Manfeeratio	11,382	0.085	0.009	0.356	0.059
Tolcost	11,382	21.572	18.413	25.208	1.379
ESGshare	7865	17.759	7.263	23.234	1.947
ESGvalue	7865	20.35	9.638	26.908	2.204

Table 3
Effect of ESG disclosure on financial performance.

	(1)	(2)
Variable	Tobin's Q	
Disclosure	−0.049 (0.065)	0.468*** (0.090)
Controls	NO	YES
Fixed Effects	YES	YES
Observations	26,824	11,382
Adj. R2	0.454	0.744

This table proves that ESG disclosure ultimately improves a company's financial performance. Tobin's Q_{it} is the dependent variable representing the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

3.3. Data specification

The research sample is Chinese listed companies from 2000 to 2020. The ESG disclosure data come from Bloomberg and WIND. When Bloomberg monitors that listed companies disclose ESG information, $Disclosure_{it}$ is set to 1. Fund investment scope and target information come from the China Funds Market Research Database. Corporate financial data come from Cathay Pacific and WIND. To ensure the reliability of the data, we exclude samples from the financial and real estate industries and exclude companies that are specially treated. ESG investors' data was collected from the fund's annual and listed company's annual reports. The annual report of the fund is from China Funds Market Research Database. We also winsorize all continuous variables by 1% and 99% to mitigate the effect of outliers on the regression results.

Table 2 reports the descriptive statistical analysis of the main

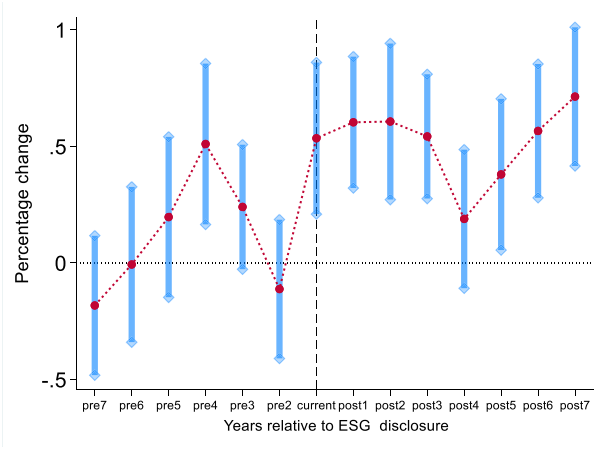

Fig. 1. Dynamic relationship between ESG disclosure and financial performance.

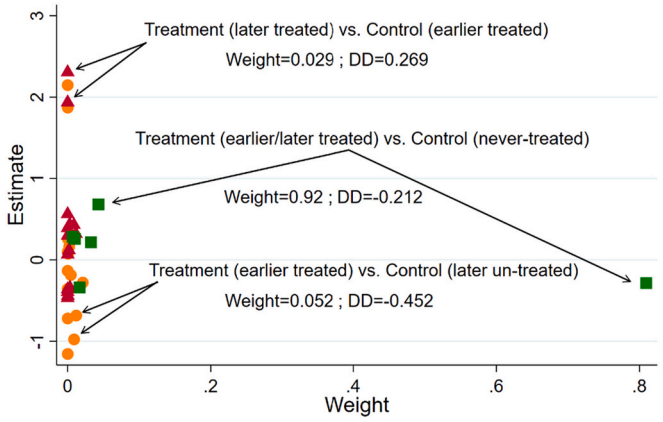

Fig. 2. DID decomposition for ESG disclosure and financial performance.

variables, including explained, explanatory, control, and moderator variables. The number of observations in the benchmark regression is 11,382, and after adding the adjustment variables $ESGshare_{it}$ and $ESGvalue_{it}$, the number of observations is 7865. $Purchaseco_{it}$ has the largest difference among all variables, with a standard deviation of 19.251. The standard deviation of the enterprise Tobin's Q is 2.002, indicating a large difference between the samples. $Disclosure_{it}$ is a dummy variable, which equals 1 when companies disclose ESG information.

4. Empirical results

4.1. Benchmark results

Table 3 reports the benchmark results for ESG disclosure and corporate financial performance based on Eq. (1). Column (1) adds the firm fixed effect and the year fixed effect with no control variables. The regression coefficient is not significant. Column (2) reports the regression results with all control variables and fixed effects added, with 11,382 observations remaining. The regression coefficient $\widehat{\alpha_1}$ of ESG disclosure is significantly positive at the 1% level, indicating that companies' transparency of ESG information is conducive to enhancing financial performance. This suggests that it is necessary to consider other factors that affect a company's financial performance. The R-squares are 0.454 and 0.744, indicating that using a TWFE staggered DID model is feasible.

4.2. Robustness analysis

4.2.1. Dynamics of ESG disclosure and financial performance

After a preliminary look at the promotion effect of ESG disclosure on financial performance, we examine the dynamics of their relationship. When the results conform to the parallel trend assumption, the staggered DID method's estimation can be proven reliable. We verify this by setting a series of dummy variables in the benchmark regression to trace the year-by-year effects of ESG disclosure on financial performance. Specifically, we establish the following model to analyze the dynamic effect with reference to Beck, Levine, and Levkov (2010).

Table 4
Effects of ESG disclosure on new explained variables.

	(1)	(2)	(3)
	ROA	ROE	Lev
Disclosure	0.016*** (0.005)	0.013*** (0.005)	−0.121*** (0.030)
Controls	YES	YES	YES
Fixed Effects	YES	YES	YES
Observations	11,380	11,380	11,382
Adj. R2	0.549	0.536	0.296

This table reports the relationship between ESG disclosures and other financial performance indicators. ROA_{it} represents the net profit ratio on assets; ROE_{it} represents the return on equity; Lev_{it} is the liabilities-to-assets ratio; $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

where the $Disclosure_{it}^{\text{relative year}}$ is a dummy variable. $Disclosure_{it}^{-p}$ equals 1 for company in the pth year before ESG disclosure, and $Disclosure_{it}^{+p}$ equals 1 for company in the pth year after ESG disclosure. Otherwise, $Disclosure_{it}^{\text{relative year}}$ equals zero. The sample contains a 20-year window. We estimate the coefficient for seven years before and after ESG disclosure, and $Disclosure_{it}^{-7}$ equals 1 for all years that are seven or more years before disclosure. With a larger variance at the endpoints, the estimation results can be identified with a lower criterion. Control variables and fixed effects are all the same as in the benchmark regression.

The dynamics between ESG disclosure and financial performance are shown in Column (1) of Table 12. To visualize the results, we plot the regression coefficients in Fig. 1. Fig. 1 depicts the year-to-year ESG disclosure and financial performance results, with the black line showing 95% confidence intervals adjusted for firm-level clustering. Fig. 1 and Column (1) of Table 12 show that the coefficients for Tobin's Q are not significantly different from 0 in all years before ESG disclosure. There is no increasing trend prior to ESG disclosure. Tobin's Q rises immediately after companies disclose ESG information. $\widehat{\beta_7}$ is positive and significant at the 1% level, with a coefficient of 0.534.

$$\text{Tobin's } Q_{it} = \alpha + \beta_1 Disclosure_{it}^{-7} + \beta_2 Disclosure_{it}^{-6} + \ldots + \beta_6 Disclosure_{it}^{-2} + \beta_7 Disclosure_{it}^{current} + \ldots + \beta_{14} Disclosure_{it}^{+7} + \delta Controls_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (4)$$

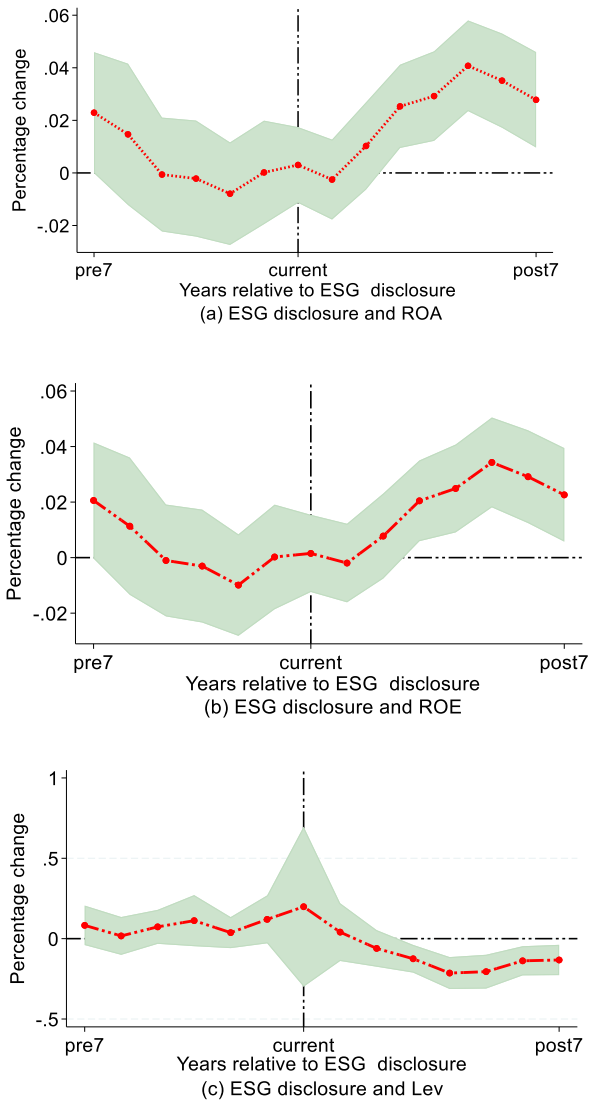

Fig. 3. Dynamic relationship between ESG disclosure and new explained variables.

4.2.2. Goodman-Bacon decomposition

The year in which companies disclosed ESG varies, allowing us to use a TWFE staggered DID technique in the benchmark regression. However, if the treatment groups that disclosed ESG first are treated as the control group that disclosed ESG later in the regression or if the treatment effects vary over time, the regression results obtained using a TWFE regression to analyze data from a staggered adoption design may be biased (De Chaisemartin & d'Haultfoeuille, 2020; Goodman-Bacon, 2021). Following Goodman-Bacon (2021), we use the decomposition method to verify the rationality of choosing the control and experimental groups when we use the staggered DID method. The decomposition result is shown in Fig. 2.

Fig. 2 uses the DID decomposition to illustrate the sources of variation. We calculate the average effect and total weight of the three types: Treatment (earlier/later treated) vs. Control (never-treated), Treatment (earlier treated) vs. Control (later un-treated), Treatment (later treated) vs. Control (earlier treated). The average effect for all three groups is positive, with the first group (earlier/later treated vs. never-treated) having the highest weight at 92%. The total weight of the third group classification (later treated vs. earlier treated) is only 2.9%, which means that regarding "already treated" groups as a control group is less weighted. Estimating EGS disclosure and corporate financial performance is feasible using the TWFE staggered DID method.

Table 5
System GMM estimation results.

	(1)	(2)
Model	OLS	GMM
	Tobin's Q	
LTobin's Q	0.190*** (0.037)	0.148*** (0.044)
Disclosure	0.472*** (0.080)	1.628*** (0.574)
Controls	YES	YES
Fixed Effects	YES	YES
Observations	11,374	9182
Adj. R2	0.760	–

This table reports the results of adding the explanatory variable to the explanatory variable with a lag of one period. Column (1) is the result estimated by the OLS method, and Column (2) is the result estimated by the system GMM. Tobin's Q_{it} is the dependent variable representing the enterprise's financial performance. LTobin's Q_{it} is the lag period of Tobin's Q_{it}. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

4.2.3. Replacement of explained variable

The financial performance of a company can be measured by financial indicators that evaluate its financial position and operating results. In this section, we use the company's accounting indicators ROA_{it}, ROE_{it}, and Lev_{it} as the measures of the company's financial performance. ROA_{it} is the ratio of net profit on assets (Kyere & Ausloos, 2021), and ROE_{it} is the ratio of net profit to shareholders' equity (Bennouri, Chtioui, Nagati, & Nekhili, 2018). The solvency of a company is also an important indicator of financial performance. We use the liabilities-to-assets ratio (Lev_{it}) to represent a company's solvency and expect ESG disclosure to reduce Lev_{it}. Lev_{it} is removed from the control variables when it is used as a new explained variable. The control variables are consistent with the baseline regression in other regression models. All models controlled for individual firm fixed effects and year fixed effects.

Table 4 presents the relationship between ESG disclosures and new explained variables. Columns (1) and (2) of Table 4 represent the regression results of ESG disclosures on companies' ROA and ROE. The coefficients are positive, showing that ESG disclosure promotes corporate financial performance. Column (3) shows the negative coefficient between ESG disclosure and the corporate liabilities-to-assets ratio. As expected, ESG disclosure reduces a company's liabilities-to-assets ratio and improves its solvency, proving that more transparent ESG information improves corporate financial performance.

Based on Eq. (4), we verify whether ESG disclosure and the new explained variables satisfy the parallel trend assumption. The yellow part represents the 95% confidence interval, adjusted for firm-level clustering. Fig. 3 illustrates two key points. ESG disclosure increases ROA_{it}, ROE_{it}, $Fmisvalue_{it}$, and reduces Lev_{it}. As shown in Fig. 3, the coefficients of net profit ratio on assets, return on equity and liabilities-to-assets ratio are not significantly different from 0 for most years before companies disclose ESG. The above robustness test results verify the benchmark conclusion using the new explained variables. ESG disclosure has a significant role in promoting the financial performance of enterprises.

4.2.4. System GMM estimation

Considering that disclosure of ESG information is a time-varying process, the impact of greater transparency on financial performance is also gradual. Therefore, we introduce the first-order lag terms of the explained variable (LTobin′s Q_{it-1}) and use the system GMM method to estimate them. The constructed dynamic panel data model is as follows:

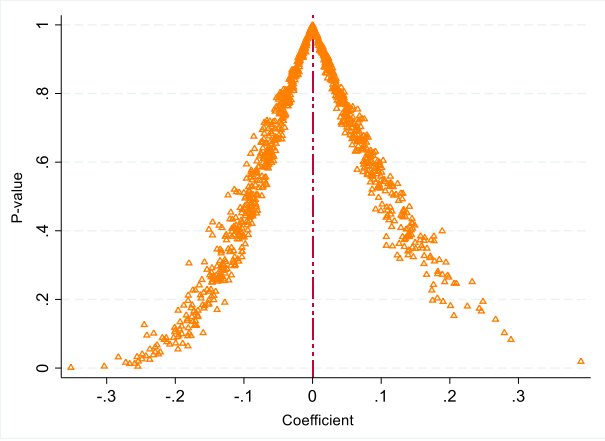

Fig. 4. Placebo test.

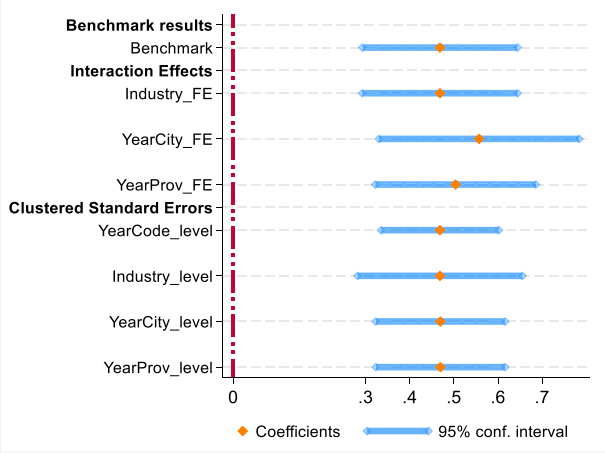

Fig. 5. Change of the fixed effects and cluster levels.

Table 6
Group difference test.

	(1)	(2)	(3)	(4)
Mean_Diff	ESGdum	Age	Medattention	Manfeeratio
Tobin's Q	−0.937***	−0.993***	−1.350***	0.698***
Disclosure	−0.201***	−0.360***	−0.332***	0.072***
Staffsize	−0.761***	−0.801***	−1.008***	0.674***
Size	−0.845***	−1.217***	−1.216***	0.944***
Dar	−0.050***	−0.103***	−0.111***	0.173***
Equity	0.010	0.226***	0.038***	−0.145***
Age	−0.129***	–	−0.264***	0.188***
Cash	−1.134***	−1.161***	−1.469***	1.215***
Investinc	−1.575***	−3.345***	−1.787 ***	1.741***
Manfeeratio	−0.819***	0.019***	0.005 ***	–
Tolcost	−0.829***	−1.301***	−1.272 ***	1.671***
Purchaseco	3.734***	3.103***	4.831 ***	3.788***

estimated by the system GMM is larger than that estimated by the OLS method, indicating that the effect of ESG disclosure is underestimated without the GMM method.

4.2.5. Placebo test

We verify that the control and experimental groups constructed on the basis of ESG disclosure are comparable by a parallel trend test. In this section, we determine whether the effect of ESG disclosure on financial performance is due to other random factors by randomly selecting the experimental group and setting a fictitious ESG disclosure year. In the traditional DID model, all individuals are affected simultaneously, and a placebo test only needs to randomly select several individuals as the experimental group or change the implementation year. In the time-varying DID, each company discloses ESG at a different time, so we group them by company code and randomly select a year from 2000 to 2020 from each group as the disclosure time. The main purpose of the placebo test using this method is to exclude the interference of other random factors on changes in corporate financial performance. The placebo results after 1000 regressions are shown in Fig. 4. The horizontal axis of Fig. 4 is the estimated coefficient, and the vertical axis is the P-value. Most of the *P* values of the regression coefficients based on the pseudo-policy time are significantly different from 0, indicating that the interference of other random factors on the results can be excluded.

$$\text{Tobin's Q}_{it} = \alpha_0 + \alpha_1 \text{LTobin's Q}_{it-1} + \alpha_2 \text{Disclosure}_{it} + \delta \text{Controls}_{it} + \text{Firm}_i + \text{Year}_t + \varepsilon_{it} \quad (5)$$

It is valid to estimate panel data with a fixed-effects model. However, if the explanatory variables in the model have a one-period lag over the explained variables, the estimated results are affected by endogeneity. We estimate Eq. (5) using the system GMM estimation method proposed by Blundell and Bond (1998). The basic idea of this method comes from Arellano and Bond (1991). We use the dependent variable with a lag of 2 periods as an instrumental variable. Before system GMM estimation, serial autoregression and over-identification tests should be carried out on instrumental variables. *P*-values of AR(1) and AR(2) of our estimated model are 0.021 and 0.156, respectively, which satisfy the requirement of first-order autocorrelation and second-order uncorrelation, indicating that there is no serial correlation in the error terms. Hansen test of the regression model is 0.107, which represents the null hypothesis that accepts the validity of the instrumental variables. The regression coefficients of Eq. (5) are shown in Table 5. Column (1) of Table 5 is the result estimated by the two-way fixed effects model, and Column (2) is the result estimated by the system GMM method. The coefficient of the first-order lag of the explained variable is significant at the 1% level, indicating that ESG disclosure has a significant lag effect. The coefficient

4.2.6. Change of the fixed effects and cluster levels

We control for time-invariant individual characteristics and year-fixed effects in the benchmark regression. In this section, we retain the firm and year fixed effects and mitigate the influence of unmeasured factors in other dimensions. As the development level of a region is an essential external environment for enterprise development (Xu, Huang, An, Vigne, & Lucey, 2021), we control for fixed effects at the provincial and regional levels. We sequentially industry fixed effects, year*city interaction fixed effects, and year*province interaction fixed effects to the regression for robustness testing. We plot the regression coefficients after replacing the fixed effects in Fig. 5. The blue line segment in Fig. 5 represents the 95% confidence interval, the orange point in the middle of the line is the regression coefficient, and the vertical red dotted line is the 0 value. The results show that the confidence intervals of all regression coefficients are significantly different from 0, indicating that the fixed effects of different dimensions do not affect the relationship between ESG disclosure and financial performance.

Our independent and dependent variables are firm-level data, so we cluster standard errors at the firm level in the benchmark regression

Table 7
Heterogeneous effects of ESGdum and firm age.

	(1)	(2)	(3)	(4)
	N-ESGdum	Y-ESGdum	Old firm	Young firm
Variable	Tobin's Q			
Disclosure	0.050	0.485***	0.041	1.000**
	(0.108)	(0.124)	(0.119)	(0.393)
Controls	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	3913	8131	3876	3432
Adj. R2	0.814	0.715	0.831	0.786
Coef. Difference Test	0.615***		0.212**	

This table reports the heterogeneous effects of ESGdum and firm age. N-ESGdum$_{it}$ represents companies with no investors, and Y-ESGdum$_{it}$ represents companies with ESG investors. Old firm$_{it}$ for older companies and Young firm$_{it}$ for younger companies. Tobin's Q$_{it}$ is the dependent variable representing the enterprise's financial performance. Disclosure$_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Coef. Difference Test indicates that there is a significant difference in coefficients between groups. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

Table 8
Heterogeneous effects of media attention and agency cost.

	(1)	(2)	(3)	(4)
	Low-Medattention	High-Medattention	Low-Manfeeratio	High-Manfeeratio
Variable	Tobin's Q			
Disclosure	0.343 (0.221)	0.584***	0.191	0.842***
		(0.176)	(0.128)	(0.261)
Controls	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES
Observations	2977	3801	3798	3218
Adj. R2	0.762	0.799	0.832	0.751
Coef. Difference Test	0.702***		0.293***	

This table reports the heterogeneous effects of media attention and agency cost. Low-Medattention$_{it}$ represents a company with low media attention, and High-Medattention$_{it}$ represents a company with high media attention. Low-Manfeeratio$_{it}$ stands for firms with low agency costs, and High-Manfeeratio$_{it}$ for firms with high agency costs. Tobin's Q$_{it}$ is the dependent variable representing the enterprise's financial performance. Disclosure$_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Coef. Difference Test indicates that there is a significant difference in coefficients between groups. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

with reference to Petersen (2009). Larger between-group differences have less bias in regression results. Angrist and Pischke (2008) indicate that the clustering should be at one level above the sample. Therefore, we use industry-level clustering standard errors for robustness testing. In addition, we adopt interactive clusterings such as year*firm, year*city, and year*province. The regression results for changing the clustering level are shown in Fig. 5. All coefficients are significantly positive, indicating that the positive effect of ESG disclosure on corporate financial performance is robust.

5. Heterogeneity analysis

In the above section, we verify the effect of ESG disclosure on corporate financial performance in various ways. Here, we analyze whether ESG disclosure has heterogeneous effects on the financial performance of different firms. We divide two sub-samples according to whether the company has ESG investors. In addition, we divide firm age, media attention, and agency cost into three equal parts and select subsamples from the first and third groups for heterogeneity analysis. After grouping, we compare whether the means of multiple variables in the two subsample groups are significantly different. Table 6 shows that most variables have significant differences between groups, indicating that comparison between groups is feasible.

5.1. Whether the company has ESG investors

As an emerging capital market, China's stock market is significantly different from developed capital markets in terms of the information environment and investor trading concepts. In particular, China's stock market has a strong speculative atmosphere, and the proportion of individual investors is much higher than that of institutional investors. However, institutional investors have a greater effect on corporate funds than stakeholders such as the government, communities, and consumers. Institutional investors do not frequently change trading strategies and portfolios. Chen, Chou, and Lin (2019) analyze the effect of investor sentiment on the expected return of assets. This also shows that different investor tastes affect the decision-making behavior of corporate managers. Investors with ESG preferences are among the stakeholders most concerned about corporate ESG information. Enterprises are more active in disclosing ESG information, improving management efficiency, and gaining the favor of ESG investors. Therefore, we predict that the effect of corporate ESG disclosure on corporate financial performance is more pronounced in companies with ESG investors.

As previously mentioned, we determine whether investors have ESG preferences based on the fund's investment objectives and whether the investment scope includes environmental, social, or governance. We divide the sample into two subsamples by whether the company has ESG investors, denoted by ESGdum. ESGdum is a dummy variable that equals 1 if the company has ESG investors (denoted as Y-ESGdum); 0, otherwise (denoted as N-ESGdum). We find twice as many companies in our sample with ESG investors as without ESG investors. Column (1) of Table 7 shows that the effect of ESG disclosure on financial performance is not significant among firms without ESG investors. Column (2) shows that the effect of ESG disclosure on financial performance is significantly positive among firms with ESG investors. These results illustrate the important role ESG investors play in the relationship between ESG disclosure and financial performance. The two possible reasons are as follows. One is that corporate investors have ESG preferences, and companies are more willing to disclose ESG information to cater to investors. Another is that after companies disclose ESG information, ESG investors increase their investment in companies and thus promote the financial performance of companies.

5.2. Firm age

Previous research has shown that the age of a company drives changes in many characteristics and affects corporate behavior (Kieschnick & Moussawi, 2018). Young companies prefer to hire and treat young employees (Ouimet & Zarutskie, 2014), young employees are relatively inexperienced, and workplace reputation mainly depends on work results (Li, Lin, & Zhan, 2019). Young managers are more adventurous and experimenting. They are willing to disclose more information at this stage, demonstrate their capabilities by changing bad corporate behavior, and attract more investor attention (Welch & Yoon, 2020). Older companies have stable asset portfolios, are more inclined to operate as they were, and generally hold lower debt. Compared to these companies, younger companies are more willing to demonstrate ESG information and cater to investor preferences. We, therefore, predict that ESG disclosure plays a significant role in young companies.

We divide the sample into three equal parts according to the average age of the company and select the two subsamples with the oldest age (represented by Old firm) and the youngest (represented by Young firm)

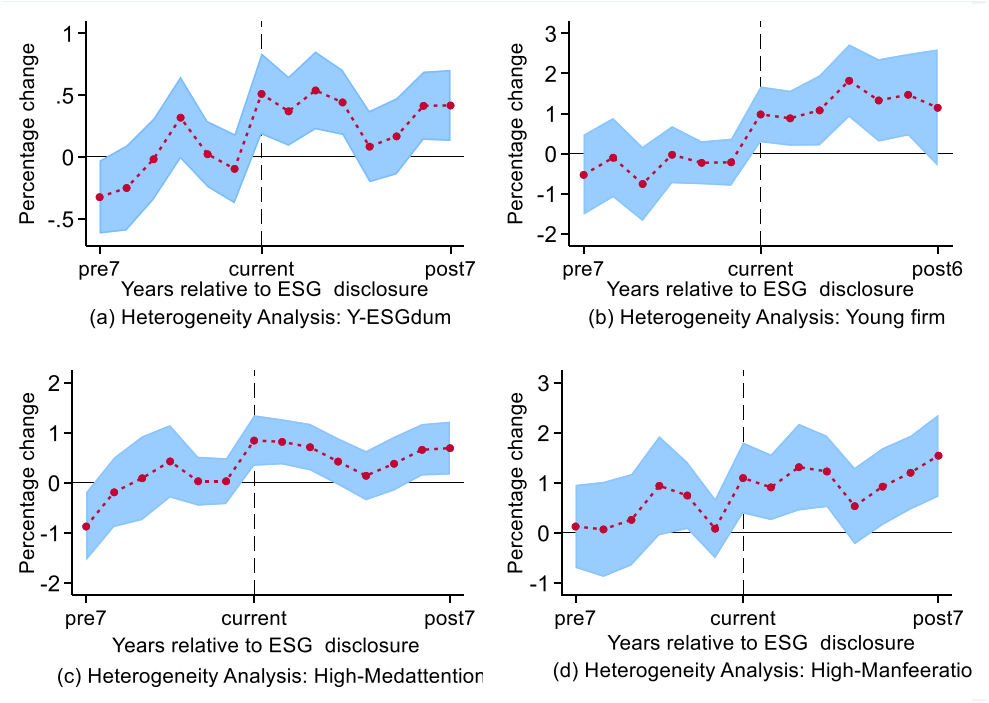

Fig. 6. Dynamic effects of ESG disclosure in different samples.

to analyze the heterogeneity effect of companies with different life cycles. In the group of old firms, the average life cycle of enterprises is 16.27 years, the longest is 30 years, and the shortest is 11 years. In the group of young firms, the average life cycle of enterprises is 3.38 years, the longest is 5 years, and the shortest is 2 years. This shows that the two sub-samples are significantly different, which is also proved by Column (2) of Table 6. Column (3) of Table 7 shows that the relationship between ESG disclosure and financial performance is insignificant in older firms. As they grow older, companies tend to protect the advantages they already have and build on in terms of connections and resources, and their management style tends to be conservative. Older companies are more motivated to hide negative information. However, young companies take the initiative to alleviate the information asymmetry with investors and gain access to the market by disclosing more non-financial information. As shown in Column (4) of Table 7, ESG information plays a more pronounced role in young companies, which is also in line with our expectations.

5.3. Media attention

The media is a critical information disseminator in the capital market, providing stakeholders with the company's financial and non-financial information. The tone of the media affects investor sentiment, and the report's content is an essential reference for influencing investment or divestment (Wong & Zhang, 2022). As a third party, the media has no motive to cover up the negative news about the company. Therefore, compared to the company's annual report or official website information, the media reports are more informative (especially negative reports). Media agencies specializing in the financial industry have professional analysts. As professional information intermediaries connecting listed companies and external investors, the media and analysts aim to reduce information asymmetry and strengthen information transmission, which is of great significance for improving the efficiency of market resource allocation (Derrien, Krueger, Landier, & Yao, 2021). In companies with high media attention, information disclosure is more timely, and ESG information can be quickly transmitted to external investors, alleviating the time lag effect of information disclosure. Therefore, we predict that the greater the media attention to the company, the stronger the impact of ESG disclosure on the company's financial performance.

Chinese Research Data Service Platform (CNRDS) provides news reports on listed companies from 2000 to 2020, including online and traditional newspaper reports. Media attention is the sum and logarithm of the number of media reports. The sample is divided into three equal parts according to media attention. The sub-samples with the most (indicated by High-Medattention) and the least (indicated by Low-Medattention) media attention are taken for heterogeneity analysis. Column (3) of Table 6 is the coefficient difference test between groups of different media attention. All indicators are significant, indicating that the two subsamples can be compared. The heterogeneous effects of ESG disclosure on financial performance in the sample of analyst attention are shown in Columns (1) and (2) of Table 8. When media attention is low, the effect of ESG disclosure on financial performance is insignificant. In the High-Medattention group, the effect of ESG disclosure on financial performance is significantly positive, validating our conjecture.

5.4. Agency cost

A potential conflict of interest exists between managers and investors. The agency problem induces the opportunistic behavior of the management, and it is one of the common internal governance problems in modern enterprises. The direct cause of the agency problem is the separation of ownership and control, and the essential reason is information asymmetry. High agency costs indicate that managers are hurting investors' interests for their own sake (Zhou, Li, & Chen, 2021). We, therefore, predict that ESG disclosure improves financial performance by reducing information asymmetry between investors and managers, and this effect is more pronounced in firms with severe agency problems. Administrative expenses include normal operational management expenses and on-the-job consumption of the management team. On-the-job consumption is a means for executives to encroach on company resources and a manifestation of agency costs. Administrative expenses are the most appropriate measure of on-the-job consumption across all

Table 9
Moderating role of ESG investors on the relationship between ESG disclosure and financial performance.

	(1)	(2)	(3)	(4)
Variable	Tobin's Q			
Disclosure × ESGshare	0.125**	0.306***		
	(0.060)	(0.075)		
Disclosure × ESGvalue			0.200***	0.367***
			(0.060)	(0.075)
ESGshare	0.563***	0.587***		
	(0.030)	(0.045)		
ESGvalue			0.707***	0.684***
			(0.031)	(0.044)
Disclosure	−0.215***	0.270**	−0.290***	0.251**
	(0.079)	(0.118)	(0.073)	(0.112)
Controls	NO	YES	NO	YES
Fixed Effects	YES	YES	YES	YES
Observations	16,948	7614	16,948	7614
Adj. R2	0.547	0.761	0.571	0.777

This table illustrates the positive moderating effect of ESG investors between ESG disclosure and financial performance. Tobin's Q_{it} is the dependent variable and represents the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

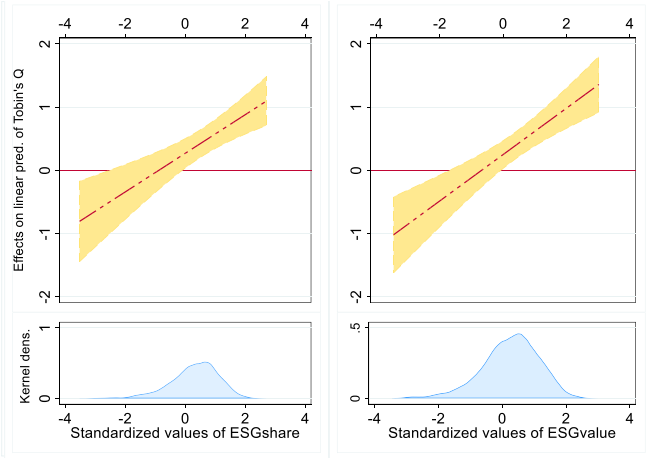

Fig. 7. Conditional marginal effects of ESG disclosure.

accounting subjects. Therefore, we adopt the ratio of administrative expenses to operating income (Liu, Yin, Yin, & Sheng, 2021) to measure agency costs.

We divide the sample into three equal parts according to the agency cost and take the subsample with the highest (indicated by High-Manfeeratio) and lowest (indicated by Low-Manfeeratio) agency cost for heterogeneity analysis. Companies with low agency costs have fewer conflicts of interest between investors and managers, and ESG disclosure plays a limited role. The insignificant coefficient reflecting the effect of ESG disclosure on financial performance in Column (3) of Table 8 suggests that disclosures at firms with low agency costs do not significantly improve financial performance. High agency costs indicate a serious information asymmetry between investors and managers. Disclosure of non-financial information increases corporate transparency. Aggressive disclosure of ESG information in companies with severe agency problems significantly increases Tobin's Q, as shown in Column (4) of Table 8.

We verify the heterogeneous effects of ESG disclosure on financial performance across different firm characteristics. ESG disclosure plays a vital role in companies with ESG investors and companies with longer inception, high media attention, and high agency costs. We verify the parallel trend test of the above-grouped regression based on Eq. (4) and plot the coefficients as shown in Fig. 6. The coefficient value is the red dotted line, and the blue area represents the 95% confidence interval. For companies with ESG investors and companies with longer inception, high media attention, and high agency costs., the financial performance is not significantly different from 0 before ESG disclosure. However, the coefficient is significantly positive and gradually increases after ESG disclosure. This outcome shows no significant difference in the financial performance of the ESG pre-disclosure treatment group and the control group, which meets the requirements of using the TWFE staggered DID model. Significantly positive results also verify that ESG disclosure substantially affects financial performance in companies with the above characteristics.

6. Moderating effect of ESG investors

Based on Eq. (1), we obtain the benchmark result that ESG disclosure promotes financial performance. We want to learn more about whether investors with ESG preferences can moderate the relationship between ESG disclosure and corporate financial performance. Therefore, we add the interaction terms of ESG investors and ESG disclosure into the benchmark regression model and normalize them to obtain Eqs. (2) and (3). ESG investors are represented by the logarithm of the number of ESG investors' holdings (ESGshare) and the logarithm of the value of the holdings (ESGvalue). Based on Eqs. (2) and (3), we explore how the marginal effect of ESG disclosure on financial performance changes

Table 10
Moderating role of heterogeneous ESG investors on the relationship between ESG disclosure and financial performance.

	(1)	(2)	(3)	(4)	(5)	(6)
Type	Bond Fund		Hybrid Fund		Innovative Fund	
Variable	Tobin's Q					
Disclosure	0.473*** (0.164)	0.454*** (0.153)	0.261** (0.114)	0.241** (0.108)	0.473*** (0.179)	0.437*** (0.169)
ESGshare	0.883*** (0.075)		0.642*** (0.049)		0.562*** (0.063)	
Disclosure × ESGshare	0.269** (0.110)		0.251*** (0.077)		0.372*** (0.092)	
ESGvalue		0.997*** (0.070)		0.725*** (0.045)		0.707*** (0.063)
Disclosure × ESGvalue		0.312*** (0.104)		0.317*** (0.077)		0.367*** (0.092)
Controls	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	4823	4823	7439	7439	5692	5692
Adj. R2	0.784	0.802	0.763	0.779	0.781	0.796

This table illustrates the positive moderating effect of heterogeneous ESG investors between ESG disclosure and financial performance. Tobin's Q_{it} is the dependent variable and represents the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

Table 11
Effects of ESG disclosure on investors with different preferences.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	ESGshare	ESGvalue	EIs	SIs	GIs	Geninvestor
Disclosure	0.388*** (0.116)	0.400*** (0.133)	1.736*** (0.634)	−0.003 (1.077)	1.106*** (0.214)	0.702 (0.934)
Controls	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	7614	7614	9693	9693	9693	11,369
Adj. R2	0.738	0.727	0.605	0.590	0.662	0.908

This table illustrates that ESG disclosure improves financial performance by attracting ESG investors, EIs, and GIS. $ESGshare_{it}$ and $ESGvalue_{it}$ stand for ESG investors, EIs_{it} for environmental investors, SIs_{it} for socially responsible investors, GIs_{it} for governance investors, and $Geninvestor_{it}$ stands for the general investors. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

when ESGshare and ESGvalue take different values. Table 9 validates the positive relationship between ESG disclosure and financial performance.

Columns (1) and (2) of Table 9 are the regression results using the logarithm of the number of shares held by ESG investors as the moderator variable. The interaction coefficient $\widehat{\gamma_3}$ of ESG disclosure and ESGshare is significantly positive at 1%, indicating that the more shares held by ESG investors, the stronger the deterrent effect and financing effect on enterprises, which is conducive to enhancing the financial performance of enterprises. Columns (3) and (4) of Table 9 use the market capitalization of shares held by ESG investors as a moderator. All interaction coefficients are significantly positive at the 1% level. The results also verify that ESG investors amplify the promotion effect of ESG disclosure on financial performance. Companies disclose ESG information to attract more investors with ESG tastes. As the most important stakeholder group, investors can alleviate the operating difficulties of enterprises and supervise the behavior of managers, which are all conducive to the sustainable development of enterprises.

Next, to visualize the role of ESG investors in the relationship between ESG disclosure and Tobin's Q, we plot the crossover marginal effects. According to Hainmueller, Mummolo, and Xu (2019), we plot conditional marginal effects of ESG investors of Disclosure with 95% confidence intervals as Fig. 7. The lower part of Fig. 7 presents the kernel density distributions for $ESGshare_{stdit}$ and $ESGvalue_{stdit}$. As ESG investors increase, the marginal effect of ESG disclosure on financial performance gradually increases and becomes more statistically significant. The marginal effects plot supports the positive moderating role of ESG investors in the relationship between ESG disclosure and financial performance.

ESG investors are referring to funds that prefer ESG in their investment willingness. Institutional investors in the benchmark regression are equity funds. In addition to stock funds, China also has bond funds, stock-bond funds, and so on. Bond funds are more stable and less risky than equity funds. Hybrid funds are mutual funds with growth stocks, income stocks, and bond funds in the portfolio. Innovative funds are innovative in terms of fund investment targets, income distribution, governance structure, rate structure, or management model. We discuss the moderating role of different types of ESG investors by reconstructing ESG investors using bond funds, hybrid funds, and innovative funds in equity funds from China Funds Market Research Database. We regress Eqs. (2) and (3) after replacing the type of ESG funds, the results are shown in Table 10. Heterogeneous ESG investors positively moderate the relationship between ESG disclosure and financial performance. No matter what type of institutional investor shows ESG preference, it affects the relationship between ESG disclosure and financial performance.

Table 12
Dynamic effects of ESG disclosure.

	(1)	(2)	(3)	(4)	(5)
Variable	Tobin's Q	ESGshare	ESGvalue	EIs	GIs
pre7	−0.183	0.033	−0.245	0.661	−1.220**
	(0.182)	(0.358)	(0.416)	(1.461)	(0.517)
pre6	−0.007	0.633**	0.716**	1.937	−0.246
	(0.203)	(0.314)	(0.350)	(1.454)	(0.472)
pre5	0.196	0.372	0.347	2.444*	0.156
	(0.209)	(0.296)	(0.333)	(1.316)	(0.516)
pre4	0.510**	0.035	0.069	1.261	−0.120
	(0.210)	(0.277)	(0.341)	(1.237)	(0.397)
pre3	0.240	−0.201	−0.167	1.063	−0.451
	(0.163)	(0.221)	(0.255)	(1.120)	(0.364)
pre2	−0.112	−0.263	−0.344	0.583	0.543
	(0.181)	(0.205)	(0.230)	(0.975)	(0.337)
current	0.534***	0.006	−0.020	1.560**	0.215
	(0.198)	(0.166)	(0.186)	(0.773)	(0.262)
post1	0.603***	0.233	0.249	2.137**	0.723**
	(0.172)	(0.157)	(0.177)	(0.982)	(0.298)
post2	0.606***	0.501***	0.479**	1.961*	1.050***
	(0.204)	(0.169)	(0.193)	(1.115)	(0.329)
post3	0.542***	0.592***	0.599***	2.034*	1.120***
	(0.162)	(0.166)	(0.192)	(1.081)	(0.292)
post4	0.188	0.483***	0.478**	3.840***	1.429***
	(0.181)	(0.178)	(0.207)	(1.290)	(0.331)
post5	0.379*	0.452**	0.395*	3.912***	1.757***
	(0.197)	(0.181)	(0.211)	(1.468)	(0.351)
post6	0.566***	0.733***	0.802***	4.855***	1.927***
	(0.174)	(0.192)	(0.223)	(1.193)	(0.344)
post7	0.713***	1.098***	1.252***	5.552***	1.927***
	(0.181)	(0.209)	(0.244)	(1.158)	(0.323)
Controls	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES
Observations	11,382	7614	7614	9693	9693
Adj. R^2	0.746	0.743	0.733	0.608	0.665

This table details the dynamic effects of ESG disclosure and Tobin's Q, ESG investors, EIs, and GIs. $ESGshare_{it}$ and $ESGvalue_{it}$ stand for ESG investors, EIs_{it} for environmental investors, and GIs_{it} for governance investors. Tobin's Q_{it} is the dependent variable representing the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

7. Further analysis

7.1. ESG disclosure and investors with varying tastes

In our analysis above, we argue that ESG investors amplify the effect of ESG disclosure on financial performance. In this section, we want to explore which types of investors promote the effect of ESG disclosure on financial performance. As with the benchmark regression, we set up a TWFE staggered DID model as follows:

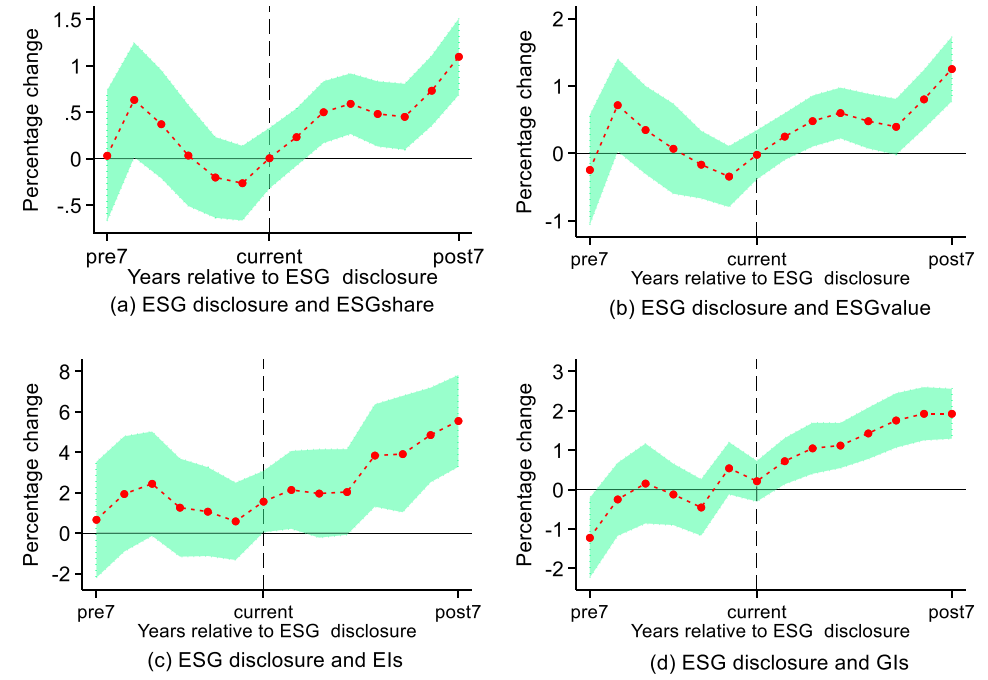

Fig. 8. Dynamic effects of ESG disclosure on investors.

Table 13
Effect of ESG performance on financial performance.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Tobin's Q					
PBratings	0.035*** (0.003)	0.022*** (0.004)				
WDratings			0.147*** (0.010)	0.095*** (0.009)		
HZratings					0.153*** (0.008)	0.059*** (0.018)
Controls	YES	YES	YES	YES	YES	YES
Fixed Effects	NO	YES	NO	YES	NO	YES
Observations	11,700	11,382	11,700	11,382	11,700	11,382
Adj. R2	0.291	0.745	0.297	0.747	0.298	0.743

This table shows that companies with better ESG performance have higher Tobin's Q ratio. PBratings, WDratings, and HZratings represent ESG ratings from Bloomberg, WIND, and Shanghai Huazheng Index Information Service Co., Ltd. Tobin's Q_{it} is the dependent variable and represents the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

Table 14
Moderating role of ESG investors in the relationship between ESG performance and financial performance.

	(1)	(2)	(3)	(4)	(5)	(6)
Variable	Tobin's Q					
ESGshare × ratings	0.066*** (0.020)	0.086*** (0.016)	0.046 (0.034)			
ESGvalue × ratings				0.087*** (0.021)	0.094*** (0.017)	0.108*** (0.033)
ESGshare	0.625*** (0.044)	0.587*** (0.040)	0.640*** (0.058)			
ESGvalue				0.723*** (0.041)	0.702*** (0.038)	0.684*** (0.054)
PBratings	0.085** (0.034)			0.049* (0.029)		
WDratings		0.018 (0.016)			0.001 (0.014)	
HZratings			0.105 (0.078)			0.027 (0.073)
Controls	YES	YES	YES	YES	YES	YES
Fixed Effects	YES	YES	YES	YES	YES	YES
Observations	7614	7614	7614	7614	7614	7614
Adj. R2	0.762	0.763	0.760	0.778	0.778	0.775

This table illustrates the positive moderating effect of heterogeneous ESG investors between ESG performance and financial performance. PBratings, WDratings, and HZratings represent ESG ratings from Bloomberg, WIND, and Shanghai Huazheng Index Information Service Co., Ltd. $ESGshare_{it}$ and $ESGvalue_{it}$ stand for ESG investors. Tobin's Q_{it} is the dependent variable representing the enterprise's financial performance. $Disclosure_{it}$ is a dummy variable that equals 1 in the year after the company disclosed ESG information; 0, otherwise. Controls is a vector containing all control variables. Fixed effects contain firm and year fixed effects. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the firm level and reported in parentheses.

$$Investor_{it} = \alpha_0 + \alpha_1 Disclosure_{it} + \delta Controls_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (6)$$

where $Investor_{it}$ is the dependent variable, representing investors with different preferences, including ESG investors, EIs, SIs, GIs, and general investors. ESG investors are represented by the shareholding ratio of ESG investors (denoted as $ESGshare_{it}$) and the stock market value held by ESG investors (denoted as $ESGvalue_{it}$). EIs, SIs, and GIs are subcategories among ESG investors. EIs are investors who care about the environment in their investment objectives and investment scope and are represented by the number of logarithmic EIs (denoted as EIs_{it}). SIs are investors who prefer social responsibility, expressed by the number of logarithmic SIs (denoted as SIs_{it}). GIs are investors who focus on corporate governance and sustainable development and are represented by the logarithmic number of GIs (denoted as GIs_{it}). General investors refer to all institutional investors who do not differentiate their preferences, expressed by the shareholding ratio of institutional investors (denoted as $Geninvestor_{it}$). $Disclosure_{it}$ is a dummy variable, indicating whether the company discloses ESG information. Control variables and fixed effects are the same as in the benchmark regression.

Table 11 reports how investors' preferences influence ESG disclosure's effect on financial performance. Columns (1) and (2) of Table 11 show that ESG disclosure improves financial performance by attracting investors with ESG preferences. Columns (3) to (5) illustrate that among ESG investors, investors who prefer environment and governance play a stronger deterrent effect in the relationship between ESG disclosure and financial performance, whereas the influence of SIs is not obvious. As shown in Column (6), the coefficients of all institutional investors' shareholding ratios are not significant without distinguishing ESG preferences. This result shows that ESG disclosure does not increase Tobin's Q through mechanisms that attract ordinary investors and that considering investors' ESG preferences is necessary.

We use a time-varying DID model to verify that ESG disclosure attracts ESG investors, EIs, and GIs. We then examine the dynamic effects of ESG disclosure by adding a series of dummy variables.

$$Investor_{it} = \alpha + \beta_1 Disclosure_{it}^{-7} + \beta_2 Disclosure_{it}^{-6} + \ldots + \beta_6 Disclosure_{it}^{-2} + \beta_7 Disclosure_{it}^{current} + \ldots + \beta_{14} Disclosure_{it}^{+7} + \delta Controls_{it} + Firm_i + Year_t + \varepsilon_{it} \quad (7)$$

$Investor_{it}$ includes ESG investors (ESGshare and ESGvalue), EIs, and GIs. Other variables are the same as in Eq. (4). The sample contains a 20-year window. $Disclosure_{it}^{-7}$ equals 1 for all years that are seven or more years before disclosure. All control variables, firm fixed effects, and year fixed effects are added to the regression. The dynamic effects of ESG disclosure are shown in Table 12. Column (1) of Table 12 is the regression result based on Eq. (4), representing the dynamic relationship between ESG disclosure and corporate financial performance. Columns (2) to (5) are the regression results based on Eq. (7), indicating that the effects of ESG disclosure on ESG investors, EIs, and GIs all pass the parallel trend test. Among them, we observe a time lag in the effect of ESG disclosure on ESG investors and GI. After ESG disclosure, the number of companies' ESG investors, EIs, and GIs increase significantly. We plot the regression coefficients for Columns (2) to (5) for visual observation, as shown in Fig. 8.

7.2. ESG performance, ESG investors, and corporate finance performance

As previously mentioned, the use of ESG scores or ratings to measure ESG disclosure is controversial. The review basis and weight of various rating agencies vary greatly owing to the lack of uniform standards (Avramov, Cheng, Lioui, & Tarelli, 2022; Clementino & Perkins, 2021; Friede, 2019; Pedersen, Fitzgibbons, & Pomorski, 2021; Serafeim & Yoon, 2022). Nevertheless, that ESG scores or ratings are currently the most widely used measure of ESG performance is undeniable (Baker, Boulton, Braga-Alves, & Morey, 2021; Garel & Petit-Romec, 2021; Joliet & Titova, 2018). Therefore, in light of data availability, we re-discuss the relationship between ESG performance and corporate financial performance using ESG ratings from Bloomberg, WIND, and Shanghai Huazheng Index Information Service Co., Ltd. We denote ESG score or rating data from the three databases as PBratings, WDratings, and HZratings and conduct empirical analysis with a TWFE model.

Table 13 reports the relationship between ESG ratings of different rating agencies and financial performance. Columns (1), (3), and (5) of Table 13 are results with no fixed effects, and Columns (2), (4), and (6) are results with firm and year fixed effects. The ESG performance and financial performance coefficients are significantly positive at the 1% level, regardless of whether control variables are considered. This finding shows that companies with better ESG performance have a better reputation in the market.

We care whether investors with special preferences still play a role. To verify whether ESG investors have a moderating role in ESG performance and Tobin's Q, we add the interaction term between ESG performance and ESG investors to examine whether ESG investors play a moderating role in the relationship between ESG performance and corporate financial performance. As with the benchmark regression, ESGshare represents the shareholding ratio of ESG investors, and ESGvalue represents the market capitalization of ESG investors' holdings. We replace the dummy variable $Disclosure_{it}$ in Eqs. (2) and (3) with ESG ratings, and normalize ESG ratings, ESGshare, and ESGvalue.

Columns (1) to (3) of Table 14 are the results of ESGshare_std as the moderator variable, and the coefficients of the three interaction terms are 0.066, 0.086, and 0.046. Columns (4) to (6) are the results of ESGvalue_std as the moderator variable. The coefficients are 0.087, 0.094, and 0.108. The results show that ESG performance and ESG investors are beneficial to corporate financial performance. As the shareholding ratio of ESG investors increases, ESG performance has a stronger role in promoting Tobin's Q. ESG investors positively moderate the relationship between ESG performance and corporate financial performance, validating the above results. It shows that raising investors' ESG awareness can motivate corporate information transparency.

8. Conclusion

We examine the relationship between ESG disclosure and the financial performance of Chinese listed companies from 2000 to 2020. To avoid the influence of errors in ESG score measurement, we take the ESG ratings of companies first published by Bloomberg as a shock and use the staggered DID method to address endogeneity issues. The results show that ESG disclosure improves corporate financial performance. The conclusion remains robust after a series of robustness tests, such as the parallel trend test, Goodman-Bacon decomposition, changing of financial performance measures, system GMM estimate, and placebo test. ESG disclosure has heterogeneous effects on financial performance. The effect of ESG disclosure is greater in companies with ESG investors and companies with longer inception, high media attention, and high agency costs. We also examine the moderating effect of heterogeneous ESG investors. We find that the greater the shareholding of ESG investors, the more pronounced the effect of ESG disclosure on financial performance. Our extended analysis finds that ESG disclosures enhance financial performance by attracting ESG investors. The influence of EIs and GIs is significant. Finally, compared with the existing literature, we

measure ESG performance using ESG ratings from multiple institutions. The results show that companies with better ESG performance have higher Tobin's Q ratio, and ESG investors play a positive moderating role.

The findings of this study help market participants, including businesses, investors, and regulators, understand the effect of ESG information transparency on business and societal development. The article also provides the following regulatory implications for standard setters to promote the coordinated development of the environment, society, and governance. First, achieving coordinated development of the environment and the economy requires companies to assume more ESG responsibilities and actively disclose non-financial information. Our findings demonstrate that disclosing ESG information does not just bring about higher costs. Companies with greater transparency attract more investors and can improve financial performance in the long run. And companies should increase the shareholding ratio of institutional investors (the shareholding ratio of institutional investors in China is much lower than that in developed countries). Institutional investors have the power to incentivize and monitor companies' ESG behavior. Second, all countries in the world, especially developing countries, need to develop further and improve the ESG supervision and evaluation system, so enterprises, investors, and other capital market players should pay attention to ESG. Most companies' ESG behaviors are disclosed through CSR reports and annual reports, which are not enough to prove the true behavior of companies. The difference in ESG evaluation indicators and weights is why it is currently impossible to use ESG scores to study corporate behavior. Policymakers should develop standard ESG disclosure formats and regulatory requirements to guide companies to adopt uniform standards for disclosing environmental information. Only in this way can companies send more effective signals to stakeholders. Third, the article demonstrates that ESG disclosure heterogeneous impacts companies with different media attention. The government should encourage more commentary in the media to give stakeholders quicker access to information.

Data availability

Data will be made available on request.

Acknowledgments

We thank the support provided by the Natural Science Foundation of Guangdong Province of China [Grant No. 2021B1515020103] and the Outstanding Innovative Talents Cultivation Funded Programs for Doctoral Students of Jinan University [Grant No. 2021CXB025].

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