sustainability

MDPI

Article

Does Shared Institutional Equity Enhance Corporate Eco-Transparency Reporting? Evidence from Firm Life Cycles Stages

Yishan Liu [1], Xingao Xu [2], Hongbo Hai [1] and Hadi Hussain [1,*]

[1] School of Economics and Finance, Xi'an Jiaotong University, Xi'an 710049, China
[2] Business School, University of Warwick, Coventry CV4 7AL, UK
* Correspondence: hussainhadi@stu.xjtu.edu.cn

Abstract: This study investigates the relationship between corporate shared institutional equity (SIE) holders and eco-transparency reporting (ETR). Specifically, it examines three distinct types of SIE: (1) common institutional shareholders with industry peers, (2) the average count of unique institutional owners holding shares in both the focal company and its peers, and (3) the total percentage of SIE within the focal company. The findings indicate that firms with higher levels of SIE are more likely to disclose ETR, signaling a commitment to enhancing public trust and aligning with governmental expectations. Furthermore, the study explores the impact of SIE across different stages of the firm's life cycle, revealing that the influence of SIE on ETR is more pronounced during the growth and mature stages. The results remain robust even when alternative thresholds for SIE are applied, such as adjusting from a 5% to a 3% threshold. To account for potential misspecification and omitted variables, propensity score matching (PSM), System generalized method of moments (Sys GMM) and two-stage least squares (2SLS) methods were employed. This research contributes to the literature by highlighting the role of shared institutional ownership in promoting environmental transparency, offering novel insights into how institutional investors can drive corporate sustainability practices across different firm life cycles.

Keywords: shared institutional equity; collaborative governance; eco-transparency reporting; stake-holder theory; legitimacy theory; China

check for updates

Academic Editor: Klaus Reiner Schenk-Hoppé

Received: 19 November 2024
Revised: 6 January 2025
Accepted: 14 January 2025
Published: 20 January 2025

Citation: Liu, Y.; Xu, X.; Hai, H.; Hussain, H. Does Shared Institutional Equity Enhance Corporate Eco-Transparency Reporting? Evidence from Firm Life Cycles Stages. *Sustainability* **2025**, *17*, 791. https://doi.org/10.3390/su17020791

Copyright: © 2025 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https://creativecommons.org/licenses/by/4.0/).

1. Introduction

In response to escalating environmental protection challenges [1,2], governments worldwide are adopting carbon neutrality objectives, while public awareness of eco-friendly and low-carbon practices continues to grow [3]. Environmental transparency is a cornerstone of this movement, with eco-transparency reporting (ETR) emerging as a pivotal tool for companies to disclose their environmental impact. ETR transcends traditional reporting frameworks by emphasizing clarity, accountability, and stakeholder engagement, encompassing metrics such as carbon emissions, resource utilization, and waste management [4]. The comprehensive nature of ETR enhances corporate accountability, fosters stakeholder trust, and aligns with the rising demand for sustainable business practices [5].

Despite its growing significance, the promotion of ETR remains fraught with challenges, particularly in developing economies. In China, the largest emerging economy, the demand for robust ETR frameworks is driven by a combination of socio-economic factors, including the rapid economic growth spurred by market-oriented reforms and increasing public pressure to address pollution's adverse effects [6]. Acknowledging the importance

of ETR, the Chinese government introduced guidelines in 2008 mandating environmental disclosure by listed companies [7]. However, compliance levels remain rudimentary, with many firms treating ETR as a regulatory obligation rather than a strategic priority [8]. This underscores the need to explore drivers that can elevate the quality of ETR beyond mere compliance.

One such driver of corporate transparency is shared institutional equity (SIE), a governance mechanism reflecting the ownership of equity commonly shared among firms within the same industry. This interconnected ownership structure creates overlapping interests among institutional investors, positioning them as influential actors in promoting corporate transparency and environmental accountability. The financial literature on SIE predominantly explores its role in economic and operational outcomes. Studies highlight its impact on corporate misconduct [9], investment efficiency [10], innovation [11], and earnings management [12]. These works underscore how shared equity fosters coordinated decision-making, reduces information asymmetry, and aligns managerial actions with shareholder interests. For instance, SIE holders act as monitors, using their significant stakes to advocate for improved investment strategies and innovation practices while discouraging opportunistic behaviors. This body of research establishes a foundation for understanding the governance potential of SIE in driving corporate outcomes.

In contrast, the non-financial literature on SIE remains relatively underexplored, particularly in relation to its environmental implications. Prior studies suggest that institutional investors play a pivotal role in enhancing corporate environmental performance by fostering greater managerial accountability [13]. However, linking SIE to environmental transparency remains limited in scope. Non-financial literature posits that SIE can enhance ETR by aligning investor and firm priorities with long-term sustainability goals [11]. Institutional investors bring not only financial resources but also industry expertise and advocacy for environmental practices, contributing to refined reporting mechanisms and greater disclosure quality [14]. The importance of SIE within non-financial contexts lies in its ability to foster collaborative accountability among firms within shared ownership networks. By leveraging their collective ownership, SIE holders encourage firms to adopt proactive transparency practices that exceed mere regulatory compliance. This shared accountability creates a competitive dynamic wherein firms are motivated to match or surpass the transparency standards set by their peers to maintain investor confidence and market positioning [15,16]. Furthermore, the presence of SIE can catalyze industry-wide improvements in environmental reporting by disseminating best practices and fostering innovation in disclosure mechanisms.

Despite these potential benefits, gaps in the current literature persist. Research has predominantly focused on the financial dimensions of SIE while overlooking its non-financial applications, particularly in the context of ETR. This study aims to bridge this gap by exploring the nuanced roles that SIE plays in shaping ETR behaviors. The relationship between SIE and ETR is analyzed through the integration of stakeholder theory and legitimacy theory. Stakeholder theory posits that corporations are accountable not only to shareholders but also to a broader spectrum of stakeholders, including employees, customers, regulators, and the environment [17]. Within this framework, SIE operates as a mechanism through which institutional investors amplify the concerns of these stakeholders. Institutional equity holders, especially those with shared ownership in multiple firms within the same industry, act as advocates for comprehensive transparency and sustainability [11]. Their influence extends beyond financial performance to include non-financial objectives, such as environmental disclosures that reflect stakeholder expectations. From the stakeholder perspective, SIE serves as a driver that aligns managerial priorities with the diverse interests of stakeholders [16]. The overlapping ownership interests of institutional investors

create incentives for firms to adopt proactive transparency practices, ensuring they remain accountable and responsive to their stakeholders. By fostering alignment between corporate actions and stakeholder expectations, SIE enhances the strategic importance of environmental transparency.

On the other hand, legitimacy theory emphasizes that organizations seek to align their activities with societal norms and values to secure legitimacy and ensure long-term survival [18]. In the realm of ETR, firms with shared institutional ownership leverage enhanced transparency to establish and sustain their legitimacy [19]. SIE fosters a collective expectation of high transparency standards across the ownership network. Failure to meet these standards risks not only eroding legitimacy with external stakeholders but also damaging reputations within the shared equity group [20]. This dynamic creates peer accountability, where legitimacy pressures exerted by institutional investors motivate firms to meet or surpass industry norms for environmental disclosures. The competitive environment within shared ownership networks further intensifies these pressures, driving firms to align their reporting practices with the most transparent peers to maintain investor confidence and societal approval. By integrating these two theoretical frameworks, this study highlights how SIE simultaneously aligns corporate behavior with stakeholder expectations and reinforces legitimacy through enhanced transparency, providing a comprehensive understanding of its impact on ETR.

To further examine the impact of SIE on ETR, it is essential to consider the different firm life cycle stages (FLCS) and how their capital structures evolve throughout these phases [21]. As firms progress from introduction to growth, maturity, and ultimately decline, their capacity for transparency and sustainability reporting is influenced by both internal dynamics and external pressures [22,23]. During the growth and maturity stages, firms typically experience increased capital accumulation and a greater focus on stakeholder engagement [24], positioning them to prioritize ETR initiatives. Institutional investors, by virtue of their significant ownership stakes, actively promote sustainable practices and enhanced reporting standards, encouraging firms to disclose their environmental impacts and initiatives [25]. In contrast, during the introduction and decline stages, firms may face challenges that hinder their ability to commit to eco-transparency. In the introduction phase, limited resources and market uncertainty may cause firms to prioritize survival and product development over sustainability efforts. Similarly, in the decline stage, firms often grapple with declining revenues and potential asset divestitures, leading to reduced investor scrutiny and a diminished emphasis on transparent reporting. Consequently, the relationship between SIE and ETR is most pronounced during the growth and maturity phases, where firms can leverage their institutional backing to foster a culture of accountability and sustainability. By recognizing how SIE influences ETR across the FLCS, we can better understand the strategic importance of eco-transparency reporting in fostering long-term sustainable practices within the corporate landscape.

To empirically address our research question, we utilized a dataset comprising China A-share listed companies spanning from 2009 to 2022. The findings reveal a positive impact of SIE on corporate ETR. Notably, this impact is particularly significant during the growth and maturity of FLCS, where firms have greater resources and incentives to prioritize sustainability practices. This trend contrasts with firms in the introduction and decline FLCS, which often lack the capacity or focus necessary to leverage SIE for enhanced transparency. This positive relationship remains robust even when employing alternative proxies for SIE within the 5% to 3% thresholds. Mechanism analysis further illustrates that SIE enhances a firm's internal control, consequently leading to improvements in ETR. To address potential issues related to functional misspecification and omitted explanatory variables, this study employed propensity score matching (PSM), System

generalized method of moments (Sys GMM) and two-stage least squares (2SLS) methods. These methodological choices enhance the robustness of our findings, providing a more comprehensive understanding of the relationship between SIE and ETR practices. By integrating FLCS dynamics into our analysis, we offer insights into how SIE influences ETR at various stages, emphasizing the importance of capital structure evolution in fostering eco-transparency.

This study makes significant contributions to our understanding of ETR in four key ways. Firstly, it broadens the analytical lens on factors influencing ETR by moving beyond traditionally studied determinants, such as government regulations, firm-specific characteristics, executive attributes, cultural and institutional factors, and media attention. By adopting a more expansive approach, this research investigates the impact of common institutional corporate governance roles on ETR quality, filling a critical gap in the literature. Secondly, the study introduces the "collaborative governance effect", revealing how SIE can enhance ETR by strengthening internal controls. This mechanism underscores the unique governance advantages of SIE, particularly in firms emphasizing transparency and environmental accountability, offering a nuanced understanding of how shared ownership aligns stakeholder interests with corporate sustainability goals. Thirdly, in contrast to prior studies that predominantly explore the role of institutional investors and their direct shareholding in shaping corporate environmental strategies, this research highlights the broader and less explored impact of common ownership. It demonstrates how common owners can exert indirect yet significant influence over corporate conduct and decision-making processes, thus enriching the discourse on corporate environmental governance. Lastly, this study provides actionable implications for policymakers and practitioners by identifying SIE as a pivotal factor in driving ETR. The findings suggest that fostering collaborative governance structures through shared institutional ownership could serve as a strategic tool for improving corporate transparency and environmental performance. By performing so, this research not only advances theoretical frameworks in corporate governance and sustainability but also bridges the gap between academic inquiry and practical application, offering a roadmap for enhancing eco-transparency in diverse organizational contexts.

The remaining structure of the work is organized as follows: Section 2 delves into the literature review. In section and the development of hypotheses. In Section 3, we present details regarding the data, sample selection, and the measurement of variables. Section 4 provides the empirical results of our analysis. Following this, Section 5 engages in a discussion of the obtained results. Lastly, Section 6 offers the study conclusion, implications, and limitations.

2. Relevant Literature

2.1. Shared Institutional Equity and Institutional Investor Paradox

It has become increasingly common in recent years for a single institutional investor to hold shares in multiple publicly traded companies within the same sector, known as SIE [26]. This practice has significant implications for fostering collaboration, aligning stakeholder interests, and enhancing corporate governance, ultimately contributing to a more accountable and stable business environment [27]. However, SIE and the institutional investor paradox are complex concepts that relate to the ownership structure of corporations and the impact of institutional investors on corporate governance and performance. The primary objective for many institutional investors is to generate profits but SIE help achieve this goal by optimizing the performance of their portfolio companies and benefiting from sector-wide growth [12,28]. Second, they give investors more influence over the companies they hold shares in. This influence used to advocate for changes in corporate governance, strategy, or sustainability practices [11,29–31].

The concept of SIE in capital markets has fueled academic debates with two distinct viewpoints. The first perspective, termed "collaborative governance", underscores the positive impacts of shared institutional equity. Studies suggests that it can lead to increased market share [32], a higher number of patent applications [33], and enhanced performance in mergers and acquisitions [34]. Furthermore, the presence of industry hubs amplifies governance effects, aiding in effective monitoring and corporate misconduct prevention [9]. On the other hand, the second perspective, rooted in the "adversarial governance", posits that SIE may disrupt market dynamics and discourage corporate social responsibility engagement among portfolio companies [26]. This perspective raises concerns about collusion and anti-competitive consequences.

2.2. Eco-Transparency Reporting and Firm Life Cycle

The adoption and emphasis on Environmental Transparency Reporting (ETR) are not static; instead, they evolve as a firm progresses through different stages of development. Firms frequently reassess their environmental practices and disclosures, adjusting them to align with changing regulatory frameworks, shifting market expectations, and updated sustainability goals [35,36]. Scholars like Chandler [37] have highlighted that contemporary organizations are dynamic by nature, meaning that the process of strategic decision-making evolves in response to the firm's stage of development. This dynamic nature is further reflected in the stages outlined by the FLCS, which are broken down into distinct phases: introduction, growth, maturity, and decline [25,38,39]. As firms move through these phases, their approach to ETR and strategic decisions shift accordingly, with each stage requiring different responses to the evolving business environment.

While Dickinson [21] emphasizes the role of operational investment, profitability, risk profile, and financing cash flows in determining the trajectory of a firm across these stages. In accordance with the corporate life cycle theory, firms proceed through a number of phases throughout the course of their existence, encountering difficulties from both institutions and competitors as they move from the stage of introduction to the stage of decline [40]. According to DeAngelo, DeAngelo [41], the aims, strategies, and performance of a firm are always evolving as a result of the distinct opportunities and challenges that are met at each stage of the firm life cycle. In addition, Shahzad, Ahmad [39] suggested that the FLCS is representative of the strategic route that is defined by investment proposals. In this context, the concept is significant since key resource allocation promotes a firm's development, competitiveness, and innovation. However, businesses have the capacity to improve their competitiveness, generate long-term development, solve environmental difficulties, and address concerns about sustainability if they incorporate ETR across the FLCS. From the perspective of organizational ecology, a firm can be likened to a living organism that goes through different FLCS. Just as living organisms must adapt to survive in changing environments, firms must continuously evolve their approach to ETR to meet the changing demands of stakeholders at each phase of their life cycle. For example, in the early FLCS, the primary focus may be on securing investors and establishing market presence, with less emphasis on ETR. At this stage, environmental concerns may be secondary to financial stability and growth [40]. Moreover, investors and financial backers may dominate decision-making priorities, whereas, in later stages, regulatory bodies, consumers, and environmental advocates play a more central role.

As firms enter the growth and maturity phase, the demands for environmental transparency grow stronger, driven by both regulatory requirements and consumer expectations. At this stage, the pressure to disclose environmental information increases, and firms are more likely to prioritize ETR as a key strategy to address stakeholder concerns. The growing influence of consumers, governments, and other stakeholders compels firms to

integrate sustainability more deeply into their operations. ETR becomes not only a tool for compliance but also a means to differentiate themselves in a competitive market [42]. Moreover, firms in the maturity phase face heightened risks and pressures that can affect their overall strategy. Therefore, a firms progress through different stages of their life cycle, they must balance the interests of various stakeholders [43], which shift in importance over time. Consequently, a firm's commitment to ETR becomes more pronounced as it moves through these stages, with environmental disclosures gaining greater prominence in the firm's strategy as it responds to the evolving expectations of its stakeholders. The FLCS plays a critical role in driving firms to enhance their environmental disclosure practices.

3. Theoretical Framework and Hypothesize Development

3.1. Eco-Transparency Reporting: Legitimacy Theory and Stake Holder Theory

ETR serves as a tool for conveying a company's environmental responsibility efforts, including its outputs, objectives, and operational procedures [3,5]. Specifically, ETR aims to enhance the company's credibility and public image by providing both qualitative and quantitative data. These data is used to describe or measure how a company's operations affect the environment. Compared to traditional financial reporting, ETR offers a more comprehensive overview of a company's environmental activities and their consequences [44]. Consequently, ETR is considered the primary source of information for the general public to gain insights into a company's environmental initiatives. This, in turn, promotes communication between businesses and society [45]. Moreover, ETR also places emphasis on examining how environmental regulations impact a company [46]. This aspect is regarded as pivotal in the regulation of corporate environmental practices [47]. Corporate ETR has evolved to become an essential element of a company's Corporate Social Responsibility (CSR) implementation strategy [48], and it is now legally mandated in several countries [49].

In the context of legitimacy theory, some scholars have examined corporate environmental and social disclosure policies [50]. Legitimacy theory suggests that a company's legitimacy is not solely determined by adhering to legal or illegal norms, as societal expectations regarding business conduct can be either implicit or explicit [51,52]. However, critics argue that this theory often emphasizes symbolic gestures of corporate legitimacy, such as ETR disclosures, rather than fostering substantive transparency. This limitation undermines the true role of SIE in enhancing public trust, as companies may only engage in symbolic activities, such as issuing environmental reports, to appear responsible without genuinely aligning their operations with ethical practices. These symbolic actions fail to meet the underlying societal expectations and often become tools for avoiding more substantial changes to corporate behavior. By prioritizing mere representations of legitimacy over real accountability, the theory can mask deeper issues within corporate governance and undermine efforts to achieve genuine environmental sustainability. In particular, a 'legitimacy gap' may arise if institutional investors' values are misaligned with societal expectations. If companies are not transparent or committed to actual environmental improvements, but only engaged in symbolic actions to maintain legitimacy, they risk widening this gap. This misalignment can have significant consequences, affecting not only the companies but also their investors. To bridge this gap, organizations must focus on areas they can control and engage with key stakeholders within SIE who influence legitimacy. Aligning corporate actions with societal expectations ensures sustainable and responsible investment management, addressing both operational and reputational risks.

On the other hand, stakeholder theory provides a framework for navigating diverse expectations from various interest groups, especially in the realm of CSR [48]. Companies are increasingly recognizing their broader responsibilities, particularly in addressing

environmental challenges to which they may have contributed [53]. While this theory emphasizes corporate responsiveness to stakeholders, it has been criticized for potentially overemphasizing shareholder wealth, which could lead to unethical corporate practices. The theory traditionally assumes that by addressing stakeholders' interests, businesses can align their actions with ethical standards. However, critics argue that this can sometimes devolve into focusing on the interests of the shareholders above all else, potentially neglecting broader ethical concerns such as environmental damage, labor rights, or community welfare. This overemphasis on shareholder value may incentivize companies to adopt short-term strategies that maximize profits, often at the expense of long-term sustainability and social responsibility. In this way, the theory might inadvertently contribute to corporate malpractices and environmental harm, as businesses prioritize financial returns over the welfare of other stakeholders, including the environment and local communities. Traditional stakeholders, such as owners, clients, civic groups, and suppliers, influence corporate strategic decisions. In CSR, stakeholders also include regulatory bodies, environmental advocacy groups, and organizations focusing on social issues [17]. SIE, as significant stakeholders, shape corporate strategies and CSR initiatives [26]. Their dual role as both influencers and beneficiaries of corporate transparency places them at the core of ETR strategies. However, in some cases, these investors may prioritize short-term returns, thus exacerbating the overemphasis on shareholder wealth at the expense of broader ethical considerations.

Overall, both Legitimacy Theory and Stakeholder underscore the importance of SIE as a critical determinant of strategic environmental decisions in business [7]. Stakeholder theory enriches our understanding of how SIE influences ETR by highlighting corporate resource allocation and governance priorities. Similarly, legitimacy theory provides valuable insights into the symbolic and substantive dimensions of corporate legitimacy. However, its tendency to prioritize symbolic gestures over substantive change detracts from its ability to facilitate genuine corporate responsibility and transparency. The integration of these two theories offers a comprehensive perspective, reflecting the interplay of SIE characteristics and organizational traits while addressing societal expectations and corporate accountability.

3.2. The Collaborative and Adversarial Governance Role of Shared Institutional Equity

Institutional investors, as key external stakeholders, play a significant role in shaping corporate behavior by pushing for transparency in environmental practices. However, ETR serves as a vital communication channel between corporations and their stakeholders, ensuring that organizations address environmental concerns, maintain credibility, and secure long-term support from investors, regulators, and the public [54]. In this context, SIE represents a powerful force in influencing corporate governance and decision-making processes. By actively engaging in corporate governance, SIEs encourage companies to adopt environmentally sustainable strategies and disclose critical environmental information [9]. The role of SIE in fostering environmental responsibility aligns with both stakeholder theory and legitimacy theory.

The legitimacy theory underscores that firms seek to align their actions with societal expectations to maintain their legitimacy within the broader social and regulatory environment. According to this theory, companies disclose environmental information to meet stakeholder demands and conform to societal norms, thereby maintaining their legitimacy and avoiding reputational risks [18]. SIEs, with their significant influence, can encourage firms to adopt ETR as a means of maintaining legitimacy in the eyes of regulators, investors, and the public. In this way, SIEs not only promote greater transparency but also ensure that firms meet societal expectations, thereby securing their social license to operate. SIEs

also exhibit a heightened level of governance efficacy compared to traditional institutional investors. Their broader engagement across multiple firms within the same sector provides them with a unique understanding of industry dynamics and potential risks [55]. This engagement enhances their ability to influence decision-making processes, such as voting against decisions that do not align with best practices or divesting investments when firms fail to meet expected standards. The accumulation of expertise gained through active participation further empowers SIEs to mitigate agency conflicts, refine corporate governance practices, and ultimately push firms toward better environmental practices and enhanced ETR.

At the same time, stakeholder theory posits that organizations depend on external resources for their long-term success and sustainability, highlighting the importance of aligning corporate practices with stakeholder interests [7]. In this framework, SIEs act as intermediaries between firms and their stakeholders, facilitating the exchange of information and promoting transparency. By holding companies accountable, SIEs not only help maintain trust with external factors, such as creditors and regulators, but also create strategic opportunities for firms to enhance their transparency and engage in meaningful environmental reporting [56]. Through their influence, SIEs push for better environmental practices, ultimately improving corporate governance and increasing a company's commitment to sustainability.

However, while SIEs can contribute positively to corporate governance and environmental transparency, their involvement is not without potential downsides. The profit-oriented nature of many institutional investors may lead to conflicts between the desire for financial returns and the commitment to sustainability [57]. In certain cases, SIEs may prioritize short-term financial gains over long-term environmental commitments, resulting in reduced focus on the quality of ETR [4]. This profit-seeking behavior can contribute to greenwashing, a practice where firms make exaggerated or misleading environmental claims without making substantive investments in sustainable practices [58]. In this adversarial governance model, SIEs may encourage firms to engage in strategic manipulation of environmental data, creating information asymmetry that hinders effective environmental disclosure and misleads stakeholders. The prioritization of informational advantages over environmental integrity can distort the true picture of a company's environmental impact, thereby undermining the potential benefits of ETR. Additionally, some institutional investors, especially those with limited ownership stakes or focused on risk diversification, may lack the motivation or capacity for active governance. These investors are often less engaged in ensuring the accuracy and transparency of environmental disclosures, which can further exacerbate the risks of greenwashing and reduce the overall quality of corporate governance [59]. In this scenario, the lack of strong external pressure or regulatory oversight may enable companies to avoid meaningful environmental improvements, relying instead on vague or misleading statements about their sustainability practices.

Thus, the role of SIEs in shaping ETR is multifaceted, with the potential to either promote or hinder environmental transparency depending on the governance structures and profit-driven motives of institutional investors. Building on the aforementioned discussion and theoretical analysis, this study proposes its first hypothesis:

H1. *Ceteris paribus, shared institutional equity positively influences the quality of corporate eco-transparency reporting.*

3.3. Shared Institutional Equity, Eco-Transparency Reporting, and Firm Life Cycle Stages

The evolving nature of a firm, from its inception to eventual decline, shapes the impact of SIE on ETR. This influence varies significantly across the stages of a firm's life cycle stages. As firms transition through various phases of their life cycles, they encounter

distinct competitive challenges and growth opportunities that influence their resource availability [25], and firms ETR priorities. By integrating life cycle phases into the study framework, a more nuanced analysis emerges regarding how SIEs can impact ETR as firms evolve. It is important to recognize that resource constraints fluctuate across life cycle stages, which can significantly influence the effectiveness of ETR in enhancing firm performance and management engagement [60]. Consequently, SIEs, must be attuned to these variations to optimize their engagement strategies and drive meaningful environmental disclosures, aligning their investments with sustainable practices that resonate with the firm's growth trajectory.

During the introductory FLCS, corporate investment decisions are critical in shaping a firm's financial stability [61]. At this stage, research suggests that SIE has a limited impact on ETR initiatives. As highlighted by Adizes [62] and Dickinson [21], firms in their early development often experience negative cash flows from operations and investments, relying primarily on equity, private investments, and internal funding to support their activities. It is probable that environmental impact is irrelevant or a negligible consideration to decision processes. However, the new industries are also marked with a lesser incidence of institutional ownership. The technology and the business models need to be developed and consequently, the institutional investors may have to wait. The another indication of weak institutional investor involvement is that there are fewer shareholder representatives demanding the management to consider external environmental costs and provide more information about the firm's environment [63], these firms do not embrace secondary organizational goals such as ETR. As firms grow, the dynamics shift. The growth phase is characterized by significant increases in production, operations, and sales volumes, which can exacerbate environmental impacts [64]. At this stage, institutional investors, drawn to successful firms, play a pivotal role in advocating for robust environmental programs and disclosures. Their influence is motivated by the need to mitigate risks such as regulatory non-compliance and hazardous waste management, which could lead to substantial costs [65]. The heightened presence of SIE, coupled with increased common ownership, drives significant improvements in environmental governance and transparency [66].

H2. *The influence of shared institutional equity on eco-transparency reporting is more significant during the growth stage than in the introduction stage.*

In the maturity stage, growth slows but operations remain extensive. Firms must balance profitability with sustainability and SIE continues to play an influential role. Institutional investors, typically long-term equity holders, emphasize consistent and meaningful ETR practices, encouraging firms to maintain high standards of environmental disclosure and governance [67]. Moreover, institutional investors during this stage observe successful firms and are more inclined to invest. Their presence increases pressure for enhanced environmental reporting and disclosure, allowing investors to assess environmental risks and effects [66]. Consequently, they demand robust environmental programs and disclosures as prerequisites for further investment [65]. As a result, institutional ownership continues to positively impact environmental disclosures throughout the maturity stage. In the decline stage, total industry sales and operations tend to decrease significantly. Firms experience declining revenues and shrinking profits. As a result, they adopt a conservative approach, focusing heavily on cost-cutting measures to maintain fiscal sustainability [40]. Additional spending on environmental programs or information disclosure is viewed as an unnecessary distraction from the core goal of maximizing cash flow before the industry faces strategic withdrawal or bankruptcy. Such firms also divest poorly performing stocks to manage risk, even those they previously held ownership and advocacy [68]. As a result, the remaining SIE may shift their focus to pressuring management to cut operating costs

and preserve asset values for shareholders, rather than encouraging investment in environmental reporting or accounting. As a result, shared institutional equity no longer acts as a driver for enhanced environmental disclosure during the firm decline stage. Based on the above discussion we formulate our following hypothesis H3.

H3. *Compared to the maturity and decline stages, the impact of shared institutional equity on eco-transparency reporting is more pronounced in the maturity stage.*

4. Data, Sample Selection, and Variable Measurement

4.1. Data Sample and Source

We selected Chinese companies listed on the Shanghai and Shenzhen Stock Exchanges, covering the period from 2009 to 2022. To ensure data consistency and reliability, we opted to use information from 2009 onward, considering the impact of the financial crisis and data availability constraints. The ETR data for the listed companies were sourced from the China Research Data Service (CNRDS) platform, while information on shared institutional equity was manually collected from the Chinese Securities Market and Accounting Research (CSMAR) database. Internal control data were obtained from the DIB database. Following the study of [4,69,70], banking businesses were excluded from the study due to their distinct characteristics and potential data reliability issues. To mitigate the influence of outliers on empirical results, all continuous variables were adjusted by restricting them to the 1st and 99th percentiles. Firms that received "special treatment" or were newly listed were removed to enhance data reliability. Following these data refinement steps, we obtained an unbalanced panel dataset comprising 19,545 observations of firm-year combinations, with no missing values. Table 1 presents a comprehensive breakdown of data distribution across different years and industries.

4.2. Variable Measurement

4.2.1. Dependent Variable

The disclosure of environmental information varies depending on specific conditions. This study specifically focuses on the eco-transparency reporting by publicly listed firms, reflecting the increased interest of the public and stakeholders in this type of information. In line with previous studies [4,71], we manually collected data on ETR from the annual, semiannual, and Corporate Social Responsibility reports of companies. The purpose of this metric is to assess the extent to which companies engage in disclosing environmental information at the corporate level. Drawing from the work of Khan, Zahid [13], Nguyen, Elmagrhi [71], and Zahid, Maqsood [4], we identified four environmental activities among Chinese companies. These activities include technology adoption for environmental protection, environmental responsibility and consciousness, investment in pro-environment activities, and other environmental information. Appendix A, Table A1 delineates these activities, comprising a total of ten components categorized as either environmental monetized (quantitative) or non-monetized (qualitative) information. We assigned a score of 2 for disclosing non-monetized environmental information and a score of 3 for monetized environmental information. If a firm did not disclose any environmental information, we assigned a score of 0. Utilizing this criterion in Equation (1), we calculated our ETR indicator.

$$\mathrm{ETR_i} = \sum_{j=1}^{10} individualComponents_i / optimal\ disclosure\ score \quad (1)$$

where in Equation (1), ETR represents the overall score of Eco-Transparency Reporting for firm *i*, and *individualComponents* denotes the score of the *j*th component for firm *i*. It is important to note that the highest score varies among components due to differences in the

type of information. Consequently, the maximum possible disclosure score is 26 (please refer to Table A1 for additional details).

4.2.2. Independent Variable

The independent variable in this study is known as shared institutional equity (SIE). This variable is composed of four distinct components, namely SIED, SIEP, SIEN, and SIE_Per. The components of SIE employed in this study were derived from prior research [12,72]. The data for these components were extracted from the CSMAR database in alignment with the methodologies outlined in the mentioned studies. These components function as the independent variables in the analysis presented in this article.

1. SIED: This is a binary variable that takes the value 1 if the focal company and at least one industry peer are jointly held by one or more institutional block holders for at least one quarter within the year. If this condition is not met, it takes the value 0.
2. SIEP: This variable represents the count of industry peers that share common shared equity with the focal company across the four quarters of a year.
3. SIEN: SIEN is the average count of unique institutional owners who hold both the focal company and its industry peers throughout the four quarters of the year.
4. SIE_per: SIE_per stands for "shared institutional equity percentage". It represents the sum of all instances of shared institutional equity within the focal company, averaged over the four quarters of the year.

4.2.3. Control Variable

This study also took into account various firm and governance-level control variables that could potentially influence the results. These variables were identified based on pertinent studies related to SIE and ETR [4,5,7,33,71,73].

(a) Firm size

Existing literature highlights that larger firms typically face heightened public scrutiny and are likely to demonstrate a stronger inclination towards environmental disclosure [7]. Additionally, larger corporations are actively enhancing transparency and implementing strategic measures to appeal to new investors, responding to the growing demand for information from shareholders [74]. In line with previous research, we quantified company size by utilizing the natural logarithm of its total sales.

(b) Financial performance indicators

The financial performance of a firm plays a pivotal role in determining whether environmental issues are prioritized [30,31,75,76], as environmentally responsible activities often entail significant costs. During periods of low financial performance, firms tend to prioritize financial objectives over environmental concerns. In this study, we assess the financial performance of listed companies using five key metrics: firm size (Size), cash flow (CF), Tobin's Q, total debt-to-assets (DTA) ratio, and firm profitability (ROA).

Table 1. Sample distribution by years and industry.

	Years														
Industry Name	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**Total**
Agriculture, forestry, husbandry, and fishery	11	24	27	24	26	28	27	29	29	27	31	34	41	45	403
Mining	29	38	42	43	45	48	50	53	55	59	63	64	67	97	753
Textile, manufacturing, and products of leather and fur, beverage	91	314	334	398	459	463	506	613	794	901	1007	1198	1176	1205	9459
Production and supply of electric power, tap water	39	50	52	57	59	61	74	80	83	93	101	117	119	123	1108
Construction	21	32	35	50	54	56	61	60	73	75	81	88	91	101	878
Wholesale and retail	53	78	91	110	114	108	104	112	120	125	131	152	153	161	1612
Transportation	45	63	67	68	72	71	68	73	80	88	93	92	98	101	1079
Hotel and Accommodation	2	9	9	10	10	10	7	7	7	8	8	11	13	17	128
Information and technology	38	51	54	52	53	52	51	67	81	99	101	107	107	110	1023
Real Estate	65	95	99	112	106	106	99	97	99	104	107	112	113	115	1429
Commercial and leasing	9	16	19	14	15	17	17	27	29	32	37	39	41	47	359
Information technology	2	5	4	5	5	5	11	13	18	26	29	31	37	39	230
Wood and furniture	1	6	7	15	16	19	20	19	26	28	31	33	37	44	302
Other services	3	6	7	0	0	0	0	0	0	0	0	0	3	8	27
Education	0	0	0	1	0	1	1	3	2	2	3	5	9	11	38
Social services	0	1	1	1	1	1	0	5	5	7	9	11	13	18	73
Communication	3	7	8	14	16	16	23	26	31	36	39	41	46	49	355
Conglomerates	18	36	34	14	15	15	13	14	15	12	14	18	29	42	289
Total observation by year	430	831	890	988	1066	1077	1132	1298	1547	1722	1885	2153	2193	2333	19,545

Note: This table presents the distribution of observations categorized by industry and year, covering the period from 2000 to 2022.

Firm size is measured as the natural logarithm of total assets. Cash flow (CF) is calculated by dividing operational cash flow by total assets. Tobin's Q is determined as the ratio of total assets minus the book value of equity, plus the market value of equity, divided by total assets. The DTA ratio is derived by dividing total debt by total assets. Furthermore, the return on assets (ROA) significantly impacts the level of environmental disclosure. Ahmad, Li [5] suggest that firms investing in environmental projects contribute to both sustainability and profitability. In our study, ROA is calculated as the ratio of net profit to the average total assets balance, reflecting its influence on environmental disclosure practices.

(c) Corporate broad level indicators

In the realm of environmental research, board characteristics are pivotal factors influencing information disclosure and various corporate actions [4,13,69,71]. Board indicators such as board size (B_size), board independence (B_ind), and duality are widely acknowledged in investigating the connection between the board and information disclosure.

B_size pertains to the total number of directors on the board, including the chairman, vice-chairs, CEO, chief financial officer, chief operating officer, and directors [13]. B_ind is the percentage of independent directors on the board, expressed as a percentage [4]. Duality, represented as a dummy variable, signifies whether the chairman of the board also serves as the CEO. If the chairman and CEO are the same person, the value is 1; otherwise, it is 0 [69]. Table 2 presents a comprehensive breakdown, including detailed definitions, measurement units, and data sources, for all variables utilized in this study.

Table 2. Variables definitions.

Acronym	Variable's Name	Definitions	Source
		Dependent variables	
ETR	Environment information disclosure	The ETR index calculated by assigning each firm a comprehensive score derived from Equation (1) for eco-transparency reporting (ETR), which was manually extracted from annual, semiannual, and Corporate Social Responsibility reports of the companies. Appendix A, Table A1 provides the detail comprehensive score of environmental disclosures.	Data collect from the China Research Data Service (CNRDS) and calculation abased on study of [4,71].
		Independent variables	
SIED	Shared institutional equity	A dummy variable that equals 1 if at least one institutional block-holders holds the focal firm and at least one industry peer for at least one quarter in a year, and 0 otherwise.	We collect Institutional investors data from CSMAR and calculation of Common institutional ownership variables based on the study of [10,12,72].
SIEP	Shared institutional equity held peers	Natural logarithm of the number of peer firms in the same industry as the focal firm that had at least one owner in common with that company having four quarters in a year.	
SIEN	No. of commonly held peers	Natural logarithm of the number of peer firms in the same industry as the focal firm that had at least one owner in common with that company having four quarters in a year.	
SIE_per	Shared institutional equity percentage	Average of all instances of common institutional ownership in the focal firm across four quarters a year.	

Table 2. *Cont.*

Acronym	Variable's Name	Definitions	Source
		Firm life cycle stages	
Intro	Introduction FLCS	If operating cash flow is "−", Investing cash flow is "−", and financing cash flow is "+", the stage is considered Introduction.	Dickinson [21], cash flow model for life cycle stages
Growth	Growth FLCS	If operating cash flow is "+", Investing cash flow is "−", and financing cash flow is "+", the stage is considered growth.	
Maturity	Maturity FLCS	If operating cash flow is "+", Investing cash flow is "−", and financing cash flow is "−", the stage is considered Introduction.	
Decline	Decline FLCS	If operating cash flow is "+", Investing cash flow is "+", and financing cash flow is "+/−", the stage is considered Introduction.	
		Control variables	
Size	Firm size	The natural logarithm of the total sales of a given firm.	Data of all control variable used in this study taken from CSMAR.
CF	Cash flow	The natural logarithm of firm operating cash flows.	
Tobin's Q	Tobin's Q ratio	The ratio of total assets minus the book value of equities plus the market value of equities divided by total assets.	
DTA	Debts to assets ratio	The ratio of total debt to total assets.	
ROA	Return on assets	Calculated as the ratio of net income to total assets.	
B_size	Board size	The natural log of total number of directors serving on the board.	
B_ind	Board independence	The proportion of independent directors on the board, represented as a percentage.	
Duality	CEO duality	Duality, represented as a dummy variable, signifies whether the chairman of the board also serves as the CEO. If the chairman and CEO are the same person, the value is 1; otherwise, it is 0.	
		Mediating variable	
IC	Internal control	We gauge IC quality by taking the logarithm of the DIB, IC index of listed companies.	The IC data collect from: https://www.dibtime.com/index.html
		Instrumental variables	
Ind_SIE	Industry mean of shared institutional equity	The instrumental variable used is the industry mean of shared institutional equity.	Author calculation, based on the primary variable used in this study.

Note: This table provides the definitions, measurement methods, and data sources for all variables used in this study.

4.3. Research Design

Our study aimed to uncover the relationship between SIE and ETR. To achieve this, we meticulously designed regression models and carefully selected variables to capture the nuances of this relationship. By employing the fixed-effect ordinary least squares (OLS) regression method to address a significant consideration: the presence of consistent but unobservable differences among various entities over time, often termed as time-invariant unobserved heterogeneity. We ensured a robust analysis by incorporating fixed effects for both the specific year and industry. Our model construction adheres to well-established theories in the realm of SIE and environmental research [11], bolstering the theoretical

foundation and strengthening the validity of our findings. This meticulous approach to model construction is indispensable for generating reliable and meaningful results in our analysis.

$$ETR_{i,t} = \alpha + \beta_1 SIED_{i,t} + \beta_n control_{i,t} + year_t FE + industry_j FE + \varepsilon_{i,t} \quad (2)$$

$$ETR_{i,t} = \alpha + \beta_1 SIEP_{i,t} + \beta_n control_{i,t} + Year_t FE + Industry_j FE + \varepsilon_{i,t} \quad (3)$$

$$ETR_{i,t} = \alpha + \beta_1 SIEN_{i,t} + \beta_n control_{i,t} + Year_t FE + Industry_j FE + \varepsilon_{i,t} \quad (4)$$

$$ETR_{i,t} = \alpha + \beta_1 SIE_per_{i,t} + \beta_n control_{i,t} + Year_t FE + Industry_j FE + \varepsilon_{i,t} \quad (5)$$

In Equations (2)–(5), the notation is as follows: ETR stands for eco-transparency reporting, SIED represents the shared institutional equity dummy, SIEP signifies the shared institutional peer count, SIEN denotes the average unique shared institutional ownership count, and SIE_per indicates the percentage of shared institutional equity. The term "control" encompasses a set of control variables (define in Section 4.2.3). The term "i" refers to individual firms or companies, "t" corresponds to the specific year under study. Additionally, industry and year-fixed effects are incorporated into all equations. The intercept and the random error term in all regression models are denoted by the letter ε.

5. Empirical Results

5.1. Descriptive Statistics and Correlation Matrix

Table 3 provides descriptive statistics for all variables, including the count of firm-year data and measures such as mean, standard deviation, lowest, and highest values for each variable. The ETR index, with a mean of 1.425 and a median of 0. The average SIED is 0.268, indicating that around 26.8% of the sampled enterprises share shared institutional equity. Descriptive statistics for control variables fall within a reasonable range, consistent with prior studies [4,13], suggesting minimal impact from extreme outliers on study findings. Moreover, following the approach of Shahzad, Luo [31] and Shahzad, Liu [30], the study presents a visual representation of SIE across different FLCS in Figure 1. This figure illustrates the box plot of SIEs across these stages, clearly showing that SIEs have a greater weight during the growth and maturity stages of the firm life cycle.

Table 3. Descriptive statistics.

	Mean	Std. Dev.	Median	min	max	N
Dependent variable						
ETR	1.425	4.626	0.000	0	26	19,545
Independent variable						
SIED	0.268	0.443	0.000	0	1	19,545
SIEP	0.871	2.662	0.000	0	33	19,545
SIEN	0.295	0.514	0.000	0	4	19,545
SIE_per	7.139	15.484	0.000	0	99.38	19,545

Table 3. *Cont.*

	Mean	Std. Dev.	Median	min	max	N
Firm level control variable						
Size	21.242	1.423	21.120	9.044	27.813	19,545
CF	6.281	3.538	7.957	0	11.03	19,545
Tobin's Q	2.126	2.51	1.645	0	126.951	19,545
DTA	0.421	0.591	0.395	0.007	63.971	19,545
ROA	0.037	0.394	0.039	0.316	8.441	19,545
B_size	8.614	1.705	9.000	0	18	19,545
B_ind	0.373	0.054	0.333	0	0.821	19,545
Duality	0.283	0.45	0.000	0	1	19,545

Note: This table displays the descriptive statistics for the variables used in the study. The first three columns report the mean, median, and standard deviation, while the last two columns indicate the minimum, maximum values, and the number of observations.

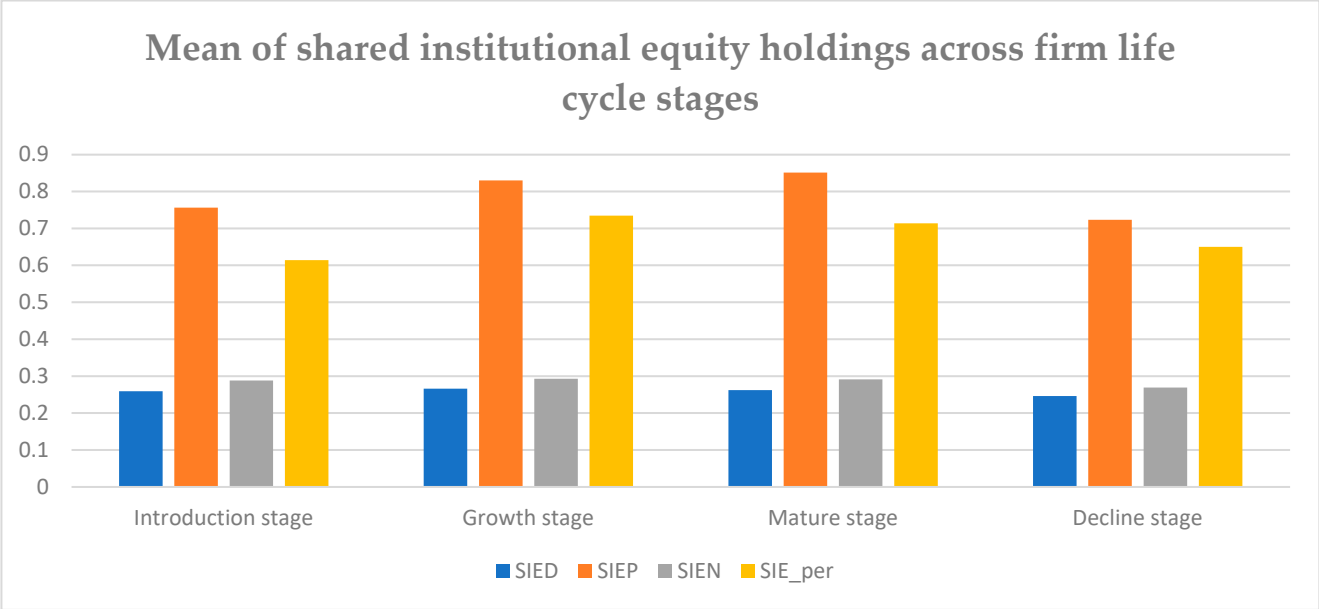

Figure 1. Displays the box plot of SIE across the various stages of the firm life cycle stages.

Table 4 displays the Pearson correlation coefficient matrix, revealing connections between primary study variables. Notably, the highest correlation coefficient is 0.947, alleviating concerns about significant multicollinearity issues. This reassurance allows us to proceed confidently with our regression analysis.

5.2. Base-Line Regression Result

The findings from the OLS-fixed-effects regression are detailed in Table 5. The reported coefficients for SIED, SIEP, SIEN, and SIE_per demonstrate a positive association between SIE and ETR in columns 1 through 4, respectively. Specifically, the coefficients are as follows: SIED = 0.0663 ($p < 0.01$), SIEP = 0.0152 ($p < 0.01$), SIEN = 0.0413 ($p < 0.01$), and SIE_per = 0.0452 ($p < 0.01$). These outcomes signify that a higher involvement of institutional owners is statistically linked to a significant increase in ETR. Moreover, these coefficients imply that as the degree of shared ownership and the proximity of the shared institutional equity link rise, there is a notable augmentation in environmental performance. These findings support the idea of Ding [11], who demonstrates that SIE help firm to enhanced the environmental performance.

Table 4. Pearson correlation coefficient matrix.

	ETR	SIED	SIEP	SIEN	SIE_per	Size	CF	Tobin's Q	DTA	ROA	B_size	B_ind	Duality
ETR	1												
SIED	0.0541 ***	1											
SIEP	0.0480 ***	0.540 ***	1										
SIEN	0.0886 ***	0.947 ***	0.556 ***	1									
SIE_per	0.0806 ***	0.762 ***	0.328 ***	0.810 ***	1								
Size	0.219 ***	−0.00490	0.0155	0.00420	−0.0101	1							
CF	0.0746 ***	−0.00194	−0.00393	0.00422	0.0188 *	0.181 ***	1						
Tobin's Q	−0.0299 ***	0.00285	0.00765	0.00437	0.0154	−0.283 ***	−0.0277 **	1					
DTA	0.0253 **	0.0281 **	0.0328 ***	0.0284 **	0.0217 *	0.134 ***	−0.0486 ***	0.416 ***	1				
ROA	0.00933	−0.0158	−0.0340 ***	−0.0137	−0.00549	0.0307 ***	0.0443 ***	−0.442 ***	−0.902 ***	1			
B_size	0.130 ***	0.0137	0.0145	0.0177 *	0.0207 *	0.273 ***	0.0793 ***	−0.0969 ***	0.0408 ***	0.0178 *	1		
B_ind	−0.0293 ***	0.0134	0.0285 **	0.0253 **	0.0224 *	−0.0770 ***	−0.0202 *	0.0475 ***	−0.0164	−0.00469	−0.497 ***	1	
Duality	−0.0823 ***	−0.00925	−0.0119	−0.0167	−0.0207 *	−0.172 ***	−0.0410 ***	0.0386 ***	−0.0304 ***	−0.00640	−0.183 ***	0.118 ***	1

Note: This table presents the correlation matrix for the variables in the study, including their significance levels. Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table 5. Base line regression.

	(1)	(2)	(3)	(4)
	ETR	**ETR**	**ETR**	**ETR**
SIE	0.0663 **			
	(0.0261)			
SIEP		0.0152 **		
		(0.0144)		
SIEN			0.0413 **	
			(0.0181)	
SIE_per				0.0452 **
				(0.0162)
Size	0.0554 ***	0.0271 ***	0.0275 ***	0.0273 ***
	(0.0112)	(0.0192)	(0.0173)	(0.0193)
CF	0.0153 ***	0.0123	0.0134	0.0113
	(0.0042)	(0.0052)	(0.0031)	(0.0023)
Tobin's Q	−0.0231 ***	−0.0234 ***	−0.0242 ***	−0.0244 ***
	(0.0083)	(0.0074)	(0.0072)	(0.0075)
DTA	−0.2845 ***	0.1256 *	0.1163 *	0.1214 *
	(0.0751)	(0.0686)	(0.0682)	(0.0683)
ROA	0.8482 ***	0.2275	0.2261	0.2233
	(0.0393)	(0.0133)	(0.0232)	(0.0131)
B_size	−0.0162 **	−0.0124 **	−0.0132 **	−0.0123 **
	(0.0074)	(0.0065)	(0.0062)	(0.0062)
B_ind	−0.4346 *	−0.4236 **	−0.4273 **	−0.3932 **
	(0.221)	(0.1886)	(0.1874)	(0.1872)
Duality	0.0332	0.0116	0.0122	0.0131
	(0.0321)	(0.0256)	(0.0252)	(0.0252)
_cons	−1.6921 ***	−1.2946 ***	−1.2951 ***	−1.2932 ***
	(0.2241)	(0.1926)	(0.1922)	(0.1922)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	19,545	19,545	19,545	19,545
R-squared	0.0832	0.3832	0.3823	0.3792
F-Stat	56.35	56.33	56.34	56.32

Note: The table provides findings on the impact of CIO on (ETR). Standard errors are reported in parentheses. Significance levels are indicated as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Definitions for all variables can be referenced in Table 2.

5.3. Impact of Shared Institutional Equity on Firm Eco-Transparency Reporting from Firm Life Cycle Stages

The study further examined the relationship between shared institutional equity (SIE) and eco-transparency reporting (ETR) across different firm life cycle stages (FLCS), namely the introduction, growth, maturity, and decline phases [21]. This analysis utilized four distinct panel regression models, each producing unique insights, as summarized in Table 6. Panels A, B, C, and D present the correlation between SIE and ETR across all phases, with year and industry fixed effects incorporated into each model.

In the introduction phase (Panels A of Table 6), the coefficients for SIED, SIEP, SIEN, and SIE_per in relation to ETR are statistically insignificant. This suggests that during early FLCS, firms prioritize establishing product viability and market presence, leaving limited capacity to address complex reporting practices such as ETR. These findings align with [21] Dickinson et al. (2018), who suggest that the information set institutional investors focus on evolves over the firm life cycle.

Table 6. Impact of shared institutional equity on a firm's eco-transparency reporting from firm life cycle stages.

Panel A: Introduction stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE	0.0159			
	(0.2181)			
SIEP		0.0077		
		(0.0287)		
SIEN			0.0895	
			(0.1355)	
SIE_per				−0.0079
				(0.0129)
Size	0.7768 ***	0.9913 ***	0.8703 ***	0.6453 ***
	(0.0880)	(0.0957)	(0.0838)	(0.2036)
CF	0.0312	0.5194 ***	0.4374 ***	0.4196
	(0.1712)	(0.1456)	(0.1366)	(0.6428)
Tobin's Q	0.0942	0.0980 *	0.2091 ***	0.0284
	(0.0631)	(0.0546)	(0.0543)	(0.0991)
DTA	−0.2086	−1.8198 ***	−0.5917	−0.1620
	(0.3768)	(0.5022)	(0.3994)	(1.1541)
ROA	−1.1787	−0.8755	−1.2932	0.5283
	(0.9577)	(1.1993)	(1.6927)	(1.9615)
B_size	0.1351 *	−0.0020	0.2590 ***	−0.0957
	(0.0720)	(0.0562)	(0.0516)	(0.1619)
B_ind	0.8386	−0.7858	4.5561 ***	−0.7726
	(2.0576)	(1.6635)	(1.4577)	(4.7068)
Duality	−0.3550 *	−0.2321	−0.1198	0.1674
	(0.2068)	(0.1773)	(0.1539)	(0.4218)
_cons	−14.7859 ***	−21.4534 ***	−23.4447 ***	−10.0211 **
	(2.1971)	(1.8424)	(1.6296)	(4.8935)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	1881	1881	1881	1881
R-squared	0.1188	0.1526	0.1561	0.0939
Panel B: Growth stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE	0.0976 **			
	(0.1575)			
SIEP		0.0007 ***		
		(0.0285)		
SIEN			0.0895 ***	
			(0.1355)	
SIE_per				0.0066 **
				(0.0044)
Size	0.8703 ***	0.8688 ***	0.8703 ***	0.8750 ***
	(0.0838)	(0.0838)	(0.0838)	(0.0839)
CF	0.4374 ***	0.4388 ***	0.4374 ***	0.4379 ***
	(0.1366)	(0.1366)	(0.1366)	(0.1365)
Tobin's Q	0.2096 ***	0.2091 ***	0.2091 ***	0.2105 ***
	(0.0543)	(0.0543)	(0.0543)	(0.0543)
DTA	−0.5879	−0.5787	−0.5917	−0.6165
	(0.3992)	(0.3990)	(0.3994)	(0.3997)
ROA	−1.2888	−1.2721	−1.2932	−1.3449
	(1.6926)	(1.6925)	(1.6927)	(1.6928)
B_size	0.2590 ***	0.2596 ***	0.2590 ***	0.2574 ***
	(0.0516)	(0.0516)	(0.0516)	(0.0516)
B_ind	4.5737 ***	4.5941 ***	4.5561 ***	4.5203 ***
	(1.4569)	(1.4586)	(1.4577)	(1.4571)

Table 6. *Cont.*

Panel B: Growth stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
Duality	−0.1200	−0.1203	−0.1198	−0.1186
	(0.1539)	(0.1539)	(0.1539)	(0.1539)
_cons	−23.4548 ***	−23.4330 ***	−23.4447 ***	−23.5203 ***
	(1.6299)	(1.6297)	(1.6296)	(1.6302)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	4277	4277	4277	4277
R-squared	0.1560	0.1560	0.1561	0.1564
Panel C: Mature stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE	0.1606 **			
	(0.1732)			
SIEP		0.0077 **		
		(0.0287)		
SIEN			0.1289 ***	
			(0.1465)	
SIE_per				0.0006
				(0.0048)
Size	0.9907 ***	0.9913 ***	0.9906 ***	0.9921 ***
	(0.0956)	(0.0957)	(0.0956)	(0.0956)
CF	0.5202 ***	0.5194 ***	0.5211 ***	0.5183 ***
	(0.1455)	(0.1456)	(0.1455)	(0.1456)
Tobin's Q	0.0988 *	0.0980 *	0.0985 *	0.0981 *
	(0.0546)	(0.0546)	(0.0546)	(0.0546)
DTA	−1.8273 ***	−1.8198 ***	−1.8267 ***	−1.8156 ***
	(0.5022)	(0.5022)	(0.5022)	(0.5023)
ROA	−0.8757	−0.8755	−0.8780	−0.8830
	(1.1989)	(1.1993)	(1.1989)	(1.1990)
B_size	−0.0026	−0.0020	−0.0037	−0.0019
	(0.0562)	(0.0562)	(0.0562)	(0.0563)
B_ind	−0.8336	−0.7858	−0.8709	−0.7656
	(1.6641)	(1.6635)	(1.6665)	(1.6656)
Duality	−0.2311	−0.2321	−0.2302	−0.2324
	(0.1772)	(0.1773)	(0.1772)	(0.1773)
_cons	−21.4592 ***	−21.4534 ***	−21.4335 ***	−21.4519 ***
	(1.8422)	(1.8424)	(1.8423)	(1.8425)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	4127	4127	4127	4127
R-squared	0.1528	0.1526	0.1528	0.1526
Panel D: Decline stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE	−0.1873			
	(0.4483)			
SIEP		−0.0191		
		(0.0832)		
SIEN			−0.2554	
			(0.3923)	
SIE_per				−0.0079
				(0.0129)
Size	0.6557 ***	0.6528 ***	0.6541 ***	0.6453 ***
	(0.2040)	(0.2040)	(0.2036)	(0.2036)

Table 6. *Cont.*

Panel D: Decline stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
CF	0.4197	0.4212	0.4175	0.4196
	(0.6430)	(0.6431)	(0.6428)	(0.6428)
Tobin's Q	0.0288	0.0302	0.0279	0.0284
	(0.0991)	(0.0991)	(0.0991)	(0.0991)
DTA	−0.2017	−0.2015	−0.1748	−0.1620
	(1.1528)	(1.1530)	(1.1531)	(1.1541)
ROA	0.4513	0.4702	0.4522	0.5283
	(1.9646)	(1.9654)	(1.9621)	(1.9615)
B_size	−0.0965	−0.0990	−0.0915	−0.0957
	(0.1623)	(0.1627)	(0.1624)	(0.1619)
B_ind	−0.7544	−0.8635	−0.6921	−0.7726
	(4.7156)	(4.7062)	(4.7126)	(4.7068)
Duality	0.1623	0.1693	0.1633	0.1674
	(0.4219)	(0.4226)	(0.4218)	(0.4218)
_cons	−10.1876 **	−10.1612 **	−10.2073 **	−10.0211 **
	(4.9048)	(4.9173)	(4.8986)	(4.8935)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	480	480	480	480
R-squared	0.0935	0.0932	0.0940	0.0939

Note: This table presents the findings on the impact of shared institutional equity (CIO) on ETR across different stages of the firm life cycle. Standard errors are reported in parentheses, with significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. For definitions of all variables, please refer to Table 2.

Conversely, in the growth and maturity stages, significant positive correlations emerge. The coefficients for SIED, SIEP, SIEN, and SIE_per achieve significance at the 1% and 5% levels (e.g., 0.0976 **, 0.0007 ***, 0.0895 ***, and 0.0066 ** in Panel B, and 0.1606 **, 0.0077 **, and 0.1289 *** in Panel C of Table 6). These results indicate that as firms progress through these stages, they accumulate resources and market power, enabling SIE to enhance competitiveness and operational efficiency. Simultaneously, firms increase their focus on ETR to align with sustainability standards and strengthen stakeholder trust. This finding is consistent with Filatotchev, Toms [23], who noted that corporate governance practices change over the firm life cycle, reflecting a firm's evolving priorities and resources.

In the decline phase (Panel D of Table 6), the relationship between SIE and ETR becomes statistically insignificant. Firms in this phase tend to prioritize survival, addressing financial constraints and reducing costs, which diverts attention and resources away from long-term initiatives like ETR. Overall, these findings validate Hypotheses 2 and 3 by demonstrating the varying influence of SIE on ETR across the FLCS.

5.4. Bootstrap Sampling Regression

In order to enhance the robustness of our analysis, we conducted a bootstrap regression analysis with 2000 replications. This approach allows us to account for potential sampling variability and provides a more reliable and stable estimation of the relationships under consideration [77]. By subjecting our data to this resampling technique, we have taken proactive measures to mitigate the impact of potential outliers and sampling fluctuations. The findings of this analysis are presented in Table 7 and serve to reinforce and solidify the robustness of our main results reported in Table 5. The bootstrap regression analysis, with its multiple replications, adds a layer of confidence to our conclusions by demonstrating the consistency and reliability of the observed associations between SIE and ETR.

Table 7. Bootstrap sample regression.

	Model 2	Model 3	Model 4	Model 5
	ETR	ETR	ETR	ETR
_bs_1	0.3816 ***	0.3800 ***	0.3815 ***	0.3793 ***
	(0.0242)	(0.0241)	(0.0238)	(0.0247)
All control variable	Yes	Yes	Yes	Yes
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	17,545	17,545	17,545	17,545

Note: The table presents bootstrap regression results conducted with 2000 replications. Bootstrap standard errors are reported in parentheses. Statistical significance is denoted as follows: *** $p < 0.01$.

5.5. Mechanism Analysis

This study aimed to explore the relationship between SIE and ETR, while also delving into the mechanisms that link these two variables. Prior studies have demonstrated that SIE impacts a company's internal governance, particularly by enhancing the quality of internal control (IC) when institutional investors hold significant ownership stakes and wield influence over governance processes and avoid misconduct [9]. Consequently, we postulated that a firm's IC could serve as an intermediary through which SIE exerts its influence on ETR. We utilized a three-step mediation model and conducted a Sobel test, adhering to the framework introduced by Baron and Kenny [78] and Sobel [79], aiming to assess whether firm IC mediates the relationship between SIE and ETR.

$$ETR_{it} = \beta_0 + \psi SIE_{\mathrm{it}} + \sum_{\phi=1}^{8} \phi_k Controls_{it} + \delta_t + \gamma_j + \varepsilon_{it} \quad (6)$$

$$\mathrm{IC}_{it} = \beta_0 + \tau SIE_{\mathrm{it}} + \sum_{\phi=1}^{8} \phi_k Controls_{it} + \delta_t + \gamma_j + \varepsilon_{it} \quad (7)$$

$$ETR_{it} = \beta_0 + \sigma SIE_{\mathrm{it}} + \upsilon \mathrm{IC}_{\mathrm{it}} + \sum_{\phi=1}^{8} \phi_k Controls_{it} + \delta_t + \gamma_j + \varepsilon_{it} \quad (8)$$

In the equations presented above, $\mathrm{IC}_{\mathrm{it}}$ represents the internal control of firm 'i' in year 't'. Equations (6)–(8) are used to assess the impacts of SIE on a firm's ETR, and the mediating effect of IC on the relationship between SIE and a firm's ETR. The results of the mediation analysis are summarized in Table 8, Panel A, columns (1)–(12). To begin, Equation (6) is employed to examine the influence of SIE on ETR in (columns 1–4). The coefficients of the SIE proxies were both statistically significant and notably positive, indicating that the presence of SIE encourages firms to disclose environmental information. Subsequently, Equation (7) was executed to assess the impact of SIEs on IC (columns 5–8). The SIE proxies displayed positive and significant coefficients, signifying that SIEs contribute to the improvement of a firm's IC, which supports the idea of [9]. Lastly, Equation (8), which incorporates both SIE and IC (columns 9–12), was analyzed. In all instances, the SIE proxies maintained their statistical significance and positive coefficients, affirming the effectiveness of the mediation process. These findings collectively demonstrate how SIEs exert their influence on the transmission of ETR through the enhancement of IC.

Table 8. Mechanism analysis and Sobel Test.

Panel A	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**	**(12)**
	ETR	**ETR**	**ETR**	**ETR**	**IC**	**IC**	**IC**	**IC**	**ETR**	**ETR**	**ETR**	**ETR**
SIE	0.0223 ***				0.0373 **				0.0492 ***			
	(0.0153)				(0.0143)				(0.005)			
SIEP		0.0211 ***				0.0452 ***				0.0413 ***		
		(0.0113)				(0.0171)				(0.001)		
SIEN			0.0231 ***				0.0721 ***				0.044 **	
			(0.0141)				(0.0192)				(0.004)	
SIE_per				0.0221 ***				0.0722 *				0.0451
				(0.0121)				(0.0181)				(0.002)
IC									0.0342 ***	0.0342 ***	0.0342 ***	0.0342 ***
									(0.0021)	(0.0021)	(0.0021)	(0.0021)
All control	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
_cons	−11.2761 ***	−11.2961 **	−11.2762 ***	−11.2762 ***	5.2341 ***	5.6961 ***	5.7211 ***	5.6371 ***	−0.2935 **	−0.2921 **	−0.2912 **	−0.2921 **
	(0.0821)	(0.0822)	(0.0823)	(0.0827)	(0.0725)	(0.0852)	(0.0452)	(0.0551)	(0.1143)	(0.1143)	(0.1143)	(0.1143)
Year-FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	19,545	19,545	19,545	19,545	19,545	19,545	19,545	19,545	19,545	19,545	19,545	19,545
R-squared	0.1053	0.1053	0.1053	0.1053	0.1842	0.1841	0.1842	0.1841	0.1092	0.1092	0.1093	0.1093
						Panel B						
Sobel Test-IC									2.5755 **	2.6091 **	3.6591 ***	3.8744 **
									(0.0004)	(0.0005)	(0.0006)	(0.0001)

Note: This table presents the results of the mechanism and Sobel test in Panel A and Panel B, respectively. Standard errors are reported in parentheses. Significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Furthermore, we employed the Sobel test to examine whether the mediate effects are significant [79]. The findings in Table 8, Panel B shows that all the computed z-values surpass the critical threshold of 1.9 and significant at 1%. This compelling result provides robust evidence supporting the notion that our selected mediating channels effectively transmit and drive the observed results. The Sobel test not only enhances the depth of our mediating analysis but also adds a crucial layer of validation, affirming that the selected channels indeed contribute significantly to the mediation effect observed in our research.

5.6. Robustness Analysis

5.6.1. One-Year Lag Approach

To address potential reverse causality concerns between the presence of SIE and ETR, this study adopts a strategic approach by incorporating a one-period time lag. This method enhances the reliability of our analysis by acknowledging that companies actively engaged in environmental initiatives may be more attractive to institutional investors. The results, presented in Table 9, reveal significant positive relationships between ETR and the coefficients of SIED, SIEP, SIEN, and SIE_per. Specifically, the regression coefficients are as follows: SIED = 0.1373 ($p < 0.01$), SIEP = 0.0272 ($p < 0.01$), SIEN = 0.0623 ($p < 0.01$), and SIE_per = 0.0195 ($p < 0.01$). These findings reinforce the idea that a proactive environmental approach can attract institutional investors, thereby influencing the ETR.

Table 9. One-year lag of dependent variable.

	(1)	(2)	(3)	(4)
	L.ETR	**L.ETR**	**L.ETR**	**L.ETR**
SIE	0.1373 ***			
	(0.1081)			
SIEP		0.0272 ***		
		(0.0172)		
SIEN			0.0623 **	
			(0.0923)	
SIE_per				0.0195 ***
				(0.0036)
All control	YES	YES	YES	YES
_cons	−21.2472 ***	−21.2272 ***	−21.2224 ***	−21.2144 ***
	(1.2871)	(1.2852)	(1.2863)	(1.2854)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	17,150	17,150	17,150	17,150
R-squared	0.1271	0.1282	0.1272	0.1272

Note: This table displays the one-year lag of the dependent variable, with standard errors presented in parentheses. Significance levels are denoted as follows: *** $p < 0.01$, ** $p < 0.05$. For a comprehensive understanding of each variable, refer to the definitions provided in Table 2.

5.6.2. Alternative Variable Analysis: Replacing SIE with the Top 3% Rather than 5% Measure

Equity holders with more than 3% ownership of a company equity in China have the right to submit written proposals to the board of directors at least 10 days before a general meeting, according to Chinese corporate law [80]. According to Bai, He [10], shareholders who exceed this 3% threshold have the potential to influence the decision-making process within the company. The study recalibrated the major SIE proxies, shifting from a 5% cutoff to a 3% threshold, to assess their influential impact on corporate environmental decisions. The results presented in Table 10, columns 1–4 show that the coefficients remained significantly positive even with the updated SIE proxies using the 3% threshold, demonstrating a significant relationship with ETR (SIE_i: = 0.0992, $p < 0.001$; SIEP_i: = 0.041, $p < 0.01$; SIEN_i: = 0.0213, $p < 0.001$; SIE_per_i: = 0.0129, $p < 0.001$). This further validates the strong

relationship between the SIE proxies and ETR, even after accounting for the potential influence of shareholders who own more than 3% of the company's shares.

Table 10. Replacing the main variable with 3% to 5%.

	(1)	(2)	(3)	(4)
	ETR	**ETR**	**ETR**	**ETR**
SIE_i	0.0992 ***			
	(0.1141)			
SIEP_i		0.0141 *		
		(0.0164)		
SIEN_i			0.0213 ***	
			(0.1024)	
SIE_per_i				0.0129 ***
				(0.0044)
All control	YES	YES	YES	YES
_cons	−5.3823 ***	−5.383 ***	−5.4096 ***	−5.3965 ***
	(2.0011)	(2.0012)	(2.0015)	(2.0016)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	19,545	19,545	19,545	19,545
R-squared	0.1613	0.1612	0.1614	0.1612

Note: This table present the outcomes of an alternative variable analysis, where the primary independent variable is substituted with an alternative, specifically reducing shared institutional equity from 5% to 3%. Standard errors, presented in parentheses, indicate significance levels: *** $p < 0.01$, * $p < 0.1$.

5.6.3. Replacing the Main Variable with 3% to 5% and Firm Life Cycle

The study recalibrated the primary SIE proxies by adjusting the cutoff from 5% to a 3% threshold to evaluate their impact on corporate environmental decisions. This revised criterion was then applied from a FLCS. Results presented in Table 11, columns 1–4, spanning Panels A to D, indicate that the coefficients remained significantly positive during the growth and mature stages (panels B and C) even with the updated 3% threshold. This demonstrates a strong relationship between the SIE proxies and ETR. Further validating the robust connection between SIE proxies and ETR during the growth and mature phases, even when considering shareholders holding more than 3% of the company's shares. However, the results were insignificant for the introduction and decline stages (panels A and D) which supports Hypothesis 2.

Table 11. Replacing the main variable with 3% to 5%: Firm Life Cycle Stages.

Panel A: Introduction stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE_i	0.0570			
	(0.2235)			
SIEP_i		0.0166		
		(0.0353)		
SIEN_i			0.0896	
			(0.2032)	
SIE_per_i				−0.0026
				(0.0078)
All control	YES	YES	YES	YES
_cons	−14.8109 ***	−14.7260 ***	−14.8257 ***	−14.7485 ***
	(2.1979)	(2.1966)	(2.1966)	(2.1956)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	1881	1881	1881	1881
R-squared	0.1188	0.1189	0.1189	0.1189

Table 11. *Cont.*

Panel B: Growth stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE_i	0.0377 **			
	(0.1620)			
SIEP_i		0.0222 ***		
		(0.0310)		
SIEN_i			0.0443 *	
			(0.1415)	
SIE_per_i				0.0003 **
				(0.0048)
All control	YES	YES	YES	YES
_cons	−23.4226 ***	−23.4413 ***	−23.4232 ***	−23.4286 ***
	(1.6302)	(1.6295)	(1.6299)	(1.6310)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	4277	4277	4277	4277
R-squared	0.1560	0.1561	0.1560	0.1560
Panel C: Mature stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE_i	0.1613 **			
	(0.1778)			
SIEP_i		0.0193 ***		
		(0.0309)		
SIEN_i			0.1375 ***	
			(0.1533)	
SIE_per_i				0.0012 *
				(0.0052)
All control	YES	YES	YES	YES
_cons	−21.4689 ***	−21.4667 ***	−21.4525 ***	−21.4499 ***
	(1.8423)	(1.8425)	(1.8422)	(1.8423)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	4127	4127	4127	4127
R-squared	0.1528	0.1527	0.1528	0.1526
Panel D: Decline stage of firm life cycle				
	(1)	**(2)**	**(3)**	**(4)**
	ETR	**ETR**	**ETR**	**ETR**
SIE_i	−0.3976			
	(0.4638)			
SIEP_i		−0.0803		
		(0.0879)		
SIEN_i			−0.4202	
			(0.4076)	
SIE_per_i				−0.0100
				(0.0136)
All control	YES	YES	YES	YES
_cons	−10.2873 **	−10.3961 **	−10.2554 **	−10.0090 **
	(4.8989)	(4.9051)	(4.8934)	(4.8927)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	480	480	480	480
R-squared	0.0946	0.0948	0.0952	0.0942

Note: This table presents the results of an alternative variable analysis, where the primary independent variable (SIE) has been adjusted from 5% to 3%. The analysis evaluates the impact of this adjustment on ETR across different FLCS. The values of control variables are included in the analysis but not reported in the table for brevity. Standard errors, shown in parentheses, indicate significance levels as follows: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

5.7. Endogeneity Analysis

5.7.1. Propensity Score Matching

To mitigate the bias resulting from functional form misspecification within the selected sample, this study employs the PSM technique [81]. This approach tackles these concerns by identifying comparable counterparts for each observation, thereby creating a controlled group that closely mirrors the characteristics of the treatment group. In the context of this research, the treatment group comprises enterprises with shared institutional ownership, while the control group consists of firms without shared institutional equity. Employing a one-to-one closest neighbor matching technique based on prior research SIE and environment [11], ensures a robust matching procedure.

To validate the matching outcomes, propensity score density plots are generated before and after the matching process. Figures 2 and 3 visually demonstrate how propensity score matching effectively reduces bias, ensuring that the two groups align with the common support assumption. Additionally, the results of the PSM sample are presented in Table 12, Panel A.

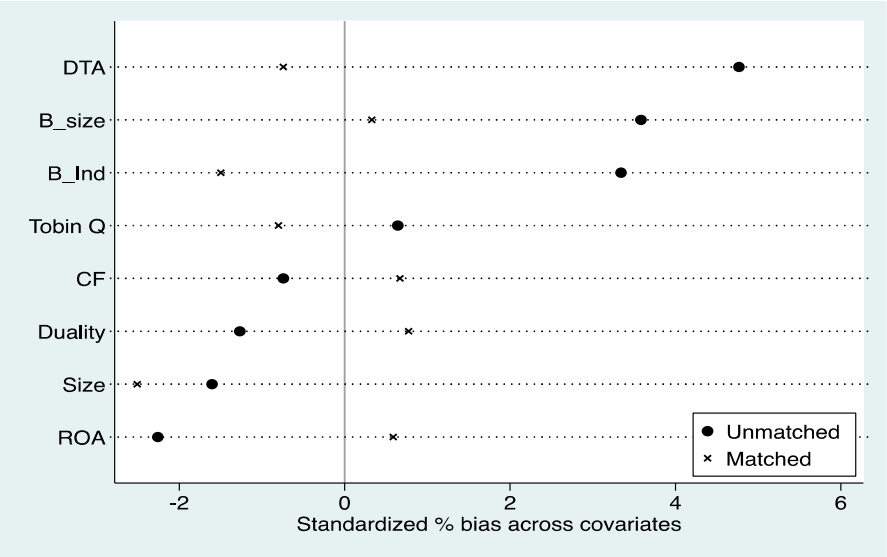

Figure 2. The covariates balance test.

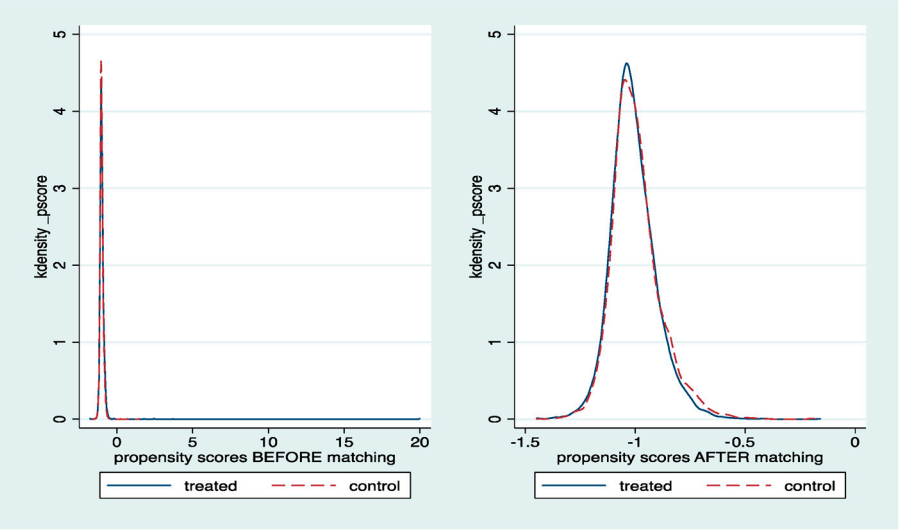

Figure 3. Density plot before and after matching.

Table 12. Propensity score matching analysis.

Panel A: PSM Match Sample						
	Mean		***t*-Test**		**V(T)/**	
Variable	**Treated**	**Control**	**%bias**	**T**	***p* > t**	**V(C)**
Size	21.0962	21.0842	0.9211	0.3723	0.7143	1.231 *
CF	6.158	6.223	−1.8002	−0.7534	0.4524	1.0302
Tobin's Q	2.114	2.112	0.1321	0.0527	0.9617	1.5345 *
DTA	0.403	0.399	0.5355	0.7121	0.4758	0.9256 *
ROA	0.037	0.038	0.000	−0.0318	0.9792	1.1832 *
B_size	8.571	8.631	−3.6001	−1.4623	0.1441	0.9332 *
B_ind	0.375	0.374	1.4322	0.5813	0.5653	1.0202
Duality	0.3002	0.3184	−3.9002	−1.5901	0.1113	
Panel B: PSM Regression						
	(1)	**(2)**	**(3)**		**(4)**	
	ETR	**ETR**	**ETR**		**ETR**	
SIE	0.1092 **					
	(0.1445)					
SIEP		0.0197 ***				
		(0.0221)				
SIEN			0.0263 ***			
			(0.1214)			
SIE_per					0.0212 ***	
					(0.0044)	
Size	1.0913 ***	1.0945 ***	1.0914 ***		1.0914 ***	
	(0.0854)	(0.0856)	(0.0853)		(0.0854)	
CF	0.0385 *	0.0365 *	0.0374 *		0.0374 *	
	(0.0221)	(0.0231)	(0.0221)		(0.0241)	
Tobin's Q	0.1343 ***	0.1343 ***	0.1343 ***		0.1343 ***	
	(0.0331)	(0.0335)	(0.0335)		(0.0332)	
DTA	−0.8914 **	−0.9673 **	−0.8882 **		−0.8833 **	
	(0.3965)	(0.3971)	(0.3964)		(0.3963)	
ROA	−1.8423 **	−1.8553 **	−1.8343 **		−1.8253 **	
	(0.8131)	(0.8176)	(0.8133)		(0.8153)	
B_size	0.1796 ***	0.1696 ***	0.1692 ***		0.1711 ***	
	(0.0611)	(0.0614)	(0.0615)		(0.0613)	
B_ind	2.0842	2.1256	2.0759		2.1064	
	(1.5787)	(1.5774)	(1.5783)		(1.5834)	
Duality	−0.3593 **	−0.3642 **	−0.3621 **		−0.3633 **	
	(0.1425)	(0.1427)	(0.1423)		(0.1424)	
_cons	−20.8641 ***	−20.8498 ***	−20.8243 ***		−20.8133 ***	
	(2.0395)	(2.0367)	(2.0374)		(2.0374)	
Year-FE	YES	YES	YES		YES	
Industry-FE	YES	YES	YES		YES	
Observations	7212	7212	7212		7212	
R-squared	0.1426	0.1476	0.1423		0.1434	

Note: This table displays PSM results. Panel A showcases balanced covariates for treated and control groups. In Panel B, PSM regression outcomes denote significance levels (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$) with standard errors in parentheses.

Following the matching process, we conducted a comprehensive analysis of the results through PSM regression, as presented in Table 12, Panel B. Notably, the coefficients for SIED, SIEP, SIEN, and SIE_per reveal significant positive relationships: β = SIED = 0.1092 ($p < 0.01$), SIEP = 0.0197 ($p < 0.01$), SIEN = 0.0263 ($p < 0.01$), and SIE_per = 0.0212 ($p < 0.01$). These findings not only reaffirm the earlier empirical results but also provide additional robust support for the "collaborative governance assumption" posited in this study.

5.7.2. System Generalized Method of Moments Regression

ETR serves as a vital communication channel between a company and its stakeholders. A potential bidirectional relationship may exist between SIE and ETR, as companies with higher levels of ETR disclosure may attract more investors who share ownership across firms. To address this potential endogeneity, we employed a sys-GMM regression approach. The results, presented in Table 13 (columns 1–4), consistently demonstrate statistically significant positive coefficients for the SIE proxies. These findings support our initial hypothesis that SIE and ETR are positively correlated. By modeling the potential bidirectional relationship between SIE and ETR, the sys-GMM analysis not only resolves endogeneity concerns but also reinforces the robustness of our core results.

Table 13. System generalized method of moments analysis.

	(1)	(2)	(3)	(4)
	ETR	**ETR**	**ETR**	**ETR**
ΔETR	0.2952 ***	0.2953 ***	0.2953 ***	0.2952 ***
	(0.0081)	(0.0081)	(0.0081)	(0.0081)
SIE	0.0753 ***			
	(0.0921)			
SIEP		0.0031 ***		
		(0.0151)		
SIEN			0.0281 ***	
			(0.0792)	
SIE_per				0.0212
				(0.0031)
_cons	−9.4791 ***	−9.4842 ***	−9.4941 ***	−9.4881 ***
	(0.8171)	(0.8171)	(0.8171)	(0.8172)
Observations	17,531	17,531	17,531	17,531
AR(1)	62.00	61.86	61.96	61.85
AR(2)	11.23	11.24	11.24	11.24
Sargan test of overid	4018.45	4009.13	4016.07	4007.25

Note: This table presents the results from the system GMM framework. Standard errors are shown in parentheses and indicate significance levels as follows: *** $p < 0.01$. Control variables are included in the analysis but not reported in the table for brevity.

5.7.3. Two-Stage Least Square Analysis

To deal potential endogeneity problems caused by sample selection bias, this paper uses the 2SLS instrumental variable (IV) method. The instrumental variable used is the industry mean of shared institutional equity. The reasons for choosing this instrumental variable are as follows: If there are more SIE in an industry, the probability of a company in the industry being held by shared institutional investors is greater; SIE of other companies in the industry is less likely to influence a company's ETR. Table 14 shows the results of the 2SLS analysis. In columns 1–4, the results of the first stage are presented, in which the fitted values of all four proxies of SIEs are obtained by regressing them on the IV. The results indicate that the selected instrument is significantly positively correlated with the fitted values. Moreover, the F-statistics of the first-stage regressions are all greater than ten, implying that the instrument is strong. The second stage results are presented in columns 5–8. The results show that the coefficients of the fitted values of the SIE proxies are significantly positive. These results are consistent with the baseline results, indicating that the main results are still valid after addressing the problem of omitted explanatory variables.

Table 14. Two stage least square analysis.

First Stage	**(1)**	**(2)**	**(3)**	**(4)**
Variables	**CIO**	**CIOP**	**CIPN**	**CIO_per**
Ind_SIE	1.555 ***	2.3212 ***	1.7372 **	6.8534 ***
	(0.5912)	(3.5443)	(0.6852)	(2.1060)
All other control variable	YES	YES	YES	YES
_cons	−0.0785	−1.3923 **	−0.2413 **	−1.9538 **
	(0.16933)	(1.016)	(0.1963)	(1.5905)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	19,545	19,545	19,545	19,545
R-squared	0.2231	0.2133	0.2432	0.2624
F-stat	33.821	33.925	33.103	33.354
Second Stage	**(5)**	**(6)**	**(7)**	**(8)**
	ETR	**ETR**	**ETR**	**ETR**
SIE	1.0631 **			
	(0.4112)			
SIEP		3.8849 **		
		(1.2762)		
SIEN			1.9887 **	
			(0.8275)	
SIE_per				1.3173 ***
				(0.4059)
All other control variable	YES	YES	YES	YES
_cons	−1.1006 ***	−8.6211 ***	−6.8825 ***	−6.90685 ***
	(8.4846)	(8.2078)	(6.4102)	(4.9267)
Year-FE	YES	YES	YES	YES
Industry-FE	YES	YES	YES	YES
Observations	19,545	19,545	19,545	19,545
R-squared	0.1432	0.1467	0.1484	0.1481

Note: This table illustrates the results of the 2SLS analysis. In the first stage, we introduced an instrumental variable by utilizing the industry mean of SIE. The second stage reveals that the fitted values of the SIE proxies exhibit a statistically significant positive association with ETR. Standard errors are provided in parentheses, with significance levels denoted as follows: *** $p < 0.01$, ** $p < 0.05$.

5.8. Result and Discussion

The ETR in corporate settings is a complex system that involves a variety of stakeholders, investors, and corporate attributes. In light of growing environmental concerns [1], and scholarly calls for action [7], we adopted a systematic approach utilizing the SIE concept. This approach combines quantitative and qualitative data, taking into account a diverse range of viewpoints [26,33], to provide more comprehensive and reliable findings. In contrast to recent research that examines institutional investors', and their shareholding patterns and their influence on environmental performance and disclosure, our study concentrates on four primary categories of institutional owners with shared ownership interests across various firms. Our findings differ from existing studies, such as those by Li, Zhang [82] and Li, Ruan [83], which have provided evidence that institutional investors and their shareholding have a positive impact on ETR. However, we take into account the types of SIE, namely SIED, SIEP, SIEN, and SIE_per. We provide evidence that these common institutional owners have more influence on firm decisions due to their multiple shareholdings. The findings are align with the research of [29], which indicated that long-term common shareholders prioritize the strategic decisions and economic consequences of their affiliated enterprises. Consequently, these investors use more strategic tactics, possess more risk resilience, and formulate longer investment strategies [10]. The adoption of SIE and a range of shareholding structures will enhance shareholder incentives for monitoring

and establish an effective mechanism for overseeing and verifying the manipulation of ETR by significant shareholders [9], thus fostering more sustainable development practices.

5.9. Theoretical and Practical Implication

This study significantly enriches the discussion on shared equity structures and their profound impact on corporate eco-reporting behavior, particularly focusing on ETR. By linking SIE with ETR practices, we extend traditional ownership theories that mainly emphasize financial outcomes, offering a more comprehensive understanding that integrates environmental aspects. This alignment with stakeholder theory highlights the importance of addressing the expectations of various stakeholders, including institutional investors, who demand transparency and sustainability from firms. Moreover, legitimacy theory further elucidates how firms, through their environmental practices, seek to align themselves with societal norms and expectations, thereby gaining acceptance from stakeholders and maintaining their social license to operate. We establish a positive relationship between SIE and ETR, demonstrating that SIE influences corporate behavior by enhancing internal control mechanisms and driving firms to prioritize environmental transparency. Furthermore, this study also finds that the impact of SIE on ETR varies across different stages of a firm's life cycle. In the introduction stage, SIE begins to shape initial transparency practices, but ETR adoption may still be limited. As firms enter the growth stage, the influence of SIE strengthens, driving the adoption of more comprehensive ETR practices in response to increasing investor expectations. During the maturity stage, institutional investors' pressure to maintain high levels of ETR becomes pivotal in sustaining competitive advantage. Even in the decline stage, SIE continues to promote transparency, helping firms regain trust and potentially enhance financial performance. By examining this nexus, this study highlights the need for a more nuanced theoretical model that incorporates environmental dimensions and emphasizing how firms, driven by both stakeholder expectations and societal norms, navigate the complex landscape of corporate responsibility and environmental disclosure.

On the practical side, our study offers valuable insights for firms, particularly those operating in China, where institutional equity holders play a significant role in shaping corporate governance and sustainability practices. Firms can leverage SIE to enhance their ETR practices, meeting both investor expectations and regulatory requirements, while improving their legitimacy in the eyes of stakeholders. Policymakers and regulatory authorities can design frameworks that encourage SIE participation to promote ETR practices across firms, aligning corporate behavior with broader environmental and sustainability objectives. Furthermore, the study empowers institutional and individual investors to make informed decisions, prioritizing companies that demonstrate strong ETR practices as indicators of transparency and responsibility.

6. Conclusions

This study, utilizing a comprehensive dataset of Chinese enterprises listed on the Shanghai and Shenzhen stock exchanges from 2009 to 2022, examines the relationship between SIE and corporate ETR, revealing a clear and positive connection. We further demonstrate that firm internal control serves as a mediating factor, enabling SIE to enhance ETR. Our findings remain robust when considering alternative SIE proxies, and bootstrap regression sampling confirms the consistency and reliability of the identified relationship. To address potential issues of functional form misspecification and omitted explanatory factors and endogeneity, we employ PSM, System GMM, and 2SLS analysis, which bolster the validity of our primary results.

Importantly, our findings reveal that the impact of SIE on ETR varies significantly across different stages of the firm life cycle. Specifically, the positive effect of SIE is most

pronounced during the growth and maturity stages, where firms possess the resources and capabilities to prioritize eco-transparency initiatives. In contrast, firms in the introduction and decline stages may not fully leverage SIE to enhance their reporting practices. This nuanced understanding adds depth to our findings, highlighting that SIE can serve as a powerful catalyst for environmental reporting, contingent upon the specific characteristics and maturity of the firms involved.

Study Limitation

This paper acknowledges several limitations that warrant more comprehensive exploration in future research: Firstly, this study constructs the indicator of SIE based on available data from listed firms, without considering the potential presence of shared institutional equity holders in non-listed companies. Future research could refine the construction of this indicator, considering the complexities of SIE across different types of entities along with the scales proxy variables for strategic reference point shifting to empirically validate the proposed framework. Lastly, this research is conducted within the context of China and its findings may not universally apply due to the institutional settings. Therefore, future research should explore in more diverse contexts, such as the United States or European countries, to assess whether the conclusions maintain consistency or exhibit variations in response to distinct institutional settings.

Author Contributions: Conceptualization, Y.L.; methodology, H.H. (Hadi Hussain); software, H.H. (Hadi Hussain); formal analysis, H.H. (Hadi Hussain); investigation, X.X.; resources, X.X.; data curation, H.H. (Hongbo Hai); writing—original draft, Y.L.; writing—review & editing, Y.L. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Data Availability Statement: The data presented in this study are available in CSMAR at https://www.csmar.com/.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Environment Information Disclosure Activities.

Type of Information	Activity Definition	Disclosure	
		Yes	No
Non-monetized	Insights into ISO Environmental System Certification.	2	0
Non-monetized	The building and management of projects aimed at enhancing ecological ecosystem.	2	0
Non-monetized	The impact of government policies on firms with regard to environmental protection.	2	0
Non-monetized	The guiding principles and goals of corporate environmental protection.	2	0
Monetized	Investment made by a company on environmental investment for the purpose of technology development.	3	0
Monetized	Government incentives for environmental protection, including grants, subsidies, and tax deductions.	3	0
Monetized	Managing Waste: Disposal, Treatment, Recycling, and Innovative Utilization of Generated Waste Products.	3	0
Monetized	Loan pertaining to environment protection.	3	0
Monetized	Litigation, restitution, fines, and incentives associated with environmental protection.	3	0

Table A1. *Cont.*

Type of Information	Activity Definition	Disclosure	
		Yes	No
Monetized	Other pertinent information related to the environment activities (such as environmental awareness, tree plantation drive, biodiversity conservation, etc.) that contribute to the betterment of public welfare.	3	0
Total		26	

References

1. IEA. *World Energy Outlook 2022*; IEA: Paris, France, 2022.
2. Maqsood, U.S.; Wang, S.; Li, Q.; Zahid, R.A. Protect your green line: Foreign residency rights and green innovation. *Econ. Lett.* **2024**, *234*, 111442. [CrossRef]
3. Ahmad, N.; Youjin, L.; Hdia, M. The role of innovation and tourism in sustainability: Why is environment-friendly tourism necessary for entrepreneurship? *J. Clean. Prod.* **2022**, *379*, 134799. [CrossRef]
4. Zahid, R.M.A.; Maqsood, U.S.; Irshad, S.; Khan, M.K. The role of women on board in combatting greenwashing: A new perspective on environmental performance. *Bus. Ethics Environ. Responsib.* **2023**, *34*, 121–136. [CrossRef]
5. Ahmad, N.; Li, H.-Z.; Tian, X.-L. Increased firm profitability under a nationwide environmental information disclosure program? Evidence from China. *J. Clean. Prod.* **2019**, *230*, 1176–1187. [CrossRef]
6. Zeng, S.; Xie, X.; Tam, C.M.; Wan, T. Relationships between business factors and performance in internationalization: An empirical study in China. *Manag. Decis.* **2009**, *47*, 308–329. [CrossRef]
7. Liu, X.; Anbumozhi, V. Determinant factors of corporate environmental information disclosure: An empirical study of Chinese listed companies. *J. Clean. Prod.* **2009**, *17*, 593–600. [CrossRef]
8. Huang, R.; Chen, D. Does environmental information disclosure benefit waste discharge reduction? Evidence from China. *J. Bus. Ethics* **2015**, *129*, 535–552. [CrossRef]
9. Wang, Z.; Wang, C.; Fang, Z. Common institutional ownership and corporate misconduct. *Manag. Decis. Econ.* **2023**, *44*, 102–136. [CrossRef]
10. Bai, Y.; He, L.; Zhang, T. Common Institutional Ownership and Investment Efficiency: Empirical Evidence from China. *Borsa Istanb. Rev.* **2023**, *23*, 1067–1077. [CrossRef]
11. Ding, H. Common institutional ownership and green innovation in family businesses: Evidence from China. *Bus. Strategy Dev.* **2023**, *6*, 828–842. [CrossRef]
12. Ramalingegowda, S.; Utke, S.; Yu, Y. Common institutional ownership and earnings management. *Contemp. Account. Res.* **2021**, *38*, 208–241. [CrossRef]
13. Khan, M.K.; Zahid, R.A.; Saleem, A.; Sági, J. Board composition and social & environmental accountability: A dynamic model analysis of Chinese firms. *Sustainability* **2021**, *13*, 10662. [CrossRef]
14. Asad, S.; Hennig, J.C.; Oehmichen, J.; Wolff, M.; Haas, V. From attention to action: How board environmental expertise influences corporate environmental performance. *Strateg. Organ.* **2023**, 14761270231197995. [CrossRef]
15. Connelly, B.L.; Tihanyi, L.; Certo, S.T.; Hitt, M.A. Marching to the beat of different drummers: The influence of institutional owners on competitive actions. *Acad. Manag. J.* **2010**, *53*, 723–742. [CrossRef]
16. Hu, J.; Tang, Y.; Yin, N.; Guo, X. Institutional investor information competition and accounting information transparency: Implications for financial markets and corporate governance in china. *J. Knowl. Econ.* **2024**, *15*, 9629–9666. [CrossRef]
17. Freeman, R.E. *Strategic Management: A Stakeholder Approach*; Cambridge University Press: Cambridge, UK, 2010.
18. Suchman, M.C. Managing legitimacy: Strategic and institutional approaches. *Acad. Manag. Rev.* **1995**, *20*, 571–610. [CrossRef]
19. Tilling, M.V. Some thoughts on legitimacy theory in social and environmental accounting. *Soc. Environ. Account. J.* **2004**, *24*, 3–7. [CrossRef]
20. Messer, C.M.; Adams, A.E.; Shriver, T.E. Corporate frame failure and the erosion of elite legitimacy. *Sociol. Q.* **2012**, *53*, 475–499. [CrossRef]
21. Dickinson, V. Cash flow patterns as a proxy for firm life cycle. *Account. Rev.* **2011**, *86*, 1969–1994. [CrossRef]
22. Ahmed, B.; Akbar, M.; Sabahat, T.; Ali, S.; Hussain, A.; Akbar, A.; Hongming, X. Does firm life cycle impact corporate investment efficiency? *Sustainability* **2020**, *13*, 197. [CrossRef]
23. Filatotchev, I.; Toms, S.; Wright, M. The firm's strategic dynamics and corporate governance life-cycle. *Int. J. Manag. Financ.* **2006**, *2*, 256–279. [CrossRef]
24. Habib, A.; Hasan, M.M. Firm life cycle, corporate risk-taking and investor sentiment. *Account. Financ.* **2017**, *57*, 465–497. [CrossRef]

25. Habib, A.; Hasan, M.M. Corporate life cycle research in accounting, finance and corporate governance: A survey, and directions for future research. *Int. Rev. Financ. Anal.* **2019**, *61*, 188–201. [CrossRef]
26. Cheng, X.; Wang, H.H.; Wang, X. Common institutional ownership and corporate social responsibility. *J. Bank. Financ.* **2022**, *136*, 106218. [CrossRef]
27. Baig, M.H.; Xu, J.; Shahzad, F.; Rehman, I.U.; Ali, R. Exploring the impact of fintech innovation on dividend payout decisions: The roles of intellectual capital and board characteristics. *Int. J. Emerg. Mark.* **2024**. [CrossRef]
28. Shahzad, F.; Baig, M.H.; Rehman, I.U.; Saeed, A.; Asim, G.A. Does intellectual capital efficiency explain corporate social responsibility engagement-firm performance relationship? Evidence from environmental, social and governance performance of US listed firms. *Borsa Istanb. Rev.* **2022**, *22*, 295–305. [CrossRef]
29. Koch, A.; Panayides, M.; Thomas, S. Common ownership and competition in product markets. *J. Financ. Econ.* **2021**, *139*, 109–137. [CrossRef]
30. Shahzad, U.; Liu, J.; Pang, T.; Luo, F. Institutional investors and the moral hazards of technology investment: Evidence from China. *Econ. Innov. New Technol.* **2023**, *32*, 223–249. [CrossRef]
31. Shahzad, U.; Luo, F.; Pang, T.; Liu, J.; Nawaz, T. Managerial equity incentives portfolio and the moral hazard of technology investment. *Technol. Anal. Strateg. Manag.* **2021**, *33*, 1435–1449. [CrossRef]
32. He, J.; Huang, J. Product market competition in a world of cross-ownership: Evidence from institutional blockholdings. *Rev. Financ. Stud.* **2017**, *30*, 2674–2718. [CrossRef]
33. Gao, K.; Shen, H.; Gao, X.; Chan, K.C. The power of sharing: Evidence from institutional investor cross-ownership and corporate innovation. *Int. Rev. Econ. Financ.* **2019**, *63*, 284–296. [CrossRef]
34. Brooks, C.; Chen, Z.; Zeng, Y. Institutional cross-ownership and corporate strategy: The case of mergers and acquisitions. *J. Corp. Financ.* **2018**, *48*, 187–216. [CrossRef]
35. Jia, X.; Zhang, Y.; Tan, R.R.; Li, Z.; Wang, S.; Wang, F.; Fang, K. Multi-objective energy planning for China's dual carbon goals. *Sustain. Prod. Consum.* **2022**, *34*, 552–564. [CrossRef]
36. Monteiro, A.P.; Pereira, C.; Barbosa, F.M. Environmental disclosure on mandatory and voluntary reporting of Portuguese listed firms: The role of environmental certification, lucratively and corporate governance. *Meditari Account. Res.* **2023**, *31*, 524–553. [CrossRef]
37. Chandler, A.D. Strategy and structure: Chapters in the history of the industrial empire. *Camb. Mass* **1962**, *5*, 12–48.
38. Miller, D.; Friesen, P.H. A longitudinal study of the corporate life cycle. *Manag. Sci.* **1984**, *30*, 1161–1183. [CrossRef]
39. Shahzad, F.; Ahmad, M.; Fareed, Z.; Wang, Z. Innovation decisions through firm life cycle: A new evidence from emerging markets. *Int. Rev. Econ. Financ.* **2022**, *78*, 51–67. [CrossRef]
40. Jawahar, I.M.; McLaughlin, G.L. Toward a descriptive stakeholder theory: An organizational life cycle approach. In *Business Ethics and Strategy, Volumes I and II*; Routledge: London, UK, 2018; pp. 381–398.
41. DeAngelo, H.; DeAngelo, L.; Stulz, R.M. Seasoned equity offerings, market timing, and the corporate lifecycle. *J. Financ. Econ.* **2010**, *95*, 275–295. [CrossRef]
42. Chen, B.; Gegentana; Wang, Y. The Impact of Environmental Regulations on Enterprise Pollution Emission from the Perspective of "Overseeing the Government". *Sustainability* **2023**, *15*, 11311. [CrossRef]
43. Tariq, A.; Badir, Y.F.; Safdar, U.; Tariq, W.; Badar, K. Linking firms' life cycle, capabilities, and green innovation. *J. Manuf. Technol. Manag.* **2020**, *31*, 284–305. [CrossRef]
44. Cerin, P. Characteristics of environmental reporters on the OM Stockholm exchange. *Bus. Strategy Environ.* **2002**, *11*, 298–311. [CrossRef]
45. Yang, Y.; Yao, C.; Li, Y. The impact of the amount of environmental information disclosure on financial performance: The moderating effect of corporate internationalization. *Corp. Soc. Responsib. Environ. Manag.* **2020**, *27*, 2893–2907. [CrossRef]
46. Zhang, J.; Liu, Y.; Zhou, M.; Chen, B.; Liu, Y.; Cheng, B.; Xue, J.; Zhang, W. Regulatory effect of improving environmental information disclosure under environmental tax in China: From the perspectives of temporal and industrial heterogeneity. *Energy Policy* **2022**, *164*, 112760. [CrossRef]
47. Zheng, Y.; Ge, C.; Li, X.; Duan, X.; Yu, T. Configurational analysis of environmental information disclosure: Evidence from China's key pollutant-discharge listed companies. *J. Environ. Manag.* **2020**, *270*, 110671. [CrossRef]
48. Gupta, J.; Das, N. Multidimensional corporate social responsibility disclosure and financial performance: A meta-analytical review. *Corp. Soc. Responsib. Environ. Manag.* **2022**, *29*, 731–748. [CrossRef]
49. Meng, X.; Zeng, S.; Xie, X.; Qi, G. The impact of product market competition on corporate environmental responsibility. *Asia Pac. J. Manag.* **2016**, *33*, 267–291. [CrossRef]
50. Wilmshurst, T.D.; Frost, G.R. Corporate environmental reporting: A test of legitimacy theory. *Account. Audit. Account. J.* **2000**, *13*, 10–26. [CrossRef]
51. Deegan, C. Introduction: The legitimising effect of social and environmental disclosures–a theoretical foundation. *Account. Audit. Account. J.* **2002**, *15*, 282–311. [CrossRef]

52. Deegan, C.; Rankin, M.; Voght, P. Firms' disclosure reactions to major social incidents: Australian evidence. In *Accounting Forum*; Taylor & Francis: London, UK, 2000.
53. Roberts, R.W. Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Account. Organ. Soc.* **1992**, *17*, 595–612. [CrossRef]
54. Freeman, R.E.; Harrison, J.S.; Wicks, A.C.; Parmar, B.L.; De Colle, S. Stakeholder theory: The State of The art. *Acad. Manag. Ann.* **2010**, *4*, 403–445.
55. He, J.J.; Huang, J.; Zhao, S. Internalizing governance externalities: The role of institutional cross-ownership. *J. Financ. Econ.* **2019**, *134*, 400–418. [CrossRef]
56. Wu, X.; Li, Y.; Feng, C. Green innovation peer effects in common institutional ownership networks. *Corp. Soc. Responsib. Environ. Manag.* **2023**, *30*, 641–660. [CrossRef]
57. Luo, X.R.; Wang, D. Are politically endorsed firms more socially responsible? Selective engagement in corporate social responsibility. *J. Bus. Ethics* **2021**, *170*, 535–555. [CrossRef]
58. Yang, J.; Shi, D.; Yang, W. Stringent environmental regulation and capital structure: The effect of NEPL on deleveraging the high polluting firms. *Int. Rev. Econ. Financ.* **2022**, *79*, 643–656. [CrossRef]
59. Azar, J.; Schmalz, M.C.; Tecu, I. Anticompetitive effects of common ownership. *J. Financ.* **2018**, *73*, 1513–1565. [CrossRef]
60. Lin, S.-H.; Chen, Y.-J.; Wang, T.-L.; Angela Liu, Y.-C. FDIs in life cycle stages: Firm-level evidence from Taiwan. *Appl. Econ. Lett.* **2012**, *19*, 393–397. [CrossRef]
61. Senchack, A.J. The firm's optimal financial policies: Solution, equilibrium, and stability. *J. Financ. Quant. Anal.* **1975**, *10*, 543–555. [CrossRef]
62. Adizes, I. *Managing Corporate Lifecycles*; The Adizes Institute Publishing: Santa Barbara, CA, USA, 2004.
63. Ararat, M.; Sayedy, B. Gender and climate change disclosure: An interdimensional policy approach. *Sustainability* **2019**, *11*, 7217. [CrossRef]
64. Kamthe, M.; Verma, D.S. Product life cycle and marketing management strategies. *Int. J. Eng. Res. Technol. (IJERT)* **2013**, *2*, 2035–2042.
65. Wang, S.; Wang, H.; Wang, J.; Yang, F. Does environmental information disclosure contribute to improve firm financial performance? An examination of the underlying mechanism. *Sci. Total Environ.* **2020**, *714*, 136855. [CrossRef]
66. Kelly, T.G. Institutional investors as environmental activists. *J. Corp. Law Stud.* **2021**, *21*, 467–489. [CrossRef]
67. Rannikko, H.; Tornikoski, E.T.; Isaksson, A.; Löfsten, H. Survival and growth patterns among new technology-based firms: Empirical study of cohort 2006 in Sweden. *J. Small Bus. Manag.* **2019**, *57*, 640–657. [CrossRef]
68. Morrow, J., Jr.; Sirmon, D.G.; Hitt, M.A.; Holcomb, T.R. Creating value in the face of declining performance: Firm strategies and organizational recovery. *Strateg. Manag. J.* **2007**, *28*, 271–283. [CrossRef]
69. Li, Q.; Maqsood, U.S.; Zahid, R.A. Nexus between government surveillance on executive compensation and green innovation: Evidence from the type of state-owned enterprises. *Bus. Ethics Environ. Responsib.* **2023**, *33*, 94–112. [CrossRef]
70. Li, Q.; Maqsood, U.S.; Zahid, R.M.A.; Anwar, W. Regulating CEO pay and green innovation: Moderating role of social capital and government subsidy. *Environ. Sci. Pollut. Res.* **2023**, *31*, 46163–46177. [CrossRef]
71. Nguyen, T.H.; Elmagrhi, M.H.; Ntim, C.G.; Wu, Y. Environmental performance, sustainability, governance and financial performance: Evidence from heavily polluting industries in China. *Bus. Strategy Environ.* **2021**, *30*, 2313–2331. [CrossRef]
72. Xiao, H.; Xi, J. The Impact of Institutional Cross-ownership on Corporate Tax Avoidance: Evidence from Chinese Listed Firms. *Aust. Account. Rev.* **2023**, *33*, 86–105. [CrossRef]
73. Kang, J.-K.; Luo, J.; Na, H.S. Are institutional investors with multiple blockholdings effective monitors? *J. Financ. Econ.* **2018**, *128*, 576–602. [CrossRef]
74. Hossain, M.; Perera, M.H.B.; Rahman, A.R. Voluntary disclosure in the annual reports of New Zealand companies. *J. Int. Financ. Manag. Account.* **1995**, *6*, 69–87. [CrossRef]
75. Calabrò, A.; Vecchiarini, M.; Gast, J.; Campopiano, G.; De Massis, A.; Kraus, S. Innovation in family firms: A systematic literature review and guidance for future research. *Int. J. Manag. Rev.* **2019**, *21*, 317–355. [CrossRef]
76. Maqsood, U.S.; Li, Q.; Zahid, R.M.A.; Wang, S. From greed to good: How government regulations of executive compensation impact corporate ESG performance? *Asia-Pac. J. Account. Econ.* **2023**, *31*, 1072–1092. [CrossRef]
77. Wu, C.-F.J. Jackknife, bootstrap and other resampling methods in regression analysis. *Ann. Stat.* **1986**, *14*, 1261–1295. [CrossRef]
78. Baron, R.M.; Kenny, D.A. The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *J. Personal. Soc. Psychol.* **1986**, *51*, 1173. [CrossRef] [PubMed]
79. Sobel, M.E. Asymptotic confidence intervals for indirect effects in structural equation models. *Sociol. Methodol.* **1982**, *13*, 290–312. [CrossRef]
80. Xi, C. In search of an effective monitoring board model: Board reforms and the political economy of corporate law in China. *Conn. J. Int'l L.* **2006**, *22*, 1.

81. Shipman, J.E.; Swanquist, Q.T.; Whited, R.L. Propensity score matching in accounting research. *Account. Rev.* **2017**, *92*, 213–244. [CrossRef]
82. Li, Z.; Zhang, T.; Zhao, X.; Zhu, Y. Monitoring or Colluding? Institutional Investors' Heterogeneity and Environmental Information Disclosure Behavior. *Front. Psychol.* **2022**, *13*, 911901. [CrossRef]
83. Li, Q.; Ruan, W.; Li, R.; Li, H. Do institutional investors' holdings affect corporate environmental information disclosure? Evidence from China. *Environ. Dev. Sustain.* **2022**, *25*, 14733–14751. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.