



LUND UNIVERSITY

School of Economics and Management
BUSN79 – Master Thesis in Accounting and Finance
2023-05-28

Environmental and Social Performance and the Firm Performance of Chinese Listed Companies - *A Study of the Moderating Role of Government Ownership and CEO Duality*

Authors:

**Fan Hu
Grafika Cynthia Trinanda**

Supervisor:

Reda Moursli

Summary

Seminar date:	June 1st, 2023
Course:	BUSN79 Degree Project in Accounting and Finance
Authors:	Fan Hu and Grafika Cynthia Trinanda
Advisor/Examiner:	Reda Moursli / Elias Bengtsson
Five key words:	Environmental, Social, Firm Value, government ownership, CEO duality
Purpose:	This study aims to examine the relationship between environmental and social (ES) performance and firm performance. Additionally, we explore the potential moderating effects of government ownership and CEO duality on the relationship between ES and firm performance.
Methodology:	This study adopts a quantitative approach using fixed effects panel regressions to analyze the relationships between environmental and social (ES) performance and firm performance.
Theoretical perspectives:	The analysis is conducted using previous empirical literature and theoretical perspectives based on agency theory, stakeholder theory, government ownership and CEO duality
Conclusions:	Our study found a positive association between ES performance and firm financial performance, but these relationships were not statistically significant. However, when considering the interaction of government ownership and CEO duality, we observed significant changes in the results, with ES performance showing a positive and significant correlation with Tobin's Q.

Acknowledgements

We would like to sincerely thank our supervisor Reda Moursli for his commitment and guidance throughout the process of writing this thesis. Your feedback and dedication have improved the thesis and facilitated the process.

Fan Hu

Grafika Cynthia Trinanda

Table of Contents

1. INTRODUCTION	5
1.1 RESEARCH BACKGROUND	5
1.2 PROBLEM DISCUSSION	6
1.3 PURPOSE AND RESEARCH QUESTION	6
1.4 METHODOLOGY	7
1.5 MAIN FINDINGS AND LIMITATION	7
1.6 CONTRIBUTION	8
1.7 OUTLINE	9
2. ES LANDSCAPE, GOVERNMENT OWNERSHIP AND CEO DUALITY IN CHINA	9
2.1 ENVIRONMENTAL AND SOCIAL (ES) LANDSCAPE IN CHINA	9
2.2 GOVERNMENT OWNERSHIP AND CEO DUALITY IN CHINA	10
3. THEORETICAL BACKGROUND	11
3.1 ENVIRONMENT AND SOCIAL PERFORMANCE	11
3.2 AGENCY THEORY	13
3.3 STAKEHOLDER THEORY	13
3.4 GOVERNMENT OWNERSHIP	14
3.5 CEO DUALITY	15
4. EMPIRICAL LITERATURE REVIEW	17
4.1 ES PERFORMANCE AND FIRM'S PERFORMANCE	17
4.2 ENVIRONMENTAL PERFORMANCE AND FIRM'S PERFORMANCE	18
4.3 SOCIAL PERFORMANCE AND FIRM'S PERFORMANCE	18
4.4 GOVERNMENT OWNERSHIP AS A MODERATOR IN THE ES AND FIRM PERFORMANCE	19
4.5 CEO DUALITY AS A MODERATOR IN THE ES AND FIRM PERFORMANCE	20
5. HYPOTHESIS DEVELOPMENT	20
5.1 ES PERFORMANCE AND FIRM'S PERFORMANCE	21
5.2 ENVIRONMENTAL PERFORMANCE AND FIRM'S PERFORMANCE	21
5.3 SOCIAL PERFORMANCE AND FIRM'S PERFORMANCE	22
5.4 GOVERNMENT OWNERSHIP AS A MODERATOR IN THE ES AND FIRM PERFORMANCE	22
5.5 CEO DUALITY AS A MODERATOR IN THE ES AND FIRM PERFORMANCE	23
6. METHODOLOGY	24
6.1 DEDUCTIVE APPROACH	24
6.2 PANEL REGRESSION	25
6.3 INTERACTION MODEL	26
6.4 ECONOMETRIC MODELS	27
6.5 ROBUSTNESS TEST	28
7. DATA SUMMARY AND DESCRIPTIVE STATISTICS	28
7.1 SAMPLE DESCRIPTION	28
7.2 VARIABLES IN THE MODELS	30
7.2.1 <i>Dependent Variable (Tobin's Q)</i>	30
7.2.2 <i>Explanatory Variable</i>	31

7.2.3	<i>Interaction Variables</i>	31
7.2.4	<i>Control Variable</i>	32
7.3	DESCRIPTIVE STATISTICS	33
7.4	CORRELATION ANALYSIS	35
7.5	HETEROSCEDASTICITY	36
8.	EMPIRICAL FINDINGS	36
8.1	UNIVARIATE ANALYSIS	36
8.2	ANALYSIS OF ES PERFORMANCE AND FIRM PERFORMANCE (H1)	39
8.3	ANALYSIS OF THE MODERATING EFFECT OF STATE OWNERSHIP (H2)	41
8.4	ANALYSIS OF THE MODERATING EFFECT OF CEO DUALITY (H3)	45
8.5	ROBUSTNESS TEST ANALYSIS	49
8.5.1	<i>Government Ownership</i>	49
8.5.2	<i>Price-to-Book Ratio</i>	51
9.	CONCLUSION	53
10.	REFERENCES	55
11.	LIST OF TABLES	63

1. Introduction

This chapter discuss the background of this study, including a problem discussion regarding present gap in previous research, as well as the purpose and research questions to be investigated. This is followed by the key findings, our contribution to the topic, and the study's limitations.

1.1 Research Background

The growing concern for sustainability in society has been a gradual process driven by increased awareness of environmental and social issues. This has led to an evolution in the role of businesses, extending beyond traditional profit generation for shareholders. In addition to economic performance, stakeholders now require businesses to adopt a comprehensive approach to their responsibilities that includes environmental and social impacts. Significant international agreements, such as the Paris Agreement (2015) and the initiation of the United Nations' Sustainable Development Goals (SDGs), have highlighted the urgency of sustainability. These agreements result in a changing regulatory landscape with significant implications for various industries. Consequently, businesses have made commitments to reduce their carbon footprints and align their practices with the broader sustainability agenda (United Nations, 2021).

As a result, Environmental and Social (ES) considerations, together with Governance (forming the ESG), have been crucial criteria to assess the impact and overall performance of a company. Therefore, investors who prioritize long-term returns on investment have begun to consider these factors in their investment decisions. The speed at which China's economy has grown has been remarkable. Additionally, by 2020, China's GDP had grown to over \$15 trillion, making it the world's second-largest economy after the United States (World Bank Report, 2020). China's fast-growing economy has brought benefits but also environmental and social concerns. The potential moderating roles of government ownership and CEO duality are important yet overlooked aspects of the relationship between environmental and social (ES) performance and firm performance. In China, the presence of state-owned enterprises (SOEs) and the influence of government ownership structure can significantly impact a company's ES performance and firm performance, as the government's goals may differ from those of private shareholders. CEO duality is another influential factor, which can result in efficient decision-making but may generate conflicts of interest and accountability concerns. Given these

complexities, further investigation is needed to understand the relationship between ES performance, firm performance, government ownership, and CEO duality.

1.2 Problem Discussion

The existing research in ES performance and firm performance has primarily focused on examining the overall Environmental, Social, and Governance (ESG) performance (Ruan & Liu, 2021; Xie et al., 2017; Friede, Busch & Bassen, 2015; Wang et al., 2022). This comprehensive ESG approach, while valuable in offering a holistic perspective, can potentially hide the individual effects and interactions of the various ESG factors. Consequently, there is an increasing need to explore and understand these components' influences and interactions.

Our study examines the Environmental and Social (ES) components while excluding the Governance (G) factor, in line with Gillan, Koch & Starks (2021). This decision enables us to study deeper into understanding the impacts and dynamics of environmental and social performance on firm performance without being overwhelmed by many corporate governance factors. Nevertheless, the relationship between ES performance and firm performance remains unclear. Previous studies reported mixed findings, with some indicating a positive correlation between ES performance and firm performance, others found a negative relationship, and some studies.

Moreover, the potential moderating factors in the relationship between ES and firm performance have not been extensively explored. Our research will consider the roles of government ownership and CEO duality, two factors that may significantly impact how ES performance impact firm performance. Despite their potential importance, these factors have often been overlooked in previous research, creating a gap that our study aims to address. By considering these moderating variables, we aim to provide a more nuanced understanding of how ES performance affects firm performance.

1.3 Purpose and Research Question

This study aims to examine the relationship between environmental and social (ES) performance and firm performance. Specifically, we aim to investigate whether ES performance significantly impacts firm performance. Additionally, we explore the potential

moderating effects of government ownership and CEO duality on the relationship between ES and firm performance.

Research Question 1: Does ES performance have an impact on firm performance?

Research Question 2: Does government ownership moderate the relationship between ES performance and firm performance?

Research Question 3: Does CEO duality moderate the relationship between ES performance and firm performance?

By addressing these research questions, we aim to contribute to the existing literature by providing insights into the relationship between ES and firm performance and the potential moderating effects of government ownership and CEO duality.

1.4 Methodology

This study adopts a quantitative approach using fixed effects panel regressions to analyze the relationships between environmental and social (ES) performance and firm performance. The analysis will involve estimating regression models that examine the relationship between ES performance and Tobin's Q while also exploring the potential moderating effects of government ownership and CEO duality. Additionally, robustness checks will be conducted to ensure the reliability of the findings. Results will be evaluated at appropriate levels of statistical significance.

The sample for this study consists of companies listed on the Shanghai and Shenzhen Stock Exchanges from 2016 to 2021. These exchanges were chosen due to their significance in the Chinese market and the availability of relevant data. Data for this study will be collected from various sources, including annual reports, Environmental and Social scores from the Bloomberg database, and governance data from China Stock Market & Accounting Research Database (CSMAR). The measure of firm performance used in this study is Tobin's Q, a popular metric used to determine a firm's market value relative to its asset value.

1.5 Main Findings and Limitation

This study utilizes a fixed-effects model to probe the correlation between environmental-social (ES) performance, CEO duality, and state ownership (SOE) on the firm performance represented by Tobin's Q. Initial findings depicted a positive association between ES

performance and firm financial performance. However, these relationships are not statistically significant.

Including interaction terms, the findings showed changes. ES performance showed a positive, statistically significant correlation with Tobin's Q, highlighting the firm's superior ES performance. However, the interaction between environmental-social (ES) performance and state-owned enterprises (SOEs) is negatively and significantly correlated with Tobin's Q. This suggests that the positive relationship between ES performance and a firm's performance is weakened in SOEs. State-owned enterprises inherently have social and economic objectives, which may create pressures to prioritize non-financial goals over maximizing firm value.

Furthermore, our findings reveal that ES performance and CEO duality positively and significantly correlate with Tobin's Q. However, we find a significant negative correlation when examining the interaction between CEO duality and ES performance. This implies that CEO duality can benefit a firm's performance due to increased efficiency and unity of command. However, CEO duality can be a limiting factor when it comes to generating the full benefits of good ES performance.

While the utilization of fixed effects models with clustered standard errors in our research help in mitigating some endogeneity issues, specifically, those emerging from omitted variable bias, our study does not account for endogeneity resulting from simultaneity. Consequently, potential bias arising from the simultaneous determination of ES performance and firm performance may persist in our findings.

1.6 Contribution

This research contributes to the existing knowledge in multiple ways. Firstly, it extends the understanding of the relationship between environmental and social (ES) performance and firm performance. In addition, the study explores the role of government ownership and CEO duality as a moderating factor in ES performance, addressing a gap in the existing literature.

While prior research has explored this relationship, our study looks deeper to provide a more nuanced understanding. This study is particularly relevant in economies where government-owned enterprises play a significant role. Our findings could inform policymaking and strategic

decisions for these entities. Collectively, these contributions provide a more holistic understanding of ES performance's impacts on firms and the conditions under which these impacts may vary. It can inform business strategy, investor decision-making, and policy development in the context of sustainability.

1.7 Outline

The paper is structured as follows. Section 2 provides an explanation of ES Landscape, Government Ownership and CEO Duality in China. Section 3 elaborates theoretical review and section 4 provides summary of the relevant empirical literature on the relationship between ES performance, government ownership, and firm performance. Section 5 outlines several hypotheses based on theoretical review and previous studies. Section 6 explains the methodology employed, including the interaction regression models used. In Section 7, we describe the sample and the variables used in this study. Section 8 presents the empirical results and discussion. Finally, we conclude in Section 9.

2. ES Landscape, Government Ownership and CEO Duality in China

This chapter provides elaboration of the Environmental and Social (ES) Landscape, Government Ownership, and CEO Duality in China

2.1 Environmental and Social (ES) Landscape in China

In "Our Common Future" report (The United Nations World Commission on Environment and Development, 1987) the concept of sustainable development was introduced and emphasized the balance between economic growth, social and environmental protection. In the wake of this trend, the Chinese government has also launched several CSR disclosure programs in China. In 2000, the Shanghai Stock Exchange (SSE) began a journey to improve the social responsibility transparency of its listed companies. This was evidenced by the introduction of the "Guidance on Governance of Listed Companies". Additionally, SSE also promulgated the "Guide on Environmental Information Disclosure for Companies Listed on the Shanghai Stock Exchange" in May 2008. The Shenzhen Stock Exchange (SZSE) released "the Guide on Listed Companies' Social Responsibility" in 2006 to achieve scientific advancement, create a harmonious community, progress toward economic and social sustainability, and promote corporate social responsibility (Lin LW, 2009).

In 2009, the China Securities Regulatory Commission (CSRC), similar to the US Securities and Exchange Commission (SEC), began implementing strict regulations. The CSRC is responsible for developing and enforcing securities laws and regulations, monitoring the securities industry and firms, protecting investors' rights and interests, and maintaining a fair and open market. The CSRC has instructed more than 360 listed companies on the SSE and SZSE to include social responsibility reports in their annual reports to fulfill these obligations (Siddy, 2009). In September 2018, the CSRC revised the "Code of Governance for Listed Companies", outlining the social responsibility of listed companies concerning environmental protection, employees, and stakeholders. It also increased the requirements for environmental protection and social responsibility among listed companies (Siddy, 2009).

2.2 Government Ownership and CEO duality in China

Corporate governance is another critical factor that may have a significant role in the relationship between ES performance and firm performance, particularly in China's unique ownership structure. A key difference between China and developed Western countries is that China has many state-owned enterprises (Xu & Wang, 1999). In China, state-owned enterprises are often seen as representing the interests of the government and as such, they are held to higher standards of accountability and transparency. The concentrated ownership structure in China presents unique challenges to effective corporate governance mechanisms. This creates a horizontal agency conflict between controlling and minority shareholders, which differs from Western countries' classical vertical agency problems (Jiang & Kim, 2020; Hu, Tam & Tan, 2009). While concentrated ownership can provide better monitoring of corporate activities, it can also lead to minority shareholders expropriation.

State-owned enterprises manifest in two forms: those under absolute state control and those under relative state control. According to the Identification of State-owned Corporate Enterprises by the National Bureau of Statistics, an enterprise under absolute state control refers to one where the government owns more than 50% ownership. Conversely, a relatively state-controlled enterprise is characterized by government ownership not exceeding 50% of the total share capital but is relatively higher than other shareholders, such as private and institutional investors. Alternatively, the government may exert effective control via an agreement, even if its ownership is not the largest.

Additionally, CEO duality, wherein the CEO also serves as the board chair, is a distinctive feature of corporate governance in China. This is significantly influenced by the country's unique cultural and institutional environment (Jiang & Kim, 2020). According to agency theory, the separation of roles between decision management and decision control disappears when the CEO is also the board chair, and therefore, the CEO becomes more powerful, which leads to self-seeking behavior (Jensen, 1993).

3. Theoretical Background

This chapter serves to provide a comprehensive theoretical foundation for the study. We explore key theories, including Agency Theory, Stakeholder Theory, Government Ownership, CEO Duality, and ES Performance. This theoretical exploration sets the stage for our empirical investigation, allowing us to examine the nuanced relationships and dynamics that shape the outcomes of interest in our study.

3.1 Environment and Social Performance

Environmental and Social (ES) factors include a wide range of crucial aspects, such as supply chain management, sustainable product development, community rights, ethics & compliance, labor & employment practice, and product quality management (Methodology for Environmental and Social Scores, Bloomberg, December 2020). Recognizing environmental and social (ES) factors as essential drivers of value creation and long-term sustainability have encouraged businesses to integrate these factors into their strategic decision-making processes. Firms that effectively manage ESG factors can improve risk management, obtain a competitive advantage, and enhance their reputation, ultimately leading to enhanced firm performance (Giese et al., 2019; Martínez et al., 2014). However, the costs associated and a lack of understanding of the impact of ES implementation remain significant barriers (Ruan & Liu, 2021).

Firms that implement environmental and social (ES) practices are widely recognized as being less risky and more reputable, which in turn makes them appealing to risk-averse and socially conscious investors (Giese et al., 2019). By prioritizing ES factors, firms can effectively build resilience against market shocks, thereby reducing systemic risk and ultimately lowering their cost of capital (Giese et al., 2019; Eichholtz et al., 2019). Moreover, aligning business practices with ES principles not only improves risk management but also drives long-term

value creation. By mitigating risks, reducing costs, and enhancing operational efficiency, companies gain a competitive advantage in the market (Wagner and Schaltegger, 2004). This strategic alignment also enables them to identify new business opportunities and promotes innovation. This strategic alignment enables companies to meet the growing demand for sustainable and responsible business practices, ultimately leading to sustained financial performance and shareholder value.

Commitment to comply with ES standards and ethics demonstrates their trustworthiness and responsibility, therefore attracting customers who prioritize ethical and sustainable practices (Wagner and Schaltegger, 2004). ES principles improve a company's reputation and encourage customer loyalty by aligning with its values and expectations. Strategic alignment helps firms stand out and strengthen stakeholder relationships. Companies can increase customer loyalty and brand perception by prioritizing employee rights and building strong relationships with suppliers and the community (Saura et al., 2020; Hawkins et al., 2010). ES integration comprehensively puts firms for long-term success and sustainable value creation.

Additionally, upholding employee rights is important for the success of an organization. By participating in labor practices, a company may create a productive and empowering workplace (Voorde et al., 2016). Businesses that prioritize employee well-being, fair compensation, diversity, and inclusion demonstrate high ethical standards while achieving greater employee satisfaction, lower employee turnover and increased productivity (Bhatti et al., 2020). Aligning business practices with employee rights increases performance, consequently nurturing a resilient and sustainable organization. Moreover, a strong emphasis on employee rights demonstrates the company's commitment to social responsibility, which enhances its reputation and attractiveness to prospective employees and stakeholders (Chen, Kuo & Chen, 2022).

However, despite the numerous benefits of implementing ES practices into business operations, incorporation is constrained by some obstacles. One key challenge is the associated costs of implementing and maintaining ES initiatives. Companies may view these costs as an additional financial burden, especially if they are unaware of the long-term value and competitive advantages of such practices (Lin et al., 2021). Additionally, a lack of understanding and awareness regarding the importance of ES implementation may contribute to the hesitation in embracing these principles.

3.2 Agency Theory

The agency theory explains how principals (capital provider) and agents interact. Agents, who are responsible for the daily management of the business and have a better understanding of the business and are responsible for decision-making. This theory recognizes the potential conflicts of interest and challenges that can arise due to the separation of ownership and control in business (Meckling & Jensen, 1976). According to the agency theory, when shareholders delegate decision-making authority and control to professional managers, there is a risk that the managers will not always prioritize shareholder interests over their own, resulting in an agency problem (Meckling & Jensen, 1976).

In 1986, Jensen further expanded on the agency theory by introducing the free cash flow hypothesis concept. The hypothesis suggests that companies should return excess free cash flows to shareholders through methods such as dividends or share repurchases, as this reduces the availability of resources for potentially wasteful spending (Jensen, 1986).

The presence of information asymmetry contributes to the agency problem, given that the agent has more information about their actions and the state of the business than the principal. This information asymmetry can lead to moral hazard (managers take hidden actions) and adverse selection, where hidden information affects decision-making (Akerlof, 1970; Rothschild & Stiglitz, 1976). Managers, for example, may prefer engaging in ES initiatives that enhance their reputation but may not necessarily bring shareholder value (Barnea & Rubin, 2010; Nekhili et al., 2021). Conversely, they might neglect ES initiatives to maximize immediate financial returns, ignoring the potential long-term benefits to the firm's reputation and risk management.

3.3 Stakeholder Theory

Stakeholder theory suggests that businesses should be responsible to those who can affect, or are affected by, the firm's operations and decisions (Freeman, 1984). This includes not only shareholders and employees but also customers, suppliers, local communities, regulators, and even society at large (Freeman, 2010). According to this theory, when the interests of all stakeholders are considered, long-term business success and sustainable value creation can be achieved. Stakeholder theory highlights the importance of ethical behavior, social responsibility, and sustainable practices while making decisions. This might mean considering the environmental impact of business operations, treating employees fairly, trading ethically

with suppliers, and contributing positively to the communities in which they operate. By taking care of these social responsibilities, businesses can develop positive relationships with their stakeholders, contributing to long-term success (Freeman, 1984).

3.4 Government Ownership

Government ownership, also referred to as state-owned enterprise (SOE), is common in several sectors, particularly those considered strategic or vital for the public good. The government monitors SOEs, ensuring compliance with regulations, promoting transparency, and safeguarding the public interest (Sun et al., 2002). According to Sheng et al. (2011), the Chinese government retains tight control over scarce resources such as land, bank loans and subsidies. Having easier access to these scarce resources might be helpful for SOEs to gain competitive advantages in the market and take ES initiatives, therefore helps SOEs improve firms' performance. In addition, as a shareholder and policymaker, the government is responsible for monitoring the operations and performance of SOEs (Shengyu Li et al., 2019). However, this dual role may add complexity and lead to conflicts of interest between the government and other shareholders, particularly concerning the pursuit of a firm's performance.

On the other hand, the increased government control and monitoring can harm their operational flexibility and decision-making autonomy, consequently limiting their capacity to maximize firm value (Yesilkagit et al., 2008). Even though intended to protect public interests, increased monitoring and regulation may discourage entrepreneurial initiative, innovation, and flexibility essential for maintaining a competitive advantage in today's dynamic business environment. Government ownership gives rise to various agency problems as the government represents the public interest and may have different objectives and interests than other shareholders (Sun et al., 2002; Chen et al., 2017). Governments aim to achieve their social objectives through these companies, and there may be higher expectations for SOEs to deliver positive social outcomes alongside their financial performance. This dual mandate may create additional challenges for SOEs (Chen et al., 2017). Furthermore, control and cash flow rights may conflict if the largest shareholder is the controlling shareholder. Consequently, the conflict of interest between the largest and minority shareholders will be worsen (Fama & Jensen, 1983; Morck, Shleifer & Vishny, 1989).

State-owned enterprises (SOEs) often have a concentrated ownership structure, with the government as the controlling shareholder having significant power and influence over decision-making processes within the company. This power asymmetry can lead to conflicts of interest and agency problems, as the objectives and motivations of the controlling shareholders may not align with those of minority shareholders (Cheung et al., 2010). When the controlling shareholders prioritize their interests, it can lead to minority expropriation, a phenomenon known as tunneling (Cheung et al., 2010; Johnson et al., 2000) and self-dealing. In addition, Chinese SOE managers are primarily motivated by political promotion (Cao et al., 2019; Fan et al., 2007) and are not heavily incentivized by good performance or penalized for poor performance. Consequently, SOE managers prioritize the interests of the state-controlling shareholder over minority shareholders.

The tunneling effect is a serious concern in Chinese state-owned enterprises (SOEs), as it may hinder them from maximizing profits and achieving their full potential (Cheung et al., 2010). Despite heavy policy burdens, SOEs may overinvest because of the additional funding in case of financial constraints (Lin et al., 1998; Zhang et al., 2022). This soft budget constraint can lead to a moral hazard where they may engage in excessive investments and increase firms' risk. Additionally, information asymmetry makes it difficult for the state to distinguish between losses caused by policy burdens or managerial opportunism (Lin & Tan, 1999). This behavior can result in inefficient resource allocation and decreased firm value (Kuzman et al., 2018). In addition, less strict bank monitoring may worsen information asymmetry and reduce compliance, raising the risk faced by SOEs (Xiaofei Pan et al., 2013).

Finally, the government's role in SOEs as a major stakeholder and policymaker brings benefits and challenges to implementing ES initiatives and firm performance. Additionally, agency problems and conflicts of interest between stakeholders may complicate the successful implementation of ES programs.

3.5 CEO Duality

CEO duality refers to the situation where the CEO of a company also serves as the chairman of the board of directors. This circumstance gives the CEO significant influence over decision-making and oversight (Kosnik, 1987). CEO duality can promote command unity and improve decision-making (Boyd, 1995; Donaldson, 1990; Donaldson & Davis, 1991). In contrast, it can

lead to conflicts of interest and a lack of accountability (Augustine Duru et al., 2016). Therefore, the CEO's duality may influence the relationship between ES and firm performance.

CEO duality can improve decision-making efficiency by reducing conflicts between the CEO and the board. According to the stewardship theory (Donaldson, 1990; Donaldson & Davis, 1991), CEOs act in the shareholders' best interests by using the stronger unified leadership that comes with duality. Unified leadership might allow faster decision-making, a clear strategic vision, and frictionless implementation (Massie, 1965). In addition, unified leadership reduces coordination and information acquisition costs and facilitates quick, effective decision-making and adaptability (Boyd, 1995; Jensen & Mecklenburg, 1995; Yang & Zhao, 2014; Li et al., 2019).

In the context of ES initiatives, decisions can be made and implemented more quickly. There is typically less bureaucratic delay because two parties are not required to discuss thoroughly (Yang et al., 2014). This efficiency can be crucial in quickly responding to ES issues or capitalizing on opportunities that align with the firm's sustainability goals. Moreover, The CEO-Chair can establish a comprehensive and cohesive ES strategy and integrate it into the company's overall vision, resulting in enhanced firm performance.

Conversely, there are lack of checks and balances when one person holds both positions. The centralization of power might undermine the board's oversight role (Donaldson & Davis, 1991; Daily & Schwenk, 1996; Tian & Lau, 2001). There may be no impartial oversight, and the CEO's decisions may not be evaluated critically. Further, the concentration of power could limit diverse perspectives and checks on decisions (Yang et al., 2014; Duru et al., 2016), which may not always result in the best ES outcomes. A lack of board oversight can also result in decisions prioritizing short-term financial performance over long-term ES objectives.

Further, agency theory suggests that CEO duality increases the CEO's entrenchment and power over the board, resulting in higher agency costs, especially among larger and more complex firms that are more difficult to monitor and have more resources to waste (Jensen & Meckling, 1976; Fama & Jensen, 1983; Jensen, 1993). This could negatively impact the company's performance and shareholder value in the long run.

4. Empirical Literature Review

This chapter provides an in-depth analysis of previous empirical studies conducted in the field of ES Performance and Firm's Performance. Additionally, we examined the moderating role of Government Ownership and CEO Duality in the relationship between ES Performance and Firm Performance.

4.1 ES Performance and Firm's Performance

Environmental and social (ES) factors have significantly shaped a company's performance and competitiveness in the modern business landscape. Organizations can mitigate risks, enhance their reputation, and gain a competitive edge within their industry by having a strong ES profile and implementing ES practices. This strategic alignment facilitates the development of long-term business plans, ultimately leading to improved financial performance and sustainability (Barney, 1991). Many scholars have extensively studied the relationship between ES performance and corporate financial performance. Friede, Busch & Bassen (2015) compiled a list of ESG-related studies over 40 years from the 1970s. According to the authors, firms with better ES are perceived as more trustworthy and responsible due to their compliance standards and governance (Friede, Busch & Bassen, 2015). This reduction of information asymmetry attracts risk-averse investors who value ethical and sustainable practices, positively impacting financial performance (Giese et al., 2019). In addition, strong ESG performance can enhance a company's reputation, leading to increased customer loyalty and preference for the brand (Austmann & Vigne, 2021).

Giese et al. (2019) found that companies with a robust ESG profile exhibit greater resilience to systematic market shocks, demonstrating lower systematic risk. Ultimately, this reduced risk exposure contributes to a lower cost of capital, resulting in higher valuations for these companies (Giese et al., 2019). In addition, Zhou, Liu & Luo (2022) revealed in their study that improved ESG performance led to higher firm value, as measured by Tobin's Q, and operational capability as indicated by the total asset turnover ratio, played a key intermediary role in this relationship.

However, the associated costs are a key challenge in implementing and sustaining ES initiatives. Ruan and Liu (2021) found a significant negative correlation between ESG performance and firm performance, as measured by Tobin's Q and ROA. They argued that

China, an emerging market, may face significant cost burdens due to ES disclosure requirements imposed on listed companies. Furthermore, investors and companies may need a clearer understanding of the precise impact of ES activities on corporate performance (Ruan & Liu, 2021).

4.2 Environmental Performance and Firm's Performance

With increasing global environmental concerns, there is a greater focus on integrating environmental performance into firm's operation and strategic planning to enhance the value of products. Alareeni and Hamdan (2020) showed that ESG disclosure positively impacted all firms' operational, financial, and market performance, as measured by ROA, ROE, and Tobin's Q, respectively. The authors studied the relationship between ESG disclosure and firm performance using a sample of 4,869 observations from US S&P 500-listed companies between 2009 and 2018. However, when analyzed separately, environmental disclosure had a negative relationship with operational and financial performance, while it was positively related to Tobin's Q, indicating a favorable impact on market performance.

In addition, Chen, Kuo & Chen (2022) analyzed the impact of equity structures and climate change related risks and opportunities disclosure on global manufacturing companies' ESG and financial performance indicators from 2005 to 2020 using a multilevel quadratic growth model. The results revealed a positive environmental and financial performance correlation across different equity structures. However, the result showed that companies may experience a change in the impact of environmental performance on financial performance, from positive to negative, when implementing various ES-related activities, resulting in increased operating costs and a gradual decline in financial performance.

4.3 Social Performance and Firm's Performance

In a study on S&P 500 firms, Alareeni and Hamdan (2020) found that there is negative relationship between corporate social responsibility (CSR) disclosure and operational and financial performance, potentially due to the increased financial costs of engaging in socially responsible practices. However, CSR disclosure was positively related to Tobin's Q, indicating favorable impact on market performance as firms use CSR disclosure to attract investors.

However, Chen, Kuo & Chen (2022) found that there was no direct relationship between social performance and financial performance. Additionally, Xie et. al (2018) found the relationship between social activities and corporate financial performance is controversial. They analyzed data from 74 countries and 11 sectors in 2015, using ESG data from Bloomberg. Further, Xie et. al (2018) found that practicing social activities can involve costs, which may reduce profits and efficiency if the costs outweigh the benefits. Some social activities, such as health and safety policies and employee CSR training, have been found to have a negative or no relationship with financial performance (Xie et al., 2018). Engaging in social activities that come with high costs may reduce profits and efficiency, potentially leading to negative effects on a company's operational and financial performance (Xie et al., 2018).

4.4 Government Ownership as a Moderator in the ES and Firm Performance

The government and regulatory authorities promote the improvement of policies and the guidance of paths of ES to better conduct ES activities that promote the transition of the entire society to high-quality development. Additionally, investors attach importance to sustainable investment to inspire enterprises, finally achieving the virtuous circle of economy, society, and nature (Ruan & Liu, 2021).

Li et al. (2013) found that SOEs are also more likely to receive political and financial support from the government, which creates incentives for governmental leaders to assist SOEs. In exchange for this support, SOEs need to legitimize their position and, therefore, are more likely to disclose their CSR activities regardless of their profitability level. In China, SOEs are more likely to engage in social activities because it is driven by their role as a political player and their connection to the government (Li, Meng & Zhang, 2006). Further, the close relationship between SOEs and the government creates an inherent political connection that enables SOEs to enjoy financial and regulatory preferences (Wu et al., 2012). Additionally, Mamatzakis and Xu (2020) reported that the government ownership ratio and government-controlled companies positively influence the performance of Chinese mutual funds from 2005 to 2015. Governments, possessing a monopoly on the use of coercive power, can effectively oversee and regulate the operations of government-controlled companies.

However, SOEs are subject to political and strategic objectives alongside profit-maximizing goals. Li (2013) argued that corporate ownership structure could impact how managers

prioritize stakeholder management and make decisions about disclosure. SOEs' goals may differ from those of private shareholders. While private shareholders prioritize wealth maximization, the state may prioritize social welfare, which means that state-owned enterprises (SOEs) have objectives that include profit and social welfare (Lin et al. 2015). Further, Li et al. (2013) discovered that CSR disclosure is comparatively weaker among state-owned enterprises than their non-state-owned counterparts. These SOEs have a variety of societal aims that can sometimes conflict with efficiency goals.

4.5 CEO Duality as a Moderator in the ES and Firm Performance

Empirical evidence suggests varied results of CEO duality on firm performance. Tan et al. (2001) found that firms led by founder CEOs perform better, and the CEO duality structure is beneficial, especially in turbulent environments. Similarly, Elsayed et al. (2007) explained the positive effects of CEO duality, especially under low corporate performance, varied across industries, consistent with agency and stewardship theories.

However, contradictory findings occurred too. Riaqa Mubeen et al. (2020) found a negative correlation between CEO duality and firm performance, indicating that firms with separate CEO-chairman roles performed better. These findings are consistent with agency theory, suggesting that separating these roles can improve a firm's performance (Liu et al., 2015). Further supporting these findings, Shao (2018) observed a significantly negative correlation between CEO duality and firm performance. Moreover, Patrick Velte (2019) found that CEO's power negatively moderates the relationship between ESG performance and financial performance, suggesting the positive effect of high ESG performance on financial performance is weaker in firms where the CEO holds a dual role.

5. Hypothesis Development

The purpose of this chapter is to develop hypotheses that explore the relationship between ES performance and firm performance, with particular focus on the moderating role of government ownership and CEO duality, based on a comprehensive review of the theoretical arguments and empirical research in the field.

5.1 ES Performance and Firm's Performance

The theoretical perspective highlights the importance of ES factors in driving value creation and long-term sustainability. Firms that effectively manage ES factors are expected to improve risk management, obtain a competitive advantage, and enhance their reputation, which leads to enhanced firm performance. Regardless, it is important to consider the cost of implementing and maintaining ES initiatives.

Friede, Busch & Bassen (2015) found a positive relationship between ESG performance and firm performance. Companies with better ESG performance were perceived as less risky and trustworthy. Moreover, ES activities reducing information asymmetry attracts risk-averse investors who value ethical and sustainable practices, resulting in a positive impact on the company's financial performance (Giese et al., 2019; Frydman & Wang, 2020; Joliet & Titova, 2018). Additionally, companies with a robust ESG profile exhibited greater resilience to systematic market shocks, indicating lower systematic risk (Friede, Busch & Bassen., 2015). Supporting these findings, Zhou, Liu & Luo (2022) found that improved ESG performance was associated with higher firm value, as measured by Tobin's Q. However, Ruan and Liu (2021) presented a different perspective, revealing a significant negative correlation between ESG performance and firm performance. They argued that China, as an emerging market, may face significant cost burdens related to implementing ES initiatives. Therefore, it is possible to hypothesize that ES performance affects firms' performance.

H1: ES performance affects firms' performance.

5.2 Environmental Performance and Firm's Performance

Environmental initiatives are believed to enhance the competitiveness of businesses, achieve cost savings, ensure compliance with environmental regulations, and meet the expectations of stakeholders and environmentally conscious consumers (Kotsantonis et al., 2016; Alsayegh et al., 2020). Sustainable product development is also recognized as a crucial element of business strategy that can improve firm performance (Jermsittiparsert et al., 2021). In the empirical review, Alareeni and Hamdan (2020) found a negative relationship between environmental disclosure and operational and financial performance, while it was positively related to Tobin's Q. Chen, Kuo & Chen (2022) also discovered a positive correlation between environmental and financial performance. Therefore, it can be hypothesized that environmental performance affects firms' performance.

H2: Environmental performance affects firms' performance.

5.3 Social Performance and Firm's Performance

Based on the theoretical review, respecting and upholding employee rights is crucial for organizational success, as it creates a productive and empowering workplace (Voorde et al., 2016). Additionally, establishing strong relationships with local communities and suppliers fosters trust and cooperation, leading to mutual development and prosperity (Saura et al., 2020; Hawkins et al., 2010). Engaging in sustainable supply chain practices and supporting local businesses can enhance a company's reputation and strengthen its supply chain (Frostenson et al., 2015).

In previous research, Alareeni and Hamdan (2020) found a positive relationship between corporate social responsibility (CSR) disclosure and market performance, as measured by Tobin's Q, indicating a favorable impact on attracting investors. However, Chen, Kuo, and Chen (2022) did not find a direct relationship between social performance and financial performance. Additionally, Xie et al. (2018) highlighted the controversial nature of the relationship between social activities and corporate financial performance. Therefore, it is possible to hypothesize that social performance plays a role in determining firms' performance.

H3: Social performance affects firms' performance.

5.4 Government Ownership as a Moderator in the ES and Firm Performance

In the agency view, ES initiatives can be a form of agency conflict (Zhang et al., 2022). In this view, managers may prioritize their interests over the company's financial performance, potentially damaging firm value and performance. In this context, examining how government ownership may moderate the relationship between ES performance and a firm's performance is important. As the principal shareholder in Chinese SOE, the government plays a critical role in providing essential resources and legitimacy that are crucial for these enterprises' continued success and sustainability.

The theoretical review demonstrates that government monitors SOEs, ensuring compliance, promoting transparency, and safeguarding the public interest (Sun et al., 2002; Shengyu Li et al., 2019). However, increased government control and monitoring may limit operational

flexibility and decision-making autonomy, affecting the firm's capacity to maximize value (Yesilkagit et al., 2008). Furthermore, SOEs' dual mandate to attain social and financial objectives create additional challenges. When controlling shareholders prioritize their interests, it can result in minority expropriation (Cheung et al., 2010). Moreover, the motivation of Chinese SOE managers primarily driven by political promotion (Jiang & Kim, 2020).

The evidence suggests that the impact of government ownership can be diverse. On the one hand, political and financial support from the government may be advantageous to SOEs, resulting in enhanced performance of the firms (Li et al., 2013; Wu et al., 2012; Mamatzakis & Xu, 2020). However, prioritizing political and strategic objectives may create agency problems, decision-making and disclosure issues (Kuzman et al., 2018). In addition, the societal aims of SOEs can sometimes conflict with efficiency goals (Li, 2013).

The complex relationship between government ownership, ES activities, and corporate financial performance needs further study. This research seeks to add to the understanding of this relationship by investigating the potential moderating effects of government ownership. Based on the arguments presented, it can be hypothesized that government ownership plays a significant role in moderating the relationship between ES performance and firm performance.

H4: government ownership moderate ES performance to firm's performance

5.5 CEO duality as a Moderator in the ES and Firm Performance

Theoretical perspectives suggest that CEO duality, where the CEO also serves as the board chair, significantly influences decision-making and oversight. This dual role can facilitate command unity and enhance efficient decision-making (Boyd, 1995; Donaldson, 1990; Donaldson & Davis, 1991). However, it can also create potential conflicts of interest and reduce accountability, adding complexity in the role and impacts of CEO duality.

The impact of CEO duality on firm performance has led to varied results in empirical studies. On the one hand, Tan et al. (2001) and Elsayed et al. (2007) identify the benefits of CEO duality, particularly in turbulent times or under low corporate performance. Conversely, Riaqa Mubeen et al. (2021) found a negative correlation between CEO duality and firm performance, indicating enhanced performance for firms with separate CEO-chairman roles. Further, Velte

(2020) found that CEO power negatively moderates the relationship between ES and financial performance.

Additional study is needed to understand the complex relationship between CEO duality, ES performance, and firm performance. This study adds to our understanding of this relationship by looking into the potential moderating effects of CEO duality. Based on the previous findings and arguments, it can be hypothesized that CEO duality moderates ES performance to the firm's performance.

H5: CEO power moderates ES performance to firm's performance

6. METHODOLOGY

The methodology chapter first presents our research approach upon which the study is built, followed by econometric methodology with the models used to test the hypothesis are described together.

6.1 Deductive Approach

The research design used for this study is grounded in the principles of deductive theory and quantitative methodology. As explained by Bryman and Bell (2015), this theoretical framework is particularly beneficial when the researcher's objective is to establish a connection between the research and the theory. This methodological choice is driven by the intent to facilitate a rigorous analysis of the research problem, thereby enhancing the validity of the study's findings.

The deductive approach comprises six methodical steps, as depicted in Figure 1. The initial step involves a comprehensive review of existing theories and prior research in the field. This step is fundamental as it sets the stage for the following development of hypotheses. This process is followed by data collection, hypothesis formulation, and finding presentation. The last step entails linking the findings back to the original theory, thereby closing the loop in the research process (Bryman & Bell, 2015).

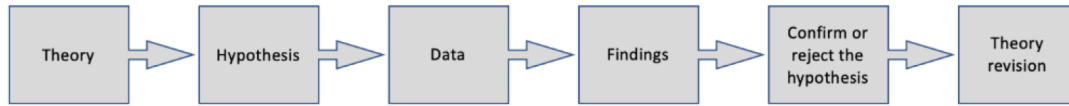


Figure 1. The deductive approach, Source: Bryman & Bell (2015, p.23)

All these deductive steps have been done in this study. The authors began by assessing empirical studies within the field of sustainable finance, with a particular focus on the influence of Environmental and Social (ES) factors on firm performance. A deeper examination of the theory used in these empirical studies was conducted to find the causal relationship between ES performance and firm performance. Hypotheses aimed to test the proposed causal relationship and enhance the understanding of the role ES factors play in shaping firm performance. The specifics of the econometric method will be elaborated in the remaining sections of this chapter.

6.2 Panel Regression

The current study employs panel data for its analysis. We report both pooled OLS regression with industry and year controls, as well as firm fixed effects method regression with year control. The panel data structure allows for the incorporation of both cross-sectional and time-series dimensions, enhancing the robustness of the research findings.

In previous studies examining the relationship between Environmental and Social factors and firm performance, pooled Ordinary Least Squares (OLS) regressions have been utilized. In contrast, this study adopts the fixed effects model to address the potential issue of endogeneity, which can arise when an explanatory variable is correlated with the error term. In our research, we acknowledge the potential for endogeneity issues, which could lead to biased and inconsistent estimations. To mitigate these concerns, we implemented a fixed effects regression model. By controlling for time-invariant unobserved individual effects, the fixed effects model allows for more reliable estimates of the relationships of interest. This choice of methodology is supported by the Hausman test, which indicates that the fixed effects model is more appropriate. Moreover, to address the issue of heteroskedasticity, the data is controlled for by directly using clustered robust standard errors by firm ID in the fixed effects model. This approach helps to control for unobserved heterogeneity across firms and allows for a more accurate estimation of the model coefficients.

Despite the advantageous nature of panel data methodologies in addressing endogeneity, it is crucial to recognize that these methodologies can only partially eliminate this issue and have drawbacks (Roberts & Whited, 2012). Research conducted by Cheng, Ioannou, and Serafeim (2014) demonstrated that fixed effect models, while effective in reducing the problem of endogeneity in their ESG research, however, resulted in the ESG score being statistically insignificant. Other sources of endogeneity include omitted variables and simultaneity. This study will include a comprehensive discussion of potential key variables as control variables. Simultaneity, or reverse causality, presents another challenge for this study. The base equation for a panel data regression looks like the one below in equation 1:

$$y_{it} = \alpha + \beta_1 X_{it} + \dots + \beta_k X_{it} + C_{it} + \varepsilon_{it} \quad (1)$$

Where 'i' represents the data unit, 't' represents the period, 'beta' signifies the coefficient of interest, and 'x' represents the effect of the estimator. Additionally, 'ai' is for the unobserved effect, or fixed effect, which is characterized by its time-invariance. The idiosyncratic error term is denoted as 'uit', which possesses a dynamic nature, changing over time and exerting influence on the dependent variable, 'yit'. (Woolridge, 2016). Furthermore, we include an interaction term between government ownership and CEO duality variables in our analysis. This is motivated and discussed in more detail in the following subsections.

6.3 Interaction Model

In the empirical analysis of this study, we introduce interaction terms to further explore the moderating effects of government ownership (SOE) and the CEO's dual role on the relationship between a firm's Environmental and Social (ES) performance and firms' performance, as measured by Tobin's Q.

In the second hypothesis, the interaction model incorporates a term that multiplies SOE (a dummy variable coded as '1' for state-owned enterprises (SOE) and '0' for non-SOE) with the firm's ES score. This interaction term essentially divides the sample into state-owned and non-state-owned companies. Similarly, in the third hypothesis, the interaction model includes a term that multiplies the CEO's dual role (a dummy variable coded as '1' if the CEO also serves as the board director and '0' otherwise) with the firm's ES score. These interaction terms provide

valuable insights into how the effects of ES performance on Tobin's Q may differ based on the moderating influence of state ownership and the CEO's role within the firm.

6.4 Econometric Models

As mentioned, this study primarily utilizes a fixed effect model to account for potential firm fixed effects, as a time-invariant error term could exist. The next paragraphs outline the models used for testing Hypotheses 1 through 3. All hypotheses are tested using a fixed-effect model, controlling for year and firm-fixed effects to account for the potential bias due to unobserved firm-specific characteristics. The dependent variable in these models is Tobin's Q and the Environmental and Social (ES) as explanatory variable. Detailed descriptions of these variables and the control variables employed in the analysis will be provided in the next subchapter. Equation (2) tests Hypothesis 1, which examines whether a higher ES performance influences a firm's value.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 Leverage_{it} + \beta_3 Asset\ Turnover_{it} + \beta_4 Revenue\ growth + \beta_5 Log\ Assets_{it} + \beta_6 Age + \beta_7 Board\ Size_{it} + \beta_8 Independent\ Board_{it} + \lambda Year\ Controls + u_{it} \quad (2.a)$$

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 Environmental_{it} + \beta_2 Controls_{it} + \lambda Year\ Controls + u_{it} \quad (2.b)$$

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 Social_{it} + \beta_2 Controls_{it} + \lambda Year\ Controls + u_{it} \quad (2.c)$$

Equation (3) tests Hypothesis 2, which investigates the moderating role of government ownership on the relationship between ES performance and firm value.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 SOE\ Relative + \beta_3 ES * SOE + \beta_4 Leverage_{it} + \beta_5 Asset\ Turnover_{it} + \beta_6 Revenue\ growth + \beta_7 Log\ Assets_{it} + \beta_8 Age + \beta_9 Board\ Size_{it} + \beta_{10} Independent\ Board_{it} + \lambda Year\ Controls + u_{it} \quad (3)$$

Further, equation (4) tests Hypothesis 3, which examines the moderating influence of a CEO's dual role on the relationship between ES performance and firm value.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 CEO\ Duality + \beta_3 ES * CEO + \beta_4 Leverage_{it} + \beta_5 Asset\ Turnover_{it} + \beta_6 Revenue\ growth + \beta_7 Log\ Assets_{it} + \beta_8 Age + \beta_9 Board\ Size_{it} + \beta_{10} Independent\ Board_{it} + \lambda Year\ Controls + u_{it} \quad (4)$$

6.5 Robustness Test

To ensure the robustness of our findings, we utilized another type of definition of government ownership in China, classifying firms with at least 50% ownership by the government as state-owned enterprises (SOEs). This stricter threshold helps to differentiate between SOEs and non-SOEs. Additionally, we conducted additional analyses using more the price-to-book (PB) ratio as the dependent variable in all models. The PB ratio is an alternative measure of firm value that allows us to assess the consistency of our results across different valuation metrics (Marsat & Williams, 2011). By implementing these variations in our methodology, we aimed to validate the reliability and stability of our results, providing further support for the conclusions drawn in our study. In these tests, we also adopt the fixed effects model regression. Further, equations (5) to conduct robustness test for SOEs >50% government ownership and equation (6) to conduct robustness tests using price-to-book (PB) ratio as the dependent variable in all models.

$$TOBIN'S Q_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 SOE50 + \beta_3 ES * SOE + \beta_4 Controls_{it} + \lambda Year Controls + v_{it} \quad (5)$$

$$PB_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 Controls_{it} + \lambda Year Controls + v_{it} \quad (6.a)$$

$$PB_{it} = \beta_0 + \beta_1 Environmental_{it} + \beta_2 Controls_{it} + \lambda Year Controls + v_{it} \quad (6.b)$$

$$PB_{it} = \beta_0 + \beta_1 Social_{it} + \beta_2 Controls_{it} + \lambda Year Controls + v_{it} \quad (6.c)$$

$$PB_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 SOERelative + \beta_3 ES * SOE + \beta_4 Controls_{it} + \lambda Year Controls + v_{it} \quad (6.d)$$

$$PB_{it} = \beta_0 + \beta_1 ES_{it} + \beta_2 CEODuality + \beta_3 ES * CEO + \beta_4 Controls_{it} + \lambda Year Controls + v_{it} \quad (6.e)$$

7. DATA SUMMARY AND DESCRIPTIVE STATISTICS

This part of the study provides the reader with sample description, descriptive statistics and the variables used in the regression model.

7.1 Sample Description

This study utilizes a sample from the Shanghai and Shenzhen indexes, containing various sectors. The dataset contains 891 firms, collectively contributing to 5294 firm-year observations, thus providing a robust foundation for the study's empirical analysis. As presented in Table 1, the distribution of firms across sectors is unbalanced. The industrial sector, basic materials, and consumer discretionary sectors are markedly more represented, reflecting their prominence in these indexes. In contrast, communication services and health

care sectors are less represented. The dataset's structure is unbalanced, primarily due to the index composition's dynamic nature over 2016-2021.

Table 1. Summary Statistics Sectors

No.	ICB	Freq	Percent	No.	ICB	Freq	Percent
1	Industrials	825	15.58	14	Technology Services	138	2.61
2	Basic Materials	588	11.11	15	Consumer Durables	126	2.38
3	Consumer Disc	570	10.77	16	Consumer Non-Durables	96	1.81
4	Process Industries	394	7.44	17	Industrial Services	72	1.36
5	Producer Manufacturing	375	7.08	18	Telecommunications	71	1.34
6	Electronic Technology	281	5.31	19	Retail Trade	60	1.13
7	Health Care	241	4.55	20	Transportation	59	1.11
8	Real Estate	239	4.51	21	Distribution Services	54	1.02
9	Consumer Staples	234	4.42	22	Commercial Services	48	0.91
10	Non-Energy Minerals	229	4.33	23	Consumer Services	30	0.57
11	Health Technology	196	3.70	24	Energy Minerals	24	0.45
12	Energy	168	3.17	25	Communications	6	0.11
13	Technology	164	3.10	26	Health Services	6	0.11
					Total	5294	100.00

Table 2 Summary Statistics by year

Year	Total	Percent
2016	871	16.45
2017	880	16.62
2018	885	16.72
2019	886	16.74
2020	884	16.70
2021	888	16.77
Total	5294	100.00

This study utilizes annual data derived from non-financial firms listed on the Shanghai and Shenzhen Stock Exchange in China, over the period 2016 to 2021. The Environmental and Social (ES) data and the firms' financial data have been sourced from the Bloomberg database. The initial sample was subjected to a rigorous screening process based on the following criteria:

- Firms with incomplete financial and ES data were eliminated from the sample.

- Financial and utility companies were excluded due to their distinct regulatory and operational characteristics
- Special Treatment (ST) and *ST-listed firms were also removed from the sample to ensure the robustness and generalizability of the results.

Based on the sample screening procedure described previously, the study's final sample consisted of 5,294 observations drawn from 891 listed companies. All continuous variables were winsorized at the 1% and 99% levels to reduce the potential impact of extreme values on the study's findings. The data were organized as panel data, and the statistical program STATA was utilized.

7.2 Variables in the models

The variables used in all the regression models are presented in Table 13 in appendix. The table provides the name of the variables and how they are measured. The variables are discussed and explained in the following subsections.

7.2.1 Dependent Variable (Tobin's Q)

The dependent variable in this study is Tobin's Q. Tobin's Q is a financial metric that compares a company's market value to its book value. This ratio effectively captures how the financial market values a company's potential to generate income relative to the replacement cost of its assets. Tobin's Q is widely used measure in research where firm value is to be examined (Cai, Jo & Pan, 2012; Velte, 2017). A Tobin's Q greater than 1 indicates the market perceives the company's assets to be of greater value than their book value, signaling the presence of intangible or growth assets not reflected in the balance sheet. Conversely, a Tobin's Q less than 1 suggests the market values the company's assets less than their book value, which could be a sign of overvaluation or inefficient use of assets. Approximation of Tobin's Q, represented in Equation below:

$$Tobin's\ Q = \frac{(Market\ value\ of\ equity + market\ value\ of\ total\ liabilities)}{book\ value\ of\ total\ liabilities} \quad (7)$$

This metric reflects the market's valuation of the firm's assets and growth opportunities relative to its liabilities, considering future earnings and expected growth relative to the replacement cost of assets. Consequently, Tobin's Q is used as the dependent variable in this study.

7.2.2 Explanatory Variable Environment and Social (ES) Score

The independent variable in this study is the Environmental and Social (ES) performance score, as provided by the Bloomberg Terminal. The Bloomberg ES score has been employed in previous research investigating the impact of ES performance, reinforcing its suitability for this study (Velte, 2017; Garcia, Da-Silva & Orsato, 2017). The Environmental-Social (ES) score is calculated by averaging the Environmental (E) and Social (S) scores.

In this research, all ES scores range from 0 to 100, with a higher score indicating better ES performance. The scoring methodology adopted by Bloomberg for ES performance is bottom-up and model-driven. It primarily utilizes self-reported, publicly available data. Bloomberg's ES scores are derived from a variety of data sources primarily company-reported sustainability information, financial fundamentals data, proprietary research assets, and analytics. This leads to a fully transparent, parametric, rules-based scoring framework. The rigorous, quantitative techniques employed ensure the reflection of meaningful signals in the scores (Methodology for Environmental and Social Scores, Bloomberg, December 2020).

The Environment pillar encompasses aspects such as air quality, climate exposure, ecological impact, energy management, environmental supply chain management, greenhouse gas emission management, sustainable product development, waste management, and water management. In addition, the social pillar, includes aspects such as community rights, occupational health & safety management, ethics & compliance, operational risk management, labor & employment practices, product quality management, and social supply chain management.

7.2.3 Interaction Variables Government ownership

Government ownership is crucial in evaluating a firm's operations and performance, particularly in economies where the state plays a significant role in the business sector, such as in China. In this study, government ownership is represented by a dummy variable which takes the value of '1' when the government is the controlling owner of the firm and '0' otherwise. The concept of ownership in China is categorized into two distinct types: absolute and relative ownership. We used relative ownership in main models and absolute ownership as a robustness

test. Relative ownership occurs when the government maintains a controlling interest in the firm despite holding less than 50% of the shares.

CEO duality

CEO duality refers to a situation where a single individual serves as both the Chief Executive Officer (CEO) and the Chairperson of the Board of Directors in a firm. The 'CEO duality' variable is assigned a value of '1' when CEO duality is present, and '0' when different individuals hold these positions. In this study, the 'CEO Duality' variable will be used to examine whether the simultaneous holding of the top two positions in a firm, namely the CEO and the Chairperson, has a moderating effect on the relationship between ES performance and firm performance.

7.2.4 Control Variable

Firm Characteristic Control Variable

This study controls for other firm characteristics that may influence the relationship between ES and firm performance. As control variables, the following variables are included in the model: size, leverage ratio, asset turnover, and revenue growth. Size is calculated as the natural logarithm of total assets. The leverage ratio measure implies the degree to which a company is financed through debt. Asset turnover indicates a company's effectiveness in generating income from its assets. A higher asset turnover ratio implies that the company use its resources effectively, while a smaller ratio shows that the assets are not being managed well. Revenue growth reflects the firm's growth rate over time. The study includes revenue growth as a control variable, which is considered a fundamental driver of firm value. Controlling these variables will allow for a more accurate assessment of the relationship between ES performance and firm performance. Additionally, including these variables as controls will increase the robustness of the results, as any potential bias introduced by omitted variables will be minimized.

Corporate Governance Control Variable

Understanding the role of corporate governance characteristics in influencing firm performance is important, therefore these characteristics must be included as control variables. The first corporate governance variable we control is board size, denoted by the number of directors on the firm's board is used. The effect of board size on firm performance has been widely debated in the literature. Some studies suggest that larger boards can bring more resources and expertise

to the firm, potentially influencing ES performance. Conversely, others declare that larger boards may inhibit effective decision-making due to coordination difficulties. Controlling for board size allows us to account for these potential influences.

The second corporate governance variable is firm age. By controlling for firm age, we ensure that the influence of a firm's life cycle stage on its ES performance is accounted for. With their established structures and practices, older firms may approach ES issues differently than younger, potentially more agile companies (Berrone, Cruz & Gomez-Mejia, 2012). Lastly, we include independent board as a control variable, measured by the number of non-executive directors on the board. Independent directors, free from conflicts of interest inherent in executive positions, are often seen as guardians of shareholder interests and promoters of good corporate governance (Fama & Jensen, 1983). As such, a higher degree of independent board might affect a firm's ES performance.

7.3 Descriptive Statistics

The descriptive statistics for the study's primary variables are outlined in Table 3, presenting the mean, median, minimum, maximum, and standard deviation for each variable. In order to manage the potential impact of extreme values, the variables of Tobin's Q, E and S scores, leverage, asset turnover, and revenue growth have been winsorized at the 1st and 99th percentiles. The winsorize method reduces the impact of anomalies on the dataset, thereby promoting a more normal distribution and improving the accuracy of the following regression analysis.

Table 3: Summary Statistics

	Mean	Med	SD	Min	Max	N
TOBINSQ	1.764	1.316	1.750	0.010	10.786	5,294
ES	12.940	9.709	9.999	0	58.796	5,294
Environmental	12.303	8.155	14.244	0	73.815	5,294
Social	13.576	11.397	7.468	0	50.212	5,294
Leverage	0.241	0.232	0.169	0	0.673	5,294
Asset Turnover	0.687	0.579	0.482	0.062	2.933	5,294
Revenue Growth	0.123	0.083	0.333	-	1.945	5,294
Assets (In Million)	41,050.880	13,735	93,781.720	881.800	713,300	5,294
Age	21.869	22	5.190	7	41	5,294
Independent Board	3.675	3	1.075	2	10	5,294
Board Size	9.844	9	2.584	4	25	5,294
CEO Duality	0.769	1	0.421	0	1	5,294
Government Ownership	0.345	0	0.475	0	1	5,294

As the dependent variable, Tobin's Q shows a considerable variation among firms with a standard deviation of 1.75 and mean of 1.76. However, the median value of 1.32, being lower than the mean, indicates a positively skewed distribution. The range of Tobin's Q is from a minimum of 0.1 to a maximum of 10.79. Further, the ES score, has a mean value of 12.89, with a range from a minimum of 1.6 to a maximum of 46.47. However, a standard deviation of 9.83 points to considerable variation in ES scores across firms. The median ES score of 9.71 is significantly lower than the mean. When we break down the ES score into its Environmental (E) and Social (S) scores, we see variability. The environmental score has a mean of 12.24, a median of 8.15, and ranges from 0 to 56.09, with a standard deviation of 14.03. The social score exhibits a mean of 13.54, a median of 11.4, and ranges from 3.2 to 36.85, with a standard

deviation of 7.32. This suggests that a larger proportion of firms have a social score above the median.

7.4 Correlation Analysis

Woolridge (2015) discusses that variables are allowed to be correlated but not perfectly so. The absolute limit of correlation of this study is $-0,8$ to $+0,8$ in accordance with Studenmund (2013). The correlation matrix is presented in table 4.

Table 4. Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
(1) TOBINSQ	1.000												
(2) ES	-0.013	1.000											
(3) ENVIRONMENT	-0.004	0.960***	1.000										
(4) SOCIAL	-0.028**	0.846***	0.664***	1.000									
(5) LEVERAGE	-0.390***	0.007	0.009	0.003	1.000								
(6) ASSETTURNOVER	0.051***	0.036***	0.040***	0.020	-0.014	1.000							
(7) REVENUEGROWTH	0.117***	-0.011	-0.005	-0.019	-0.031**	0.149***	1.000						
(8) LOGASSETS	-0.390***	0.256***	0.238***	0.231***	0.348***	0.024*	0.045***	1.000					
(9) AGE	-0.116***	0.047***	0.053***	0.025*	0.066***	-0.060***	-0.054***	0.032**	1.000				
(10) BOARDSIZE	-0.109***	0.030**	0.013	0.055***	0.074***	-0.040***	-0.005	0.152***	0.043***	1.000			
(11) BOARDIND	-0.062***	0.052***	0.038***	0.066***	0.054***	-0.031**	-0.004	0.166***	0.012	0.780***	1.000		
(12) CEODUALROLE	-0.118***	-0.019	-0.028**	0.002	0.031**	0.006	-0.026*	0.058***	0.049***	0.138***	0.085***	1.000	
(13) SOERELATIVEADJ	-0.215***	-0.019	-0.029**	0.003	0.093***	0.002	-0.020	0.145***	0.138***	0.162***	0.136***	0.169***	1.000

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Correlation analysis allows us to assess the relationships between variables and provides initial insights into potential multicollinearity issues in our regression models. Tobin's Q is found to have a negative correlation with the overall ES score and the Environmental score. This indicates that a higher ES or Environmental performance does not correlate with a higher firm value as measured by Tobin's Q. However, a negative correlation is observed between the Social score and Tobin's Q, suggesting that firms with higher social performance may have lower firm value.

For our control variables, Leverage is found to be significantly negatively correlated with Tobin's Q, suggesting that firms with higher financial risk tend to have lower firm value. Asset Turnover and Revenue Growth both show a significant positive correlation with Tobin's Q. The variables of firm size, firm Age, relative SOE ownership, CEO dual role, Board Size, and Independent board all have non-significant negative correlations with Tobin's Q. In addition to the correlation analysis, in case of high collinearity among the independent variables, STATA automatically drops the variables that cause the collinearity issue. Therefore, the high-

correlation values identified in the correlation analysis are not expected to have a significant impact on our results.

7.5 Heteroscedasticity

As a pre-regression diagnostic, a White test was conducted to test for heteroskedasticity, and the result is presented in appendix 2. The results show that models 1, 2, and 3 estimated with conventional standard errors exhibit unrestricted heteroskedasticity. The White test reports a p-value of 0.000, indicating that the null hypothesis of constant variance can be rejected at the 1% significance level. As a result, the use of conventional standard errors becomes insufficient, and the results of the estimated regression become invalid. To address this issue, all regressions moving forward are conducted using clustered robust standard errors.

8. EMPIRICAL FINDINGS

In this chapter the findings regarding hypothesis 1-3 is presented. Furthermore, a robustness test is performed to test if the findings are consistent in other model settings.

8.1 Univariate Analysis

A test between the differences in mean when splitting the sample based on the dummy variable *High ES score* was conducted and presented in table (5). There is an insignificant difference in the mean Tobin's Q between firms with high ES scores and those that do not have a high ES score. Univariate analysis is employed in this study to compare firms with high ES scores (defined as scores above the mean) against those with low ES scores (below the mean). Table 5 presents t-tests for differences in means between the two subsamples.

The dependent variable, Tobin's Q mean value for firms with low ES scores is 1.784, while for firms with high ES scores, the mean is slightly lower at 1.744. This may suggest that firms with higher ES performance do not necessarily have a higher Tobin's Q. The means for ES, Environment and Social scores clearly demonstrate the distinction between the high and low ES score groups. Firms with high ES scores have a mean of 20.244, significantly higher than the mean of 5.636 for firms with low ES scores. Similarly, firms with high ES scores present a mean Environmental score of 22.733, markedly greater than the low-scoring firms' mean of 1.873. The Social score follows the same pattern, with a mean of 17.753 for high ES score firms and 9.399 for low ES score firms.

Table 5 Difference in Means by ES scores.

Variables	Low ES		High ES		Difference in Means
	Mean	N	Mean	N	
Tobinsq	1.784	2647	1.744	2647	0.040
ES	5.636	2647	20.244	2647	-14.608***
Environment	1.873	2647	22.733	2647	-20.86***
Social	9.399	2647	17.753	2647	-8.354***
Leverage	0.241	2647	0.241	2647	0.000
Assetturnover	0.665	2647	0.709	2647	-0.044***
Revenuegrowth	0.127	2647	0.119	2647	0.008
Logassets	9.367	2647	9.898	2647	-0.531***
Age	21.549	2647	22.190	2647	-0.641***
Board Ind	3.651	2647	3.698	2647	-0.047
Boardsize	9.802	2647	9.885	2647	-0.083

Table 6. Difference in Means by government ownership.

Variables	Non-SOE		SOE		Difference in Means
	Mean	N	Mean	N	
Tobinsq	2.100	3467	1.271	1827	0.829***
ES	13.079	3467	12.675	1827	0.404
Environment	12.600	3467	11.739	1827	0.861**
Social	13.559	3467	13.610	1827	-0.051
Leverage	0.230	3467	0.263	1827	-0.033***
Assetturnover	0.686	3467	0.689	1827	-0.003
Revenuegrowth	0.128	3467	0.114	1827	0.014
Logassets	9.496	3467	9.892	1827	-0.396***
Age	21.351	3467	22.853	1827	-1.502***
Board Ind	3.569	3467	3.876	1827	-0.307***
Boardsize	9.540	3467	10.420	1827	-0.88***

Table 6 presents t-tests for differences in means between the two subsamples of SOEs and non-SOEs. There is a significant difference in the mean for Tobin's Q in non-SOE firms with a higher mean value of 2.1 than SOEs, with a mean value of 1.271. This initial finding suggests that firms without government ownership might have a higher Tobin's Q compared to SOEs. In addition, the ES score, a measure of a firm's environmental and social performance, reveals

a higher mean for non-SOE firms (13.079) as compared to SOEs (12.675). This could suggest better ES performance in non-SOE. Additionally, we see a similar pattern when we separate the ES score into Environmental and Social scores. The mean environmental score for firms without government ownership is slightly higher (12.6) compared to SOEs (11.739). However, the Social scores are almost similar, with firms without government ownership displaying a mean score of 13.559 and SOEs a mean score of 13.610.

Table 7 Difference in Means by CEO duality.

Variables	Non-CEO Duality		CEO Duality		Difference in Means
	Mean	N	Mean	N	
Tobinsq	2.229	1222	1.689	4072	0.540***
ES	13.292	1222	12.834	4072	0.458
Environment	13.034	1222	12.084	4072	0.950**
Social	13.549	1222	13.585	4072	-0.036
Leverage	0.232	1222	0.244	4072	-0.012**
Assetturnover	0.681	1222	0.689	4072	-0.008
Revenuegrowth	0.139	1222	0.118	4072	0.021*
Logassets	9.497	1222	9.674	4072	-0.177***
Age	21.404	1222	22.009	4072	-0.605***
Boarding	3.508	1222	3.724	4072	-0.216***
Boardsize	9.193	1222	10.039	4072	-0.846***

Table 7 presents t-tests for differences in means between the two subsamples of firm with CEO duality and those without CEO duality. For Tobin's Q, firms without CEO duality display a higher mean value of 2.229 compared to firms with CEO duality, which have a mean value of 1.689. This initial finding suggests that firms without CEO duality might have a higher Tobin's Q compared to firms with CEO duality. Further, the ES score, a measure of a firm's environmental and social performance, shows a slightly lower mean for firms without CEO duality (13.292) as compared to firms with CEO duality (12.834). This could potentially indicate marginally better ES performance in firms with CEO duality. When we separate the ES score, we observe a small difference. The mean Environmental score for firms without CEO duality is higher (13.034) compared to firms with CEO duality (12.084). However, the social scores are nearly identical, with firms without CEO duality displaying a mean score of 13.549 and firms with CEO duality having a mean score of 13.585.

8.2 Analysis of ES Performance and Firm Performance (H1)

The analysis was conducted using pooled OLS regression to test Hypothesis 1, which explores the relationship between Environmental and Social (ES) performance and Tobin's Q. The results, as presented in Table 8, reveal that the main explanatory variable ES is positive significant at the 1% level to Tobin's Q. Further examination of each score of E and S individually also demonstrates their statistical significance at the 1% level to Tobin's Q and have a positive relationship with Tobin's Q. The results from the Pooled OLS regression provide preliminary insights into the relationships in our model. However, they do not account for unobserved heterogeneity across firms or over time.

Afterward, Model 1 employed a fixed-effects regression model clustered by firm ID. However, in this model, the main explanatory variable ES does not exhibit statistical significance in its relationship with Tobin's Q. To further examine the ES performance, the impacts of environmental (E) and social (S) performance were separately examined (Regressions 2 and 3, respectively). Neither the environmental nor social scores were found to be significant in their separate regressions, reinforcing the findings of Regression 1 and suggesting that both dimensions of ES performance do not impact firm value. The evidence thus obtained, indicates an absence of significant positive correlation between either ES, E, or S and Tobin's Q. The above suggests that there is insufficient evidence to confirm hypothesis H1.

Regarding control variables, some exhibited significant influence across all three regression models. The leverage ratio and firm size, as measured by the natural logarithm of total assets, were found to negatively correlate with Tobin's Q. On the other hand, asset turnover was positively related to Tobin's Q, indicating that firms with higher asset efficiency have a greater market valuation relative to their book value. Additionally, revenue growth, firm age, board size, and independent board were not significantly associated with Tobin's Q in any of the regression models, suggesting that these findings indicate that these factors do not have a meaningful impact on the firm value within our sample.

Table 8. Regression analysis ES Performance and Firm Performance (H1)

	Model 1	Model 1	Model 1	Model 1	Model 1	Model 1
	POLS	POLS	POLS	FE	FE	FE
VARIABLES	TOBINS Q	TOBINSQ	TOBINSQ	TOBINSQ	TOBINS Q	TOBINSQ
ES	0.011*** (0.003)			0.004 (0.003)		
Environment		0.008*** (0.002)			0.003 (0.002)	
Social			0.011*** (0.004)			0.003 (0.004)
Leverage	-2.391*** (0.223)	-2.396*** (0.223)	-2.403*** (0.224)	-1.314*** (0.292)	-1.313*** (0.292)	-1.317*** (0.292)
Assetturnover	0.003 (0.078)	0.002 (0.078)	0.004 (0.078)	0.486*** (0.129)	0.486*** (0.129)	0.487*** (0.129)
Revenuegrowth	0.556*** (0.082)	0.555*** (0.082)	0.555*** (0.082)	0.089 (0.063)	0.089 (0.063)	0.088 (0.063)
Logasset (in million)	-0.323*** (0.037)	-0.322*** (0.037)	-0.317*** (0.037)	-0.360*** (0.124)	-0.359*** (0.124)	-0.359*** (0.125)
Age	-0.024*** (0.007)	-0.024*** (0.007)	-0.025*** (0.007)	0.120 (0.253)	0.121 (0.252)	0.123 (0.256)
Boardsize	-0.049** (0.021)	-0.048** (0.021)	-0.050** (0.021)	0.004 (0.014)	0.005 (0.014)	0.004 (0.014)
Board Independence	0.094** (0.045)	0.094** (0.045)	0.095** (0.045)	-0.008 (0.026)	-0.008 (0.026)	-0.008 (0.026)
Constant	5.601*** (0.369)	5.649*** (0.369)	5.536*** (0.370)	2.392 (6.302)	2.367 (6.282)	2.324 (6.367)
Year Control	Yes	Yes	Yes	Yes	Yes	Yes
Industry Control	Yes	Yes	Yes	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes
SE Type	Cluster (Firm)	Cluster (Firm)	Cluster (Firm)	Cluster (Firm)	Cluster (Firm)	Cluster (Firm)
Observations	5,294	5,294	5,294	5,294	5,294	5,294
Adjusted R-squared	0.349	0.349	0.347	0.308	0.309	0.308
Number of Firmid	891	891	891	891	891	891

Note: This regression table reports the results for the model 1 with pooled-OLS and fixed effect with the objective of measuring the effect of ES performance and environmental and social performance on the financial performance of companies listed in China. Winsorization was applied to the variables leverage, assetturnover, revenuegrowth and logasset, and Winsorization used the 1st and 99th percentiles as boundary values to deal with extreme observations.

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

The results of our analysis indicate that the relationship between ES performance and firm performance, as measured by Tobin's Q, is positive insignificant. These findings align with previous studies that have also arrived at unclear conclusions regarding the impact of ES on firm value. Atan and Alam (2018) found no statistically significant relationship between ESG scores and Tobin's Q, while Servaes and Tomayo (2013) concluded that CSR has no significant impact on firm value. Haryono and Iskandar (2015) also found no significant impact of corporate social performance on firm value.

Chen, Kuo, and Chen (2022) found no correlation between social performance and Tobin's Q, suggesting that the impact of environmental performance on financial performance can change from positive to negative when implementing various ES-related activities, leading to increased operating costs and a gradual decline in financial performance. Furthermore, Iwata and Okada (2011) discovered that different levels of environmental performance can generate varying effects on financial performance. Lahouel et al. (2020) found a nonlinear relationship between environmental performance and financial performance. These diverse findings highlight the complexity of the relationship and may explain why our results were statistically insignificant.

Additionally, Xie et al. (2018) reported a controversial relationship between social activities and corporate financial performance. While social activities can enhance a company's reputation and attract customers, they may also incur costs that can impact profitability and efficiency. High-cost social activities might lead to reduced profitability and efficiency, negatively affecting a company's operational and financial performance.

8.3 Analysis of The Moderating Effect of State Ownership (H2)

The second hypothesis, outlined in this section, investigates the interaction between Environmental and Social (ES) performance and State-Owned Enterprise (SOE) ownership in relation to Tobin's Q. We used fixed-effect regression clustered by firm ID as the main method of analysis, and the results are presented in Table 9.

Table 9. Regression analysis of The Moderating Effect of State Ownership (H2).

VARIABLES	Model 2	Model 2	Model 2	Model 2	Model 2	Model 2	Model 2
	POLS	POLS	POLS	FE	FE	FE	FE
	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ
ES	0.013*** (0.004)			0.004 (0.003)	0.007* (0.004)		
Environment		0.009*** (0.003)				0.005** (0.003)	
Social			0.013** (0.005)				0.007* (0.004)
SOERelative	-0.177* (0.098)	-0.217*** (0.083)	-0.174 (0.116)	-0.054 (0.066)	-0.234*** (0.079)	-0.244*** (0.063)	-0.243** (0.062)
ESxSOE	-0.009*** (0.006)				-0.003** (0.005)		
ExSOE		-0.006 (0.004)				-0.003 (0.003)	
SxSOE			-0.009** (0.008)				-0.011* (0.006)
Leverage	-2.377*** (0.221)	-2.384*** (0.221)	-2.383*** (0.221)	-1.317*** (0.292)	-2.007*** (0.227)	-2.011*** (0.227)	-2.009*** (0.228)
Assetturnover	0.011 (0.078)	0.012 (0.078)	0.012 (0.078)	0.487*** (0.129)	0.262*** (0.082)	0.261*** (0.082)	0.261*** (0.083)
Revenuegrowth	0.546*** (0.082)	0.546*** (0.082)	0.546*** (0.082)	0.089 (0.063)	0.199*** (0.064)	0.198*** (0.064)	0.195*** (0.064)
Logasset/mn	-0.317*** (0.038)	-0.316*** (0.037)	-0.312*** (0.038)	-0.359*** (0.125)	-0.386*** (0.045)	-0.385*** (0.045)	-0.392*** (0.046)
Age	-0.021*** (0.007)	-0.021*** (0.008)	-0.021*** (0.007)	0.12*** (0.253)	-0.029*** (0.008)	-0.029*** (0.008)	-0.032*** (0.008)
Boarding	-0.044** (0.021)	-0.044** (0.021)	-0.045** (0.021)	0.004 (0.014)	-0.014 (0.014)	-0.014 (0.014)	-0.014 (0.014)
Boardsize	0.098** (0.045)	0.098** (0.045)	0.098** (0.045)	-0.008 (0.026)	0.029 (0.028)	0.029 (0.028)	0.026 (0.028)
Constant	5.402*** (0.364)	5.466*** (0.365)	5.320*** (0.365)	9.365 (0.797)	9.363 (0.791)	9.362 (0.790)	9.483 (0.797)
Year Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Control	Yes	Yes	Yes	No	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes	Yes
SE Type	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)
Observations	5,294	5,294	5,294	5,294	5,294	5,294	5,294
Adjusted R-squared	0.354	0.354	0.353	0.306	0.31	0.31	0.308
Number of Firmid	891	891	891	891	891	891	891

Note: This regression table reports the results for the model 2 with pooled-OLS and fixed effect with the objective of does the SOE moderate the relationship between ES performance and financial performance of companies listed in China. Winsorization was applied to the variables leverage, assetturnover, revenuegrowth and logasset, and Winsorization used the 1st and 99th percentiles as boundary values to deal with extreme observations.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

The first model of fixed effect model suggests that both ES performance (ES) and state ownership (SOE) do not have a statistically significant effect on Tobin's Q, as indicated by their insignificant coefficients. This implies that, based on this model, changes in ES performance and the status of state ownership alone do not significantly influence firm value. However, in the second model, where an interaction term (ES*SOE) is introduced, the results change considerably. The introduction of this interaction term reveals a positive significant relationship between ES performance and firm value that was not apparent in the first model.

This change is significant implying that ES performance does matter for firm value, but its effect is dependent on whether the firm is state-owned.

The coefficient for ES performance becomes positive at 0.007 and is statistically significant at the 5% level. This result indicates that for each unit increase in ES performance, Tobin's Q increases by 0.007 units, *ceteris paribus*, and this result is statistically significant. Similarly, the coefficient for state ownership (SOE) is -0.234 and is also statistically significant at the 5% level, suggesting that being a state-owned enterprise decreases Tobin's Q by 0.234 units, all else being equal. The interaction term (ES*SOE) has a coefficient of -0.003 and is significant at the 5% level. This indicates that the effect of ES performance on Tobin's Q is moderated by state ownership. Specifically, the positive effect of ES performance on firm value is 0.003 units less for state-owned enterprises compared to non-state-owned enterprises. This finding suggests that while ES performance does enhance firm value, the effect of this enhancement is slightly reduced in SOE.

In terms of control variables, leverage, firm size (as measured by the natural logarithm of total assets), and firm age show negative and significant relationship with Tobin's Q. In contrast, asset turnover and age are positively correlated with Tobin's Q. These findings suggest that larger, older, and more leveraged firms tend to have lower market valuations relative to their book value, while firms with higher asset efficiency and revenue growth display higher market valuations. Finally, board size and independent board are not significantly associated with Tobin's Q, indicating that these factors do not significantly impact firm value in the context of this study.

The regression analysis reveals important insights into the relationship between ES performance, SOE and Tobin's Q. Table 9 presents the regression results demonstrate a positive correlation between ES performance and Tobin's Q. Furthermore, the interaction term of SOE and ES performance is also negative, indicating that Tobin's Q in SOEs is lower than in non-SOE firms. This suggests a less pronounced positive relationship between ES performance and Tobin's Q for SOEs.

The analysis shows a positive relationship between ES performance and Tobin's Q. This indicates that firms with stronger ES performance tend to have higher firm value. The analysis

reveals a positive relationship between ES performance and Tobin's Q, indicating that firms with higher ES performance tend to have higher firm value. ES performance serves as a risk factor that attracts investors. Firms with strong ES performance demonstrate better overall risk management practices, making them less risky and more trustworthy to investors (Giese et al., 2019). This reduced risk and enhanced transparency result in lower information asymmetry and increased stakeholder confidence. Moreover, companies with strong ES performance display greater resilience to market shocks, leading to lower costs of capital and making them more attractive to investors (Giese et al., 2019; Eichholtz et al., 2019).

ES performance adds value to a firm through competitive advantage. By integrating sustainability and social responsibility in the long-term plans, companies improve their operational capability and gain a favorable market share and profitability position (Giese et al., 2019; Zhao et al., 2018). This strategic approach allows them to differentiate themselves and attract investors. Additionally, ES performance impacts the perception of a firm. Focusing on employee rights and cultivating positive relationships with suppliers and the local community boosts the company's reputation and brand image (Saura et al., 2020; Hawkins et al., 2010).

Conversely, state ownership (SOE) demonstrates a negative relationship with Tobin's Q. The government's role in SOEs plays a significant role as a controlling owner in influencing firm value. State-owned enterprises inherently have different objectives compared to private firms. These objectives encompass social and economic goals, which may create pressures to prioritize non-financial goals over maximizing firm value. As a result, the efficiency of SOEs can be lower compared to non-SOE firms, as they may face constraints and obligations that hinder their ability to operate with maximum profitability (Kuzman et al., 2018). Additionally, SOEs can be tasked with political objectives, further distracting them from profit-driven decision-making, leading to inefficiencies and SOE poor performance (Kuzman et al., 2018).

According to Wang et al (2008), government ownership in SOEs introduces the implication of soft budget constraints, increasing these entities' risk. Soft budget constraints can have detrimental effects on the financial performance of SOEs, leading to overinvestment and hindering the maximization of profits. SOEs often enjoy additional funding from the government, creating a moral hazard situation where they may engage in excessive investments due to limited financial constraints. The information asymmetry between the state and SOEs

makes it challenging for the government to differentiate between losses caused by policy burdens or managerial opportunism (Lin & Tan, 1999). This behaviour can result in inefficient allocation of resources and lower firm value (Kuzman et al., 2018).

In addition, the increased government control and monitoring can have a negative effect on their operational flexibility and decision-making autonomy, consequently limiting their capacity to maximize firm value. Even though intended to protect public interests, increased monitoring and regulation may discourage entrepreneurial initiative, innovation, and flexibility essential for maintaining a competitive advantage in today's dynamic business environment (Yesilkagit et al., 2008).

The Chinese government's dual role as both an owner and a policymaker add a layer of complexity to the corporate governance of SOEs. This dual role may create conflicts of interest between the government as a controlling owner and minority shareholders, particularly concerning pursuing ES objectives (Jiang & Kim, 2020). SOEs have been criticized for their potential to expropriate minority shareholders, which could suppress their market valuation. Furthermore, SOE managers may face less pressure to perform, as they are often less likely to be dismissed despite poor performance (Yuan et al., 2011).

8.4 Analysis of The Moderating Effect of CEO Duality (H3)

Our third hypothesis investigates the interaction between Environmental and Social (ES) performance and CEO's dual role in relation to firm value. The analysis employs a fixed-effect regression clustered by firm ID, which incorporates an interaction term to assess the moderating effect of a CEO's dual role on ES performance and Tobin's Q relationship. The findings are presented in Table 10.

Table 10. Regression analysis of The Moderating Effect of CEO Duality

	Model 3	Model 3	Model 3	Model 3	Model 3	Model 3	Model 3
	POLS	POLS	POLS	FE	FE	FE	FE
VARIABLES	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ	TOBINSQ
ES	0.020*** (0.006)			0.001 -0.001	0.003** -0.002		
Environment		0.013*** (0.004)				0.002** -0.001	
Social							0.003 -0.002
CEODualrole	-0.086 (0.104)	-0.150* (0.089)	0.024*** (0.008)	0.027 -0.023	0.072** -0.032	0.057** -0.027	0.074** -0.037
ESxCEO	-0.013* (0.007)				-0.003** -0.002		
ExCEO		-0.008* (0.005)				-0.002** -0.001	
SxCEO			-0.019 (0.126)				-0.004* -0.002
Leverage	-2.383*** (0.221)	-2.387*** (0.220)	-0.018** (0.009)	-0.692*** -0.107	-0.690*** -0.107	-0.689*** -0.107	-0.692*** -0.107
Assetturnover	0.009 (0.078)	0.009 (0.078)	-2.398*** (0.221)	0.176*** -0.05	0.174*** -0.049	0.174*** -0.049	0.174*** -0.049
Revenuegrowth	0.547*** (0.081)	0.547*** (0.081)	0.010 (0.078)	0.023 -0.024	0.024 -0.024	0.024 -0.024	0.023 -0.024
Logasset/mn	-0.324*** (0.037)	-0.322*** (0.037)	0.545*** (0.081)	-0.169*** -0.036	-0.170*** -0.036	-0.171*** -0.036	-0.169*** -0.036
Age	-0.023*** (0.007)	-0.023*** (0.007)	-0.317*** (0.037)	0.103 -0.084	0.099 -0.081	0.1 -0.08	0.101 -0.083
Boarding	-0.042** (0.021)	-0.042* (0.021)	-0.024*** (0.007)	0.002 -0.005	0.002 -0.005	0.002 -0.005	0.002 -0.005
Boardsize	0.088** (0.045)	0.088* (0.045)	-0.043** (0.021)	0.002 -0.67	0.003 -0.588	0.003 -0.588	0.002 -0.647
Constant	5.639*** (0.374)	5.733*** (0.371)	0.089** (0.021)	-2.072	-1.991	-1.972	-2.056
Year Control	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Control	Yes	Yes	Yes	No	No	No	No
Firm Fixed Effects	No	No	No	Yes	Yes	Yes	Yes
SE Type	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)
Observations	5294	5294	5294	5294	5294	5294	5294
Adjusted R-squared	0.353	0.353	0.352	0.309	0.31	0.31	0.309
Number of Firmid	891	891	891	891	891	891	891

Note: This regression table reports the results for the model 2 with pooled-OLS and fixed effect with the objective of does the CEO Duality moderate the relationship between ES performance and financial performance of companies listed in China. Winsorization was applied to the variables leverage, assetturnover, revenuegrowth and logasset, and Winsorization used the 1st and 99th percentiles as boundary values to deal with extreme observations.

Robust standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.1

In regression 1 of fixed effect model, both ES performance (ES) and CEO duality CEO have insignificant effects on firm performance, as indicated by the Tobin's Q value. The coefficient of ES is 0.001, while the coefficient for CEO duality is 0.027. These findings suggest that, in this initial model, there is statistically insignificant relationship between either ES performance or CEO duality and the firm performance.

However, the inclusion of an interaction term (ES*CEO) in Model 2 changes the results. When the interaction term is introduced, ES, CEO duality and interaction variable of ES*CEO coefficients become positive significant. The coefficient of ES is positive at 0.003 and is statistically significant at the 5% level, indicating a positive relationship between ES performance and firm value. This suggests that every unit increase in ES performance corresponds to a 0.003 unit increase in Tobin's Q. This indicates that enhanced ES performance is linked to greater firm value. The coefficient for CEO duality also becomes statistically significant at the 5% level with a value of 0.072. This shows that the presence of CEO duality is associated with a higher Tobin's Q, implying better firm performance.

The coefficient of interaction term (ES*CEO) is -0.003 and statistically significant at the 5% level. This negative coefficient implies that while ES performance and CEO duality individually have positive effects on firm performance, their combined effect is less beneficial. More specifically, it means that the positive effect of ES performance on firm value diminishes in firms where the CEO also holds the position of the board chair.

Regarding control variables, leverage, and firm size show a negative and statistically significant relationship with Tobin's Q. In contrast, asset turnover presents a positive and statistically significant relationship with Tobin's Q. This indicates that firms with higher asset turnover, i.e., those that can effectively generate revenue from their assets, tend to have higher market valuations. Finally, control variables, including revenue growth, firm age, board size, and independent board, did not display a statistically significant relationship with Tobin's Q.

Table 10 presents the results of the regression, highlighting significant coefficients and their implications. Regression results demonstrate a positive correlation between environmental-social (ES) performance and Tobin's Q. When we see a positive coefficient for the CEO variable, it suggests that CEO duality can have positive effects on firm performance. These effects could be due to enhanced decision-making efficiency and unified command, as power and authority are centralized in one individual (Boyd, 1995; Donaldson, 1990; Donaldson & Davis, 1991).

However, the negative coefficient of the ES*CEO interaction term suggests that these positive effects of CEO duality are somewhat offset when it comes to driving ES performance benefits.

The reason might be that the consolidation of power in the CEO's hands could potentially discourage the implementation of robust ES strategies, due to a short-term financial focus, conflicts of interest, or a lack of independent oversight (Donaldson and Davis, 1991; Daily and Schwenk, 1996; Tian and Lau, 2001).

In highly concentrated companies in Asia, having representatives of controlling shareholders on the board is common, with these directors playing a critical role in board decisions. (Claessens et al., 1999; Heidrick & Struggles, 2007; Yeh, Lee, & Woidtke, 2001). The management styles of CEOs in firms with dual roles differ from those in firms with separate roles, potentially leading to a need for more diverse perspectives and independent voices. Therefore, it can lower innovation and the ability to adapt to changing market conditions (Blibech & Berraies, 2018). Moreover, many CEOs of listed firms in China also exhibit strong political connections, given the substantial state control over these entities (Yang et al., 2011). This concentration of power may contribute to a need for more diverse perspectives, including ES initiatives. This can potentially diminish the positive impact of ES performance on firm valuation.

The agency problem is a crucial factor in CEO dual roles, where managerial entrenchment and a concentration of power can occur. Limited monitoring and independent checks on the CEO's actions in organizations where the CEO is chairman (Bliss et al., 2007). In firms with CEO duality, limited oversight, and independent checks on the CEO's actions (Bliss et al., 2007). In the Chinese context, where the presence of controlling directors on boards is prevalent, this issue becomes even more significant. Directors aggressively influence the development of business objectives with a focus on the interests of controlling shareholders but not minority shareholders (Claessens, Djankov, & Lang, 2000; Young et al., 2008). Controlling directors have a responsibility to safeguard the interests of both controlling and minority shareholders, but conflicts of interest may arise between these two groups (Hu, Tam & Tan, 2009). The principal-agent problem between controlling and minority shareholders can undermine the potential positive impact of ES performance on firm value, as choices may be made that do not fully consider the interests of all shareholders (Hu, Tam & Tan, 2009).

The presence of an independent board plays a critical role to provide checks and balances on the CEO's power. However, when the CEO also serves as the chairman, this monitoring

function can be weakened, resulting in less effective oversight of the CEO's decisions, including those related to ES performance (Qiao Liu, 2005). Furthermore, the presence of controlling directors, particularly those with political backgrounds representing state ownership, can further hinder the governance role of other directors and diminish the board's effectiveness in monitoring the CEO (Chang & Wong, 2004; Dong & Gao, 2002).

To conclude, CEO duality can be beneficial for a firm's performance due to increased efficiency and unity of command. However, when it comes to generate the full benefits of good ES performance, CEO duality can be a limiting factor. The negative interaction effect suggests that firms with CEO duality might not be able to leverage their ES efforts into performance improvements as effectively as firms where the roles of CEO and board chair are separate.

8.5 Robustness Test Analysis

8.5.1 Government Ownership

To ensure that our findings are not sensitive to this specific measure of state ownership, we further conduct a robustness test using another form of government ownership in China. For this robustness assessment, we classify any firm with a government shareholding of 50% or more as an SOE. The detailed results of our analysis are presented in Table 11. Specifically, the outcomes of the individual impacts of the Environmental and Social (ES) pillars on Tobin's Q are broken down in Table 11. Column (1) demonstrates the significance of the overall ES score at the 5% level with a coefficient of 0.001, indicating a positive association between ES performance and Tobin's Q. However, it also reveals a significant, but negative relationship between state ownership (SOE) and Tobin's Q, as well as a significant negative interaction effect between ES and SOE, both at the 1% level. In column (2), the Environmental (E) score is significant at the 5% level with a coefficient of 0.001, while SOE and the interaction term ES x SOE remain negative and significant. In column (3), we observe that the Social (S) score is significantly associated with Tobin's Q at the 5% level with a coefficient of 0.001. Furthermore, SOE and the interaction term ES x SOE are negative and significant.

Table 11. Robustness Test

VARIABLES	FE	FE	FE
	TOBINSQ	TOBINSQ	TOBINSQ
ES	0.001** (0.001)		
Environment		0.001** (0.001)	
Social			0.001** (0.001)
SOE50	-0.080** (0.048)	-0.058** (0.044)	-0.080** (0.051)
ExSOE50	-0.005*** (0.002)		
SxSOE50		-0.004*** (0.001)	
			-0.005** (0.002)
Leverage	-2.357 (0.221)	-2.107 (0.227)	-2.011*** (0.227)
Assetturnover	0.180*** (0.051)	0.180*** (0.051)	0.181*** (0.051)
Revenuegrowth	0.020 (0.024)	0.021 (0.024)	0.020 (0.024)
Logasset/mn	-0.152*** (0.036)	-0.151*** (0.036)	-0.150*** (0.036)
Age	0.099 (0.083)	0.099 (0.082)	0.103 (0.084)
Boarding	0.002 (0.005)	0.002 (0.005)	0.002 (0.005)
Boardsize	0.002 (0.010)	0.002 (0.010)	0.002 (0.010)
Constant	-0.722 (2.046)	-0.714 (2.032)	-0.806 (2.073)
Year Control	Yes	Yes	Yes
Industry Control	No	No	No
Firm Fixed Effects	Yes	Yes	Yes
SE Type	Cluster (firm)	Cluster (firm)	Cluster (firm)
Observations	5,294	5,294	5,294

Number of Firmid	891	891	891
Adjusted R-squared	0.305	0.305	0.304

Note: This regression table reports the results for the SOE Robustness Test with the objective of the impact of government holding on the robustness of the study results. By replacing the relatively government-owned SOEs (SOE RELATIVELY) in the main model with absolutely government-owned SOEs (i.e. government ownership greater than 50 per cent). By comparing the government relative holding SOEs with the government absolute holding SOEs, it helps to assess the robustness impact of the degree of government holding on the study results and provides a more comprehensive analytical framework to validate the reliability of the main model. Winsorization was applied to the variables leverage, asset turnover, revenue growth and log asset, and Winsorization used the 1st and 99th percentiles as boundary values to deal with extreme observations.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

8.5.2 Price-to-Book Ratio

In addition to Tobin's Q, several studies in the existing literature have employed a variety of alternative proxies to represent firm value. We also used Price-to-Book (P/B) ratio as an alternative dependent variable in our regression model. This approach follows the methodology used in papers such as that by Marsat & Williams (2011), where P/B ratio served as an effective proxy for firm value. We applied the fixed effect regression model, with P/B ratio replacing Tobin's Q as the dependent variable, while maintaining the same independent variables as specified in equation (5). This alternative model allows us to further assess the validity and reliability of our initial findings. The results of this robustness test, using the P/B ratio as a dependent variable, are reported in Table 12 below.

The results from column 11 indicate that the Environmental and Social (ES) performance significantly positively impacts the firm's performance at a 1% level of significance. On the other hand, the coefficient of State-Owned Enterprises (SOEs) is negative, implying that government ownership might negatively affect firm performance. The interaction term (ES x SOE) is also negative and significant at a 10% level. This suggests that while ES positively affects firm performance, this effect is less pronounced in SOEs than in non-SOE.

Table 12 Robustness Test using PB Ratio

VARIABLES	PB	PB	PB	PB	PB
ES	0.022***			0.042***	0.027***
	-0.005			-0.01	-0.007
Environment		0.013***			
		-0.004			
Social			0.026***		
			-0.007		
CEODualrole				0.494**	
				-0.22	
ESxCEO				-0.027**	
				-0.011	
SOERelative					-0.121*
					-0.259
ESxSOE					-0.013*
					-0.011
Leverage	1.485**	1.480**	1.472**	1.483**	1.467**
	-0.73	-0.729	-0.731	-0.727	-0.73
Assetturnover	0.498	0.494	0.503	0.479	0.509
	-0.379	-0.379	-0.38	-0.376	-0.379
Revenuegrowth	0.177	0.173	0.174	0.18	0.173
	-0.142	-0.143	-0.142	-0.142	-0.143
Logasset/mn	-0.710***	-0.700***	-0.711***	-0.724***	-0.720***
	-0.242	-0.242	-0.242	-0.24	-0.241
Age	0.179	0.191	0.182	0.148	0.163
	-0.309	-0.307	-0.322	-0.293	-0.304
Boarding	-0.031	-0.029	-0.033	-0.033	-0.031
	-0.032	-0.032	-0.032	-0.032	-0.032
Boardsize	0.141**	0.140**	0.143**	0.145**	0.142**
	-0.067	-0.067	-0.067	-0.067	-0.067
Constant	4.651	4.374	4.598	5.184	5.079
	-7.942	-7.906	-8.238	-7.583	-7.818
Year Control	Yes	Yes	Yes	Yes	Yes
Industry Control	No	No	No	No	No
Firm Fixed Effects	Yes	Yes	Yes	Yes	Yes
SE Type	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)	Cluster (firm)
Observations	5294	5294	5294	5294	5294
Number of Firmid	891	891	891	891	891
Adjusted R-squared	0.124	0.124	0.124	0.126	0.125

Note: This regression table reports the results of the robustness tests for TOBINSQ, with the aim of providing a robustness analysis of different approaches to the firm value measure. Replacing Tobin's Q in the main model with the Price-to-Book ratio as the firm value metric helps to assess the impact of different metrics on the robustness of the study results and provides a more comprehensive analytical framework to validate the reliability of the main model. Winsorization was applied to the variables leverage, assetturnover, revenuegrowth and logasset, and Winsorization used the 1st and 99th percentiles as boundary values to deal with extreme observations.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Column 5 presents the result for the third hypothesis. We observe that ES exhibits a positive correlation with firm performance, significant at the 1% level, while CEO duality also shows a positive correlation. However, the interaction term (ES x CEO duality) reveals a negative correlation. This result suggests that while CEO duality might improve firm performance, the firm's performance is lower in firms with CEO duality.

The significant result for hypothesis 1 could be due to the P/B ratio's focus on the market value to the book value, which might better reflect the real-time market perception of the firm's value and its ES performance. On the other hand, Tobin's Q, which represents a firm's market value divided by its assets' replacement cost, might be less responsive to these factors. Therefore, the non-significance of Tobin's Q doesn't necessarily contradict the findings using the P/B ratio. However, it provides a more nuanced understanding of how these variables might affect different dimensions of firm value. The consistent findings across both the main regression and the robustness test provide strong support for the validity of the results. It suggests that the positive impact of ES performance on firm performance is consistent and not contingent on the specific measure of firm performance used. This demonstrates that the regression analysis results will remain identical even if another proxy for firm value is used, implying that other measures of firm value will most likely have no effect on the ES to Firm performance.

9. CONCLUSION

This paper selects 891 listed companies on the Shenzhen Stock Exchange and Shanghai Stock Exchange in China for the period 2016-2021 and employs a fixed-effects model to address potential endogeneity issues. The relationship between ES performance and firm financial performance, and whether government ownership and CEO duality moderate this relationship are studied.

According to our findings, the correlation between ES, E, and S performance and enterprises financial performance is positive but not statistically significant. Our research demonstrates that high ES performance, E and S performance still have positive effects on the company's performance. A socially responsible firm can build its reputation, reduce risks, and establish the groundwork for long-term sustainable growth. Therefore, to achieve long-term sustainable growth and competitive advantage, firms should focus on ES activities.

Furthermore, when we include interaction term, we found that environmental-social (ES) performance is positively correlated with Tobin's Q. However, both SOE and the interaction term between SOE and ES performance are negatively and significantly correlated, indicating that government ownership has a negative moderating effect on the relationship between ES performance and corporate performance. This is because compared with private enterprises, state-owned enterprises essentially have different goals. These goals include social and economic goals, which can create pressure to prioritize non-financial goals over maximizing company value. In addition, ES performance and CEO duality are positively and significantly correlated with Tobin's Q. However, the interaction term between CEO duality and ES performance is significantly negatively correlated, suggesting that CEO has a negative moderating effect on the relationship between ES performance and firm performance. This may be because the dual role of the CEO leads to serious agency problems and weakens oversight and independent checks on the behavior of the CEO.

Our study provides important implications for businesses and policymakers on how ES considerations can drive a firm's performance and the need to incorporate ES factors into business decision-making. However, in this research, we acknowledge the widely recognized issue of endogeneity within ES data. It is a common challenge due to the common relationship between ES performance and firm performance, unobserved heterogeneity, and potential measurement errors. We tried to address this issue by employing fixed effects regression. Despite these efforts, endogeneity remains a persistent obstacle, revealing a gap in the existing literature and highlighting the need for other methodologies to effectively address this in ES studies. Exploring these research gaps can contribute to advancing our understanding of the true impact of ES performance on firm value.

In conclusion, our study contributes to the literature on the relationship between ES and performance and the moderating role of government ownership and CEO dual role. We believe that these findings could inform and guide businesses and policymakers in their decision-making and contribute responsible business environment.

References

- Akerlof, G.A. (1970). An economic theorist's book of tales: The market for “lemons”: quality uncertainty and the market mechanism.
- Alareeni, B.A. and Hamdan, A. (2020). ESG impact on performance of US S&P 500-listed firms. *Corporate Governance: The International Journal of Business in Society*, 20(7), pp.1409–1428.
- Allegrini, M. and Greco, G. (2011). Corporate boards, audit committees and voluntary disclosure: evidence from Italian Listed Companies. *Journal of Management & Governance*, [online] 17(1), pp.187–216.
- Alsayegh, M.F., Abdul Rahman, R. and Homayoun, S. (2020). Corporate Economic, Environmental, and Social Sustainability Performance Transformation through ESG Disclosure. *Sustainability*, 12(9), p.3910.
- Austmann, L.M. and Vigne, S.A. (2021). Does environmental awareness fuel the electric vehicle market? A Twitter keyword analysis. *Energy Economics*, [online] 101(C).
- Atan, R., Alam, Md.M., Said, J. and Zamri, M. (2018). The impacts of environmental, social, and governance factors on firm performance. *Management of Environmental Quality: An International Journal*, 29(2), pp.182–194.
- Banker, R.D., Mashruwala, R. and Tripathy, A. (2014). Does a differentiation strategy lead to more sustainable financial performance than a cost leadership strategy? *Management decision : MD*, [online] 52(5).
- Barnea, A., & Rubin, A. (2010). Corporate social responsibility as a conflict between shareholders. *Journal of Business Ethics*, 97(1), 71–86.
- Barney, J., 1991. Firm resources and sustained competitive advantage. *J. Manag.* 17 (1), 99–120.
- Ben-Porath, E., Dekel, E., & Lipman, B. L. (2018). Disclosure and choice. *The Review of Economic Studies*, 85(3), 1471–1501.
- Bernardi, C. and Stark, A.W. (2018). Environmental, social and governance disclosure, integrated reporting, and the accuracy of analyst forecasts. *British Accounting Review*, [online] 50(1), pp.16–31.
- Berrone, P., Fosfuri, A., Gelabert, L. and Gomez-Mejia, L.R. (2013). Necessity as the mother of ‘green’ inventions: Institutional pressures and environmental innovations. *Strategic Management Journal*, 34(8), pp.891–909.

- Blibech, N., & Berraies, S. (2018). The impact of CEO' duality and board's size and independence on firms' innovation and financial performance. *E3 Journal of Business Management and Economics*, [online] 9(1), pp.022–029.
- Bliss, M.A., Muniandy, B. and Majid, A. (2007). CEO duality, audit committee effectiveness and audit risks. *Managerial Auditing Journal*, [online] 22(7), pp.716–728.
- Bofinger, Y., Heyden, K. J., & Rock, B. (2022). Corporate social responsibility and market efficiency: Evidence from ESG and misvaluation measures. *Journal of Banking & Finance*, 134, Article 106322.
- Boyd BK. 1995. CEO duality and firm performance: a contingency model. *Strategic Management Journal* 16(4): 301–312.
- Brundtland, G.H. (1987). Report of the World Commission on Environment and Development: Our Common Future Towards Sustainable Development 2. Part II. Common Challenges Population and Human Resources 4. [online] United Nations, p.16.
- Cai, J. and Zhang, Z. (2011). Leverage change, debt overhang, and stock prices. *Journal of Corporate Finance*, 17(3), pp.391–402.
- Chen RY, Ghoul SE, Guedhami O, Wang H (2017) Do state and foreign ownership affect investment efficiency? Evidence from privatizations. *J Corp Financ* 42:408–421
- Cheung, Y.-L., Rau, P.R. and Stouraitis, A. (2010). Helping Hand or Grabbing Hand? Central vs. Local Government Shareholders in Chinese Listed Firms*. *Review of Finance*, 14(4), pp.669–694.
- Chiu, I.H-Y. (2017). Unpacking the Reforms in Europe and UK Relating to Mandatory Disclosure in Corporate Social Responsibility: Instituting a Hybrid Governance Model to Change Corporate Behaviour? *European Company Law*, 14(Issue 5), pp.193–208.
- Chung, K.H. and Pruitt, S.W. (2007). A Simple Approximation of Tobin's Q. [online] Social Science Research Network.
- Daily, C.M., & Schwenk, C.R. (1996). Chief Executive Officers, Top Management Teams, and Boards of Directors: Congruent or Countervailing Forces? *Journal of Management*, 22, 185 - 208.
- Davis, J. H., Schoorman, F. D., & Donaldson, L. (1997). Toward a stewardship theory of management. *Academy of Management Review*, 22(1), 2047.
- Duru, A., Iyengar, R.J. and Zampelli, E.M. (2016). The dynamic relationship between CEO duality and firm performance: The moderating role of board independence. *Journal of Business Research*, [online] 69(10), pp.4269–4277.

- Eccles, R.G., Ioannou, I. and Serafeim, G. (2014). The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, [online] 60(11), pp.2835–2857.
- Eichholtz, P., Holtermans, R., Kok, N., & Yonder, E. (2019). Environmental performance and the cost of debt: Evidence from commercial mortgages and REIT bonds. *Journal of Banking & Finance*, 102, 19–32.
- Elsayed, K. (2007). Does CEO Duality Really Affect Corporate Performance? *Corporate Governance: An International Review*, 15(6), pp.1203–1214.
- Fama, E. F., & Jensen, M. C. (1983). Separation of ownership and control. *Journal of Law and Economics*, 26(2), 301-325.
- Fan J, Wang T, Zhang T (2007) Politically connected CEOs, corporate governance, and Post-IPO performance of China's newly partially privatized firms. *J Financ Econ* 84:330–357
- Freeman, E. (1984). *A Stakeholder Approach to Strategic Management*. [online] ResearchGate.
- Freeman, R. E. (2010). *Strategic management: A stakeholder approach*. Cambridge university press.
- Friede, G., Busch, T. and Bassen, A. (2015). ESG and financial performance: aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, [online] 5(4), pp.210–233
- Frostenson, M. and Prenkert, F. (2015). Sustainable supply chain management when focal firms are complex: a network perspective. *Journal of Cleaner Production*, 107, pp.85–94.
- Frydman, C., & Wang, B. (2020). The impact of salience on investor behaviour: Evidence from a natural experiment. *The Journal of Finance*, 75(1), 229–276.
- Giese, G., Lee, L.-E., Melas, D., Nagy, Z. and Nishikawa, L. (2019). Foundations of ESG Investing: How ESG Affects Equity Valuation, Risk, and Performance. *The Journal of Portfolio Management*, [online] 45(5), pp.69–83.
- Gillan, S.L., Koch, A. and Starks, L.T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance*, 66(101889), p.101889.

- Gil-Saura, I., Ruiz-Molina, M.E., Berenguer-Contrí, G. and Seric, M. (2019). The Role of Retail Equity, Value and Relational Benefits in Building B2B Relationships in Retailing. *Journal of Relationship Marketing*, 19(4), pp.253–286.
- Haryono, U. and Iskandar, R. (2015). Corporate Social Performance and Firm Value. *International Journal of Business and Management Invention ISSN*, [online] 4, pp.69–75.
- Hawkins, C.V. (2011). Local economic development joint ventures and metropolitan networks. *Public Administration Quarterly*, [online] 35(1), pp.59–93.
- Hayat Bhatti, M., Akram, U., Hasnat Bhatti, M., Rasool, H. and Su, X. (2020). Unraveling the Effects of Ethical Leadership on Knowledge Sharing: The Mediating Roles of Subjective Well-Being and Social Media in the Hotel Industry. *Sustainability*, 12(20), p.8333.
- Hu, Helen Wei et al. “Internal governance mechanisms and firm performance in China.” *Asia Pacific Journal of Management* 27 (2009): 727-749.
- Husted, B.W. and Sousa-Filho, J.M. de (2019). Board structure and environmental, social, and governance disclosure in Latin America. *Journal of Business Research*, 102, pp.220–227.
- Iwata, H. and Okada, K. (2011). How does environmental performance affect financial performance? Evidence from Japanese manufacturing firms. *Ecological Economics*, [online] 70(9), pp.1691–1700.
- Javaid Lone, E., Ali, A. and Khan, I. (2016). Corporate governance and corporate social responsibility disclosure: evidence from Pakistan. *Corporate Governance: The international journal of business in society*, 16(5), pp.785–797.
- Jensen, M.C.; Meckling, W.H. (1976) Theory of the firm: Managerial behavior, agency costs and ownership structure. *J. Financ. Econ.* 3, 305–360.
- Jensen, M.C. (1986). Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *The American Economic Review*, [online] 76(2), pp.323–329.
- Jensen, M.C. (1993) The Modern Industrial Revolution, Exit, and the Failure of Internal Control Systems. *The Journal of Finance*, 48, 831-880.
- Jermisittiparsert, K. (2021). The role of supply chain and product development in sustainable performance, goodwill and firm popularity. *Uncertain Supply Chain Management*, [online] 9(4), pp.877–886.

- Jiang, F. and Kim, K.A. (2020). Corporate Governance in China: A Survey. *Review of Finance*, 24(4).
- Joliet, R., & Titova, Y. (2018). Equity SRI funds vacillate between ethics and money: An analysis of the funds' stock holding decisions. *Journal of Banking & Finance*, 97, 70–86.
- Kosnik, R.D. (1987). Greenmail: A Study of Board Performance in Corporate Governance. *Administrative Science Quarterly*, [online] 32(2), pp.163–185.
- Kuzman, T., Talavera, O. and Bellos, S.K. (2018). Politically induced board turnover, ownership arrangements, and performance of SOEs. *Corporate Governance: An International Review*, 26(3), pp.160–179.
- Li, H., Meng, L. and Zhang, J. (2006). Why Do Entrepreneurs Enter Politics? Evidence from China. *Economic Inquiry*, [online] 44(3), pp.559–578.
- Lin, J.Y., Cai, F. and Li, Z. (1998). Competition, Policy Burdens, and State-Owned Enterprise Reform. *The American Economic Review*, [online] 88(2), pp.422–427.
- Lin, K.J., Tan, J., Zhao, L. and Karim, K. (2015). In the name of charity: Political connections and strategic corporate social responsibility in a transition economy. *Journal of Corporate Finance*, [online] 32(C), pp.327–346.
- Lin, L.-W. (2009). Corporate Social Responsibility in China: Window Dressing or Structural Change?
- Lin, Y.-E., Li, Y.-W., Cheng, T.Y. and Lam, K. (2021). Corporate social responsibility and investment efficiency: Does business strategy matter? *International Review of Financial Analysis*, [online] 73(C).
- Li, S. and Zhang, H. (2019). Does External Monitoring Improve the Performance of State-Owned Enterprises? [online] papers.ssrn.com.
- Li, Y., Gong, M., Zhang, X.-Y. and Koh, L. (2018). The impact of environmental, social, and governance disclosure on firm value: The role of CEO power. *The British Accounting Review*, 50(1), pp.60–75.
- Marsat, S. and Williams, B. (2011). CSR and Market Valuation: International Evidence. [online] papers.ssrn.com.
- Martínez, P. and Rodríguez del Bosque, I. (2014). Sustainability Dimensions: A Source to Enhance Corporate Reputation. *Corporate Reputation Review*, 17(4), pp.239–253.

- Massie, J. L. 1965. Management theory. In J. G. March (Ed.), *Handbook of organizations*: 387-422. Chicago: Rand-McNally.
- Morck, R., Shleifer, A., & Vishny, R. (1989). Alternative mechanisms for corporate control. *American Economics Review*, 79(4), 842-852.
- Mubeen, R., Han, D., Abbas, J. and Hussain, I. (2020). The Effects of Market Competition, Capital Structure, and CEO Duality on Firm Performance: A Mediation Analysis by Incorporating the GMM Model Technique. *Sustainability*, 12(8), p.3480.
- Nekhili, M., Boukadhaba, A., Nagati, H., & Chtioui, T. (2021). ESG performance and market value: The moderating role of employee board representation. *The International Journal of Human Resource Management*, 32(14), 3061–3087.
- Orazalin, N.S. (2019). Corporate governance and corporate social responsibility (CSR) disclosure in an emerging economy: evidence from commercial banks of Kazakhstan. [online] *Corporate Governance: The International Journal of Business in Society*.
- Pan, X. and Tian, G.G. (2013). Does Bank Ownership Imply Efficient Monitoring? Evidence from Bank Lending and Firm Investment Efficiencies in China. *SSRN Electronic Journal*.
- Ray, S. (2011). Financial Performance of Paper and Paper Product Companies in India in Post-Liberalization Period: An Exploratory Study. *Research Journal of Finance and Accounting*, [online] 2(5), p.48.
- Roberts, M.R. and Whited, T.M. (2011). Endogeneity in Empirical Corporate Finance. *SSRN Electronic Journal*.
- Rothschild, M. and Stiglitz, J. (1976). Equilibrium in Competitive Insurance Markets: An Essay on the Economics of Imperfect Information. *The Quarterly Journal of Economics*, 90(4), p.629.
- R. Tan et al. (2001). "CEO Share Ownership and Firm Value." *Asia Pacific Journal of Management*.
- Ruan, L. and Liu, H. (2021). Environmental, Social, Governance Activities and Firm Performance: Evidence from China. *Sustainability*, 13(2), p.767.
- Sakis Kotsantonis, Pinney, C. and Serafeim, G. (2016). ESG Integration in Investment Management: Myths and Realities. *Journal of Applied Corporate Finance*, 28(2), pp.10–16.
- Scirp.org. (2015). Bryman, A. and Bell, E. (2015) *Business Research Methods*. Oxford University Press, Oxford. - References - Scientific Research Publishing.

- Servaes, H. and Tamayo, A. (2013). The Impact of Corporate Social Responsibility on Firm Value: The Role of Customer Awareness. *Management Science*, [online] 59(5), pp.1045–1061.
- Sheng, S., Zhou, K.Z. and Li, J.J. (2011). The Effects of Business and Political Ties on Firm Performance: Evidence from China. *Journal of Marketing*, 75(1), pp.1–15.
- Siddy, D. (2009). Raising ESG awareness and standards among listed companies Information products and services for sustainable investors Specialised markets for specific sustainable investment niches Case studies Sustainable investment indices Exchanges and sustainable investment.
- Sun Q, Tong W, Tong J (2002) How does government ownership affect firm performance? Evidence From China's Privatization Experience. *J Bus Financ Acc* 29:1–27.
- Tian, J., & Lau, C. (2001). Board Composition, Leadership Structure and Performance in Chinese Shareholding Companies. *Asia Pacific Journal of Management*, 18, 245-263.
- United Nations (2021). SDG Indicators. [online] unstats.un.org.
- Van De Voorde, K., Veld, M. and Van Veldhoven, M. (2016). Connecting empowerment-focused HRM and labour productivity to work engagement: the mediating role of job demands and resources. *Human Resource Management Journal*, 26(2), pp.192–210.
- Velte, P. (2019). Does CEO power moderate the link between ESG performance and financial performance? *Management Research Review*, [online] 43(5), pp.497–520.
- Wagner, M. and Schaltegger, S. (2004), “The effect of corporate environmental strategy choice and environmental performance on competitiveness and economic performance: an empirical study of EU manufacturing”, *European Management Journal*, Vol. 22 No. 5, pp. 557-572.
- Wang, Q., Wong, T.J. and Xia, L. (2008). State ownership, the institutional environment, and auditor choice: Evidence from China. *Journal of Accounting and Economics*, [online] 46(1), pp.112–134.
- Wooldridge, J.M. (2015). *Introductory Econometrics: A Modern Approach - Standalone Book Sixth Edition*. 6th edition ed.
- World Bank. (n.d.). *World Development Report 2020 Chapters and Data*.
- Xie, J., Nozawa, W., Yagi, M., Fujii, H. and Managi, S. (2018). Do environmental, social, and governance activities improve corporate financial performance? *Business Strategy and the Environment*, 28(2), pp.286–300.
- Xu, X. and Wang, Y. (1999), “Ownership structure and corporate governance in Chinese stock companies”, *China Economic Review*, Vol. 10 No. 1, pp. 75-98.

- Yang, T. and Zhao, S. (2014). CEO duality and firm performance: Evidence from an exogenous shock to the competitive environment. *Journal of Banking & Finance*, 49, pp.534–552.
- Yesilkagit, K. and van Thiel, S. (2008). Political Influence and Bureaucratic Autonomy. *Public Organization Review*, 8(2), pp.137–153.
- Yuan, Q. (2011). Public Governance, Political Connectedness, and CEO Turnover: Evidence from Chinese State-Owned Enterprises. *SSRN Electronic Journal*.

10. List of Tables

Table 13. Variable Description

Variable	Definition
Tobin's Q	$\frac{\text{market value of equity} + \text{market value of total liabilities}}{\text{book value of total assets}}$
ES Score	ES performance score compiled from the Environmental and Social scores from Bloomberg Database
Leverage Ratio	$\frac{\text{total debt}}{\text{total assets}}$
Asset Turnover	$\frac{\text{net sales}}{\text{average total assets}}$
Revenue Growth	$\frac{(\text{revenue } t - \text{revenue } t - 1) \times 100}{\text{revenue } t - 1}$
Ln Total Asset	Natural Logarithm of total assets
Age	(Year of obtaining data - year establishing firm) + 1
Board Size	number of directors on the firm's board
Board Independence	number of non-directors on the board
SOE Ownership	Government owned enterprises assigned a value of 1, otherwise 0
CEO Dual Role	Presence of CEO duality assigned a value of 1, otherwise 0

Table. 14 White Test

Whit's Test	H0	Test Statistic	p-value	Decision	Heteroskedasticity
Stata test (Chi-squared) - regression 1	Homoskedasticity	553.58	0	Reject	Yes
Stata test (Chi-squared) - regression 2	Homoskedasticity	613.13	0	Reject	Yes
Stata test (Chi-squared) - regression 3	Homoskedasticity	565.45	0	Reject	Yes

Table 15. Hausman Test

Hausman Test	Test Statistic	Prob.>F	Decision
Model 1	156.61	0.0000	Fixed Effect
Model 2	169.82	0.0000	Fixed Effect
Model 3	174.19	0.0000	Fixed Effect