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THE IMPACT OF OVERINVESTMENT ON ENVIRONMENTAL, SOCIAL AND GOVERNANCE RATINGS: EVIDENCE FROM CHINESE CORPORATIONS

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ABSTRACT

In an era where sustainability practices face increasing global scrutiny, understanding how investment decisions impact environmental, social and governance (ESG) ratings is essential. This study examines the relationship between corporate overinvestment and ESG ratings using data from Chinese corporations between 2012 and 2020. Employing fixed effects models for empirical analysis, the results reveal a significant negative relationship between overinvestment and ESG ratings, particularly affecting the social aspect. These findings highlight the importance of efficient investment management in enhancing corporate ESG performance. The study provides valuable insights for corporations aiming to optimise resource allocation to improve their sustainability outcomes.

Keywords: Environmental, social and governance, corporate investment, sustainability, ESG rating, green economics

INTRODUCTION

The global corporate arena has witnessed a progressive surge in focus on environmental, social and governance (ESG) considerations (Chen & Xie, 2022; Khan, 2022). This shifting paradigm is underscored by an escalating trend in capital allocations dedicated to ESG initiatives

(Zhang et al., 2022), alongside a growing number of corporations incorporating ESG reporting into their operational framework. Irrespective of the ongoing academic discourse interrogating the underlying motivations and implications for the capital market inherent to such investments, one certainty prevails: the ESG rating is influenced by a multifarious array of factors (DasGupta, 2022; Imperiale et al., 2023; Wang et al., 2023). One such factor that significantly contributes to shaping ESG ratings is the efficiency of investments (Harymawan et al., 2022; Lai & Zhang, 2022). The efficacy of allocating and utilising resources can profoundly impact a corporation's ESG rating (Welch & Yoon, 2023; Zheng & Aishan, 2023). This understanding underscores the need for greater scrutiny of investment efficiency, particularly within its influence on ESG outcomes. Inefficient investments, the misallocation or overutilisation of resources, can result in detrimental effects on ESG ratings.

To illustrate the relevance of this study, it is pertinent to consider China's expenditure on sustainable practices in capital allocation. According to the Climate Bonds Initiative (CBI), China's green finance market has grown exponentially, with green bonds reaching USD68.2 billion in 2020 and a cumulative issuance totalling USD199.2 billion, making China the second largest green bond market globally. Moreover, the Chinese government has been increasingly directing investments into infrastructure, renewable energy and pollution control, with 85% of green investments originating from social capital in China (Tang et al., 2023). These investments underscore China's commitment to integrating sustainability into its economic framework. However, allocating these substantial resources necessitates efficiency to maximise their impact on ESG ratings. Inefficient investment practices can undermine these efforts, resulting in suboptimal ESG outcomes.

Inefficient investment has two primary forms: overinvestment and underinvestment. Previous research has acknowledged that overinvestment has the potential to negatively impact corporate value and shareholder wealth. While it is universally accepted that a certain degree of investment is vital for business development, there is consensus that overinvestment may lead to inefficiency and waste of resources (Amaral et al., 2022; Hu et al., 2019). Research suggests that overinvestment could serve other stakeholders at the expense of shareholders, leading to a transfer of wealth from shareholders to different stakeholders (Allen & Berg, 2020), It often results in inefficient resource allocation, environmental degradation and

governance risks, which outweigh potential social benefits. Overinvestment, particularly when driven by managerial incentives, informational asymmetry or speculative motives, can indeed lead to resource misallocation, wasteful projects, increased carbon footprints and financial inefficiency, thereby negatively impacting ESG ratings. Similarly, Zhang et al. (2016) provide clear evidence from Chinese energy firms, demonstrating that managerial discretion and abundant free cash flows encourage investments in negative net present values (NPV) projects, thereby creating financial inefficiencies and resource wastage. Hoffmann and Schnabl (2011) further illustrate how excessively expansionary monetary policies lead to speculative overinvestment in projects with inherently low productivity, triggering economic and financial instability. Collectively, these insights clarify that excessive investments, driven by managerial or speculative incentives rather than strategic sustainability alignment, undermine long-term ESG outcomes by causing resource misallocation, inefficiencies and financial instability.

While overinvestment might initially satisfy stakeholder interests through enhanced short-term employment, local development or alignment with policy incentives, these benefits are often superficial and temporary, overinvestment undermines corporate sustainability performance and negatively impacts long-term economic outcomes (Zhang & Kong, 2022). Franzoni (2009) demonstrates that managerial empire-building behaviour leads to resource allocation towards projects with negative net present value, thereby diminishing overall efficiency and sustainability. Moreover, Bebchuk and Stole (1993) highlight that managerial short-term objectives combined with informational asymmetry often incentivise overinvestment as a signalling mechanism, exacerbating resource misallocation and resulting in long-term inefficiencies. Consequently, despite apparent short-term stakeholder benefits, overinvestment ultimately deteriorates ESG ratings and undermines broader corporate sustainability by fostering inefficient resource utilisation, increasing financial risks and creating misaligned investment incentives.

Concurrently, a growing body of research underlines that inefficient investment can adversely affect a corporation's ESG rating. ESG ratings gauge a company's commitment to sustainable operations and responsible business practices, incorporating various indicators, including energy use, waste management, worker safety, product safety, business ethics and board diversity. Inefficient investment can be explained as a company's inability

to efficiently manage resources, negatively affecting the environmental and governance dimensions of the ESG rating. Inefficient investments, misallocating or overutilising resources can adversely affect ESG ratings. Research by Kuzey et al. (2023) revealed that overinvestment increases social pillar inequality while reducing environmental pillar inequality, leading to an imbalance in ESG dimensions and increasing legitimacy concerns. Harymawan et al. (2022) demonstrated that investment efficiency enhances ESG reporting quality, while inefficiency results in poorer ESG outcomes.

Overinvestment by a corporation leads to excessive resource utilisation, culminating in environmental degradation, which adversely impacts the environmental aspect of the ESG rating. This indicates a potential lack of environmental stewardship and effective resource management, essential for achieving high environmental scores (Avramov et al., 2022). In governance, overinvestment can signal weak financial management and flawed decision-making processes, resulting in lower ESG rating scores. Overinvestment may imply potential agency issues, where managers invest in personal gains at the expense of shareholders, indicating a lack of robust corporate governance (Burke, 2021; Feng et al., 2022). However, the determining factor for actual ESG outcomes is not merely the scale of investment but its strategic effectiveness and alignment. Prior studies highlight that managerial discretion, particularly driven by agency conflicts, frequently results in ESG-related investments that do not yield genuine performance improvements. Pellicani and Kalatzis (2019), demonstrate that managerial discretion often directs resources towards superficially stakeholder-oriented projects with negative NPV, thus undermining efficiency. Similarly, Shi (2019) identifies managerial empire-building tendencies in Chinese energy firms, where abundant free cash flow facilitates ESG-related investments that are economically inefficient despite their apparent alignment with sustainability objectives. Zhang and Wang (2021) offer complementary insights, illustrating that policy-driven investments in environmental initiatives, such as carbon emissions reduction projects, frequently encounter operational inefficiencies and resource misallocation, ultimately reducing corporate sustainability. Additionally, D'Mello and Miranda (2010) stress that without strong governance mechanisms, managerial overinvestment stemming from excess cash flows often supports superficially beneficial projects lacking strategic alignment, impairing long-term sustainability and governance performance. Collectively, these perspectives underscore how seemingly ESG-oriented but inefficient investments may ultimately diminish rather than enhance ESG ratings.

The imperative for our research is predicated on the extant lacuna within empirical examinations about the distinct repercussions of overinvestment on ESG ratings. Despite numerous past studies highlighting the negative relationship between inefficient investment and ESG ratings, most of them elaborate on this relationship in the context of the impact of ESG performance on inefficient investment (Hammami & Hendijani Zadeh, 2020). A conspicuous exigency is discerned for empirical forays meticulously dissecting the precise conduits through which overinvestment exerts detrimental effects on the discrete dimensions of ESG ratings, with an accentuated focus on the environmental and governance aspects. Furthermore, the corpus of antecedent research exhibits an unmistakable tilt towards the Western corporate milieu, scarcely extending its gaze to interrogate this pivotal relationship within the ambit of emerging markets. With corporate practices under the sustainability and responsibility umbrella undergoing constant evolution, it is plausible to posit that the dynamics encapsulating overinvestment and its ramifications for ESG ratings are concurrently in flux. Thus, our research venture aims to address this gap, offering a seminal contribution to the literature. Understanding the potential consistency, or lack thereof, of the impact of overinvestment on ESG ratings across divergent geographical and economic topographies is paramount. Considering the endemic variances infusing regulatory frameworks, corporate governance edifices and investment climates characteristic of different regions, this understanding is imperative.

This research makes three fundamental contributions to the literature. First, it provides empirical evidence demonstrating that overinvestment significantly influences the decline in ESG ratings. Through a comprehensive analysis of the three dimensions of ESG performance, it is inferred that the impact of corporate overinvestment on ESG performance primarily manifests through its influence on environmental and governance investments. Second, this article enhances the existing body of research by conducting a microlevel evaluation of Chinese corporations. By utilising corporation-level data, this study captures the influence of overinvestment on ESG ratings, presenting insights more aligned with these corporations' investment realities. Finally, the research reveals heterogeneity within the corporate sector by identifying the distinct impacts of overinvestment on ESG ratings between corporations with high and low financing constraints. The analysis deepens the understanding of the role of overinvestment in ESG rating and contributes to the refinement of policies and business strategies related to ESG investment.

LITERATURE REVIEW

Drawing from investment principles in financial management, corporations are typically advised to channel resources towards initiatives that provide the highest net present value. These optimal investment decisions hinge upon an intricate balance of a corporation's financial capacity and the prospective value of the investment (Leng et al., 2023). Executed accurately, these decisions could significantly amplify a corporation's rating (Chen & Xie, 2022; Yu & Xiao, 2022). The rationale underpinning this assertion is manifold. Initially, prudent investments inherently correspond with efficient resource allocation and responsible risk management (Chen et al., 2022; W. Wang et al., 2022). Such judicious investment decisions also pave the way for enhanced stakeholder relations, fostering innovation, boosting employee morale and securing future cash flows (Liu et al., 2022). These accumulative positive outcomes invariably enrich the corporation's ESG rating, fortifying the organisation's long-term sustainability and promoting ethical practices (Jonsdottir et al., 2022).

A prevailing concern within the domains of financial management and ESG rating is the phenomenon of corporate overinvestment. Stemming from applying Q theory (Tobin, 1969) within the purview of neoclassical economic interpretation, the prevailing conjecture is that corporations continue to invest in new ventures until the marginal benefits align with the marginal costs. However, in a world saturated with friction, this equilibrium is susceptible to perturbations leading to investment distortions (Gomariz & Ballesta, 2014; Law & Singh, 2014; Vo, 2019). Overinvestment within corporate finance is frequent, the consequences of which are principally borne by investors rather than managers. Overinvestment can occur due to various factors, including managerial overconfidence or the misestimation of investment value. The senior managers often derive private benefits through overinvestment, categorised as empire-building (Gul et al., 2020; Q. S. Wang et al., 2022; Weiskirchner-Merten, 2022). However, concurrently engenders value destruction, impairing investor returns. The information asymmetry between corporate insiders further complicates the situation and dispersed investors (Kong et al., 2021; Myers & Majluf, 1984; Zhang & Kong, 2022). Managers, cognisant of the deleterious outcomes, may resort to manipulative financial disclosure practices to obfuscate their shortcomings (Mutschmann et al., 2021; Stocken & Verrecchia, 2004). Cognisant of the deleterious outcomes, managers may resort to manipulative financial disclosure practices to obfuscate their shortcomings (Jiang et al., 2020;

Naeem & Li, 2019). This skewed perspective, along with the divergence in utility functions between investors and managers, as proposed by agency theory (Cuevas-Rodríguez et al., 2012; Murphy, 1985), can result in substantial overinvestment, detrimentally impacting a corporation's ESG rating.

Complicating matters further, issues of information asymmetry, such as moral hazard and adverse selection, can amplify the detrimental impacts of overinvestment (So, 2022; Tang et al., 2022). When corporations pursue self-beneficial investments, which often conflict with ESG practices, overpriced securities might be deliberately issued by managers who possess superior information about the corporation's prospects than shareholders, leading to adverse selection. Both of these situations contribute to overinvestment and subsequent erosion of ESG ratings.

Moreover, a corporation's financial reporting caliber is a pivotal determinant of its ESG rating. Tettamanzi et al. (2022) underscore that superior financial reporting enables corporations to navigate macroeconomic shocks and uphold investment efficiency, thereby bolstering ESG ratings. Conversely, corporations characterised by inferior financial reporting, as demonstrated by Wu and Abeysekera (2023), are susceptible to lower ESG ratings.

HYPOTHESIS DEVELOPMENT

Agency theory suggests that managers, as agents of shareholders, might engage in overinvestment driven by personal interests, such as empire-building or increasing compensation (D'Mello & Miranda, 2010). This behaviour often leads to inefficient use of resources, resulting in poor financial performance and a subsequent decline in ESG ratings. ESG ratings encompass various indicators, including governance quality and resource efficiency, compromised by overinvestment. Overinvestment typically involves allocating corporate funds to projects with a negative net present value where the marginal costs exceed the marginal benefits. Managers may pursue such investments to expand their control over more assets or to boost short-term performance metrics that affect their compensation, even if these projects do not align with shareholder interests. These investments fail to generate adequate returns, ultimately leading to the inefficient use of resources. In the context of ESG ratings, overinvestment can negatively impact several key aspects.

First, for environmental ratings, investment results in excessive resource utilisation, which can lead to environmental degradation. For instance, projects that require large amounts of energy or raw materials without corresponding benefits can increase a company's carbon footprint and waste output. This degradation poorly reflects a company's environmental stewardship, a critical aspect of ESG ratings. Effective environmental management is crucial for higher ESG ratings, and overinvestment directly undermines this issue by promoting unsustainable practices. The second is the governance rating. Overinvestment can signal weak financial management and flawed decision-making processes, integral to governance ratings. When managers engage in overinvestment, poor oversight and a lack of robust corporate governance structures often occur. This can manifest in various forms, such as inadequate risk assessment, lack of accountability, and ineffective board supervision. These issues are detrimental to governance scores, highlighting deficiencies in leadership and policy frameworks essential for good governance. Inefficient investment practices often result in poor financial outcomes, which are reflected in lower ESG ratings. For example, studies have shown that companies engaging in overinvestment typically exhibit lower returns on assets and higher debt levels, detrimental to overall financial health and sustainability. These financial strains can reduce the resources available for sustainable initiatives and responsible business practices, lowering ESG ratings.

The Resource-Based View (RBV) adds another dimension to this understanding by emphasising how overinvestment misallocates valuable resources that could otherwise be used to build and sustain a corporation's competitive advantage (Zhai et al., 2024). According to the RBV, a corporation's success hinges on managing and deploying valuable, rare, inimitable and nondutiable resources. Overinvestment leads to squandering these critical resources on suboptimal projects, diminishing the corporation's capacity to leverage its unique strengths for long-term success. From an RBV perspective, overinvestment in projects with negative NPV represents a failure to utilise resources in a manner that enhances corporation capabilities and competitive positioning. Instead of investing in initiatives that align with the corporation's strategic goals and sustainability objectives, resources are wasted on ventures that do not contribute to the corporation's core competencies or market differentiation. This misalignment not only

hampers financial performance but also weakens the corporation's ability to achieve high ESG ratings, as these scores reflect the effective and efficient use of resources in a socially and environmentally responsible manner.

Agency theory suggests that managerial overinvestment, driven by personal objectives such as empire-building or short-term gains, often leads to inefficient resource allocation and governance failures, negatively affecting ESG ratings. Overinvestment prioritises immediate managerial interests over sustainable long-term growth, elevating environmental and governance risks. Conversely, the RBV emphasises that sustainable competitive advantage is achieved through the effective management and strategically deploying valuable resources. Thus, overinvestment undermines competitive advantage by diverting resources away from projects that align strategically with sustainability goals. This misallocation adversely impacts ESG ratings, highlighting the importance of efficient investment practices to enhance corporate sustainability outcomes.

Moreover, overinvestment erodes shareholder value by diverting funds from potentially profitable and sustainable ventures to less efficient and riskier ones. This misallocation of resources undermines trust in management's ability to govern the company effectively and to make decisions that align with shareholder interests. Over time, this erosion of trust can lead to a devaluation of the company's stock, reduced investor confidence and a higher cost of capital, all of which negatively impact the ESG rating. Therefore, integrating insights from both agency theory and the resource-based view, it is hypothesised that overinvestment is negatively related with ESG ratings. Corporations that manage their investments efficiently ensure that they only undertake projects with positive NPV and align their resource allocation with sustainable and responsible practices will likely achieve higher ESG ratings. Conversely, companies that engage in overinvestment are prone to inefficiencies that detract from their environmental and governance performance, resulting in lower ratings. Therefore, Hypothesis as follows:

H1: Overinvestment is negatively related with ESG ratings.

EMPIRICAL DESIGN AND DATA

Data and Variables

The financial data for China A-listed companies were obtained from the CSMAR database, while the ESG rating data were sourced from Bloomberg. To ensure the authenticity and comparability of the data, several precautionary measures were taken. Specifically, all samples that were flagged as ST or *ST, as well as financial and insurance companies, were excluded from the dataset. In addition, any companies that had missing or abnormally related data were also removed from the sample. Concurrently, all continuous variables were subjected to a winsorisation process, a method that trims the data at the 1% extremes at both ends of the distribution. This procedure mitigates the impact of potential outliers and consequently enhances the robustness of the subsequent statistical analysis. The final dataset consists of observations from 1,172 companies after applying the necessary data cleaning and filtering procedures to ensure consistency and reliability.

Figures 1 to 4 depict the annual mean scores for 2012 through 2020, about ESG ratings and each of its constituent aspects: environmental, social, and governance. A discernible increase is observed in the graphs, with ESG ratings increasing from 19 in 2012 to 23 in 2020. Governance rating follows an overall upward trend, with a decline from 2012 to 2014. This upward trajectory is noticeable in the aggregate ESG rating and mirrored within each aspect thereof, thereby illustrating a consistent increase in ESG ratings among the diverse corporations under examination. These data visually encapsulate the steady enhancement and commitment to ESG principles exhibited by various corporations over the stated timeframe.

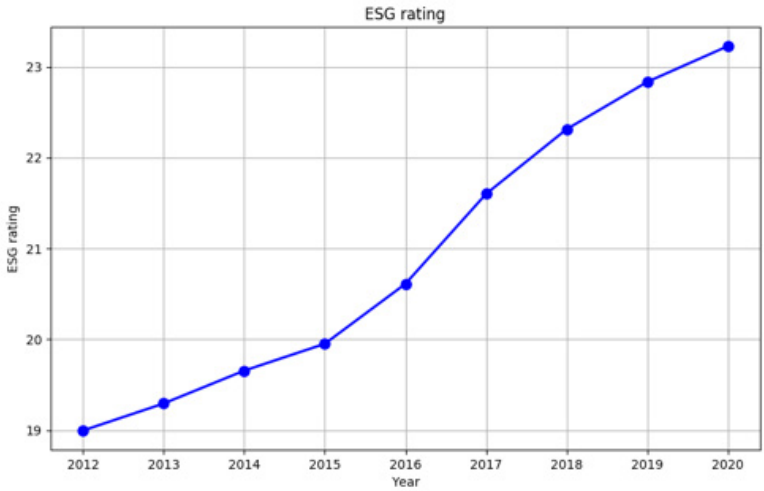

FIGURE 1: ESG rating

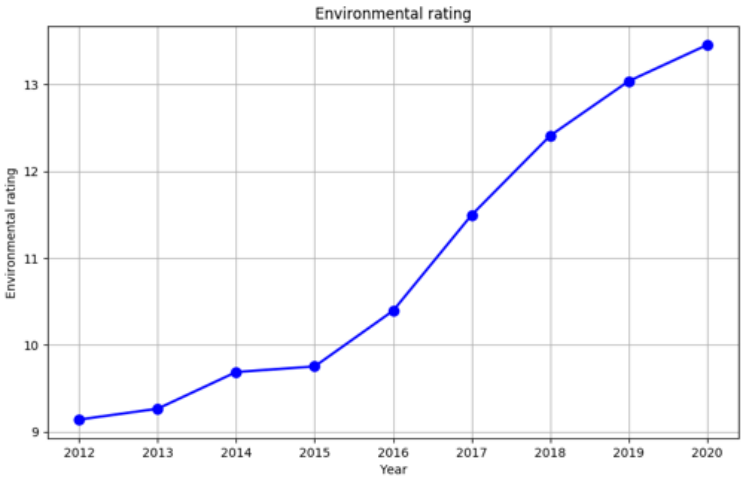

FIGURE 2: Environmental rating

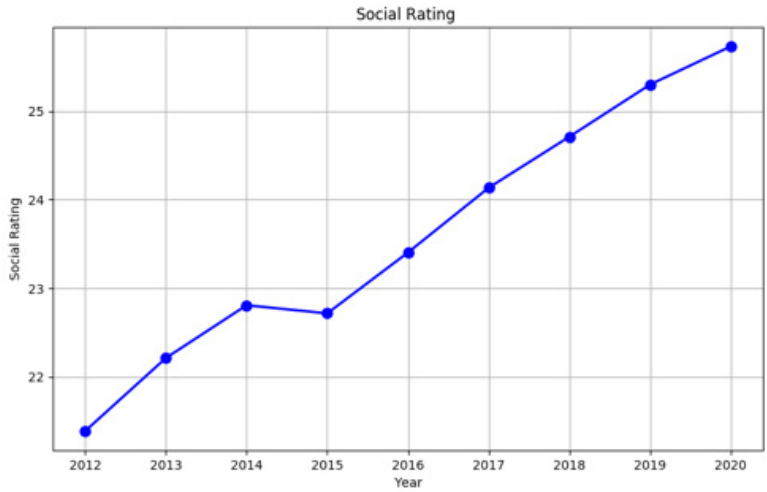

FIGURE 3: Social rating

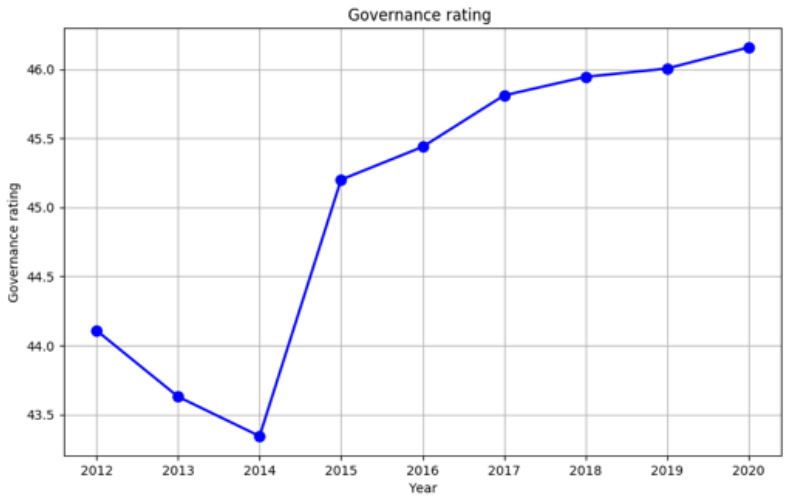

FIGURE 4: Governance rating

Independent Variables

The investment model proposed by Richardson (2006) forms the crux of our methodology for assessing overinvestment; several studies have applied Richardson's model in measuring overinvestment (Lo & Shiah-Hou, 2022;

Zhai et al., 2024). This model is instrumental in distinguishing between optimal and nonoptimal investment behaviours within corporations. Richardson's model operates on the principle that corporations have an optimal level of investment that maximises their value. Deviation from this optimal level, specifically in the form of excessive investment, indicates overinvestment. The model begins by estimating a corporation's expected level of investment based on its characteristics and market conditions. This involves regressing actual investment levels on variables that theoretically influence investment decisions. The residuals from this regression (ε_{it}) are interpreted as the measure of overinvestment. A positive residual indicates that the corporation has invested more than what is predicted by the model, thus signifying overinvestment.

The formula in the model can be represented as:

$$\begin{aligned} \text{Invest}_{i,t} = {} & \alpha_0 + \alpha_1 \text{Growth}_{i,t-1} + \alpha_2 \text{Size}_{i,t-1} + \alpha_3 \text{Lev}_{i,t-1} + \\ & \alpha_4 \text{Cash}_{i,t-1} + \alpha_5 \text{Age}_{i,t-1} + \alpha_6 R_{i.t-1} + \alpha_7 \text{Invest}_{i,t-1} + \\ & \sum \text{Industry} + \sum \text{Year} + \varepsilon_{it} \end{aligned} \quad (1)$$

In the equation, each variable captures a distinct aspect of the corporation's characteristics: *Invest* denotes the total investment spending of the enterprise. *Growth* measures the expansion rate of the company's primary business operations, indicating the corporation's growth potential. *Size* reflects the overall scale of the enterprise. *Lev* represents the company's financial leverage ratio, indicating its reliance on debt financing. *Cash* represents the liquidity available to the company, indicated by the amount of cash holdings. *Age* indicates how long the enterprise has been in operation. Finally, *R* signifies the return on stocks, representing the corporation's financial performance.

Dependent Variable

Evaluating a corporation's sustainable practices is crucially facilitated by assessing ESG ratings. This study uses ESG ratings, alongside individual ratings for environmental, social and governance aspects, as dependent variables. Each rating ranges from 0 to 100, with 100 indicating the highest level of sustainable conduct. The evaluation considers the specific characteristics of each industry, ensuring that the ratings are relative values. This study derives a corporation's ESG rating from Bloomberg's ESG

disclosure score. Bloomberg's ESG-related data covers over 9,000 firms across more than 83 countries. The data is sourced from public documents such as annual corporate reports, corporate social responsibility reports and corporate websites. The comprehensive nature of Bloomberg's ESG database ensures a robust and extensive analysis of corporate sustainability practices.

Model Setting

The Fixed Effects (FE) model serves as the foundational framework for this study due to its adeptness at controlling for unobserved heterogeneity among corporations. Given the heterogeneous sample of companies under scrutiny in the current research, such control is imperative. Suited aptly for analyses centred on deciphering the impact of time-variant variables, the FE model presents a robust framework. It meticulously facilitates examining the relationship between overinvestment and ESG ratings across a diverse array of corporations, zeroing in on within-corporation changes over time. This focused approach illuminates the dynamic interplay transpiring between overinvestment and ESG ratings. Several scholars have previously championed the FE model in conducting analogous longitudinal analyses. This preference underscores the model's efficacy in discerning nuanced variations transpiring within corporations over time while preventing the erroneous attribution of these variations to differences between corporations. With its utility convincingly demonstrated in prior research (Hongming et al., 2020; Li et al., 2022), the FE model has emerged as a method that is both reliable and validated. It adeptly navigates through the complexities intertwined with investment efficiency and ESG ratings, thereby enhancing the rigour and credibility underpinning the findings of our study. Based on the Hausman test results, which yield a test statistic of 27.32 with a *p*-value of 0.000, there is significant evidence to reject the null hypothesis of no systematic difference between the coefficients of the fixed-effects and random-effects models. Considering the aforementioned points, the fixed effects model was conclusively identified as the analytical tool for this study. It not only offers a robust mechanism for elucidating the nuanced relationships at play but also aligns seamlessly with the established methodological precedents documented in the academic literature.

$$ESG_{i,t} = \beta_0 + \beta_1 Over_{i,t} + \beta_2 Lev_{i,t} + \beta_3 Age_{i,t} + \beta_4 Cash_{i,t} + \beta_5 ROA_{i,t} + \beta_6 \text{Size}_{i,t} \beta_8 \text{Tobin}Q + X_i + X_y + \varepsilon_{i,t} \quad (2)$$

The proposed model in this study considers ESG_{it} as the dependent variable, representing the ESG rating of the corporation i at time t. The primary independent variable under investigation is *Over*, signifying corporate overinvestment. Additionally, several control variables, namely, *Lev, Age, Cash* and *ROA*, have been integrated into the model to account for various other potentially influential corporate characteristics. In the model, X_i and X_y symbolise time-fixed effects and individual effects, respectively, and the error term is denoted by $\varepsilon_{i,t}$.

TABLE 1
Variable definitions

Variable	Symbols	The interpretation of variables
ESG rating	ESG	Bloomberg ESG rating
Environmental rating	E	Bloomberg environmental rating
Social rating	S	Bloomberg social rating
Governance rating	G	Bloomberg governance rating
Over	Over	According to the Richardson model, the value of the *i* residuals is greater than 0
Leverage	Lev	Total liabilities/total assets
Age	Age	In (duration since establishment + 1)
Operating profit margin	OPR	Net profit/Operating income
Cash holding	Cash	(liquid investments + cash on hand)/total assets
Return on asset	ROA	Ratio of net profits to total assets
Size of corporate	Size	ln (Total assets)
Tobin's Q	TobinQ	ln (Ratio of the asset's market value to its replacement value)

EMPIRICAL RESULTS

Statistics

Table 2 shows descriptive statistics, spanned by the environmental, social and governance (ESG) ratings of the companies. The mean ESG rating is 20.661. However, a standard deviation of 6.979, coupled with a range from the minimal ESG rating of 1.24 to the maximal rating of 64.115,

underscores the notable heterogeneity in the adoption of ESG ratings among the corporations in the sample. Regarding the individual constituents of the ESG rating, the average environmental (E) rating is 20.916. Despite this, the minimum rating ranged from 0.775 to 65.625. The social (S) ratings exhibit a parallel trend. The mean social rating is 23.554, despite a broad distribution that varies from a low point of 3.509 to a zenith of 77.193. On average, Governance (G) ratings present a higher value of 48.980 compared to both environmental and social ratings. This observation suggests that the corporations within our sample possess robust governance structures and practices, likely reflecting the intensified focus on corporate governance in the contemporary business sphere.

TABLE 2
Descriptive statistics

Variable	Mean	S. D.	Min	Max
ESG	20.916	6.975	1.240	64.115
E	22.055	8.248	0.775	65.625
S	23.554	9.801	3.509	77.193
G	48.980	5.260	3.571	64.539
Over	0.060	0.201	0.000	7.247
LEV	0.448	0.203	0.008	0.994
Age	2.734	0.610	0.000	4.190
Cash	0.161	0.119	0.000	0.999
TobinQ	0.177	0.921	–2.824	3.549
ROA	0.037	0.186	–2.160	10.501
Size	22.243	1.313	14.942	28.257

EMPIRICAL RESULTS

Baseline Regression

The fixed effects model regression analysis in Table 3 reveals a consistent and significant negative relationship between overinvestment and ESG ratings. Across all the models, overinvestment is negatively related with ESG ratings, with coefficients ranging from –1.479 to –1.124. This indicates that higher levels of overinvestment lead to lower ESG ratings, confirming the H1.

TABLE 3
Baseline regression

Variable	ESG (1)	ESG (2)	ESG (3)	ESG (4)
Over	–1.479***	–1.397***	–1.247**	–1.124**
	(–2.94)	(–2.81)	(–2.27)	(–2.09)
LEV	–3.633***	–2.466**	–2.922*	–1.805
	(–3.07)	(–2.04)	(–1.92)	(–1.19)
Age	2.515***	0.118	3.757***	–10.13***
	(3.56)	(0.11)	(3.18)	(–2.86)
Cash	0.777	0.695	–0.0564	0.210
	(0.56)	(0.50)	(–0.03)	(0.13)
ROA	–4.033	–5.845**	–2.276	–4.962*
	(–1.64)	(–2.34)	(–0.84)	(–1.82)
Size	2.353***	2.272***	2.292***	2.056***
	(11.37)	(10.29)	(6.30)	(5.62)
TobinQ	0.626***	1.159***	0.495*	1.348***
	(2.59)	(4.28)	(1.78)	(4.13)
N	1,323	1,323	1,323	1,323
Year effect	N	Y	N	Y
Individual effect	N	N	Y	Y
R^2	0.173	0.212	0.175	0.221

Notes: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Impact Channel Testing

Table 4 provides an in-depth analysis of the divergent impacts of overinvestment on the three distinct aspects of ESG ratings, specifically E, S and G, based on the FE model.

The distinct variation in the ramifications of overinvestment across the three constituents of ESG ratings is initially discerned. No statistically significant influence is exerted by overinvestment on the environment and governance rating. However, in contrast, the impact on social ratings is notably more pronounced. A negative relationship is identified between a reduction in overinvestment and an enhancement in the Social Rating, substantiated by a coefficient of –1.103, which is deemed to be statistically significant. This observation suggests that corporations that effectively

curtail overinvestment might be in a position to allocate their resources towards pivotal social initiatives, thereby bolstering their social performance. However, the influence of overinvestment on the governance rating remains insignificant, as indicated by a coefficient of –0.437. This finding indicates that the Governance Rating, which incorporates facets such as leadership and policy frameworks, might not be directly impacted by investment management practices, confirming the H2.

In the analysis of additional variables, a discernible divergence in effects across the ESG aspects emerges. This discrepancy is evident for variables such as leverage, ROA and corporate age. For instance, leverage has a significant negative impact on governance ratings, while its influence on the environment and social rating remains minimal. These findings underline the intricate interactions between various corporate characteristics and the unique aspects of ESG ratings. Hence, it is the social rating that primarily feels the effects of overinvestment. Skilful management of overinvestment could, therefore, potentially enhance a corporation's social performance, thereby improving its aggregate ESG rating.

TABLE 4
Results of ESG aspects

Variable	E (2)	S (3)	G (4)
Over	–1.103 (–1.56)	–1.349* (–1.71)	–0.437 (–0.97)
LEV	0.576 (0.29)	–2.650 (–1.19)	–3.799*** (–3.01)
Age	–18.41*** (–3.96)	–6.030 (–1.16)	–5.808** (–1.97)
Cash	2.701 (1.28)	–2.779 (–1.18)	0.974 (0.73)
ROA	–7.525** (–2.11)	–0.327 (–0.08)	–4.401* (–1.94)
Size	2.642*** (5.50)	2.872*** (5.35)	0.0141 (0.05)
TobinQ	1.817*** (4.25)	0.562 (1.17)	0.523* (1.92)
N	1,323	1,323	1,323
Year effect	Y	Y	Y
Individual effect	Y	Y	Y
R^2	0.206	0.140	0.190

Notes: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

HETEROGENEITY TEST

In this study, financial constraints were assessed using the Size-Age (SA) Index developed by Hadlock and Pierce (2010). The SA index is widely recognised for its robustness in measuring financial constraints and is calculated as follows: The SA index effectively captures the degree of financial constraints faced by a corporation, with higher values indicating greater financial constraints. This approach leverages the intuitive understanding that younger and smaller corporations typically face more significant financial hurdles than larger, more established corporations. To categorise corporations into low and high financial constraints, we utilised the median SA index value as the threshold. Corporations with an SA index below the median were classified as having low financial constraints, while those with an index above the median were categorised as having high financial constraints. This bifurcation allows for a comparative analysis of the impact of overinvestment on ESG ratings across corporations with differing levels of financial flexibility.

The results from Table 5, which segregate corporations based on their financing constraints, can be interpreted through the lens of agency theory and the RBV. Agency theory posits that managers, acting as agents of shareholders, might engage in overinvestment driven by personal interests, such as empire-building or increasing their own compensation. This behaviour often leads to inefficient use of resources and subsequent decreases in ESG ratings. The RBV complements this by emphasising that overinvestment wastes valuable resources that could otherwise enhance a corporation's competitive advantage. In corporations with high financing constraints, overinvestment significantly negatively impacts the overall ESG rating and its environmental (E) aspect. The negative coefficient for overinvestment in environmental ratings suggests that managers of these corporations, despite their resource limitations, may still pursue projects that do not align with strategic environmental sustainability goals, possibly due to short-term incentives or pressures. These projects likely have high energy and resource requirements without commensurate benefits, leading to environmental degradation and poor ESG ratings. This finding aligns with agency theory, as managers may not prioritise the long-term sustainability objectives critical for high ESG ratings when financial oversight is stringent and resource misallocation directly harms environmental stewardship.

TABLE 5
Financing constraints

Variables	High financing constraints				Low financing constraints			
	ESG (1)	E (2)	S (3)	G (4)	ESG (5)	E (6)	S (7)	G (8)
Over	–1.810**	–2.042*	–1.679	–0.688	–3.616***	–3.497**	–7.671***	–0.616
	(–2.07)	(–1.88)	(–1.33)	(–1.14)	(–2.72)	(–2.20)	(–3.39)	(–0.54)
LEV	–3.122	–4.073	–1.638	–1.884	–2.165*	–2.805**	–0.501	–1.044
	(–1.11)	(–1.16)	(–0.40)	(–0.96)	(–1.84)	(–1.99)	(–0.25)	(–1.02)
Age	2.726**	0.845	5.499***	2.914***	0.603	-0.807	1.092	1.802**
	(2.06)	(0.51)	(2.87)	(3.19)	(0.71)	(-0.80)	(0.76)	(2.46)
Cash	–3.842	–7.068*	–1.167	1.242	4.776***	7.728***	1.643	0.769
	(–1.22)	(–1.81)	(–0.26)	(0.57)	(3.18)	(4.30)	(0.64)	(0.59)
ROA	–17.81**	–27.33***	–3.934	–8.636	–3.011	–5.419	3.056	–2.715
	(–2.28)	(–2.82)	(–0.35)	(–1.60)	(–0.98)	(–1.48)	(0.58)	(–1.02)
Size	3.223***	3.694***	3.695***	1.339***	1.655***	2.078***	1.312***	0.745***
	(9.39)	(8.66)	(7.43)	(5.64)	(7.58)	(7.95)	(3.52)	(3.94)
TobinQ	2.541***	3.105***	2.772***	0.842**	0.501	0.468	0.374	0.121
	(–7.59)	(–7.63)	(–6.76)	(0.79)	(–3.45)	(–5.39)	(–0.97)	(4.26)
N	512	512	512	512	811	811	811	811
Year effect	Y	Y	Y	Y	Y	Y	Y	Y
Individual effect	Y	Y	Y	Y	Y	Y	Y	Y
R^2	0.223	0.180	0.178	0.128	0.097	0.101	0.038	0.035

Notes: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Conversely, corporations with low financing constraints show significant negative impacts of overinvestment on both the environmental (E) and social (S) aspects of ESG ratings. Notably, the influence on the social (S) dimension of ESG ratings exhibits distinct variations across different subsamples. Companies with low financing constraints experience a pronounced and statistically significant negative impact on their social ratings due to the inefficient allocation of resources towards social initiatives with uncertain long-term benefits. Conversely, firms facing high financing constraints encounter a milder and statistically insignificant effect, likely stemming from their limited financial capacity to meaningfully engage in social investments. This result aligns with recent literature examining over-investment in Corporate Social Performance (CSP).

Habermann (2021) explicitly demonstrates that excessive investments in the social dimension of CSP lead to diminishing marginal returns and eventually become value-destroying, thereby negatively affecting the firm's overall social performance. Similarly, Wang et al. (2021) suggest that abundant financial resources can incentivise managers to excessively invest in social initiatives driven by agency problems or managerial signalling motives. Such investments often result in inefficient resource allocation and ultimately deteriorate both social and financial performance. Together, these studies clarify the circumstances under which abundant financial resources, instead of improving social performance, lead to negative outcomes in the ESG social dimension due to inefficient and excessive social investments. Consequently, the mechanisms through which overinvestment influences the social dimension of ESG ratings differ substantially depending on the financial flexibility and strategic resource allocation practices of the companies.

ENDOGENEITY TEST

To address potential endogeneity issues within this study, we applied a two-stage least squares (2SLS) approach using two instrumental variables. First, overinvestment lagged (L.over) by one period was employed as an instrumental variable, as presented in Column 1. This lagged overinvestment is crucial in shaping the ESG rating in the subsequent period. The rationale behind using lagged overinvestment as an instrumental variable is its significant influence on the ESG rating in the following period, without

being affected by contemporaneous shocks or errors. This characteristic makes lagged overinvestment a robust tool for mitigating endogeneity concerns.

Second, following the framework proposed by Benlemlih and Bitar (2018), we used the mean overinvestment of all corporations within the same province for the corresponding year as an additional instrumental variable, as presented in Column 1 (OverMean). This approach helps address the issue of a corporation's overinvestment being influenced by the overinvestment behaviours of other corporations in the same region. Importantly, the overinvestment levels of external corporations do not directly affect their investment efficiency.

The results, presented in Columns 1 and 2 of Table 6, show that both instrumental variables are significant at the 1% level. The consistency of these findings further validates the conclusions drawn from the fixed effects model, confirming that overinvestment negatively impacts a corporation's ESG rating. By employing these two instrumental variables in a 2SLS regression model, we aim to ensure that our findings regarding the impact of overinvestment on ESG ratings are robust and free from endogeneity bias, thereby enhancing the credibility of our results.

TABLE 6
Endogeneity test

Variable	ESG (1)	ESG (2)
L.over	–11.13*** (–5.13)	–
OverMean	–	–4.480*** (–2.75)
LEV	–0.053 (–0.02)	–1.156 (–0.84)
Age	–0.935 (–0.06)	–11.36*** (–2.75)
Cash	–2.995 (–0.77)	–0.323 (–0.19)
ROA	4.972 (1.04)	–4.067* (–1.81)
Size	2.023** (2.14)	2.053*** (4.96)
TobinQ	1.866*** (3.03)	1.403*** (3.94)
N	1,323	1,323
Year effect	Y	Y
Individual effect	Y	Y

Notes: Standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

CONCLUSION

By combining theoretical analysis and empirical evidence, this study offers a clearer understanding of the novel insights and knowledge derived from examining the impact of overinvestment on ESG ratings. Theoretically, this research integrates principles from agency theory and the RBV to explain how overinvestment misallocates resources and undermines corporate governance, negatively affecting ESG ratings. Empirically, this study leverages a robust dataset of Chinese corporations and applies fixed effects models to reveal a significant negative relationship between overinvestment and ESG ratings, particularly within the environmental dimension. By stratifying corporations based on financing constraints, the research reveals heterogeneity in the impact of overinvestment, demonstrating that corporations with different financing constraints experience different negative effects in different aspects. This nuanced understanding fills a critical gap in the literature and provides actionable insights for corporate managers and policymakers striving to enhance investment efficiency and sustainability practices.

By delving into the specific mechanisms through which overinvestment detrimentally influences ESG ratings, this study contributes a novel perspective to the discourse on corporate sustainability. This highlights the importance of optimising investment strategies to align with ESG goals, emphasising that careful management of investment levels can significantly bolster a corporation's sustainability outcomes. The findings suggest corporations should avoid excessive resource allocation and focus on efficient investment practices to improve their overall ESG ratings. This research underscores the delicate balance and interplay between corporate investment practices and sustainability, offering valuable guidance for fostering responsible business practices in the global corporate landscape.

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