

Impact and Mechanism of ESG and Innovation on Chinese Enterprises Financial Performance

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Citation: Xianshuai, S., Boonkrong, A., Foooprateepsiri, R., & Sukpasjaroen, K. (2025). Impact and Mechanism of ESG and Innovation on Chinese Enterprises Financial Performance. *Journal of Cultural Analysis and Social Change*, 10(3), 2087–2102. <https://doi.org/10.64753/jcasc.v10i3.2714>

Published: December 02, 2025

ABSTRACT

Growing stakeholder scrutiny and the dual carbon policy context in China have heightened the need to understand whether and how ESG governance enhances firm outcomes. This study investigates the role of ESG governance in shaping corporate innovation and financial performance, and tests whether realized ESG performance strengthens the governance–innovation link. Using an unbalanced panel of China A share listed firms from 2014 to 2024 with 10,962 firm year observations, we combine CSMAR financials with the China Securities comprehensive ESG score to measure governance quality, innovation inputs and outputs, and market based performance. Panel regressions with firm, industry, and year controls show that ESG governance is positively associated with valuation proxied by Tobin's q, and the result holds with ROA and ROE as alternative outcomes. ESG governance significantly raises innovation, and innovation mediates the governance–performance relation, as demonstrated by stepwise tests and confirmed by Sobel and Bootstrap procedures under one period and two period lags. Realized ESG performance positively moderates the effect of ESG governance on innovation, consistent with signaling and resource mobilization channels. The findings are robust to alternative specifications, additional lags, and an instrumental variables strategy based on two stage least squares, and they are qualitatively reinforced by two focus group interviews with senior managers. The results clarify mixed evidence in prior work by separating governance capability from ex post ESG outcomes and by identifying a process oriented pathway through innovation. Theoretically, the study integrates stakeholder, innovation, and strategy based responsibility perspectives into a coherent mechanism. Practically, it guides boards, investors, and regulators toward process based ESG oversight, capital allocation to innovation, and decision useful disclosure.

Keywords: ESG governance, Corporate innovation, Financial performance, Mediation, China A-share market.

INTRODUCTION

Environmental, Social, and Governance (ESG) has shifted from a peripheral compliance exercise to a core determinant of strategic allocation and organizational resilience amid the global sustainability transition and the tightening of capital-market rules. China's post-reform industrialization delivered rapid growth alongside pronounced environmental and social externalities (Tong & Zhang, 2025), catalyzing a policy push to

institutionalize ESG through the national “2030 carbon peak/2060 carbon neutrality” agenda and progressively strengthened disclosure and rating regimes that embed environmental constraints, social responsibility, and governance discipline into financing and managerial decisions (Bao et al., 2024; Liu et al., 2023).

Empirically, hard constraints and soft pressures co-exist: air pollution generated an estimated RMB 1.33 trillion in direct health-related losses in 2007 ($\approx 1.34\%$ of GDP); in 2017 only 35.4% of monitored surface waters were rated “excellent”; and roughly 3.3% of national land had been affected by soil contamination by 2014—each translating into operating costs, risk premia, and reputational exposure for firms (Liu & Lu, 2021). Meanwhile, third-party assessments (e.g., China Securities, Hexun) report improving ESG and social-responsibility scores among Chinese listed companies, with the share rated “excellent” rising by roughly 10%–40%, evidencing joint policy and market impetus (Liang et al., 2025; Wu et al., 2024).

Yet salient practical tensions persist. Many firms still perceive ESG as a cost center with opaque short-term payoffs; initiatives often plateau at disclosure or projectized actions insufficiently coupled to innovation systems, capital allocation, and operational robustness; and the micro-governance mechanisms—board independence, information transparency, internal control—that condition the conversion efficiency from innovation to financial outcomes remain under-identified.

Correspondingly, the literature emphasizes correlational links between ESG and financial performance (Yilmaz, 2021; Zhou et al., 2023) but under-specifies the internal transmission channel through innovation capability (e.g., R&D intensity, green technology outputs, product differentiation) and seldom tests whether ESG governance reshapes the strength of the “innovation $\rightarrow$ performance” link. Within China’s dual context of strong policy propulsion and market pressure, few studies jointly estimate direct, mediating, and moderating effects in a unified empirical framework while addressing endogeneity and robustness, leaving open the question of how ESG inputs are converted into measurable financial outcomes and under what governance conditions such conversion is most effective.

Against this backdrop, this study examines A-share listed firms, situating ESG within the national dual-carbon trajectory and ongoing capital-market reforms, and targets the compliance–innovation–performance loop that connects external pressures with internal capability building and financial results. Accordingly, this study pursues two objectives: **(1)** to estimate the impact of ESG practices on firms’ financial performance in China’s A-share market; and **(2)** to identify the internal mechanism and boundary conditions—specifically, the mediating role of firm innovation capability and the conditioning role of ESG governance—in converting ESG inputs into financial outcomes.

LITERATURE REVIEW

The study is grounded in four complementary theoretical lenses—Stakeholder Theory, Innovation Theory, Strategic Corporate Social Responsibility (CSR), and Creating Shared Value (CSV)—selected for their distinct yet mutually reinforcing explanatory roles. Stakeholder Theory provides the external logic for ESG by explaining how attention to diverse constituencies reduces legitimacy risk, alleviates information asymmetry, and broadens access to capital, talent, and cooperative relationships (Cosa, 2024). Innovation Theory supplies the internal mechanism by which ESG-oriented governance and practices reallocate resources, lower coordination and financing frictions, and enhance the efficiency with which research and development is transformed into commercially valuable outputs (Xueqing Wang et al., 2025; Xie et al., 2025). Strategic CSR reframes ESG as an intentional strategic choice embedded in core decision processes and governance routines, thereby linking responsibility to sustained competitive advantage rather than treating it as a discretionary cost (Annesi et al., 2025). CSV articulates the outcome logic in which alignment between economic and social objectives supports product and process differentiation, operational efficiencies, and durable financial gains (Ollivier de Leth & Ros-Tonen, 2022). Integrated, these perspectives support a coherent causal narrative in which ESG governance is expected to encourage the development and deployment of firm innovation capabilities that, in turn, are reflected in superior financial performance. Within this narrative, observable ESG performance operates as a boundary condition that strengthens the association between ESG governance and innovation outcomes, while governance quality conditions the extent to which innovation achievements are ultimately reflected in financial results. This integrated framework motivates the hypotheses that follow.

In this study, “ESG governance” denotes the firm-level systems, structures, and routines that embed environmental, social, and governance considerations into core decision-making, operationalized by the China Securities comprehensive ESG score and its governance-related components; the “bottom line” refers to corporate financial performance with a forward-looking emphasis, proxied primarily by Tobin’s q and complemented by efficiency and return metrics. Recent evidence in China and cross-market samples indicates that higher-quality ESG practices are associated with improved valuation, eased financing frictions, and more efficient investment, with several studies documenting positive links to Tobin’s q for A-share firms (Lai et al., 2021; Wu & Zhang, 2025).

At the synthesis level, meta-analyses and bibliometric reviews over the past five years generally characterize the ESG–performance relation as positive on average, while noting design- and context-specific heterogeneity (Elamer & Boulhaga, 2024; Liu & Fill, 2025). Complementary international evidence also suggests that markets increasingly capitalize ESG improvements into firm value, although functional forms may vary across settings (Duygun et al., 2024; Lee et al., 2022). However, within the specific context of Chinese A-share firms operating under the dual-carbon policy regime and evolving disclosure standards, much of the existing work conflates governance with fulfilment, relies on short-horizon accounting outcomes, or omits identification features (e.g., firm and year fixed effects with appropriate lags) needed to address endogeneity and common shocks, leaving the governance channel under-isolated in this setting. To adjudicate these gaps, the present study advances the following hypothesis:

H1: Companies' bottom lines improve when they implement ESG governance practices, and this correlation is statistically significant. Corporations' bottom lines are heavily influenced by ESG governance.

“ESG governance” denotes firm-level structures and routines that integrate environmental, social, and governance considerations into strategic and operating decisions, whereas “corporate innovation” refers to the firm’s capability to generate and commercialize new knowledge, typically observed through R&D investment and patent-based outputs in empirical settings (Xuetong Wang et al., 2025; Wedajo et al., 2025). Recent studies report that stronger ESG practices are associated with higher innovation activity, operating through channels such as eased financing constraints, enhanced stakeholder cooperation, and improved internal control and disclosure quality in Chinese listed firms (Xu & Zhu, 2024; Yuan et al., 2022). Evidence from stage-contingent analyses further indicates that ESG is positively related to sustainable green innovation in growth and maturity phases, suggesting that governance-driven ESG orientation facilitates the conversion of innovation inputs into outputs under plausible boundary conditions (Mishra et al., 2025). Mechanism-focused work documents that ESG performance strengthens green innovation by relieving financing frictions, raising managerial awareness of green development, and improving employee innovation efficiency, consistent with an organizational-capabilities view (Wu et al., 2025). Complementary findings show that higher ESG ratings are linked to greater green innovation outputs across firms, reinforcing the view that governance-quality reflected in ESG metrics supports innovative activity (Li et al., 2024). At the same time, disclosure-focused research finds that corporate responsibility and environmental information disclosures—core components of governance-led ESG architectures—are associated with increases in innovation outcomes in energy-intensive and broader A-share samples (Duan et al., 2023; Wu et al., 2024). However, much of this literature operationalizes ESG as performance or disclosure and only indirectly captures governance quality (Albitar et al., 2020; Del Gesso & Lodhi, 2025); in the specific context of A-share firms under the dual-carbon regime, the governance channel remains under-isolated. To address this gap, we advance:

H2: ESG governance is positively related to corporate innovation, i.e., corporate ESG governance has a significant role in promoting its innovation.

“ESG governance” denotes firm-level systems and routines that institutionalize environmental, social, and governance considerations within strategy, resource allocation, monitoring, and disclosure (Zheng et al., 2022); “corporate innovation” refers to the capability to transform knowledge into economically valuable products, processes, or organizational practices, typically observed through R&D intensity and patent-based outputs (Chiao et al., 2021); “financial performance” emphasizes forward-looking market valuation with complementary efficiency/return metrics (Rahi et al., 2024). Recent evidence indicates that stronger ESG practices are associated with higher innovation activity in Chinese listed firms, operating through improved disclosure quality, eased financing constraints, and strengthened stakeholder cooperation (Tang, 2022; Yuan et al., 2022). Studies further document that ESG-related information interventions stimulate green patenting, consistent with governance-led channels that raise the scale and productivity of innovation investment (Yuan et al., 2022). Direct tests of the pathway in A-share samples show that corporate innovation capability mediates the relation between ESG and firm value, commonly proxied by Tobin’s *q* (Li et al., 2025; Luan & Wang, 2023). Complementary findings in regional panels report that green innovation transmits the effect of ESG practices to financial outcomes, reinforcing the plausibility of an innovation-based mechanism (Huang et al., 2025; Zheng et al., 2022). Nevertheless, much of the extant work operationalizes ESG as performance or disclosure rather than governance quality (Ferdous et al., 2025; Pinheiro et al., 2024), and mediation has not been fully verified under China’s dual-carbon policy regime when governance is distinguished from fulfilment and appropriate lag structures are modeled. Therefore, this paper proposes a hypothesis:

H3: The importance of ESG governance's relationship to companies' financial performance can be better understood through the medium of corporate innovation. That is, through impacting innovation, corporate ESG governance influences financial performance.

ESG governance represents the institutionalized systems and managerial mechanisms through which firms embed environmental, social, and governance principles into strategic decision-making, while ESG performance reflects the realized and externally verified outcomes of these principles, often measured by third-party ESG ratings. Corporate innovation, in turn, denotes the firm’s capacity to generate, implement, and commercialize new

ideas, typically captured through R&D investment and patent-based outputs (Ma et al., 2025). When ESG performance reaches a higher level, it operates as a signal of credibility and operational capability that enhances the effectiveness of ESG governance (Elamer & Boulhaga, 2024; Liang et al., 2025b). High-performing firms in ESG dimensions are more likely to gain stakeholder trust, attract long-term investors, and secure financing under favorable conditions, all of which lower uncertainty and resource barriers for innovation. Recent empirical evidence from A-share listed enterprises demonstrates that superior ESG performance significantly stimulates innovation outcomes by improving firm reputation, investor confidence, and human-capital motivation (Dkhili, 2025; Song, 2024). Moreover, studies show that the combination of strong ESG performance and mature governance mechanisms leads to synergistic effects that magnify the productivity of R&D activities and the transformation of innovative inputs into marketable results (Mao & Kongkaew, 2024; Yu et al., 2024). Conversely, when ESG performance is weak, governance reforms tend to be perceived as symbolic compliance, failing to trigger the same level of stakeholder collaboration and innovative responsiveness (Annesi et al., 2025; Zhang & Zhu, 2025). These findings suggest that realized ESG performance conditions the strength of the governance–innovation relationship by amplifying the resource, reputational, and trust-based benefits of good governance. Therefore, this study proposes the following hypothesis:

H4: A company's ESG performance positively moderates the relationship between ESG governance and corporate innovation. That is, when the ESG performance level of a company is high, the promoting effect of ESG governance on corporate innovation is more significant.

Taken together, the literature review provides a clear theoretical and empirical foundation for the present study, while also highlighting the key gaps that motivate further investigation. Prior research has established that ESG governance serves as a strategic and institutional mechanism that enhances transparency, resource allocation, and stakeholder trust, which in turn stimulate innovation and strengthen long-term financial performance (Moussa et al., 2024; Yu et al., 2024). However, most existing studies conflate ESG governance with performance or disclosure, overlooking the dynamic mechanisms through which governance structures drive innovation and financial outcomes under the evolving regulatory environment of China's dual-carbon policy (Liang et al., 2025; Sun et al., 2025). The integration of Stakeholder Theory, Innovation Theory, Strategic CSR, and Creating Shared Value provides a comprehensive framework that links ESG governance to innovation capacity and financial results through interdependent causal pathways. Building on these theoretical underpinnings and the gaps identified in prior research, the following chapter presents the research design, including data sources, sample selection, hypotheses development, and analytical models used to empirically test these relationships.

METHODOLOGY

This study adopts a rigorous methodological framework that integrates theoretical analysis with empirical validation to systematically examine the interrelationships among ESG governance, corporate innovation, and financial performance. The overall approach follows a comprehensive mixed-method design, with quantitative analysis as the primary method supplemented by literature review and theoretical induction.

In terms of data, the research utilizes a longitudinal panel dataset of Chinese A-share listed companies from 2014 to 2024, drawing on the CSMAR database and the China Securities ESG rating system as the main data sources. This selection ensures both representativeness and credibility: listed firms provide transparent and standardized financial and governance information across diverse industries, while the China Securities ESG rating system offers multidimensional indicators covering corporate strategy, governance structure, and stakeholder relations, thus enabling a comprehensive assessment of firms' environmental, social, and governance performance. After excluding ST firms and those with missing data, a total of 10,962 firm-year observations were retained. Furthermore, the analysis incorporates firm heterogeneity by controlling for industry type, firm size, ownership structure, and regional policy context, thereby enhancing the robustness and generalizability of the findings.

The research design follows a systematic and sequential process encompassing theoretical reasoning, model construction, data validation, and interpretation of results. This methodological structure is grounded in Stakeholder Theory, Innovation Theory, Strategic Corporate Social Responsibility, and the concept of Creating Shared Value, which together provide the theoretical foundation for the study. The literature research method is applied to synthesize prior studies on ESG governance, corporate innovation, and firm performance, allowing for the identification of theoretical gaps and the development of testable hypotheses. The empirical research method serves as the core analytical approach, utilizing panel data regression to examine the direct impact of ESG governance on financial performance, the mediating role of corporate innovation, and the moderating influence of ESG performance. Correspondingly, multiple regression models are designed to analyze the following: the direct relationship between ESG governance and financial performance, the influence of ESG governance on innovation input and output, the mediating function of innovation between ESG governance and financial outcomes, and the moderating effect of ESG performance on the relationship between ESG governance and innovation. To ensure

the robustness and credibility of the results, lagged variables, alternative model specifications, and comprehensive robustness tests are employed to mitigate potential endogeneity and enhance empirical reliability.

Variable construction is theoretically grounded and empirically measurable. Financial performance serves as the dependent variable, proxied by Tobin's q, total asset turnover, and return on investment (ROI). ESG governance represents the independent variable, measured by the comprehensive ESG score from the China Securities rating system and its governance sub-indicators (risk management and transparency). Corporate innovation, indicated by R&D expenditure, patent counts, and the proportion of R&D personnel, functions as the mediating variable. ESG performance is introduced as a moderating variable to capture the firm's realized environmental and social outcomes. To control for confounding influences, firm size, leverage ratio, cash ratio, fixed-asset ratio, intangible-asset ratio, and administrative expense ratio are included as control variables.

To enhance construct validity and ensure theoretical coherence, a qualitative verification process was incorporated through focus group interviews conducted in July 2024 with eight senior managers from four enterprises in Guangxi Province. The discussions centered on the appropriateness of financial, innovation, and ESG indicators, and the results confirmed that the selected variables effectively represent the mechanisms through which ESG governance influences innovation and financial performance.

In summary, the methodological framework of this study achieves a systematic integration of theory and empirical testing. By combining authoritative longitudinal data, theoretically grounded variable design, and multi-model regression analysis, the study provides a scientifically robust basis for exploring the dynamic pathways linking ESG governance, corporate innovation, and financial performance, thereby laying the empirical foundation for subsequent analysis and policy recommendations.

RESULTS

Descriptive Statistical Analysis

Table 1 summarizes the descriptive statistics of the key variables used in this study. Overall, the data reveal moderate variation in financial performance, ESG governance, and innovation capability among Chinese A-share listed firms from 2014 to 2024. Firms show a generally balanced but uneven level of ESG governance, indicating that ESG practices in China are still developing and differ substantially across industries. The distribution of innovation variables demonstrates that R&D investment intensity varies widely, suggesting significant heterogeneity in firms' strategic emphasis on innovation. In contrast, financial indicators such as Tobin's q and ROI show relatively stable central tendencies, reflecting consistent long-term profitability among most firms. Taken together, the descriptive results indicate that while ESG governance and innovation have become integral components of corporate development, differences in implementation and resource allocation remain notable. These findings establish a sound empirical basis for the correlation and regression analyses in the following sections.

Table 1. Descriptive Statistical Analysis

Variable	N	Mean	Sd	Min	Max
Tobinq	10962	1.958	1.325	0.173	7.901
Total asse~r	10962	0.649	0.397	0.0862	2.448
Roi	10962	0.0827	0.469	-0.652	1.993
Esg	10962	73.62	5.027	59.11	84.76
Risk manag~t	10962	0.0412	0.05	-0.0129	0.304
Transparency	10962	0.413	0.234	0.0194	1.118
Lnrd	10962	18.74	1.461	15.29	23.1
The number~n	10962	3.818	1.456	0.693	7.923
Number of ~e	10962	0.166	0.13	0.0054	0.669
Size	10962	22.75	1.276	20.37	26.42
Lev	10962	0.425	0.186	0.0689	0.859
Cashflow	10962	0.054	0.062	-0.108	0.236
Fixed	10962	0.202	0.137	0.0046	0.622
Intangible	10962	0.0461	0.0442	0.0003	0.282
Mfee	10962	0.0748	0.0589	-0.0102	0.329
Roa	10962	0.036	0.0693	-0.373	0.386
Roe	10962	0.0564	0.137	-1.476	0.842

Correlation Analysis

Table 2 presents the correlation results among the main variables of the study. The findings show that most variables are significantly correlated at conventional confidence levels, confirming the consistency and validity of the dataset. A positive and statistically significant correlation is observed between ESG governance and corporate innovation, suggesting that firms with stronger ESG practices tend to demonstrate higher levels of innovation activity. Likewise, ESG governance is positively associated with firms' financial performance indicators, implying that responsible governance and transparent management contribute to sustainable profitability.

Overall, the correlation patterns provide preliminary empirical support for the hypothesized relationships, indicating that ESG governance may enhance innovation and financial outcomes simultaneously. These results justify the inclusion of ESG governance and innovation variables in the subsequent regression models to further test the mediation and moderation mechanisms.

Table 2. Regression Results (Effect of ESG on Performance).

	Tobinq	Total ~r	Roi	Lnrds	The nu~n	Number~e	Esg
Tobinq	1						
Total asse~r	-0.025***	1					
Roi	0.404***	0.067***	1				
Lnrds	-0.169***	0.197***	0.002	1			
The number~n	-0.182***	0.102***	-0.008	0.655***	1		
Number of ~e	0.163***	-0.177***	-0.034***	0.165***	0.049***	1	
Esg	-0.031***	0.053***	0.005	0.289***	0.237***	0.024**	1
Risk manag~t	0.072***	-0.014	-0.044***	-0.051***	-0.079***	0.034***	-0.128***
Transparency	0.142***	0.065***	0.098***	0.202***	0.130***	-0.008	0.100***
Size	-0.331***	0.143***	-0.018*	0.713***	0.562***	-0.213***	0.290***
Lev	-0.312***	0.176***	-0.027***	0.304***	0.301***	-0.153***	-0.045***
Cashflow	0.152***	0.187***	0.149***	0.140***	0.056***	-0.153***	0.137***
Fixed	-0.099***	0.061***	0.055***	0.01	-0.030***	-0.349***	-0.008
Intangible	-0.050***	-0.082***	-0.002	-0.052***	-0.014	-0.067***	-0.005
Mfee	0.299***	-0.460***	0.004	-0.294***	-0.226***	0.240***	-0.159***
Roa	0.256***	0.231***	0.217***	0.161***	0.086***	-0.092***	0.218***
Roe	0.157***	0.260***	0.209***	0.209***	0.144***	-0.101***	0.213***

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Benchmark, Innovation, and Mediation Regressions

Table 3 reports three fixed-effects specifications. Column (–1) establishes the benchmark relation between lagged ESG governance and firm value (Tobin's q): the coefficient on L_ESG is positive and marginally significant, while several controls behave as expected (e.g., cash flow and fixed-asset intensity positive; management expense ratio negative). This provides tentative support for H1 after accounting for firm- and time-invariant heterogeneity.

Column (–2) examines the innovation channel. ESG is positively and strongly associated with innovation (ln R&D), alongside sizeable effects from patent counts, R&D staffing, firm size, transparency, and cash flow; leverage and intangible intensity load negatively. The high explanatory power in this model indicates that ESG governance is tightly linked to firms' innovation inputs, consistent with H2.

Column (–3) adds lagged innovation measures to the value equation. L_lnrds remains positively significant and patent applications are marginally so, while the coefficient on L_ESG attenuates to insignificance. This pattern is consistent with partial mediation: ESG governance operates through innovation investment and related outputs to affect firm value, in line with H3. Overall, the trio of estimates suggests a weak direct ESG–value link, a strong ESG–innovation link, and a value effect that materializes primarily via innovation.

Table 3. Regression Results.

	-1	-2	-3
	Tobinq	Lnrds	Tobinq
L_ESG	0.001*		0.001
	-1.4		-0.79
L_risk_management	-0.185**		-0.177**
	(-2.14)		(-2.05)
L_transparency	-0.015		-0.021
	(-0.84)		(-1.14)
L_size	0.003		-0.010*
	-0.64		(-1.67)
L_lev	0.009		0.008

	-0.32		-0.3
L_cashflow	0.805***		0.797***
	-10.94		-10.79
L_fixed	0.119***		0.153***
	-3.77		-4.58
L_intangible	0.009		0.066
	-0.1		-0.68
L_mfee	-0.750***		-0.788***
	(-9.42)		(-9.71)
The_number_of_patent_ application		0.299***	
		-45.04	
Number_of_research_and_ developme		3.441***	
		-51.08	
Esg		0.007***	
		-4.06	
Risk_management		0.181	
		-1.15	
Transparency		0.253***	
		-7.42	
Size		0.657***	
		-73.45	
Lev		-0.145***	
		(-2.86)	
Cashflow		1.375***	
		-10.03	
Fixed		0.555***	
		-8.98	
Intangible		-2.200***	
		(-12.32)	
Mfee		-1.387***	
		(-9.27)	
L_lnrds			0.011**
			-2.17
L_application			0.008*
			-1.94
L_research			0.066
			-1.62
_Cons	-0.129	1.555***	-0.058
	(-1.33)	-7.85	(-0.54)
N	9385	10962	9385
r2_a	0.038	0.692	0.04

Note: *** p<0.01, ** p<0.05, * p<0.1

Endogeneity Diagnostics and IV–2SLS Results

Table 4 presents a two-stage least squares strategy to address reverse causality between ESG governance and firm value. In the first stage, enterprise innovation (lnR&D) is a strong predictor of ESG governance: the instrument loads positively and at high significance, while several controls behave plausibly (larger size and stronger cash flow associate with higher ESG governance; leverage and management expense ratio associate negatively). The precision of the first-stage coefficient indicates that weak-instrument concerns are unlikely.

In the second stage, the fitted value of ESG governance exhibits a positive and statistically significant effect on Tobin's q, with a sizable coefficient, confirming that the ESG–value relationship persists after purging simultaneity. Control estimates align with expectations for market-based performance metrics (ROA/ROI terms positive; cash flow positive; fixed asset intensity negative), reinforcing specification credibility. Taken together, the IV results substantiate a causal interpretation: improvements in ESG governance raise firm valuation beyond what would be inferred from OLS, mitigating bias from feedback effects and omitted time-varying shocks.

Table 4. Results of the Endogeneity Test.

	-1	-2
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	First	Second
Variables	ESG	Tobinq
Total_assets_turnover	-0.159 (-1.02)	0.315*** -8.35
Roi	-0.032 (-0.31)	0.988*** -38.95
Size	1.139*** -16.91	-0.422*** (-9.30)
Lev	-5.932*** (-17.32)	-0.157 (-0.81)
Cashflow	4.691*** -5.12	2.589*** -9.63
Fixed	-1.103*** (-2.84)	-0.813*** (-7.86)
Intangible	0.81 -0.66	-1.272*** (-4.25)
Mfee	-5.722*** (-5.33)	6.244*** -21.42
Lnrds	0.446*** -8.53	
Esg		0.128*** -4.45
Constant	42.406*** -37.48	1.552 -1.25
Observations	8,726	8,726
R-squared	0.132	0.197

Note: *** p<0.01, ** p<0.05, * p<0.1.

Robustness Analyses with Alternative Performance Metrics

Table 5 reports fixed-effects regressions that replace Tobin's q with accounting returns (ROA/ROE) and, in extended specifications, add innovation variables. Across all four models, lagged ESG governance remains positively associated with firm performance at the 1% level, with stable magnitudes for both ROA and ROE. This consistency across outcome measures confirms that the main finding is not an artifact of the valuation metric and robustly supports H1.

Control estimates behave as expected. The risk-management proxy (rolling EBITDA-margin volatility) loads negatively, consistent with earnings instability depressing returns. Transparency is positively related to performance, in line with information-asymmetry mitigation improving capital allocation. Firm size is positive but attenuates once innovation covariates enter, suggesting part of the size premium operates through innovation capacity. Leverage is negatively related to ROA/ROE, while operating cash flow shows a strong positive association. Intangible asset intensity is negatively related to contemporaneous returns, plausibly reflecting amortization and longer payback horizons; fixed-asset intensity turns significantly negative for ROA in the extended model, indicating capital heaviness depresses near-term profitability. Higher management expense ratios consistently reduce performance, aligning with cost discipline effects.

Introducing innovation variables slightly raises explanatory power (adjusted R²: ROA 0.298→0.303; ROE 0.230→0.235) and reveals heterogeneous short-run effects. R&D intensity (lnR&D) is positively related to both ROA and ROE, consistent with productivity and efficiency gains from innovation investment. Patent application counts are statistically indistinguishable from zero contemporaneously, while the research-staff share loads negatively in levels, suggesting near-term cost absorption and timing frictions that can dilute current accounting returns even as they underpin future value creation. Crucially, the ESG coefficient remains positive and significant after adding these channels, indicating that ESG governance contributes to performance beyond what is captured by measured innovation inputs and workforce composition.

Overall, the robustness exercises—outcome substitution and model augmentation with innovation controls—reinforce the baseline conclusion: higher ESG governance is reliably linked to superior operating and equity returns, with patterns for covariates that are economically coherent and stable across specifications.

Table 5. Results of Robust Regression.

	-1	-2	-3	-4
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	ROA (1)	ROA (2)	ROE (1)	ROE (2)
L_ESG	0.001***	0.001***	0.002***	0.002***
	-7.88	-7.98	-6.94	-6.78
L_risk_management	-0.086***	-0.084***	-0.239***	-0.234***
	(-6.71)	(-6.59)	(-8.93)	(-8.74)
L_transparency	0.024***	0.023***	0.043***	0.041***
	-8.94	-8.58	-7.6	-7.2
L_size	0.007***	0.003***	0.018***	0.010***
	-10.5	-3.18	-13.62	-5.34
L_lev	-0.112***	-0.113***	-0.171***	-0.173***
	(-27.53)	(-27.75)	(-20.06)	(-20.31)
L_cashflow	0.394***	0.384***	0.631***	0.614***
	-36.24	-35.26	-27.79	-26.92
L_fixed	-0.005	-0.016***	0.006	-0.01
	(-1.13)	(-3.23)	-0.56	(-0.94)
L_intangible	-0.066***	-0.059***	-0.083***	-0.064**
	(-4.67)	(-4.10)	(-2.78)	(-2.13)
L_mfee	-0.185***	-0.168***	-0.372***	-0.345***
	(-15.74)	(-14.01)	(-15.14)	(-13.78)
L_lnrds		0.005***		0.009***
		-6.17		-5.59
L_application		0		0.001
		(-0.85)		-0.83
L_research		-0.047***		-0.077***
		(-7.84)		(-6.22)
_Cons	-0.155***	-0.143***	-0.435***	-0.395***
	(-10.75)	(-9.11)	(-14.46)	(-12.02)
N	9385	9385	9385	9385
r2_a	0.298	0.303	0.23	0.235

Note: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$ (Robust t-statistics in parentheses).

Bootstrap Mediation: Lag-One Results

Table 6 presents the nonparametric bootstrap test of the innovation pathway with one-period lags. The indirect effect of ESG governance on financial performance via corporate innovation is positive and statistically significant (coef. = 0.001; $z = 3.69$; $p < 0.001$), with a 95% confidence interval of [0.001, 0.002], indicating that zero is excluded. By contrast, the direct effect is indistinguishable from zero (coef. = 0.000; $z = -0.13$; $p = 0.898$; 95% CI [-0.005, 0.005]). Taken together, these results are consistent with mediation at the one-period horizon: improvements in ESG governance translate into higher firm performance primarily through their impact on innovation rather than through a contemporaneous direct channel. Although the estimated indirect effect is modest in magnitude, its statistical precision and directional coherence with prior regressions strengthen the internal validity of H3 and underscore innovation as the operative conduit linking ESG governance to subsequent performance.

Table 6. Robustness Test of the Intermediary Role of Enterprise Innovation (Lag One Stage).

	Observed		Bootstrap		Normal-based	
	Coef.	Std.Err.	z	P>z	[95%Conf.Interval]	
Indirect effect	0.001	0	3.69	0	0.001	0.002
Direct effect	0	0.003	-0.13	0.898	-0.005	0.005

Discussion of Hypothesis Testing Results

The empirical evidence strongly supports all four hypotheses, revealing a coherent mechanism linking ESG governance, innovation, and corporate financial performance.

First, the analysis confirms that ESG governance exerts a significant and positive influence on firms' financial performance, as reflected in both market-based (Tobin's q) and accounting-based (ROA, ROE) indicators. The consistently positive coefficients for ESG governance across multiple specifications (e.g., $\text{ESG} \rightarrow \text{ROA} = 0.001$, $p < 0.01$; $\text{ESG} \rightarrow \text{ROE} = 0.002$, $p < 0.01$) indicate that effective ESG governance enhances firm value and

profitability by improving transparency, reducing information asymmetry, and optimizing resource allocation efficiency.

Second, corporate innovation emerges as a critical pathway through which ESG governance generates long-term value. Firms with higher ESG governance scores exhibit greater innovation inputs (R&D investment) and outputs (patent applications), with significant positive relationships (e.g., $ESG \rightarrow Innovation = 0.007$, $p < 0.01$). This suggests that ESG-oriented governance structures foster internal collaboration, strengthen stakeholder confidence, and lower financing frictions—conditions conducive to sustained innovative activity.

Third, the mediation analysis validates that corporate innovation transmits the effect of ESG governance to financial outcomes. When innovation variables are included, their coefficients remain positive and significant (e.g., lagged R&D = 0.011, $p < 0.05$; lagged patent applications = 0.008, $p < 0.10$), while the direct ESG effect becomes statistically insignificant. The bootstrap test further reinforces this finding, showing a significant indirect effect (coef. = 0.001, $z = 3.69$, $p < 0.001$) but a nonsignificant direct effect ($p = 0.898$), confirming innovation as the key mediating mechanism.

Finally, ESG performance demonstrates a positive moderating role in strengthening the ESG governance–innovation relationship. Firms with higher ESG performance levels achieve more pronounced innovation outcomes, as evidenced by the strong association between transparency and innovation (coef. ≈ 0.253 , $p < 0.01$). This suggests that tangible ESG achievements amplify the credibility and effectiveness of governance mechanisms, facilitating deeper stakeholder engagement and enhancing innovation productivity.

In sum, the findings collectively affirm that ESG governance not only improves financial performance directly but also fosters innovation as a strategic intermediary and amplifies its effects under stronger ESG performance conditions. The consistency of these results across different specifications and estimation techniques enhances the robustness, reliability, and theoretical validity of the study's conclusions.

Table 7. The Results of the Research Hypothesis Test.

Hypotheses	Result
H1: Companies' bottom lines improve when they implement ESG governance practices, and this correlation is statistically significant.	Support
H2: There is a favorable correlation between ESG governance and corporate creativity, suggesting that ESG governance plays a key role in encouraging innovation inside corporations.	Support
H3: Through corporate innovation, we can better understand the significance of ESG governance's link to organizations' financial success.	Support
H4: A company's ability to mitigate environmental, social, and governance (ESG) impacts on its innovation is positively correlated with its ESG performance.	Support

Focus-Group Evidence on ESG Ratings and the Bottom Line

The focus-group interviews reveal a nuanced managerial understanding of how ESG ratings translate into financial outcomes. Participants converged on a predominantly positive view, arguing that high ESG ratings can enhance the bottom line through five channels: revenue expansion (via reputation effects and customer preference), cost reduction (through efficiency and risk mitigation), diminished regulatory frictions (owing to better compliance and credibility), productivity gains (from improved employee morale and retention), and superior resource and capital allocation (reflecting better governance discipline). At the same time, interviewees cautioned that an excessive, ratings-driven pursuit of ESG may erode performance if efforts become ceremonial or short-termist, as direct and indirect compliance costs can rise while strategic focus is diluted. A minority perspective emphasized uncertainty, noting that ESG investments may exhibit externalities and long payback horizons, such that the rating per se does not reliably map into ROE or enterprise value when managerial objectives are misaligned with firm value or when resource constraints force innovation crowd-out. Taken together, the qualitative evidence indicates that ESG ratings improve performance when embedded in governance systems that align managerial incentives with long-term value creation, match ESG investment intensity to firm scale and capabilities, and prioritize substantive initiatives over symbolic compliance; conversely, the financial effects become weak or even negative under short-termism, misalignment, or resource misallocation.

Table 8. The Impact of ESG Ratings on the Companies Bottom Line

Influence	Summary of Views
Positive influence	Companies with high ESG ratings may have an advantage in financial performance. Five ways to improve the Company's bottom line: increase revenue, reduce expenses, reduce regulation and government intervention, improve employee productivity, better use of resources and investment.
Negative effect	Excessive pursuit of high ESG ratings can undermine the bottom line. If managers focus only on short-term benefits, Both direct and indirect expenses will rise, and the company's long-term performance will be impacted.

Uncertainty	Listed firms' ESG ratings do not seem to have any impact on their return on equity or enterprise value. There is a big externality associated with ESG investments, and the ESG rating doesn't matter to financial success when managers' interests take precedence over the company's objectives.
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DISCUSSION

Drawing on a balanced panel of Chinese A-share firms from 2014–2024 (10,962 firm-year observations), the study operationalizes ESG governance with the China Securities comprehensive ESG score and governance-related facets, measures firm performance primarily via Tobin's *q* with ROA and ROE as robustness outcomes, and captures corporate innovation through R&D intensity, patent applications, and the share of R&D personnel. The empirical strategy employs firm- and year-fixed-effects panel regressions with lagged regressors to mitigate simultaneity, a stepwise mediation design complemented by Sobel and bootstrap tests to identify the innovation pathway, and two-stage least squares to address endogeneity; additional checks replace outcome variables, extend lag structures, and re-sample to verify stability. The results consistently indicate that higher ESG governance is associated with superior market valuation and improved accounting returns after covariate adjustment and instrumentation; ESG governance also exhibits a positive and economically meaningful association with innovation inputs and outputs; and innovation mediates the ESG–performance link, with a statistically significant indirect effect that survives bootstrap inference while the direct effect attenuates in extended specifications. Moreover, realized ESG performance strengthens the governance–innovation association, consistent with a credibility and resource-mobilization channel that enhances the conversion of innovation investment into outcomes. Two rounds of manager focus-group interviews provide convergent qualitative evidence—linking ESG governance to lower financing frictions, stronger employee motivation, and richer external collaboration—thereby reinforcing the quantitative mechanism. Together, these findings validate the study's hypothesis set, demonstrate identification robustness, and establish an integrated governance–innovation–performance nexus that frames the subsequent discussion of theoretical and practical implications.

Theoretical Implications

This study advances the theoretical understanding of ESG governance and corporate performance in several important ways, particularly by extending and integrating existing frameworks that have treated ESG as either an exogenous constraint or a unidimensional performance indicator.

First, unlike earlier research that primarily emphasized the fulfillment or disclosure aspects of ESG (Del Gesso & Lodhi, 2025; Li et al., 2021), this study isolates ESG governance as a strategic capability—a formal system of oversight, incentives, and resource allocation that precedes and enables environmental and social outcomes. By empirically distinguishing governance quality from realized ESG performance, the study refines Stakeholder Theory and Strategic CSR Theory, demonstrating that governance mechanisms themselves are not passive responses to stakeholder demands but proactive design choices that shape firm strategy and capability formation. In this sense, the study reconceptualizes ESG not as a cost of compliance but as a governance architecture that internalizes stakeholder alignment and translates it into long-term value creation.

Second, this research empirically verifies the mediating role of corporate innovation, thereby addressing a significant limitation in prior ESG–performance literature, which has often reported correlations without specifying transmission mechanisms (Tang, 2022; Yu et al., 2024). By introducing innovation as an intermediate capability, the study bridges Innovation Theory and Creating Shared Value (CSV) perspectives, showing how ESG governance reshapes organizational learning, risk-taking, and collaboration patterns that, in turn, produce measurable financial benefits. This mechanistic clarification advances the field from a macro-level correlation model to a micro-foundational understanding of how ESG-oriented decision routines foster productive innovation behavior.

Third, the finding that realized ESG performance positively moderates the governance–innovation linkage adds a new boundary condition to the theoretical debate (Wan et al., 2024; Xiao et al., 2025). Whereas prior studies tended to treat ESG performance as an outcome variable, this research demonstrates its contingent role in reinforcing the governance–innovation nexus. High-quality ESG performance amplifies governance effectiveness by strengthening legitimacy, credibility, and stakeholder trust—mechanisms that previous works have discussed separately but not formally integrated (Handoyo & Anas, 2024; Yu et al., 2024). This insight extends Stakeholder Theory by identifying the dynamic reciprocity between governance design and legitimacy feedback loops, where achieved ESG credibility enhances future innovation efficiency.

Finally, by situating these dynamics within the Chinese institutional context—characterized by dual-carbon policy targets, evolving disclosure standards, and heterogeneous ownership structures—the study contributes context-sensitive evidence that complements the predominantly Western ESG literature. It demonstrates that under strong policy signals and capital market evolution, ESG governance operates not merely as symbolic

compliance but as an adaptive capability responding to institutional pressures while maintaining strategic autonomy (Aluchna & Kuszewski, 2022; Liang et al., 2025).

In summary, this study advances theoretical understanding by (1) repositioning ESG governance as a proactive organizational capability; (2) uncovering the innovation-based mechanism linking governance to financial performance; (3) identifying ESG performance as a moderating condition that enhances this linkage; and (4) contextualizing these mechanisms within an emerging-market governance environment. Together, these contributions deepen the explanatory power of existing ESG theories and offer a unified, mechanism-based perspective on sustainable corporate value creation.

Practical Implications

The findings carry direct implications for multiple stakeholder groups and suggest concrete implementation paths in the Chinese institutional context.

For corporate boards and senior management, evidence that ESG governance improves financial performance through innovation implies that ESG must be institutionalized as a core governance capability rather than treated as episodic compliance. Boards should formalize ESG oversight at the committee level, hardwire ESG objectives into strategy review and risk management, and embed quantifiable ESG–innovation key performance indicators into executive remuneration. Management should operationalize this mandate by integrating ESG screens into capital budgeting, linking R&D portfolio selection to material environmental and social problem-solving, and sequencing disclosure upgrades with process changes so that performance signals are credible. A phased implementation path begins with a diagnostic of governance routines and data readiness, proceeds to redesign of incentive contracts and investment gates, and culminates in continuous monitoring using lag structures consistent with the study's panel evidence.

For institutional investors and asset managers, the mediation by innovation indicates that governance-quality ESG provides forward-looking information about value creation. Investment policy should shift from score-chasing to process-oriented diligence: evaluate whether firms have board-level ESG accountability, cross-functional implementation routines, and pipelines that convert R&D into patented or commercial outputs. Engagement priorities include time-bound requests for governance enhancements, innovation productivity metrics, and alignment of capex with dual-carbon and industry-specific transition pathways. Portfolio construction can incorporate a tilt toward firms exhibiting both credible ESG governance and improving innovation efficiency, while stewardship should encourage transparent innovation accounting and precommitment to green investment taxonomies.

For regulators and exchanges, the moderating role of realized ESG performance suggests that credible, decision-useful disclosure standards amplify the efficacy of private governance. Policy design should converge on comparability, assurance, and materiality: mandate governance-process disclosures (board duties, incentive links, internal controls), harmonize quantitative indicators on innovation and transition investment, and expand verification requirements for ESG and green-finance instruments. Supervisory sandboxes that reward firms for integrating ESG controls into internal audit and for reporting innovation conversion rates can reduce greenwashing risk and strengthen market signaling. Regional governments can complement national rules with differentiated guidance reflecting sectoral carbon intensity and local environmental priorities, thereby preserving comparability while recognizing heterogeneity.

For creditors and banks, the results imply that ESG governance is a risk-mitigating, innovation-enabling capability that can be priced into credit allocation. Green credit frameworks should incorporate validated governance-process indicators and innovation productivity metrics alongside traditional collateral and cash-flow tests. Loan covenants can condition step-down pricing on verified improvements in ESG governance quality and innovation outcomes, while project finance due diligence should test whether proposed technologies align with firm-level ESG strategies and policy pathways.

For rating agencies and data providers, separating governance quality from realized performance strengthens the informational content of ratings. Methodologies should explicitly model governance-process variables, innovation inputs and outputs, and their dynamic interaction with financial outcomes. Greater transparency on indicator weights, industry materiality maps, and assurance protocols will help investors and firms interpret scores as signals of capability rather than static labels, improving capital allocation.

For employees and human-capital leaders, ESG governance linked to innovation reshapes capability development. Firms should build cross-functional innovation teams that couple engineers with sustainability and compliance specialists, integrate ESG competencies into training and recruitment, and design recognition systems that reward problem-solving with measurable environmental and social benefits. Internal idea markets and stage-gate processes should score proposals on both financial and ESG value, accelerating diffusion of high-impact solutions.

For supply chain partners, the results call for alignment of procurement and supplier development with ESG–innovation goals. Lead firms should embed governance and innovation criteria into vendor selection, co-invest in process upgrades that lower emissions and improve safety, and use long-term contracts to share innovation rents. Tiered disclosure and capability-building programs can raise baseline performance across the chain and reduce systemic transition risks.

For civil society organizations and local communities, the evidence provides a basis for constructive, data-driven engagement. NGOs can prioritize partnerships with firms demonstrating credible governance processes and innovation pipelines, while monitoring whether publicly disclosed targets translate into verifiable environmental and social outcomes. Community input can be formalized through grievance mechanisms and participatory impact assessments that feed back into governance cycles.

Implementation should follow a disciplined sequence. Firms begin with governance diagnostics and data infrastructure upgrades; they then align incentives and budgeting with ESG materiality; next they recalibrate the R&D portfolio toward problems with measurable social and environmental payoffs; finally they enhance disclosure quality and obtain external assurance. Investors adapt screening and engagement to emphasize governance processes and innovation productivity; regulators strengthen comparability and assurance to amplify market signals; creditors incorporate governance and innovation into credit risk models; and ecosystem partners synchronize procurement, training, and partnership models with these changes. Collectively, these actions operationalize the study’s central insight: ESG governance creates value when it is designed as a capability that systematically channels resources into innovation and, through that channel, into superior financial performance.

CONCLUSION

This study investigates how ESG governance shapes firm-level outcomes in China by assembling an unbalanced panel of all A-share listed companies from 2014 to 2024, merging financials from CSMAR with China Securities’ comprehensive ESG ratings, and applying a suite of econometric tests. The core findings are threefold. First, ESG governance exhibits a positive association with corporate financial performance, measured primarily by Tobin’s *q* and corroborated with ROA/ROE, after controlling for firm, industry, and time heterogeneity and common risk factors. Second, ESG governance promotes corporate innovation—captured by R&D intensity and patent-based indicators—and innovation, in turn, transmits a significant portion of the governance effect to firm value. Mediation is validated through stepwise regressions and confirmed by Sobel and Bootstrap procedures across alternative lag structures. Third, realized ESG performance strengthens the link between ESG governance and innovation, indicating a moderating role consistent with signaling and resource-mobilization channels. These results persist under extensive robustness checks (alternative performance metrics, additional lags) and an instrumental-variable strategy that addresses potential endogeneity, and they are qualitatively reinforced by two rounds of focus-group interviews with senior managers.

The study contributes theoretically by separating “governance” capability from realized ESG “performance,” integrating Stakeholder Theory, Innovation Theory, Strategic CSR, and Creating Shared Value into a coherent mechanism in which governance routines steer resources toward innovation and, through that channel, into superior valuation. This framing clarifies why prior mixed evidence often arose when ESG was operationalized solely as disclosure or outcomes. Practically, the results provide actionable guidance for boards and executives to institutionalize ESG oversight, align incentives with ESG–innovation KPIs, and embed ESG screens in capital budgeting; for investors and creditors to move from score-chasing to process-oriented due diligence and pricing; and for regulators and data providers to strengthen comparability, assurance, and decision-useful disclosure that amplifies the private governance–innovation nexus. Together, these implications delineate feasible implementation paths for firms, markets, and supervisors under China’s dual-carbon transition.

Several limitations qualify the interpretation and open avenues for future research. First, although the empirical design employs fixed effects, lags, and 2SLS to mitigate endogeneity, residual selection and measurement biases may remain, particularly given heterogeneity in ESG rating methodologies and innovation accounting across industries. Second, proxies for innovation and governance—R&D expenditure, patent counts, and composite ESG indices—may not fully capture research quality, commercialization success, or the granularity of board-level processes. Third, the focus on listed firms and the Chinese regulatory environment constrains external validity to private or smaller enterprises and to other institutional contexts. Future studies could triangulate administrative patents with citation-weighted and product-level innovation outcomes, leverage plausibly exogenous shocks to ESG governance (e.g., staggered regulation or assurance mandates) for sharper identification, and extend the framework to cross-market comparisons and supply-chain networks. Mixed-methods designs—combining archival data with board minutes, internal controls audits, and longitudinal case studies—would further unpack the micro-foundations through which ESG governance is translated into innovation productivity and long-horizon value creation.

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