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Том III



5-7 ноември 2026 г.

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ESG ПРЕДСТАВЯНЕ И ПАЗАРНА ОЦЕНКА В КИТАЙСКИЯ ИНДУСТРИАЛЕН СЕКТОР: МОДЕРИРАЩАТА РОЛЯ НА ИДИОСИНКРАТИЧНИЯ РИСК

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Резюме: *Изследването анализира дали идиосинкратичният риск променя връзката между ESG представянето и пазарната оценка в китайския индустриален сектор. Използван е годишен панел от китайски индустриални листвани компании за периода 2017-2024 г. Пазарната оценка се измерва чрез Tobin's Q, а ESG представянето се въвежда със закъснение от една година, за да се ограничи едновременността между ESG и пазарните резултати. Идиосинкратичният риск е изчислен на база месечна доходност на акциите и отразява фирмено-специфичната несигурност. Моделите включват фирмени и годишни фиксирани ефекти, стандартизирани ключови променливи и клъстерирани стандартни грешки на фирмено равнище. Резултатите показват, че ESG е свързано с Tobin's Q, но средният ефект не е еднозначно положителен. По-важно е, че взаимодействието между ESG и идиосинкратичния риск е положително и статистически значимо. Това означава, че ESG има по-силно оценъчно значение при по-висока фирмена несигурност. Изводите подкрепят виждането за ESG като условен пазарен сигнал.*

Ключови думи: *ESG; пазарна оценка; идиосинкратичен риск; Tobin's Q; индустриални компании.*

JEL: G32; G34; M14; Q56.

ESG PERFORMANCE AND MARKET VALUATION IN CHINA'S INDUSTRIAL SECTOR: THE MODERATING ROLE OF IDIOSYNCRATIC RISK

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Abstract: *This study examines whether idiosyncratic risk changes the relationship between ESG performance and market valuation in China's industrial sector. Using an annual panel of Chinese industrial listed firms from 2017 to 2024, the analysis measures market*

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valuation with Tobin's Q and uses lagged ESG scores to reduce simultaneity between ESG performance and valuation outcomes. Idiosyncratic risk is estimated from monthly stock-return data and captures firm-specific uncertainty. The empirical models include firm and year fixed effects, standardize the key explanatory variables, and cluster standard errors at the firm level. The results show that ESG performance is associated with Tobin's Q, but the average coefficient is negative, suggesting that investors do not automatically reward ESG engagement in this sector. The key result is that the interaction between ESG and idiosyncratic risk is positive and statistically significant. ESG therefore has stronger valuation relevance when firm-specific uncertainty is higher. The findings support a risk-contingent signaling view: ESG information matters most when investors need additional signals about governance quality, stakeholder management, and long-term resilience. This evidence clarifies why ESG-value findings differ across firms in risk-intensive industrial settings. For managers, the results imply that ESG communication should be linked to risk control and credible long-term strategy.

Keywords: *ESG performance; market valuation; idiosyncratic risk; Tobin's Q; China's industrial sector.*

JEL: G32; G34; M14; Q56.

1. Introduction

Environmental, social, and governance (ESG) performance has become an important issue for industrial firms as companies respond to sustainability pressure, regulatory transition, capital-market scrutiny, and broader changes in business models. For industrial enterprises, ESG reaches beyond reputation and connects to environmental compliance, production safety, energy efficiency, stakeholder relations, governance quality, and long-term resilience. These issues are particularly relevant in China, where industrial firms play a central role in economic development while also facing pressure to improve sustainability performance and adapt to changing investor expectations.

Albuquerque et al. (2019), Fatemi et al. (2018), and Yu et al. (2018) show that ESG-related practices can influence firm value. ESG performance may improve market valuation by reducing information asymmetry, strengthening stakeholder trust, lowering risk, and signaling long-term strategic quality. However, the financial implications of ESG remain debated. ESG activities may also involve direct costs, delayed payoffs, and uncertain market interpretation. This tension is especially important for industrial firms, where sustainability investments may be capital-intensive and where investors may find it difficult to distinguish substantive ESG strategy from symbolic compliance.

This paper argues that the market valuation of ESG performance depends on firm-specific risk. Drawing on signaling theory, ESG performance can be interpreted as a signal that helps investors evaluate firm quality when information is incomplete (Connelly et al., 2011; Spence, 1973). The value of such a signal should be stronger when uncertainty is higher. Idiosyncratic risk provides a useful setting for testing this argument because it captures the firm-specific component of stock-return volatility that cannot be explained by common market factors. When idiosyncratic risk is high, investors may face greater difficulty assessing the

firm's prospects and may therefore pay more attention to credible non-financial signals such as ESG performance.

The research question of this paper is therefore: Does idiosyncratic risk moderate the relationship between ESG performance and market valuation among Chinese industrial firms? To answer this question, the paper uses an annual panel dataset of Chinese industrial listed firms from 2017 to 2024. Market valuation is measured by Tobin's Q, ESG performance is measured by the lagged ESG score, and idiosyncratic risk is measured from monthly stock-return data. The empirical models include firm and year fixed effects and cluster standard errors at the firm level.

The paper makes two main contributions. First, it provides evidence on the ESG-valuation relationship in China's industrial sector, a context where sustainability pressure and industrial upgrading are highly relevant. Second, it shows that ESG performance should be understood as a conditional market signal rather than as a universally positive valuation driver. The results indicate that the interaction between ESG and idiosyncratic risk is positive and statistically significant, suggesting that ESG becomes more valuation-relevant when firm-specific uncertainty is higher. This finding helps explain why prior studies often report mixed ESG-value relationships and highlights the importance of considering the risk environment in which ESG information is interpreted.

The remainder of the paper is organized as follows. The next section reviews the relevant literature and develops the hypotheses. The methodology section describes the sample, variables, and empirical models. The empirical results section reports the descriptive statistics, regression results, and visualization of the moderation effect. The discussion section interprets the findings and outlines their implications. The final section concludes the paper.

2. Literature Review and Hypothesis Development

The relationship between ESG performance and market valuation has become an important issue in corporate finance because ESG activities combine non-financial responsibility with potential financial consequences. A conventional view suggests that ESG engagement may support firm value by improving stakeholder relationships, strengthening reputation, lowering risk, and reducing information asymmetry. Fatemi et al. (2018) show that ESG strengths are positively related to firm value, while ESG weaknesses reduce valuation. Yu et al. (2018) similarly argue that ESG transparency can increase firm value by reducing information asymmetry and agency costs. From this perspective, ESG performance can be understood as a strategic asset that helps investors evaluate the quality and sustainability of the firm.

At the same time, the valuation effect of ESG is not necessarily uniform. ESG activities may involve visible costs, delayed benefits, and uncertain market interpretation. This ambiguity is especially relevant in industrial sectors, where firms often face high capital intensity, environmental pressure, technological

upgrading, and regulatory transition. Albuquerque et al. (2019) develop a theoretical and empirical argument that corporate social responsibility can increase firm value and reduce systematic risk, but their framework also implies that the value of responsible behavior depends on the market conditions and firm characteristics under which it is observed. Evidence from China also points to mixed market responses to ESG disclosure, suggesting that investors may not always treat ESG information as immediately value-increasing in emerging-market settings.

This paper interprets ESG performance through signaling theory. In markets with information asymmetry, observable signals help outside investors infer otherwise unobservable firm quality (Spence, 1973). Connelly et al. (2011) emphasize that signals become more useful when receivers face uncertainty and when the signal is sufficiently credible to distinguish high-quality firms from low-quality firms. ESG performance can serve this signaling function because it may communicate managerial discipline, stakeholder commitment, governance quality, and long-term strategic orientation. However, the signal is unlikely to have the same value in every context. If investors already face little uncertainty about a firm, ESG information may add limited new information. If firm-specific uncertainty is high, ESG performance may become more informative.

Idiosyncratic risk provides a useful context for testing this conditional argument. In asset-pricing research, idiosyncratic volatility captures the portion of stock-return variation that is specific to the firm and not explained by common risk factors (Fama & French, 1993). Ang et al. (2006, 2009) show that idiosyncratic volatility is strongly related to stock-market outcomes. This evidence confirms that firm-specific uncertainty matters for capital-market pricing. For the present paper, high idiosyncratic risk means that investors face greater difficulty interpreting a firm's future prospects. Under such conditions, non-financial information such as ESG performance may become more relevant because it helps investors form judgments about firm quality beyond short-term accounting and market fluctuations.

Prior research also links corporate sustainability and social performance to risk. Lee and Faff (2009) examine corporate sustainability performance and idiosyncratic risk from a global perspective, while Oikonomou et al. (2012) show that corporate social performance is associated with dimensions of financial risk over time. These studies support the idea that ESG-related performance concerns both firm value and firm risk. In the context of Chinese industrial firms, this risk dimension is particularly relevant because investors may be concerned about environmental exposure, production uncertainty, policy transition, and firm-specific operational shocks. ESG performance may therefore be more meaningful when the market is already uncertain about the firm.

Based on this reasoning, the paper expects ESG performance to be related to market valuation, although the sign of the relationship is treated as an empirical question because prior studies report both value-positive and context-dependent

effects. The stronger expectation concerns the conditional role of idiosyncratic risk. If ESG performance works as a stronger signal when firm-specific uncertainty is high, the relationship between ESG and Tobin's Q should become more favorable as idiosyncratic risk increases. The study therefore tests the following hypotheses:

H1: ESG performance is associated with the market valuation of Chinese industrial firms.

H2: Idiosyncratic risk positively moderates the relationship between ESG performance and market valuation, so that the valuation relevance of ESG is stronger for firms with higher firm-specific risk.

3. Methodology

This study examines whether ESG performance is associated with the market valuation of Chinese industrial firms and whether this association depends on firm-specific risk. The empirical design uses a concise panel-data approach. It focuses on one market-based outcome, Tobin's Q, and one moderating condition, idiosyncratic risk. Tobin's Q is widely used as a market-based proxy for firm value because it links market valuation to the firm's asset base and captures expectations about future value creation (Fatemi et al., 2018; Yu et al., 2018). This focus keeps the analysis close to the paper's central argument: ESG performance may not be valued uniformly across firms, but its market relevance may become stronger when investors face greater uncertainty about firm-specific prospects.

The sample is constructed from an annual panel of Chinese industrial listed firms for the period 2017-2024. The panel contains 3,624 firm-year observations from 453 firms. Because the main explanatory variable is lagged ESG performance, the final regression sample covers 2018-2024 and contains 3,156 firm-year observations. The use of lagged ESG performance is important because it reduces the risk that contemporaneous market valuation and ESG scores are determined at the same time. It also fits the logic that market participants may incorporate prior non-financial performance into subsequent valuation decisions.

The dependent variable is Tobin's Q, which is used as the proxy for market valuation. Tobin's Q is appropriate for this paper because it reflects the market's assessment of a firm's future prospects relative to its asset base. Unlike accounting indicators such as ROA or ROE, Tobin's Q captures investor expectations, perceived growth opportunities, and intangible value. Since ESG performance is often interpreted through long-term reputation, stakeholder trust, and governance quality, a market-based valuation measure provides a more direct test of whether investors attach value to ESG information (Albuquerque et al., 2019; Fatemi et al., 2018).

The core independent variable is the firm's ESG score lagged by one year. Higher ESG scores indicate stronger environmental, social, and governance performance. The moderating variable is idiosyncratic risk, measured from

monthly stock-return information as the firm-specific component of return volatility. This approach is consistent with asset-pricing studies that separate firm-specific volatility from common market, size, and value-related return factors (Ang et al., 2006, 2009; Fama & French, 1993). Conceptually, idiosyncratic risk captures uncertainty that is specific to an individual firm and cannot be fully explained by common market-wide movements. A higher level of idiosyncratic risk implies greater firm-specific uncertainty, which may increase investors' demand for credible non-financial signals. Both lagged ESG and idiosyncratic risk are standardized before constructing the interaction term, which allows the interaction coefficient to be interpreted for standard-deviation changes.

Table 1. Variable definitions

Variable	Measurement	Role in the model
Tobin's Q	Market valuation indicator reported in the dataset.	Dependent variable
Lagged ESG score	One-year lag of the firm's ESG score.	Main explanatory variable
Idiosyncratic risk	Firm-specific stock-return risk estimated from monthly return data.	Moderating variable
ESG x idiosyncratic risk	Interaction between standardized lagged ESG and standardized idiosyncratic risk.	Key test variable
Debt ratio	Total liabilities divided by total assets.	Control variable
Firm size	Natural logarithm of total assets.	Control variable
Revenue growth	Change in operating revenue relative to prior-year operating revenue.	Control variable
Board size	Number of board directors.	Control variable
Independent directors	Proportion of independent directors on the board.	Control variable
CEO duality	Indicator equal to one when the chairperson and general manager positions are held by the same person.	Control variable
Female directors	Proportion of female directors on the board.	Control variable

Source: Author's compilation based on the empirical dataset.

The model includes several firm-level controls that may affect market valuation. The debt ratio controls for capital structure and financial risk. Firm size controls for scale, visibility, and resource capacity. Revenue growth captures operating expansion and market expectations about business momentum. Board size, independent-director ratio, CEO duality, and female-director ratio control for governance characteristics that may influence both ESG performance and investor valuation. All continuous variables are winsorized at the 1st and 99th percentiles to reduce the influence of extreme observations.

The baseline empirical specification first estimates the average association between ESG performance and market valuation. The model is expressed as follows:

$$TobinQ_{it} = \alpha + \beta_1 ESG_{i,t-1} + \gamma Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

In this equation, TobinQ_it denotes market valuation for firm i in year t, ESG_i,t-1 denotes lagged ESG performance, Controls_it represents the set of

firm-level control variables, mu_i captures firm fixed effects, lambda_t captures year fixed effects, and epsilon_it is the error term. Firm fixed effects absorb time-invariant differences across firms, such as persistent business models, industry position, and unobserved organizational characteristics. Year fixed effects absorb shocks common to all firms in a given year, such as macroeconomic conditions, regulatory changes, and broad market cycles.

To test the moderating role of idiosyncratic risk, the study extends the baseline model by adding idiosyncratic risk and its interaction with lagged ESG performance:

$$TobinQ_{it} = \alpha + \beta_1 ESG_{i,t-1} + \beta_2 IRISK_{it} + \beta_3 ESG_{i,t-1} \times IRISK_{it} + \gamma Controls_{it} + \mu_i + \lambda_t + \varepsilon_{it}$$

The coefficient of interest is the interaction coefficient. A positive interaction coefficient would indicate that the association between ESG performance and Tobin's Q becomes more favorable as idiosyncratic risk increases. This would support the argument that ESG performance carries stronger market-relevant information when firm-specific uncertainty is high, in line with signaling theory's emphasis on the value of credible signals under information asymmetry (Connelly et al., 2011; Spence, 1973). A negative interaction coefficient would suggest the opposite: that risk weakens the valuation relevance of ESG. The models are estimated with firm and year fixed effects, and standard errors are clustered at the firm level to account for serial correlation within firms over time.

The empirical strategy is intentionally parsimonious. It does not try to exhaust all possible channels linking ESG and financial outcomes. Instead, it provides a focused test of whether idiosyncratic risk conditions the market valuation of ESG performance. By using a single market-based dependent variable, a lagged ESG measure, one theoretically motivated moderator, and a consistent set of controls, the analysis remains transparent and directly aligned with the research question.

4. Empirical Results

This section reports the empirical evidence on whether ESG performance is related to market valuation in China's industrial sector and whether this relationship varies with firm-specific risk. The analysis focuses on Tobin's Q as the market-based outcome because it captures investors' valuation of the firm beyond short-term accounting profitability. ESG performance is measured with the lagged ESG score, which reduces simultaneity concerns and allows the model to examine whether prior ESG performance is reflected in subsequent market valuation. The moderating variable is idiosyncratic risk, estimated from monthly stock-return data and standardized for interpretation. All continuous variables are winsorized at the 1st and 99th percentiles.

Table 2. Descriptive statistics

Variable	N	Mean	Std. dev.	Min	Max
Tobin's Q	3156	2.171	1.437	0.846	9.139
Lagged ESG score	3156	74.724	4.439	61.517	85.107
Idiosyncratic risk	3156	0.168	0.057	0.041	0.336
Debt ratio	3156	0.347	0.156	0.065	0.684
Firm size	3156	22.411	1.131	20.268	25.517
Board size	3156	8.362	1.371	5.000	12.000
Independent directors (%)	3156	37.291	5.342	33.330	57.140
Revenue growth	3156	0.127	0.220	-0.351	1.017

Source: Author's calculation based on the cleaned annual panel dataset.

The descriptive statistics indicate that the sample contains substantial variation in both market valuation and firm-specific risk. The average winsorized Tobin's Q is above one, suggesting that the market generally values these industrial firms above the book value of their assets, but the wide dispersion shows that valuation outcomes are far from uniform. ESG scores are also dispersed across firms, which is important for identifying whether ESG performance has market relevance. The variation in idiosyncratic risk is especially useful for the present study because the paper examines the average ESG-valuation association and asks whether investors interpret ESG differently when firm-specific uncertainty is higher.

Table 3. ESG performance, idiosyncratic risk, and market valuation

Variable	(1) Tobin's Q	(2) Tobin's Q
Lagged ESG score	-0.0498**	-0.0707***
	(0.0254)	(0.0241)
Idiosyncratic risk		0.2752***
		(0.0289)
ESG x idiosyncratic risk		0.0400**
		(0.0162)
Controls	Yes	Yes
Firm fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Clustered standard errors	Firm	Firm
Observations	3,156	3,156
Firms	453	453
Within R-squared	0.065	0.105

*Notes: Standard errors clustered by firm are reported in parentheses. ESG and idiosyncratic risk are standardized. Controls include debt ratio, firm size, board size, independent-director ratio, CEO duality, female-director ratio, and revenue growth. ***, **, and * denote significance at the 1%, 5%, and 10% levels.*

Column (1) first estimates the average relationship between lagged ESG performance and market valuation. The coefficient on lagged ESG is negative and statistically significant at the 5% level. After controlling for firm and year fixed effects, a one-standard-deviation increase in ESG is associated with a lower

Tobin's Q on average. This result cautions against a simple value-premium interpretation of ESG in the industrial sector. Although prior studies often find that ESG strengths or transparency can support firm value (Fatemi et al., 2018; Yu et al., 2018), the negative average coefficient is consistent with the broader view that market responses to ESG may depend on context, cost perceptions, and the credibility of the information environment.

Column (2) introduces idiosyncratic risk and the interaction between ESG and idiosyncratic risk. The interaction term is positive and significant at the 5% level. This finding is the central result of the paper. It suggests that idiosyncratic risk changes how the capital market prices ESG performance. Although the average ESG coefficient remains negative, the positive interaction indicates that the negative association becomes weaker as firm-specific risk rises. In other words, ESG appears to have greater valuation relevance when firms face higher firm-specific uncertainty. This pattern is consistent with research showing that sustainability and social performance are connected to firm risk, including idiosyncratic and broader financial risk dimensions (Lee & Faff, 2009; Oikonomou et al., 2012).

The economic interpretation is consistent with a risk-contingent signaling mechanism. In low-risk firms, investors may treat ESG activities as routine compliance or as expenditures whose financial benefits are uncertain. In high-idiosyncratic-risk firms, however, ESG performance may carry more information about governance discipline, stakeholder management, and long-term strategic commitment. Under higher uncertainty, investors have stronger incentives to search for credible non-financial signals, and ESG performance may therefore help reduce concerns about the firm's underlying quality (Connelly et al., 2011; Spence, 1973). The result does not imply that ESG automatically increases market value for all firms; rather, it shows that the market relevance of ESG depends on the risk environment in which the firm operates.

Figure 1 plots the conditional effect implied by the interaction model. At lower levels of idiosyncratic risk, the marginal effect of ESG on Tobin's Q is negative. As idiosyncratic risk increases, the slope moves upward and approaches zero. This pattern supports the regression evidence: ESG is not uniformly rewarded by the market, but its valuation penalty is attenuated among firms with higher firm-specific risk. In China's industrial sector, ESG performance is best understood as a conditional market signal rather than as a universally positive valuation driver.

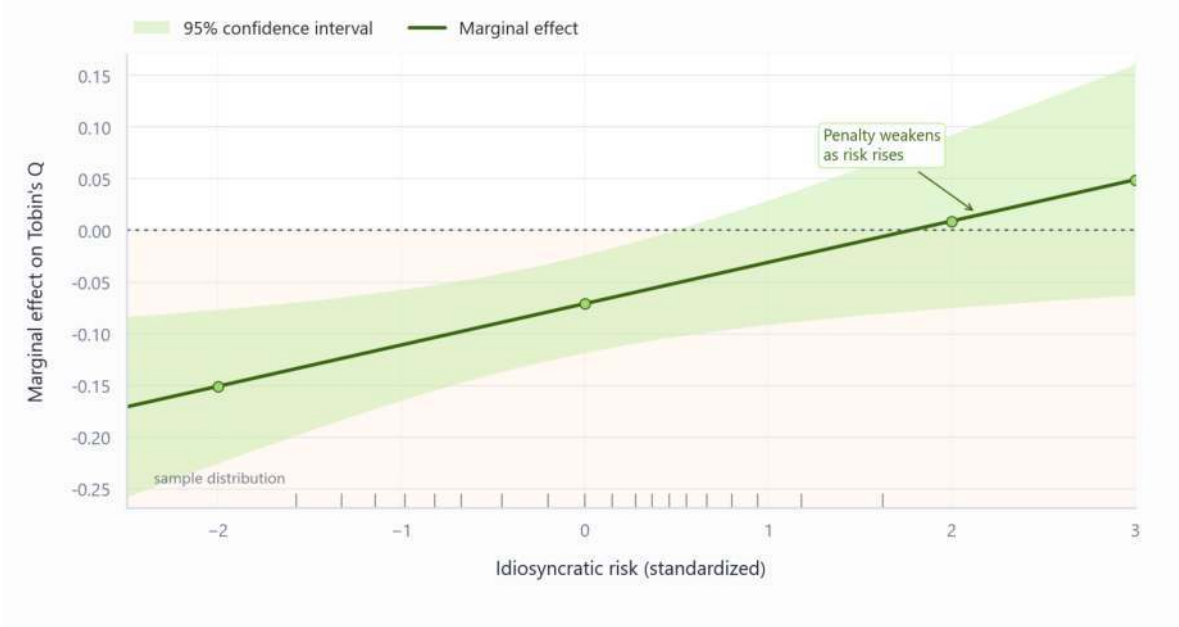


Figure 1. Marginal effect of ESG on Tobin's Q across idiosyncratic risk
Source: Author's calculation. The line reports the estimated marginal effect of standardized lagged ESG on Tobin's Q from Model (2); the ribbon shows the 95% confidence interval and the lower ticks summarize the observed distribution of idiosyncratic risk.

Overall, the empirical evidence supports the paper's main argument that idiosyncratic risk moderates the relationship between ESG performance and market valuation. The findings are especially relevant for industrial firms because these firms operate under capital intensity, environmental pressure, and operational uncertainty. The evidence suggests that managers should not expect ESG investment to be rewarded mechanically by the market. Its valuation effect is more likely to emerge when ESG helps investors interpret firm quality under uncertainty. This also implies that investors should evaluate ESG information together with firm-specific risk, rather than treating ESG scores as isolated indicators. In this respect, the results extend prior ESG-value and ESG-risk research by showing that the valuation relevance of ESG depends on the firm-specific risk environment (Albuquerque et al., 2019; Fatemi et al., 2018; Lee & Faff, 2009).

5. Discussion

The empirical results provide a qualified interpretation of the ESG-valuation relationship in China's industrial sector. The baseline model shows that lagged ESG performance is associated with Tobin's Q at the 5% significance level, but the sign of the coefficient is negative. This finding supports H1 by confirming an association between ESG performance and market valuation, while showing that the direction is not uniformly value-positive. The result cautions against treating ESG as an automatic source of market premium. In an industrial setting, ESG investment may be viewed by investors as costly, slow to generate financial benefits, or difficult to evaluate when disclosure quality and investor interpretation remain uneven.

This result does not necessarily contradict prior evidence that ESG can support firm value. Fatemi et al. (2018) and Yu et al. (2018) show that ESG strengths and transparency may support valuation, while Albuquerque et al. (2019) argue that responsible corporate behavior can increase firm value through risk and differentiation channels. El Ghoul et al. (2011) also show that stronger corporate social responsibility can be associated with a lower cost of equity capital. Taken together, these studies imply that capital markets may reward responsible practices when they are credible and financially meaningful. The present findings suggest that these benefits may not appear as a simple average effect in all contexts. For Chinese industrial firms, the market may distinguish between ESG as a strategic signal and ESG as a compliance cost. If ESG activities are perceived as symbolic, costly, or insufficiently linked to future cash flows, investors may discount them in the short term.

The interaction result provides the paper's main contribution. The positive and statistically significant coefficient on the interaction between ESG and idiosyncratic risk supports H2. It indicates that the negative average association between ESG and Tobin's Q becomes weaker when firm-specific risk is higher. This finding is consistent with signaling theory. When investors face greater uncertainty about a firm's future prospects, credible observable signals become more useful for evaluating unobservable firm quality (Connelly et al., 2011; Spence, 1973). It is also consistent with evidence that social capital and trust become especially valuable during crisis periods, when uncertainty is high and investors need additional confidence in firm quality (Lins et al., 2017). ESG performance may therefore matter more when the market has stronger reasons to search for additional information beyond conventional financial indicators.

Idiosyncratic risk is especially relevant because it reflects uncertainty that is specific to the firm rather than uncertainty shared by the whole market. Ang et al. (2006, 2009) show that idiosyncratic volatility is closely connected to stock-market outcomes and cannot be ignored in valuation analysis. In the present study, higher idiosyncratic risk creates the setting in which ESG information becomes more informative. For firms exposed to greater firm-specific uncertainty, ESG performance may signal stronger governance discipline, better stakeholder management, and a more credible long-term orientation. These qualities can help investors interpret the firm more favorably, even if ESG does not generate an unconditional valuation premium.

The findings also extend the literature linking sustainability performance and risk. Lee and Faff (2009) and Oikonomou et al. (2012) show that corporate sustainability or social performance is connected to firm risk. This paper adds that risk is both an outcome that ESG may influence and a condition that shapes how ESG is valued by the market. In other words, idiosyncratic risk is a boundary condition. ESG has stronger market relevance when investors face higher firm-specific uncertainty, which helps explain why previous studies often find mixed ESG-value relationships across samples, markets, and institutional settings.

For managers of industrial firms, the implication is that ESG strategy should be connected clearly to risk management, operational resilience, and long-term competitiveness. ESG efforts are unlikely to be rewarded simply because they are present. Investors need to understand how environmental, social, and governance practices reduce uncertainty, strengthen stakeholder relationships, or improve strategic credibility. This is particularly important for industrial companies, whose ESG issues are often tied to environmental compliance, production safety, supply-chain stability, energy efficiency, and policy transition. Firms with higher idiosyncratic risk may benefit more from communicating ESG as part of a broader risk-control and value-creation strategy.

For investors, the findings suggest that ESG scores should not be interpreted in isolation. The same ESG score may carry different information depending on the firm's risk environment. When idiosyncratic risk is low, ESG performance may add limited new information to market valuation. When idiosyncratic risk is high, ESG performance may help investors distinguish firms with stronger governance and stakeholder-management capacity from firms whose uncertainty reflects deeper weaknesses. This interpretation is consistent with the view that ESG information becomes more useful when traditional financial signals are incomplete.

The study has limitations that should be acknowledged. First, the analysis focuses on Chinese industrial listed firms, so the results may not generalize to financial firms, service industries, or non-listed enterprises. Second, the study uses an aggregate ESG score, while different environmental, social, and governance dimensions may have different valuation implications. Third, although the use of lagged ESG and fixed effects reduces some endogeneity concerns, it does not fully eliminate the possibility that omitted time-varying factors influence both ESG performance and market valuation. These limitations create opportunities for future research to examine ESG sub-dimensions, alternative risk measures, and longer sample periods.

Overall, the discussion suggests that ESG performance should be understood as a conditional market signal rather than as a universally positive valuation driver. The central empirical pattern is not that ESG always raises firm value, but that its valuation relevance changes with firm-specific risk. This insight is useful for understanding ESG in China's industrial sector, where sustainability transition, operational uncertainty, and investor interpretation interact in complex ways.

6. Conclusion

This paper examines the relationship between ESG performance and market valuation in China's industrial sector, with particular attention to the moderating role of idiosyncratic risk. Using a panel of Chinese industrial listed firms from 2017 to 2024, the study focuses on Tobin's Q as the market-based measure of firm value, lagged ESG score as the main explanatory variable, and firm-specific

idiosyncratic risk as the moderating condition. The empirical design uses firm and year fixed effects and clustered standard errors.

The findings show that ESG performance is associated with market valuation, but the average relationship is not straightforwardly positive. In the baseline model, lagged ESG performance is negatively associated with Tobin's Q. This result suggests that investors may not automatically reward ESG engagement in the industrial sector, especially when ESG activities are perceived as costly, uncertain, or weakly connected to future cash-flow benefits. The result supports the need for a more conditional interpretation of ESG rather than a simple assumption that higher ESG always leads to higher market value.

The main contribution of the paper lies in the moderation result. The interaction between ESG performance and idiosyncratic risk is positive and statistically significant. This indicates that ESG becomes more valuation-relevant when firm-specific uncertainty is higher. In other words, ESG performance may function as a stronger market signal in firms with higher idiosyncratic risk. This finding is consistent with signaling theory and suggests that investors may use ESG information to interpret governance quality, stakeholder management, and long-term resilience when conventional financial signals are incomplete.

The practical implication is that industrial firms should not treat ESG as a stand-alone disclosure label. To create market value, ESG activities need to be connected clearly to risk management, operational resilience, environmental transition, and long-term competitiveness. This is especially important for firms facing higher firm-specific uncertainty. For investors, the results suggest that ESG scores should be evaluated together with the firm's risk profile. ESG information may be more useful when it helps distinguish firms with credible long-term strategies from firms whose uncertainty reflects deeper weaknesses.

The study is subject to several limitations. It focuses only on Chinese industrial listed firms, so the findings may not apply to other sectors or unlisted firms. It uses an aggregate ESG score, while environmental, social, and governance dimensions may affect market valuation in different ways. The fixed-effects design and lagged ESG measure reduce some empirical concerns, but they cannot fully eliminate all endogeneity issues. Future research could examine ESG subdimensions, alternative risk measures, different industrial subsectors, or longer time periods to provide a more detailed understanding of how ESG information is priced by capital markets.

Overall, the paper concludes that ESG performance in China's industrial sector is best understood as a conditional signal. Its market valuation effect depends on the level of firm-specific risk. This conclusion contributes to the broader discussion on industrial business under global change by showing that ESG, risk, and market valuation are interconnected rather than separate corporate-finance issues.

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