

A review of recent developments in ESG and corporate finance

Jiani Yu

School of College of Economics & Management, South China Agricultural University, Guangzhou, China

yujiani@stu.scau.edu.cn

Abstract. The integration of Environmental, Social, and Governance (ESG) considerations into corporate finance has generated extensive yet fragmented research. Existing findings are heterogeneous, and causal claims are often undermined by measurement noise, selection bias, and pronounced ESG rating divergence. This lack of consensus obscures the mechanisms through which ESG affects firm value. To address this gap, this paper reviews recent developments by organizing evidence around five transmission channels: information, risk management, stakeholder relations, innovation, and capital allocation. Focusing on studies with credible identification, the review synthesizes findings on financial performance, cost of capital, climate risk, disclosure, governance, and engagement. The analysis reveals that ESG value creation is conditional, depending systematically on industry materiality, governance quality, and institutional context. The most robust evidence supports ESG's role in reducing financing costs and mitigating tail risks, while evidence of persistent alpha remains mixed. By clarifying boundary conditions and mechanisms, this review provides an integrated framework that reconciles prior inconsistencies. The paper concludes with implications for managers, investors, and policymakers and outlines promising frontiers in climate finance and machine-learning-based measurement. This synthesis thus offers a structured foundation for future theoretical and empirical inquiry.

Keywords: sustainable finance, ESG ratings, climate risk, corporate financial performance, cost of capital

1. Introduction

Environmental, Social, and Governance (ESG) considerations have moved from the periphery to the center of corporate finance, with global sustainable investment assets reaching roughly \$35 trillion in 2024. Three forces drive this shift. First, the climate transition and the *Paris Agreement* have raised the salience of carbon and physical risks for both firms and investors. Second, social scrutiny has intensified, particularly during and after the COVID-19 crisis, when employee, customer, and community relations were stress-tested in real time [1]. Third, recurring governance failures have eroded confidence in unconstrained shareholder primacy. Mandatory disclosure regimes in the European Union, the United Kingdom, China, and increasingly the United States have followed, alongside private-sector taxonomies, ratings, and standard-setting bodies that together form the institutional backbone of contemporary sustainable finance [2].

Despite explosive growth in research, fundamental questions remain about whether and how ESG affects firm value, financing costs, and corporate risk. Reported findings are heterogeneous and many causal claims are fragile. ESG ratings disagree substantially across providers, the underlying constructs are multi-dimensional, and the same firm can simultaneously be a leader on one dimension and a laggard on another. Measurement noise, selection effects, and reverse causality complicate inference, while strategic disclosure makes it difficult to separate the marginal effect of substantive sustainability investment from the marginal effect of being seen to invest.

This paper organizes the evidence around a single thread that ESG creates value by operating through identifiable transmission channels (including information, risk management, stakeholder relations, innovation, and capital allocation), but the strength and even the sign of these effects systematically depend on industry materiality, governance quality, and the institutional context. Following this theme, this paper focuses on research designs with credible identifiability, investigates the boundary conditions under which the positive correlation between ESG and performance break down, and highlight both ratings noise and strategic disclosure as factor that undermines causal interpretation.

2. ESG and corporate financial performance

2.1. Accounting and market evidence

Meta-analytic evidence on the ESG–performance relationship is broadly positive. Friede et al. synthesize more than 2,000 empirical studies and report that approximately 63% find a positive relationship between ESG and corporate financial performance, with only a small minority finding negative effects [3]. Long-horizon matched-sample work by Eccles et al. shows that high-sustainability firms outperform on both stock-market and accounting measures over an 18-year window, with the gap widening over time [4]. The persistence and direction of the gap are consistent with sustainability shaping organizational processes such as board oversight, stakeholder engagement, and long-term investment.

Quasi-experimental designs strengthen the causal interpretation. Flammer uses close-call shareholder votes on CSR proposals as a regression-discontinuity instrument and shows that proposals narrowly passing improve subsequent operating performance and labor productivity, while proposals narrowly failing do not [5]. Because firms on either side of the cut-off are comparable on observables, the design isolates the causal effect of CSR adoption from selection on firm quality. Market-based evidence provides even more nuanced results Albuquerque et al. treat ESG as a form of product differentiation that lowers consumer demand elasticity and find that high-ESG firms display higher Tobin's Q and lower systematic risk, both predicted by their model [6]. Edmans documents two to three percent annual abnormal returns for firms in the "Best Companies to Work For" list, providing direct evidence that intangible human-capital quality is incompletely priced [7].

These performance findings highlight an obvious tension, namely that if ESG firms earn higher returns, why do not arbitrageurs eliminate the premium? Pástor et al. reconcile the evidence within an equilibrium model in which a subset of investors derives non-pecuniary utility from holding green assets [8]. In equilibrium, green firms have lower expected returns but generate ex post outperformance during periods when ESG preferences strengthen unexpectedly. The significance of this model is that it implies a portion of historical ESG excess return is transitory. As preferences stabilize, the realized green premium should converge toward a lower long-run mean, and any remaining gap reflects compensation for unhedgeable climate-policy risk rather than mispricing.

2.2. Investing and ratings divergence

The investor side adds a complementary layer. ESG ratings divergence complicates portfolio construction. The average correlations coefficient across major rating agencies is approximately 0.5, which is considerably lower than that of credit ratings. Furthermore, it is entirely possible for a firm to be ranked in the top quartile by one provider while being ranked in the bottom quartile of another. Such measurement noise mechanically biases regression estimates toward zero and rationalizes the conflicting findings reported across the empirical literature [9]. Methodological progress, notably the "rater effect" decomposition, suggests that scope and weight differences across providers, rather than measurement of the same underlying construct, drive most of the disagreement. The implication is that ESG is best treated as a portfolio of partly-overlapping constructs, not a single latent factor, and that empirical work should report sensitivity across multiple raters.

3. ESG, cost of capital, and climate risk

3.1. Cost of debt

ESG performance reduces debt financing costs through credit ratings, loan spreads, and bond yields. Goss and Roberts report that firms with CSR concerns pay 7–18 basis points more on bank loans and face tighter covenants, with the effect concentrated in firms whose social weaknesses raise the salience of reputational and regulatory risk [10]. The asymmetry between strengths and concerns—concerns priced more heavily—is consistent with debt being a downside-protection contract: lenders care about left-tail outcomes, so adverse ESG signals translate more directly into spreads than positive ones. The corporate green-bond market has matured in parallel. Flammer documents a positive market reaction to corporate green-bond announcements, with the largest reactions for first-time issuers and certified bonds, alongside subsequent improvements in environmental performance and an increase in long-term institutional investor ownership [11]. The pattern is consistent with green bonds serving simultaneously as a credible commitment device and as a way to attract investors with ESG mandates. The combination of certification, disclosure, and dedicated investor base distinguishes labelled green bonds from generic environmental rhetoric and helps explain why a measurable premium has survived the rapid growth of the market.

3.2. Cost of equity

El Ghoul et al. estimate that high-CSR firms enjoy a roughly 20–50 basis-point reduction in the implied cost of equity, attributing the effect to a broader investor base, lower perceived risk, and improved disclosure environments [12]. Dhaliwal et al. provide complementary evidence: firms initiating standalone CSR reports experience comparable drops in their cost of equity, with the effect strongest for firms previously associated with weak information environments [13]. The combination of cross-sectional and event-based estimates points to a robust information channel: ESG disclosure narrows the gap between firm insiders and capital providers, and the resulting reduction in estimation risk is impounded into prices. Subsequent studies have isolated the disclosure channel by exploiting the staggered initiation of voluntary reports, the introduction of mandatory regimes, and the entry of dedicated ESG analysts, with broadly consistent magnitudes. The convergence of cross-sectional, event-study, and quasi-experimental estimates around a 20–50 basis-point band is one of the more robust quantitative findings in the literature and provides a useful anchor for both academic research and corporate decision making.

3.3. Climate risk

Carbon and climate risks are increasingly priced in both equity and debt markets. Bolton and Kacperczyk find that high-emission firms earn higher subsequent stock returns, consistent with a carbon premium that compensates investors for transition risk and divestment pressure from large institutional holders [14]. The premium is concentrated in scope-1 emissions, suggesting that investors penalize direct rather than embedded carbon exposure, and the magnitude has grown as climate-policy news has accumulated. The result has held up across alternative emissions databases, sample windows, and risk-factor adjustments, lending it unusual robustness for an asset-pricing finding. Sautner et al. build a text-based, firm-level climate-exposure measure from earnings-call transcripts and show that exposed firms display higher return volatility, lower valuations, and higher financing costs, with effects strongest for firms whose exposure has increased recently [15]. The text-based measure captures both physical and transition exposure and illustrates how machine-learning methods can extract financially material ESG signals from unstructured corporate communications. Together, these findings establish climate risk as a material first-order consideration in capital pricing rather than a peripheral ESG concern, with measurable consequences for both expected returns and the cross-section of corporate financing.

The risk picture is also internally coherent with the performance evidence. Since companies with high-ESG scores are typically less exposed by transition risks, they should display lower tail risk and lower idiosyncratic volatility, which is exactly what Albuquerque et al. and Ferrell et al. document [6, 16]. Risk reduction, rather than alpha generation, may be the most empirically robust contribution of ESG to firm value. From a portfolio perspective, this distinction matters for how investors should integrate ESG into asset allocation. If the dominant benefit is downside protection rather than risk-adjusted excess return, then ESG belongs in the risk model rather than in the alpha model, and screening rules should be calibrated against tail-risk metrics rather than mean-return objectives.

4. Disclosure, governance, and engagement

Voluntary ESG disclosure expanded from roughly 20% of S&P 500 firms in 2011 to over 90% in 2024, and mandatory regimes in the EU, China, and several Asian jurisdictions have raised the regulatory floor. Voluntary disclosure lowers the cost of equity, attracts dedicated long-horizon investors, and improves analyst forecast accuracy by providing additional inputs to forecasting models and reducing dispersion across analysts [13]. Mandatory regimes provide cleaner causal identification but also raise concerns about boilerplate reporting, namely, whether mandatory disclosure genuinely drives substantive change or merely produces standardized disclosure templates. The evidence to date suggests the former dominates. Mandated disclosure improves information environments and shifts capital toward better performers, particularly when it forces previously opaque firms to publish auditable quantitative metrics rather than narrative descriptions.

The credibility of ESG disclosure remains the central concern. ESG rating disagreement compounds the difficulty of detecting greenwashing ex ante, and managers face few legal consequences for soft sustainability claims [9]. The policy response has been to push for taxonomies, third-party assurance, and standardized metrics aligned with industry-specific materiality. Each of these instruments addresses one part of the problem: taxonomies discipline what counts as green, assurance disciplines whether reported numbers are accurate, and materiality standards discipline the selection of which the numbers to report in the first place. None alone is sufficient, and the recent convergence of regulatory effort around the combination of all three reflects a growing consensus that the disclosure ecosystem needs simultaneous reinforcement at the definitional, verification, and selection layers.

Governance structures strongly influence whether ESG initiatives create or destroy value. Independent and diverse boards are associated with stronger environmental performance, and ESG-linked executive compensation correlates with superior long-run sustainability outcomes when the metrics are difficult to game [4]. The gaming concern is non-trivial: when bonuses are tied to easily manipulated indicators such as headline carbon disclosures, without anchoring them to verified emissions or third-party-audited targets, managers can shift effort toward optimizing measurement rather than achieving substantive performance. The most credible compensation designs combine a small number of material, verifiable indicators with multi-year vesting and clawback provisions. Institutional investors influence ESG through engagement, voting, and screening. Dimson et al. find approximately 2.3% in abnormal returns over the year following successful ESG engagements by a single large asset manager, with the largest effects for engagements addressing corporate governance and climate change, and with persistence over multiple years [17]. Dyck et al. show that institutions headquartered in countries with strong environmental and social norms drive cross-border CSR improvements at their portfolio firms, providing evidence that ESG diffuses through international ownership rather than being purely a local phenomenon [18]. Engagement, rather than divestment, appears to be the dominant lever through which large diversified investors translate ESG preferences into corporate behavior, and the empirical record suggests that engagement is most effective when it is sustained, coordinated across investors, and backed by a credible threat to escalate via voting against directors or board nominees.

5. Heterogeneity, mechanisms, and boundary conditions

Industry materiality is the most important moderator of the ESG–performance relationship. Khan et al. use the Sustainability Accounting Standards Board (SASB) classification to separate material from immaterial ESG issues at the industry level and show that performance on material issues predicts financial outcomes, whereas performance on immaterial issues does not predict such outcomes - and may even subtract value when it crowds out productive investment [19]. Their finding has reshaped the field by explaining much of the heterogeneity in earlier pooled studies that mixed material and immaterial scores into a single index. Subsequent work consistently finds that pollution-intensive industries display the strongest environmental-performance-financial-value relationships, while human-capital-intensive sectors show the strongest social-dimension effects [7]. The materiality lens also helps reconcile the gap between investor demand for granular ESG data and the prevalence of broad composite scores: composite scores are convenient but average across material and immaterial dimensions in ways that statistically attenuate any underlying causal relationship, while industry-specific material scores recover stronger effects.

Cross-country variation is large. Liang and Renneboog document that civil law countries with stronger stakeholder orientations exhibit systematically higher CSR, suggesting that legal origin shapes the relative bargaining power of non-shareholder constituencies [2]. The international evidence is consistent with a layered explanation in which formal legal protections, informal social norms, and the composition of the institutional investor base interact to produce equilibrium ESG levels that differ across jurisdictions. Within these contexts, firm-level moderators sharpen the picture: the crisis benefits concentrate in financially constrained firms [1] a valuation benefits concentrate in well-governed firms [16]; and the move from voluntary to mandatory disclosure regimes erodes the signaling value of basic disclosure while strengthening the role of substantive performance [8]. Studies that estimate ESG-performance relations on pooled cross-country samples without modelling these moderators tend to recover small or insignificant effects, while studies that condition on the relevant moderators routinely recover economically meaningful magnitudes.

Synthesizing across sections, five transmission channels recur. The information channel reduces asymmetry between firms and stakeholders [13]. The risk-management channel insures against operational, regulatory, and reputational shocks. The stakeholder-relationship channel builds intangible assets such as customer loyalty and employee productivity [7, 20]. The innovation channel encourages long-horizon investment and patent productivity in firms with stronger stakeholder orientation. Finally, the capital-allocation channel routes funds toward high-ESG firms through ESG-oriented investors and lenders [11]. The relative weights of these channels generate the observed heterogeneity, and any single-channel explanation is incomplete. A useful diagnostic for empirical work is to ask which of the five channels the research design plausibly identifies; studies that conflate channels almost always report effects that are smaller, noisier, and harder to interpret than studies that isolate one. The five-channel taxonomy also clarifies the policy debate: information and capital-allocation channels respond directly to disclosure rules, while stakeholder-relations and innovation channels respond more strongly to corporate governance and competition policy.

6. Conclusion

The ESG-corporate-finance literature supports four conclusions. First, the ESG–performance relationship is predominantly positive but heterogeneous, with credible quasi-experimental support [3-5]. Second, ESG reduces both debt and equity financing costs and lowers multiple risk dimensions, with insurance benefits that materialize during crises [1, 12, 13]. Third, voluntary and mandatory disclosure improve information environments and induce real changes, while governance structures and institutional investor engagement determine whether ESG initiatives create or destroy value [17, 18]. Fourth, crucial contextual factors, including industry materiality [19], institutional environment [2], and governance quality [16], collectively determine when and to what extent ESG matters exert influence.

However, this paper leaves many questions unanswered. Firstly, causal identification is partial and concentrated in a few credible designs. Secondly, ESG ratings disagree substantially [9], and long-run dynamics, particularly under climate-policy uncertainty, are understudied. Furthermore, the existing literature pays relatively little attention to how ESG considerations propagate through supply chains and across firm boundaries, leaving open the question of whether the observed firm-level effects partly reflect outsourcing of ESG-intensive activities to less visible counterparties. Promising frontiers include climate finance and transition risk [14, 15], supply-chain ESG, machine-learning-based measurement that exploits unstructured text and satellite data, emerging-market evidence where the institutional environment differs sharply from advanced economies, and field-experimental designs that can directly test mechanism-level predictions rather than relying on observational identification.

For managers, the literature implies that focused ESG investment in industry-material areas, supported by credible governance and transparent disclosure, can create long-term value, while symbolic activities are unlikely to do so. The practical implication is that ESG strategy should begin with a materiality assessment grounded in industry-specific frameworks, proceed through governance reforms that align incentives with long-horizon outcomes, and culminate in disclosure that is standardized, audited, and connected to financial reporting. For investors, ESG carries genuine information but its noisy measurement requires due diligence, multi-rater triangulation, and active engagement rather than passive screening. Investors who treat ESG as a single score are likely to be disappointed. Investors who use multiple raters, supplement them with raw data and text-based measures, and engage portfolio firms on a small set of material issues are more likely to capture both the risk-reduction and the alpha components of the ESG premium. For policymakers, the case for credible mandatory disclosure—focused on material issues, supported by standardized metrics, and reinforced

by third-party assurance-is increasingly strong, while one-size-fits-all rules that ignore industry materiality are likely to misfire. The recent international convergence of disclosure standards offers an opportunity to reduce the fragmentation that has previously undermined cross-jurisdictional comparability and inflated compliance costs for global firms. ESG's value is real but conditional, and the conditions under which it operates are now better understood than at any earlier point in this rapidly evolving literature.

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