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ESG Factors and Asset Pricing Efficiency from the Perspective of Information Asymmetry: A Narrative Review

Yuxin Yi*

School of International Politics and Communication, Beijing Language And Culture University, Beijing, China

**Corresponding author: Yuxin Yi*

Abstract

This narrative review systematically investigates the connection between the aspects of ESG and asset pricing efficiency with regard to the view of information asymmetry. As the analysis reveals, ESG has two impacts on prices: a signaling channel, whereby credible disclosures such as ratings and certifications address the information asymmetry in the stock market, and a trust channel, whereby the investors, because of their value congruence, reduce the risks associated with transactions. A central contribution is the development of a contingency framework demonstrating that the relative efficacy of these pathways depends on the information environment—signaling dominates in high-asymmetry contexts, while trust gains prominence as information becomes more abundant. The analysis further reveals that the moderating role of information asymmetry is shaped by heterogeneous conditions at the firm, market, and institutional levels. For instance, ESG signals exert stronger pricing effects in opaque environments, while trust mechanisms dominate in contexts with abundant information. The review constructs a contingency, which incorporates signaling and trust pathways. It concludes conflicting results in the literature and provides viable information to investors and regulators in improving the efficiency of the markets through prescribing a combination of measures that can be adopted in both opaque and transparent markets.

Keywords

ESG disclosure, ESG rating adjustment, asset pricing, CAPM model, information asymmetry

1. Introduction

In recent years, Environmental, Social, and Governance (ESG) factors have increasingly become a central component of global investment strategies, driven by regulatory frameworks such as the European Union’s Sustainable Finance Disclosure Regulation (SFDR) and China’s “dual-carbon” goals [1, 2]. In addition, at the market response level, the rapid development of green bonds and ESG-themed wealth management products indicates that capital is actively being channeled toward sustainability objectives [3]. For instance, on the back of the sustainable finance market achieving several significant milestones in 2025, Climate Bonds Initiative has identified six trends for 2026 [4], reflecting the significant trend of sustainable and green low-carbon development in the financial market. Against this backdrop, ESG factors have become critical in shaping asset valuation and pricing efficiency.

Existing research has come up with a basic consensus that ESG performance is related to the corporate value and stock returns, usually through alleviating the information asymmetry. Other studies like Pedersen et al. [5] suggest an ESG-efficient frontier, whereby when ESG activities exist, high RSG ratings have the potential to decrease capital costs and increase efficiency in prices. Similarly, Shi and Wang [6] find that ESG risks are priced in the Chinese market and the higher the ESG performance the lower the cost of capital of firms. Nevertheless, despite the growing body of literature focusing on the investigations of the relationship between ESG and asset pricing, there are still major disputes relating to the direction, mechanism, and contextual limits of these effects [7.8]. There are major concerns that are involved in the debate. To start with, whereas there are scholars who claim that ESG performance impact mispricing through a homogenous effect on disclosure quality across the markets [9], other scholars point to a heterogeneity of markets and firms [10]. Second, the lack of consistency in the prices across different studies on ESG has been caused by the variation in methodologies, including different ESG rating criteria, biases in sample selection, and models [11].

This review aims to synthesize the literature related to ESG factors, and asset pricing efficiency with respect to the role of information asymmetry. Explaining the theoretical channels through which ESG influences the price, discussing the discrepancy in results across studies concerning the matter and understanding the contextual aspect, this review details future research potentials. It contributes to a deeper understanding of the mechanisms by which ESG affects asset pricing, provides practical insights for investors in evaluating ESG-related risks and opportunities, and informs regulators to develop more standardized disclosure regulations to increase e market efficiency.

2. Theoretical Background

2.1 Asset Pricing Theory and the Role of Information

Contemporary asset pricing theory dates back to Capital Asset Pricing Model which formalizes the relationship between expected return and systematic risk (Beta). One of the additional assumption is that every publicly available information is fully socialized in the prices, the Efficient Market Hypothesis [12]. Subsequent multi-factor models also add more dimensions of risk but do not modify rational information processing [13]. The asymmetry of information in such a tradition refers to skewed information that is not shared equally among market participants as a primary cause of market friction that may cause prices to be below the intrinsic value.

The emergence of ESG investing introduces a new layer. The ESG data representing such aspects of non-financial performance as carbon emissions, employee welfare, and board independence is a unique category of non-financial performance data [5], which provide an insight not only into the risk exposure of a specific firm but also into its long-term sustainability possibilities.

2.2 Signaling Theory and Trust Theory

With ESG investing, there is a high level of information asymmetry between firms and investors. Companies have comprehensive information about what they are doing, including ESG practices, and investors can hardly observe and verify those. There are two primary explanatory channels in the literature on the topic of ESG information regarding bridging this gap [11].

Signaling theory assumes that high-quality firms have credible and costly signals to make distinction [14]. Sustainability reports, third-party ratings, and certified green bonds are some of the examples of sustainability signals in ESG. These signals reduce investors' information processing costs, enabling more accurate firm valuation.

Trust theory changes to the nternal psychology of the investors. Trust which is a psychological condition depending on a positive anticipation towards the good will and honesty of another person is a complex part of cooperation and expands simplicity [15]. When company values align with investor values, affective trust develops, influencing behavior beyond risk-return calculations [16]. This mechanism is especially crucial where information is ambiguous.

2.3 Theoretical Synthesis

Signaling Theory lays stress on objective, verifiable external mechanisms used to diminish information asymmetry, while Trust Theory highlights subjective, internal psychological mechanisms for building investor relationships. This composite lens frames the further discussion of ESG's pricing effects, how information asymmetry moderates such impact, and rate at which they change in heterogeneous conditions.

Table 1: Signaling Theory vs. Trust Theory: A Comparative Framework

Dimension	Signaling Theory	Trust Theory
Core	The sender's strategy and signal effectiveness	The receiver's psychological perception and value identification
Concepts	Information asymmetry, adverse selection, signal cost, credibility	Psychological contract, perceived responsibility, affective trust, value alignment
Role of ESG	Serves as a differentiating signal to reduce information asymmetry	Serve as a relationship bond that evokes investors' emotions and value resonance
Primary Mechanism	Reduces uncertainty through external validation (e.g., ratings)	Build psychological security through internal identification (e.g., sense of responsibility)

3. Literature Review

3.1 The Asset Pricing Efficacy of ESG Factors

Based on the theoretical backgrounds of signaling theory and trust theory, increasing literature is involved in exploring if and how ESG factors are priced in financial markets. Empirical studies that have been carried out so far provide substantial evidence that ESG factors have a large impact on asset pricing, though the direction and mechanisms of this impact remain under discussion. The fundamental topic of the discussion consists of whether ESG performance is a risk enhancing factor, a quality indicator of firms, or a non-pecuniary investor utility source.

Mainstream research based on the ESG Effective Frontier theoretical framework holds that the capital cost of a company is reducing and results in superior ESG performance in the case where the investor possesses non-pecuniary preferences towards sustainability [5]. This is mainly owed to the fact that ESG helps to alleviate risks which are being the most commonly priced in like regulatory, reputational, and litigation risks. As an example, research on the cost of debt and equity results in a view that companies scoring highly on ESG enjoy low financing cost [8, 17]. Similarly, Shi and Wang [6] provide evidence from the Chinese market that ESG risks are systematically priced, with superior ESG performance associated with reduced cost of capital.

However, the empirical evidences not very conclusive. Conversely, another perspective suggests that ESG factors, particularly controversies, can themselves be a source of systematic risk that demands a risk premium. Crifo et al. [3] the asymmetric effect is uncovered: the effect of the disclosure of irresponsible ESG practices has a stronger negative effect on firm valuation than the effect of responsible practices. This brings out the defensive incentive of making firms consider entering into ESG disclosure in order to shield their valuation. Similarly, Bang et al. [7] construct an ESG controversy risk factor and find that negative ESG events can have asymmetric pricing effects compared to positive ESG performance. This aligns with the risk-based explanation, where poor ESG performance is associated with higher future cash flow volatility and commands higher expected returns. The model proposed by Avramov et al. [18] is a dynamic equilibrium model whereby it is shown that ESG uncertainty has a major impact in the asset prices, and the attribute of impacts differs considerably under varying market condition.

To sum up, despite a trend towards agreeing that ESG factors are relevant to the pricing of assets, there are still considerable controversies about the direction, the strength, and the mechanism of these impacts. Other literature focuses on the risk reduction channel as it states that good ESG performance decreases firm specific risk and consequently lowers required returns. Others mention the channel of investor preference, indicating ESG is getting a special group of investors who are ready to get reduced returns in non-pecuniary gains. Although these two mechanisms are not mutually exclusive but may co-exist, the role of either could depend on a specific firm, industry, and market environment. Conventionally, the literature suggests that the

ESG-pricing relationship is conditional by a few moderating factors such as information asymmetry, rating disagreement, and government structure.

3.2 The Moderating Role of Information Asymmetry

While the preceding section establishes that ESG factors influence asset pricing, the magnitude and direction of this influence are not consistent. Information asymmetry is regarded as a paramount modifying variable in the connection between ESG and asset pricing. In this section, the differing degrees of information asymmetry will be analyzed in terms of exacerbating or mitigating the information effects of ESG factors basing on the two theoretical prisms: the signaling theory and the trust theory.

From signaling theory perspective [14], information asymmetry creates the very condition that makes ESG signals valuable. High-quality ESG disclosure acts as a credible signal to the market. It reduces the information gap between managers and outside investors, leading to more accurate valuation. When investors face high uncertainty about firm quality, credible ESG signals become more diagnostic and exert stronger influence on asset prices. Ruan et al. [10] demonstrate that ESG rating adjustments have greater pricing impact in information-opaque environments, where external validation serves as a crucial substitute for direct observation. This finding aligns with Christensen et al.'s [11] observation that rating divergence is most pronounced when underlying firm information is scarce, suggesting that signals matter most precisely when they are needed most. Conversely, ESG signals will have lower value of marginal value when in an information-rich environment. Avramov et al. [18] indicate that ESG uncertainty carries mutual characteristics with the information transparency, and market and firm pricing effects are concentrated in firms and markets where the alternative sources of information are scarce. It would mean that the ESG factors serve as an alternative information asymmetry mechanism which means the more other information sources are scarce the better is the pricing effectiveness.

Information asymmetry not only amplifies signals but also creates space for trust-based mechanisms to operate. Trust Theory presents a complimentary psychological process. An informal institution such as social trust has the ability to minimize perceived risks and transaction costs. Investors follow affective trust and value alignment to make decisions when the information necessary is not objective. Li et al. [8] discover that CEO power moderates the ESG-firm value relationship, suggesting that leadership credibility becomes more important when information is ambiguous. Subsequently, social trust has the potential to further increase the effect of ESG factors on asset pricing. Fan et al. [16] demonstrate that in regions with higher social trust, corporate ESG performance is significantly better. They argue that social trust fosters an environment where public environmental concern is heightened and corporate compliance is improved, thereby facilitating ESG engagement. The study by Crifo et al. [3] indirectly supports this, as the negative reaction to bad ESG news can be interpreted as a rapid erosion of trust, which is more damaging than the positive build-up from good news.

The combination of these results holds that information asymmetry would not linearly moderate the relationship between ESG-pricing. Rather, it acts through two channels, one which is the signal channel where high asymmetry enhances the diagnostic value of external signals; other is the trust channel where high asymmetry enhances the reliance on emotional trust, and amplifies the susceptibility to trust violation.

3.3 Information Asymmetry under Heterogeneous Boundary Conditions

The moderating effect of information asymmetry on the ESG-asset pricing association shows significant heterogeneity under different boundary conditions. These differences can be categorized into firm-level, market-level, and institutional-level factors.

Firm-level heterogeneity can be found in terms of scale, visibility and asset structure. Given the analyst coverage and media attention, the extent of information asymmetry is reduced in the case of large and visible firms. In the case of these types of firms, ESG indicators might have the role of differentiation other than information substitutes [10]. Small and medium enterprises, in turn, work rather in obscurity; in their case ESG ratings and certifications are the critical visibility-boosting signals that can dramatically alter investor perceptions [24]. Similarly, Fan et al. [16] show that the positive effect of social trust on ESG performance is stronger for firms with low internal control quality, indicating that external institutional pressures (like social trust) can compensate for weak internal governance mechanisms.

Market-level conditions, such as industry competition and market development, also shape the role of information asymmetry. Due to their high impact on the economy, energy, mining, and manufacturing sectors are characterized by inherent information asymmetry. Bang et al. [7] indicate that ESG scandals in such industries cause escalated market responses since investors are not able to observe these scandals directly and have to depend on the external indicators. Lin et al. [19] find that the relationship between state ownership and innovation is moderated by ESG practices and is more pronounced in periods of high economic policy uncertainty. In highly competitive industries, the signaling value of ESG might be heightened as firms strive to differentiate themselves. In low-impact industries, ESG information may be less material, and trust-based mechanisms may predominate. Moreover, the effects of ESG pricing also vary in the developed and emerging markets. Pedersen et al. [5] find that ESG-efficient frontiers are most clearly defined in markets where sustainability data is reliable and comparable.

Institutional-level factors, particularly the interplay between formal and informal institutions, are paramount in shaping the effectiveness of ESG strategies and their acceptance in different markets. The European Union's SFDR represents a fundamental shift, mandating standardized ESG disclosures that directly reduce information asymmetry [1]. The effectiveness of ESG signals and trust mechanisms also depends heavily on the broader institutional environment. Fan et al. [16] discover a complementary relationship between informal institution (social trust) and formal institution (legal environment) in promoting ESG performance. This suggests that a strong legal framework enhances the credibility and enforcement of ESG disclosures, thereby strengthening the signaling effect.

4. Discussion

4.1 The Dual-Channel Framework: Signaling and Trust Mechanisms

Our analysis demonstrates that the optimal ESG strategy for firms is determined by their information sphere. Information asymmetry manages the ESG-pricing relationship via two different and complementary ways. The signaling channel predominates when information asymmetry is high. In these environments, external validation, certifications, and standardized disclosures acts as a crucial alternative to direct observation, enabling investors to distinguish firm quality more precisely. They cut down on investors' information acquisition costs and enable more accurate risk assessment, ultimately enhancing pricing efficiency. Simultaneously, in low-asymmetry contexts, building trust mechanism through affective bonds and value alignment may prove more effective. When objective data is plentiful but its interpretation remains uncertain, investors increasingly rely on subjective assessments. Leadership credibility, demonstrated through consistent value alignment, can shape investor perceptions. High ESG performance fosters effective trust, which reduces perceived risk and transaction costs, while ESG controversies can trigger rapid trust dissolution with disproportionate pricing consequences. Critically, these mechanisms are jointly related. By repeated validation, signals can build trust as time goes on, and trust affects how signals are judged. The interaction of these channels brings into being a dynamic equilibrium. In the early stages of ESG markets or in settings with little information, trust mechanisms may be the main factor as investors lack strong verification signals. As the market ripens and standardized disclosure shows up, signaling mechanisms gain prominence. Still, in information - rich environments, trust remains relevant for sorting out ambiguity in ESG data interpretation, especially when different stakeholders may have different understandings of the same data due to their different priorities or values.

4.2 The Influence of ESG Factors from a Contingency Perspective

From this perspective, the ESG-pricing relationship is best understood as context-dependent, with information asymmetry serving as the master moderator, which itself varies across boundary conditions. The reviewed literature further reveals that the relative effectiveness of information asymmetry depends on boundary conditions at multiple levels.

Firm-level factors such as size, visibility, and governance quality determine the baseline information environment. For large, well-endowed firms with good governance, there might be limited value creation on ESG cues, and trust mechanisms might therefore be more relevant to the differentiation. For small, opaque firms, credible ESG signals provide more benefits by addressing fundamental information gaps. Market-level

conditions including industry characteristics and market development stage create natural variation in information asymmetry. The observation that the ESG controversies elicit exaggerated responses in high-impact sectors is the feature of both an increased signal value as it is important and the heightened sensitivity of trust because of the expectations of stakeholders [10]. The arrangements at the institutional level influence who takes the upper channel. Effective signaling can be promoted by strong legal systems that can guarantee the credibility and advanced social trust systems that can boost the mechanisms of trust [16].

5. Conclusion

This review has conducted a review of literature on the ESG factors and asset pricing efficiency in terms of information asymmetry. It has been shown in the analysis the two different, but complementary, effects of the ESG information on the asset prices; signaling pathway, which is dependent on the credible external validation, and trust pathway, which depends on the affective bonds and value alignment. The comparative effectiveness of these pathways depends on the information environment, where in high-asymmetry environments, signaling prevails and in environments characterized by increased information, trust prevails.

The main contribution of this review lies in advancing a contingency perspective that moves beyond universal claims about ESG's pricing effect. This framework defines the circumstances in which each of the mechanisms works, in the interaction of their mechanisms and the contexts of the subsequent relative contributions of the firms, markets and institutions. This collective knowledge resolves ostensibly conflicting results in the body of literature and gives a consistent base to further research. For practitioners, the framework provides a strategic direction. The companies ought to diagnose their information environment to find the best compromise between the signaling aspects as the third-party certifications and expanded disclosures and trust booster activities as the stakeholder involvement and continued demonstration of value. For policymakers, the key findings are the need to have both formal institutions such as standardized reporting structures to enhance signaling channels. At the same time, the informal institutions, like the trust-building programs and rules of ethics, ought to be elaborated in order to promote the significance of the trust-resources.

While this review synthesizes current evidence, several limitations warrant attention. The literature is dominated by the studies of public equity markets and a weak insight in the ESG pricing mechanisms on the private markets or fixed income. Problems in measuring information asymmetry and separating signaling and trust effects are methodological issues that are still significant. Policy Longitudinal studies of the changing relative significance of these mechanisms with market development, designs that better isolate workings of causation and cross market studies on how institutional structures determine the dynamics of ESG pricing can be undertaken in future research.

In conclusion, information asymmetry operating through dual channels fundamentally shapes the relationship between ESG factors and asset pricing efficiency. Recognizing this complexity moves us toward a more sophisticated understanding that accounts for contextual variation and provides actionable insights for market participants seeking to navigate the evolving ESG landscape.

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