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The ESG Paradox: Why ESG Disagreements Raise the Cost of Equity Without Lowering Carbon Intensity

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ABSTRACT

Environmental, social, and governance (ESG) ratings help investors identify firms that offer both financial returns and social and environmental responsibility. However, the six major ESG rating providers agree on their scores at a correlation of only 0.38 to 0.71, far below the 0.99 correlation achieved by traditional credit rating agencies. This disagreement creates uncertainty for investors and confusion for firm managers. It also undermines the main promise of ESG investing: that markets can consistently reward responsible companies and penalise harmful ones. Using 39 academic and industry sources, this literature review examines how ESG rating disagreement affects two outcomes: the cost of equity, which is the return investors require to hold a firm's shares, and carbon emission intensity, which is the amount of carbon a firm emits per unit of output. There are three main themes for analysis. First, disagreement is structural, coming from differences in how agencies calculate scores, which attributes they include, and how they weigh those attributes. Second, higher disagreement is associated with higher cost of equity. Investors treat the lack of a definite ESG rating as risky and thus demand compensation for taking on that risk. Third, disagreement associated with higher firm carbon intensity because inconsistent ratings reduce firms' incentives to invest in green innovation. This review uncovers an important unanswered question of whether these two effects are actually linked. In theory, they should be: disagreement raises a firm's cost of raising money, which then pressures it to cut emissions. But existing evidence suggests this link may be broken, meaning higher capital costs do not always translate into cleaner behaviour. The review argues that testing whether this chain actually works should be a priority for future research.

I. INTRODUCTION

ESG investing entered mainstream finance through a 2004 United Nations report titled Who Cares Wins and grew quickly after 2020, when large asset managers such as BlackRock began incorporating ESG criteria into their investment decisions (Cho & Moon, 2023). By 2023, approximately $35 trillion in assets under management carried some form of sustainability criteria (Trahan & Jantz, 2023). However, this growth has diminished. Investors' extra preference for ESG-branded funds peaked in late 2019 and has since faded even though overall demand for these funds has not become negative (Curtis, 2025). The main appeal of ESG investing is that it helps investors identify companies that deliver both financial returns and positive social or environmental outcomes, and ESG ratings are the primary tool designed to

help them do so (Knoll, 2002). In theory, when investors can reliably distinguish between sustainable and unsustainable firms, they can direct their capital toward responsible companies and away from harmful ones. This rewards good behaviour without sacrificing investors' financial performance. High ESG-rated firms may also adapt better to unpredictable market changes, such as new regulations. As a result, they have less exposure to risk and to losses in valuation (Giese et al., 2021).

However, this theory depends on the assumption that ESG ratings can accurately and consistently identify firms that are sustainable. The evidence suggests they do not. Berg, Kölbel, and Rigobon show that ESG scores from the six major rating providers correlate with one another at only 0.38 to 0.71 (Berg et al., 2022). For comparison, traditional credit ratings, which assess a company's ability to repay debt, correlate at 0.99 across agencies (Berg et al., 2022). This means that two rating agencies looking at the same company can reach very different conclusions about its sustainability. The comparison is not perfect because credit ratings measure a single contractually defined threshold while ESG ratings summarise a broad and multidimensional concept. Nevertheless, the level of disagreement is large enough to raise the question: if investors cannot agree on which firms are sustainable, can markets still use ESG ratings to reward responsible behaviour and penalise harmful behaviour?

This question matters because the cost of equity, the return that investors require to hold a firm's shares, is the main mechanism through which financial markets both reward and penalise corporate behaviour. To understand why, one must consider what happens when a company wants to raise money by issuing shares. Investors will only buy those shares if they expect a return that compensates them for the risk involved. If investors view a company as risky, they will demand a higher return, which means the company must offer its shares at a lower price. Investors demand this risk premium due to the risk-return tradeoff concept as they practice risk aversion. This happens because investors will only buy the shares at a lower price, or will wait for the price to drop before entering. A higher required return means a higher cost of equity for the firm, because it must issue more shares, giving up more ownership, for the same amount of capital. When investors have reliable information about a company's sustainability, they can price that risk accurately. But when ESG ratings disagree, investors face uncertainty. They may treat that uncertainty as an additional source of risk and demand a higher return to compensate (Avramov et al., 2022). This raises the firm's cost of equity.

This literature review explores how disagreement in ESG ratings affects the financial and environmental performance of a firm, as measured by cost of equity and carbon intensity, respectively. The review argues that ESG rating disagreement raises firms' cost of equity but does not reduce carbon intensity through that channel; instead, it harms environmental outcomes mainly by weakening firms' incentive to pursue green innovation, thus revealing its paradox.

The contribution of this paper is to interpret what these two areas of research show side by side to understand what the combined evidence does and does not establish about the connection between them. After the methodology, the review is written in four parts. First, it defines what ESG ratings are and how they work. Second, it examines why ratings disagree and establishes that the divergence is structural.

Third, it follows two separate consequences of disagreement: one for how much it costs firms to raise money, and one for how much they pollute. Fourth, it evaluates whether these two effects are causally connected or are independent findings. This review finds that ESG rating disagreement has real financial costs: firms with disputed ratings face a higher cost of equity, a prediction supported by both theoretical modelling (Avramov et al., 2022) and empirical evidence from the US market (Gibson et al., 2019). This review also finds that disagreement is associated with worse environmental outcomes, as firms that have mixed ratings tend to have higher carbon intensity (Deng et al., 2025). However, the financial and environmental findings are almost always studied separately, even though in theory they are interconnected: the cost of capital is the mechanism through which markets are supposed to turn investor preferences (e.g., sustainability) into corporate environmental behaviour (Heinkel et al., 2001).

In theory, when enough investors avoid investing in polluting firms, those firms face a higher cost of equity, which should incentivize them to clean up their operations. However, Heinkel, Kraus, and Zechner use a theoretical model to show that at least 20% of investment funds must be controlled by green investors for this mechanism to work effectively, whereas at the time of their study (2001) only about 10% was (Heinkel et al., 2001). This threshold challenge raises the possibility that the chain between investor preferences and changing corporate behaviour is already broken before ESG rating disagreement is even introduced into the analysis.

II. METHODS

A. Research Question

This review addresses one main question: does ESG rating disagreement weaken markets' ability to reduce firms' carbon intensity through a higher cost of equity? It answers this through three sub-parts: splitting the review to why ESG rating agencies disagree, how disagreement affects a firm's cost of equity and carbon intensity, and whether these two effects are connected through the same mechanism.

B. Search Strategy

The author, Deeptayan De, found sources by searching Google Scholar, SSRN, and JSTOR between June and August 2026. Searches included terms including but not limited to "ESG rating disagreement," "ESG rating divergence," "cost of equity," "carbon intensity," and "green innovation." The author also reviewed the reference lists of key papers, such as Berg et al. (2022) and Gibson et al. (2019), to find more relevant studies. All sources were managed by the Zotero citation manager.

C. Source Selection Criteria

Sources were selected based on three criteria: they directly examine ESG rating disagreement or its financial and environmental consequences; they are published in peer-reviewed journals or come from recognised academic working paper series; and together they form a link from rating disagreement to financial outcomes to environmental outcomes. A small number of industry sources (MSCI, KPMG, and the Harvard Law School Forum on Corporate Governance) were also included, but only to provide descriptive statistics on the size and use of the ESG ratings market. In total, the review synthesises 38

sources: 30 peer-reviewed journal articles, 4 academic working papers, 2 books or book chapters, and 3 industry sources.

D. Analysis

The author grouped each source by its main theme: the causes of rating disagreement, its financial effects, its environmental effects, or the link between them. Within each theme, the review compares where studies agree, where they conflict, and where their samples, methods, or markets differ to form a thorough review.

III. BACKGROUND: WHAT ARE ESG RATINGS?

ESG stands for environmental, social, and governance. It is a framework used to assess how well a company manages risks and opportunities related to these three dimensions (Pollman, 2022). The environmental pillar measures a company's impact on Earth, including carbon emissions, energy efficiency, waste management, water use, and pollution. The social pillar measures how a company manages relationships with its employees, suppliers, customers, and communities, including issues like labour standards, health and safety, product safety, and human rights. The governance pillar looks at the quality of corporate oversight, including board composition, executive compensation, accounting quality, anticorruption practices, and shareholder rights (Samans & Nelson, 2022).

To create an ESG rating, rating agencies first identify specific components within each pillar. For example, MSCI, one of the largest rating providers, includes climate change, natural capital, pollution and waste, and environmental opportunities under the environmental pillar. Under the social pillar, it includes human capital, product liability, stakeholder opposition, and social opportunities. Under governance, it includes corporate governance and corporate behaviour (Giese et al., 2021). Different providers use different numbers of indicators: FTSE Russell uses approximately 300 indicators, Refinitiv uses 630 metrics, and S&P Global uses over 1,000 data points (Tayan et al., 2022). After collecting data from company filings, sustainability reports, media coverage, government datasets, and company questionnaires, agencies make four decisions: which indicators are financially relevant or significant enough to influence a company’s risk, how to handle missing data, how to standardise across companies, and how to weight each indicator. The final result is a score or letter rating: MSCI, for example, rates companies from AAA (best) to CCC (worst) (Ademi & Klungseth, 2022).

ESG ratings are now widespread. MSCI alone covers more than 17,000 distinct entities and nearly one million securities worldwide (MSCI, n.d.). A survey of 130 fund management professionals found that 88% of investment professionals use third-party ESG ratings as part of their investment process, and 92% expect to do so in the future (Tayan et al., 2022). KPMG's 2024 Survey of Sustainability Reporting found that 96% of the world's 250 largest companies report on sustainability, and 79% of 5,800 companies surveyed across 58 countries do so (KPMG, 2024).

Investors use ESG ratings in two main ways. Some use them to screen investments by excluding companies with poor ESG performance from their portfolios. Others use ESG as a risk management tool. They assert that strong ESG practices improve management effectiveness, reduce a company's exposure to regulatory changes, lower reputational risk, and consolidate stakeholder relationships (Pollman, 2022). A review by Kräussl, Oladiran, and Stefanova synthesises the literature on investor expectations and beliefs. It finds strong evidence that investors prefer sustainable investments and are willing to accept lower returns to hold them. However as investors face inconsistent ESG ratings, a lack of standardised disclosures, and greenwashing (making misleading or unsupported claims about environmental performance) they experience major uncertainty in distinguishing genuinely sustainable investments and are left vulnerable to misleading ESG labels (Kräussl et al., 2024).

Firms use ESG ratings differently. Some companies want high scores in order to attract investors and demonstrate their sustainability leadership, while others use ratings as feedback to identify areas for improvement in their operations and to benchmark their performance against competitors (Clementino & Perkins, 2021). The meta-analysis by Friede, Busch, and Bassen, which reviewed over 2,200 empirical studies, found that approximately 90% of studies show a positive or neutral relationship between ESG and financial performance (Friede et al., 2015). This finding, which is consistent across time, regions, and asset classes, supports the argument that firms can improve their sustainability practices without sacrificing financial returns. A different meta-analysis by Atz, Van Holt, Liu, and Bruno, which reviewed more than 1,100 primary peer-reviewed papers and 27 meta-analyses published between 2015 and 2020, concluded that the financial performance of ESG investing was on average indistinguishable from conventional investing. This suggests that while ESG does not harm financial performance, it cannot consistently improve it either (Atz et al., 2023).

To illustrate how an ESG rating is formulated, one can consider a large technology company. Under the environmental pillar, a rater like MSCI might assess its carbon footprint, energy efficiency of data centres, use of renewable energy, and electronic waste management. Under the social pillar, it might evaluate employee diversity, labour practices in its supply chain, data privacy and security, and community engagement. Under governance, it might examine board independence, executive compensation structure, and political spending transparency. Each attribute is given a score, with more important ones for the company's industry receiving greater weight. These scores are combined to produce one overall rating from AAA to CCC. However, as Berg, Fabisik, and Sautner note, a company's ESG rating can change not because the company changed its behaviour, but because the rating agency changed its methodology (Berg et al., 2020). This review explores this kind of instability of what ESG ratings measure and how they are calculated, leading to rating disagreement.

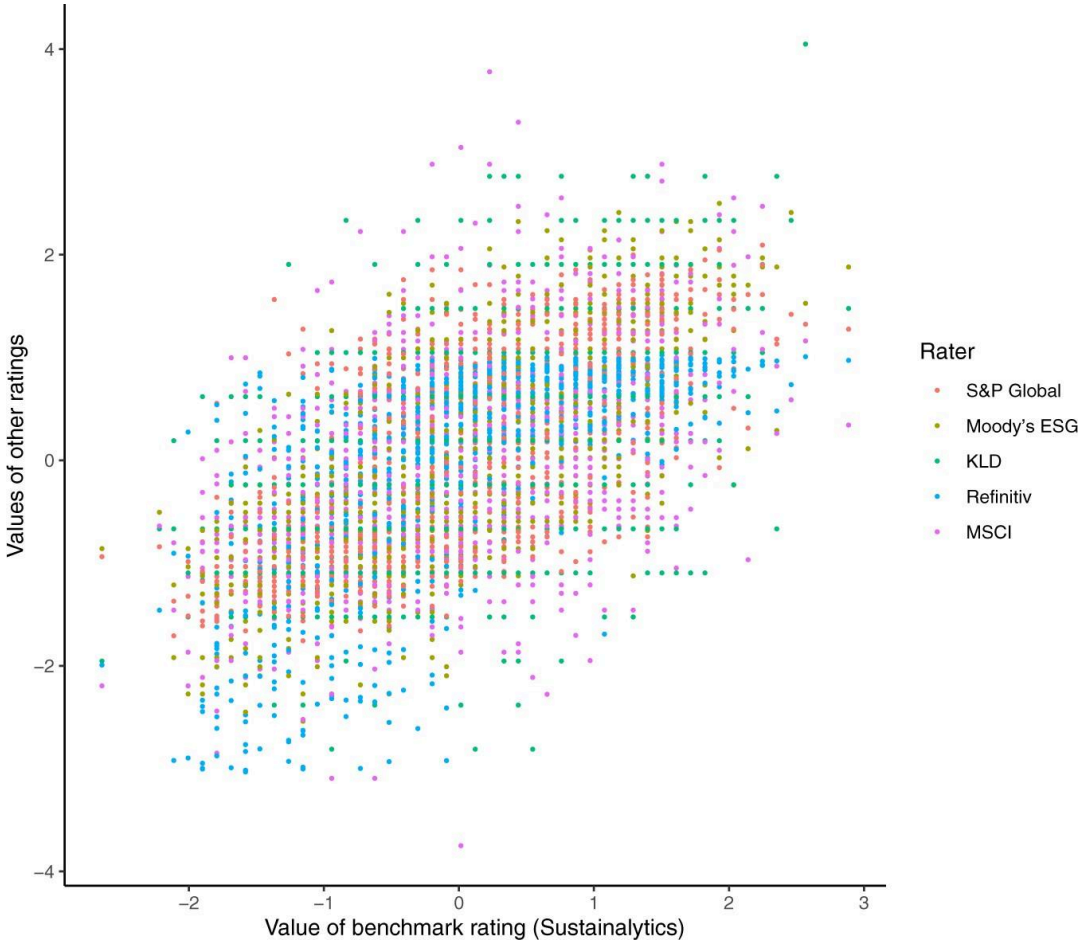
IV. WHY ESG RATINGS DISAGREE

Before examining what rating disagreement does, this review will establish what disagreement is and why it happens. This section asserts that divergence between ESG rating agencies is structural rather than accidental. In other words, it is a product of how ESG is defined and measured, not of simple error.

A. Three Sources of Divergence

Berg, Kölbel, and Rigobon break down this divergence between six major rating providers into three sources. The first is what they call measurement divergence, which accounts for 56% of the total disagreement. In simpler terms, measurement divergence occurs when rating agencies use different methods to calculate the same attribute. For example, if two agencies are both looking at a firm's carbon emissions, one might use self-reported data from the company's sustainability report, while the other might use satellite data or government records. This leads to agencies getting different values for the same indicator they measure. The second source is scope divergence, contributing 38%. This means that agencies include different attributes in their ratings in the first place. One agency might consider a company's supply chain labour practices, while another might not, meaning they are evaluating different aspects of the firm's performance. The third source is weight divergence, accounting for 6% of the divergence. Weight divergence occurs when agencies include the same attribute and assign it the same value but give it different levels of importance in their final calculation. For example, one agency might weight carbon emissions as 30% of the environmental score, while another weights it at 20% (Berg et al., 2022).

Figure 1. ESG Rating Disagreement Across Six Major Rating Agencies (Berg et al., 2022)



As Figure 1 shows, the same firms are receiving varying scores from different agencies. Accordingly, Berg et al.'s decomposition matters because it reveals that standardising the providers' rating methods would not be straightforward. If disagreement were mainly driven by weighting, regulators could solve the problem by mandating common weighting rules. However, because disagreement is driven primarily by measurement and scope, agencies are not simply weighting the same attributes differently. They are using different data to assess different attributes of the same firm, making harmonisation far more complex.

B. Supporting Evidence

Chatterji, Durand, Levine, and Touboul reached a similar conclusion in an earlier study. They documented an average correlation of only 0.30 between six major ESG raters, even after accounting for the differences the agencies claim to have (Chatterji et al., 2016). They argued that this low correlation means ESG ratings have low validity as a measure of a company's actual corporate social responsibility. Disagreement exists not only because agencies use different definitions of ESG, but also because they measure the same ESG attributes using different methods, creating measurement errors that differ from one rater to another.

Several other studies reinforce this finding. Shi and Yao note that ESG rating divergences can also be explained by the fact that ESG is a qualitative indicator. This means subjective judgements by raters have a large influence too, in addition to data collection methods that differ across agencies (Shi & Yao, 2025). Drempetic, Klein, and Zwergel found that ESG scores are influenced not only by a firm's actual sustainability performance but also by firm characteristics such as size, resources, and disclosure capacity (Drempetic et al., 2020). Larger firms with greater resources and better ESG reporting receive considerably better ratings, implying that ratings can sometimes reflect a firm's ability to produce disclosures rather than its actual sustainability performance. Billio, Costola, Hristova, Latino, and Pelizzon found that rating agencies do not share a common definition of, or criteria for, ESG. The subsequent disagreement spreads ESG investors' capital across many firms instead of concentrating it in genuinely green ones. Furthermore, even a portfolio made up only of companies on which multiple ESG indexes agree shows no significant improvement in financial performance compared to non-ESG portfolios. This suggests that consensus among rating providers does not translate into stronger financial returns (Billio et al., 2021).

C. Ratings That Change Over Time

An extra complication is that ESG ratings are not fixed over time either. Berg, Fabisik, and Sautner found that Refinitiv, a major rating provider, largely rewrote its historical ESG ratings after changing its methodology in 2020. More than 60% of firms changed ESG rankings, with their environmental scores swinging by as much as 44% (Berg et al., 2020). Firms with stronger past stock performance often received upgrades in their environmental and social scores after the methodology change. As a result, the relationship between ESG ratings and stock returns appeared much stronger when using the new data than when using the ratings that were actually available to investors at the time. This means that even researchers using historical ESG data may be working with ratings that have been altered after the fact.

The root cause of all these problems is that ESG has never had a single, agreed-upon definition. As Pollman argues, ESG is used to refer to different things depending on context: criteria for investment decisions, risk management, a synonym for corporate social responsibility, or even an ideological or political stance (Pollman, 2022). The rating providers are therefore producing estimates of several different components of what qualifies as ESG, and those components do not always correlate.

V. DISAGREEMENT AND THE COST OF EQUITY

A. Evidence That ESG Is Priced

Before examining how disagreement can distort how markets incorporate ESG performance into stock prices, bond prices, and borrowing costs, it is important to establish that ESG does get priced into the cost of capital at all. As noted in Section III, most of the 2,200 studies reviewed by Friede et al. (2015) find a positive or neutral link between ESG and financial performance. Gupta (2018) provided more specific evidence. This study used 23,301 firm-year observations (one firm-year observation is data from one specific company for one specific calendar year) across 43 countries to show that better environmental

performance is associated with a significantly lower cost of equity (Gupta, 2018). Simply put, firms with better environmental practices pay less to raise capital, because investors view them as less risky. This effect is stronger in countries with weaker governance, where environmental performance is a more valuable signal of quality. These studies establish that ESG does get priced into the cost of capital, which lays the groundwork to examine how disagreement distorts that pricing.

B. The Theoretical Mechanism

The theoretical mechanism that connects rater disagreement to the cost of equity was formalised by Avramov, Cheng, Lioui, and Tarelli in 2022. Their equilibrium model explains how ESG preferences and uncertainty about ESG ratings affect investor demand, stock prices, and the return companies must offer to attract investors (the cost of equity). Instead of assuming investors know a company's true ESG performance, the authors assume they only see a range of possible ESG scores. They measure this uncertainty using the standard deviation of ratings from six major ESG providers (Asset4, MSCI KLD, MSCI IVA, Bloomberg, Sustainalytics, and RobecoSAM). Investors who care about sustainability receive not only financial returns but also personal satisfaction (which the authors call nonpecuniary benefits) from owning highly rated ESG companies. However, when ESG ratings disagree, investors become less certain about whether a company is truly sustainable. This extra uncertainty makes the stock appear riskier than its financial returns alone would suggest, because investors now face both financial risk and ESG-rating risk.

Their model predicts two main effects. First, ESG-focused investors become less willing to buy these stocks. The authors confirm this using real-world data, finding that norm-constrained institutions (e.g., pension funds, endowments, and insurers) hold about 21% less of high-ESG companies when those companies also have high ESG rating disagreement. Second, because demand falls, companies must offer investors a higher expected return to attract capital, increasing their cost of equity. This higher required return appears in two ways: both the firm's CAPM alpha (returns beyond what market risk alone predicts) and its effective beta (a measure of market risk that also includes ESG uncertainty) increase as ESG rating uncertainty rises.

The paper's most important finding is that ESG rating uncertainty determines whether the usual ESG advantage exists at all. Brown stocks, companies with poor ESG performance, outperform green stocks by about 0.40% per month (after adjusting for market risk) only when ESG ratings are consistent across providers. When rating disagreement is high, this performance difference disappears. In other words, companies only benefit from a lower cost of equity for having strong ESG performance if investors can confidently verify that performance, and this only happens when ESG rating providers all agree on the firm’s rating. When ESG ratings disagree, that advantage largely disappears (Avramov et al., 2022).

C. Empirical Evidence

Empirical evidence confirms this theoretical model too. Gibson, Krueger, and Schmidt examined ESG ratings from seven major providers for S&P 500 firms between 2010 and 2017. They found that firms with more ESG rating disagreement face higher stock returns and a higher cost of equity. Specifically,

higher disagreement increased a company's annual cost of equity by approximately 0.92 percentage points. When they examined which pillar drove this effect, they found that environmental rating disagreement had the strongest impact: it raised the cost of equity by about 1.32 percentage points on its own (Gibson et al., 2019). This means that investors are particularly sensitive to uncertainty about a firm's environmental performance. Unlike studies that suggest disagreement improves governance by incentivising better disclosure, Gibson et al. (2019) argue that disagreement mainly creates uncertainty, which makes it more expensive for firms to raise capital.

Table 1: Summary of Key Studies on ESG Rating Disagreement (Crafted by Author)

Study	Sample and Method	Key Finding
Berg et al. (2022)	Six ESG rating agencies, 924 firms in 2014; decomposes the divergence	Ratings correlate at only 0.38–0.71; 56% of divergence from measurement, 38% from scope, 6% from weight
Avramov et al. (2022)	U.S. common stocks, 2002–2019 using equilibrium model with six ESG agencies	Disagreement lowers ESG investor demand and raises required returns
Gibson et al. (2019)	S&P 500 firms monthly stock returns, 2010–2017 with seven ESG agencies	Disagreement raises the annual cost of equity by about 0.92 pp (1.32 pp for the environmental pillar alone)
Zhu et al. (2025)	Chinese A-share listed firms; ESG ratings from CNRDS and Sino-Securities Index	Disagreement reduces green innovation
Deng et al. (2025)	Chinese manufacturing firms, 2011-2022 using six ESG agencies	Rating divergence is associated with higher carbon intensity
Delmas et al. (2013)	475 large U.S. firms, 2004–2007; using KLD, Trucost, and SAM environmental measures	Tobin's Q is linked to process-based ratings, not environmental outcomes

D. Interpreting the Conflicting Models

There is, however, a contradiction when these findings are compared with the equilibrium model of Pástor, Stambaugh, and Taylor (2021). This model predicts that green firms should have lower expected returns in ceteris paribus given many investors are willing to accept lower returns to hold sustainable companies due to their personal investing criteria. Accordingly, if green firms have lower expected returns, they also have a lower cost of equity. This seems to conflict with Avramov et al.'s paper, as they show that uncertainty can raise returns. However, the two findings are not completely contradictory.

Pástor et al. describe what happens when investors have reliable ESG information: green firms receive a lower cost of equity because investors willingly accept lower returns (Pástor et al., 2021). Avramov et al. describe what happens when that information is unreliable: the uncertainty risk overwhelms the green discount investors give, and the cost of equity rises instead. Thus, when ratings agree, green firms enjoy a lower cost of equity and when ratings disagree, that benefit is undone.

E. The Roles of Disclosure and Investor Types

Another part of the link between disagreement and cost of equity is the role of corporate disclosure. One might expect that requiring companies to disclose more ESG information would reduce rating disagreement because agencies would get access to the same data. However, Christensen, Hail, and Leuz reviewed the literature on mandatory CSR and sustainability reporting and found that greater disclosure can actually increase disagreement (Christensen et al., 2021). Their explanation is that ESG information is inherently subjective. When more information is disclosed, rating agencies have more material to interpret, and since they use different frameworks and methodologies, their interpretations diverge even further. This finding is counterintuitive but important because it shows that transparency by itself does not solve the disagreement problem and may even worsen it.

Pedersen, Fitzgibbons, and Pomorski add nuance by showing that a stock's ESG rating affects its price in two ways: first it gives information on a firm's future earnings and risks, and second it appeals to investors who care about doing good. Whether high ESG scores actually help or hurt a stock's returns depends entirely on who is buying it. If most buyers ignore ESG entirely to focus on financial returns, high-ESG companies end up undervalued, meaning buyers can buy them cheaply and make higher returns. If most buyers are purely practical, using ESG data just to spot good deals, they bid prices to where they should be, making returns completely normal. But if most buyers are all ethical investors, their high demand for green firms creates a bidding war that drives up stock prices today. However, a higher stock price does not automatically increase the company's underlying earnings or cash flow. Since return is calculated as the company's actual profits divided by the price paid for the stock, paying this inflated price for the exact same amount of company earnings reduces the percentage yield on that investment. In essence, ethical investors overpay for high-ESG stocks due to their moral preferences, sacrificing a portion of their future financial returns in exchange for supporting responsible companies (Pedersen et al., 2021). This can also help explain why different studies reach different conclusions about the ESG and returns relationship. Gillan, Koch, and Starks confirm that research on ESG and CSR often yield conflicting hypotheses and empirical results on firms' risk, performance, and value. While a firm's ESG profile is strongly associated with its market, leadership, and ownership characteristics, a central unresolved question in corporate finance is whether ESG activities directly benefit shareholders or are instead an outcome of agency problems —namely, situations in which senior managers prioritize personal goals over the objective return of investors and poor internal governance (Gillan et al., 2021).

Taken together, the evidence establishes that disagreement directly affects stock prices and financial returns. Firms with disputed ratings face a higher cost of equity, with the environmental pillar carrying the largest share of that effect. The question that follows is whether this financial pressure is actually translating into changes in corporate environmental behaviour.

VI. DISAGREEMENT AND CARBON INTENSITY

A. Markets Pricing Carbon Signals

To understand whether disagreement affects environmental outcomes, this review will first establish that markets do price carbon risk, but only when they can read it clearly. Using a global sample of firms, Bolton and Kacperczyk found that investors demand a carbon premium (higher expected returns) for holding firms with high direct emissions (Bolton & Kacperczyk, 2021). In other words, investors treat high emissions as a risk factor and require compensation for bearing it, similar to how risk of ESG disagreement causes higher costs of equity. This effect holds worldwide, though it varies by country and policy rules. These findings establish that when environmental signals are clear, markets do communicate them to firms (e.g., polluting firms face higher financing costs, which should create an incentive to reduce emissions).

B. Disagreement and Green Innovation

Zhu, Xiong, Lu, and Yao investigate how disagreement between ESG rating agencies affects firms' willingness to invest in green innovation, defined as the research and development of new technologies, products, or production methods that reduce environmental harm. Using a sample of Chinese listed firms, they find that greater ESG rating disagreement significantly reduces green innovation. The authors argue that this occurs because inconsistent ESG ratings weaken a firm's sustainability signal. The information that investors, customers, lenders, and other stakeholders use to judge a firm's environmental performance becomes unreliable. When different rating agencies give the same firm conflicting ESG scores, stakeholders receive mixed signals about how sustainable the firm really is. As a result, firms become less confident that investing in costly environmental improvements will be recognised and rewarded, which reduces their incentive to pursue green innovation. The negative effect is strongest when firms disclose little information, face greater information asymmetry (where managers know more about the firm's true performance than investors), or face greater information uncertainty (where available information is incomplete or inconsistent) (Zhu et al., 2025). These are the conditions where stakeholders have the most difficult time judging a firm's environmental performance independently, so ESG ratings become a more useful source of information. In summary, the link works as follows: ESG divergence reduces green innovation, and reduced green innovation leads to higher carbon emission intensity.

C. ESG Funds and Misdirected Capital

Raghunandan and Rajgopal examine ESG funds, which are investment funds marketed as sustainable. They find that these funds hold firms with worse records of compliance with labour and environmental laws than non-ESG portfolios. This is because these funds tend to reward firms that disclose more ESG information, rather than firms with better ESG records (Raghunandan & Rajgopal, 2022). This means that

ESG, a tool designed to identify and reward sustainable companies, is channeling capital towards firms with poorer environmental records. If ESG funds cannot reliably identify green firms, this suggests that the price signal reaching those firms is compromised. Companies do not face a clear financial incentive to improve their environmental performance because the market itself cannot accurately distinguish between green and polluting firms. This finding is particularly revealing, as it suggests that the failure lies in the ESG ratings and the core of the ESG investing model.

D. Where Disagreement Is Concentrated

The severity of this problem is amplified by where disagreement is most concentrated. Gibson et al. show that ESG rating disagreement is highest in carbon-heavy sectors, including energy and utilities (Gibson et al., 2019). This is the worst-case scenario for climate outcomes: the firms where accurate pricing matters most for environmental behaviour are exactly the firms where ratings agree least. If disagreement raises the cost of equity without giving a clear signal about which environmental improvements are being valued, then firms in these sectors face higher capital costs without getting guidance on how to reduce them. The result is a paradox: the firms most in need of clear ESG signals are the ones receiving the most confused signals.

Sections V and VI have now explored both effects. Disagreement raises the cost of equity and is also associated with higher carbon intensity. But are these two effects connected, or are they independent findings that happen to involve the same variable?

VII. THE LINK BETWEEN FINANCIAL AND ENVIRONMENTAL EFFECTS

The previous two sections established that disagreement raises the cost of equity and that disagreement is associated with higher carbon intensity. The question now is whether these two effects are two ends of a single interlinked chain where higher disagreement raises the cost of capital and weakens the market's ability to incentivise emissions reductions, or whether they are independent findings that just so happen to be linked by ESG disagreement.

A. The Theoretical Chain

This chain was first described by Heinkel, Kraus, and Zechner, whose model maps out a three-step process. First, investors who care about sustainability will refuse to hold shares in polluting firms, either by not including them in their portfolios or by demanding higher returns to compensate for perceived risk. Second, this reduces the pool of capital available to polluting firms, forcing them to offer higher expected returns to attract the remaining investors, which raises their cost of equity. Third, a higher cost of capital makes new investment more expensive, incentivising firms to clean up their operations to become more attractive to investors (Heinkel et al., 2001). However, as mentioned in the Introduction, this chain only functions if green investors control at least 20% of investment funds.

B. Evidence That the Chain Is Broken

The most direct evidence that the interlinked chain is broken comes from Delmas, Etzion, and Nairn-Birch. They combined ratings from three providers (KLD, Trucost, and SAM) and found that environmental ratings split into two separate dimensions: environmental processes, such as management systems, reporting, and sustainability practices, and environmental outcomes, such as actual pollution and environmental damage. Crucially, they found that financial performance, measured by Tobin's Q (a ratio that compares a firm's market value to the replacement cost of its assets to show whether it is undervalued) was positively associated with process-based ratings but not with actual environmental outcomes (Delmas et al., 2013). That is to say, the market rewards firms for looking like they are "green" via disclosures and management systems, rather than for actually being "green", via reducing pollution. This implies that the chain between cost of equity and emissions is broken, and was broken even before ESG rating disagreement was introduced into the question.

Disagreement simply makes the problem worse. With disagreement, even the process-based signal becomes noisy. The firm cannot tell which type of disclosure will be rewarded because rating agencies are interpreting its disclosures differently, as Christensen et al. (2021) demonstrate. Meanwhile the outcome signal, actual emissions, was already not being priced, as Delmas et al. (2013) show. So disagreement corrupts the one channel that was working, the process and appearance channel, while the outcome channel was already broken. The final result is that firms face higher costs of capital without receiving any clear signal about what they should do to reduce them.

C. Divestment Versus Engagement

Divestment, the strategy of selling shares in polluting firms, does not solve this problem. Berk and van Binsbergen find that ESG divestment has little effect on corporate behaviour because it does not meaningfully increase a firm's cost of capital (Berk & van Binsbergen, 2025). Their theoretical and empirical analyses show that the amount of divestment required to influence real investment decisions is unrealistically large. This is because when responsible investors sell their shares, other investors simply buy them, so the firm faces little pressure to change. Broccardo, Hart, and Zingales reached a similar conclusion. They found that voice, meaning engaging with and voting in companies, is usually more effective than exit, meaning selling shares or boycotting. This is because exit allows other investors to step in, while voice exercises direct control over corporate policy (Broccardo et al., 2022).

What does work, according to some evidence, is engagement. Dimson, Karakaş, and Li study corporate ESG engagements. These are instances where socially conscious institutional investors actively work with companies to address specific environmental, social, or governance concerns like environmental practices, labour issues, or corporate governance reforms. By examining U.S. public companies from 1999 to 2009, they found that successful ESG engagements led to positive abnormal stock returns, while unsuccessful engagements had no effect on price at all. Successful engagements on environmental and social issues also improved accounting performance, corporate governance, and institutional ownership (Dimson et al., 2015). Kölbel, Heeb, Paetzold, and Busch reviewed the mechanisms of investor impact and found that shareholder engagement had the strongest empirical evidence for improving corporate

ESG practices, while capital allocation, meaning buying or avoiding ESG stocks, has much weaker evidence (Kölbel et al., 2019). These findings align with those of Dimson et al. (2015) and suggest that when ESG actions lead to real changes rather than just higher ESG ratings, financial and ethical goals can be aligned.

D. A Different Viewpoint

An alternative perspective is offered by Liu, Wu, and Lin, who assert that greater disagreement between ESG rating agencies can act as a governance mechanism by making it harder for firms to manipulate ESG performance to satisfy all rating agencies simultaneously. In their view, disagreement uncovers the times when managers are using ESG mostly to improve their ratings rather than to genuinely improve environmental or social outcomes (Liu et al., 2025). However, even if disagreement makes "gaming" ESG scores harder, it also makes the price signal unusable, presenting a trade-off. A firm that cannot tell which improvements will be rewarded has less incentive to make any improvements at all, regardless of whether it was planning to game the system.

This review argues that the financial and environmental effects of ESG rating disagreement are, at best, only weakly connected. The disagreement raises the cost of equity and is associated with less green innovation and higher carbon intensity. However, the chain that should join these two effects is weak for two reasons. Higher capital costs from divestment are too small to change real investment (Berk & van Binsbergen, 2025), and markets reward environmental processes rather than environmental outcomes (Delmas et al., 2013). The disagreement therefore seems to harm the environment more indirectly by weakening firms' incentive to innovate, rather than through the cost of capital. This also explains why engagement, which changes corporate policy directly, has stronger evidence than capital allocation (buying or avoiding a firm's shares).

VIII. DISCUSSION

This section answers the review's three research questions explicitly and considers what they mean for investors, firms, and regulators.

The first question asked why ESG rating agencies disagree. The review's evidence shows that disagreement is structural. Measurement and scope together explain 94% of it and the lack of a shared definition of ESG could be the reason why. This matters for regulators because a mandate that forces agencies to use common weightings would address only 6% of the problem. Standardizing ratings would require agencies to agree on which attributes to measure and which data to use, which is a much more tedious task.

The second question asked how disagreement affects the cost of equity and carbon intensity. On the financial side, the evidence points towards one direction: rating disagreement raises the cost of equity, namely the environmental attribute of it. Rating agreement helps green firms achieve a lower cost of equity. This means that actual ESG investment made by firms may not be rewarded if rating agencies

disagree. Environmentally, disagreement is associated with less green innovation and higher carbon emissions, especially in carbon-heavy industries, where disagreement happens to be the highest.

The third question asked whether these two effects are connected. After considering a wide variety of research, the review's evidence indicates that the two are more likely to be parallel effects than one interlinked chain. A political implication would be making ESG ratings more consistent in order to revitalize the reward for firms being genuinely green. However, fixing that is probably not sufficient on its own to reduce emissions. Investors who want to make real change may achieve more through engagement than through buying or selling shares as seen in the review.

This problem is likely to worsen as ESG demand weakens. Since green investors must control at least 20% of capital for the cost-of-equity mechanism to work, the declining investor preference for ESG funds moves markets further from that threshold, making it even less likely that higher capital costs will push firms to cut emissions.

These findings have three implications. For regulators, a solution to ESG disagreement must target common data sources and attribute scope, not just weightings. For investors, engagement with the firm's corporate board is a more reliable route to cutting emissions than through buying and selling shares. For firms in carbon-heavy sectors, where disagreement is highest, improving a single rating will not reliably lower capital costs, so accomplishing measurable reductions in carbon emissions would offer a clearer path than having better disclosure alone.

The review's contribution is not new empirical work. Instead, it connects three previously separate research areas (ESG rating divergence, the financial performance effects of ESG, and the environmental performance effects of ESG) into a single coherent story. The review has shown that disagreement is structural, financially costly to firms and investors alike, and environmentally consequential, and that the connection between the financial and environmental effects, while theoretically compelling, has not been directly tested.

IX. CONCLUSION

A. Summary of Findings

This literature review has synthesised 38 academic sources and industry data to examine how ESG rating disagreement affects the cost of equity and carbon emission intensity of firms. The review substantiated three claims. First, disagreement is structural, it originates from differences in how agencies calculate scores, which attributes they include, and how they weigh those attributes, not from random error. Second, disagreement carries a financial cost: firms with disputed ratings face a measurably higher cost of equity, with the environmental pillar having the largest effect. Third, disagreement is associated with worse environmental outcomes as firms receiving mixed ratings tend to have higher carbon emission intensity because inconsistent ratings reduce their incentives for green innovation. In answer to the

review's main research question, disagreement does weaken the market's ability to reduce carbon intensity, but mainly by reducing green innovation rather than through the cost of equity. However, these two effects have never been directly tested together.

B. Limitations

This review has three main limitations. First, comparability across studies is an issue. The studies reviewed use different sets of rating agencies: Berg et al. (2022) analyse six providers, Gibson et al. (2019) use seven, and Deng et al. (2025) use six, only two of which are international while four are Chinese. They also use different measures of disagreement, including the standard deviation of ratings, pairwise correlation (correlation between two agencies' ratings at a time), and rank divergence (how differently agencies rank the same firm relative to other firms). They also measure the cost of equity differently, using either implied cost of equity models or realised stock returns.

Second, the geographic variety of the evidence limits the extent to which findings can be generalised. Most of the cost of equity evidence comes from the United States and Europe and most of the carbon-intensity evidence comes from China. China's capital markets are less mature, state-owned enterprises play a larger role, and regulatory enforcement varies significantly across regions which could affect the applicability of their data. Even Bolton and Kacperczyk's (2021) global evidence shows that the carbon premium varies by country and policy regime. The connection between the financial and environmental effects is therefore harder to prove when the evidence comes from different contexts.

Third, most studies only show that the variables are related, not that one causes the other. Very few studies use unexpected real-world events to prove a verifiable cause-and-effect relationship. It is possible, for example, that firms with higher carbon intensity also happen to have more rating disagreement because they are larger and more complex, rather than because disagreement leads to higher emissions.

C. Future Research

Future research should test whether the same firms with greater ESG rating disagreement also face higher financing costs and then also produce more pollution, and whether these outcomes are connected through the same underlying mechanism. Researchers could use sudden rating methodology changes, such as Refinitiv's 2020 rewrite as experiments to test the cause and effect relationship. Future studies should also compare markets by testing whether the carbon-intensity findings from China hold in the United States and Europe, and should also separate process-based ratings from outcome-based ratings when measuring environmental performance to address Delmas et al.'s (2013) posits.

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