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Reframing Capital Allocation, Risk and Accountability in Sustainable Finance

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Abstract
The practice of sustainable finance, which incorporates environmental, social and governance (ESG) factors into financing and investment decisions, has grown from being a small practice into a major issue for regulators, investors and companies. In this theoretical article, recent scholarship is brought together in a three-layered framework: drivers (policy, preferences of investors and climate-related risk); mechanisms (risk pricing, capital allocation and stewardship); and outcomes (cost of capital, impact on real-economy and financial stability). It explores four lenses of theory (risk-based, preference-based, impact-based, and information-based) and demonstrates that they illuminate various aspects of observed behavior in the market. While the volume of labelled products is not the most important factor to convince the market of the credibility of sustainable finance, the quality of measurement is, according to the review. The main weaknesses are divergent ESG ratings, greenwashing risk and uncertain additionality. The article ends with recommendations for future research and implications for investors, corporate management and regulators, also among emerging economies, like India.

Keywords: Sustainable finance, ESG, Green bonds, Climate risk, Greenwashing, Responsible investing

1. Introduction

Finance is at the crossroads of economic growth and environmental boundaries (Wang et al., 2025). It is the same capital markets that provide funding for factories, power stations and houses that determine the pace at which economies transition away from carbon-heavy production. Today it is known as Sustainable finance. It is a very broad definition and it includes all types of financial decisions that incorporate environmental, social and governance (ESG) considerations to foster long-term investor and social returns (Schoenmaker & Schramade, 2019). It encompasses green bonds, ESG integrated funds, sustainability linked loans, transition finance, climate risk management in banks and mandatory sustainability disclosure in practice.

There has been fast growth in this area, and so has the scepticism. Supporters say that climate change and social upheavals are concrete financial threats – and capital needs to be channeled to solutions. The critics note that the ratings are conflicting, that ESG labeled products can be repackages and that the pressure from the investors may not actually lead to the companies changing their behaviors (Berg et al., 2022;

Kölbel et al., 2020). Much work has since been done by academic research, yielding a substantial but disorganized stream of evidence on topics of asset pricing, corporate finance, accounting and management.

This article provides a conceptual synthesis. Questions are raised in three parts: How can finance be used to promote sustainability? From a theoretical perspective, which theory describes each mechanism best? Which of the following are necessary for sustainable finance to be believable? The goal is not to offer a new empirical test, but to give a structured approach through which the literature may be read and propositions for further examination in future studies may be identified.

The article is organized as follows. The next section outlines the field and discusses the relationship between ESG activity and firm performance. The third section introduces the integrated framework. The fourth contrasts four theoretical lenses, the fifth addresses credibility and greenwashing and the situation of emerging economies. The article then presents propositions for research, implications and conclusion. Throughout, it is important to recognise the limitations of the evidence each body of evidence can support and ensure that the statements made regarding sustainable finance do not exceed the evidence supporting them.

2. Conceptual Foundations

2.1. Defining sustainable finance

Sustainable finance differs from traditional finance in three aspects. First, it expands the definition of value from short-term financial return to consideration of long-term risk and broader stakeholders' outcomes. Secondly, it uses non-financial data, for example emissions, labour practice, board structure etc. which is more difficult to measure and verify than accounting data. Third, it introduces an understated or unstated research implication: How capital is priced and allocated impacts actual behaviour. All these features contribute to the richness of the field intellectually, and are also responsible for the contestation of the field, as every one of them has its own measurement and causal challenges.

It is helpful to differentiate between financial materiality and impact materiality. Financial materiality is about the impact of sustainability factors on the value of the company. The question of impact materiality is: How does the firm influence people and the planet? Disclosure regimes vary in the emphasis placed. While the IFRS S1 and S2 standards (IFRS Foundation, 2023) concentrate on information provided to investors on sustainability-related risks and opportunities, the EU's taxonomy (European Parliament & Council of the European Union, 2020) categorises economic activities based on their environmental impact. The two concepts exist in contemporary practice.

2.2. From ESG performance to financial performance

Initial studies have been conducted to determine if there is a return on “ESG activity”. A large and diverse collection of more than 2,000 empirical studies detected a non-negative correlation between ESG and corporate financial performance, with most of them being positive (Friede et al., 2015). Subsequent corporate finance studies further validate ESG's negative relationship with risk, positive relationship with access to finance and governance performance, and highlight the context-specific nature of the relationship

and the lack of causal evidence (Gillan et al., 2021). Thus, the evidence for a positive association is consistent with multiple stories, such as well managed firms simply do more of everything well.

3. A Framework of Drivers, Mechanisms and Outcomes

Figure 1 shows a three-layer structure for organizing the literature. Drivers make space and time. Mechanisms translate that pressure into financial decisions. Outcomes refer to changes that take place in the markets and in the real world. Feedback loop of disclosure, ratings and policy results to drivers.

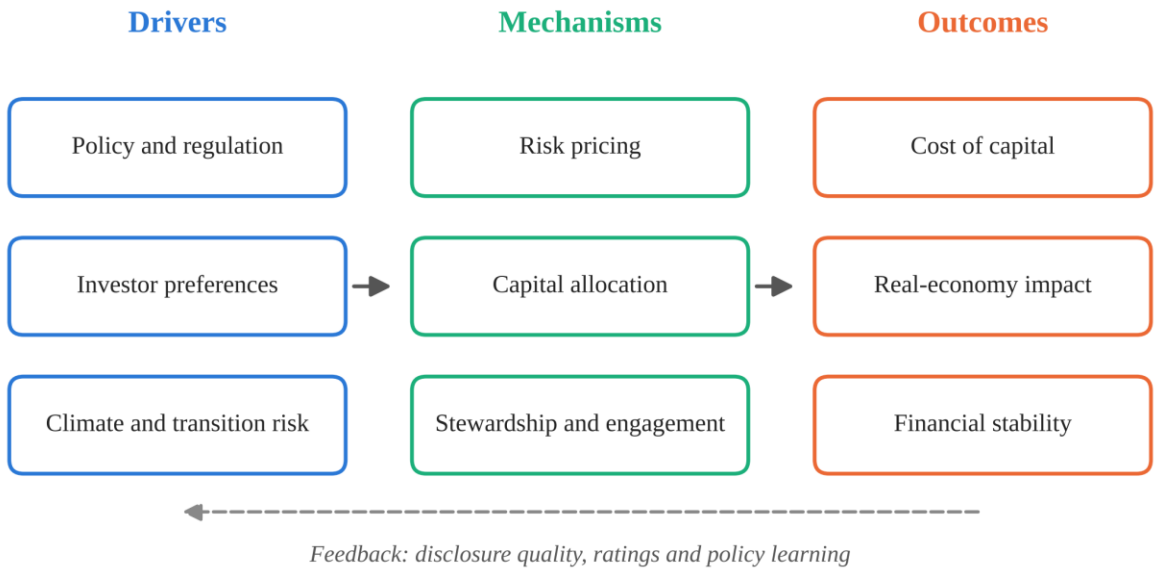


Figure 1. Integrated framework of sustainable finance: drivers, mechanisms, outcomes and feedback (author's synthesis).

3.1. Drivers

There are mainly three drivers dominating. Policy and regulation establish the rules (including carbon pricing, taxonomies and disclosure requirements). The desire of investors drives demand: survey data indicates that institutional investor's view climate risk as having material financial impacts and that they expect the risk will be more relevant, but they also prefer to engage rather than exclude (Krueger et al., 2020). Economic exposure is the actual risk to economic assets from climate and transition risks. Physical hazards negatively affect assets, and a swift policy change can leave behind carbon-intensive assets. A financial system climate stress-test identified significant losses for investors from their investments in fossil fuel and utility stocks and bonds (Battiston et al., 2017).

Policy is an area of special focus as it influences all other drivers. The information landscape is changing with disclosure; there are taxonomies to determine what is sustainable; and prudential rules to govern the way banks and insurers factor in climate risks. These instruments differ in their operation: disclosure rules are designed to enhance pricing, taxonomies are designed to guide allocation and supervisory expectation is designed to safeguard stability. Convergence on minimum standards is generally seen as desirable,

because of the significantly higher costs of compliance with fragmented rules across jurisdictions, and the possibility for regulatory arbitrage.

3.2. Mechanisms

The first mechanism is called risk pricing. Investors should expect higher returns from carbon-intensive companies if they believe they'll become more vulnerable to the transition. Bolton and Kacperczyk (2023) report a carbon premium on a global sample of firms, with firms with higher carbon emissions reporting a higher premium, similar to compensation for transition risk. Capital allocation is the second mechanism. In this case, the instruments are referred to as products. Rather, there seems to be a genuine signal, as Flammer (2021) demonstrates that the announcement of a corporate green bond generates a stock price increase, which leads to better environmental performance in the future and to a higher attraction of long-term investors and green investors. Evidence on pricing is less extensive: green bonds seem to be traded at small premiums over their conventional counterparts in terms of yield (Liu & Hu, 2025). Stewardship is the third mechanism. Voting and dialogue with management can be a way for investors to exert influence, and the literature on investor impact suggests that engaging with management is more likely to be a successful way of exerting influence than buying or selling shares (Kölbel et al., 2020).

3.3. Outcomes

There are 3 variables on the outcome layer. Firms that are seen as sustainable have lower costs of capital while firms that are seen as exposed may have higher costs of capital. Real economy impact is defined as changes in emissions, innovation, and labour/community outcomes. Central banks and supervisors (Giglio et al., 2021) will be concerned with the ability of financial stability to withstand climate risks becoming real before they materialise; this requires recognition and pricing.

4. Four Theoretical Lenses

There is not one single theory for sustainable finance. Table 1 presents four lenses and their respective explanations of why capital moves and what it is for.

Table 1. Theoretical lenses in sustainable finance

Lens	Core proposition	Representative evidence	Main limitation
Risk-based	Climate and transition risks are financial risks that should be priced	Bolton & Kacperczyk (2023); Battiston et al. (2017)	Prices reflect risk only if disclosure is reliable
Preference-based	Investors derive non-pecuniary utility from green holdings and accept lower returns	Pástor et al. (2021); Pedersen et al. (2021)	Realised returns can diverge from expected returns
Impact-based	Finance should change firm behaviour and real outcomes	Flammer (2021); Kölbel et al. (2020)	Additionality is hard to demonstrate

Information-based	Sustainability data reduce asymmetry and improve allocation	Berg et al. (2022); Christensen et al. (2022)	Ratings diverge and are noisy

4.1. The risk-based lens

The risk-based lens views sustainability as an input for regular valuations of assets. The climate change represents systemic and idiosyncratic risk and prices need to adjust as risk information is received. This is consistent with evidence of a carbon premium (Battiston et al., 2017; Bolton & Kacperczyk, 2023). This implies that sustainable investing can be aligned with profit maximisation when risk is appropriately measured.

4.2. The preference-based lens

The preference-based lens is based on the premise that some investors are satisfied with owning green assets and avoiding brown ones. The expected returns of green assets are lower than those of brown assets in such equilibrium models: Investors willing to pay more for green assets, the same logic applies to brown assets (expected returns are higher), and green assets may still outperform during periods of unexpected strengthening of climate concerns (Pástor et al., 2021). A closely related model demonstrates that investors that invest with ESG in mind will lean towards high-ESG companies, resulting in creation of an ESG-efficient frontier that balances Sharpe ratio with ESG score (Pedersen et al., 2021). An important finding is that a green return that is high in a particular period can be due to increased demand for the asset in this period, not to increased returns in subsequent periods (Pástor et al., 2022).

4.3. The impact-based lens

The impact-based lens questions: Does finance shape business behaviour? There are three ways of impact: via shareholder engagement, via capital allocation reducing the cost of capital for sustainable companies, and via indirect market signals (Kölbel et al., 2020). Experimental evidence points to investors also valuing impact, with investors willingness to pay for the social impact of their investment increasing, but not in a linear manner with the extent of social impact generated (Heeb et al., 2023). This leads to questionings about the ability of market signals to direct capital to the best projects.

4.4. The information-based lens

The information-based lens is concerned with information. Measurable indicators are necessary in sustainable finance, but the various providers of ESG ratings have fundamentally different ratings. Berg et al. (2022) find an overall correlation of just 0.54 between six major raters, and believe the differences are mainly due to the measurement and not the scope/weighting. Disagreement is costly. Higher ESG disagreement is correlated with higher return volatility and larger forecast dispersion (Christensen et al., 2022), while return volatility to Stock returns appears to have a risk premium for rating disagreement (Gibson Brandon et al., 2021). This way of thinking, the real limitation of sustainable finance is not capital but credible information.

5. Discussion: Credibility, Greenwashing and Additionality

Combining the lenses yields four central conclusions about credibility.

First, sustainability labels don't ensure sustainability results. Labelled instruments can be a sign of commitment, but if there is evidence of post-issuance improvement, like Flammer suggests (2021), then the signal is credible only if there are consequences for not delivering and there is verification and reporting. The presence of these is absent and the label can be used for marketing purposes, which is the primary focus on the greenwashing concern.

Second, the causal claim is important. An investor who is risk averse requires correct risk measurement but not a change in firm behaviour. An impact investor must have additivity, that is, results that would not have been achieved without the investment. In practice these objectives are frequently misinterpreted: funds claiming to have an impact but working on a risk and return basis. The field would be served by a more focused and more transparent investment strategy – one that addresses material, long-term value drivers – rather than its own dedicated ESG bucket, as proposed by Edmans (2023).

Thirdly, measurement is the limiting factor. Noisy ratings lead to distorted prices and allocation. A consistent methodology, assurance and disclosure framework would then benefit all four lenses. Although the development of international disclosure standards is a crucial step, implementation will differ between jurisdictions (IFRS Foundation, 2023).

Fourth, time horizons should be made explicit. The benefits of sustainability are realized over time, but fund managers are assessed on a quarterly basis and company executives are rewarded annually based on results. This imbalance reduces the motivation to set a price for long-term risks and to incentivize projects that take a long time to pay off, like grid modernization or decarbonizing industry. Long-term horizons, such as long-term ownership, sustainable compensation and patient public capital, complement good data, too. Even risks measured with a razor-thin precision can be underweighted without them.

6. Implications for emerging economies

These challenges are unique among emerging economies. They may require significant amounts of long-term, large-scale funding for energy transition, infrastructure and adaptation, but also have shallower bond markets, less data infrastructure and are more vulnerable to physical climate risk. In countries like India, sustainable finance also has the potential for domestic and international financing, but it requires credible reporting by listed companies, green and transition instruments, and not a heavy compliance burden that will exclude small companies. The research base on the functioning of sustainable finance is still limited in these contexts, and this is an area of priority.

7. Propositions for Future Research

The framework outlines a number of propositions that could be tested. P1: The carbon premium will be less strong where emissions disclosure is unreliable, as investors won't be able to price what they don't observe. P2: green bond issuers that have external verification and report on the use of proceeds will exhibit greater environmental improvement post issuance than those that do not. P3: Investors who employ

engagement, rather than exclusion, will produce more measurable change at the firm level. P4: Reducing the rating disagreement (such as with a common denominator on disclosure) will reduce the volatility of returns and the differences in valuation between high and low ESG firms. Careful identification strategies, such as regulatory changes to create natural experiments, are needed to test these propositions.

8. Practical Implications

The framework suggests that for investors, the objective of the investment must be explicitly communicated, risk management must be considered, the satisfaction of preferences or impact must be taken into account and the choice of the instruments and of the metrics must be aligned. A single rating should be treated with some caution as rater ratings can vary. In the corporate world, credible sustainability finance demands alignment of finance mechanisms with measurable and audited targets and clear and honest reporting on progress and challenges. The goal for regulators is similar: assurance of disclosure and clear taxonomies, with labelled markets monitored to stop greenwashing. The key for researchers is that they have to distinguish between risk, preference and impact narratives and not assume positive ESG outcomes mean positive answers to all three of these questions.

9. Conclusion

Sustainable finance can best be viewed as a set of mechanisms and not a category. Through risk pricing, capital allocation and stewardship, policy, preferences and physical risk can drive outcomes in capital markets and the real economy. Four lenses, risk, preference, impact and information, describe aspects of the evidence and each have their own limitations. The current research indicates sustainable finance can help build a more resilient and sustainable economy – provided that measurement is reliable, claims are precise and incentives drive real change. The importance of enhancing these foundations is greater than increasing the number of products labelled.

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